

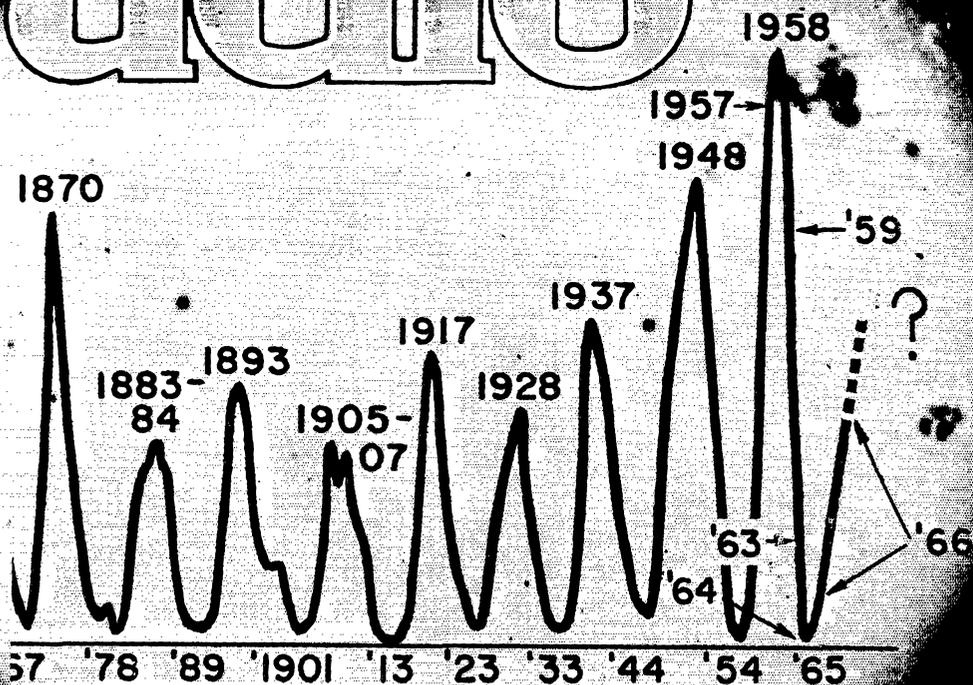
# QST

December 1966

60 Cents

devoted entirely to

# amateur radio





# Hallicrafters advanced technology brings you a new breed of amateur equipment



## SX-146 Receiver

This is an amateur band receiver of advanced design employing a single conversion signal path and pre-mixed oscillator chain to assure high order frequency stability and freedom from adjacent channel cross-modulation products. The SX-146 employs a high frequency quartz crystal filter and has provision for installation of two more crystal filters. The receiver may also be used from 2 to 30 mc, with the exception of a narrow gap at 9.0 mc, with the connection of auxiliary oscillators. The highly stable conversion oscillator chain may be used for transceiver operation of the matching HT-46 transmitter.

**FREQUENCY BANDS:** 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0 mc (28.0 to 28.5, 29.0 to 30.0 requires extra crystals at users option).

**SENSITIVITY:** Better than 1  $\mu$ v for 20 db S/N.

**TUBES AND FUNCTIONS:** 6JD6 RF amplifier; 12AT7 Signal mixer and cathode follower; 6AU6A 9 mc IF amplifier; 12AT7 AM detector—AVC rectifier—product detector; 12AT7 USB—LSB crystal oscillators; 6GW8 Audio amplifier and audio output; 6BA6 Variable frequency oscillator; 6EA8 Crystal heterodyne oscillator and pre-mixer; Plus diode power supply rectifier, ANL diode and AVC gates diode; \*6AU6A—100 kc crystal calibrator oscillator; \*Harmonic generator diode.

**PHYSICAL DATA:** Size: 5 $\frac{7}{8}$ " x 13 $\frac{1}{8}$ " x 11". Shipping wt., 20 lbs.

**FRONT PANEL CONTROLS:** Frequency: Power off CW—upper-lower and AM; Audio gain; Band selector—3.5, 7.0, 14, 21.0, 28.0, 28.5, 29.0, 29.5; Selectivity—0.5, 2.1, 5.0 kc (0.5 and 5.0 kc filters optional extra); Pre-selector; RF gain; AVC on-off; Cal. on-off; ANL on-off; Phone set jack; S-meter.

**REAR CHASSIS:** S-meter zero adjust; Internal-External oscillator switch; Slave oscillator output; External oscillator input; Antenna socket; Speaker, ground and mute terminals; Grounding stud; AC power cord.

**POWER REQ.:** 105/125 volt—50/60 cycle AC—55 watts.

**I-F SELECTIVITY:** Uses a 6-pole crystal filter to obtain a nose-to-skirt ratio better than 1 to 1.8.

Amateur net, \$269.95

Model HA-19 plug-in, 100-kc quartz calibrator available as accessory. Amateur net, \$19.95

\*Part of HA-19 calibrator.

## HT-46 5-band transmitter

All new from the ground up! Here's the "new breed" transmitter that matches your SX-146 . . . works independently or may be interconnected for transceiver operation.

**FEATURES:** 180 watts PEP input on SSB; 140 watts on CW; Frequency control independent or slaved to SX-146 receiver; Upper or lower sideband via 9 mc quartz filter; Built-in power supply; Press-to-talk or optional plug-in VOX; grid block for keying for CW.

**FREQUENCY COVERAGE:** 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 mc and 28-30 mc in four 500-kc steps. Crystal supplied for 28.5-29.0 mc coverage. Other plug-in crystals at user's option.

**TUBES:** 6BA6 VFO; 6EA8 Heterodyne crystal oscillator and mixer; 12AT7 Carrier oscillator-third audio; 12AT7 Mic amplifier; 6EA8 9 mc I-F amplifier and AALC; 6AH6 Mixer; 12BY7 Driver; 6HF5 Power amplifier; 0A2 Reg.

**FRONT PANEL CONTROLS:** Frequency Tuning; Operation-Off, Standby, USB, LSB, CW-Tune, Standby LSB USB; Microphone gain; Driver tune; Carrier level; Band selector; Final tune; VFO selector—Transmitter-Receiver; Dial cal.; Calibrate Off-On; Meter MA-RFO.

**REAR APRON FUNCTIONS:** AC Cord; Ground lug; Fuse; Key jack; VOX accessory socket; Antenna jack; Receiver input (for transceiver); 11 pin control socket; bias adjust.

**PHYSICAL DATA:** Size: 5 $\frac{7}{8}$ " x 13 $\frac{1}{8}$ " x 11". Shipping wt., 26 $\frac{1}{2}$  lbs.

HA-16 Vox Adapter, \$37.95

Amateur net, \$349.95

R-51 Speaker,

4 x 6 inch oval speaker and attractive 24 hour clock.  
amateur net \$34.95

*"Quality through  
Craftsmanship"*



**hallicrafters**

Fifth and Kostner Aves., Chicago, Illinois 60624  
Export: International Division

Available in Canada from Gould Sales Co.

God Jul  
Feliz Navidad  
Fröhliche Weihnachten  
Joyeux Noël  
Merry Christmas!



Across horizons—to all corners of the earth—the wish goes out in many tongues as radio amateurs exchange friendly holiday greetings.

To this worldwide fraternity with its honored reputation for service to others, Collins would like to send its good wishes for a joyful season.



**STAFF**

JOHN HUNTOON, W1VQ  
*Editor*

E. LAIRD CAMPBELL, W1CUT  
*Managing Editor*

GEORGE GRAMMER, W1DF  
*Technical Editor*

DONALD H. MIX, W1TS  
BYRON GOODMAN, W1DX  
DOUG DE MAW, W1CER  
*Assistant Technical Editors*

EDWARD P. TILTON, W1HDO  
*V.H.F. Editor*

LEWIS G. McCOY, W1ICP  
*Beginner and Novice*

WALTER F. LANGE, W1YDS  
*Hints and Kinks*

ROD NEWKIRK, W9BRD  
SAM HARRIS, W1FZI  
HELEN HARRIS, W1HOY  
LOUISE RAMSEY MOREAU,  
W6BBO  
JOHN TROSTER, W6ISQ  
*Contributing Editors*

MARJORIE B. FORAN  
*Editorial Assistant*

LORENTZ A. MORROW, W1VIG  
*Advertising Manager*

EDGAR D. COLLINS  
*Advertising Assistant*

I. A. MOSKEY, W1JMY  
*Circulation Manager*

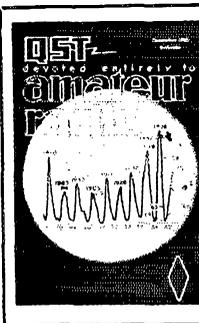
R. J. RINALDI, W1CNY  
*Assistant Circulation Manager*

**OFFICES**

225 Main Street  
Newington, Connecticut 06111  
Tel.: 203-666-1541

Subscription rate \$6.00 per year postpaid: \$6.50 in Canada; \$7.00 elsewhere. ARRL Membership, including *QST*, available only to individuals with a bona fide interest in amateur radio: \$5.00 per year; \$5.25 in Canada; \$6.00 elsewhere. Single copies, 60 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds. Second-class postage paid at Hartford, Conn. and at additional mailing offices. Copyright 1966 by the American Radio Relay League, Inc. Title registered at U. S. Patent Office. International copyright secured. All rights reserved. *Impreso reservados todos los derechos. Printed in U.S.A.*

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



**OUR COVER**

Man has re-recorded sunspot numbers for more than 200 years, but we still can only guess about the shape of the rising curve we're presently riding. How high will it go? Ask us about 1970!

# QST

**DECEMBER 1966**

VOLUME L NUMBER 12

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

## -CONTENTS-

**TECHNICAL —**

The Field-Effect Transistor as a Stable V.F.O. Element <i>G. D. Hanchett, W2YM</i>	11
Low-Loss Coax..... <i>Freeman F. Desmond and Richard Tuttle, W1QMR</i>	15
Transceiver Modifications for the Heath SB-300/SB-400 Combination <i>William M. Brelsford, K2INO/K3FXJ</i>	21
A Passive Limiter..... <i>George Schleicher, W9NLT</i>	22
A 50-Watt Universal Modulator <i>Doug DeMaw, W1CER</i>	25
Evolution of a Grounded-Grid Amplifier <i>Wayne W. Cooper, K4ZZV/W6EWC</i>	29
Gimmicks and Gadgets: A V.H.F. Lazy-H Antenna.....	34
Break-In Monitoring with the HA-1 <i>Doyle D. Thompson, W4PLL</i>	35
More Modifications For The Knight C-100 <i>Robert D. Streeter, W9IQI</i>	38
Recent Equipment: The Drake 2-C Receiver.....	40
The Drake 2-NT.....	42
Technical Correspondence.....	45

**BEGINNER AND NOVICE —**

The Selectoroid..... <i>Lewis G. McCoy, W1ICP</i>	18
---	----

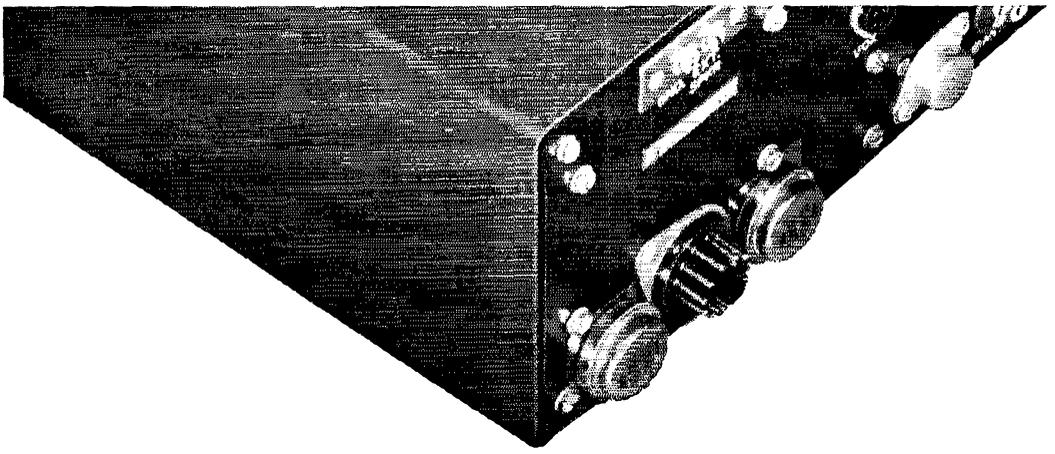
**OPERATING —**

ARRL DX Competition Rules for DX.....	14
20th V.H.F. Sweepstakes Announcement.....	61
September V.H.F. QSO Party Results <i>Ellen White, W1YYM</i>	62
Succeeding By Success.....	67

**GENERAL —**

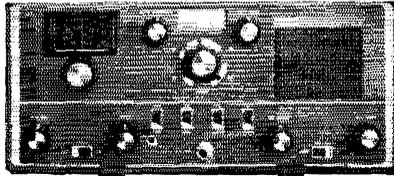
Hamquest 67.....	47
TVI is Still With Us..... <i>Frank M. Kratokvil, W3BA</i>	50
Red Wire To Post Three..... <i>Robert Holt, WA0MFF</i>	52
Station Design For DX..... <i>Paul D. Rockwell, W3AFM</i>	53
For Safety's Sake..... <i>H. W. Morgan, K0JTP</i>	56
What Wives Think About Ham Radio <i>Donald G. Ross, W2JMZ</i>	57
SJRA 50th Anniversary.....	71
QST Classic.....	80

ARPS.....	67	Index to Advertisers.....	168
ARRL CSL Bureau.....	134	"It Seems to Us".....	9
Coming Conventions.....	77	IARU News.....	74
Correspondence From Members.....	78	League Lines.....	10
DX QSL Bureau.....	75	Operating News.....	92
Feedback.....	77	Silent Keys.....	136
Hamfest Calendar.....	77	Station Activities.....	98
Happenings of the Month.....	72	World Above 50 Mc.....	84
Hints & Kinks.....	48	YL News and Views.....	82
How's DX.....	87	25 Years Ago in QST.....	83



# SBE

## has a corner on the market

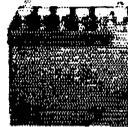


Extra value is right around the corner in every SB-34 transceiver in the form of a very special built-in power supply.

This power supply will operate with 117V AC input...



and equally well on 12V DC...



The supply is transistorized—has a heavy-duty power transformer. One changes input voltages merely by using the appropriate AC or DC-plug/cable set. Both are packed with every SB-34. (You see the input power plug and the two power transistors in the rear corner photograph of SB-34). This two-way power supply is standard, built-in equipment in every SB-34 and included in the price so that there is no need to look for such fine-

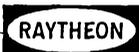
print statements as, "AC power supply extra" or, "Inverter for DC extra."

In SBE advertising one simple statement covers it all, "**Suggested price 395.00.**" When you unpack a sparkling new SB-34, 4-band transceiver you get a single compact unit that is ready to play . . . in your car . . . or at home. You need only a microphone, an antenna, a source of power and a keen desire to work the world on sideband.

In every SB-34 transceiver, extra value is right around the corner, performance is inherent.

Power input: 135W P.E.P. input. (Slightly lower on 15). Frequency range: 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc. 23 transistors, 18 diodes, 1-zener, 1 varactor, 2-6GB5's PA, 1-12DQ7 driver. Built-in speaker. Prewired receptacles on rear accept VOX and Calibrator—both units optionally available. Size: 5"H, 11¼"W, 10"D.

Write today for your copy of the new SBE four page brochure



RAYTHEON COMPANY

213 East Grand Avenue, South San Francisco, California 94080

Export sales: Raytheon Company, International Sales & Services, Lexington 73, Mass, U.S.A.

**A Christmas QSO to all the  
HAMS in this whole wide  
wonderful world**



A SUBSIDIARY OF



**AEROTRON**



**FM AND AM TWO-WAY RADIO • SSB AND ISB COMMUNICATIONS  
• CONTROLATOR FUEL CONTROL & DATA EQUIPMENT •  
AMECO HAM, CB AND SWL EQUIPMENT**

## Section Communications Managers of the ARRL Communications Department

**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired for inclusion in QST. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed OKS, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. P.A.M. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

ATLANTIC DIVISION			
Delaware	W3HC	John Thompson	1016 Parkside Drive
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.
Maryland D. C.	W3QA	Bruce Boyd	290 Bloomsburg Ave., Apt. 6-3
Southern New Jersey	W2ZL	Edward G. Raser	19 Blackwood Drive
Western New York	K2HUK	Charles T. Hansen	Warner Gulf Rd.
Western Pennsylvania	W3NEM	Robert E. Gawryla	1463 N. Allen St.
CENTRAL DIVISION			
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.
Indiana	K9IVG	Mrs. M. Roberta Arouhka	401 E. Portal Drive
Wisconsin	K9GSO	Kenneth A. Ebneter	822 Watoua Trail
DAKOTA DIVISION			
Minnesota	W0TCK	Herman R. Kopschke, Jr.	RFD 2
North Dakota	W0DDM	Harold L. Sheets	31 Healdt Ave.
South Dakota	K0TXW	Seward P. Holt	Box 58
DELTA DIVISION			
Arkansas	K5GKN	Don W. Whitney	1117 North Drive
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E
Mississippi	W5EMM	S. H. Hairston	2321-27th Ave.
Tennessee	W4UVP	William A. Scott	115 East Holston Ave.
GREAT LAKES DIVISION			
Kentucky	WA4KFO	Lawrence F. Jeffrey	1605 Antler Ave.
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road
Ohio	W8AL	Wilson E. Weckel	1317 Logan Ave., N.W.
HUDSON DIVISION			
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive
N. Y. C. & Long Island	K2IDB	Blaine S. Johnson	266 Cypress St.
Northern New Jersey*	W2LQP	Louis J. Amoroso	150 Pleasant Ave.
MIDWEST DIVISION			
Iowa	W0BDZ	Owen G. Hill	RFD 1
Kansas	K0BXF	Robert M. Summers	3045 North 72nd.
Missouri	W0TFK	Alfred E. Schwaneke	Edgar Star Rte
Nebraska	W0GGP	Frank Allen	Box 272
NEW ENGLAND DIVISION			
Connecticut	W1GVT	John J. McNassor	218 Berlin Ave.
Eastern Massachusetts	W1ALP	Frauk L. Baker, Jr.	85 Solar Ave.
Maine	K1DYG	Herbert A. Davis	RFD 1
New Hampshire	W1SWX	Robert Mitchell	Box 137-A, RFD
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.
Vermont	K1MFP	E. Reginald Murray	3 Hillcrest Drive
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.
NORTHWESTERN DIVISION			
Alaska*	KL7DG	John P. Trent	2429 Maple Ave.
Idaho	W7ZNN	Donald A. Crisp	3727-14th St.
Montana	W7TYN	Joseph A. D'Arcy	1916 Huglin Ave.
Oregon	W7AJN	Everett E. Young	3274 S.E. 116th Ave.
Washington	W7HAMQ	Everett E. Young	2217 Fifth St., S.E.
PACIFIC DIVISION			
East Bay	K6LRN	Richard Wilson	107 Cordova Way
Hawaii	KH6BZF	Lee R. Wical	45-601 Luku Rd.
Nevada	W7PBV	Leonard M. Norman	652 Utah St.
Sacramento Valley	W6AJDT	John F. Minke, III	6230 Rio Bonito Drive
San Francisco	W6AUD	Hugh Cassidy	77 Coleman Drive
San Joaquin Valley	W6JHU	Ralph Saroyan	6204 E. Townsend Ave.
Santa Clara Valley	W6ZBJ	Jean A. Gmein	10835 Willowbrook Way
ROANOKE DIVISION			
North Carolina	W4BNU	Barnett S. Dodd	420 West Franklin St.
South Carolina	K4LNI	Clark M. Hubbard	124 Fant Lane
Virginia	W4BJL	H. J. Hopkins	8600 Hammett Ave.
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane
ROCKY MOUNTAIN DIVISION			
Colorado	K0TTB	Donald Ray Crumpton	P.O. Box 223
New Mexico	W4SFLG	Bill Farley	1306 Spruce
Utah	W7VSS	Gerald P. Warner	4765 South 275 West
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.
SOUTHEASTERN DIVISION			
Alabama	K4VHV	Edward L. Stone	1806 Spring Ave., S.W.
Canal Zone	KZ5TT	Mrs. Lillian C. Smith	P.O. Box 191
Eastern Florida	K4SJI	A. L. Hamel	220 N.E. 25th St.
Georgia	W4RZL	Howard L. Schonher	P.O. Box 1902
West Indies (F.R.-V.I.)	KP4DV	Albert R. Crumley, Jr.	P.O. Box 10073
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.
SOUTHWESTERN DIVISION			
Arizona	W7FKK	Floyd C. Colyar	341 West Pierson St.
Los Angeles	W6BHG	H. C. Gorman	3732 Chatswin Ave.
Orange	W6DEY	Roy R. Maxson	1434 South Olive St.
San Diego	W6LRU	Don Stansifer	4427 Pescadero
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court
WEST GULF DIVISION			
Northern Texas	W5BNG	L. L. Harbin	4515 Calmount
Oklahoma	K5CAY	Daniel B. Prater	1401 E. Oklahoma Ave.
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskridge St.
CANADIAN DIVISION			
Alberta	VE6TG	Harry Harrold	1834-5th Ave. N.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.
Manitoba	VE4FT	John Thomas Stacey	19 Cottonwood Cres.
Maritime	VE1MX	J. Harley Grimmer	40 1/2 Rosebud Ave.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.
Quebec	VE2OJ	Jim Ihey	209 Brookdale Ave.
Saskatchewan	VE5QQ	Mel Mills	P.O. Box 801
			1834-5th Ave. N.
			4553 West 12th Ave.
			19 Cottonwood Cres.
			40 1/2 Rosebud Ave.
			170 Norton Ave.
			209 Brookdale Ave.
			P.O. Box 801
			Wilmington 19803
			Panama 18252
			Baltimore, Md. 21228
			Wilburta Gardens,
			Trenton 08628
			Holland 14080
			State College 16801
			Springfield 62703
			Meligan City 46361
			Portage 53901
			Janesville 56048
			Grand Forks 58201
			Clear Lake 57226
			(P.O. Box 311), Osceola 72370
			Covington 70433
			Meridian 39303
			Johnson City 37601
			Owensboro 42301
			Detroit 48240
			Canton 44703
			Schenectady 12309
			Massapequa Park, L. I. 11762
			Bergenfield 07621
			Glenn 50106
			Bethel 66009
			Kolla 65401
			Gering 69341
			Southington 06489
			Braintree 02185
			Portland 04634
			Chester 03036
			Pawtucket 02860
			Montpelier 05601
			Westfield 01085
			Anchorage 99504
			Lewiston 83501
			Anacounda 59711
			Portland 97265
			Puyallup 98371
			Concord 94521
			Kaneohe 96744
			Boulder City 89005
			Carmichael 95608
			San Rafael 94901
			Fresno 93702
			Cupertino 95014
			Hallsbury 28144
			Union 20379
			Norfolk 23503
			Fairmont 26554
			Alamosa 81101
			Alamogordo 88310
			Ogden, 84401
			Casper 82601
			Decatur 35601
			Baldon
			Pompano Beach 33064
			Columbus 31902
			Caparra Heights
			San Juan, P.R. 00922
			Fort Walton Beach 32548
			Phoenix 85017
			Long Beach 90808
			Santa Ana 92707
			San Diego 92107
			Thousand Oaks 91360
			Fort Worth 76107
			Enid 73701
			Houston 77023
			Lethbridge, Alta.
			Vancouver 8, B. C.
			Brandon
			Fairview, Halifax Co., N. S.
			Willowdale, Toronto, Ont.
			Dorval, P. Q.
			Saskatoon

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

# NEW from International

## SINGLE SIDEBAND 9mc EXCITER-DRIVER 50-54mc MIXER-AMPLIFIER

The SBX-9 Exciter-Driver and the SBA-50 Mixer-Amplifier provide the perfect combination for 50-54mc SSB operation. Performance, versatility and reliability are incorporated into this new SSB pair. A tremendous value at a low price!



### Model SBX-9

#### SPECIFICATIONS:

Exciter-Driver 9mc

Tubes: 6BH6 Oscillator  
12AX7 Audio

7360 Bal Modulator  
6BA6 RF Amplifier

Filter: Four crystal half lattice  
Carrier Suppression 45db min.  
Unwanted SB Atten. 40db min.

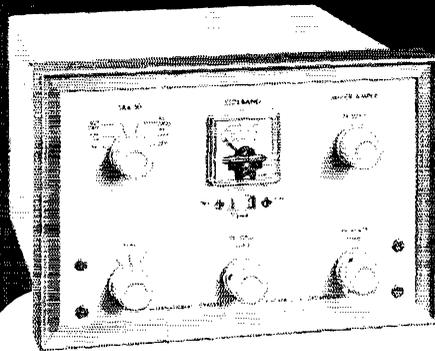
Output: Provides voltage drive for  
mixer such as SBA-50

Controls: Carrier Balance  
Microphone Gain  
Test Switch  
USB-LSB Switch

Metering: RF output for balance  
adjust. Two sensitivity  
ranges available with  
front panel switch.

Misc: Relay included for push-to-talk  
operation. Crystals for upper  
and lower sideband included.  
Requires high impedance microphone.  
For operation on 117 vac 60 cycle power.  
**\$125.00**

Order direct from  
International Crystal Mfg. Co.



### Model SBA-50

#### SPECIFICATIONS:

Mixer-Amplifier 50-54mc

Tubes: 6U8A Oscillator-Mixer  
12BY7A Amplifier

Drive: Requires 9mc sideband signal  
from SBX-9

Output: SSB single tone 10 watts  
Controls: On-Off Power  
PA Grid Tune  
PA Plate Tune  
PA Load Tune  
Metering Switch

Metering: Oscillator  
9mc Drive  
Buffer Grid  
PA Grid  
RF Out

Crystals: Three positions, uses 3rd  
overtone 41-45mc range.  
Crystal frequency = final  
frequency — 9mc

Misc: Accessory socket provided for  
connecting keying circuit to  
SBX-9. Comes with three crystals.  
Specify frequency when ordering.  
For operation on 117 vac 60 cycle power.  
**\$145.00**



**CRYSTAL MFG. CO., INC.**

18 NO. LEE • OKLA. CITY, OKLA. 73102

# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



## Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914-1936  
EUGENE C. WOODRUFF, W8CMP, 1936-1940  
GEORGE W. BAILEY, W2KH, 1940-1952  
GOODWIN L. DOSLAND, W0TSN, 1952-1962  
HERBERT HOOVER, JR. W6ZH, 1962-1966

## Officers

President . . . . . ROBERT W. DENNISTON, W0NWX  
Box 73, Newton, Iowa 50208

First Vice-President . . . . . WAYLAND M. GROVES, W5NW  
1406 West 12th Street, Odessa, Texas 79760

Vice-Presidents . . . . . CHARLES G. COMPTON, W0BUO  
GILBERT L. CROSSLEY, W3YA

Secretary . . . . . JOHN HUNTOON, W1LVQ

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

Honorary Vice-Presidents . . . . . ALEX REID, VE2BE  
FRANCIS E. HANDY, W1BDI

General Manager . . . . . JOHN HUNTOON, W1LVQ

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

Technical Director . . . . . GEORGE GRAMMER, W1DF

Assistant General Manager . . . . . RICHARD L. BALDWIN, W1IKE

Assistant Secretaries . . . . . PERRY F. WILLIAMS, W1UED  
WILLIAM SMITH, K0CER

225 Main St., Newington, Connecticut 06111

General Counsel . . . . . ROBERT M. BOOTH, JR., W3PS  
1100 Vermont Avenue, N. W., Washington, D. C. 20005

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

## DIRECTORS

### Canada

NOEL B. EATON . . . . . VE3CJ  
R. R. 3 Burlington, Ontario

Vice-Director: Colin C. Dumbrie . . . . . VE2BK  
116 Oak Ridge Drive, Bale d'Urfe, Quebec

### Atlantic Division

GILBERT L. CROSSLEY . . . . . W3YA  
734 West Foster Avenue, State College, Pa. 16801

Vice-Director: Jesse Bleherman . . . . . W3KT  
R1 D Valley Road, Malvern, Pa. 19355

### Central Division

PHILIP F. HALLER . . . . . W9HPG  
8000 S. Tripp Ave., Chicago, Ill. 60629

Vice-Director: Edmond A. Metzger . . . . . W9PRN  
1520 South Fourth St., Springfield, Illinois 62703

### Dakota Division

CHARLES G. COMPTON . . . . . W0BUO  
1011 Fairmount Ave., St. Paul, Minn. 55105

Vice-Director:

### Delta Division

PHILIP P. SPENCER . . . . . W5LDH/W5LXX  
29 Snipe St., Lake Vista, New Orleans, La. 70124

Vice-Director: Max Arnold . . . . . W4WHN  
612 Hogan Road, Nashville, Tenn. 37220

### Great Lakes Division

DANA E. CARTWRIGHT . . . . . W8UPB  
2970 Observatory Ave., Cincinnati, Ohio 45208

Vice-Director: Charles C. Miller . . . . . W8J8U  
4572 Calvin Drive, Columbus, Ohio 43227

### Hudson Division

HARRY J. DANNALS . . . . . W2TUK  
RFD 1, Arbor Lane, Dix Hills, Huntington,  
N. Y. 11743

Vice-Director: Stan Zak . . . . . K28JO  
13 Jennifer Lane, Port Chester, New York 10573

### Midwest Division

SUMNER H. FOSTER . . . . . W0GQ  
2110 Goblin's Gully Dr., S.E., Cedar Rapids, Iowa  
52403

Vice-Director:

### New England Division

ROBERT YORK CHAPMAN . . . . . W1QV  
28 South Road, Groton, Conn. 06340

Vice-Director: Bigelow Green . . . . . W1EAE  
11 Law's Brook Rd., South Acton, Mass. 01771

### Northwestern Division

ROBERT B. THURSTON . . . . . W7PGY  
7700 31st Ave. N.E., Seattle, Wash. 98115

Vice-Director: R. Rex Roberts . . . . . W7CPY  
537 Park Hill Drive, Billings, Mont. 59102

### Pacific Division

HARRY M. ENGWICHT . . . . . W6HC  
770 Chapman, San Jose, Calif. 95126

Vice-Director: Ronald G. Martin . . . . . W6ZF  
1573 Baywood Lane, Napa, Calif. 94558

### Roanoke Division

P. LANIER ANDERSON, JR. . . . . W4MWH  
428 Maple Lane, Danville, Va. 24541

Vice-Director: Joseph F. Abernethy . . . . . W4AEK  
764 Colonial Drive, Rock Hill, S.C. 29730

### Rocky Mountain Division

CARL L. SMITH . . . . . W0BWJ  
1070 Locust St., Denver, Colo. 80220

Vice-Director: John H. Sampson, Jr. . . . . W7OCX  
3618 Mount Ogden Drive, Ogden, Utah 84403

### Southeastern Division

CHARLES J. BOLVIN . . . . . W4LVV  
2210 S.W. 27th Lane, Miami, Fla. 33133

Vice-Director: Albert L. Hamel . . . . . K48JH  
220 N.E. 25th Street, Pompano Beach, Fla. 33064

### Southwestern Division

HOWARD F. SHEPHERD, JR. . . . . W6QJW  
127 South Citrus Avenue, Los Angeles, Calif. 90036

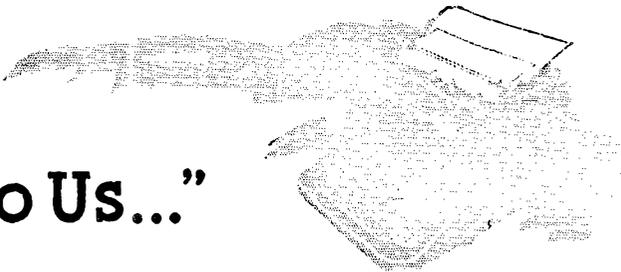
Vice-Director: John P. Martin . . . . . W6ECP  
1135 Great Drive, Encinitas, Calif. 92024

### West Gulf Division

ROEMER O. BEST . . . . . W5QKF  
P.O. Box 1656, Corpus Christi, Texas 78401

Vice-Director: Ray K. Bryan . . . . . W5UYQ  
2117 S.W. 61st Terrace, Oklahoma City, Okla.  
73159

# "It Seems to Us..."



## NEW OPERATING MANUAL

THE League's family of publications has a new addition — with the appearance this month of the long-awaited *Radio Amateur's Operating Manual*.

Except for "beginners" items (e.g., code book and license manual), ARRL's handbook and manuals have been principally in the technical field. The new arrival, therefore, is a departure from past practice in that it is the first product, specifically for sale, in the operating area.

Not that there has been a void of material treating operating matters. On the contrary, our Communications Department has been prolific in preparing informational and working materials to assist station operating activities. But in the past, the League has distributed almost all operating data free of charge on an individual request basis. An emergency communications manual. An assortment of operating aid cards and leaflets covering phonetics, RST, GMT conversion, countries list, etc. A RACES pamphlet. A brochure on National Traffic System organization. And the old standby, *Operating an Amateur Radio Station*, sent free (despite its nominal cover price of 25 cents) to hundreds of thousands of amateurs and prospects, including one to each new licensee.

Now the essence of these and related materials has been gathered, plus some additional areas of coverage, into the new volume. The goal of this manual is to provide between two covers a guide for operating in all modes of transmission and in all forms of amateur interest, including contests, ragchewing, emergency nets — the whole bit. To achieve a complete "grass roots" approach — and, not incidentally, to avoid additional burdens on an already-busy Hq. — the job was done outside the staff. The author is George Thurston, W4MLE, long-time SEC of Western Florida and earlier the co-author (with W4IYT) of an excellent manual on state-wide emergency amateur communications.

Professionally a journalist, W4MLE consulted at length with numerous specialists in the fields of RTTY, c.w., phone, DX, RACES, AREC, NTS, to provide broad coverage with

authoritative as well as helpful data. That we hams are pretty much individualists with strong convictions was again apparent in differing viewpoints — even from the "experts" — on procedures as well as policies. It was, indeed, resolving such matters which delayed the manual well beyond its expected appearance.

Even now, no one will claim that the result is Utopian. It is the first attempt, and future editions can be improved with your help. Put a copy on your operating table. Let us (or W4MLE) know of any instances where you find the material short of the mark, or lacking in some area of coverage. We'll appreciate it, and so will future purchasers. More important, it will help raise the general level of operating competency if we all pitch in to make it really a group project with the manual a composite of the efforts of all of us.

Because a book of this nature is a service to amateur radio to an extent even greater than other ARRL manuals, it has been priced at a low figure to obtain widespread distribution. It's a good buy. Betcha a buck you'll think so too!

## RACES

Some personnel primarily active in the Radio Amateur Civil Emergency Service have been concerned — a few even incensed — at the ARRL Board's action last May in putting RACES activity under the ARPSC banner along with AREC and NTS. They are fearful that this action was an attempt to "take over" or some other manner interfere with the RACES organizational structure. There is no substance to this view.

RACES is basically an amateur activity — licensed to, organized by, and manned largely by hams. It is an integral part of the amateur performance in the "public interest, convenience and necessity." The Board's action was simply to grant more formal recognition to this fact, and to show continuing support of e.d. through closer liaison with RACES. As with the combining of AREC/NTS recently, basic activity continues as before, but now with even closer cooperation between the three groups.

QST

## League Lines . . .

HamQuest 67 is rolling along with growth in both club and League membership. See page 47 for details; then make sure your club is participating. What? You're not a club member and know of no group in the area? Write us for a kit of info on how to organize a ham club.

In addition to the regular RTTY bulletin, WIAW now has an extra transmission each Wednesday evening (0000 GMT Thursdays) first with 170-cycle shift to assist those using or intending to use narrow-shift techniques, then repeated with the standard 850-cycle shift.

Sorry, DXers, but a heavy workload plus staff illness prevented our making the deadline for this issue with the DXCC Honor Roll and complete current membership list. Next month for sure.

An anti-League amateur who prefers to believe his hero's malicious rumor that ARRL lost 14,000 members last year "dares" us to print the true figure. If he would (could?) read, he'd find we did--on page 41 of the March issue. It reported a loss of 680 Full Members in 1965, eight-tenths of one percent.

QSL de WWV! A first-day QSL will be sent amateurs reporting reception of initial Bureau of Standards time and frequency transmissions from the new location at Fort Collins, Colorado. December 1 at 0000 GMT marks the changeover--that's the evening of November 30 here. See page 53 November QST for details.

We were pleasantly surprised to find a BuStans survey indicating that amateurs comprise 35% of the users of WWV time/frequency/propagation services. A complete story is now in the works, aimed at January QST, on the station setup and operations, authored by Yardley Beers, W0EXS, Chief of the Radio Standards Physics Division.

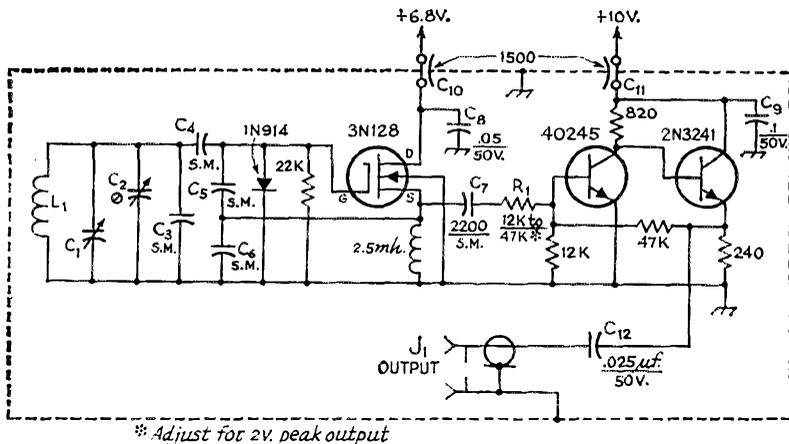
A new 20-kw. self-starting emergency power supply has been installed at WIAW, replacing the 25-year-old hand-cranked units. This will insure continuity of full station operation in the event of power failure. Test runs are made weekly to keep the equipment in top condition.

MARS and ARRL have agreed on a series of standard message texts, supplementing the ARRL numbered texts, principally to facilitate morale traffic from Viet Nam. See page 92 for the new "MTX" texts in case one shows up on your local net.

With the Christmas traffic, hard-working net managers and control stations would appreciate additional stations reporting in to section nets. If you're new to traffic work, just listen in for a session or two until you can grasp the procedures in use. And say--there's lots of good publicity for ham radio in delivery of a Christmas message from a G.I. or student a long way from home.

And speaking of Christmas, may yours be a happy one! Season's greetings from the crew at Headquarters.





\* Adjust for 2v. peak output

Fig. 1—Circuit diagram of the variable-frequency oscillator and buffer. Except as indicated, capacitances are in pf. ( $\mu\text{mf.}$ ). Resistances are in ohms ( $K = 1000$ ); resistors are  $\frac{1}{2}$ -watt composition.

- C<sub>1</sub>—Double-bearing variable (Millen 23100 or 23050—see table below).
- C<sub>2</sub>—25-pf. air trimmer (Hammarlund APC-25 or equivalent).
- C<sub>3</sub>, C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>—Silver mica; see table below for values.
- C<sub>7</sub>—2200-pf. silver mica
- C<sub>8</sub>, C<sub>9</sub>, C<sub>12</sub>—Ceramic disk.
- C<sub>10</sub>, C<sub>11</sub>—Feedthrough type.
- J<sub>1</sub>—Coaxial connector, chassis mounting.
- L<sub>1</sub>—See table below.
- R<sub>1</sub>—12,000 to 47,000 ohms; select for 2-volt peak output level at input to transmitter.
- RFC<sub>1</sub>—Miniature 2.5-mh. r.f. choke, iron core (Millen J300-2500).

### Mechanical Details

Like the vacuum-tube unit, the MOS v.f.o. requires great care in the mounting of the oscillator components. The complete v.f.o. is housed in a  $4 \times 5 \times 6$ -inch aluminum utility box. The MOS oscillator, less its tuned circuits, is mounted on an H. H. Smith No. 1070 terminal strip, as shown in the bottom view. The two-stage amplifier is mounted on a similar strip. Power is carried to the closed unit by means of 1500-pf. feedthrough capacitors mounted at the rear of the utility box along with the 25-pf. frequency-setting capacitor. The tuning capacitor should be a high-quality, two-bearing type; in this particular oscillator, a Millen 23100 MKF was used.

Maximum rigidity of the oscillator circuit is obtained by the use of a special bracket formed from one of the utility box covers. The box cover material is soft aluminum and can be bent easily with the aid of wood blocks and a vise. Hardwood blocks and a hammer are used to make

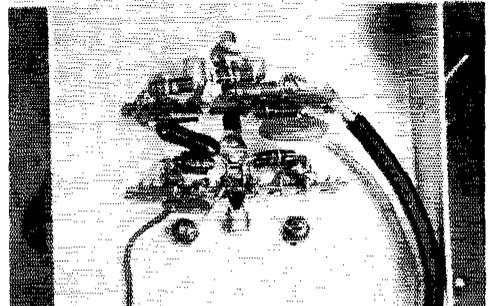
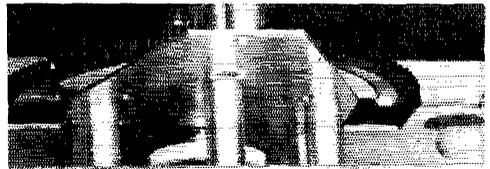
### Tuned-Circuit Data

	3.5-4.0 Mc.	5.0-5.5 Mc.	8.0-9.0 Mc.
L <sub>1</sub> — No. of turns	17*	14 $\frac{3}{4}$ *	11 $\frac{1}{2}$ **
Wire size	20	20	18
Turns/inch	16	16	8
Diam., inches	1	1	1
C <sub>1</sub> , pf.	100	50	50
C <sub>2</sub> , pf.	25	25	25
C <sub>3</sub> , pf.	100	None	None
C <sub>4</sub> , pf.	390	390	270
C <sub>5</sub> , pf.	680	680	560
C <sub>6</sub> , pf.	680	680	560

\* B & W 3015, Polycoils 1748, AirDux 816T.

\*\* B & W 3014, Polycoils 1746, AirDux 808T.

Oscillator and buffer components are mounted on two tie-point strips underneath the tuned circuit. The lower strip supports the oscillator components, with the 3N128 projecting downward from the center of the strip in this view. The upper strip is for the two-stage buffer; in this case the transistors project upward on either side of the mounting screw. The short length of coax cable runs to the connector on the rear of the shield box.



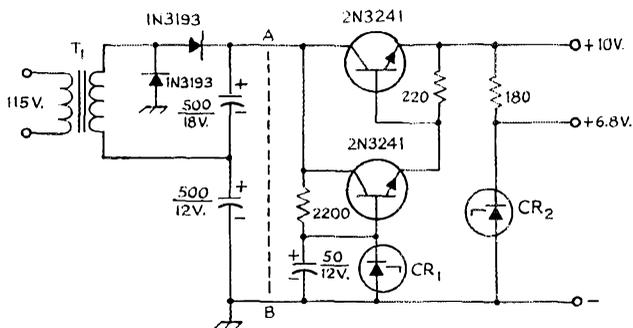


Fig. 2—Circuit of regulated power supply for the FET v.f.o. Capacitances are in  $\mu\text{f}$ , capacitors are electrolytic. Resistors are  $\frac{1}{2}$ -watt. For mobile use, a 12-volt car battery may be substituted for rectifier/filter supply to the left of line AB.

CR<sub>1</sub>—10-volt 1-watt Zener diode.  
 CR<sub>2</sub>—6.8-volt 1-watt Zener diode.  
 T<sub>1</sub>—6.3-volt 1.2-amp. filament transformer.

the bends square and sharp. When bolted securely to the front and back of the oscillator box, the bracket not only supports the circuit components but helps stiffen the box itself.

To facilitate mounting the variable capacitor, the holes for the mounting feet are slotted. In addition, during assembly the shaft nut and mounting spacers are tightened to the side of the box first, and then the 6-32 screws for the feet are tightened. Special clamps designed to hold the coil are cut from thin lucite or polystyrene in strips  $\frac{1}{4}$  inch wide and  $2\frac{1}{2}$  inches long. Holes are drilled at both ends of each strip so that they can be bolted to the standoff insulators.

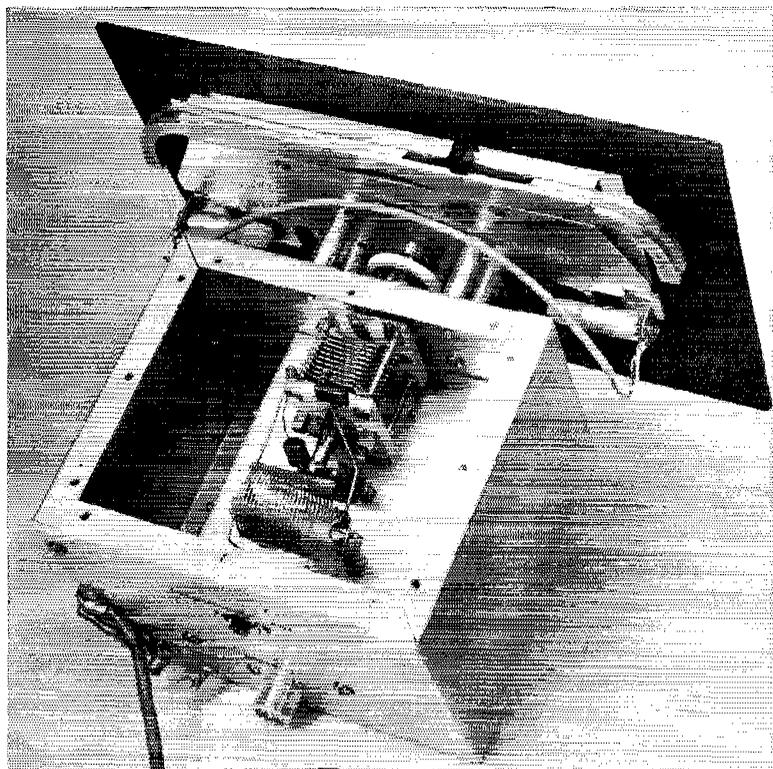
The silver-mica capacitors, which form a part of the tuned circuit, must be mounted so that

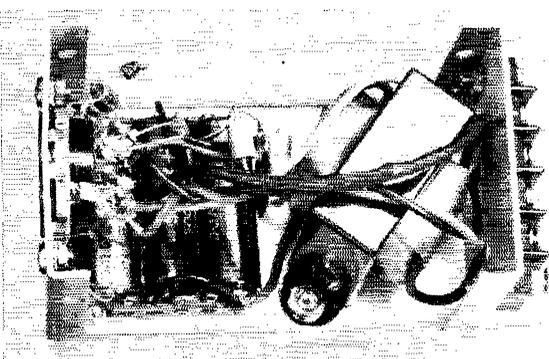
there is no possibility of motion. Small feed-through insulators are used as tie points to hold them as shown in the inside top view. For maximum reinforcement of the entire unit, new covers were cut from  $\frac{1}{8}$ -inch aluminum panel stock and fastened to the boxes with a liberal number of self-tapping screws.

Although any suitable dial and panel arrangement could be used, the particular one shown employs a Millen 10037 "no string" panel dial. The dial is mounted on a small panel and the assembly in turn is bolted to the v.f.o. box with  $1\frac{1}{4}$ -inch metal pillars. Though large, the dial is free from any noticeable backlash and provides adequate illumination and an easy-to-read scale.

The panel is provided with a single-pole, double-throw switch, which can be connected

The tuned circuit is supported by a bent aluminum sheet extending from the front to the rear of the 4 by 5 by 6-inch box. The trimmer capacitor, C<sub>2</sub>, is mounted on the rear wall, as are also the coaxial output connector and feedthrough bypass capacitors for the power leads.





inside the power supply, which is assembled on the flanged section of a 2 1/4 by 2 1/4 by 4-inch Mini-Box. Components in this unit may be mounted in any convenient way. Connections going to the v.f.o. are brought out through the octal socket at the left; a.c. input and control terminals are on the strip at the right.

so that in the "spot" position only the v.f.o. supply can be turned on, but in the transmit position this function is transferred to the main transmitter power-supply control so that it is activated by the transmit/receive switch.

Fig. 2 shows a suggested power-supply circuit.

for 120-volt, 60-cycle operation. The regulator in this circuit also can be used for mobile work.

The vacuum-tube v.f.o. article prompted many requests for information on how the unit could be adapted for use at other frequencies. Generally speaking, this MOS transistor circuit is useful at any frequency up to and including the 144-Mc. band. For those interested, coil and capacitor information is provided for two additional frequency ranges: a 5 to 5.5-Mc. range for s.s.b. transmitters, and an 8- to 9-Mc. range for 50- and 144-Mc. transmitters.

### Performance

The performance of the v.f.o. leaves very little to be desired with regard to achieving minimum frequency drift. For example, the 3.5- to 4-Mc. unit described showed a frequency drift of less than 30 cycles in two hours after a 30-second warm up. The 5- to 5.5-Mc. unit drifted less than 50 cycles for the same period, and the 8- to 9-Mc. unit drifted slightly more than 200 cycles.

### Acknowledgement

The author wishes to acknowledge the valuable aid given by Mr. L. Kaplan in the design of the two-stage feedback isolation amplifier. **QST**

## ARRL DX Competition Rules for DX

PHIONE: February 4-5 and March 4-5, 1967

C. W.: February 18-19 and March 18-19, 1967

The starting time in each instance is 0001 GMT Saturday, ending at 2400 GMT Sunday. Phone and c.w. are separate contests and separate logs and summaries must be submitted for each mode. KH6 and KL7 will be considered as DX, separate from the VE/W group.

Multippliers for DX stations will consist of the 48 continental United States, plus VE1-VE8 and VO, a possible total of 57 per band. Each completed QSO counts three

points. Logs must contain calls, dates, times, bands, exchanges (report and power for DX, report and state/province for W/VE) and points. You may use your own forms or obtain logs from ARRL, 225 Main Street, Newington, Conn., U.S.A. 06111.

Your entry must be postmarked by April 22, 1967 to be eligible. Please enclose photos and soapbox comments with your reports. **QST**

ARRL INTERNATIONAL DX COMPETITION

DX stations use check list below to check off multipliers.

1 Connecticut CT	2 Michigan MI	3 Colorado CO	4 New Brunswick NB
2 Delaware DE	3 Illinois IL	5 Kansas KS	4 Labrador LB
3 Florida FL	4 Indiana IN	6 Kentucky KY	5 New Brunswick NB
4 Georgia GA	5 Iowa IA	7 Louisiana LA	6 New Brunswick NB
5 Idaho ID	6 Kansas KS	8 Maryland MD	7 New Brunswick NB
6 Illinois IL	7 Kentucky KY	9 Massachusetts MA	8 New Brunswick NB
7 Indiana IN	8 Louisiana LA	10 Michigan MI	9 New Brunswick NB
8 Iowa IA	9 Maryland MD	11 Minnesota MN	10 New Brunswick NB
9 Kansas KS	10 Massachusetts MA	12 Missouri MO	11 New Brunswick NB
10 Kentucky KY	11 Michigan MI	13 Montana MT	12 New Brunswick NB
11 Louisiana LA	12 Minnesota MN	14 Nebraska NE	13 New Brunswick NB
12 Maryland MD	13 Missouri MO	15 Nevada NV	14 New Brunswick NB
13 Massachusetts MA	14 Montana MT	16 New Hampshire NH	15 New Brunswick NB
14 Michigan MI	15 Nebraska NE	17 New Jersey NJ	16 New Brunswick NB
15 Minnesota MN	16 Nevada NV	18 New York NY	17 New Brunswick NB
16 Missouri MO	17 New Hampshire NH	19 North Carolina NC	18 New Brunswick NB
17 Montana MT	18 New Jersey NJ	20 North Dakota ND	19 New Brunswick NB
18 Nebraska NE	19 New York NY	21 Ohio OH	20 New Brunswick NB
19 Nevada NV	20 North Carolina NC	22 Oklahoma OK	21 New Brunswick NB
20 New Hampshire NH	21 North Dakota ND	23 Oregon OR	22 New Brunswick NB
21 New Jersey NJ	22 Ohio OH	24 Pennsylvania PA	23 New Brunswick NB
22 New York NY	23 Oklahoma OK	25 Rhode Island RI	24 New Brunswick NB
23 North Carolina NC	24 Oregon OR	26 South Carolina SC	25 New Brunswick NB
24 North Dakota ND	25 Pennsylvania PA	27 South Dakota SD	26 New Brunswick NB
25 Ohio OH	26 Rhode Island RI	28 Tennessee TN	27 New Brunswick NB
26 Oklahoma OK	27 South Carolina SC	29 Texas TX	28 New Brunswick NB
27 Oregon OR	28 Tennessee TN	30 Utah UT	29 New Brunswick NB
28 Pennsylvania PA	29 Texas TX	31 Vermont VT	30 New Brunswick NB
29 Rhode Island RI	30 Utah UT	32 Virginia VA	31 New Brunswick NB
30 South Carolina SC	31 Vermont VT	33 Washington WA	32 New Brunswick NB
31 South Dakota SD	32 Virginia VA	34 West Virginia WV	33 New Brunswick NB
32 Tennessee TN	33 Washington WA	35 Wisconsin WI	34 New Brunswick NB
33 Texas TX	34 West Virginia WV	36 Wyoming WY	35 New Brunswick NB
34 Utah UT	35 Wisconsin WI	37 Wyoming WY	36 New Brunswick NB
35 Vermont VT	36 Wyoming WY		
36 Virginia VA			
37 Washington WA			
38 West Virginia WV			
39 Wisconsin WI			
40 Wyoming WY			

SUMMARY, ARRL INTERNATIONAL DX COMPETITION

Call: ARRL Section: Country:

C.W.  Single Operator  Multioperator  Single Intr.  Multi. Intr.

Name: Address:

Transmitting Equipment: Receiver(s):

Input Power: Antenna:

MULTIPLIERS: W/VW stations show number of countries per band, use 00-195. Non-W/VW show number of continental U.S. states and Canadian call areas per band. Non-W/VW use the check sheet on the reverse side of this summary.

Multiplexer	1-8 Mc.	1.5 Mc.	7 Mc.	16 Mc.	21 Mc.	28 Mc.	TOTALS
Comments							

Multioperator stations show all calls: Number of different countries worked overall: Total time worked: Participating for ARLS-affiliated club award in the: as (points) (Multiplier) (MULTIPLIER SCORE)

\* Total number of multipliers on all bands. Count 3 points per completed QSO. See contest rule #4 in January QST.

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Awards Committee.

Operator's Signature and Call:

Use the space below for comments on new countries or new states, award measurement conditions, interesting equipment, etc. Be sure to enclose your operating and antenna photos for full consideration. Mail summary, log sheets and check lists (CD-175) to ARRL, Communications Department, 225 Main Street, Newington, Connecticut, U.S.A. 06111.



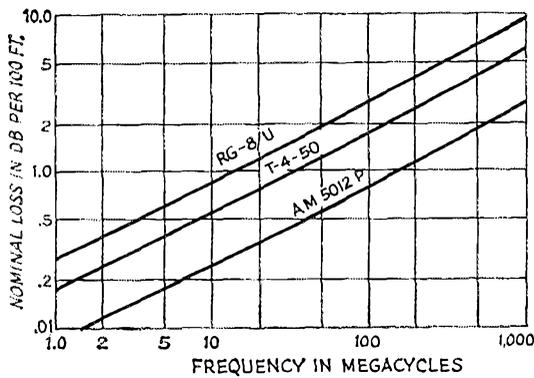


Fig. 2—Attenuation in decibels per 100 feet of cable vs. frequency.

(p.v.c.) as the jacketing compound. However, to use p.v.c. — a relatively hard, brittle substance — it is necessary to add plasticizers to make the compound pliable and flexible. The nonresinous plasticizers compounded with p.v.c. have a tendency, with sunlight and summer temperatures, to leach out of the p.v.c. and migrate into the polyethylene of the dielectric. The migration of the plasticizer through the braid into the dielectric causes the dielectric constant and power factor to rise, with a resulting rise in the v.s.w.r. and an increase in attenuation. A rise in attenuation of 1 or 2 db. per 100 feet is not uncommon, once contamination has begun. Also, with the migration of the plasticizer the p.v.c. becomes brittle and nonpliable, resulting in cracking and breaking of the jacket. RG-8/U, RG-11/U and RG-17/U are examples of coax cables with contaminating p.v.c. jackets.

The dangers of this condition have been recognized, and in many of the military cables, identical in every respect except for jacket material, the older styles have been replaced by new ones. Cables such as RG-8A/U, RG-11A/U, and RG-17A/U uses p.v.c. jackets with a resinous plasticizer which does not leach out or migrate, and thus does not contaminate the dielectric. Life expectancy of this type jacket is in excess of fifteen years.

High-molecular-weight, carbon-black-loaded, polyethylene jackets such as Xelon contain no plasticizers of any kind, consequently a useful life of 25 years or more can be expected. Because of this, polyethylene jackets permit direct burial and are usually specified for submersible applications.

### Impedance Uniformity

Attenuation is also increased by substantial v.s.w.r. Since v.s.w.r. is a function of the impedance of a cable, it follows that the more uniform the impedance the lower will be the v.s.w.r. (for a given termination). Because coaxial cable is manufactured of plastic materials by means of bulky extruders, it cannot be held to the tolerances of machined parts, especially

in lengths of many hundreds of feet. Each individual extruder has its own peculiar eccentricities that cause variations in the cable during manufacture.

These variations in dimensions are very small but, unfortunately, sum up electrically along a length of cable and, at specific frequencies, may result in a v.s.w.r. as high as 4:1 even though the cable is properly terminated. In cable constructions where impedance uniformity and low v.s.w.r. are critical, the impedance can be held to tight tolerances by close control of the extrusion processes.

### Cable Construction

Taking the foregoing into account, let us look at RG-8A/U, shown in cross-section in Fig. 4. The center conductor is stranded copper and the dielectric is solid polyethylene. The attenuation of RG-8A/U could be improved by 25 percent if we could increase the center conductor size and change to foamed polyethylene. This has been done in cable such as Times T-4-50, now available at about the same cost as RG-8A/U. Note that the overall diameter is the same, Fig. 4, but the attenuation is substantially improved (Fig. 2) and the cable weight is improved (99 lbs./1000 ft. for RG-8A/U, 94 lbs./1000 ft. for T-4-50).

However, for longest life and most carefree installation, even further improvements have been made. The largest factor contributing to degradation of attenuation in foamed polyethylene flexible coaxial cables, especially above

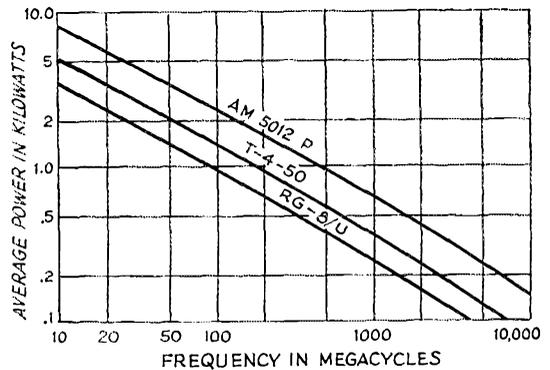


Fig. 3—Power-handling capacity as a function of frequency.

100 Mc., is moisture. Since moisture affects the power factor, the effect of moisture in the cable becomes significant as we increase frequency. This can be seen from the formula for attenuation:

$$\alpha = K \sqrt{f} + K_1 f (P.F.)$$

where

$\alpha$  = Attenuation

$K, K_1$  = Some constant

$f$  = Frequency

$P.F.$  = Power factor

As frequency is increased, the power factor becomes a more significant figure. Moisture has

been known to degrade the power factor by as much as ten times.

But how does moisture get into a cable? It enters flexible cables as water vapor, which is a very penetrating gas. This vapor condenses to water or moisture, changes the power factor and consequently raises the attenuation. For this reason, a solid, seamless, pinhole-free, metallic barrier or shield which positively excludes water vapor gives the longest-lived cable. In addition, with a solid metallic sheath the radiation into and out from the cable is eliminated, and isolation in the order of 100 db. is achieved.

In cables such as the Times Alumifoam series moisture is precluded during manufacture by a completely dry core, and with the addition of the aluminum tube the foamed polyethylene is under constant pressure. Moisture traps and vapor

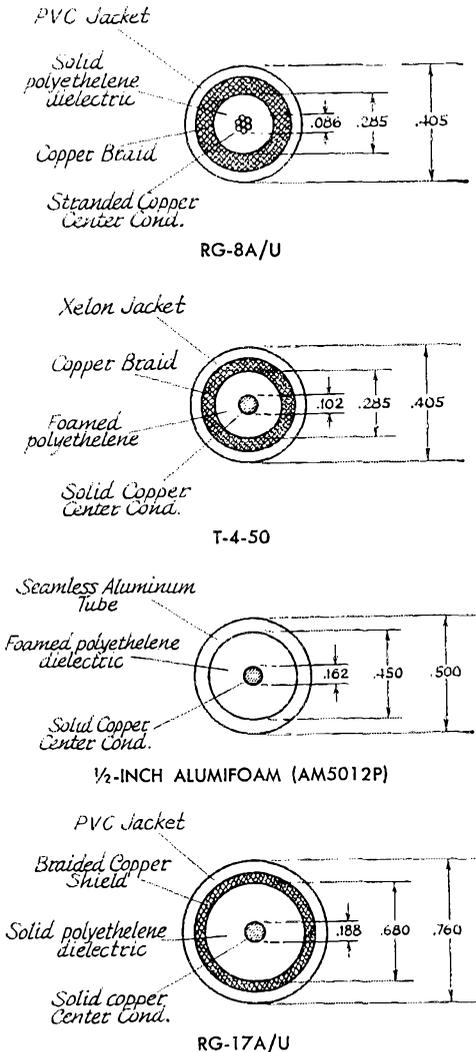


Fig. 4—Cross sections showing construction of various types of cable.

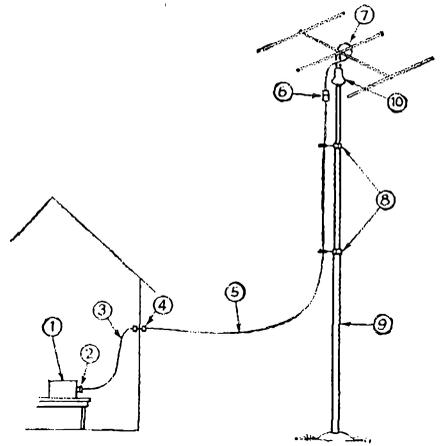


Fig. 5—Representative cable installation for a rotary beam antenna.

- 1) Transmitter.
- 2) Transmitter output connector.
- 3) Flexible 50-ohm coax (T-4-50 or RG-8A/U).
- 4) Type N connectors or flexible-cable to solid-sheath splice.
- 5) Solid-sheath foamed-dielectric cable (1/2-inch Alumifoam).
- 6) Type N connectors or flexible-cable to solid-sheath splice.
- 7) Flexible coax (T-4-50 or RG-8A/U).
- 8) Cable clamps.
- 9) Tower.
- 10) Rotator.

paths are designed out, and the user has a self-sealing cable.

For above-ground applications, the seamless shield serves the dual function of electrical shield and protective cover. It eliminates the necessity for an outer jacket and thus represents the most economical use of weight and space to achieve desired electrical characteristics. To approximate the electrical characteristics of 1/2-inch Alumifoam in an RG cable, it would be necessary to use RG-17A/U (attenuation, 0.85 db. at 100 Mc.; power handling, 3.6 kw. at 100 Mc.; cost, approximately 30 percent higher). Cross sections of the two types are shown in Fig. 4.

#### System Installation Using Semiflexible Coaxial Cable

Fig. 5 illustrates a typical system installation employing 1/2-inch Alumifoam. The cable is simple to install, and connectors are readily available for it.

It is generally most convenient to run from the transmitter to the wall of the shack with flexible coax (RG-8A/U or T-4-50), although to eliminate losses, this run should be kept as short as possible. One end of this short run should be terminated in a connector that will mate with the transmitter, and the other end may terminate either in a type N or go directly into a splice connector. Splice connectors to accept flexible coax in one side and solid-sheath coax in the other are also available.

(Continued on page 136)

## • *Beginner and Novice*

# The Selectoroid

## A Simple High-Performance Audio Filter

BY LEWIS G. McCOY, \* WIICP

**T**HERE is an old axiom in amateur radio that goes: "If you can't hear 'em, you can't work 'em." This is something a Novice quickly realizes, because even under poor skip conditions the Novice bands are very crowded. If the Novice is unable to hear the station he is trying to work, because of QRM, it can become very discouraging.

One of the unfortunate facts of life is that the average inexpensive beginner-type receiver is woefully lacking in selectivity — the ability to separate signals. Usually, the selectivity of the receiver is directly related to its cost. This is because additional circuits are required to provide selectivity. Also, many amateurs are reluctant to dig into their receivers to improve them. However, there is a way to obtain greater selectivity, at no great cost and without making any changes in the receiver. The method we have in mind is audio selectivity.

The Selectoroid described in this article is a device that will greatly improve the c.w. selectivity of a receiver, doesn't cost much, and is

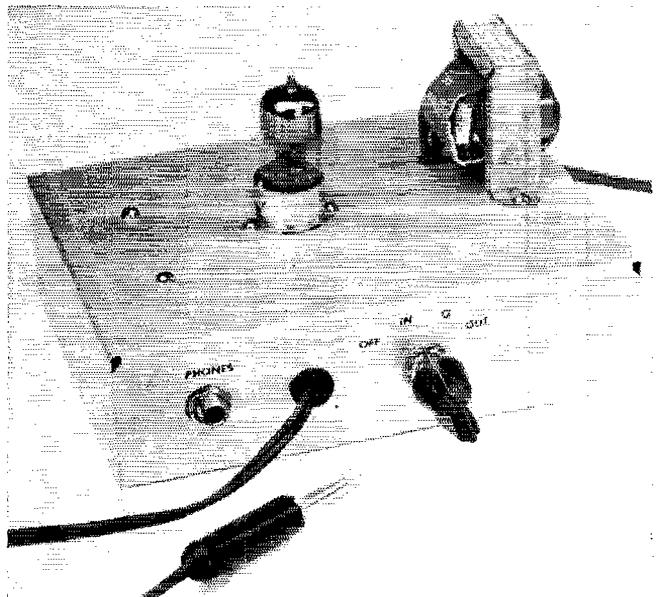
\* Beginner and Novice.

simply plugged into the receiver. It is designed to help the Novice separate c.w. signals in a crowded band and, in addition, could be a real boon to transceiver owners desiring to improve the c.w. selectivity of their units. Most transceivers have only one degree of selectivity, and that is for reception of s.s.b. signals. Although the transceiver may cover the c.w. bands, there is no provision for the additional selectivity that may be required for such work.

### *What It Is And How It Works*

The Selectoroid is an audio filter with a built-in amplifier stage. Two parallel-tuned circuits, Fig. 1, are used to provide the selectivity; these circuits use toroid coils resonated at approximately 750 cycles by appropriate capacitors.

Many newcomers confuse selectivity with bandwidth. Bandwidth is the tuning rate of a receiver. For example, one receiver may require only two turns of the tuning knob to cover 3500 to 4000 kc., while another would take five turns of the tuning knob to cover the same range. The latter receiver could be said to have



At the right is the power transformer and the 12AU7 is mounted approximately in the center of the chassis. Any chassis or box of suitable size can be used as the component arrangement is not critical.

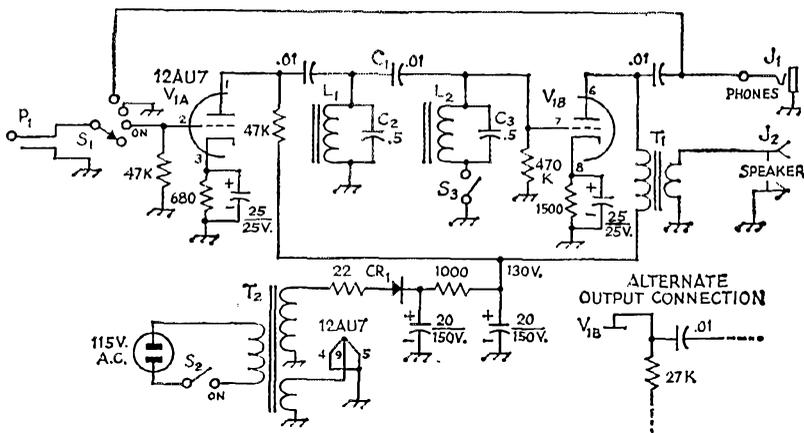


Fig. 1—Circuit diagram of the Selectoroid audio filter. All capacitances are in  $\mu\text{f}$ . Capacitors marked with polarity are electrolytic. Resistances are in ohms; all resistors are  $\frac{1}{2}$ -watt.

- $C_1$ —0.01  $\mu\text{f}$ , disk ceramic.
- $C_2, C_3$ —0.5  $\mu\text{f}$ , paper (see text).
- CR1—Silicon rectifier, 400 volts p.i.v. or more.
- $J_1$ —Headphone jack, open-circuit type.
- $J_2$ —Phone jack.
- $L_1, L_2$ —88-mh. toroid (see text).
- $P_1$ —Headphone plug.
- $S_1$ —Single-pole, four-position wafer switch, with a.c.

- switch mounted on back (Centralab 1465 or similar).
- $S_2$ —Part of  $S_1$ .
- $S_3$ —Single-pole, single-throw toggle.
- $T_1$ —Output transformer, 10,000-ohm primary, 3.5-ohm secondary (Knight 54 A 1448 or equivalent).
- $T_2$ —Power transformer, 125 volts, 15 ma.; 6.3 volts, 0.06 amp. (Knight 54 A 1410 or equivalent).

more handsread than the former. However, because one receiver has a slower tuning rate than the other it doesn't mean that one has the ability to separate signals better than the other. Selectivity is the ability of a receiver to select, or separate signals.

The theory in adding or improving selectivity to a receiver is not too complicated. Any tuned circuit will tend to reject signals that are not on the frequency to which the circuit is tuned. How well it does this depends on the  $Q$ , or quality factor, of the circuit. A circuit with a low  $Q$  has poor selectivity while one with high  $Q$  can be very selective. While "high" and "low" are relative terms, the toroid coils used in this unit are capable of providing tuned circuits with  $Q$ s on the order of 50 or so at 700 to 1000 cycles, and this can be classed as high  $Q$  for audio frequencies.<sup>1</sup>

The passband of a receiver usually is about 2000 to 5000 cycles wide. Any audio tones lower than the actual upper limit will have more or less the same amplitude. However, if you permit just a very narrow band of audio frequencies to

reach your headphones or speaker while excluding or attenuating the other tones that may be present, you improve the selectivity of the receiver. That is exactly what is done with the Selectoroid. The tuned circuits in the filter are resonated at approximately 750 cycles. The Selectoroid rejects those frequencies above and below approximately 750 cycles while actually amplifying the narrow band of audio frequencies close to 750 cycles.

How well this is accomplished is shown in Fig. 2. Fig. 2 shows the audio passband from 300 cycles to 1700 cycles. Any tone more than 100 cycles either side of 750 cycles is attenuated to the point where the audio is practically inaudible when listening with headphones or speaker.

In many instances, the user may not desire or need the very high degree of selectivity provided by the Selectoroid with both of the tuned circuits operating. We've provided a switch,  $S_3$ , that removes one of the tuned circuits, thereby broadening the response curve. With the single tuned circuit there is still a definite peak at 750 cycles, but it is nowhere near as sharp as with both circuits in. In addition,  $S_1$  can be used to switch the filter completely out, leaving the receiver output in its normal condition.

Fig. 2 shows the selectivity with both circuits tuned to the same frequency, 750 cycles, and the peak at this frequency may prove to be sharper than desired by some amateurs. If one of the circuits is tuned to a slightly lower frequency than the other the effect is to widen the passband of the overall filter. The filter will still be sharp, but may sound more pleasing to the ear. In any event, it is easy to experiment along these lines. Try adding a 0.005- $\mu\text{f}$ . or a

<sup>1</sup>Hoff, "High-Performance RTTY Filters," *QST*, August 1966.

*The Selectoroid can prove a real boon to Novices whose receivers have poor selectivity — it can easily make the difference between a partial QSO and a 100 percent one. Also, it will do an outstanding job of improving the c.w. selectivity of receivers having only s.s.b.-width filters.*  
P.S.: And it doesn't cost much!

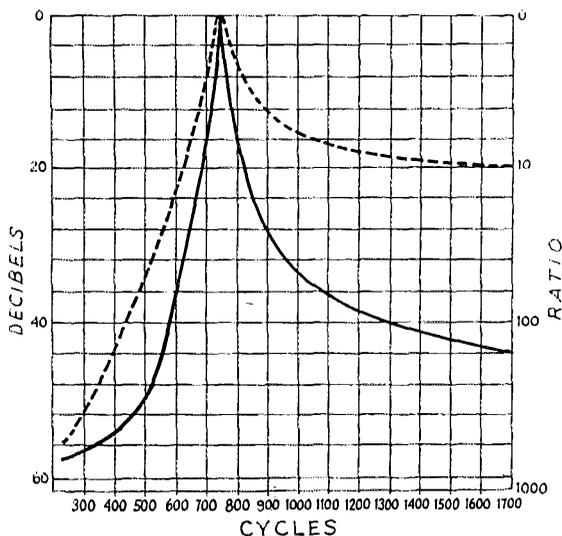


Fig. 2—The solid curve shows the response of the Selectoroid with both filter circuits operating. The dotted curve shows the selectivity with a single circuit.

0.1- $\mu$ f. capacitor in parallel with  $C_3$ . These values will broaden out the peak.

#### Additional Circuit Information

The amplifier tube used in the Selectoroid is a dual triode, a 12AU7. Other dual triodes such as the 12AT7 and 12AX7 work equally well.

The base connections are the same for all three types.

A simple half-wave rectifier is used in the power supply. Voltage out of the filter is about 130 volts, and if your receiver has an accessory socket, as some do, anything from 100 to 150 volts at 10 ma., plus the 6.3-volt a.c. heater requirement, will power the unit.

An audio output transformer is used in the plate circuit of  $V_{1B}$ . If you don't care to use a speaker, a 27,000-ohm resistor can be used to replace the transformer primary. Fig. 1 shows this alternate hookup.

#### Construction Information

The toroids used at  $L_1$  and  $L_2$  are types made for teletype units. Several amateurs run advertisements in the classified Ham-Ads every month for 88-mh. toroids at varying prices averaging about 50 cents each. These transformers have two windings which must be connected in series in order to get 88 mh. Fig. 3 shows how they

(Continued on page 150)

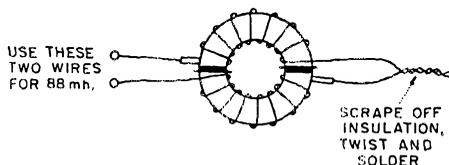
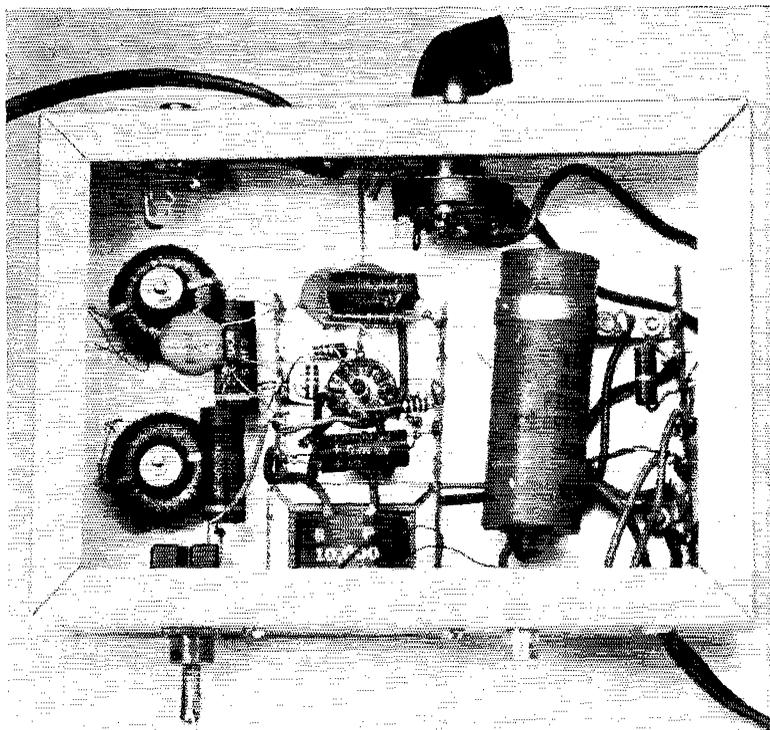


Fig. 3—This drawing shows the method of connecting the windings of the 88-mh. toroid to obtain the required inductance.

The power supply filter components are mounted at the right in this view. At the left are the two 88-mh. toroids with their capacitors,  $C_2$  and  $C_3$ . The switch on the rear is  $S_2$ .



# Transceive Modifications for the Heath SB-300/SB-400 Combination

BY WILLIAM M. BRELSFORD,\* K2INO/K3FXJ

**A**FTER using the Heath SB-400 transmitter and the SB-300 companion receiver for a short time, the author decided that a more convenient method of switching from transmit to transceive operation would be helpful. Originally, changing from one mode to the other required changing a jumper cable inside the transmitter in addition to changing the setting of the function switch. This article describes a few simple circuit modifications that enable the operator to change the equipment from one mode to the other by using the function switch only. Provision is also made for transceive operation while using the transmitter v.f.o.

## Transmitter Modification

In its original form, function switch *FS2R* was used to supply B plus to the v.f.o. (l.m.o.) and to the heterodyne oscillator in the transmit position. It also fed B plus to the receiver heterodyne oscillator-amplifier when in the transceive position. Function switch *FS2F*, on the same wafer with *FS2R*, was used to remove B plus from the carrier generator during transceive. In the modification of Fig. 1, *FS2R* is used to select the l.m.o. from the transmitter, or from the receiver. The heterodyne oscillator and carrier generator switching is done with a double-pole double-throw toggle switch (*S1*) which has been added to the chassis (inside the cabinet) between the front panel and the heterodyne crystals. *FS2F* can be used to remove B plus from the l.m.o. during transceive, unless the receiver modification mentioned later is also made.

First, the red wire connecting lugs 3 and 11 of *FS2R* is removed. The wires originally connected to *FS2R* are removed and connected as

follows: (1) Red wire from lug 8 connects to terminal 1 of *S1A*, (2) Red wire from lug 3 connects to terminal 2 of *S1A*, (3) White-violet wire from lug 7 connects to terminal 3 of *S1A*, (4) Violet wire from lug 11 connects to pin 5 of *V7*. Similarly, the wires connected to *FS2F* are removed and connected as follows: (1) Orange wire from lug 12 connects to terminal 4 of *S1B*, (2) White-yellow wire from lug 1 connects to terminal 5 of *S1B*. Terminal 6 of *S1B* is unused.

Next, connect coaxial cable (RG-174/U) to *FS2R* as follows: (1) From the receiver l.m.o. jack on the rear panel to lug 7, (2) From the bottom side of the mixer bandpass circuit board (connecting to the bottom of the l.m.o. jack) to lug 8, (3) From the l.m.o. (with *R63* across the phono plug as before) to lug 11.

## Receiver Modification

A second modification provides additional flexibility and convenience of operation. It  
(Continued on page 146)

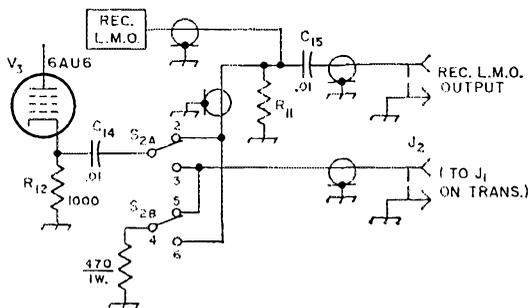


Fig. 2—Circuit modifications to the SB-300 receiver. Switch *S2* is a small d.p.d.t. single-section phenolic rotary wafer switch.

\*Dept. of Statistics, The Johns Hopkins University, Baltimore, Maryland.

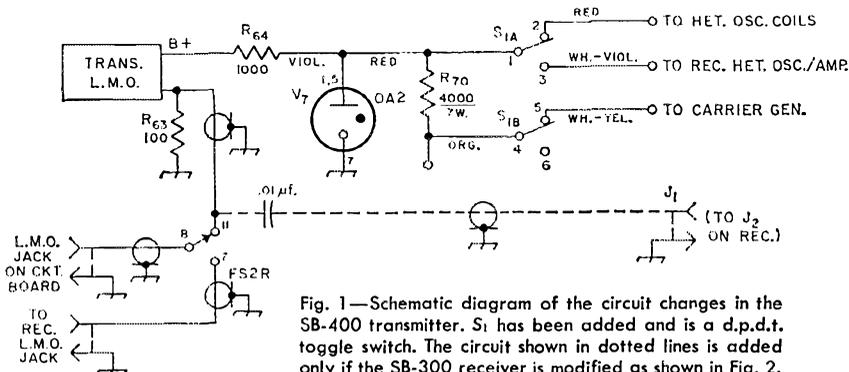


Fig. 1—Schematic diagram of the circuit changes in the SB-400 transmitter. *S1* has been added and is a d.p.d.t. toggle switch. The circuit shown in dotted lines is added only if the SB-300 receiver is modified as shown in Fig. 2.

# A PASSIVE LIMITER

BY GEORGE SCHLEICHER,\* W9NL7

*An interesting audio limiter circuit using diode switching of resistive attenuators. It does not "slice the top off the signal" sharply the way simple diode clippers do, and thus has relatively little effect on the bandwidth of a speech signal.*

A LIMITER circuit can be constructed with passive elements: the design of this one is such that it will not generate high-order harmonics and it need not be frequency sensitive in the audio range. The limiter uses a multiplicity of T-section attenuators in tandem; each section is unusual in that a pair of diodes is connected in series with the shunt arm. The diodes function like switches that open in the absence of a potential but close when the voltage applied to any section of the attenuator rises to a predetermined level. The closing of the shunt path causes the loss of the attenuator section to increase to its design value. The switching action is illustrated in Fig. 1.

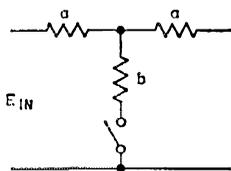


Fig. 1—The basic limiter circuit. Closing  $S_1$  increases the attenuation without changing the frequency-transmission characteristics.  $S_1$  should close when  $E_{in}$  reaches a predetermined value.

As a result of the switching action each section of the attenuator will offer a small loss to the low-amplitude portion of an electrical signal and a higher loss to amplitudes of higher level. The maximum loss of any attenuator section is governed by its design. The maximum amount of compression that the limiter can provide is determined by loss of each attenuator section and the number of sections that are connected in tandem. Good results have been obtained by using ten or twelve sections in tandem, each section having a maximum loss of two or three decibels. The maximum amount of compression that will be realized from a limiter of this type will be equal to about half of the total loss of the attenuator sections.

When a voice signal is modified by limiting action there is necessarily a change in the harmonic relationships within the signal. Listening tests indicate that heavy limiting using a limiter

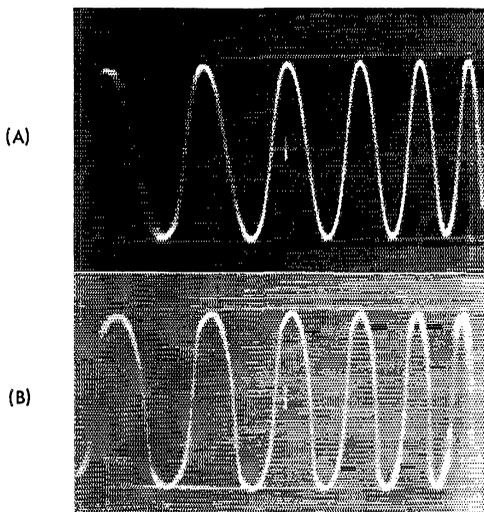
of this type causes a voice signal to become somewhat "bassy," but this effect is hardly noticeable if the voice signal has been limited to a bandwidth of only 3 kc. by means of a filter.

## Diode Action

Solid-state diodes exhibit resistance in the forward conduction mode. This resistance can vary from a fairly high value (over 10,000 ohms) to less than 100 ohms. It will depend on the voltage across the diode and the materials of which the junction is made. The materials also determine the manner in which the diode will begin conduction. For example, copper-oxide junctions begin conduction more slowly than germanium or silicon.

## Design Principles

The characteristics of the diodes and the design of the attenuator sections should be complementary. The diode resistance when conducting should be low enough to be negligible in the shunt arm of the attenuator; in the non-conducting mode it should be high enough to make the shunt appear as an open circuit. Pairs of diodes are used so that the positive-going and the negative-going portions of a wave will be similarly affected. The voltage at which the diodes begin conduction determines the range over which the limiter will be effective. The limiter circuit should be driven from a source having an impedance at least as high as the design impedance of the attenuator sections, and it should be terminated in a similar impedance. Since the diodes are connected in the



These scope pictures show the effect of limiting on waveform. (A) Sine wave (765 cycles) before limiting; (B) Same signal after 8 db. of limiting.

\* 1535 Dartmouth Lane, Deerfield, Ill. 60015

shunt arm of the attenuator the basic limiter design can be applied to both balanced and unbalanced (one side grounded) attenuators. The circuit described here uses unbalanced T sections for simplicity.

### A Practical Circuit

Building a limiter of this kind can start with the acquisition of about two dozen diodes of a given type. Their forward resistance should be measured using an arrangement similar to that shown in Fig. 2. Measurements should be made in increments of 0.05 or 0.1 volt starting at zero and continuing until the current through the diode reaches its maximum rated value for the type of diode under test. A graph can then be drawn plotting junction voltage against resistance (resistance is first computed by dividing the voltage by the resultant current). Fig. 3 shows the kind of curves that result when different diodes are measured this way. Using the curve for the 1N34A as an example, it is evident that the resistance will drop to about 200 ohms

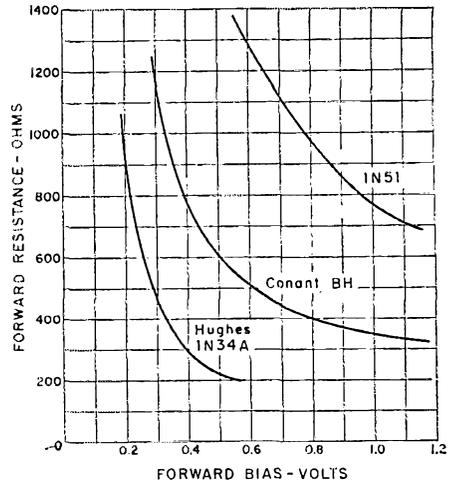


Fig. 3—Resistance of three types of diodes measured with the test circuit shown in Fig. 2.

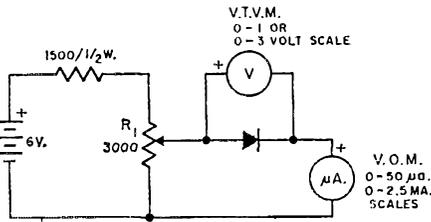


Fig. 2—Test setup for measuring diode resistance.  $R_1$  is a linear control.

and that there is a “knee” in the curve at a potential of 0.45 volts. The potential is significant because it corresponds to the input voltage at which limiting action is maximized. The diode

The resistance measured in this way is a “d.c.” resistance, and while for higher accuracy in circuit design the dynamic resistance should be determined, its measurement is considerably more difficult. The extra complication would not be warranted unless it were necessary to know the exact attenuation at different voltage levels.

resistance at the knee (250 to 300 ohms) is used in designing the attenuator sections.<sup>1</sup> The shunt resistance used in the attenuator should be about ten times the diode resistance at this point, or 2700 ohms if the nearest standard resistor value is chosen.

Knowing that the shunt resistor will be 2700 ohms and desiring a loss of about 2 db. in the attenuator leads to the conclusion that the characteristic impedance of the attenuator should be 72 ohms. (These conclusions are arrived at through the help of the formulas given below.) The resulting limiter circuit is shown in Fig. 4. It should be noted that between attenuator sections the output series resistor of one section has been combined with input series resistor of the following section ( $72 + 72 = 144$  ohms). Again the nearest standard resistor value (150 ohms) has been chosen for use in the circuit. The waveform photographs show how compression changes the shape of a sine wave.

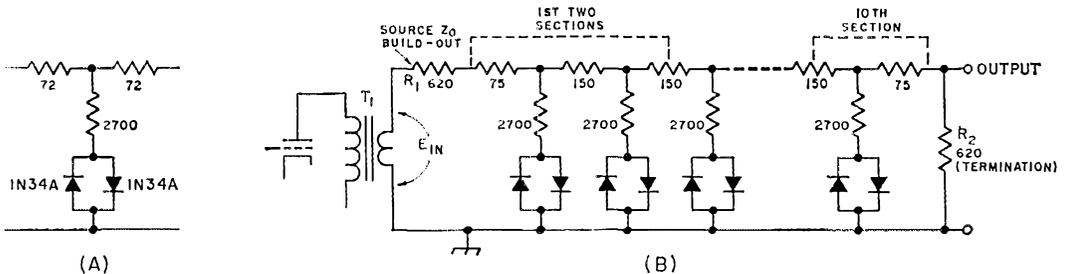


Fig. 4—(A) Practical circuit for a single section. (B) Cascaded sections; note that the 75-ohm series arm on the output side combines with the 75-ohm series arm on the input side to make the single value of 150 ohms between adjacent shunt arms. Half-watt resistors are satisfactory. In this circuit  $T_1$  is assumed to have a turns ratio such that the plate resistance of the preceding amplifier tube is transformed to a value of resistance that is low compared with the characteristic impedance, 600 ohms, of the attenuator. Likewise, the input impedance of the device to which the limiter is connected is assumed to be high compared with 600 ohms. When this is not true,  $R_1$  and  $R_2$  should be selected so that total input and output impedances are 600 ohms.

## Appendix

Attenuators are lossy resistive networks. They are usually designed to have the same impedance at their input and output terminals. Unbalanced attenuators are usually referred to as "T" or "π" attenuators since these letters describe the circuit configuration. Their balanced counterparts (for use in ungrounded circuits) are referred to as "H" or "O" attenuators.

Only four simple formulas are needed in designing T attenuators; they are as follows:

$$\text{Loss (expressed in db.)} = 20 \log \frac{I}{I_{\text{out}}} \quad (1)$$

$$n = \frac{I_{\text{out}}}{I_{\text{in}}} \quad (2)$$

$$a \text{ (the series resistor value)} = Z \frac{1-n}{1+n} \quad (3)$$

$$b \text{ (the shunt resistor value)} = Z \frac{2n}{1-n^2} \quad (4)$$

( $Z$  is the characteristic impedance of the attenuator).

As an example of the use of these formulas, assume that you are designing an attenuator of 150 ohms impedance with a loss of 6 db.:

$$\left. \begin{aligned} 6 &= 20 \log \frac{I}{I_{\text{out}}} \\ \frac{6}{20} &= \log \frac{I}{I_{\text{out}}} \\ 0.3 &= \log \frac{I}{I_{\text{out}}} \end{aligned} \right\} \text{from (1)}$$

antilogarithm of 0.3 = 2.0 } from slide rule or log table

$$\left. \begin{aligned} 2.0 &= \frac{1}{\frac{I_{\text{out}}}{I_{\text{in}}}} \\ \frac{I_{\text{out}}}{I_{\text{in}}} &= \frac{1}{2} = n = 0.5 \end{aligned} \right\} \text{solving for } n$$

$$\left. \begin{aligned} a &= 150 \frac{(1-0.5)}{(1+0.5)} = \\ &= 150 \frac{0.5}{1.5} = 50 \text{ ohms} \end{aligned} \right\} \text{from (3)}$$

$$\left. \begin{aligned} b &= 150 \frac{(2 \times 0.5)}{(1-0.5^2)} = \\ &= 150 \frac{1}{0.75} = 200 \text{ ohms} \end{aligned} \right\} \text{from (4)}$$

A single attenuator section of 150 ohms impedance and 6 db. loss is shown in Fig. 5.

Some representative attenuator section values are shown below. They are included as an aid in designing limiters of the kind described here.

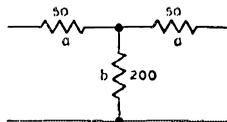


Fig. 5—Attenuator used as an example for calculation as described in the Appendix.

Loss, db.	a resistance	b resistance
1	57.5	8500
2	115.	4310
3	171.	2840
4	224.	2100

These values are based on an attenuator impedance of 1000 ohms. For other impedances the values should be increased or decreased proportionately. QST



### Navy MARS Slow-Scan TV Activity

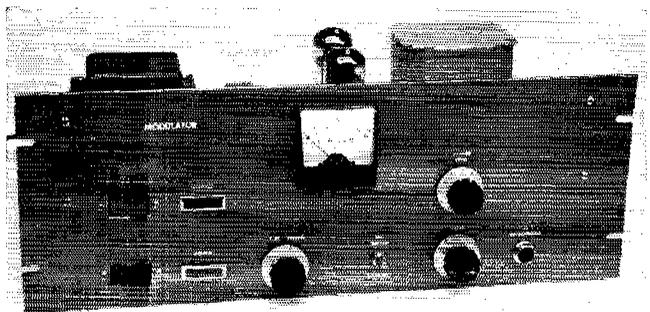
Two weekly slow-scan TV nets have been established within the Navy MARS program. They meet on 6970 kc. at 2200-2300 Sunday GMT (5:00 P.M. EST), and at 0300-0400 Wednesday GMT (10:00 P.M. EST Tuesday, U.S. day). Participating at the start are stations in Duvall, Washington (N0AUX-W7FEN); Waldron, Indiana (N0YVC-W9NTP); and Boulder, Colorado (N0ZPJ-WA0NLQ). The primary purpose of the nets is to develop more widespread use of slow-scan which could add to the present Navy MARS emergency communication capability. Net activities will include dissemination of technical information on slow-scan TV and experimental activities aimed at optimizing this mode of

communication. Navy MARS members desiring to participate should submit a request to their Navy MARS District Director via their Area Coordinator.

Some 600 amateurs and 200 YLs from 17 countries attended the International Ham Convention in Knokke, Belgium, September 12th through the 16th.

Technical meetings covered such varied subjects as meteor scatter and parametric amplifiers. The proceedings of the conference and some interviews were transmitted via amateur TV on 435 Mc. through special permission granted to ON4RT and ON4LP, members of the Amateur Television Association. DJ4ZC was presented the Comte Lippens Trophy for his work in launching a translator carrying balloon every Sunday, permitting tracking and scatter experiments.

The convention was sponsored by a group of Knokke amateurs, including ON4UM, ON4IB, ON4LV and ONL-1322. (Thanks ON4BX)



## A 50-WATT

# UNIVERSAL MODULATOR

BY DOUG DEMAW, WICER \*

**B**EFORE you point an accusing finger and ask, "Who needs an a.m. modulator?" consider for a moment that "ancient modulation," as it is sometimes referred to by the s.s.b. gang, is still popular on v.h.f. and on 160 meters. Listening in on these bands will convince the observer that a.m. hasn't gone the way of hard-rubber tires and muzzle-loading rifles . . . yet. The use of a.m. is more popular on the v.h.f. bands than is s.s.b., although the latter has seen limited use on 6 and 2 meters for quite some time.

This article, then, is intended for those stalwart operators who still use a.m. and are interested in building a modern 50-watt modulator. Several features have been included in the circuit, making possible certain functions that are frequently overlooked in run-of-the-mill designs. Speech clipping and filtering is used. Control circuits enable the operator to choose between manual operation, push-to-talk, or foot-switch control when activating the transmitter and modulator. During c.w. operation, foot-switch control of the transmitter is still available to the operator by merely throwing the phone-c.w. switch on the modulator to the c.w. position. Jacks, which are located on the rear of the modulator chassis, make available the necessary connections for triggering external control circuits.

\* Assistant Technical Editor, *QST*.

Some modern components and a few up-to-date circuit ideas are combined in this general-purpose modulator. Speech clipping and filtering have been included in the design, permitting greater audio power for weak-signal work. A relay, some switches, and three rear-chassis jacks make possible a variety of control-circuit combinations for activating the equipment to be used with the modulator.

An attempt was made to modernize the modulator, physically, this being an important consideration if one is to have a modern-looking layout. With this end in mind, rocker-type switches, one red and one black, were used for a.c. and d.c. control of the power supply. To match the motif of the switches, rectangular pilot-lamp assemblies were used as indicators. The meter is also of modern design.

### Circuit Discussion

A high-impedance microphone is connected to  $J_1$ , Fig. 1. The audio from the microphone is amplified by  $V_{1A}$ . R.f. filtering has been added to the input circuit of  $V_{1A}$  and consists of a 33,000-ohm resistor, in series with the lead from  $J_1$  to pin 2 of  $V_{1A}$ , and a 470-pf. capacitor from pin 2 to ground. This feature is especially helpful in keeping howls and squeals from appearing on the transmitted signal when r.f. is picked up on the microphone lead—a common malady during operation on the higher frequencies. Additional r.f. filtering, consisting of a 1000-ohm resistor and a 470-pf. capacitor, has been added to the grid circuit of  $V_{1B}$ .

After further amplification by  $V_{1B}$ , the audio is clipped by  $CR_1$  and  $CR_2$ . The amount of clipping is set by adjustment of  $R_1$ , the clipping-level control. The setting of  $R_2$  determines the gain of the modulator after clipping takes place. Silicon diodes are used in the low-level clipper circuit and are biased with positive voltage from the 250-volt bus so that they will not conduct until a 3-volt audio signal is applied to them.<sup>1</sup> The higher the setting of  $R_1$ , the greater the amount of clipping. Audio harmonics generated by the clipper are filtered out by  $L_1$  and its associated bypass capacitors. The audio is amplified further by  $V_2$  and is then transformer-coupled to the grids of the modulator tubes,  $V_3$  and  $V_4$ .  $T_1$  is a 1:3 interstage transformer and provides a voltage stepup to the grids of the Class  $AB_1$  7027As.

<sup>1</sup> The value of  $R_4$  may have to be changed from the specification given in Fig. 1 to secure the desired 3 volts. If so, the necessary value can be determined experimentally.



Fig. 1—Schematic diagram of the 50-watt modulator. Capacitors with polarity marks are electrolytic; others are disk ceramic. Resistors are 1/2-watt composition unless otherwise noted. C<sub>1</sub> and C<sub>2</sub> are labeled for text reference only.

- CR<sub>1</sub>, CR<sub>2</sub>—Small-signal silicon diode (1N914A suitable.)  
 CR<sub>3</sub>, CR<sub>6</sub>, inc.—Silicon rectifier, 800 p.r.v., 500 ma. (1N3256 suitable.)  
 CR<sub>7</sub>—Silicon rectifier, 400 p.r.v., 750 ma. (1N2862 suitable.)  
 CR<sub>8</sub>—Silicon rectifier, 50 p.r.v., 750 ma. (1N2858 suitable.)  
 I<sub>1</sub>—Neon panel-lamp assembly, amber (Leecraft 31-2113).  
 I<sub>2</sub>—Neon panel-lamp assembly, red (Leecraft 31-2111).  
 J<sub>1</sub>—3-terminal microphone connector (see text).  
 J<sub>2</sub>, J<sub>3</sub>—High-voltage connector Millen 37001.  
 J<sub>4</sub>, J<sub>5</sub>—2-terminal connector (Millen E-302A).  
 J<sub>5</sub>—Phono connector.  
 K<sub>1</sub>—3-p.d.t. 12-volt d.c. relay. (Guardian 1225-3C-12D with matching Guardian relay socket.)  
 L<sub>1</sub>—20-h., 15-ma. filter choke (Stancor C-1515).  
 L<sub>2</sub>—1-h., 300-ma. choke (Stancor C-2326).  
 M<sub>1</sub>—0-300 ma. d.c. meter (Simpson Model 1227 shown).  
 R<sub>1</sub>, R<sub>2</sub>—0.5-megohm control, audio taper.  
 R<sub>3</sub>—See text.  
 R<sub>4</sub>—See footnote 1.  
 S<sub>1</sub>—S.p.s.t. rocker switch (Carling TILA50-B1).  
 S<sub>2</sub>—Ceramic rotary, 1 section, 3 pole, 3 positions, 2 positions used (Centralab 2506).  
 S<sub>3</sub>—S.p.d.t. toggle.  
 S<sub>4</sub>—S.p.s.t. rocker switch (Carling TILA50-RD).  
 T<sub>1</sub>—Interstage transformer, 1:3 ratio (Stancor A-63-C).  
 T<sub>2</sub>—50-watt, multi-match modulation transformer (U.T.C. S-20).  
 T<sub>3</sub>—740 volts c.t. at 275 ma., 6.3 volts c.t. at 7 amperes. 5-volt winding not used (Stancor P-6315).  
 T<sub>4</sub>—12.6 volts at 1.5 amperes (Knight 54A4136).

The 7027A tubes were selected because they are designed for high-power, low-distortion audio work. Their characteristics are considerably better for audio than those of like-power TV sweep tubes which could have been used. The screen voltage for the 7027As is regulated at 300 volts by two 0A2s. A multi-match modulation transformer is used for T<sub>2</sub> and permits the modulator to be matched to any one of a variety of Class C loads which might be encountered.

Although a Stancor P-6315 power transformer is used in the power-supply section of the modulator, an old TV-set transformer could be substituted for T<sub>3</sub>. Most TV sets use transformers of similar specifications and these will do a good job. The rest of the power supply is of common design, so a detailed description will not be given. Bias is developed by borrowing a small amount of a.c. voltage from one side of the secondary winding of T<sub>3</sub>, through a 0.02- $\mu$ f. capacitor, and rectifying it through CR<sub>7</sub>. Approximately 30 volts, negative, is needed at the 7027A grids to establish the correct operating conditions. If the builder prefers to have adjustable bias a 100,000-ohm, 2-watt control can be installed in place of R<sub>3</sub>, and the bias voltage taken from the arm of the control.

Because silicon rectifiers are used for CR<sub>3</sub> through CR<sub>6</sub>, and because capacitor-input filtering is employed, the power supply delivers approximately 150 volts. A 600-volt capacitor is used at C<sub>1</sub> to allow adequate safety margin for the surge voltage of the supply.

Rectified voltage from CR<sub>8</sub> is used to operate relay K<sub>1</sub>. Contacts break the center-tap connection of T<sub>3</sub>, thus turning the supply on and off. The relay can be manually activated by S<sub>4</sub> when S<sub>3</sub> is in the MANUAL position. When S<sub>3</sub> is in the P.T.T. position, K<sub>1</sub> can be controlled by the microphone switch or by a foot switch connected to J<sub>5</sub>, when S<sub>2</sub> is turned to the c.w. position the foot switch can be employed to activate the control circuits of the r.f. deck and the antenna relay by using it to short circuit J<sub>4</sub>'s control line. On c.w., the secondary winding of T<sub>2</sub> is switched out of the B-plus line at J<sub>2</sub>, by S<sub>2B</sub>. A spare set of relay contacts, K<sub>1B</sub>, connected to J<sub>6</sub> can be used to control other external devices, should the need arise.

### Building the Modulator

The general layout is shown in Figs. 2 and 3. A 10 × 17 × 3-inch aluminum chassis serves as a foundation for the modulator. A 7-inch aluminum rack panel is made fast to the chassis by attaching it with a pair of steel chassis brackets. The brackets give added rigidity to the chassis—a necessity because of the heavy transformers used.

Square holes for mounting T<sub>2</sub> and T<sub>3</sub> were cut in the chassis with a hand nibbling tool. A saber saw or keyhole saw would work just as well. The holes for the rocker switches and the indicator lamps were made in the panel and chassis by first drilling numerous small holes around the desired cut-out area, knocking the resulting slug out of

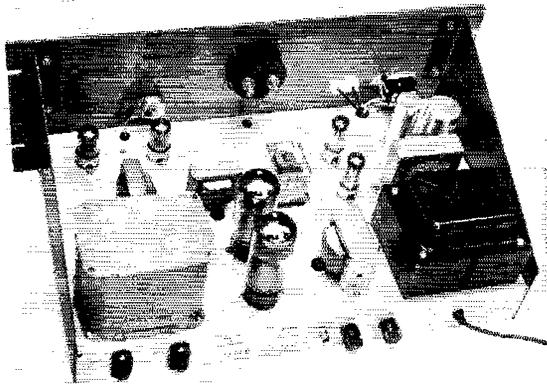


Fig. 2—A look at the top of the modulator chassis. The power supply is located on the right, the speech amplifier tubes are at the upper left, and the modulation transformer is at the lower left. The control relay,  $K_1$ , is at the center of the chassis, just behind the meter.

the metal, and then filing the holes to size. If a 2 $\frac{1}{4}$ -inch punch is not available for making the meter hole in the panel, a fly cutter can be used. If neither tool is available, the system used for cutting the switch and pilot-light holes can be employed.

#### Some Final Comments

The plate-to-plate load impedance for the modulator tubes is 6600 ohms with the voltages used. Once the load into which the modulator is to work has been determined, the matching sheet which is supplied with the modulation transformer can be consulted for the correct primary and secondary connections.

Because of the resistance and capacitance values used in the speech-amplifier stages of the modulator, and because of the characteristics of the clipper-filter, the audio response is reasonably flat from 300 to 3000 c.p.s., falling off rapidly above and below that range. This feature will help to keep the on-the-air signal narrow and clean.

The amount of clipping used will be pretty much the choice of the operator. Between 6 and

10 decibels of clipping seems best for the author's voice. Others may prefer to clip as much as 12 or 15 decibels. The more clipping that is used, the bassier the audio will seem to be, at times impairing the readability of the signal. By setting  $R_1$  far in a counter-clockwise position and advancing  $R_2$  for near-maximum gain, the clipper will be effectively disabled. An oscilloscope is useful for determining the various settings of  $R_1$  and  $R_2$  that will be desired by the operator. These settings can be logged for future use.

The idling current of the modulator output tubes is approximately 90 milliamperes. The maximum plate current on voice peaks should not exceed 200 ma. Because of the type of bias circuit used with this modulator, overdriving the 7027As will result in an increase in bias which will in turn reduce the plate current of the modulator. This condition will be readily apparent if the operator observes the plate-current meter. The increase in bias results from the flow of grid current when the 7027As are driven too hard. The added bias charges  $C_2$  beyond its normal -30-volt level and causes the plate current to diminish. This change is particularly evident when the operator ceases to talk into the microphone, when the plate current will slowly return to the normal no-signal value as  $C_2$  discharges back to its -30-volt level. This bias quirk serves as a convenient built-in over-drive indicator.

The microphone connector,  $J_1$ , can be selected to match the user's microphone plug. Any 3-terminal type will be satisfactory if push-to-talk operation is desired.

A word of caution: Do not attempt to operate the modulator without a proper load. The author wired  $T_2$  for a 4000-ohm secondary impedance and used two 2000-ohm, 25-watt power resistors, series-connected, for a dummy load during testing. The load was connected between  $J_2$  and  $J_3$ . Operating without a secondary load can destroy the modulation transformer.

If you're an "ancient-modulation" enthusiast, this 50-watt modulator might be just right for that 100-watt r.f. strip you've been planning to build. If not, you may get some circuit ideas from this article. Whatever the case, a.m. is here to stay for a while, at least, and this unit is capable of giving you a clean audio signal and plenty of control-circuit flexibility for use in a modern a.m.-c.w. station.

QST

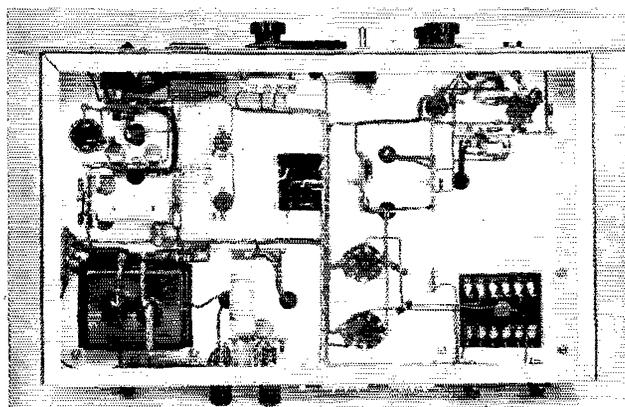
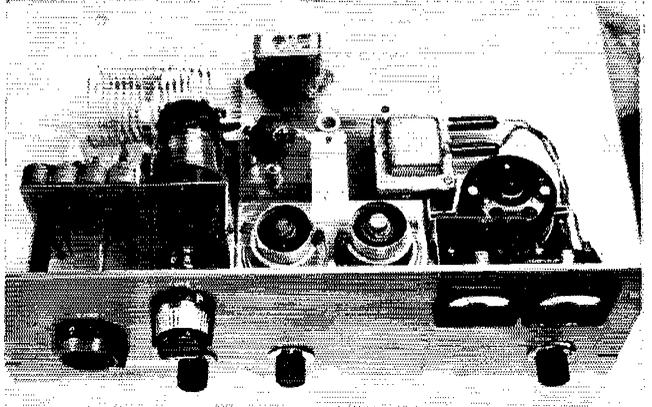


Fig. 3—A bottom-chassis view of the 50-watt modulator. The power supply section is at the left, the speech amplifier and clipper circuits are at the upper right, and the terminal block of the modulation transformer is at the lower right. The phone-c.w. switch is visible at the top center of the chassis, just above the relay socket.

Some Notes on  
the Operation  
of Radial-Beam  
Tetrodes



Panel controls, from left to right are, plate band switch, output tuning capacitor (above) and loading control (below), input band switch, and a.i.c. biasing potentiometer. This view also shows the tube plate connections.

# Evolution of a Grounded-Grid Amplifier

BY WAYNE W. COOPER,\* K4ZZV/W6EWC

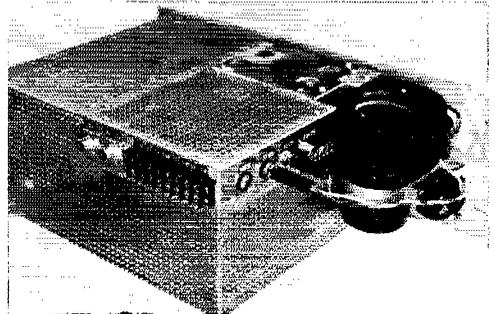
A REALLY simplified approach to building a linear amplifier is to use a grounded-grid circuit. All that is needed are tubes, a tank circuit, and a power supply," it has been said, and some commercial and ham-built amplifiers use this concept. However, not all types of tetrodes lend themselves to such cavalier treatment.

The amplifier shown in the photographs was designed around a pair of 4CX300A tetrodes, although the general principles to be discussed will apply equally to other tubes of this family, such as the 4X250 and 4X150, or their CX counter-parts. Tubes in this series were selected because they are small, rugged, and are often reasonably priced on the "new surplus" market. They also have the advantage of a cathode not connected to the heater, and therefore they can be used in the grounded-grid configuration without the need for filament chokes or a low-capacitance heater transformer.

\* 9302 N.W. 2nd Place, Miami Shores, Florida 33150.

However, they cannot be used as high- $\mu$  zero-bias triodes, with the control grid and screen tied together and grounded, as can some other types, because the control grid tends to hog most of the drive and its dissipation ratings are exceeded long before rated output is achieved.<sup>1</sup> This condi-

<sup>1</sup> Welch, Technical Correspondence, *QST*, April, 1959, p. 46.



The completed amplifier (inverted) with shielding in place.

*Although grounded-grid operation has its virtues, the author points out that the simplicity popularly associated with this type of circuit may not always be one of them. He discusses some of the problems involved in the design of his own amplifier*

C<sub>1</sub>, C<sub>3</sub>—Two 0.01- $\mu$ f. mica capacitors in parallel.

C<sub>2</sub>—Mica, see table for value.

C<sub>4</sub>, C<sub>8</sub>—Mica.

C<sub>5</sub>—Transmitting-type mica (Cornell-Dubilier type 9H).

C<sub>6</sub>—Disk ceramic, 6000 volts.

C<sub>7</sub>—Fixed air capacitor, see text for construction.

C<sub>9</sub>—3000-volt variable, see text.

C<sub>10</sub>—C<sub>13</sub>, incl.—Capacitances made up of 100-pf. 5000-volt ceramic capacitors (Centralab 858S-100N) in parallel as required. See text.

C<sub>14</sub>—Receiving-type variable (National TMS-300, Hammarlund MC-325, or similar).

C<sub>15</sub>—Air trimmer.

C<sub>16</sub>—C<sub>19</sub>, incl.—Feedthrough capacitor. Used between amplifier and power-supply chassis.

J<sub>1</sub>, J<sub>3</sub>—Chassis-mounting coaxial receptacle.

J<sub>2</sub>, J<sub>3</sub>, J<sub>1</sub>—Closed-circuit jack.

J<sub>5</sub>—R.F. type phono jack.

K<sub>1</sub>—D.p.d.t. 24-volt d.c. relay (Jennings RB-3, Guardian 1200-2C-24A, or similar).

K<sub>2</sub>—Similar to K<sub>1</sub>, s.p.d.t.

L<sub>1</sub>, L<sub>2</sub>—See table and text.

M<sub>1</sub>, M<sub>2</sub>—D.c. milliammeter, see text in reference to M<sub>2</sub>.

P<sub>1</sub>, P<sub>2</sub>—Headphone plug.

R<sub>1</sub>—Linear control.

RFC<sub>1</sub>—R.f. choke from ART-13, replacement for choke in 32V, or Raypar RL-100.

S<sub>1</sub>—Two-section, four-pole 5-position ceramic rotary switch. (Centralab 2515), poles and corresponding-position contacts connected in parallel on each wafer.

S<sub>2</sub>—Replacement switch for HT-33, see text.

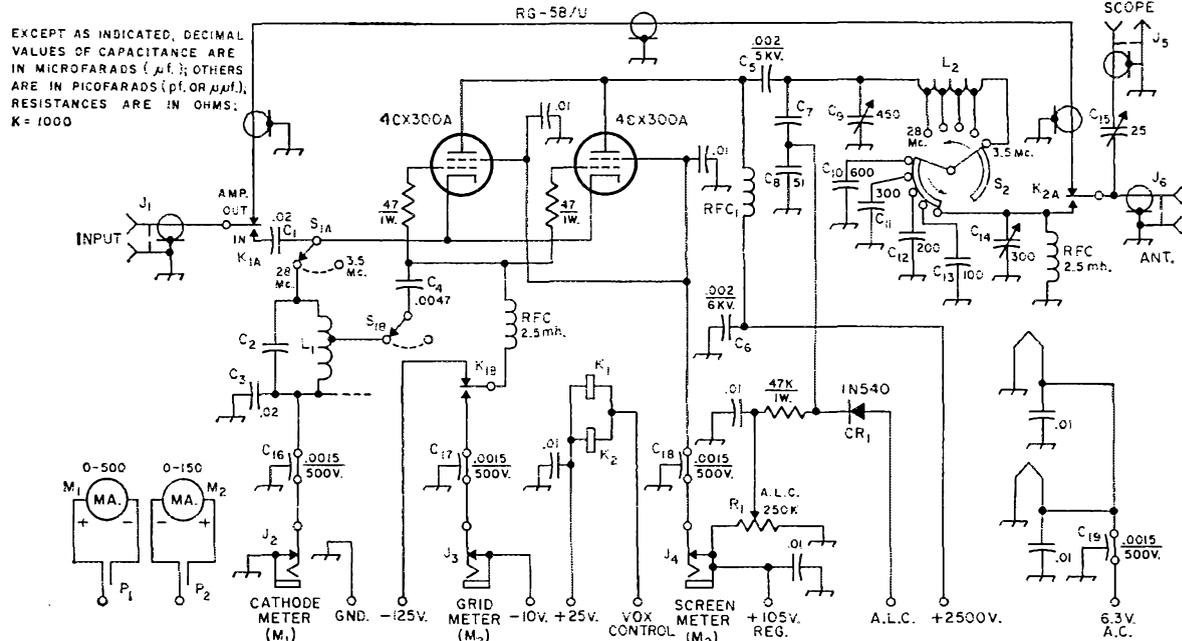


Fig. 1—R.f. and control circuitry of K4ZZV's grounded-grid amplifier. Except as indicated otherwise in the diagram, or listed at the left, fixed capacitors of decimal value are disk ceramic, 1000 volts.

tion can be avoided by grounding both elements for r.f. through bypass capacitors, but operating them at their normal d.c. potentials. This was not considered to offer any serious problem.

Since experience seemed to indicate that the pair of tubes would show an input impedance in the vicinity of 50 ohms, the amplifier was fed directly with RG-8/U coax line.

Upon completion of the construction, initial tests were made using 2500 volts on the plate, regulated 360 volts on the screen, - 55 volts of bias on the grid, and a two-tone input signal. Everything seemed to be working fine until operation was carried down to 15 meters. On this band, r.f. feedback caused very unstable operation. In the simple input coupling system being used, the tube, output tank, and excitation source are in series. The r.f. output current has to return to cathode through the exciter output coupling system and the coax line. Although the line was shorter than the  $\frac{1}{20}$  wave-length usually considered permissible, the reaction was there. And then, too, the exciter output circuit was not designed to carry the additional r.f. current, some 2 amperes in this case. A quarter-wave line could have been used, but this would have meant a separate line for each band, and switching five lines doesn't lend much to rapid band changing.

There went the first simplification. A tuned circuit had to be added. Now, the excitation voltage is developed across this input circuit, and the return current is confined to a short direct path within the amplifier itself. Very-high- $C$  input tanks are used. These are retuned to the center of each band with the aid of a grid-dip oscillator. They work very well across the phone portions of the bands without readjustment. The fly-wheel effect of these tanks also improves the regulation of the driving signal, reducing the distortion that is likely to occur, because of changes in amplifier input impedance over the driving cycle, when a simple random length of coax is used to feed the amplifier.<sup>2</sup>

The next problem to be encountered was to find that the amplifier was not linear out to the required 500 ma. of plate current. On bringing up the drive, a knee appeared in the scope

<sup>2</sup> Orr, Rinaldo, Sutherland, "The Grounded-Grid Linear Amplifier, *QST*, August, 1961.

trapezoid pattern<sup>3</sup> at about 375 ma. with optimum loading. When the loading was increased so that the output dropped 20 per cent, the knee was pushed out to 400 ma.

Super-cathode drive<sup>4</sup> was then tried. In its simplest form, this arrangement is the same as the high- $\mu$  zero-bias triode connection mentioned earlier, but with the grid tapped up from ground on the input tank. This reduces the drive to the grid, while maintaining full drive to the screen. The tap can be adjusted to limit the drive to a level that will keep the grid dissipation within rating. To assure this, the tap was placed far enough up on the input coil so that the grid current would not exceed the rated Class C value with full drive applied.

With this modification it was found that the amplifier could now be driven to a plate current of 600 ma. before flat-topping. However, considerably more drive was required for full output. Drive requirements were reduced to a more reasonable level by the use of a small amount of screen voltage. This also required some grid bias to place the operating point at the most linear portion of the tube curve. The slight concavity in the trapezoid pattern that had appeared uncorrected with the zero-bias connection was also rectified by the introduction of a suitable value of grid bias.

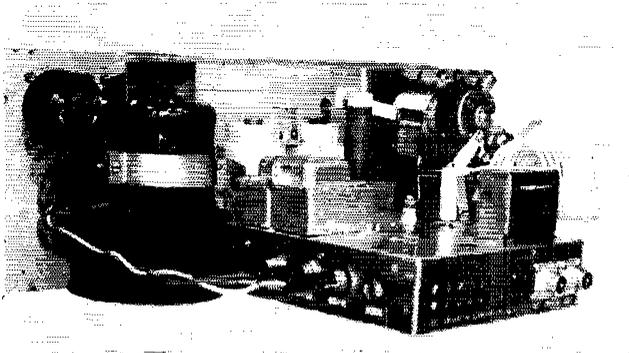
### Circuit

The final circuit that emerged from these tests is shown in Fig. 1. The high- $C$  input tank circuits are selected, according to the band in use, by the double-pole switch  $S_1$ . A band-switching pi network is used in the output circuit. The amplifier is switched in and out by relays  $K_1$  and  $K_2$ . A second pole on  $K_1$  ( $K_{1B}$ ) switches the amplifier grid to cutoff bias to let things cool down on standby and it also eliminates diode noise while receiving.

Provision is made for metering grid current, screen current and cathode current. A system of plugs and jacks is used to make connections to

<sup>3</sup> In this instance, the trapezoid pattern is used to check plate linearity only. It will not indicate possible distortion of the driver signal by nonlinear loading of the input circuit caused by changes in amplifier input impedance over the driving cycle.

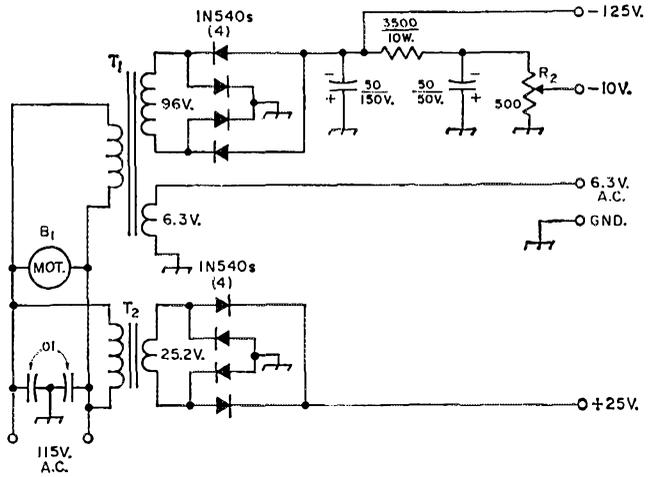
<sup>4</sup> *Single Sideband Principles*, Pappenfus, Bruene and Schoenike, pp. 159, 193. McGraw Hill.



This view shows the metering jacks, and the construction of the a.l.c. coupling capacitor  $C_7$ .

Fig. 2—Bias and relay-power circuits. Capacitances are in  $\mu\text{f.}$ ; resistances are in ohms. Capacitors of decimal value are disk ceramic; others are electrolytic. Diodes are 400 p.r.v., 750 ma.

- $B_1$ —75 c.f.m. blower.
- $R_2$ —Wire-wound control.
- $T_1$ —Power transformer: 96 volts, r.m.s., 40 ma.; 6.3 volts 6 amperes (Merit P-3044).
- $T_2$ —25.2-volt 1-ampere filament transformer (Merit P-2962).



the two meters, which are mounted on the panel, but exterior to the amplifier enclosure. A 500-ma. meter is used to measure cathode current. The other meter has a 150-ma. scale, and may be plugged in to read either grid current or screen current. The zero-set screw of this meter is adjusted to give a deflection of 20 ma. with no current flowing through it. This is to take care of reverse screen current, which is normal under certain conditions.

Relay-voltage and low-impedance adjustable bias supplies are built into the amplifier unit. The circuits of these supplies are shown in Fig. 2. Other supplies (105 volts regulated for the screens, and 2500 volts for the plates) are external. A VR-105 is used in the screen supply, and its series resistor is adjusted for a VR-tube current of 40 ma. without load.

Included also is an automatic load-control circuit. A small amount of r.f. is coupled out of the output circuit, rectified by  $CR_1$ , and fed back to the a.l.c. input of the exciter. The a.l.c. adjustment potentiometer,  $R_1$ , applies reverse bias to the diode to control the amplitude of the a.l.c. signal.

### Construction

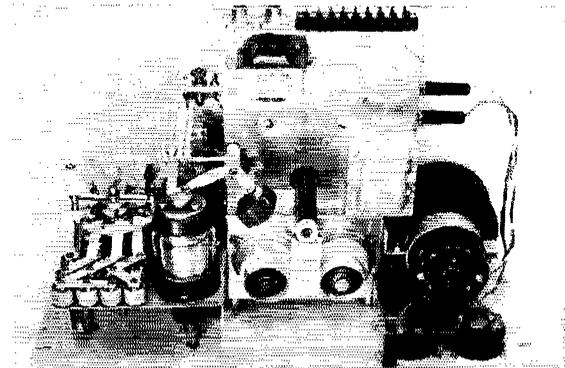
While it is probable that not many will want to duplicate the amplifier shown in the photographs in all mechanical details, constructional points will be reviewed briefly. The tubes and input-circuit components are mounted on and in a  $4 \times 6 \times 3$ -inch aluminum chassis which is mounted from the  $7 \times 19 \times \frac{3}{16}$ -inch panel on spacers. One side of the chassis is cut out to fit the exhaust flue of the blower.

A  $7 \times 7 \times 2$ -inch chassis accommodates the relays and components of the bias and relay supplies. The components of the pi network are mounted on a L-shaped subpanel attached to the amplifier-tube chassis and to the panel, using spacers about 2 inches long for the latter.

Copper strip is used for connections in the output circuit. Referring to the photographs, one end of a wide strip joins the two wrap-around

anode clamps. The other end of this strip goes to the top end of the plate-circuit r.f. choke,  $RFC_1$ . A narrower ( $\frac{1}{2}$ -inch) strip attached to the same terminal of the choke supports one side of the blocking capacitor  $C_5$ . The other end of the capacitor is supported by a short  $\frac{1}{2}$ -inch-wide strip attached to a 2-inch ceramic pillar. Capacitor  $C_7$  is formed by attaching a length of  $\frac{1}{2}$ -inch strip to the top of a ceramic feedthrough insulator mounted in the power-supply chassis, immediately below  $C_5$ . The strip is bent so that  $\frac{3}{4}$  inch of its length runs parallel to the capacitor-to-pillar lead, and spaced  $\frac{1}{8}$  inch from it. The lower terminal of the feedthrough insulator is connected to  $C_5$  which is mounted inside the chassis. The 2-inch ceramic pillar also serves as a tie point for the tank coil and tuning capacitor  $C_9$ .

The vacuum capacitor, plate band switch, and the fixed loading capacitors are mounted on a subpanel. There is a total of 12 fixed capacitors, each having a capacitance of 100 pf. Units are strapped in parallel, as necessary, to provide the capacitance values shown in the circuit diagram. Variable capacitors  $C_{14}$  and  $C_{15}$  are



Rear view showing the general layout of components. Bandswitch connections to the fixed output capacitors may be seen at the lower left.

mounted on a side apron of the power-supply chassis. The latter may be adjusted with a screwdriver from the rear.

The plate band switch,  $S_2$ , was salvaged from an HT-33. It exactly filled the bill for the author, but those who wish to build a similar amplifier may have to improvise if they can't dig up something similar. A heavy-duty switch, such as one of the new Millen units,<sup>5</sup> might be used for the coil. It is not strictly necessary that this switch be progressively shorting. If a nonshorting switch is used, the arm should be connected to the output end of the coil, and the contacts to the taps in conventional fashion. A smaller progressively-shortening switch, such as the Centra-lab PISD ceramic wafer with matching index assembly, should be adequate for switching the fixed loading capacitors.

The tuning capacitor ( $C_9$ ) in the photographs is a vacuum unit (similar in ratings to the Jennings UCSF-500) having a maximum capacitance of 450 pf. However, the capacitance needed to tune to the 75-meter band with the coil inductance specified for  $L_2$  is approximately 250 pf. If space is available, a standard air variable having a maximum capacitance of this value (such as the Johnson 154-9) should be suitable.

**Table of Tuned-Circuit Values**

Band	$C_2$	$L_1$ — turns	$L_2$ — $\mu h.$
4 Mc.	0.01 $\mu f.$	5	8
7 Mc.	0.0047 $\mu f.$	4	4
14 Mc.	0.0027 $\mu f.$	2	2
21 Mc.	0.0011 $\mu f.$	2	1.25
28 Mc.	620 pf.	2	1

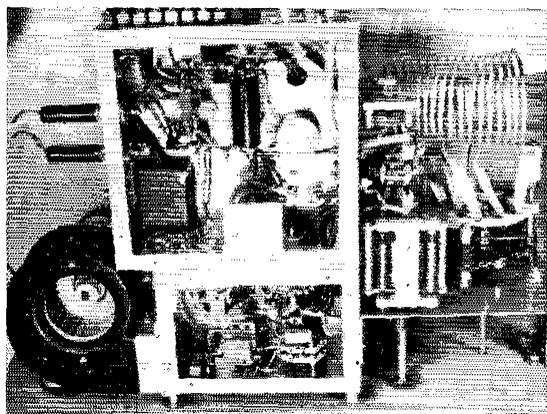
See text for other details.

### Coils

The input coils are wound on a form  $\frac{1}{2}$  inch in diameter, using No. 14 wire. After removing each coil from the form, the proper fixed capacitor should be soldered directly across the coil. The spacing of coil turns should then be adjusted until a grid-dip meter indicates resonance at the center of the desired operating range. These coils are supported between the switch terminals and a common tie point.

The pi-network coil was wound with No. 8 wire on a mandrel tapering from 3 inches o.d. to 2  $\frac{1}{8}$  inches to give a better form factor on the higher-frequency bands. A few extra turns were wound on the form at the start. After guesstimating the spacing, a grid-dip meter, a fixed capacitor of known value, and an  $LC$  chart were used to locate the taps to give the inductance values shown in the table. In this instance, the coil has a total of 16 turns, with taps at 5, 9, 10  $\frac{3}{4}$  and 12 turns from the output end, the large-diameter end of the coil being the output end. If preferred, heavy-duty variable-pitch coil stock may be substituted, using the same method to determine the tap positions.

<sup>5</sup> New Apparatus, *QST*, July, 1966, p. 29.



Bottom view showing the coil taps, variable output capacitor and the scope coupling capacitor. The input band switch and input-circuit components are assembled inside the small amplifier-tube chassis, bottom center.

The tap leads are of  $\frac{1}{8}$ -inch copper ribbon. After soldering these leads to the coil, the whole assembly was silver-plated to give it a "commercial" appearance. All other copper connecting strips and clamps were given the same treatment.

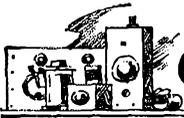
### Adjustment

The general objectives in adjustment are to set the grid tap on the input circuit at a point that will limit the grid dissipation to within rating, use sufficient screen voltage to reduce the driving-power requirement to a reasonable value, and adjust the grid bias for best linearity. These adjustments are not entirely independent of each other, or in respect to loading, and considerable time was required to arrive at the combination that was finally used. In the amplifier described, the grid is tapped down from the cathode about  $\frac{1}{8}$  of the total number of turns in the input coil for each band. Screen voltage is regulated at 105 volts, while the bias is set at approximately -10 volts. The adjustment of bias is rather critical. A few per cent either way can bring the distortion products up fast. The scope may be left connected for on-the-air monitoring. These adjustments resulted in a grid current of 10 ma. when the amplifier is driven with a two-tone test signal to a point just below flat-topping — plate current about 600 ma. The zero-signal current is about 225 ma. Methods of checking overall linearity and distortion are covered in the *A.R.R.L. Handbook* and will not be repeated here.

The a.l.c. control should be adjusted to bias off the a.l.c. diode until the amplifier is fully loaded. Then the bias should be backed off until the cathode meter kicks up to peaks of about 350 ma. on average speech. **QST**

**SWITCH  
TO SAFETY!**





## A V.h.f. Lazy-H Antenna

*An Attic Array For Cliff Dwellers*

GETTING an indoor antenna to perform satisfactorily is not always easy. Certain sacrifices will result from any attempt to install an indoor antenna. Yet, by taking advantage of broadband antennas and effecting the best possible impedance match to them, worthwhile results can be secured from an "attic special."

The 2-meter Lazy H described in this article is an old standby which should bring back a few nostalgic memories to 10- and 20-meter operators who have dabbled with combinations such as this. The entire system, including 40 feet of 300-ohm ribbon line, cost the author less than two dollars. It took about 45 minutes to cut the wire to length, tack the system to the attic wall, and adjust the matching transformer for an s.w.r. of 1:1. At optimum efficiency this antenna theoretically should be capable of a maximum gain (bidirectional) of about 5.9 decibels. The overall efficiency will be governed by the placement of the array with respect to house wiring, water pipes, gutters and downspouts. The antenna should be kept as far away from such things as possible, to lessen the chance of pattern distortion, detuning effects, and absorption of the signal.

Of any number of simple indoor antennas tried for operation on 6 and 2 meters, the Lazy-H has been superior to all others used.

### Making The Antenna

A 10-foot length of a.e. zip cord was used for the WICER Lazy-H. The cord was split at one end and the two conductors were pulled apart, making two 10-foot lengths of insulated wire. Each wire was pruned to a length of 115.5 inches and pinned to the attic wall in the configuration shown in Fig. 1, so that their center sections B-B, crossed. A piece of cardboard,  $3\frac{1}{2}$  inches square, was used as a spacer at the point where the two are transposed, permitting uniform spacing to be maintained between the phasing line. The insulation was stripped from the wires at the points marked X, permitting the matching transformer to be soldered into place. The matching transformer was fashioned from a 20-inch length of 450-ohm open-wire line.

### Tuneup

A Transmatch<sup>1</sup> is used at the author's station for coupling the v.h.f. equipment to the 300-ohm

transmission lines which feed the antennas. Initial tests were made by terminating the transmission line with a 300-ohm noninductive resistor and applying a few watts of transmitter output power to the line through an s.w.r. bridge. The Transmatch was adjusted for a 1:1 s.w.r. reading and the dial settings were noted on paper. Next, the terminating resistor was removed and that end of the feed line was tapped along T<sub>1</sub>, experimentally, until a 1:1 match was obtained at the same setting of the Transmatch controls that gave a 1:1 match with the 300-ohm termination. The dimensions given in Fig. 1 should be well within the "ball park" and should provide a close match at 145 Mc. The matching transformer should be adjusted for your favorite portion of the band. Frequency excursions to other parts of the band will be possible, but the s.w.r. will rise somewhat as you depart from the part of the band to which T<sub>1</sub> has been tuned. The Transmatch will permit matching the transmitter to the line and will disguise the slight mismatch at "off" frequencies, enabling the transmitter to load up normally. If coax line is preferred, a balun transformer<sup>1</sup> can be attached to T<sub>1</sub> in place of the 300-ohm transmission line after the system has been tuned as just described. This will permit the use of 75-ohm coaxial line, if desired.

### Performance

Since the Lazy-H is a bidirectional array, it should be oriented for maximum radiation in your favorite direction. In the author's case, north-south directivity was desired so the array

(Continued on page 150)

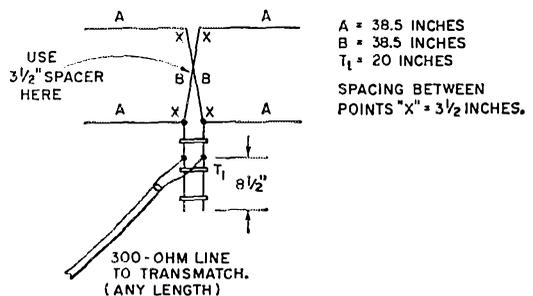


Fig. 1—Dimensions for the 2-meter Lazy-H antenna. Make certain that the center sections, B, are transposed as shown.

<sup>1</sup> *The Radio Amateur's V.H.F. Manual*, pp. 188-189.

# Break-In Monitoring with the HA-1

## Simple Muter/Monitor Switch

### Using Transistors

BY DOYLE D. THOMPSON,\* W4PLL

ANYONE owning a Hallicrafters HA-1 electronic key can quite easily add circuitry that will mute the receiver and feed the signal from the built-in side-tone oscillator of the HA-1 to the headphones.

The circuit of the system is shown in Fig. 1. The side-tone oscillator signal is fed to  $Q_1$ , while the receiver output signal is fed to  $Q_2$ . The two transistors have a common collector resistor,  $R_A$ , across which the headphones are coupled.

With the key open, the back contacts of the keying relay of the HA-1 ( $K_1$ ) close the emitter circuit of  $Q_2$ , and the receiver output signal is heard in the headphones. When the key is closed, the emitter circuit of  $Q_2$  is opened, muting the receiver output. Simultaneously, the sidetone oscillator is keyed, and its signal is heard in the headphones.

#### Construction

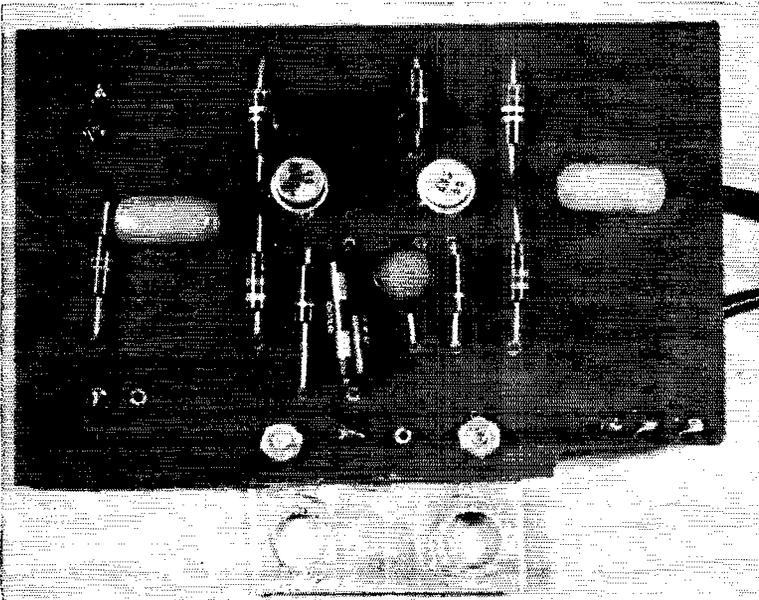
The transistor switch unit was constructed on a copper-clad board of 3 by 4½ inches, using "homemade" techniques, as can be seen in the photographs. This type of printed-circuit work

\*3213 London Road, Greensboro, N. C. 27405.

can be easily accomplished using any of the existing kits that are listed in most catalogs. The circuit was first drawn up on paper. The paper was taped to the copper-clad board while a small drill was used to drill holes for component mounting. After the holes were drilled, the board was polished with steel wool to remove any burrs around the holes. The circuit was then drawn on the copper, using a liquid resistant. (I have since found that tape markings make a much better-looking job.)

When the drawing was completed, the board was placed in a small plastic tray and covered with the etching solution. After the proper length of time, the board was removed from the solution and washed thoroughly. Be sure to examine the board to see that all excess copper has been etched away before the resistant is buffed off the copper with steel wool. This leaves a bright printed-circuit board.

The components were mounted on the board by passing the terminal wires through the drilled holes. All components were placed on the side opposite the copper, of course. When soldering



Component side of the printed-circuit board.

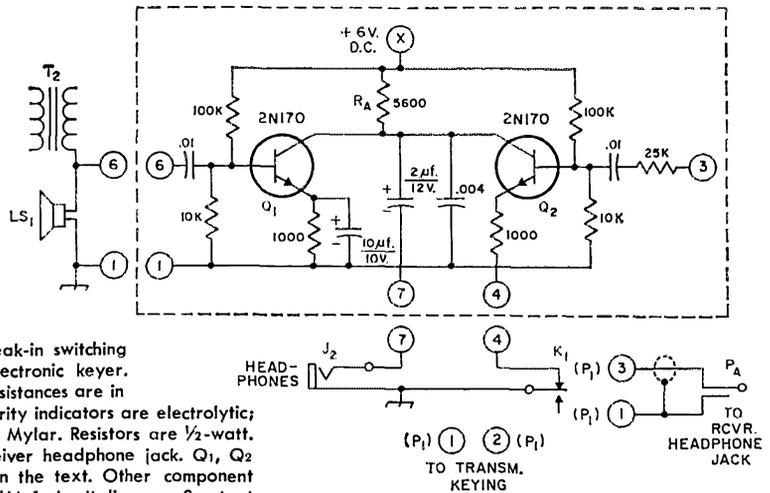


Fig. 1—Circuit of the break-in switching adapter for the HA-1 electronic keyer. Capacitances are in  $\mu\text{f.}$ ; resistances are in ohms. Capacitors with polarity indicators are electrolytic; others are disk ceramic or Mylar. Resistors are  $\frac{1}{2}$ -watt.  $P_A$  is a plug to fit the receiver headphone jack.  $Q_1$ ,  $Q_2$  and  $R_A$  are referred to in the text. Other component labels refer to the original HA-1 circuit diagram. See text for terminal connectors.

be sure to use a small soldering iron, as too much heat will cause the copper to pull away from the board. Heat sinks should be used on the transistor leads while they are being soldered to the board. (Small alligator clips work well.) The circuit is also adaptable to conventional wiring, but even inexperienced hands should have no difficulty with the simple printed-circuit work involved here.

A small aluminum bracket was made up to mount the circuit board on the rear of the keyer chassis. The nuts holding the balance and weight controls were removed from the keyer chassis and the bracket mounted by sliding it over the two control shafts and replacing the nuts. This can be seen in the photographs. A "step" was formed in the bracket to space the board a half inch or so away from the HA-1 chassis to avoid interference with components inside the cabinet, and to keep the transistors away from the heat of the keyer tubes. A small notch was filed in the rear corner of the keyer chassis (above the

ground terminal) to provide a passage for wires connecting the board to the keyer.

### Keyer Modification

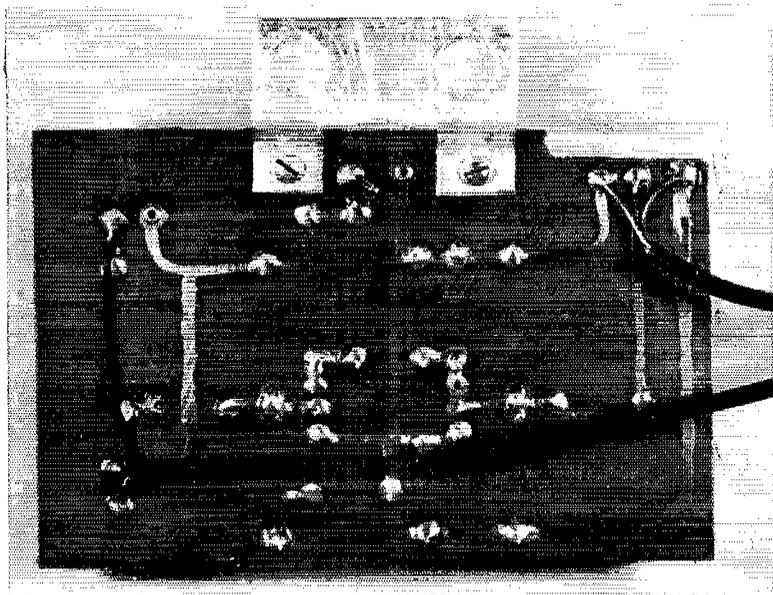
The HA-1 keyer must be modified slightly, as follows, to accommodate the added circuitry:

- 1) You will find a yellow wire running from the output transformer to the headphone jack. Disconnect this lead from the jack and reroute it to Terminal 6 of control outlet  $SO_1$ . (Leave the speaker wire connected to Terminal 6.)
- 2) Remove the 47-ohm resistor  $R_{S1}$  from the headphone jack. This resistor is no longer needed, as the speaker will be a permanent load for the transformer  $T_2$ .
- 3) Unsolder the remaining wire from the headphone jack and transfer it to the other (now vacant) terminal of the jack. This will connect the "tip" terminal of the headphone jack to Terminal 7 on  $SO_1$ .
- 4) Remove and discard the wire running from Terminal 3 of  $SO_1$  to Terminal 5 of the  $K_1$  relay socket.
- 5) Place a 270,000-ohm resistor between Terminals 1 and 3 of the 0A2 ( $V_5$ ) socket.<sup>1</sup>

<sup>1</sup> Tube-base diagrams indicate an internal connection to Pin 3 of the 0A2. Investigation shows that this pin is not connected to either of the two tube elements. However, a lead from this pin does extend into the gas-filled envelope. While no trouble has been experienced by using the pin as a tie point in this application where the voltage introduced at the pin is a matter of only a few volts, it is probable that this connection in other applications involving higher voltage might cause ionization troubles.

The break-in adapter is mounted at the rear of the HA-1 chassis by means of a bracket fastened under the mounting nuts of the balance and weight controls.





Copper side of the circuit board. Notice the step in the bracket which spaces the board away from the HA-1 chassis.

6) Be sure to remove the jumper from Terminals 6 and 7 on the keyer control plug  $P_1$ .

After modification, no external connections should be made to Terminals 4, 6 or 7, on the control plug.

When the board has been mounted on the HA-1 chassis, the numbered board terminals, shown in Fig. 1, should be connected to similarly-numbered pins of socket  $SO_1$  in the HA-1. Board Terminal X should be connected to Pin 3 of the 0A2 ( $V_5$ ) socket. Connections 1, 2 and 3 to the receiver headphone plug,  $PA$ , and to the transmitter keying terminals are made to the similarly-numbered pins of plug  $P_1$  of the HA-1. Thus, all external connections may be removed by unplugging  $P_1$ . Transmitter keyer circuits will remain unchanged, as will the key-lever connections.

While I had the chassis out of the cabinet, I added a 50- $\mu$ f. electrolytic capacitor from Pin 1 of the 0A2 socket to ground. This is not really part of the modification, but the capacitor was needed to clear up some a.c. modulation on the keyer tone. Over the keyer speaker, this modulation is not objectionable but, when listening with headphones, it becomes annoying. In my keyer, a Sprague TVA 1414 capacitor worked well.

The keyer must be operated with the mercury relay  $K_1$  in a vertical position; therefore turn the keyer chassis upright. Plug in the headphones, control plug and key lever. If everything is correctly wired, you will hear your receiver audio in the headphones when power is turned on. When the key is operated, the keyer tone will be

heard in the headphones. Volume of the tone is adjusted by the keyer volume control. Receiver volume is controlled by the receiver controls. Do not run the receiver volume too high, or the transistor stage may limit, causing distortion.

With a t.r. switch, grid-block keying, and the modified keyer, you are ready for the rewarding experience of full break-in operation. The a.g.c. characteristics of the receiver will govern the speed of receiver recovery. The receiver a.g.c. switch should always be placed in the fast position, which allows between-dot listening when sending at fair speeds. At speeds ranging to the fastest available on the keyer, you can still hear the other station when he touches his key.

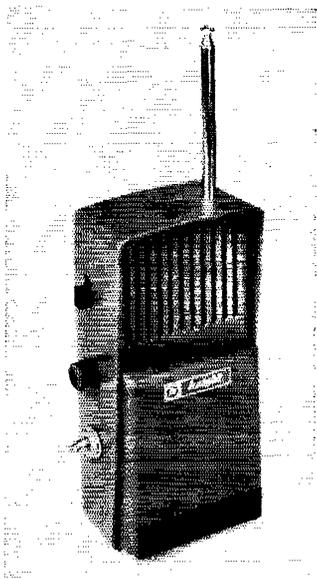
This unit could be used with other relay-type keyers. Different transistors with the same specifications, such as the RCA SK3011, could also be used, as the circuit is not critical.

Two modifications were made after the pictures were taken. A 0.004- $\mu$ f. capacitor was added from collector to ground to clear up faulty switching caused by r.f. picked up on the headphone leads, when running high power. In the first unit constructed, the  $Q_2$  emitter resistor had a capacitor in parallel with it. It was found that removal of this capacitor softened the switching of  $Q_2$ . This change lowered the gain of the stage somewhat, but this is not a problem as the level is still sufficient for the headphones. These modifications are included in Fig. 1

The transistor switch unit has given an excellent account of itself since it was first put in use early in 1963. For the little time and effort it takes to construct, why not try full BK for the added enjoyment it gives to c.w. operation? QST

# MORE MODIFICATIONS

## FOR THE



## KNIGHT C-100

BY ROBERT D. STREETER, W9IQI

*Adding a miniature transformer to the circuit board of this handi-talkie results in improved transmitting readability because of increased modulation percentage.*

## *More Audio for this Handi-Talkie*

**T**HE Knight C-100 handi-talkie kit is a very economical unit which delivers good performance. It can be used in the 10-meter band by merely changing the FA-5 crystal and slightly retuning the inductors.<sup>1</sup> Owners of the C-100 have no doubt noticed that the unit is low in modulation percentage when transmitting. As two units become farther apart during operation, understandable voice communication diminishes rapidly, although the silencing of superregeneration hiss, brought about by the carrier from the other unit, is still quite noticeable. This article describes a modification to the C-100 which is easy to do, costs very little money, and will greatly improve the modulation of the transceiver.

The problem appears to be caused by the lack of output voltage from the microphone — the speaker becomes the microphone during transmit — and does not provide enough audio voltage to drive the speech stages. This lack of audio limits the percentage of modulation.

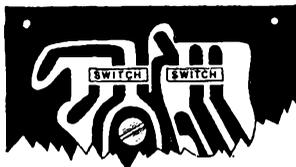
### *Changing the Circuit*

It is inconvenient to modify the existing audio stages to produce higher output. Adding another audio stage would also be inconvenient. The circuit change should affect only the transmitted signal — not the operation of the unit during receive. It was found that a step-up transformer could be added between the speaker and the audio-amplifier section which brought about a very noticeable increase in talk power of the C-100. The transformer is used during transmit only, requiring that transmit-receive switch circuitry be rearranged slightly.

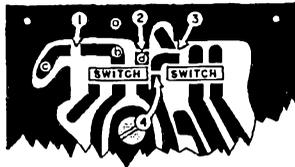
The kit should first be wired according to the instruction book, then adjusted for normal operation. Next, disassemble the C-100 so that you can get to the foil side of the circuit board. This operation will require the removal of the antenna, the front cover, the speaker, and the printed-circuit board. Turn the circuit board toward you so that the foil side is facing up and so that the switch is on your left. The foil pattern of the unmodified circuit board (switch area) is shown in Fig. 1, at A. In Fig. 1B, the same pattern is shown but with some areas of the copper cut away. This modification should be duplicated, using a sharp knife to remove the unwanted copper. The areas to be removed are labeled 1, 2, 3, and 4. After the copper has been cut, apply a hot soldering iron to the portion of the copper that is to be removed. This will loosen the adhe-

2917 Westbrook, Apt. 412, Fort Wayne, Ind. 46805

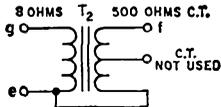
<sup>1</sup>QST, March 1964, page 36. *Radio TV Experimenter*, Fall of 1963.



(A)



(B)



(C)

sive, making it easy to remove the metal. Two jumper wires are next added to the board as shown in Fig. 1B. One of the wires is connected between points *a* and *b*. The second wire is used to join points *c* and *d*. A third wire is connected between points *h* and *i*. Fig. 1C. The new transformer,  $T_2$ , is connected to the board at terminals *e*, *f*, and *g*.

Fig. 1— Step-by-step illustrations of the changes to the printed-circuit board of the Knight C-100. At A, the original circuit. At B, sections of the p.c. board have been removed. Jumper wires are added from *a* to *b* and from *c* to *d*, as described in the text. A jumper wire is connected between *h* and *i* at C. Points *e*, *f*, and *g* show where the new transformer,  $T_2$ , is connected.

The modified circuit is shown schematically in Fig. 2. The circuit changes and additions are drawn in dashed lines. The new transformer is wrapped in black vinyl tape, after installation, and is tucked into the case of the C-100. The transformer leads should be left long enough to make this possible.

This completes the modifications. The transmitter can now be tested and a pronounced increase in talk power should be noted. I wish to thank K8DDG and K9VRP for their help in testing the converted units. QST

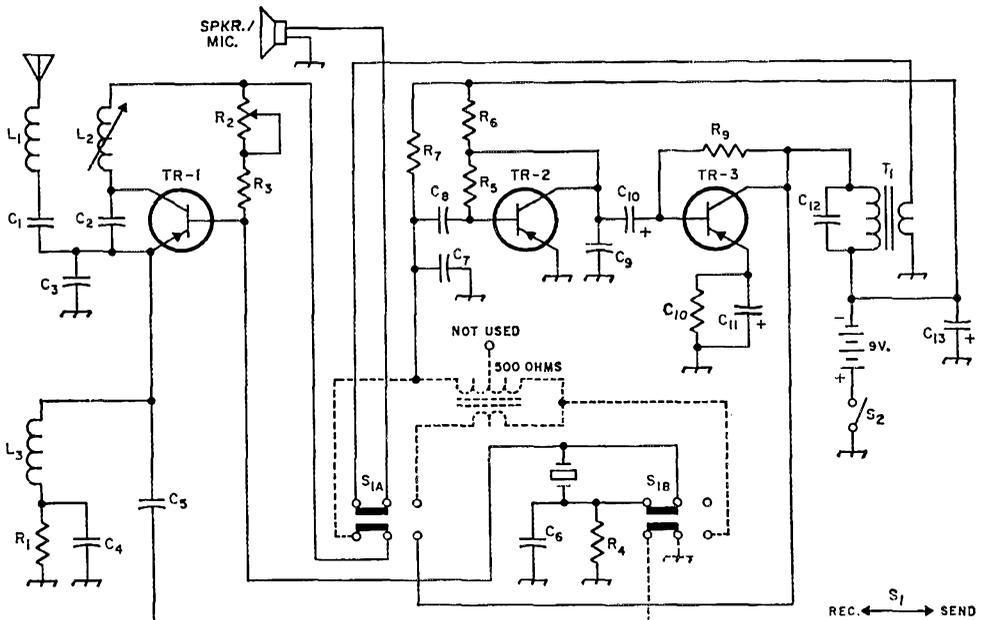
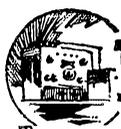


Fig. 2—A schematic diagram of the modified C-100 showing the circuit changes in dashed lines. The manufacturer's part numbers have been retained to simplify comparison checks between the old circuit (instruction manual) and the new one.  $T_2$  (shown dotted) is a miniature transformer whose primary impedance is 500 ohms each side of the center tap. The secondary impedance is 8 ohms. An Olson Radio T-333 was used by the author. Other similar types are suitable.



# Recent Equipment



To acquaint you with the technical features of current amateur gear.

## The Drake 2-C and 2-NT



**N**EWEST additions to the Drake line of amateur gear are the 2-C receiver and the 2-NT transmitter, two pieces of equipment that, while made to go hand-in-hand, nevertheless can be used quite independently.

### THE 2-C RECEIVER

One glance at the 2-C receiver will identify it as a member of the Drake family of amateur equipment, and a closer look will make it clear that the resemblance is more than skin-deep. Although priced moderately, the 2-C has the essential features that amateurs look for in a 3.5-30-Mc. amateur-band receiver these days. For those who want more, there are "frills" available as accessories.

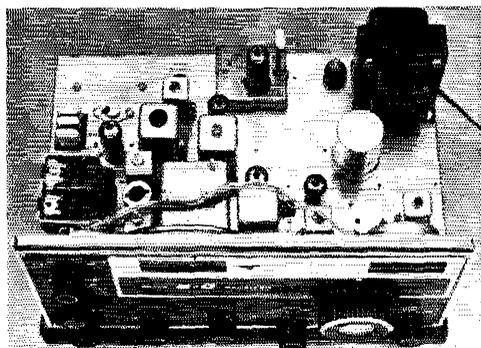
The 2-C has a basic tuning range of 3500 to 4000 kc. All other bands are converted to this frequency range, which then becomes a tunable intermediate frequency. The beating oscillator for each band is crystal-controlled. From 3.5-4 Mc. the signal is converted to an intermediate frequency of 455 kc., and then finally converted again to a 50-kc. i.f. The 50-kc. output is detected by either an envelope or product detector, and the audio output is boosted in a three-stage amplifier before being delivered to the speaker or headset.

The receiver uses a mixture of tubes and semi-conductors, the latter seemingly having been

chosen for those spots where they can do a satisfactory job without increasing the circuit complexity. Tubes are used where high input impedance and relative freedom from cross-modulation effects are important. The overall result is a reduction in size and power consumption while utilizing the advantages of both types of devices.

The circuit layout is shown in block form in Fig. 1. The r.f. circuits for the 12BZ6 antenna stage and 12AU6 first mixer — the latter is an amplifier rather than a mixer on the 3.5-4-Mc. band, where the crystal-controlled h.f. oscillator is inactive — are gang tuned by a dual capacitor. This control is separate from the main tuning, as is now common practice, and although the band switch is marked for the five amateur bands between 3.5 and 30 Mc. the actual tuning range in each switch position is such that there are no gaps in coverage between 3 and 30 Mc. The r.f. circuits are designed around shielded transformers which have tuned-circuit coils for the 7- and 28-Mc. ranges, coupled to a single primary in the case of the antenna transformer and to an untuned secondary coil in the case of the mixer transformer. For 3.5 Mc. additional fixed capacitance is shunted across the tuning capacitors. On 14 and 21 Mc. external inductances are added in series with the 28-Mc. coil, the whole being connected in parallel with the low-frequency coil on bands from 14 Mc. up.

The h.f. oscillator which beats with the incoming signal to convert it to 3.5-4 Mc. is a crystal-controlled 2N3394 with its base grounded for r.f. Broadly-resonant tuned circuits are used between the collector and ground, a single coil being used for all crystal frequencies, which lie approximately between 7 and 25 Mc. Fixed capacitances are switched across it as required for the range in use. A low-impedance coil coupled to the tuned circuit is used both for feedback and for output to the 12AU6 mixer grid. The crystal in use (none is needed for 3.5-4 Mc.) is connected between the hot side of this coil and the 2N3394 emitter to operate as a series resonator. Sockets for crystals for the 7-, 14-, 21- and 28.5-29.0-Mc. amateur-band ranges are on the chassis, and there is an auxiliary socket, selected by a slide switch, on the side of the receiver for plugging in crystals to cover all other frequencies. Any



The tunable i.f. circuits in the 2-C receiver are in the shield box at left center near the panel. The two-gang capacitor that tunes the r.f. circuits is at the left. The crystal calibrator, in the center at the rear chassis edge, is a plug-in accessory.

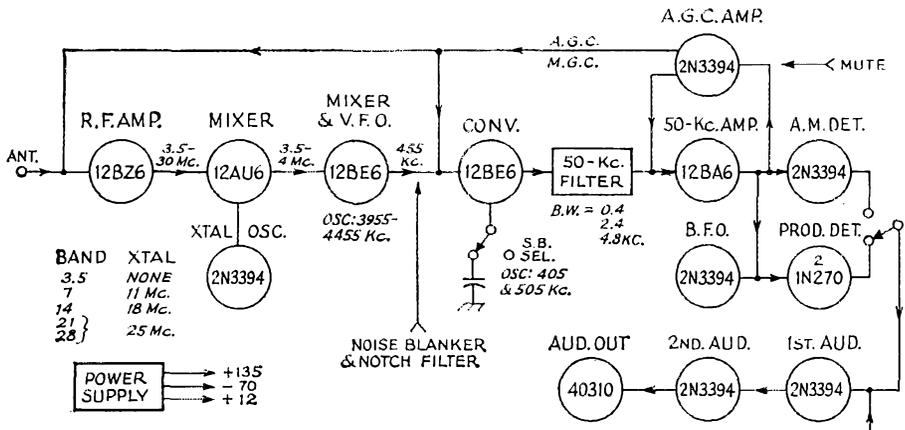


Fig. 1—Block diagram of the 2-C receiver. The same 25-Mc. crystal is used in the h.f. oscillator for 21-21.5 and 28.5-29 Mc. Crystals for other 10-meter ranges can be plugged in an auxiliary crystal socket on the side of the receiver.

500-kc. range between 3 and 30 Mc. can be covered by using external crystals of appropriate frequency in the auxiliary socket.

The third tube in Fig. 1 is a 12BE6 converter, with its control-grid circuit tuned through the 80-meter band simultaneously with the tuning of the variable oscillator, which operates 455 kc. higher. The circuits associated with this tube are rather well shielded, preventing stray pickup of strong 80-meter amateur signals when 3.5-4 Mc. becomes the tunable i.f. The stage is coupled through a double-tuned 455-kc. transformer to another 12BE6 which changes the frequency to 50 kc. The 455-kc. step suppresses images of the 3.5-4 Mc. range, and it also offers the opportunity, in the following converter, to select upper- or lower-sideband reception without retuning the suppressed-carrier frequency. This is done by choice of the 12BE6 oscillator frequency, which is either 405 or 505 kc.

The 50-kc. circuits provide the receiver's adjacent-channel selectivity. There are four tuned circuits at this frequency, coupled through capacitors at the hot ends. The selectivity is varied by changing the coupling capacitances, three degrees of bandpass being available—4.8 kc., 2.4 kc. and 400 cycles at the 6-db.-down points. The frequency of one edge of the selectivity curve is held constant for all three bandwidths. The skirts of the curves are steep, giving quite high suppression of the other sideband or audio image. A 12BA6 follows the filter for amplification at 50 kc.; its output is stepped down through an untuned transformer for driving the semiconductor detectors.

The a.m. detector is a diode-transistor combination, while the product detector is a dual-diode balanced-modulator circuit practically identical with one often seen in transmitting modulators. The difference, of course, is that the b.f.o. output and i.f. signal are mixed together to produce an audio signal, rather than using audio and r.f. to produce an i.f. output. The b.f.o. has a balanced output winding for driving the diodes,

while the i.f. input and audio output are unbalanced. The b.f.o. frequency is set about 500 cycles below the i.f. bandpass.

The amplified automatic gain control incorporated in the receiver uses a circuit that is a semiconductor analog of a tube a.g.c. amplifier. As shown in Fig. 2, the circuit also provides manual gain-control voltage. With  $R_2$ , the manual gain-control, at minimum (maximum gain) the voltage at point A is about -1.5 volts with respect to chassis. In the absence of i.f. input the transistor takes little or no collector current and the voltage at a.g.c. terminals 1 and 2 is likewise -1.5 volts. Terminal 1 biases the grid of the 12BA6 50-kc. i.f. amplifier and terminal 2 supplies grid bias to the 12BZ6 r.f. amplifier and the second 12BE6 mixer. An i.f. signal causes the collector current to rise, making the voltage at the collector (and terminals 1 and 2) more negative and reducing the gain of the three controlled stages. The voltage at terminal 2 is less than that at terminal 1 by the drop in  $R_1$ , so the last controlled stage

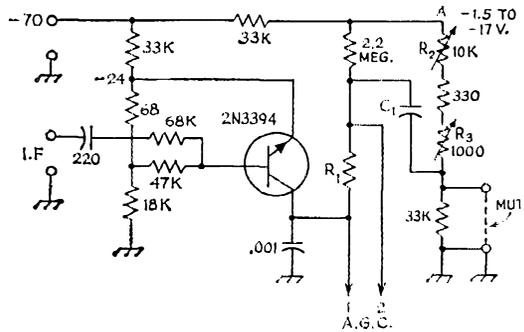
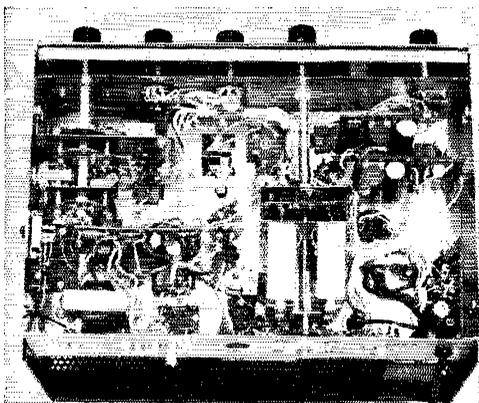


Fig. 2—Amplified a.g.c. circuit. I.f. input is taken from the plate of the 12BA6 i.f. amplifier.  $C_1$  is 0.47  $\mu$ f. for the long time constant and 0.001  $\mu$ f. for the short.  $R_1$  is 680K on the long time constant is used; this changes the ratio of a.g.c. voltages available at terminals 1 and 2.



Etched-circuit boards, mounted vertically on the bottom of the chassis, are used liberally in the 2-C. The long switch shaft just to right of center in this view is the selectivity control. The four 50-kc. i.f. circuits are mounted horizontally on a small panel next to the switch, and extend toward the rear of the chassis.

has its gain reduced more rapidly than the two earlier stages. The release time constant of the a.g.c. circuit is set by the 2.2-megohm resistor and  $C_1$ ; two values, approximately 0.75 second and 0.025 second, can be selected by a change in capacitance. The a.g.c. also can be switched off completely.

The manual gain control varies the bias voltage because the drop through it increases as its resistance is increased.  $R_3$  is an internal adjustment for setting the maximum gain. The mute terminals are normally shorted, as indicated in the drawing, but when the short-circuit is removed the controlled stages are biased back sufficiently to cut off output.

The audio amplifier following the detectors has three stages, with negative feedback for reduction of distortion. A power transistor is used in the output stage. The two low-level stages get their d.c. supply through a large dropping resistor from the tube plate supply, but the power transistor is supplied from a 12-volt d.c. rectifier-filter system.

The usual complement of controls is included on the front panel, and although the receiver is small these knobs do not get in the way of the

main tuning control. The tuning capacitor is string driven, with a light "feel" and no discernible backlash. It takes  $11\frac{1}{2}$  complete turns of the knob to tune through the 500-kc. range, an average of about 43 kc. per turn. The dial is calibrated in 10-kc. divisions and the scale is quite linear. The direction of dial rotation from the low- to the high-frequency end of a range is the same on the 3.5 and 28-Mc. bands, but reverses for 7, 14 and 21 Mc. The hairline indicator of the dial can be moved mechanically to align calibrated points with the harmonics of a 100-kc. oscillator. A plug-in 100-kc. calibrator is available as an accessory.

The cabinet construction is similar to that used in earlier Drake equipment; that is, the top and bottom are wrap-around pieces each removable without disturbing the other. The chassis is copper plated. Etched-circuit subassemblies are liberally used, and from examination of the bottom of the chassis it is evident that a major share of the wiring is on these subassemblies.

Phono connectors are provided on the back for antenna input, external muting control, loud-speaker connections, and for feeding in sidetone from a transmitter. The sidetone is introduced in the first audio stage immediately following the audio gain control. There are also sockets for two additional accessories, a noise blanker and a Q-multiplier/notch filter. When plugged in, these operate in the 455-kc. section of the receiver, as indicated in Fig. 1. The function switch on the front panel, in addition to the conventional "off," "standby" and "on" positions, has three extra positions for external muting, for cutting in the noise blanker, and for turning on the 100-kc. calibrator.

#### Drake 2-C Receiver

Height:  $6\frac{9}{32}$  inches.

Width:  $11\frac{5}{16}$  inches.

Depth:  $9\frac{3}{32}$  inches.

Weight:  $13\frac{1}{2}$  pounds.

Power Requirements: 115 volts a.c.,  
50/60 cycles, 30 watts.

Price Class: \$230.

Manufacturer: R. L. Drake Co., Miamis-  
burg, Ohio. 45342

QST ————— QST ————— QST

#### THE 2-NT TRANSMITTER

THE circuit and styling of the Drake 2-NT transmitter have been coordinated with the 2-C receiver so that together they form a complete station, suitable both for the Novice and for any c.w. man who finds 100 watts input enough for his activities. Set side by side, the two present a continuous-looking panel display, and the total table space required is only 22 inches wide by 10 inches deep.

The 2-NT is a five-band (3.5-30 Mc.) crystal-controlled transmitter in which a good deal of

thought has been given to convenience in control and operation. Although it has three stages, as shown in the block diagram of Fig. 1, there is only one adjustment to make at any given transmitting frequency. A built-in relay switches the antenna from the receiver to the transmitter at the instant the key is closed, and holds it there for a period of time (up to five seconds after opening the key) that the operator can select by a panel control. The hold-in can be made short enough so the antenna switching occurs between dots and dashes, if desired, for real break-in operation.

XTAL. OSC.

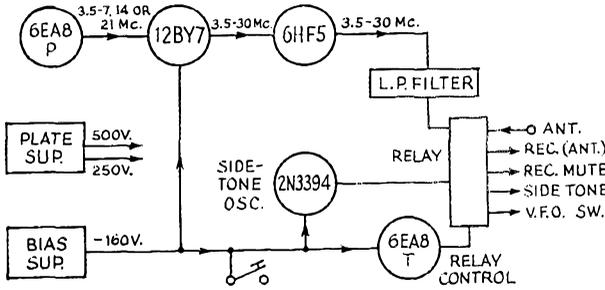


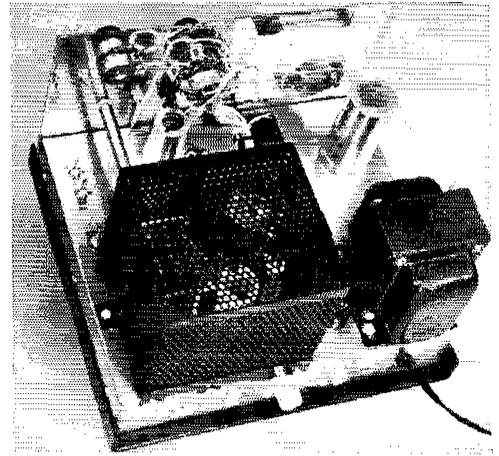
Fig. 1—Block diagram of the 2-NT transmitter.

The relay does other jobs, too. Another set of s.p.d.t. contacts is used as a switch for muting the receiver while transmitting and, on the "make" side, for closing the cathode circuit of the oscillator. The oscillator runs continuously for a length of time determined by the "delay" control, actual keying being done in the 12BY7 driver stage. If the delay is short, the hold-in time for the oscillator is equivalent to differential keying.

There is also a built-in sidetone oscillator, keyed along with the transmitter, with its output going through a third set of relay contacts to a connector on the back of the set. The sidetone can be introduced into the receiver simultaneously with muting so that the code being sent can be heard. The sidetone output-level control on the panel allows the volume to be adjusted. The sidetone is convenient for Novices, especially, since they will often be in contact with stations on frequencies sufficiently different from their own so that the actual transmitted signal cannot be monitored. The tone oscillator also can be used for code practice, a "standby" position being provided on the function control so the sidetone signal can be heard in the receiver without generating an r.f. signal.

The crystal oscillator uses the pentode section of a 6EAB in what is ordinarily called the "grid-plate" circuit. Broadly-resonant fixed circuits are switched to the plate for either fundamental-

crystal output or multiplication according to the band in use. The oscillator is intended for use with 7-Mc. crystals on all bands except 80 meters, where 3.5-Mc. crystals are used. A single plate circuit suffices for both 3.5- and 7-Mc. operation. A 14-Mc. circuit is used for 14 and



The final amplifier in the 2-NT transmitter is shielded by the perforated-metal cage which dominates the chassis. The oscillator and buffer tubes are between this enclosure and the front panel.

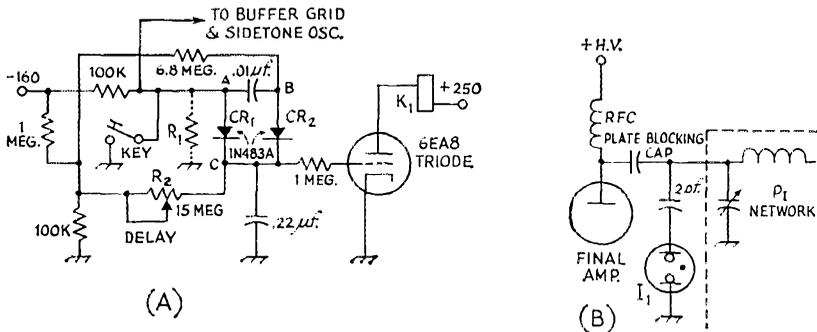
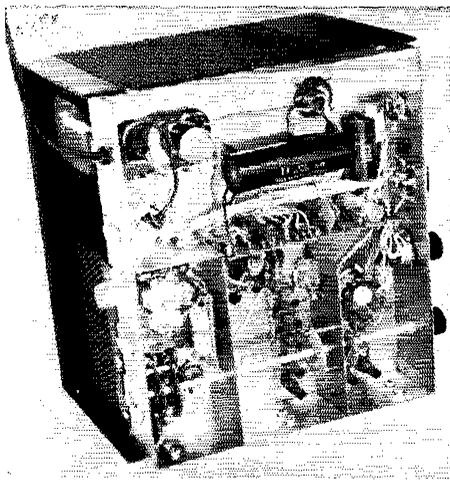


Fig. 2—A—Relay control circuit used in the 2-NT. This provides an adjustable hold-in for the oscillator, antenna switching, and other relay-controlled switching while the transmitter is being keyed. The hold-in time is set by  $R_2$ , and will be as long as five seconds with the full 15 megohms. A 5-megohm variable resistor will provide ample delay for most operators.  $R_1$  is approximately 0.15 megohm. Any medium- $\mu$  triode can replace the 6EAB section. B—R.f. indicator used in the 2-NT.  $I_1$  is a neon bulb lightly coupled to the input side of the final amplifier's pi network.



Oscillator and buffer stages are separated by a baffle shield, and a box shield surrounds the final amplifier band switch, TVI filter, and antenna relay. Non-r.f. wiring is on an etched board mounted vertically at the center. The left-hand section contains the power-supply components. As in other Drake equipment, the chassis is copper-plated.

28 Mc., and one tuned to 21 Mc. is switched in for 21-Mc. final output.

The 12BY7 driver operates as a straight amplifier on all bands except 28 Mc., where it doubles from 14 Mc. The driver is neutralized to prevent self-oscillation, and circuits with fixed tuning for each band are switched to its plate. Once properly aligned, these circuits require no adjustment within a band, so there is no panel control of their tuning. This stage is keyed by the blocked-grid method. A negative supply included in the transmitter furnishes the blocking voltage, biases the final amplifier to cutoff, operates the delay circuit, and delivers the small amount of current needed by the transistor sidetone oscillator.

The 6HF5 final amplifier is also neutralized, and works into a pi network with fixed 50-70-ohm output. Only the input capacitor of the pi is adjustable; in fact, this is the only tuning control in the transmitter. The amplifier is tuned by watching the meter, which is in the 6HF5 cathode circuit, for the usual dip, along with maximum glow of the r.f. indicator lamp on the panel alongside the tuning control. This indicator is a little out of the ordinary, being a neon lamp connected directly across the input side of the pi network through a small capacitance, as shown in Fig. 2B. With fixed loading, the brighter the glow the higher the r.f. output to the load. There is a panel control for setting the power level in the amplifier, a potentiometer which adjusts the screen voltage on the 6HF5. The plate meter is marked at 75 watts input for the benefit of the Novice user.

Before the r.f. output reaches the coaxial connector on the back of the transmitter it goes through a low-pass filter for reducing harmonic output in the TV bands. Aside from providing a

crystal, key and 50-ohm load (an accessory antenna-matching network will be available for this purpose) there is little, if anything, that the user has to wire up before putting the transmitter on the air.

The plate power supply uses the voltage-doubler circuit with a half-voltage tap for the oscillator, driver and control-tube plates. The plate voltage for the amplifier is 500 volts.

As mentioned earlier, the function switch has a stand-by position which allows use of the sidetone oscillator for code practice. In this position the oscillator and final cathodes are open. There is also a "spot" position in which the oscillator is turned on and the driver can be keyed, but the amplifier cathode is open.

There are two crystal sockets on the panel, one for each of the two popular types of crystal holders. They are wired in parallel. The crystal can be replaced by a v.f.o. (a matching unit will be available) with its output fed in through one of the crystal sockets. When an external v.f.o. is used it can be turned on and off (providing it has cathode keying), along with the 6EAS pentode, by connecting the v.f.o. cathode to the 6EAS cathode through a phono connector provided for that purpose on the rear of the chassis.

The RC constants in the grid-block keying circuit are such that the keying is slightly on the hard side, although clicks do not extend appreciably beyond the audio beat note. It is an easy matter, however, to eliminate clicks altogether: a 1- $\mu$ f. capacitor connected across the 0.02- $\mu$ f.

(Continued on page 140)

### Drake 2-NT Transmitter

Height — 6 $\frac{9}{32}$  inches.

Width — 9 $\frac{7}{8}$  inches.

Depth — 9 $\frac{9}{32}$  inches.

Weight — 12 $\frac{1}{2}$  pounds.

Power Requirements — 115 volts, 50/60 cycles, approximately 2.8 amp.

Price Class — \$130.

Manufacturer — R. L. Drake Co., Miamisburg, Ohio. 45312

### Next Month



Davco DR-30 Receiver

# Technical Correspondence

## PLASTIC QUAD FRAME

Technical Editor, *QST*:

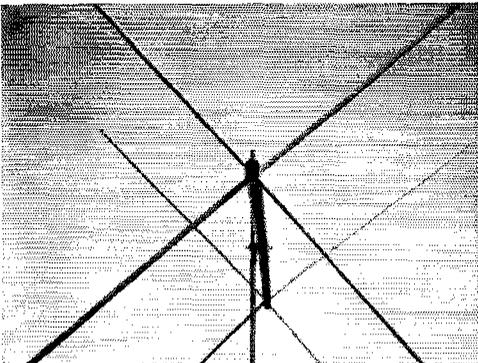
Having experienced the disadvantages of using both aluminum tubing and bamboo for cubical quads, I began a search for something better. The new quad would have to be light in weight, weather-proof, strong, easy to construct and low in cost. We raise avocados at this QTH and use a large amount of plastic water pipe for irrigation. The pipe met each of my requirements.

Plastic pipe of this type comes in various sizes and strengths. It may be purchased from most irrigating companies or hardware stores. Be sure to obtain the rigid high-pressure type.

Taking a 7-foot section of  $2\frac{1}{2}$ -inch pipe for the boom, I drilled four 1-inch holes 90 degrees apart at each end. Then two 20-foot sections of  $\frac{3}{4}$ -inch pipe (1 inch o.d.) were inserted into each end of the boom in crisscross fashion for spreaders. (The two pairs of holes for the spreaders must be offset about 1 inch so the spreaders can cross each other and not meet head-on in the center of the boom.) The spreaders were then "pinned" together, where they crossed inside the boom, by drilling a small hole directly in the center of each spreader and inserting a No. 16 nail. No spider is required with this arrangement.

To fasten the boom to a mast, drill a  $1\frac{1}{4}$ -inch hole vertically through the center of the boom and pass a standard TV mast through the hole. Then drill a  $\frac{3}{8}$ -inch hole horizontally through the boom and mast and secure both firmly together with a  $\frac{3}{8}$ -inch galvanized bolt. Care should be used to see that the  $1\frac{1}{4}$ -inch hole is drilled at exactly the right point on the boom. This method of mounting is advantageous for simplicity and strength, and no guying or other support is required.

After securing the boom to a 10-foot mast I attached wires for the 10- and 15-meter directors and reflectors. Drilling through the pipe and feeding the wire through these holes was found to be the best method. The assembly was turned in windmill fashion to reach the end of each spreader.



WA6IPD's plastic-tubing quad-antenna frame.

After 72-ohm coax was attached and tuning adjustments made, the quad was raised to an elevation of 35 feet. It has been in place now for some nine months and has withstood winds to 70 m.p.h. and temperatures from freezing to over 100 degrees with no noted defects. In warm weather there is some drooping of the spreaders, but it is considered insignificant.

A 20-meter quad would require additional rigidity in both the plastic spreaders and boom. A 1-inch board inside the boom, secured with wood screws, would provide the necessary support. A similar arrangement within the spreaders should also work satisfactorily. For 20 meters, the spreaders may be increased in length by using standard plastic pipe couplings and plastic pipe cement. — *H. A. Ridout, WA6IPD.*

## V.F.O. STABILITY

Technical Editor, *QST*:

The article in September *QST* titled "V.F.O. Stability — Recap and Postscript" was not only very enlightening but also very encouraging to those of us who are still home builders with ham-made rigs. I'd like, however, to add one thing: To enhance stability over the long run, leave the v.f.o. on continuously. Let it and other frequency-sensitive equipment operate 24 hours a day.

Wasteful? Perhaps; but the inherent gains greatly override the small increase in power consumption. Tubes will last and last and last. The equipment will remain warm and dry, and be much less subjected to sudden shocks caused by the turn-on/turn-off type of operation. The equipment should, however, be appropriately fused. This would normally be the case anyhow, but it is absolutely necessary for continuously-operating units.

At this moment, a BC-221, BC-348 and a ham-made v.f.o. right out of the 1953 *Handbook* are in continuous operation. The BC-221 has been running for close to 20 years with tube changes approximately every 5 years. The BC-348 has been operating continuously for the last 20 years, with tube changes also approximately every 5 years and nary a breakdown from pooped condensers. — *John H. Asher, W2YXB, Box 39, New Suffolk, Long Island, New York 11956.*

— — —

Technical Editor, *QST*:

. . . I believe that the real cause of frequency shift due to heater voltage change was left unexplained. The article is correct in saying that the drift is not caused by expansion of the tube elements. Actually, the drift is caused by a change in cathode interface resistance, which is very sensitive to cathode temperature. By adding an unbypassed resistor in series with the interface resistance, the change in resistance becomes a very small part of the total series resistance.

So far as I know, all receiving tubes as well as a few of the low-power transmitting types use oxide-coated cathodes. These cathodes are made by spraying or otherwise coating a metal, which is usually nickel, with a mixture of barium and strontium oxides to a thickness of about one thousandth of an inch. After further processing in a vacuum, the oxide coating becomes the cathode emitter when the metal base is heated to the proper temperature — about 850 degrees Centigrade. The cathode has a fairly low resistance through the oxide material and a somewhat higher resistance between the oxide and the metal surface — the interface resistance. The metal has negligible resistance by comparison.

Both the oxide and interface resistances are affected by the cathode temperature which in turn is affected by changing heater voltage. These resistances are also variable with age. Assuming that a tube has been properly aged to begin with, the resistance will increase during the life of the tube. Furthermore, if a tube is allowed to run with heater power only for long periods of time, without any plate current, the interface resistance increases very rapidly. Because of this effect as well as thermal stability reasons, the oscillators in our v.f.o.s should be running whenever the tubes are turned on.—*Raymond F. Rinaudo, W6KEV, 3088 Greenoak Court, San Mateo, California.*

— . . . —

Technical Editor, *QST*:

As a follow-up to George Grammer's excellent article on v.f.o. stability (September *QST*) I can offer several experimental notes which might be of interest. These tips were encountered while investigating the same basic circuit several years ago.<sup>1</sup> This version used a grid circuit on 1.75 Mc., and voltage-divider capacitors of 0.006  $\mu$ f. each. Aside from drift caused by heat transfer from tube pins to the tuned circuit (as reported by Grammer), the major cause of drift was found to be r.f. heating of the voltage-divider capacitors. It should be pointed out that aside from plain mica and silvered-mica capacitors there are available mica capacitors with six variations of temperature coefficient. (Color codes and coefficients are listed in the *Handbook* and other publications.) From a practical standpoint, a series of tests with various types of these mica capacitors in the voltage divider showed no one type to be superior in terms of lower drift. Some plain mica types turned out to cause less drift than some silver types, and about the only consistent improvement resulted by using three 0.002- $\mu$ f. units in parallel in place of a single 0.006- $\mu$ f. unit. Dipped mica capacitors were not tested. Expensive, glass-sealed micas proved no better than standard molded types.

The 1.75-Mc. v.f.o. grid circuit was made up of a fixed inductance (a toroid) and a tunable inductance. This combination worked well in the original circuit. However, the toroid form is quite sensitive to stray 60- and 120-cycle fields and this shows up as ripple modulation on the oscillator output. This effect was encountered in a transistorized version of the circuit which was being tested with a battery as power supply. For those who haven't tried it, trying to remove a.c. ripple from an oscillator powered by a battery represents quite a challenge!—*Jack Najork, W2HNI, 708 Tamaques Way, Westfield, New Jersey.*

— . . . —

Technical Editor, *QST*:

In reference to the v.f.o. article in September *QST*, I would like to pass along some of my experiences commercially with v.f.o.s. We have found the temperature characteristics of all components to be quite different from each other. To have them stable I always cycle them three times, heat (hotter than they ever will be in normal operation — about 130 degrees) and cool at about 0 degree F, each cycle about 5 minutes. If there are clusters of capacitors across a coil, for temperature compensation, they are cycled as above as a unit.

It is often stated in v.f.o. articles that zero compensating capacitors are the best. This is not so — zero capacitors are the most unstable. They drift

<sup>1</sup>"Inductive Tuning for High-C RF Oscillators," *GE Ham News*, September-October, 1961.

about 30 parts per million plus or minus and never come back to the same place next time on start-up. Thus, if you have compensated for negative drift, the "zero" capacitor may go positive, and when it does you have a bigger drift today than yesterday, for a while. Actually, the most stable is the negative-30 type, which always stays negative. Thus negative compensation can correct it.

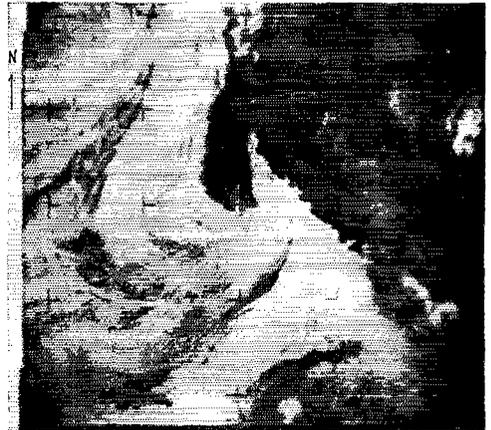
The problem in any v.f.o. is to locate where the heat is changing the inductance or capacitance. Drift is not corrected by just adding an NP0 somewhere in the capacitive element of the circuit, as many articles state.

The most common problem is v.f.o.s that jump frequency, and this is caused by internal contact problems of the capacitors themselves. This is a manufacturing problem. In the case of jumping frequency, a complete new set of capacitors, cycled by the heat/cold mentioned above, is the only cure. To try and find which single one is at fault is a chore and not worth it.—*Grant E. Makinson, W8DBC, 3003 Dahlia Drive, Dayton, Ohio 45449.*

### ESSA II

Technical Editor, *QST*:

On August 14th, Dale Thompson, W7YVL, and myself received the accompanying picture from (Continued on page 158)



Weather map transmitted by ESSA II, received by W7UGV and W7YVL with equipment of the type described by K2RNF in November 1965 *QST*.

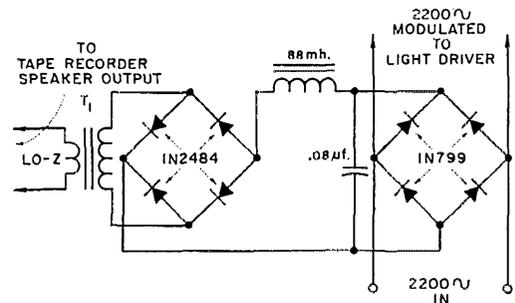


Fig. 1—Demodulator and remodulator for obtaining direct positive prints of pictures transmitted by ESSA Nimbus satellites.

# HamQUEST '67

**S**HADES of T.O.M.! Have you folks ever been keeping Hq. especially busy! Requests for more literature. For more campaign kits. Memberships. Renewals. *Handbooks*. Booster pins. Gold-stamped brief-cases. (Gift subscriptions. Bragging letters of accomplishment with promises of more to come. Why-don't-you-do-it-this-way letters, with good ideas we're passing along to clubs. And so on. Our clerical crew says, "Who the heck thought up this HamQuest 67 campaign anyway," because it's cut down their morning coffee break (the boss says hurray!).

September, the first month, was a slow starter, with many clubs getting reorganized after a summer hiatus. October started the upsurge and indicates that November will be a doozy. Keep the correspondence and requests coming, gang. And if your club hasn't yet started a HamQuest project, use a needle at the next meeting!

We're not the only ones stirred up by this HamQuest 67 campaign — here's what some of the clubs and individuals have been telling us:

As a League-affiliated club, we are participating in the recruitment drive and I intend to sign up every ham who has the price of a QST/ARRL subscription/membership. The benefits we can realize from this drive include:

Our Treasury makes a small profit on each application processed through the club and we can win some of the special HamQuest prizes.

We edge closer to 100% League affiliation as we sign up more of our W6LS members.

We give the League a stronger voice in amateur radiomatters.

We raise the percentage of League-affiliated hams in our Southwestern Division, giving our elected officials a stronger voice at ARRL meetings.

We help support some of the fine League activities which we benefit from every year — such as training films, training handouts, operating handouts, awards, contests, etc.

We have an increased ability to elect the League officials who will do the job best.

As members of ARRL, we can help improve its activities and direct its aims through unified action; non-affiliated individual hams can accomplish little towards improving the amateur radio service. — W6LS

Please send your campaign kit for "HamQuest 67." Our radio club is in desperate need of it, as I am the only member of the ARRL, and proud of it. — WB2TRX

A hot discussion got started after the "HamQuest 67" topic was introduced. We discovered that the majority of our membership is still League-minded and associated. This is not to say that there are no differences of opinions among us — opinions of disappointment, chagrin or dissatisfaction with one thing or another, just may be found in the "Correspondence From Members" column that appears in QST in any month.

The enlightening result of our discussion about the League was that, as angry as any of the dissenters may have been about their particular points of view, none would advocate an outright break with the ARRL. Hope of correcting or eliminating the points of friction seemed to be the closing theme of this discussion. Hope, of course, was a good note to end on. — W2QNL

Needless to say, the strength of amateur radio is and always has been in direct proportion to the strength of its radio clubs and the League itself. Give this League-sponsored program a lot of your personal effort because the benefits are many. — *Hampden County Radio Ass'n.*

HamQuest 67 approved and backed by entire club. Keep up the good work. — *Caldwell Radio Club*

Less than half the licensed amateurs in the United States and Canada are members of ARRL. Less than one-fourth are members of any radio club. Yet amateur radio operates in a highly competitive field. It goes without saying that without strong organization we would be crowded out in short order. ARRL provides this nationally, and worldwide through the International Amateur Radio Union. Radio Clubs, more than 1800 in this country alone, are the backbone of ham radio locally.

The Hartford County Amateur Radio Association feels that every ham should be a member of an active radio club and ARRL. We are making every effort to tie in strongly with the HamQuest 67 program announced in QST. — *Hartford County A.R.A.*

As our membership at the present time is small (17) we feel that your HamQuest 67 club promotion kit will be of great help in increasing and maintaining our membership and activities. The general feeling of the club at present is one of enthusiasm and enjoyment of the facilities of the club and its activities. This feeling I would like to see continue and grow, not for the enjoyment factor alone however, but also for the service we can perform. — W1YFC/W1IGVC.

We in our radio club here at the University of South Florida read about your HamQuest 67 in the QST. We would be very interested in receiving such a campaign kit for getting new members to our club and the League. So please send us such a kit! — *SM3CUS*, Secretary

You may be interested to know that our club voted unanimously to support HamQuest 67 at our last meeting. In fact, the club is going to "sweeten the pot" a little for the one bringing in the most new members. — *WA4LXX*

I am pleased to note the concern for the future of ham radio expressed by the ARRL in QST and thoroughly endorse your HamQuest 67 concept. — *W4SMXW*

Your exciting and revolutionary new "HamQuest 67" has truly inspired me to believe it should be a great and needed boon to amateur radio. — *W10DVR*

QST



# Hints and Kinks

For the Experimenters



## LIGHTNING CALCULATOR

THE Type A Lightning Calculator can be made more useful by marking the ham bands on the frequency scale with either a ball-point pen or a colored pencil. — *Norm Cucuel, K1LPH*

## CHASSIS MOUNTING OF PRINTED-CIRCUIT-TYPE TRANSFORMERS

MINIATURE audio transformers, designed for printed-circuit board mounting, can be altered for direct mounting to any metal chassis as shown in Fig. 1. A brass strip is soldered to the case of the transformer to serve as a mounting plate. Two 4-40 clearance holes are drilled in the plate to accommodate the mounting screws. — *WICKK*

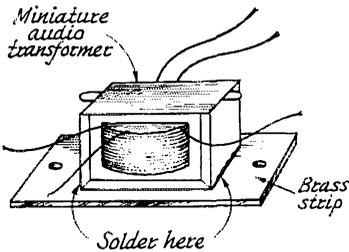


Fig. 1—Miniature printed-circuit-type transformer modified for direct chassis mounting.

## F.S.K. FOR THE HX-50

FREQUENCY shift keying can be obtained with the Hammarlund HX-50 by varying the bias on the Varicap used to shift the v.f.o. frequency in the u.s.b. position. As shown in Fig. 2, all that is needed is a 50,000-ohm potentiometer and a phone jack. This circuit works well if the keyboard contacts are kept clean. The keying comes up right (isn't inverted) on all bands. — *Jim Wilson, W15BRB*

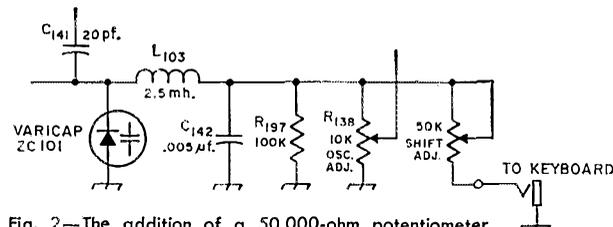
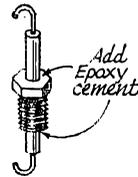


Fig. 2—The addition of a 50,000-ohm potentiometer and a phone jack converts the HX-50 to f.s.k.

## STRENGTHENING FEEDTHROUGH CAPACITORS

MOST v.h.f. feedthrough capacitors are easily damaged if bumped or subjected to undue strain. By coating the ceramic part of the unit with epoxy cement at each side of the mounting flange as shown in Fig. 3, the fragile portion of the capacitor body is reinforced. Drying time takes about 24 hours. — *WICER*



CERAMIC FEEDTHROUGH CAPACITOR

Fig. 3—WICER's method for strengthening feedthrough capacitors.

## "UNPOTTING" PERMAKAY FILTERS

IN the "Hints and Kinks" column of *QST* for May, 1963, G. L. Roberts and J. D. Gooch tell how to modify the Motorola Permakay 455-ke. filters for ham use. The authors state that the potting compound must be removed carefully and that it, "may take an hour or two." It took me six hours using a steam drill. After the job was completed, all I had was a very battered filter and the desire to find a solvent for epoxy potting compound. Epoxy compares with glass for hardness, and it is unaffected by water and most common solvents. However, I found that acetone will slowly dissolve epoxy. Acetone has little effect on the components in the filter, although it will soften the coating on the ceramic capacitors. This is no problem, as you are going to replace the capacitors in the filter anyway.

The "unpotting" job will take two or three days. Take a paint can with a tight-fitting lid and lay the filter flat on the bottom of the can.

Pour in some acetone, but not so much as to cover the bakelite base of the filter. Put the lid on the can and wait 12 to 24 hours. Then clean off all the epoxy that is loose and soak the filter once more. Repeat this procedure as many times as necessary.

— *Donald S. Krehbiel, W7PLF*

## HW-12 RATTLE

THOSE whose cars have developed mysterious rattles after the installation of a Heath HW-12, HW-22 or HW-32 might try removing the unit and bending back slightly the bracket that supports the lamp illuminating the meter. It seems that road vibration will cause the lamp to bump against the rear of the plastic meter case in a most annoying manner if the lamp is allowed to rest near the case. — Robert A. Sullivan, W0YVA/9

## EQUALIZING THE LOW-VOLTAGE REQUIREMENTS OF THE HW-12 AND THE SB-100

AFTER reading W9LSZ's hint in *QST* for May 1966 on using the HP-23 a.c. power supply with both the HW-12 and the SB-100, I feel that it should be pointed out that there is an easier and safer way to accomplish the desired results. The HW-12 will operate from a low B-plus source as high as 325 volts (250 volts is normal) if the voltage supplied to the screens of

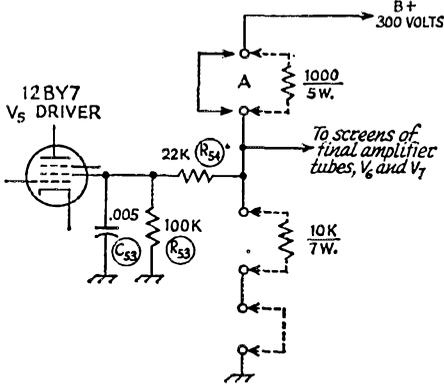


Fig. 4—To operate the Heath HW-12 from a low B-plus source of 300 volts, it is only necessary to remove the jumper from A and install the components shown in the dotted lines.

the driver and final-amplifier tubes is dropped to the proper value. As pointed out in the HW-12 instruction book and as shown in Fig. 4, it is only necessary to add two resistors and change a couple of jumpers to do this. The resistors required for the modification are a 1000-ohm, 5-watt unit and a 10,000-ohm, 7-watt unit.

The above modification has an added advantage over the previously described hint: if either

transceiver is operated mobile, the low B-plus tap in the HP-12 d.c. supply may be set at 300 volts, and the rigs will be interchangeable without attention to the power supply. Also, there is no switch that could be inadvertently left in the wrong position, permitting too high a voltage to be applied to the HW-12 and possibly burning out three tubes.

— Robert C. Clark, K9HVW/WA4VYL

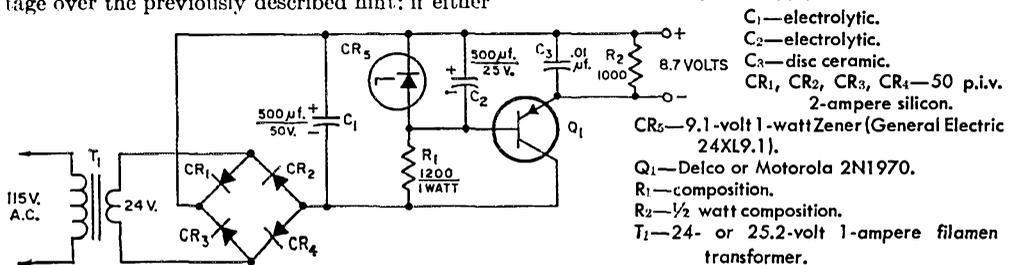
## TRANSISTOR POWER SUPPLY

THE circuit shown in Fig. 5 is an 8.7-volt 500-ma. electronically filtered transistor power supply based on a design submitted by Ralph W. Parlette, WB6JOY. Easily constructed, the supply is inexpensive, has good regulation and very low ripple.  $CR_1$  through  $CR_4$  form a bridge rectifier and  $C_1$ , a capacitor-input filter. Zener diode  $CR_5$  provides the reference voltage for emitter-follower  $Q_1$ .  $C_2$  smooths out the small amount of ripple that appears across  $CR_5$ . The effective capacitance across the load is equal to the current gain of  $Q_1$  multiplied by the capacitance of  $C_2$ .  $R_1$  limits the amount of Zener current through  $CR_5$ ; it is adjusted for a Zener current of approximately 15 ma. (no load).  $C_3$  is an r.f. bypass capacitor and  $R_2$  provides a small (10 ma.) bleeder load for the supply.

The output voltage of the unit is equal to the Zener voltage minus the emitter-to-base bias voltage of  $Q_1$ . Other voltages can be obtained by using different Zeners and changing  $R_1$ .  $R_1$  should be chosen so that the Zener will operate as a more or less constant voltage reference for the transistor regulator at output loads of 0 to 500 ma. yet stay within its maximum current rating when no external load is attached.  $Q_1$  is not special; any similar power transistor should work. Of course, the higher the current gain of the transistor, the better will be the electronic filtering.  $Q_1$  should be mounted on a heat sink.

Power-supply ripple at full load was measured with an oscilloscope at 4 millivolts r.m.s. Increasing both  $C_1$  and  $C_2$  to 1000  $\mu$ f. lowered the ripple to approximately 1 millivolt r.m.s. If less filtering can be tolerated, removing  $C_2$  from across the Zener will raise the ripple to 15 millivolts r.m.s. The output changed only 0.1 volt as the line voltage was varied over a 30-volt range. Increasing the external load current from 0 to 500 ma. dropped the output voltage 0.2 volt. — W1YDS

Fig. 5—Circuit diagram of regulated 8.7-volt transistor power supply.



- $C_1$ —electrolytic.
- $C_2$ —electrolytic.
- $C_3$ —disc ceramic.
- $CR_1, CR_2, CR_3, CR_4$ —50 p.i.v. 2-ampere silicon.
- $CR_5$ —9.1-volt 1-watt Zener (General Electric 24XL9.1).
- $Q_1$ —Delco or Motorola 2N1970.
- $R_1$ —composition.
- $R_2$ — $\frac{1}{2}$  watt composition.
- $T_1$ —24- or 25.2-volt 1-ampere filament transformer.

# TVI IS STILL WITH US



BY FRANK M. KRATOKVIL,\* W3BA

**T**HE wide acceptance of store-bought transmitters among amateurs has had a considerable impact on the TVI situation, both statistically and as a practical matter. For years I suspected that a plateau had been reached in the number of reports of amateur involvement in interference to TV reception. The latest statistics of the Field Engineering Bureau (which operates the District Offices and Monitoring Stations familiar to all amateurs) indicate that there is an actual drop, however slight, in TVI reports involving amateurs. I keep repeating the phrase "involving amateurs" because TVI is on the rise where the Citizens radio operator is considered. While amateur TVI problems have lessened, the drop is small and could be reversed in coming years, with operation on 23, 50 and 144 Mc. increasing due to better propagation conditions.

The statistics (for the first nine months of each fiscal year, licensed stations) are:

### Amateur TVI Involvement

Major Cases <sup>1</sup>		Minor Cases		Total	
1965	1966	1965	1966	1965	1966
64	56	6771	6514	6842	6577

The above does not include a large number of TVI cases handled by TVI committees.

The purpose of this article is to discuss the trend and tell you of some of the Bureau's problems with TVI cases. Some personal experiences, not only from the regulatory standpoint but from that of an operating ham, are related as well as some encountered by our Field office engineers.

Many amateurs are currently doing their best to sell ham radio as a public service. This is good. It lessens the good, however, to gain in one aspect of public (and Governmental) relations and lose some ground, or neglect close-in battle areas, in the furtherance of the program.

\* Retired Chief Field Engineering Bureau, F.C.C., 11300 Montgomery Road, Beltsville, Maryland 20705

<sup>1</sup> A Major Case is a time-consuming one or one that otherwise stands out.

I must confess that, through the years as an operating ham, I had mixed feelings about amateur operation. My job in running different districts (Detroit, Dallas, Buffalo and Supervisor South Atlantic Area, R.I.D.) made it necessary to keep the population enjoying radio and TV reasonably happy. Difficult ham interference problems caused a great deal of concern and not a little overtime (unpaid). Telephone calls from irate listeners or viewers would reach home. Frequently the selling job done by the amateur in the first place, or occasional arrogance or unconcern about his neighbors, was the greatest hurdle to overcome. Then there were those cases where a crippled or elderly person, deriving or claiming to derive great enjoyment from TV (or radio) would experience interference and the means of obtaining technical relief were not present. It is easy to say: "relocate your TV antenna, put in a \$5.00 high-pass filter or get a new set," but frequently the advice cannot be taken. In one widely publicized case in the State of Pennsylvania over 120 letters were written to TV-set manufacturers to supply filters for irate viewers. Some of these people were out of work and the service charge meant a tax they found unpleasant.

On the other hand there were cases where the amateur involved in a TVI case practically rebuilt the TV set of the complainant to make it TVI proof, something which is not recommended on an individual responsibility basis.

Commercial and public stations have also, on occasions, taken a broad approach to the interference situation. I recall that one Eastern b.c. station furnished beautiful radio sets to many complainants, thereby stilling the complaints. A police radio facility, when it moved into a residential neighborhood, gave away or may have even installed wave traps to reject their signals in complainants' receivers. The policy has been to have commercial stations first service their own complaints.

The point I am making is that good public relations demand some sacrifices or extra effort,

whether or not the party causing the interference is in the right. Some foreign administrations put the interference problem right in the ham's lap to satisfy the complainant. It is easy to see where some injustice could result in such an approach in the congested and changing U. S. society.

TVI Committees are a good way to handle the problem of interference, but it is a fact that there are committees that have not been effective. The load put on a committee adjutor is a difficult one. While a few committees may have a combination of service men and amateurs, the adjutor usually has an ingrained liking for amateur radio and is obviously pro-amateur. Yet he must put himself in the shoes of the TV viewer in trying to judge the merit of the complaint. Remember that somewhere near 10 per cent of the cases handled by the Field Engineering Bureau's field engineers are basically the result of bad amateur technical practice. It is quite possible for the ham to be at fault (even with store-bought equipment). Also, it may be asking a great deal of a filter to reject a *volt* induced into a nearby TV antenna, compared to a hundred microvolts received from a TV station. Is this good public relations on the part of the high-power operating ham? Legal remedies are possible in some cases, since no one is expected to go to extreme measures to enjoy ordinary reception.

The committee adjutor should be a technical man and make a good public appearance. It does make a difference in most cases. So many TVI committees have been successful in solving cases that they must have learned the right combination.

For the ham who does not have a TVI committee locally, or who wants to handle the complaint himself, the above advice still holds as he becomes the adjutor. It is important for him to make a record since it is on this that the case will be judged at the District Office or Washington headquarters. A map of the neighborhood showing the location of the station and the complainants is very helpful in reporting the matter to the FCC, should the latter have sent him the notice of TVI. When the amateur's position becomes so logical and technically correct, and the report shows his cooperation, the hand of the Field Engineering Bureau Engineer in Charge is strengthened in bringing the issue to an ending.

Back to the technical side of the question, there is no doubt that the use of coax or twin lead transmission lines have helped in many cases to lessen the impact of strong fields of radiation close to receiving TV antennas. Contrary to some opinions, I believe that vertical antennas, now used in greater degree, lessen TVI. It is harder to make a station TVI proof if it operates on *all* the ham frequencies.

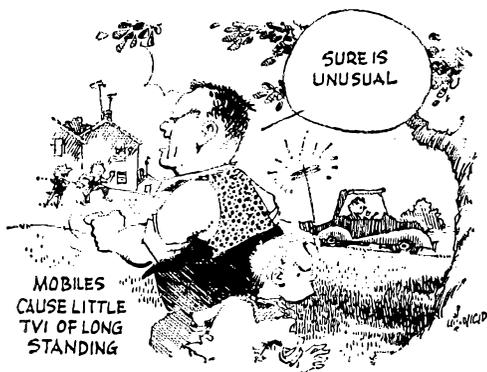
Another trend that cuts into the number of TVI cases is the use of s.s.b. The inability of the complainant to identify the station causing TVI results in some lack of pursuit of the complaint. Narrow or wide-band f.m. does the same thing.

Still further, there is the growing number of

mobile amateur operations. Mobile amateurs cause very little TVI of long standing, and there is no house wiring to conduct interference to the next door neighbor.

Another trend which reduces TVI cases is the common practice of manufacturers of TV sets to build a high-pass filter into the set, at the factory. Also, the widespread practice of furnishing a filter when a TVI committee or the Field Engineering Bureau Engineer so recommends, or upon a simple request from the set owner helps.

The increasing field strength of TV signals also causes a reduction in cases. More TV stations on the air give more variety and many people, to avoid interference, tune in the same program from another city. The growth of CATV or pipeline TV can operate to lessen the chance of amateur interference.



I strongly support the League's attempts to get amateurs to construct transmitters and the auxiliary equipment in a station. Here, however, we get into a conflict. New or experimental gear tried out on the air or in an unshielded room is more apt to cause QRM to TV than a proven piece of equipment. The answer is to monitor TV stations while testing gear and, in fact, it's a good idea while operating at other times. Let us keep on experimenting, but also be careful and observant. If amateurs will keep alert to the outside effects of their operations, they will lose no friends in the battle for public support of their use of radio frequencies.

Not only is the reading of the *Handbook* and study of the ARRL TVI kit<sup>2</sup> recommended, but individual TVI comments appearing in articles on other subjects should be noted. Hams sometimes run into the combination wherein an exciter is TVI proof but when connected to an equally TVI-proof amplifier, trouble results. Even with plate and screen voltage disconnected on a final, a pesky cathode-grid circuit can cause trouble. On the other hand, a linear has been known to help suppress TVI. A methodical approach to solve the pesky problems is recommended.

If I may digress at this point, one of the

(Continued on page 144)

<sup>2</sup> Available without charge from ARRL.

**H**MMMMM, the kit finally arrived. Sign slip, take precious package, close door . . . and run like mad to get to table and tear open the package.

Well, what do ya know? Looks like it will be quite a beautiful item when it's assembled. Just look at that gorgeous panel! HmMMMM, what's this marking on it? "Inside Panel No. 3. Finish goes face down." Hope the outside looks as good as the inside will. Maybe I can use *this* on the *outside*, and it would look better. But I'm getting ahead of myself. Gotta start at the beginning and build the thing *right* all the way through.

Better check packing slip . . . Everything seems to be here. Ahhhhh, here's the instruction book. Says to spread out parts according to diagram number one. What the heck, I'll spread 'em out my own way and save a little time and . . . Oops!

Oh, well, it'll only take me an extra two or three hours getting the parts unscrambled and then set out the *right* way . . . Gotta do it by the book, ya know.

Now to get started on this kit . . . HmMMMM, take four angle panels and mount according to Diagram Four . . . There, that's that. Should have used the screws to mount 'em with, but I need a few screws . . . what the heck, the masking tape seems to be holding the panels OK. They touch the chassis, so guess that proves that I've got electrical contact.

Ahhhhh, finally got the chassis panels all together. Now to start mounting the big parts. What's *this*? "Mount v.f.o. section in shielded box supplied for this purpose." Don't see why I should waste this little box just for that. I can put QSL cards in the little box with the holes in it, and throw some chicken wire over the v.f.o. section. That'll save me at least five minutes, and this little box must be worth at least 25 cents. If I keep thinking *smart* like I'm doing now, I'll really save a lot of time and money on this kit.

Now to start mounting the smaller parts. Don't see why I should put these little capacitors on the power leads. As far as that goes, why use this shielded wire for the power leads? I'll use some of this scrap wire and save the cable. What the heck it can't make that much difference. The manufacturers always throw in little unnecessary parts and circuits.

Don't see why I should use all of these resistors and capacitors and "chokes" between tube pins and from wires that should be grounded. I'll just connect 'em with straight wire and improve the design while I'm saving money.

HmMMMM, now all I have to do is solder everything I've got done so far and I'm almost through. I don't have to use as much solder as the instruction books suggests. Don't need as big a soldering iron, either. I'll just use a drop or two where it looks like I *should* use it, and save even more time and money . . .

Now I need a few knobs . . . HmMMMM, these knobs sure would look nice on that dresser

## Red Wire To Post Three



BY ROBERT M. HOLT,\* WAØMFF

in the other room. Guess I'll just put a little tape on the controls and let it go at that. Why the heck should I have a little knob pointing at what setting the controls are on? If I can't remember where to set the controls it won't do me any good to use this rig when I've finished building it. I'll just tune the rig by feel . . . if the manual says to set to number four, I'll just turn the control until it seems about half-way turned . . .

Now what? "Mount four meters as indicated in Figure 24." Why waste the meters? I'll just use one and save the other three for something else. All I'll have to do is bring all the wires outside the cabinet and when I want to measure something I'll just tie the right wires onto the meter. It's *smart thinking* like *this* that saves money . . . and gives a *professional finished job* . . .

Now to plug in this little beauty and see how it does.

ZZZZzzzzzzzzzz! Crrrrraaaaaaaaaacccccckkkll! Pooooof!

What an awful smell! Must be the power transformer . . . nope, can't be that — I used it for capacitors . . .

How the heck do ya like *that*? Send 'em your hard-earned money, and what do they do to ya? They send ya a piece of junk that doesn't even work *at all*!

I know I followed *all* of the instructions *correctly* — even fixed it up a place or two! Maybe I better check the wiring diagram to be sure . . .

"Connect red wire to Post Three . . ." That's funny—I got the red wire connected to Socket One.

Not only do they send ya lousy merchandise, they also have all of the instructions written completely wrong!

I tell ya, they shouldn't be allowed to sell this gyp junk to poor guys like me who follow the instructions . . .

QST

\*625 S. Union Ave., Pueblo, Colorado, 81005

# STATION DESIGN FOR DX

## PART IV — (a) Propagation Quirks and (b) Operating Tips

BY PAUL D. ROCKWELL,\* W3AFM

**D**ISCUSSION of propagation will be mainly on (a) use of the long path, (b) the twilight zone, (c) use of meteor bursts for quick identification of weak local signals, and (d) use of WWV advices.

It is well known among DXers that signals frequently come in better the long way around the earth. This applies mainly to paths exceeding about 4000 miles the short way. Under some conditions, the optimum path flips from s.p. (short path) to l.p. (long path) in a few minutes, and it is difficult to choose optimum propagation. The neatest station-design to ascertain the better path is that in use at W6AM. He brings each end of each rhombic, through transmission line, into his shack. By appropriate relays, the path may be tested or operated on in less than a second simply by flipping a switch. Similar technique can be (but practically never is) applied to driven arrays and Yagis.

The question of when, in a longer term, it is desirable to search for long-path openings, is not easily answered. Recent experience gives the operator his best competence. However, some general guidance is to look along the twilight zones.

The twilight zone, globally, has an important relation to h.f. propagation. For example, on the long hauls, about 6,000 to 20,000 miles (s.p. or l.p.), phenomenally good transmission can be realized for small portions of the day, on paths nearly *parallel* with this zone. According to the relation between the maximum useable frequencies (m.u.f.) and operating frequencies, propagation may be better on the day or night side, or directly along the twilight zone. Seasonally, the zone runs due N-S at the equinoxes:

\* 5800 Hillburne Way, Chevy Chase, Md. 20015

mornings NW-SE in summer, NE-SW in winter; evenings NE-SW in summer, NW-SE in winter. The NE and SW directions are for northern latitudes. Long propagation paths *perpendicular* to a single intermediate twilight zone, on the other hand, tend to be poor, especially when the zone is near mid-path. This is because MUFs are usually much different in night and day zones — sometimes called the “contrast” problem. An appreciation of these phenomena is useful in estimating diurnal and seasonal openings to various parts of the world.<sup>23</sup>

A chart, from information prepared by Frank Smith, W5VA, is presented as Table III. Frank has maintained daily schedules for several years over difficult DX paths — notably with VU2JA, plus 4S7NE as well.

Sometimes signals arrive from unexpected directions — neither s.p. or l.p. Particularly, arrivals from north and south have been reported for DX signals as much as 60° displaced in geometric azimuth. Signals reflected from the aurora zone are usually characterized by a gravelly sound. To a lesser extent, this can be observed on signals propagated through the aurora. When Europeans are heard working the Far East, it's a good sign that Far East propagation will be good, later in the day, from the United States.

Some propagation phenomena are useful for preliminary identification of signals in DX work. One of these phenomena is signal enhancement by reflection from meteor trails. The enhance-

<sup>23</sup> Persons interested in h.f. propagation should acquire and study an excellent value in this field: *Ionospheric Radio Propagation* (NBS CRPL), 1965. From Supt. of Documents, USGPO, Washington, D. C. 20402, \$2.75. See also “Simplified CRPL DX Predictions,” *QST*, July 1957, p. 28.

The Geochron Map-Clock. Hams at firststand transfixed before this—then steal occasional looks. It shows the sun and daylight zones imperceptibly moving across the Earth, with diurnal and seasonal corrections built in.



ments may be 20-40 db. in amplitude, and are typically about one second in duration. Unfortunately they are not always present. When they are, they serve to distinguish weak nearby (non-DX in the 20-meter skip-zone) signals from bona fide weak DX. An appreciation of this saves the time of waiting for the weak station to identify himself by sending his call letters. Another phenomenon, useful in recognition, is the well-known rounding of keying envelopes by multipath transmission. That is, keying which has passed through several propagation hops and has arrived by a combination of several paths, is likely to sound softer (in the sense of less clicky) than ground-wave or single-hop propagation signals.

It is conservative of one's time in general listening, to spend more time in good conditions than bad. WWV sends propagation advices every five minutes. While these are for the North Atlantic only, their extremes are indicative of conditions in general. A few minutes at "N7" pay off better than an hour at "W4." At W3AFM, a receiver is kept on WWV. A digital clock permits turning this receiver on a second or two before the announcement. Thus the check-up takes only about ten seconds. An automatic timer could be installed. City power runs typically  $\pm 3$  seconds of accuracy.

To be guided wholly by NBS-CRPL dicta, however, can (a) subtract the fascination of the completely unexpected, and (b) cause loss of country contacts. On rare occasions, a choice DX find will turn up on an otherwise dead band. Sometimes these signals last only a few minutes, and are heard by only one or two W stations, within a hundred-mile distance of each other.

#### Operation and Subjective Elements

Time and keen operating practices can be traded off, to some extent, for station technical-

effectiveness. Especially in this era of well-equipped DXpeditions, it is more important to be active on the right frequency at the right time, than to have the ultimate in DX e.r.p. Thus, a station at home, a home within 20 minutes drive of the place of work, and a job that doesn't require being out of town on trips, can add more to the countries total (if that's your criterion of performance) than a 200-foot tower and 50-foot boom.

A mountain-top summer-cottage, well sited and well equipped, may be the answer (a) for contest or week-end DXing, (b) if there are motivations to get the hobby out of the home, or (c) if the home location is DX-wise impossible. Remote control of the country sites is not out of the question — but is seldom put to practice, because of the costs and difficulties. W6YY u.h.f.-remotes transmitters etc. at Mt. Wilson, elevation 5710 ft., from his home at La Canada, California!

Neighborhood relations and station esthetic appearance are often problems. Even if it would fit on the home lot, a hundred-foot lattice tower and fifty-foot boom may be out of the question. In cities, the type of antenna beyond which troubles are likely to develop with neighbors is often something like a 45-foot telescoped-pipe self-supporting mast, with a 25-foot boom light-weight Yagi. Such a practical compromise, however, will not compete in contests, no matter how good the operator, against a fully equipped, well-sited station. The latter, of course, usually has a good operator along with it.

Flag-poles, if of interest for good-looking mast construction, are made by John Lingo and Son, Inc., P. O. Box 1237, Camden, New Jersey. Pneumatically telescoping masts are marketed by Andrew Corp, P. O. Box 807, Chicago, Ill. 60642. Costs of the latter range from \$2,000 to \$8,000 for heights of 30 to 100 feet.

TABLE III WSVA's LP/SP DX Chart

Season	Long Path	Short Path
Feb.—May	South Africa and Indian Ocean 13-15Z	Near East 22-02Z India 14 and 02Z Malaya 14Z Oceania 02-06Z
May—Aug.	(Same as above, but Malaya and Oceania better; India worse, near nil)	
Aug.—Nov.	(As above, but India strong. Malaya shifts to 22Z gradually) Oceania 22-24Z	
Nov.—Feb.	Europe and North Africa 13-15Z India, Near East and Far East from opening to 15Z Oceania from 20-22Z	Europe and North Africa 15-17Z South Africa 18-22Z Malaya (rare) 13 and 24Z Oceania (better l.p.) 13-14Z

Notes: 1. East Coast subtract 1 hour; West Coast add 1 hour to times above.

2. Months may be read February 15, etc. for W5 land; February 1, etc. for northern U. S. latitudes.

3. 4th Quarter l.p. sigs under South Pole reach W5 1 hour earlier than W8/1/2/3; sigs over North Pole 1 hour later.

4. November-February 01-02Z; India and Gus/Asia l.p.; FB8XX 589SP — Band sounds dead, actually is not.

### Recommended Station "Library"

*Callbooks, U.S. and Foreign*  
*W9IOP's "Second Op"*  
*ARRL Countries List (Op Aid 7)*  
*ARRL Antenna Book*  
*ARRL Radio Amateur's Handbook*  
*ARRL Radio Amateur's Operating Manual*  
*Radio Handbook, Editors and Engineers*  
*The Radio Amateur Handbook, R. S. G. B.*  
*Subscriptions to: QST, CQ, 73; WGDXC and LIDXA DX News Bulletins*  
*"The DXer Magazine," Gus Browning W4BPD, RFD 1, Box 161A, Cordova, S. C. 29039*  
*Radio Amateur World Atlas and maps, published by Radio Amateur Callbook, Inc.*  
*National Geographic Atlas of the World; also, one of their globes.*  
*Complete set of instruction books for equipment in use.*  
*QSLs, SAEs, IRCs, foreign postage (see W2SAW), ARRL station log, rubber-stamp for self-addressing envelopes.*  
*U. S. postage stamps, including 11c, 15c, 25c, etc.*  
*Letter scale, 0-9 oz., with vernier 0-2 oz., such as the German "Bilateral" which sells for about \$4.00.*  
*Of the above, the importance of the DX News Bulletins is the item most likely to be overlooked by neophyte DXers. There are several other bulletins: Geoff Watts, VERON, LIDXA speed-postcard service, NCDXC, SCDXC monthly bulletins, etc.*

### Operating Tips

Much has been written on operating practices for DX effectiveness. Listening is far more productive than calling CQ. In this connection, the tradeoffs represented by Figure 6 are recommended over the more conventional ones of Figure 7. (Part II, October *QST*).

It is better to listen several times a day for short periods, than to listen for the same total time in one session. In tuning, as from 14,000 to 14,100 kc. repeatedly, it is slightly preferable to "snap back" (as is done by oscilloscope horizontal sweep circuits) than to tune uniformly back and forth. In contests, it is preferable to tune from high to low, as "the pack" predominantly moves the other way. In pile-ups, a short call precisely timed and on the right frequency,

can be more effective than a longer call at higher power.

Logging, filing, and QSL procedures cannot be neglected. DX intelligence ("G-2") is very important. DX-alert nets are good. But when they are not available, it is sometimes possible to exchange alerting services over telephone landlines. Particularly useful are DXers who have retired from full-time employment and spend several hours a day scanning the bands. Having tools, test gear and spares close at hand can be a practical advantage in the event of breakdown at a critical time — some wrong Sunday afternoon.

### Zeroing Capability

It is desirable to be capable of zeroing-in with an accuracy better than 100 c.p.s. on top of the station communicating with the desired DX station. This can be accomplished most quickly by the use of a very sharp receiving filter (say, 200 c.p.s.). It is very helpful if a second receiver can be employed to permit the zeroing operation to be performed without detuning the desired DX station, which may be very weak and fading into and out of the noise. It is especially convenient if the second-receiver v.f.o. can be cross-coupled, transceiver style, to the exciter, so that the transmit frequency automatically follows that of the zeroing receiver.

A problem that plagues some exciters is that the spotting zero is different from the key-down zero. Such a situation can seriously impair DX effectiveness.

Receiver frequency calibration should have accuracy of  $\pm 1$  kc. or better over the 14,000-14,100-kc. range. This is to permit prompt action on DX news-bulletin or other DX tips.

### Break-in Capability

Full break-in is a very desirable feature. Use of even the best available t.r. electronic switches may degrade station DX performance materially. This is because the noise figure, at best, is inferior to that of a good receiver. However, these devices are sufficiently good to be useful during transmissions. A way of avoiding degradation during the most critical listening periods is to by-pass the t.r. switch automatically when the transmitter is switched off. Figure 8 (blocks 3, 4 and 5) in Part III, November *QST*, illustrates the interconnections and components. The B & W Model 381 has proved satisfactory at W3AFM; it permits full c.w. break-in by signals S6 or better. With it, one can tell while sending the approximate level of clutter on the calling frequency.

### Shaping of Keying Characteristic

It is well-known that the corners of the r.f. envelopes of keyed characters should be rounded to prevent clicks. For intelligibility, the leading corner should be less rounded than the final corner. What is less well-known is that a considerable improvement (as much as 3 db. in

*(Continued on page 152)*

# For Safety's Sake

BY H. W. MORGAN, M.D.,\* KØJTP

MY quad had been in the air for six years and needed to be checked over. KØIDN, a nearby ham friend, provided a gin pole and enough rope from his hay-lift equipment to lower the quad for inspection. I knew there was a loose connection somewhere in the system as a high wind caused an intermittent make and break in the signals.

I usually hire a professional climber to do my high work, ever since I spent a summer vacation in the hospital as the result of a flag pole breaking with me at the age of 18. However, two young hams, Tom and Cap, volunteered to do the climbing for me. A safety belt was provided and a safety rope was rigged for the second climber.

The quad came down easily. We had thought about that when we put it up; only two bolts twisted off in the removal process and these were easily replaced. The bad connection was found to be a coax fitting which had been improperly soldered.

A slight modification had to be made to the yoke supporting the quad boom. The old yoke was removed and replaced with a new one. This necessitated the drilling of four holes in a floor-flange bearing plate attached to the upper end of the pipe used in rotating the quad from the ground. The two boys accomplished this, working together at the top of the tower with a quarter-horse electric drill powered by a heavy-duty extension cord. Three of the four holes had been drilled and the bolts inserted with Tom working alone at the top of the tower when the accident happened.

Cap and I were on our backs on the ground watching the procedure when a cry came from Tom at the top of the tower. Being a physician, I first thought that Tom was an epileptic and had suffered an epileptic attack. Cap, however, was an old lineman and shouted that it appeared that Tom had been electrocuted. Fortunately, he was mistaken. For an old man I really made time around the corner of the house, fell as I made the turn, but was able to grab the extension cord close enough to the plug to remove it, even while I was falling. Tom immediately dropped the drill which he had been unable to release before that time. I insisted that he wait at the

top of the tower before unhooking the safety belt until George could climb up to help him. He made it down without difficulty and within thirty minutes was back at the top of the tower helping replace the quad. There was not even a burn on his hand which held the drill, or on his feet where he was in contact with the tower except for a pair of tennis shoes. What had happened?

The drill is a heavy-duty job and is provided with a ground wire but this was not used, since the extension cord was a 2-wire type. The drill was all of 25 years old and the ground wire had long since broken off at the plug end. Only a short length remained of the ground cord and this was doubled up inside the plug. I had tested the drill on the previous day, using the same long extension cord at the base of the tower, and the boys had drilled several holes on this occasion without experiencing any difficulty. In checking the drill immediately after the accident, I found the ground wire exposed and in close proximity to one of the rivets holding a plug contact in place. It is possible that the ground wire touched this rivet and the polarity was such that the metal case of the drill was on the hot side of the line. My wife also told me that during the time we were working, the electric current in the house went off at least twice for a few seconds. Remodeling of the substation supplying our power is in progress and it was thought that this was responsible for the interruption.

What can be learned from this near-fatal accident? First, never work alone. Have someone on the ground capable of disconnecting any electric circuit. You have four minutes in which to restore circulation to the brain either by cardiac massage or artificial respiration. Otherwise, brain damage will result even though life may be restored. Second, a safety belt or rope must be used. Heavy tools, such as the electrical drill, should be secured with a line, too. Last but not least, remember that a trusted tool may develop a defect.

My new extension cord is a 3-wire cord and the few remaining 2-wire plugs in my home, shop, and ham shack will soon be converted, for safety's sake.

**QST**

\* 1312 Fourth S.W., Mason City, Iowa 50401

# What Wives Think About Ham Radio



BY DONALD G. ROSS\*, W2JMZ

**H**AVE you ever considered the possibility that your wife may be less than enthusiastic about your ham radio interests? That she may be negatively inclined towards it because of its costs or the amount of time you spend at it instead of on family activities? Surely you've heard some XYLs comment unfavorably on some phase of our hobby, even bitterly at times, and it may have set you to wondering whether you are keeping ham radio in its proper perspective in your home. If so, you are not alone.

The thought occurred to the writer that it might prove illuminating and beneficial to many hams to find out generally what wives think about our hobby so that individually we could, perhaps, better understand the female point of view and thus not lose sight of perspective. Are the complaints heard isolated examples one would expect of any hobby, or do they represent a general undercurrent of feminine resentment against amateur radio?

## *A Survey is Made*

The best way of finding out was to conduct a survey of those most qualified to pass judgement — the wives themselves! A questionnaire was prepared and sent out to wives of hams in every state in proportion to state population and about equally divided between those living in metropolitan centers and those from rural areas. Three aspects of ham radio were considered prime subjects for inquiry, namely: 1. Cost 2. Amount of Operating Time 3. The Content of The OM's Contacts. The responders were asked to check off one of several statements (ranging from good to bad) which came closest to representing their views on these major topics. Additional information was requested such as value of station, whether the OM's antennas disfigured the home, and how the OM spends his operating time, i.e., ragchewing, DXing, traffic handling, emergency communications or experimenting. Each recipient was encouraged to submit any additional information she wished

\* Mossy Brook Road, High Falls, New York.

and to go into detail beyond the scope of the questionnaire proper.

Before the returns began coming in, it was assumed that a goodly percentage of the XYLs would relish this convenient opportunity to strike back at ham radio if they harbored but the slightest antagonism, so it was only normal to anticipate a wide diversity of opinion. It was hoped, however, that the composite opinion would be preponderantly one-sided and not about equally balanced for and against ham radio, since in the latter case the poll taker's personal views could tend to color the picture he reports.

## *Survey Findings*

Well, fellow OMs, most of you can begin to relax, for you may not have known up to now just how grateful most wives are that you have and enjoy such a wonderful hobby as amateur radio! Collectively this is exactly what they say, and they say it with undisguised enthusiasm! Given their chance to take pot shots at our hobby, they rejected this avenue of reply beyond doubt and went out of their way, through letters, to praise it highly. Now this is not to imply that all wives think this way, for a minority do not, and some who praise it today did not always favor it as they do now. A legitimate problem area exists or can exist in some households where ham radio is an invisible yet most real "third party" for the wife to contend with.

Let's take a look in detail at what our wives have to say.

## *Cost*

One would think that the monies spent by OMs on gear could be a source of friction in many households. Probably because of the maturity of most hams, this simply isn't so. The wives report overwhelmingly that these investments are kept within reasonable bounds, even though the average station outlay reported is close to \$1000 (ranging from \$200 to \$3000).

Some 86% of them felt the OM spends only what the family can afford and only after other obligations are met. 10% thought the purchases are kept within reason even though the OM has a tendency to overlook other obligations at times. Only 4% feel the husband spends more than the wife believes should be spent, and there was not a single instance (0%) reported where the OM spends money badly needed for family matters. There just doesn't appear to be an issue on this aspect of ham radio. The few comments made were all favorable.

### Amount of Operating Time

Nearly every hour spent operating in most shacks is time spent outside the circle of the wife and children. Do they resent this exclusion? Far from it! Only 7% were of the opinion the OM spends too much time on the air, time that should be spent with the children or on other worthwhile matters. Some 52% believe the amount of operating time is completely reasonable and, surprise of all surprises, there were 41% who would not object to more operating. Except for a special situation covered later, there are few wives who feel the OM goes off the deep end on his operating time. Some comments are:

Missouri — "When an operator's children are young and still at home I feel that after church activities, lodge meetings, Boy Scout business and other outside obligations are taken care of, the little extra time left need not be spent with the children. When the OM is operating it's o.k."

Illinois — "I think my husband's ham radio is very interesting. It gives him a lot of pleasure, and I appreciate having him home so much rather than having him gone all the time for bowling or some other such activity. I don't always understand what he is doing, but I enjoy seeing his engrossed enthusiasm when he is building equipment or operating on the air."

Nebraska — "My dad is retired and also a ham. He cannot afford much, but put his rig together and has a ball with it. I really love the guy who started this hobby. My dad spends all his time at it. If it weren't for this hobby, I can't imagine how he'd spend his time. This way he has no time to think of ever ailing! As for my husband, I would much rather have him home relaxing and enjoying himself than out in some bar. So if he talks all evening and is enjoying himself, he could be on all night if he wanted to. Life is too short, and if this is such a great hobby that a guy likes it enough to really delve into it, he should be able to."

South Dakota — "I certainly would *not* object to my husband spending more time on his set. In fact I wish he could find *more* time for it. His job is very time consuming and he is also very active in civic affairs. Our three children and their activities keep him quite busy. I feel that hamming is a relaxing hobby for him and

am very interested in his contacts. I hope that some day our kids will also become interested."

### Content of The OM's Contacts

This portion of the questionnaire dealt with the subject matter of the majority of the OM's contacts, phone and/or c.w. They were asked whether contacts were usually with stimulating people on interesting subjects, or did they deal mostly with the subject of ham radio itself and perhaps seem repetitive and even dull. Here a greater diversity of opinion was noted. 75% thought the contacts interesting, and 25% thought them dull. The written comments did indicate, however, that probably more than one-quarter of the wives do think the content of the contacts is less than stimulating. Comments: Florida — "I do enjoy the contacts with friends and family and the many friends he has made on the air."

Illinois — "His phone contacts deal mostly with the trivia of ham radio, yet I get considerable enjoyment from listening."

Ohio — "When our children are in bed in the evening, I join my husband in his shack and enjoy listening and sometimes talking."

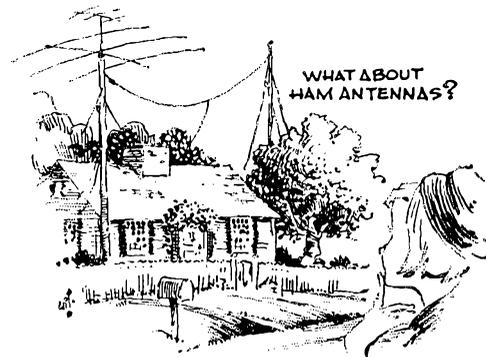
Indiana — "Let's face it — most hams are not very interesting or informed on anything beyond equipment. Wish someone would invent a noise-squawk silencer for ham rigs, as I would appreciate less yak-yak about equipment and more rounded conversations."

Ohio — "He has some interesting contacts when the people he contacts are interesting, but from my experience most hams can only talk about antennas, ham gear, etc. My husband prefers stimulating conversation but rarely raises anybody who has anything interesting to say."

California — "As far as I'm concerned, the content of his on-the-air conversations are of no more concern to me than my on-the-phone conversations with my friends are to him. Personally, I believe hams could all benefit from knowing more about their fellow hams than just the history of the other fellow's rig."

### Ham Antennas

The great majority of wives (84%) feel that the OM's antennas do not disfigure the home.



This was borne out further by the nearly complete absence of written comments on the subject. It appears that those who feel otherwise (16%) do not hold strong contrary views. An explanation for this may lie in the fact that nearly every home in America has a TV antenna, and one or two more make little additional difference.

### *The OM's Interests in Ham Radio*

The most popular aspect of amateur radio is ragchewing, since 80% of the wives indicated this activity on the part of the OM. Experimenting of one form or another was reported by 64% of the wives. DXing came next at 41%, with traffic handling and emergency communications work reported by 25% and 23% respectively. Many commented favorably upon the fact their husbands enjoy building some of their own gear in preference to buying it ready made.

### *When Ham Radio Can Be a Source of Friction*

Ham radio can be a source of friction in some marriages either shortly after the OM obtains his license or, if already a ham, after the honeymoon is over. This is the period when the wife receives her first exposure to the hobby, and her reactions can be most antagonistic if she feels her husband spends too much time hamming and not enough with her. Nearly all the negative comments received relate to the period of the first few years when the wives were adjusting to the presence of ham radio in their homes.

Generally it could be stated that the OM is at fault, although it should not be overlooked either that some wives (bless them) are chronic complainers and others can be as selfish in their demands as a man can be in his. Not all marriages are happy ones, either. Nevertheless, some men unquestionably go overboard on radio at the outset. Later some bring hamming into proper perspective, to the point where the wife then accepts it and often endorses it. The following excerpts indicate this problem area and the manners in which some wives have responded.

Ohio — "I became interested in the hobby when my husband did. Then it developed into a disease. For the next two years his hobby was almost a "hell-on-earth." He was on the air every waking minute during the week and all day Saturday and Sunday. We never visited friends, attended movies or even left the house in those two years. His TVI problems irritated the neighbors, made him nervous and almost drove me insane. Needless to say, what interest I had in the hobby soon faded. Then, after those two miserable years, he slowed down to a reasonable pace. In fact, he gets on the air only a few times a month. I would not care if he got on more often as long as he gets his needed sleep at nights. I know a few hams' wives who have the above problem not only for two years as I had them, but as a continuous problem."

WHEN THE  
HONEYMOON  
IS OVER



New York — "My husband is an avid ham. He's worked with young hams, taught radio classes and been active in a radio club. He works hard to support us and I feel that any time he can find to "ham it up" is like frosting on a cake — enjoy it. I haven't always felt this way. I do feel, however, that if a man enjoys his radio to his family then there has to be something uninteresting in the family, and perhaps mother should look over her demands on dear old dad."

Ohio — "When we were first married ham radio was a constant source of friction between us. Then I found that 90% of the ham wives had no interest in radio. When my husband went to see a ham buddy, I went along instead of staying at home mad. I met the wives and made many good friends. As to resenting my husband's interest in radio, I have just the opposite reaction. Our nine year old boy seems interested in amateur radio. I encourage it, because I feel it is one of the best hobbies a man can have. More wives should join in instead of fighting it. They would find a lot of friends and a lot of fun. Not be hams, but show some interest."

California — "My husband has been a licensed ham since he was 15. So one might say he is a dyed-in-the-wool operator. For this reason I have come to like amateur radio, following the well-known adage. "If you can't fight 'em join 'em." He is president of a mobile radio club. It is unique in that it allows the men to pursue their hobby while also being geared to please family interests at the same time. The meetings are open to women, and we have potluck dinners preceding many of them. Some wives are paid up members and a few have been elected to office. Maybe if more wives were given the opportunity of belonging to a group of this kind, there would be fewer bitter wives throughout the country."

It would be well if all husbands gave thought to the amount of time they spend hamming. Despite the warm approval given by most wives, to the 7% who feel too much time is spent on radio it can be a very real problem. At least try to learn whether your wife thinks you are guilty in this respect.

## Rx For Needed Relaxation and Making Friends

It is evident that most wives are deeply concerned with the matter of their husbands getting sufficient time to relax and enjoy some sort of hobby. Their hearty approval of ham radio seems based upon their recognition that most men do work hard to support the family, usually under pressures far more taxing than those confronting them as housewives and mothers, and therefore they are most solicitous of the husband's welfare when he is home and away temporarily from the eroding effects of his job. Wives think of it as a worthwhile hobby, in itself quite interesting to many of them, but more so in that it keeps the OM by the family hearth and by its very nature leads to socializing and the establishment of new friendships. Taken in the overall they, just as their husbands do, find it hard to top. See if you concur in these observations from these sample comments.

Florida — "My husband has always had what he wants for his ham radio. He is retired and operates whenever he wants to. I do not object at any time. It has been a wonderful hobby for him. He has had an ailing heart, so I am grateful that he can enjoy this. It keeps him happy and contented."

Missouri — "He enjoys his ham contacts very much. We have made many new friends, some of whom we visit. We have picnics each summer with a group. Also I attend hamfests with



him. We have had servicemen stop by to thank us for phone patches he ran for them. Hams are a very nice group of people. When we built our home, one ham got electrical supplies for us at cost, another did the wiring and a third helped finish the walls. To me, ham radio is not only a hobby for my husband but a wonderful way to make new friends."

Washington — "I do enjoy ham radio. We have many friends in California and have wonderful times at the s.s.b. conventions."

New York — "Since leisure time is at such a premium in our house, I must say I do resent too much time spent on the radio. On the other side of the coin, I'm very pleased that my

husband has such an absorbing and enjoyable hobby, for now and for those retirement years. He's made many friendships through ham radio. There is a lot to be said for it. Sometimes the odd jobs don't get done around the house, but life being short as it is — guess I'll worry less about the house and more about my husband's health and pleasure."

Kansas — "My husband obtained his license at a time when all we had was 32 volt power from a wind charger. He built all his own equipment and continued studying radio. Later he passed a Civil Service exam and was hired by a government agency. So you see his profession all started with ham radio. We have made a lot of friends through ham radio. Back in the '30s we didn't have much to go on, but we had friends around that we would visit every morning or once a week via radio. Today we meet hams who notice our license plate and stop to chat with us. I would have liked a license myself except that the code was too much of a problem for me."

New York — "As you see he has been operating for 32 years and that's how long we have been married. We have made some very fine friends through ham radio; some we have met and others (too far away) we hope to meet when we retire and have time to travel. I think it is a wonderful hobby for any husband, as long as he keeps within the budget and time of the family's pleasure. My husband has always been pretty considerate and I, therefore, do not have any complaints against ham radio."

Wisconsin — "After a few years went by I finally accepted this hobby of his as a member of the family. Now we get along fine. Recently, for the first time, he put me on the air and I received the biggest thrill of my life to talk to these operators. Now I am learning the code! My husband is real proud to take me to the hamfest they have here every so often. He is proud also to tell everyone I am learning the code. Of course, to me, it's such a thrill to meet the other hams' wives."

There was one letter that came quite close to embodying in its few lines the consensus opinion of the many wives so kind to submit their thoughts, and about as fine an endorsement as one could hope for.

Iowa — "I am happy to give you my opinion and reaction to my husband's ham radio activities. First of all, I want to say that he built a lot of his equipment — sometimes using 'junk.' I never cease to be amazed at his capabilities along these lines. I can't remember that I ever resented this hobby, but I do know, as the years pass, I am happier and more thankful that he has such an interesting (to him) and entertaining way to relax. I have no interest in radio except for the enjoyment he derives from it. I'm hoping it will help make his retirement years tolerable."

(Continued on page 140)

# 20th V.H.F. Sweepstakes - January 7-8

**A**TTENTION v.h.f. operators! The 1967 V.H.F. Sweepstakes will start at 1400 your local standard time on Saturday, January 7, 1967, and end at midnight local time on Sunday, January 8. Remember, contacts count only when the contest is in progress at both ends of a QSO. So join in the fun this year. Just call CQ Sweepstakes or answer such a call.

Remember that, unlike the v.h.f. QSO parties, in the SS sections count only once no matter what band they are worked on, although you may work the same station on a different band again for additional contact points. Example: W1HDQ works WA2BAH on 50 and 144 Mc. for complete exchanges of 2 points on each band;  $2 + 2$  gives 4 points but only *one* section multiplier. So bandhopping will increase your score.

In scoring, the multiplier is the number of sections worked *plus ten*. Each complete exchange counts two points. Sample: Suppose W6GDO made 100 contacts in 17 different sections:

100 QSOs  
 $\times 2$  (if all SS data exchanged in both directions)  
 200 (QSO points)  
 $\times 27$  (17 sections plus 10)  
 5400 (claimed score)

You can get log forms by writing to ARRL, 225 Main St., Newington, Conn. 06111. Logs must be postmarked by February 4 to be eligible for score listing and awards.

## Rules

- Eligibility:** Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable under one call on or above 50 Mc. are invited to take part. Yukon-N.W.T. (VE8) counts as a separate multiplier.
- Object:** Participants will attempt to contact as many other stations in as many ARRL sections as possible.
- Contest Period:** The contest starts at 2:00 P.M. your local time, Saturday, Jan. 7, 1967, and ends at midnight, Sunday, Jan. 8, 1967. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.
- Exchanges:** Contest exchanges, including all data shown in the sample, must be transmitted and received for as a basis for each scored point.
- Scoring:** (a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions.  
 (b) Foreign entries: All contacts with foreign countries (such as Mexico and the Bahamas) count for score. All for-

eight countries are grouped together as one, and a section multiplier of *no more than one* may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

(c) Final score is obtained by multiplying total contact points by the sum of different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.

6) **Conditions for Valid Contact Credit:** (a) Repeat contacts on other bands confirmed by completed exchanges of up to two points per band may be counted for each different station worked. (Example: W1HDQ works WA2BAH on 50 and 144 Mc. for complete exchanges of 2 points on each band;  $2 \times 2$  gives 4 points but only *one* section multiplier.)  
 (b) Cross-band work shall not count.

(c) Portable or mobile station operation under one call, from one location only, is permitted.

(d) A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest (with the exception of family stations, where more than 1 call is assigned to one location by FCC/DOT).

(e) Contacts with aircraft mobiles cannot be counted for section multipliers.

(f) Contacts made by retransmitting either or both stations do not count for contest purposes.

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e. able to communicate over at least a mile).

7) **Awards:** Entries will be classified as single- or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where at least three such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in QST.

When three or more individual affiliated club members compete and submit logs naming the club with which they are identified an ARRL certificate will be issued to the leading club member. A letter must be received from the club's secretary itemizing participating members and approximate claimed scores. When less than three individual logs are received there will be no club award or club mention.

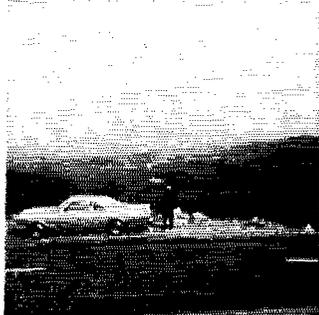
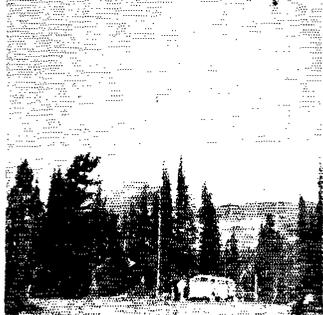
A gavel with an engraved band will be offered the affiliated club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only the score of a bona fide club member, operating a station in local club territory, may be included in club entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

8) **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Award Committee.

9) **Reporting:** Reports must be postmarked no later than Feb. 4, 1967, to be considered for awards. QST

## EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the . . . . NR		Call	CK	Place	Time	Date
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of station worked)	Your ARRL section	Send GMT time of transmitting this NR	Send date of QSO
Sample	NR 1	W1AW	59	CONN	1905	JAN 7



Western hilltoppers (left to right): **WB6KBZ/6** of Santa Clara Valley on top of Mt. Hamilton (Lick Observatory location), George says that the  $\frac{5}{8}$  base-loaded whip mounted on the camper top worked well from that 4300-ft. spot; **K7AUO/7** multioperated by **K7IUN** **K7BVT** **W7ADV** and **W7RPT** at Timberline Campground, Mt. Adams in Washington; and **K8REG/8** at the side of Mt. Evans in Colorado, the peak is 14,240 ft. and the highest auto road in the world.

## September V.H.F. QSO PARTY RESULTS

*Enthusiasm up — Conditions down*

COMPILED BY ELLEN WHITE\*, W1YYM

SEPTEMBER 10-11, 1966, the weekend scheduled for the September ARRL VHF QSO Party was heralded earlier that week by fine conditions. By the time the contest period got under way, however, you might have known it — conditions had changed. Once again, it was a contest for the persevering.

Approximately 310 reports were received from the W/VE group, with unusually fine comments, shown elsewhere in this report.

Looking down the multiplier/band chart we can see the obvious results of poorer 6-meter conditions. Only 13 stations topped 15 sections on that band. Two, on the other hand, was the interesting band for multipliers this time around, with many stations making the minimum chart figure of 10 sections. The sixth call area was most consistent with 220 and 432 Mc. activity reports.

This was the test that took a mountain top, operators and transmitters plus all the trimmings to bring in a top score. The mountaintoppers brought in the big scores led by **K1UGQ/1** with over 48-K, **W2PEZ/1** 37-K and **K1YLU/1** with close to 24-K.

The next big ARRL V.H.F. Test will be the V.H.F. Sweepstakes, January 7-8, 1967. Rules are shown elsewhere in this issue.

Single and multioperator V.H.F. QSO Party awards are scheduled for mid-December mailing

### Soapbox

"The 6220 Club of N. J. operated from a new portable location, in New Hampshire on Pack Monadnock. In general, activity was not as good as usual and we lost out in operating time as we only had 8 operators (compared to the 12 to 14 when we are in N.J.). A wonderful contest

and camping weekend with great weather." — **W2PEZ/1**. "Just got home from Europe and lucky to find the contest on." — **K1MTJ**. "Enjoyed working the contest and look forward to January." — **K1KKE**. "**W2PEZ/1** was the top signal from N. H. and **WA1DRO/1** the tops from E. Mass. These Parties are fun!" — **W1HLL**. "I was on a short trip to enjoy early autumn in Northern New England but had no contest luck until I worked **VE3CDX/W1** on Mt. Mansfield in Vermont while I was mobile." — **W4ZPD/1**. "Ninety percent of my 2-meter contacts were on c.w. My operating time was limited due to time outs to rest my left leg which was in a cast. Conditions in R. I. were poor and where were all the So. Jersey VHFers? Kudos, again, to **K1TPK**." — **K1ABR**. "Too bad 522s can't copy s.s.b., I heard only one other station on s.s.b. during the weekend, my neighbor **W1WK**." — **K1OJQ**. "My first contest, and a lot of fun." — **W11GRK**. "Operation on 144 was with a Communicator from the car. On 6, the station was a one-half watt transistor transceiver with a 3-element portable beam packed up 3 miles (on the hoof) to the summit of Stratton Mountain at a 3856 ft. elevation in South-central Vermont. DX was Mt. Washington, N.H. (**WA6ADI/1**) 100 miles northwest and **WA1BAR** Portland, Conn. 90 miles to the south." — **W1UDQ/1**. "C.w. on the low end of 6 and 2 was helpful in picking up **VE2**, **VE3** and **W8** for us. Good weather on Mt. Wachusett." — **K1YLU/1**. "Having 2 small children and lots of weekend company doesn't give one much time for contest operation." — **K1BUF**. "Friday night before the contest, the two-meter band was open to **VE3** and **W8**." — **W1JSM**. "A great time although I was disappointed in the 2-meter activity." — **WA1DRO/1**. "Below average conditions. No temperature inversion. I heard Florida stations on bursts Saturday night but couldn't make contact. Few stations south of Connecticut were good copy on either six or two." — **K1TPK**. "We were generator powered and the generator began spewing out oil early Sunday afternoon. We thus had to close down before the closing hours. Until then, the going seemed slow at our location atop Grace Mountain, about 1650 feet above sea level." — **W1NBN/1**. "One of the highlights was working **W2PEZ/1** on 1215 Mc., 5-9 signals both ways over a distance of about 55 miles. Conditions on 220 and 432 were poor. However, real team effort seems to have paid off. **WA2FQA** saved the day, by working 7 hours to put the high power 220 Mc. rig back on the air. While it was out of commission, we heard **W2UFT/8** in West Vir-

\* Asst. Communications Mgr., ARRL.

grinia 5-8 calling CQ 220. He didn't hear our 10 watter. We'll get him next time."—*K1UGQ/1*. "My single-operator venture was quite dull with the exception of 220 Mc. and six-meter iono-scatter. The 19 sections on six were obtained without the benefit of sporadic-E or aurora. 220 was useful in providing 7 sections and 12 contacts to bolster our mediocre score. At first there was no keying in the rig because I had just completed it. When I couldn't raise W3ARW on a.m., I clipped a key into the circuit and made the contact right away. LESSON: always have c.w.!"—*K1WHN*.

"I only recently completed installing the Benton Harbor lunchbox with homebrew supply in my car and welcomed the opportunity to check it out. Eureka it worked!"—*W4ZDAH/2*. "All operation was on 144 Mc. c.w. Thanks to the gang for getting on."—*W2LWT*. "A very unusual contest from many angles. WA2SOO was not competing so I had no real trouble with QRM. Most contacts were in excess of 100 miles and there was little local activity. Two meters paid off better than in the past couple of years. There seemed to be less pressure, with more time used for comments from other stations."—*K2DUR*. "The guys who have six-meter TVI should try sideband and watch their troubles disappear."—*W30YK*. "Not only my first v.h.f. contest but my first time on v.h.f. and it sure was a lot of fun."—*W2JYF*. "This is the call of a military station at USA STRATCOM-CONUS Facility at Fort Monmouth, formerly the Radio Propagation Agency. The site was Red Hill in Middletown, N. J. with an elevation of 220 feet. The two portable eight in West Virginia came back to us on 2 but couldn't copy us. We wish there had been more activity above 1 KMc. Look for us in the future with higher power and better antennas."—*W2RWB/2*. "About average band conditions for this particular time of the year. Activity on 220 and 432 in Maryland and around New York City seems to be very poor. This is one of the most enjoyable contests to work during the year."—*W2EIF*. "The Murray Hill Amateur Radio Club operated under this call."—*W2GKR/2*. "The chart you used in Sept. QST for the June report is, in my opinion, an excellent idea. Your presentation lets us check quickly and easily how our friends around the country made out. Although band conditions were not especially good here, I beat all previous efforts on 144 Mc. sections and my contacts on 432 were up. I missed skeds with K1JIX in W. Mass. and W1QWJ in W. Mass. Managed to work two stations on all four bands, W3ARW and VE3ZZZ. Next year I hope to add 1296. Keep up the good work."—*K2YCO*. "We heard W2PEZ/1 on both 6 and 2 no matter what direction our antenna faced throughout the contest."—*W2TEO*.

"Where was everybody?"—*W4EOP/3*. "Operated the entire contest under emergency power in the field. Finished homebrew 6-meter rig the morning of the contest."—*K3YQS/3*. "Sideband, c.w. and u.h.f. really paid off this time in spite of the efforts of a four foot black snake to provide QRM. We'd like to see more u.h.f. stations dust off their gear. 220 seems very inactive in Pennsylvania although we got and gave good signal reports."—*K3HKK/3*. "Although band openings were just a little above average and no spectacular openings developed, eager operators led to a respectable score. The new two meter 32-element collinear got a good workout. We're planning expanded operating on the higher bands in June

## DIVISION LEADERS

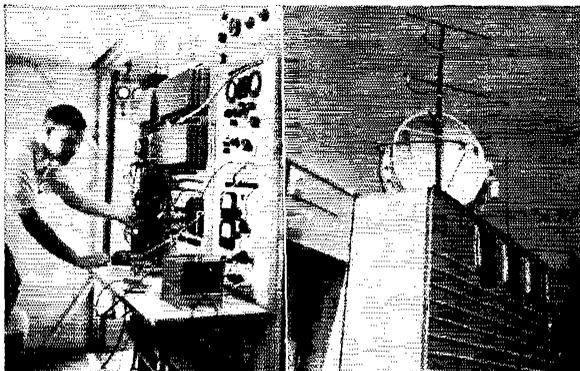
Single Operator		Multipoperator
W2EIF	Atlantic	K3MTPK/3
W49JFM	Central	W49LIV
W0LCN	Dakota	.....
W4BDXA	Delta	WA4VNF/4
W48MPW	Great Lakes	W48BCA
W82PMP	Hudson	W2GKR/2
K0TLM	Midwest	W0LB/0
K1WHS	New England	K1UGQ/1
K7BBO	Northwestern	K7DBK/7
W6GDO	Pacific	WB6PXN/6
W44LTS	Roanoke	W4TRC/4
W0AJY	Rocky Mt.	K8REG/0
K4ABT	Southeastern	.....
WB6GFD	Southwestern	W6NLO/6
W5WAX	West Gulf	K5CFM
VE2BZH/2	Canadian	VE3ZZZ

and also expect to be on in the January contest from the mountaintop."—*W3AD/3*. "A highlight for me was working Ohio on two meters, the first time in almost two years."—*W43CBC*. "We were set up on Backbone Mountain, the highest point in Maryland, near the western border. All operation was on emergency power, and to conserve power, both receiving setups were totally transistorized."—*W8AS4/3*.

"Due to some misfortunes, the Greenville VHF Society did not get to the mountain. Of all the many contests operated, however, this was the most rewarding. I had many schedules that paid off with added sections. I found that the ability to operate all bands at the same time was profitable and lastly, morning scatter on 6 can be one of your best section helpers. Hopefully the next one will be from the mountain with K4GWY."—*W44LTS*. "The only ones having any luck were the portables in the mountains."—*W44UCE*. "More contacts due to more local activity. Excellent scatter on the 11th, early morning. With c.w. we could have picked up many needed sections."—*K4HQ1*. "Worst local activity ever experienced, with only one very short 6-meter or opening."—*K4FJW/4*. "A typical mountain-top contest for us. Once on top of the mountain some of the gear wouldn't work. A bad generator forced us to use low power and none of our 220 and 432 skeds panned out, and it was cold."—*W4FDO/4*.

"I did work more sections than in any other contest, (skip not counting) by groundwave. I heard Oklahoma City stations working skip in Virginia, N. C. and Tennessee about 2300 GMT Sept. 10. I couldn't hear anything here, so guess I was just on the edge of the skip zone. The use of c.w. added several sections that I couldn't work on phone. My best contact was c.w. to c.w. with WA4MBZ in Memphis, about 300 miles. Iono-scatter Sunday morning but no takers. I heard K80XC on sideband very well."—*W5WAX*. "No openings at all but ground wave was in and out."—*W45DXA*. "The generator failed, the two-meter converter was ineffective and no 6-meter opening. Not the lowest score I've posted, but close!"—*W5IXR/5*. "This is a new experience, quite different from low-band contests. Six was shot. However, I did manage

New multipoperator muscle in the Hudson Division and a group to watch in the future, the Red White and Blue Group, **WB2RWB/2**. Shown is WA4HRX at the 220 and 432 station inside a mobile van. Antennas used for those bands, 7-L 220 Mc. and 11-L 432 Mc., fed with RG-9 and 1/4-wave beercan coaxial sleeve matching—wooden booms. The six foot dish covers 1-10 Kmc.





The top six-meter section total in the country (21) was posted by **W3KWH**, the Steel City Amateur Radio Club of W. Pa., manned solo by **W3ZGI**. Here's the six-meter operating position with an old 6C21 experimental final on the right.

and Michigan took a nosedive Sunday when an Ohio hamfest took the attention of a great many of the two-meter gang. Once again thanks to the mountain toppers, mainly **W8ASA/3**, **W2UFT/8** and **W4TRC** who handed out Md., W. Va. and Va. The ARRL VHF contests are a big boon to VHF interest and activity." — **W8QOH**. "There seemed to be a dearth of activity, particularly on 220/432. We were surprised not to hear New England stations particularly because **K2HLA** on Eastern L. I. had a terrific signal. We heard **W1AZK** but Don apparently didn't have his beams to the SW. Ditto **K1ABR** (these on 144 Mc.) The VE3 stations had very strong signals on 2 meters. Most of 2 meter operation was via c.w. This group will operate from a fixed location from **W2UFT** in June, provided we can solve the 50 Mc. TVI problem, which is horrendous. This amounts to a mammoth public relations program." — **W2UFT/8**. "None of these 'CQ Contest' operators operating at 145 Mc. took time out to tune down to 144.11 Mc. where easy extra points were waiting for them. At least they could have had the courtesy of specifying where they were tuning and saved some of us a lot of frustration. It was fun anyway (at least after the heat of the contest cooled us down!)." — **W8PAZ**. "Don't wait till tomorrow to work them as they won't be on!" — **W8WEN**. "Missed Indiana, W3 and VE3 for additional sections. Handicapped by an 8-month old Jr. op., but he cooperated exceptionally well. Looking forward to the next one and better two-meter conditions." — **W8HQL**.

"Conditions here in Chicago were extremely bad. Just one week earlier would have been great since there was a very respectable aurora opening covering Colorado to N. Y., but that's just the way the ball bounced. The noise level was much higher than even our normally very high noise level and signals were only better than normal ground wave levels in a narrow band running from Cincinnati to Sturgeon Bay, Wis., on the two-meter band. We could have added Mo. on 2 and Ohio on 6, however we didn't have s.s.b. available. **K9VKF** is a sightless op. and kept his log in Braille, transcribing it after the test. We both enjoyed the QSO Party and hope to participate again in the future." — **K9JAM**. "Conditions seemed great. Either our added ten feet on the tower helped or those boys to the south know that we are up here in north-central Wis." — **K9BWG**. "The worst 6 and 2 meter band conditions in five years of contest participation. There was about 5 minutes of "E" skip on 6 and 2, both south and east. We used to work under the call of **K9PAF**." — **W9ALTY**. "Heard six sections on two, but worked only one. Next time I'll have more than a "Twoer"." — **W9NFF**. "Never heard or worked so many on two in any contest. Six was fairly good but not as active as during the June Party as far as states worked." — **W9JFM**. "Didn't realize v.h.f. contests could be so much fun. Lots I worked felt they had to give a time check as part of every exchange, hi." — **W9GFP**. "One of the operators at **W6POY** (during a short nap away from the rig) dreamed he was working a VK on 50 Mc. I Activity in greater Kansas City was noticeable by its absence. The Kansas SCM **K0BXF** was good for a contact on six and two." — **W10FL/0**. "Six meter conditions were poor even from 13,000 foot on the side of Mt. Evans, Colorado, the highest accessible Mt. peak (by road) in the world! No DX, no groundwave and no activity. Besides all this, we experienced freezing rain, snow, hail and temperatures of 25 degrees. But boy what a view!" — **K8HEG/0**.

"I operated portable on a hill about 600 foot above the mean altitude around the Montreal area, some 35 miles west of the city. Conditions were poor to fair. Activity was poor in Quebec but appeared good south of the border. Looking forward to the January VHF SS." — **V6BZH/2**. "My city QTH is difficult because of many trees. So the cottage again seemed to be it. Again I got the 32 elements up, but also added the 5-L for 50 Mc., not knowing at the time whether I'd be able to get any worthwhile signal on either band. This year the test was a real challenge because conditions were not at all good. Of my 27 contacts, all but 3 were on c.w. or s.s.b. I've been moni-

to gain quite a few points through working locals." — **W4SKBH**.

"Here in the Orange Section activity was nil. Even usual activity was low on both 6 and 2. Sorely missed were **K6BPC/6** and **K6OKC/6** which usually supply a Santa Barbara multiplier. Plan to have beams up 50 feet and a two-meter converter by VHF SS time." — **W6P110**. "Longhaul tropo-propagation seemed worse than usual but local low power activity was higher than usual. None of my 2-meter Utah skeds (coordinated on 75 meters) panned out although I did get pings from **W7RQT/7**. It is embarrassing not to work your own section. My only 1296 QSO was with **K6HCP** 100 miles away in SCV, as there isn't any activity here in Sac. V. on this band." — **W6GDO**. "We were portable at Leek Springs Hill at an elevation of 7621 feet, approximately 60 miles east of Sacramento in Eldorado County." — **W6PXX/6**. "I had hopes of doing better but I had to take time out to take my wife to the hospital. We now have a 9 lb. 4 oz. baby girl. It isn't a contest multiplier but it sure is one around home." — **W6GFD**.

"We were located at an altitude of 7626 msl." — **W7-DAY/7**. "We were in Washington at a campground near timberline between six and seven thousand feet. Except for a few lapses, 75 meter sideband (around 3810) served excellently as a much-needed liaison for setting up schedules. I'd say it is a necessary part of every mountain-top excursion. In case **W7UDM** didn't send comments along with his log, let me say those guys sure knocked themselves out for very few contacts. They drove 1000 miles round trip for 5 or 6 contacts. They took 144 and 432 KWs along, big antennas and then found hardly anybody to talk to. Kind of discouraging, but DX can be done from there if people will only put out the effort. My experience is that from 8 to 11 a.m. local time is far better than any other time, at least for 2-meter tropo dx. Does this concur with others' experience?" — **K7AUO/7**. "Contest location was on top of 8200 foot Scott Mountain, 50 miles north of Boise, Idaho. Poor tropo conditions prevented two-way contacts with **W6GDO** in SV and **W7JRG** in Montana. First known Idaho-Utah and Portland, Oregon-Idaho contact." — **W7UDM/7**. "We had our usual cold front v.h.f. contest weather. Despite this, I was able to work Idaho for state #9 on 2 meters." — **K7ZIR**.

"As always a lot of fun, but conditions way down from the excellent June contest tropo. Activity in Ohio, Indiana



Highlighting activity from the Central Division was the two-band Wisconsin effort by **WA9JFM**, topping his section and division with 5010 points.

tering the f.m. band and think it is a very good indicator of 2-meter conditions. When things look promising, I am able to hear both Montreal and Syracuse area stations. I'm sure that if I could get a few guys interested in turning out about 6 to 7 a.m. EDT we could work all over the eastern seaboard. Next year I think I'll try to get something on for 220 and 432 although I don't want to bite off too much and I already have about a ton of gear at the cottage." — *WB3RA/3.*

**Disqualifications**

In accordance with V.H.F. QSO Party Rules, the entry of WA0HKP has been found invalid.

**SCORES**

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 432 Mc.; and E, 1296 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Novice Award Winner. A double asterisk denotes a Headquarters staff member, ineligible for an award.

**ATLANTIC DIVISION**

*Delaware*  
 W3CGV 1533-64-21-ABCD  
 W3HC 846-47-18-AB  
 K3UHT 462-42-11-A  
 W3BDP 324-26-12-BD  
 K3QBD/3 (12 oprs)  
 1584-132-12-AB

*Eastern Pennsylvania*  
 K3WJB 3276-182-18-AB  
 W3AAAN 1812-151-12-A  
 W3MPX 690-69-10-A  
 K3JHE 350-35-10-A  
 WN3FPK\* 170-34-5-B  
 WN3FDB 140-28-5-B  
 WN3RZF 2-2-1-B  
 K3MTK/3 (4 oprs)  
 16,135-461-35-AB  
 W3AD/3 (6 oprs)  
 798-294-27-AB  
 K3ZSG (K3ZSG, WA3s DNC FVK)  
 7326-220-33-ABC  
 W3ARW (K3SQO, W3s ARW PMG)  
 6273-142-41-ABCD

K3TYJ/3 (8 oprs)  
 2412-134-18-AB  
 K3YQS/3 (K3s QGQ YQS, WA3BCD)  
 329-137-17-AB  
 K3YGH (W3s GFN IJZ)  
 1617-66-21-AB

*Md.-D.C.*  
 WA3CBC2860-140-19-AB  
 WA3EUP/3  
 1012-92-11-AB  
 W3GPK 690-57-13-B  
 WA3GPK 296-37-8-B  
 WN3ELA\* 260-52-5-H  
 WN3FYZ 1-1-1-B  
 W3PGA/3 (5 oprs)  
 5808-264-22-ABC  
 K3SNL/3 (K3s QMID ZSS, WA3AKZ)  
 2176-136-16-AB  
 W8ASA/3 (4 oprs)  
 1668-98-17-AB

*Southern New Jersey*  
 W2EIF 5915-150-35-ABCD  
 WN2UVB\* 200-40-5-B  
 WB2MNM155-31-5-A  
 WB2RVE 150-25-6-AB  
 WB2SPJ 102-17-6-A  
 WA2HSP 60-15-4-B  
 WB2IGC 32-8-4-B  
 WN2UOX 1-1-1-B  
 WB2NVG (5 oprs)  
 4488-203-22-ABC  
 WB2UEY/2 (WB2s UEY YJL)  
 420-70-6-AB

*Western New York*  
 K2YCO 3192-95-28-ABCD  
 K2LFB 1710-89-19-ABD  
 K2DUR 1488-93-16-AB  
 WA2TEY1260-105-12-AB

WB2OEU/2  
 1084-78-14-AB  
 WA2KND 490-68-7-ABD  
 WB2IPX 392-56-7-AB  
 K2ACQ 150-15-5-D  
 WA2YRH 88-21-4-ABD  
 WB2KYQ 33-11-3-B  
 W2ADN 14-14-1-A  
 W2UOX/2 (5 oprs)  
 8995-257-35-AB  
 W2OW (14 oprs)  
 5249-181-19-AB  
 W2OFQ/2 (9 oprs)  
 3294-183-18-AB  
 K2ERQ (1 oprs)  
 2465-145-17-AB  
 WB2SEJ/2 (WB2s HQL SEJ VFC)  
 424-53-8-B

*Western Pennsylvania*  
 W3KWH (W3ZGI, opr.)  
 1869-89-21-A  
 W3WU 1196-90-13-ABC  
 W3RUE 1121-53-19-ABD  
 WN3FUN 188-47-4-B  
 W3DJM 140-35-4-A  
 K3TTP 45-9-5-AB  
 K3HKK/3 (10 oprs)  
 14,280-313-40-ABCD

**CENTRAL DIVISION**

*Illinois*  
 WA9OUU 2310-185-14-AB  
 K9RVU 1557-173-9-B  
 W9VWY 812-118-7-B  
 WN9RNO\* 530-106-5-B  
 WA9MSZ 280-70-4-B  
 WA9OBQ 268-67-4-B  
 WN9RSN\* 268-67-4-B  
 W9GFF 236-59-4-B  
 WA9FXH 204-61-4-B  
 WA9SKJ 196-49-4-A  
 WA9NVJ 184-46-4-B  
 W9AXT 174-27-6-BD  
 WA9CITK 170-34-5-A  
 WA9RIE\* 165-55-3-B  
 WA9FH 112-28-4-AB  
 W9VPU 102-14-6-BD  
 W9DI 4-4-1-A  
 WA9LIV (11 oprs)  
 3312-203-16-ABCD  
 K9JAM (K9VKE, W9IFO)  
 2574-234-11-AB

*Indiana*  
 K9QCB 1344-109-12-ABCD  
 K9AMH 1092-78-14-AB  
 WA9NLA/9  
 664-83-8-AB  
 WA9NJJ 210-30-7-A  
 W9BRN (W9BRN, K9MRD)  
 1760-160-11-B

*Wisconsin*  
 WA9JFM 5010-334-15-AB  
 WA9OFF 657-73-9-AB  
 K9VNM 456-76-6-B  
 K8IFL/9 168-42-4-B  
 W9IQ 144-36-4-B  
 WA9NCC 42-21-2-B  
 WA9NVY 7-7-1-B  
 K9OXY/9 (K9OXY, W9GJJ, WA9LZM)  
 1430-126-11-ABE

K9EWG (5 oprs)  
 186-81-6-B  
 WA9RNW (5 oprs)  
 330-55-6-A

**DAKOTA DIVISION**

*Minnesota*  
 W0LCN 154-22-7-B

**DELTA DIVISION**

*Louisiana*  
 WA5DXA 176-44-4-AB  
 WA5OZH 102-34-3-A  
 WA5KBB 52-26-2-AB  
 WA5DRK 24-24-1-A  
 WA5JVL 7-7-1-A

*Mississippi*  
 W5CKY (26-16-7-BD)  
 W5CUU (W4WZC, W5CUU, WA5NLO)  
 15-5-3-AB

*Tennessee*  
 K4FJW/4 80-16-5-A  
 WA4VNP/4 (5 oprs)  
 440-94-10-AB  
 WA4UCE (WA4CKP, WB4CDE)  
 45-15-3-A

**GREAT LAKES DIVISION**

*Michigan*

W8CVQ 630-61-10-ABD  
 W8HQL 280-70-4-B  
 W8HPZ 116-29-1-AB  
 W8IBB 80-16-5-B  
 W8QK (K8UCQ, WA8MOA)  
 105-21-5-A

*Ohio*

WA8MPW 2220-222-10-AB  
 W8QOH 1391-107-13-B  
 W8WEN 1302-93-14-B  
 WA8LW 1274-91-14-AB  
 W8JRN 777-111-7-AB  
 WN8SJJ\* 156-52-3-B  
 WN8SOW 57-19-3-B  
 WN8PZ 34-17-2-B  
 W8FAZ 12-4-2-BD  
 WA8BA (14 oprs)  
 8088-337-24-AB  
 WA8MSF (WA8s MRW MSF SVV)  
 2340-156-15-AB

Minimum Number of Sections	(Calls in bold-face type denote single-operator section leaders.)				Minimum Number of Sections	(Calls in bold-face type denote single-operator section leaders.)					
	15	10	2	1		15	10	2	1		
Band (Mc.)	50	144	220	432	1296	Band (Mc.)	50	144	220	432	1296
KIABR		14				W2WEB/2*		15			
W1ALE			3	3		W2WVA		10			
W1CB/1*				3		W3AD/3*		15			
W1DHT*		10				W3ARW*		18	6	4	
WA1DRO/1		11				W3BDP		11			
K1FFE		11		4		WA3CBC		10			
W1JSM		12				W3CGV			2	4	
W1LUA/1*	16	13	5			W3GKP		13			
W1NBN/1*		10	2	4		W3HC		13			
W1OOP			5	6		K3HKK/3*		17	18	2	3
K1QIZ/1*		10				W3KWH		21			
K1TPK		10				K3MTK/3*		18	17		
K1TZD		2			1	W3PGA/3*		12			
K1UGQ/1*	18	20	10	11	2	W3RUE		11		4	
K1WHS	19	15	7			K3ZSG*		15	16	2	
K1YON		10			1	WA4LTS		18			2
K1LYL/1*	15	16	6	3		K4SUM				2	5
K2ACQ		14				W4TRC/4*	15				
W2AQT		14				W5CKY					2
W2AQV		20				W6GDO			3	6	1
K2ARO		10				WB6GFD			4	3	2
WA2BANK		10				K6HMS					
K2CBA/2			2	6		WB6KAP			3	5	1
K2DNR		17				K6KLY					4
W2EIF		13	4	4		W6NLO				4	
K2ERQ*	15					W6PUZ					4
WA2EUS					2	WA8BCA*		12			
W2GKR/2		16	4			W8CVQ					2
W2GKZ		10				W8QOH					13
W2HF		11				W8WEN					14
W2LWI		21				W9AXT					2
WB2OJ*		11				W9BRN*		11			
W2OW*		17				W9LIV*				2	
W2PEZ/1*	16	16	7	4	1	K9OXY/9*					1
WB2PMP		15				VE2BZH/2		10			
WB2QLP*		11				VE3AIB					3
WB2QZZ		18				VE3BPR					7
WB2RWB/2*		12	2	1		VE3DSE					2
WB2TEO*		12				VE3ZZZ*		14	4	2	
W2UFT/8*		19	2								
W2UOX/2*	19	16									

\* Multi-operator Station.

**HUDSON DIVISION**

*Eastern New York*

- K2CBA/2 (W2JKI opr.)
- W2AQQ 1827- 78-21-ABCD
- W2AQQ 1500- 75-20-B
- W2LWT 1365- 65-21-B
- K2DNR 1156- 68-17-B
- K2ARO 704- 63-11-BD
- WB2TNM
- 318- 53- 6-A
- W2HF 252- 20-12-BC
- W2TP 224- 28- 8-A
- WB2VVQ 192- 32- 6-A
- WA2USG 174- 29- 6-B
- WA2DAH/2
- 37- 9- 3-A
- WA2MMI (WA2MM1, WB2UHZ)
- 1568-112-14-AB
- WB2OJJ (WB24 MYK OJJ)
- 605- 55-11-B
- WB2JYV (4 oprs.)
- 459- 51- 9-AB
- WA2UIY (4 oprs.)
- 350- 35-10-AB
- WN2WUS (4 oprs.)
- 250- 50- 5-B

*N.Y.C.-L.I.*

- WB2PMP 8960-240-20-AB
- WB2QAF 1350- 90-15-AB
- WN2WVA\* 1180-118-10-B
- WA2EUF 810- 52-15-ABD
- WB2IKQ 565- 70- 8-AB
- WN2WVU 441- 63- 7-B
- WB2JTE 420- 60- 7-AB
- W2GKZ 360- 36-10-B
- WB2HME 330- 55- 8-A
- WN2VGR 240- 40- 6-B
- WN2IZH 172- 45- 4-B
- K2EVE 168- 28- 6-A
- W2KXG 145- 29- 5-B
- WB2MEO 140- 35- 4-B
- WB2TEO (WB28 EDF TEO TFD)
- 7098-273-26-AB
- WB2QLP (WB24 MZE GLP)
- 6720-280-24-AB

*Northern New Jersey*

- WB2QZZ 2736-152-18-B
- WA2BNK 1080-108-10-B
- W2CVW 600- 50-12-AB
- W2AQT 434- 31-14-B
- WB2QYK 48- 12- 4-A
- WN2YRD 40- 20- 2-B
- W2GKR/2 (6 oprs.)
- 15,470-432-35-ABCD
- WB2KWB/2 (6 oprs.)
- 12,818-360-34-ABCDE
- WA2WBR/2 (9 oprs.)
- 1830-160-30-ABC
- WB2MZH (WB2 MZH NCX)
- 1392-116-12-AB

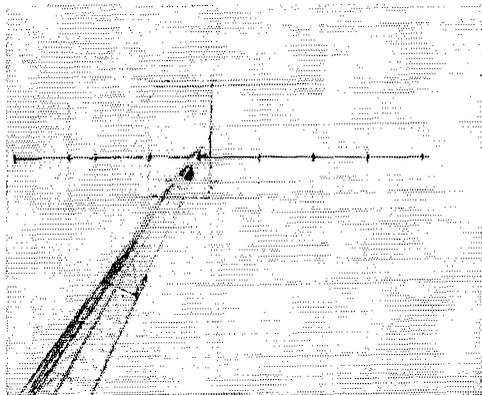
**MIDWEST DIVISION**

*Iowa*

- K0KPK 354- 59- 6-A
- W0FII 168- 28- 6-AB
- WA0FLD/0 100- 25- 4-AB

*Kansas*

*Eastern Massachusetts*



The top New England Division and Connecticut single-operator score was posted by **K1WHS**. Dave's v.h.f. antenna array consists of a Tri-ec crank-up tower supporting 9 elements on a 31-ft. boom for 50 Mc., a 32-element Telrex Quad array for 144 Mc. and a temporary 6-element 220 Mc. Yagi. The top two meter antennas are 93 feet off the ground.

- W0LR/0 (7 oprs.) 1200-129-10-AR
- WA0POY (4 oprs.) 945-105- 9-AB
- Missouri*
- K0TLM 432- 54- 8-AB

**NEW ENGLAND DIVISION**

*Connecticut*

- K1WHS 13,448-316-41-ABC
- K1YON 3286- 81-21-ABCE
- WA1EAZ 2190-146-15-AB
- K1TZD 1728-101-16-ABCE
- WA1EQC 352- 44- 8-B
- W1AW (W1WPR, opr.)\*\*
- 236- 32- 8-AB
- 130- 26- 5-AR
- WA1GIS 105- 21- 5-B
- K1QPN 60- 20- 3-B
- WA1FLC 33- 11- 3-B
- WA1GRK 21- 8- 3-A
- W1LUA/1 (9 oprs.)
- 12,070-319-34-ABC
- W1DHT (5 oprs.)
- 2415-115-21-AB
- K1RKK/1 (K18 RKK SUB)
- W1DWE/1 510- 85- 6-A
- Eastern Massachusetts*
- WA1DRO/1 3780-210-18-AB
- K1FFE 1110- 65-15-BD
- W1DOM 1044-116- 9-AB
- WA1BFD 990- 90-11-A
- W1HIL 793- 61-13-AB
- W1JSM 780- 65-12-B
- W1KBN (K1OPW, opr.)
- 690- 69-10-AB
- 594- 27-11-CD
- WA1BQ 368- 46- 8-AB
- WA1AEZ 357- 51- 7-A
- WA1FCD 288- 36- 8-AB
- K1BUP 125- 25- 5-A
- WA1DPX 110- 22- 5-A
- W1CTR/1 104- 26- 4-B
- WA1ETE 84- 21- 4-B
- K1OJQ 68- 17- 4-A
- WA1DYU 42- 14- 3-A
- W1CTR 36- 12- 3-A
- W1CB/1 (K18 XYZ ZTA, WA1CD)
- 2075-166-17-ABD
- WA1ACD (WA18 ACD PGZ)
- BIQ 1716-156-11-AB
- Maine*
- K1MTJ 372- 31-12-AB
- New Hampshire*
- W1ALE 1826- 72-22-ABCD
- WA1CIR 132- 22- 6-B
- W2PEZ/1 (8 oprs.)
- 37,048-809-44-ABCDE
- Rhode Island*
- K1TPK 5676-258-22-AB
- K1ABR 1743- 83-21-AB

*Vermont*

- W1HDQ/1\*\* 170- 17-10-AB
- W1EXZ 32- 8- 4-AB
- W1QQ 2- 2- 1-B
- WA2ZPD/1 1- 1- 1-B
- K1QZ/1 (4 oprs.)
- 2457-117-21-AB
- W1HPJ/1 (4 oprs.)
- 1980-110-18-AB
- W1ARE (W18 ARE DAO)
- 330- 30-11-AB

*Western Massachusetts*

- K1ULZ 1032- 86-12-AB
- W1UWX 754- 58-13-AB
- W1UCB 216- 23- 9-ABC
- K1UGQ/1 (12 oprs.)
- 48,100-742-61-ABCDE
- K1YLU/1 (8 oprs.)
- 23,880-571-40-ABCD
- W1NBN/1 (5 oprs.)
- 5510-177-29-ABCD

**NORTHWESTERN DIVISION**

*Idaho*

- W7UDM/7 (W76 DPE SMV UDM)
- 20- 5- 4-B
- W7LIQ (4 oprs.)
- 16- 8- 2-B

*Montana*

- W7CJN 22- 11- 2-AR
- W7TQC 30- 10- 2-AB
- W7TYN/7 10- 10- 1-B

*Oregon*

- WA7RJT/7 306- 63- 6-ABCD
- W7TYR 330- 50- 6-ABCD
- K7ZLR 234- 37- 6-ABCD

*Washington*

- K7BRO 1089-121- 9-AB
- WA7FHG 18- 18- 2-A
- W7GZN/7 36- 18- 2-A
- K7DBR/7 (K78 DBR IVC)
- 300-100- 3-AB
- K7AUO/7 (4 oprs.)
- 96- 32- 3-B
- WA7BTG (WA7BTG, WN7CVZ)
- 58- 29- 2-AB

**PACIFIC DIVISION**

*East Bay*

- K6KLY 88- 11- 4-D
- WB6FHH 12- 4- 3-B
- WB6LFF 6- 3- 2-B

*Neveda*

- K7ICW 216- 17-12-ABD

*Sacramento Valley*

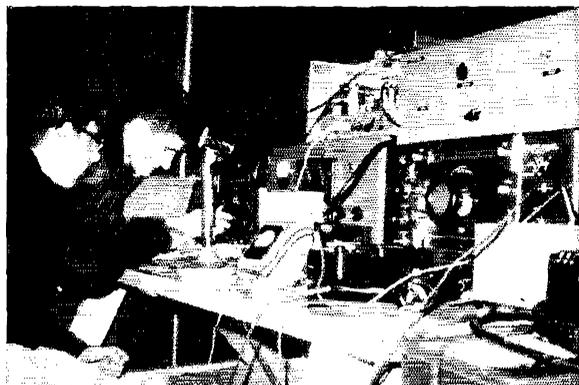
- W6GDO 4158-136-27-ABCDE
- WN6TO 14- 22- 2-B
- WA6CXB 22- 11- 2-B
- WA6JDT 4- 4- 1-B
- WB6PXN/6 (WB2KVB, WB6PXN, K7BCD)
- 630- 70- 9-AB

*Sun Joaquin Valley*

- K6UJG 248- 31- 8-AB

(Continued on page 148)

The top score in the contest was amassed through the multioperator-efforts of **K1UGQ/1**, with close to 50-K for a 5-band performance. Antennas for the Mt. Greylock (W. Mass.) operation were 3/3 yagi for 50 Mc., 8/8/8 J-beams for 144 Mc., 15-1 yagi for 220 Mc., 24-1 colinear for 432 Mc. and an 8 ft. dish for 1215. On the left, 220 Mc. operator **WB2RDF** seems to be saying to **K1KSG** "It's a WA6 alright, but he's portable 2!"



CONDUCTED BY GEORGE HART,\* WINJM

## Succeeding By Success

THE mark of a successful salesman is to be able to sell someone something he doesn't need or doesn't want. Anyone can sell a commodity in great demand; but good salesmanship can create the demand through various different kinds of appeals, then turn this artificial demand into sales profits.

At a convention we attended some years ago, we noted that each of the featured speakers represented one of the exhibitors, and the underlying purpose of each talk or demonstration was to sell the exhibitor's product. When it came our turn to talk we pointed out that this was fine, and we hoped all exhibitors would benefit measurably (and be able to increase their *QST* advertising budget thereby); but that we also had a product we wanted to sell — amateur radio public service. We then went about our sales "pitch."

This convention was a rare exception, because we were given an opportunity to speak to the entire assembly, not just those amateurs who were interested in public service. This is possible at comparatively small gatherings, but not practical at the really large conventions. At these, our talks on public service are delivered before an audience of amateurs who are already interested in the subject and who may already be participating in it — otherwise they would not be there.

How, then, do we reach the average amateur to get him interested? By writing *QST* articles? By bulletins? By generating publicity releases? How do you ignite that initial spark of interest among the main body of the amateur fraternity which is basically disinterested?

We have tried just about everything, most of it with indifferent success. It seems that no matter what we do, about 90% of the licensed amateurs put up a terrific resistance to having any close connection with the public service program. We have pondered this and marveled at it and condemned it, but there it is. What's to do?

Recently, we have been advising ECs writing us about it to forget about the disinterested majority and concentrate on the enthusiastic minority of those who are willing and eager to take part in our program. The more often we give this advice, the better we like it. If everybody interested pitched in and made the program succeed, even if only in a small way, those not in it would start to look toward us with interest, maybe even envy. So your group consists of only half a dozen hams in a community boasting

two hundred, and this is terrible but no matter what you do, you can't seem to get anyone else interested. Is the thing to do to go beating the bushes for more prospects? Is it progressive to be a supplicant or a mendicant? Or is it better to be able to present your ARPSC group as a going thing in which participation is an honor to the participant rather than a favor being asked of him?

Just as those who attend ARPSC meetings at conventions are the amateurs interested in public service work, only those interested in the subject read this column. We hope you will speak with pride of your group and leave no opportunity neglected for doing so among amateur gatherings. Tell them of the interesting things you do, the people in high places you meet, the deep satisfaction you get from knowing that what you are doing is important. Relate anecdotes of amusing incidents during tests, drills, emergencies. Resist the impulse to sneer back at those who sneer at you. And among those of your ilk, work hard to make your organization succeed, for nothing attracts participation like success. ARPSC will always have its loyal adherents, and you can say what you please about "fair weather friends," but if our program is to be No. 1 in fact as well as in fancy we need all the friends we can get. So a principal factor in success is success itself. Make your program a success and the ham world will flock to your banner. Maybe we have been trying to do it in the wrong order — WINJM.



The AREC and RACES members of the Albany Amateur Radio Assn. were able to drag themselves away from the feasting long enough to have this picture taken. From left to right we have: (first row) K2ACB WB2SFN WA2HFT WA2RWR WB2PUH. (second row) WA2BAH WB2OIM WA2OYV WA2JWO WA2WSY WB2BZE. (Third row) W2DSK WB2RBG. (Back row) W2MCN W2AWF (EC/RO) W2IWI K1KIY.

\* National Emergency Coordinator.

## Diary of the AREC

While on his way home after attending a convention in Arlington, Texas, on June 5, W5YCK stopped at the entrance to the Southeast Freeway to wait for traffic. As he looked across the highway, he saw a car strike something and begin to roll. W5YCK grabbed the mike of his 2-meter f.m. rig and began to call for help. By this time, the car was rolling end over end down a hill and finally landed upside down and then rolled over on to his wheels when he finally came to rest. By this time, WN5NFA answered W5YCK's emergency call and told him that the police had been called and were on their way. K5PIC and K5OLJ, who were passengers in W5YCK's car, ran over to the wreck to see if they could help the driver. They found both seats covered with glass fragments and a young man unhurt but shaking and saying how lucky he felt. Another call by WN5NFA relayed the information to the police that the driver was unhurt but trapped in the car. Within twelve minutes after the initial call, police cars arrived and the driver freed. — *W5YCK.*

In mid-August, W6RT was the relay for communications between two physicians, one in London and the other in Viet Nam, in consultation involving heart surgery on a 16-year old Vietnamese girl. The consulting physician was in a London hospital room, the one performing the operation in the hospital ship *Repose* off the South Vietnamese coast. "One of the best hookups I've ever had," said W6RT, a retired marine general. — *W6RT/JL.*

The opportunity to demonstrate international cooperation between hams was provided by the Canadian Centennial Canoe Race from Montreal to New York City on August 22-29. The trial for a longer race during Canada's Centennial celebration in 1967 provided much favorable publicity for the AREC.

Organized by VE2AUU, Canadian NEC, a large group of VEs and Ws participated. Two yachts equipped with 75 and 2 meter equipment and two cars, similarly equipped, accompanied the canoe teams. The operators handled traffic, ranging from medical first aid to any changes in the race plans. Because of a telecommunications blackout in Canada, the amateurs were the only source of information for Canadian press, television and radio. W2ODC, VE3YC, VE3CGO, VE2ABV and VE2KO maintained schedules during the day with hams accompanying the race and the Trans-Canada ARPSC net every evening to pick up race results and traffic from VE2KO, for dissemination to local news outlets and officials throughout Canada. — *VE2ALE, SEC Quebec.*

Early on the morning of August 23, W5RNL was awakened by flood waters of the Pecos River lapping at his back



From Aug. 29 through Sept. 3, amateurs from Shenandoah, Pa., provided communication for the centennial celebration, which included radio control for six parades during the affair. Those members of the Schuylkill Co. AREC who participated (and pictured above) were: (l. to r.) WA3BEX WN3DPS WA2KAP W3ORJ (second row, l. to r.) W3ZRQ (E. Pa. SCM) K3HXS K3IAC K3FMF WN3EKU.

## NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

### FULL TIME

3550	7100	50,550
3875	29,640	145,350

### PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Full time frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for any purpose (except calling for emergency help) the first minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in a FCC-requested or FCC-declared emergency, at which times they become full time frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require us all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

door. Water was running through his garage, so there was no question about the necessity of packing his family and a few necessities into his house trailer and heading for higher ground. At 1136Z the same morning, the FAA flight service station personnel at Carlsbad, N. Mex., airport found themselves completely without point-to-point communication. The flood waters had washed out the teletype and telephone lines connecting the airport with Roswell and Albuquerque. The air-to-ground frequencies were temporarily used to maintain communication but had to be relinquished quickly as they were needed for the primary air-to-ground links. W5PKW, an employee at the El Paso, Texas station, got the idea of using amateur radio to supply the missing communication links. For his partner, W5PKW chose W5RNL and with the help of a small plane, was located with his family on the hilltop they had selected for safety. W5PKW and W5RNL maintained communication airport to airport on 75 meters, handling such vital information as the filing of flight plans, pre-flight briefings, hourly weather reports and various types of miscellaneous traffic were handled for five solid days.

On August 28, both stations could cease their emergency operation as telephone service had been restored and the Carlsbad service was back in business. — *W5SG.*

When a tornado struck Cleveland, Ohio, on Sept. 29, AREC and RACES members quickly came to the fore and provided emergency communications for the Red Cross. Base and mobile communications were provided during the entire emergency under the direction of K8MBV, Asst. EC for the Red Cross. The following amateurs were known to have participated: W8s SUS PIN OKE GMS AZO, K8s GVK YVK VMC AJC JGH MIBV JSE BIE MMM OBX QOT SGX MIK QOT, W4s IMO TTB GEO SDO GFV PXL. — *W4SPQL, Acting EC Cuyahoga County, Ohio.*

The Los Alamos AREC/RACES crew couldn't wait for SET weekend, they had the real thing on Sept. 23, when a ditch digger took out a main telephone trunk line (with 1200 pairs of line) and blacked out most of the New Mexico community. Amateurs were called shortly after the line was cut and within 30 minutes communication was established to the Medical Center and within an hour, various mobiles and fixed stations were in operation around the town. The local 10-meter emergency net was used. Emergency traffic was handled for the c.d. director and various medical services. Within 3½ hours after the telephone line was cut, temporary telephone service was restored and the amateurs were no longer needed. Those amateurs known to have participated were: W5s MIDW MYQ OJM, K6s EJJW HTT MFD QIN RIR WFY. — *K5MFD, EC Los Alamos, New Mexico.*

The Tulsa, Okla., AREC, under EC W5DFQ, provided emergency communication for the local police on Sept. 29-30, during a 36-hour search for a 10-year old boy who had drowned in the Arkansas River. The AREC crew provided much needed communication from boat to boat and from shore points to the various search vessels. Not only did they help with communications, but provided operators for various boats, helped with dragging operations, provided some feeding services along with the Red Cross and provided lighting equipment throughout most of the search. Those amateurs known to have participated were: W5s DFQ DBZ GZS, K6s ZCJ LDR GMP, W4s BPS OEM KCL LXS and WN5QKQ. — *K5ZCJ, SEC Oklahoma.*

—♦♦♦—

On Oct. 2, W8YHU/mobile in Canton, Ohio, was heading for home when he came upon an auto accident. He put out a call on the local ten-meter AREC frequency and was answered by K8DHJ. When informed of the situation, K8DHJ phoned the police who dispatched a car to the scene of the accident. — *K8DHJ, EC Canton, Ohio.*

—♦♦♦—

On Oct. 7, VE2ALE, SEC Quebec, heard reports of a collision between a freight train and a school bus at a crossing in Dorion, Que. The Western Quebec AREC Net was alerted and ten amateurs stood by in case their assistance was required. VE2ALE went to the scene of the accident and found VE2ALF assisting the rescue teams but amateur radio was not required for emergency communication and the net secured. — *VE2ALE, SEC Que.*

—♦♦♦—

W6MLZ, EC Western San Gabriel Valley, Calif., scheduled a drill to check the promptness that both communication and medical personnel could be alerted and go into action in a short period of time. WA6NLG and WA6TWS, both ECs, and K6SUI were alerted by phone to activate their nets, detail mobile units to proceed to the nearest hospital or police station and report to net control when they had arrived. The longest time for any mobile to report on station was 15 minutes and the shortest 3½ minutes. The longest time to report to the area of a police station was 5 minutes, indicating very good cooperation by those involved in the drill. — *W6MLZ, EC Western San Gabriel Valley, Calif.*

—♦♦♦—

On May 22, the Glens Falls Area, N.Y., AREC was called upon to provide communications for the local little league parade. Various divisions of the parade organized in different parking lots and mobiles were used to link the divisions together during the organizing period as well as during the parade. K2EJZ/mobile was deployed to head the parade line and K2PBE/mobile took up the end of the line along with some ambulances so she could give messages to the ambulances should they be needed along the route. W2OBR, W2B8s OMP JDD KBQ, were all mobile and in the line of march at the end of each division. WB2UFEX operated from his home station as a control point and relay if needed. He was also available to provide any other type of communication should it be needed. — *K2AYQ, EC Glens Falls Area, N.Y.*

—♦♦♦—

A rather large scale drill was held in Canada on May 29, organized jointly by KLM Airlines and Canadian NEC, VE2AUU. The exercise presumed a complete failure of all of KLM's normal communications channels and consisted of many messages to various cities from Quebec to Vancouver, B.C. Long haul traffic was sent via the Trans-Canada ARPSC Net, while local and section nets were used for delivering purposes.

In Quebec City, VE2ADR acted as NCS of the Trans-Canada Net and to receive traffic with VE2BVII relaying on 80-meters to VE2AP/mobile at the home of the KLM official. Activity was heavier in Montreal with VE2XT, operated by VE2AUU, as eastern control backed up by VE2KO who handled incoming traffic to Montreal on 20 and was connected to VE2XT via a teletype link. VE2HV, who was at the same location as VE2XT, operated on 2 meters through the local repeater to pass traffic to various mobile units stationed at the homes of local KLM employees. VE2BZH/mobile was located on Mount Rigaud, about 35 miles west of Montreal. He was a standby control station operating both 20 and 2 meters.



Some conventions attempt to set up a station for talk-in purposes, but few if any have one set up specifically for traffic men to meet their NTS commitments. The Southwestern Division Convention was one of those rare few and this shot of the operating position shows Bob Howe, K7NHL, TWN manager, about to NCS PAN. Photo by WA6YWN.

In Saskatchewan, SEC VE5CU received information from VE2AUU as to the details of the test and arranged for VE5LG, acting EC, to have operators available. Four Saskatoon operators were available for the operation which lasted for 2½ hours.

In Alberta, VE6FK, SEC, arranged to have VE6s XC HM BR standing by on the Trans-Canada net to handle traffic with VE6AKV in reserve. VE6FK set up a 75 meter station at VE6BR's QTH and handled local traffic there with mobile units used for delivery. VE6XC commented that, "trying to stand by on 20 and send traffic on 75 and vice versa is quite a business."

British Columbia was on the other end of the string and SCM VE7FB tells us how his boys handled the delivering of traffic. VE7SE did all the communicating with the Trans-Canada Net. After receiving traffic, he would go to the B.C. Emergency Net and VE7FB would send the messages received on 20. VE7ASU/mobile moved to Burnaby to deliver the traffic in person and parked outside one addressee's home. VE7AIX/mobile was told to go to Fisher Man's Cove. VE7FB suggested he phone first to obtain directions to the addressee's house. The addressee suggested that VE7AIX stay right where he was and telephone the messages to him. VE7AEN was their floating mobile unit, used for relays. When VE7AIX went to the cove, VE7FB told VE7AEN to move into a position so he would be able to relay traffic from VE7SE.

From indications received from all hands, the test was a big success and VE2AUU deserves much credit for setting up such an extensive operation.

—♦♦♦—

Forty-eight SEC reports were received for August, representing 18,799 AREC members. This is one less SEC report and about 2,000 less AREC members. We still have a few SECs who, for some reason, don't feel it is important to send in monthly reports. Please fellows, these reports are most important in that they reflect some activity or interest on your part. We aren't as anxious to see large or impressive totals as we are to simply receive a report form indicating that you are still alive. How about it?

Those sections heard from this month are: Conn., E. Mass., Maine, N.H., E.N.Y., N.Y.C.-L.I., N.N.J., S.N.J., W.N.Y., E. Pa., W. Pa., Del., Ala., E. Fla., Ga., Ky., N.C., Tenn., W. Fla., Ark., N. Mex., Okla., S. Tex., E. Bay, Los A., Orange, S. Bar., S.V., Mont., Nev., Ore., Utah, Wash., Mich., Ohio, Ill., Colo., Kans., Minn., Mo., Nebr., S. Dak., Que., Ont., Man., Sask., Alta., B.C.

—♦♦♦—

### RACES News

Working with the Central Peninsula Civil Defense and Disaster Association, under the call WA6YBE/6, twenty-

two amateurs in the San Francisco Bay area assisted as operators in attendance at the San Mateo County Fair during the week of August 5. W6VZE indicates that over 200 messages were sent and the general public had a chance to see amateur radio operators doing their stuff. Special mention goes to WA6OXE and WA6NVQ who remained on standby for 12 hours per day, every day and handled the bulk of the outgoing traffic. — W6VZE.



### National Traffic System

NTSers everywhere will be interested to know that two of our three NTS Areas now have official Area Staffs to assist headquarters in selecting replacements for management vacancies at Region and Area level (Section level vacancies are filled by the SCMD and in general to be of assistance in guiding the destinies of NTS in their respective Areas.

The idea originated on the west coast in 1952. The first Pacific Area Staff consisted of W6JZ, chairman and TCC director Pacific Area; W7NH, Pacific Area Net manager; W6IPW, RN6 manager; W7PKX, RN7 manager; and W0KHQ, member at large. There was no TWN then (it was a part of RN6), and there was a vacancy as member-at-large which later was filled by W6IC. Today the PAS consists of W6IC, chairman and member at large; W7NH, manager Twelfth Region Net; K7JHA, manager Seventh Region Net; W7DZX, director TCC Pacific; W6VNVQ, manager Pacific Area Net; W6BBO, manager Sixth Region Net; and W6EOT and WA6BRG, members at large. Since it came into existence, every Region and Area net manager and TCC director in the Pacific Area has been appointed at the recommendation of this body.

Last spring at the National Convention in Boston, the first steps were undertaken to set up an Eastern Area Staff similar to PAS. Just as we go to press with this issue of QST, the procedure has been completed. As was and is the case with PAS, the Eastern Area Staff of NTS consists of the Region net managers, the Area net manager, the TCC director and three "members at large" (informally abbreviated MAL). The latter were selected by vote of the eight "automatic" members, and then all eleven members voted for one of their number as chairman. As a result, we have the following lineup for the EAS: W2ZVW, chairman and member at large; K1WJD, manager EAS; W3JML, TCC director Eastern; W1EFW, manager 1RN; WA2GQZ, manager 2RN; K3MVO, manager 3RN; W4SHJ, manager 4RN; W8CHT, manager 8RN; VE3BZB, manager ECN; and two additional members at large, W2SEI and W4DVT. Tentative plans are being made for the first formal meeting of the complete EAS some time near the turn of the year.

Those amateurs whose calls appear above are the ones who are in leadership capacities above Section level. There is no intention on the part of either of these groups to usurp the present functions of any NTS net manager at any level. The PAS and EAS are concerned primarily with two functions: (1) replacement of Region or Area net managers or TCC directors when vacancies occur, and (2) the general liaison function among the various NTS echelons. They are also available for consultation by Section net managers on internal problems, but will take no initiative in this respect, nor in the internal functions of Region or Area nets.

We suppose the question will naturally be asked: How come you have a PAS and now an EAS, but no CAS? The answer is simply that so far there has been no proposal made for a CAS. We did not solicit for the two existing "staffs" and do not intend doing so for the Central Area. If the net management in that Area wishes to establish a Central Area Staff, we shall be glad to work with them on it as we have for Pacific and Eastern Areas, but "area staffs" are not considered a necessity; they are an expedient which can operate to the betterment of NTS.

What has all this to do with you, the average NTSer? Everything. One of the things that makes NTS the tightest operating organization in amateur radio is the fact that its participants have the whole picture, not just the local one. Every NTSer knows that he is part of a nationwide traffic-handling organization, not just a member of a local net, and



George "Rolie" Chamberlain, W1UIR, is the PAM for both VHF and HF nets in Eastern Mass.

is interested in the overall aspects. The makeup and functioning of Area staffs is one of them. — W1NJM.

#### September reports:

Net	Ses-sions	Traffic	Rate	Average	Representa-tion (%)
EAN.....	30	1714	1.231	57.1	95.0
CAN.....	30	1133	.903	37.8	100
PAN.....	30	1623	1.020	51.1	87.8
1RN.....	60	470	.305	7.3	95.0
2RN.....	60	326	.614	5.4	96.0
3RN.....	60	549	.414	9.2	99.6
4RN.....	57	540	.379	9.5	90.5
RN5.....	60	695	.332	11.6	72.9
RN6.....	60	1052	.390	17.5	100
RN7.....	30	491	.562	16.3	74.8 <sup>1</sup>
8RN.....	60	620	.361	10.3	93.5
9RN.....	30	455	.671	14.8	98.3 <sup>1</sup>
TEN.....	60	758	.584	12.5	73.3
ECN.....	28	88	.195	3.1	65.6 <sup>1</sup>
TWN.....	17	210	.381	12.4	29.4 <sup>1</sup>
Sections <sup>2</sup> .....	1983	11,595		5.8	
TCC Eastern.....	120 <sup>3</sup>	825			
TCC Central.....	90 <sup>3</sup>	649			
TCC Pacific.....	120	1259			
Summary.....	2655	25,042	EAN	8.4	86.7
Records.....	2241	22,413	1.183	15.4	

<sup>1</sup> Representation based on one or less sessions per day.

<sup>2</sup> Section/Local nets reporting (66): GPN (Conn.); R1SPN (R.I.); Alta SSB; MDDS (Md.-D.C.-Del.); PHD MOSSBN MOTTN (Mo.); QFN FAITN WFPP GN (Fla.); EPA WPA 11TN EPAEPTN (Pa.); VSBNE VSBNL VSN VN (Va.); BN OLN OSSBN (Ohio); KTN (Ky.); Mich. 6 QMINF QMNS Wolverine (Mich.); NCNE NCNL NCSSBN (N.C.); PTN (Maine); EMNN WAIN (Mass.); QIN (Ind.); LAN (La.); GSN (Ga.); BUN (Utah); WSN (Wash.); CHNN (Colo.); OZK (Ark.); ILN (Ill.); TN TPN TSSBN ETPN (Tenn.); NJ6 NJ2 NJEPTN (N.J.); NCN SoCal 6 (Cal.); AENB AEND AENH AENM AENP AENO AENR AENT (Ala.); Iowa 75; GBN (Ont.); NTTN (Tex.); OQN (Ont.-Que.); WBSN (Wis.); NYCLIVHF NYCLIPN NLI (N.Y.C.-L.I.).

<sup>3</sup> TCC functions not counted as net sessions.

Well, we have some more new records. No doubt about it, net sessions and traffic are increasing by leaps and bounds. Unfortunately, the percentage of increase in traffic is slower than the corresponding increase in sessions so our "Average" figure is well below the record points.

Have you noticed something different about the above tabulation? Take a look at the representation column and compare it with previous lists and you will see that we no longer are using an individual net to establish the record for each month. From now on, the representation figure shown under the "Summary" and "Record" headings will reflect

(Continued on page 142)

# 50<sup>TH</sup> ANNIVERSARY FOR SJRA



More than 200 members, their ladies and guests attended the 50th anniversary dinner. (Photos by W2OGZ).

**S**ELDOM do radio amateurs organize a local club which continues to remain active over several generations of membership.

On September 10th, the South Jersey Radio Association celebrated its 50th Anniversary with a banquet dinner in Pennsauken, New Jersey. Two of the charter members, Roger W. Barrington, W2LY, and Gordon Kressel, W2BQ, are still active and were present at the affair.

The SJRA was organized in 1916, two years after the founding of ARRL, for those interested in the technical development and operation of wireless communications. The crashing spark passed word of the organization meeting at the home of William Phillips. C. Waldo Batchelor was elected president by the forty founding members present.

The early history of the SJRA closely parallels that of ARRL and amateur radio in general. When World War I silenced amateurs in 1917, the SJRA responded with a wireless school to train urgently

needed operators. From the end of the conflict until the late 20s were difficult times for amateur radio with the Secretary of the Navy seeking control of all radio stations, and the birth of the broadcast era. Activity was low but the SJRA continued to function under the guidance of a handful of members.

During all this time SJRA amateurs were pioneering the short waves. Norman R. Weible, 3BWJ, gained national prominence by being the first North American amateur to communicate with a South American using a vacuum-tube transmitter and a short wavelength.

Memberships and attendances grew during the 1930s with such well-known persons as Major Edwin Howard Armstrong, inventor of several receiver circuits, Kenneth B. Warner, then ARRL General Manager and Editor of *QST*, and John Reinartz, appearing before the club.

War came again in December 1941, silencing amateur radio and depleting clubs. However although the membership was small, SJRA continued to meet. Postwar, with members returning, activities picked up and in 1950 the club acquired the call K2AA as a memorial to William Ebensperger, a past president.

The year 1952 marked the beginning of nationwide recognition of the club having won the club award for the ARRL VHF Sweepstakes; SJRA went on to win the same event eight more times through 1960. The club has remained active in ARRL-sponsored events such as DX Contests, Field Day participation and QSO Parties. K2AA/2 placed first nationally in the four or six-transmitter class Field Day competition from 1955 through 1964. SJRA is probably best known through the amateur ranks for its annual picnic which draws over 1,000 attendance and is the largest gathering of Mid-Atlantic amateurs.

Membership in the SJRA now numbers more than 200. President Amor Klotzbach, W2FVS, cites affiliation with the ARRL, participation in League events and the various facets of club activity as the strength behind the 50-year history of the South Jersey Radio Association. 



Presentation of "President Emeritus" award to W2BQ (left), SJRA charter member, by W2VX.

# Happenings of the Month

## MASSACHUSETTS LICENSE PLATES

The 1966 session of the Massachusetts Legislature adopted a bill for "vanity license plates" bearing initials and other combinations of letters to be available upon payment of an extra fee of \$9.00. Unfortunately — despite the feeling of the governor and the registrar of motor vehicles that amateur plates belong in the public service category — the legislature unmistakably included amateurs under the "vanity" rules.

Another attempt to exclude amateurs from the "vanity" class will be made in the next session. Massachusetts amateurs interested in the matter should be in touch with their representatives at the appropriate time during the next sitting.



Doug Hyslop, VE8YQ, president of the Polar Amateur Radio Club (VE8RCS), presents a certificate of appreciation to Len Jarrett, VE3EWE, chief operator of VE3WSB, at the World Scout Bureau in Ottawa. The certificate thanks the scout headquarters station for its part in handling morale traffic for the men at Alert in the Northwest Territories.

## STAFF NOTES

Headquarters announces with pleasure that D. William Smith, K0CER, of Sioux Falls, South Dakota, has joined the permanent staff as an assistant secretary for membership services. He is 27, is married and the father of a three-year-old YL. A student of journalism at the State University of Iowa and Arizona State University, Bill spent three years as a newsman at KELO-TV. He has been active on all the amateur bands from 40 to 2 meters, having worked some 150 countries on the "d.c." bands, 48 states

on 6 and 19 states on 2, mostly by meteor scatter. He's served as public information officer for the Sioux Falls Civil Defense organization and was chairman of a v.h.f. convention in 1965. He'll be answering your letters on licensing and regulations, League affairs and International Amateur Radio Union matters, writing news for *QST*, doing public relations work, and meeting you at club meetings and conventions in the future.

## D. J. Angus, W9C9Q

With regret we report the passing of Donald J. Angus, W9CYQ, of Indianapolis, Indiana on October 1 at the age of 79. W9CYQ was a director of ARRL from the Central Division from April 15, 1930 to January 1, 1931 and was ARRL Section Communications Manager of Illinois from July 1, 1926 to July 15, 1930. Earlier, he had been Assistant Division Manager for Southern Indiana. As founder and past president of the Indianapolis Radio Club, OM Angus was also active in Masonry, boating, archeology and photography. He was an engineer and inventor with more than 30 patents to his credit, and helped found the Esterline Angus Instrument Co., serving as its president when he retired in 1960. Throughout, he had been active in amateur radio on c.w.

## EXECUTIVE COMMITTEE MEETING

Minutes of Executive Committee Meeting

No. 311

September 24, 1966

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters offices of the League in Newington, Connecticut, at 9:30 A.M. September 24, 1966. Present: President Robert W. Denniston W8NWK, in the Chair; First Vice President W. M. Groves, W5NW; Directors Charles G. Compton, W8BUO, Gilbert L. Crossley, W3YA, Noel R. Eaton, VE3CJ, Carl L. Smith, W8BWJ; General Manager John Huntoon, W1LVQ. Also present were Assistant General Manager R. L. Baldwin, W1IKE; General Counsel Robert M. Booth, Jr., W3PS; and Communications Manager F. E. Handy, W1BD1.

Examining the mail expression of opinion of directors concerning the application of By-Law 3 to the election procedures, the Committee found a majority indication of intent to make the 30-day grace period retroactive, and accordingly agreed to so apply the By-Law in determining director eligibility.

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

Central Division

For Director:

Philip E. Haller, W9HPG, was found lawfully nominated and eligible. Being the only eligible nominee, he was there-



Reigning over activities at the Hudson Division Convention October 15-16, 1966 was "Miss Amateur Radio of 1966," Laurie Bausch, WB2PIV of Elmont, New York. Laurie received her coronet from Director Harry J. Dannals, W2TUK, center, while Vice Director Stan Zak, K2SJO, left and Al Smith, WA2TAQ, banquet chairman, look on.

upon declared, pursuant to the By-Laws, to be duly re-elected as Director from the Central Division for the 1967-1968 term without membership balloting.

*For Vice Director:*

Edmond A. Metzger, W9PRN, and Sidonius M. Pokorny W9NRP, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

**Hudson Division**

*For Director:*

Harry J. Dannals, W2TUK, and Christopher DiPasqua, WA2YQW, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

*For Vice Director:*

Stan Zak, K2SJO, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice Director from the Hudson Division for the 1967-1968 term without membership balloting.

**New England Division**

*For Director:*

Robert York Chapman, W1QV, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Director from the New England Division for the 1967-1968 term without membership balloting.

*For Vice Director:*

Rigelow Green, W1EAE, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice Director from the New England Division for the 1967-1968 term without membership balloting.

**Northwestern Division**

*For Director:*

Robert B. Thurston, W7PGY, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Director of the Northwestern Division for the 1967-1968 term without membership balloting.

*For Vice Director:*

Newton W. Brumbach, W7FMJ, was found lawfully nominated but ineligible due to class of license. R. Rex Roberts W7CPY, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice Director of the Northwestern Division for the 1967-1968 term without membership balloting.

**Roanoke Division**

*For Director:*

Victor C. Clark, W4KFC, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Director of the Roanoke Division for the 1967-1968 term without membership balloting.

*For Vice Director:*

L. Phil Wicker, W4AGY, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice Director of the Roanoke Division for the 1967-1968 term without membership balloting.

**Rocky Mountain Division**

*For Director:*

Bois R. Council, K0ATZ, and Carl L. Smith, W0BWJ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

*For Vice Director:*

John H. Sampson, Jr., W7OCX, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice Director of the Rocky Mountain Division for the 1967-1968 term without membership balloting.

(Continued on page 156)



The Sangamon Valley Radio Club presented amateur radio to more than a million spectators attending the Illinois State Fair, 2200 of them amateurs who signed in at the booth. Shown, left to right, are WB2SKI, WA9-RKK, W9PRN, WA9GUM, WN9SID, and WN9SIN's XYL.

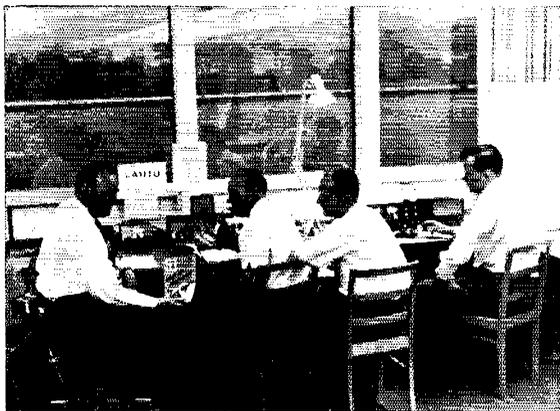
# I.A.R.U. News



## LA1ITU ESTABLISHED FOR ASSEMBLY

Amateurs attending the XI Plenary Assembly of the International Radio Consultative Committee (CCIR) in Oslo this summer found a multi-position station awaiting them. The installation, LA1ITU, was a cooperative effort between the Norwegian Telecommunications Administration and the *Norwegian Radio Relay League*. LA1ITU was situated on the top floor of the NTA headquarters building overlooking the harbor and city of Oslo. The equipment was loaned by local amateurs, provided by the NRRL, or purchased especially for the station by the NTA. The top of the building was decked with rotary beams for 2, 10, 15 and 20 meters, a 10-through 40-meter trap vertical and an 80-meter dipole.

Several of the amateurs attending the Assembly had requested operating permission from the Norwegian government but under existing regulations, operation by non-citizens was not permitted. The NTA chose the special station as the best way to provide amateur operation. Regulations were relaxed to allow transmitter operation, as long as a Norwegian amateur was

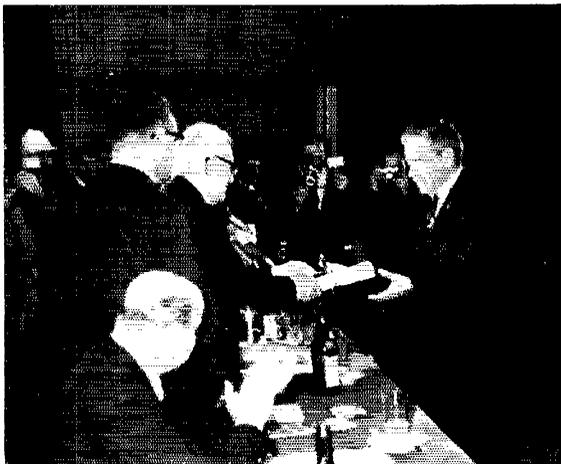


W3ASK, K3BGX, DL1FZ and LA5KJ at LA1ITU, Norwegian Telecommunications Administration headquarters, Oslo, Norway.

in control of the station, and were further relaxed to allow third party traffic on the part of overseas visitors.

It is understood the situation has led to steps being taken to allow non-citizen operators to secure permission to operate in Norway on a reciprocal basis, and that discussions have been initiated.

(Thanks to K3BGX for story and picture.)



President Giuseppe Saragan of the Republic of Italy presents Gold Medal Award to Ray E. Meyers, W6MLZ

## W6MLZ WINS COLUMBUS AWARD

Ray E. Meyers, W6MLZ, was presented the International Institute of Communications' Columbus Gold Medal Award at Genoa, Italy, October 18.

Ray was the first American to receive the Medal for Humanitarian Services. The citation read in part: . . . "has devoted his time to the teaching of radio telecommunications techniques to the physically disabled people through his international network of handicapped amateur radio operators, created and sponsored by him."

W6MLZ founded the International Handicapped Network in 1959 after inventing a special device for paralyzed twin brothers enabling them to operate their amateur stations. One of the boys told Meyers it would be wonderful to have a whole network of handicapped radio operators with whom they could talk over the air. The idea of the IHN grew rapidly into a worldwide network of 2,600 handicapped amateurs.

## DX OPERATING NEWS

(**Bold face** indicates changes since the most recent *QST* listing.)

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, France, India, Israel, Germany, **Kuwait**, Luxembourg, **Nicaragua**, Paraguay, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licensees

amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

### Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U. S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes are: CE CM CO CP CX EL HC HH HI HK HP HR OA PY TI VE VO XE XP YN YS YV ZP and 4X. Canadian radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U. S. and Venezuela. Permissible prefixes are: CE CP HR HK K OA TI W XE YS YV, 4X and 4Z.

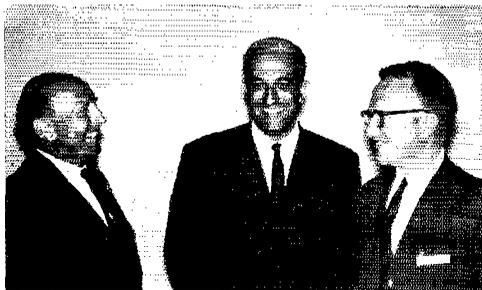
### DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunication Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia<sup>1</sup> (including West New Guinea), Thailand and Viet Nam<sup>2</sup> forbid radio communication between their amateur stations and amateur stations in other countries. U. S. amateurs should not work HS XU 3W8 or SF. Canadian amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Viet Nam and Jordan. Prefixes to be avoided are HS JY XU XW8 3W8 and 8F.

<sup>1</sup> W0GTA/8F4 has permission for international communications from U. S. and Indonesia officials between October 18 and December 31, 1966. No third party traffic is authorized.

<sup>2</sup> KIYPE/XV5 has permission for international communications from U. S. and Vietnamese administrations and is authorized to handle third-party messages with U. S. amateurs.



IARU Headquarters continues to spread the word about the value of amateur radio. Here, at a dinner meeting in Nicosia, Cyprus, in early September are (l. to r.) Cyril Collins, ZC4SC, president of the Cyprus Amateur Radio Society; Mr. Embodoklis, Director of Planning, Cyprus Telecommunications Authority; and ARRL Hq. staffer W1KE, at the time of this photo the newest member of CARS! Both at this meeting and at others set up by the very able leadership of CARS, W1KE had an opportunity to discuss present and future amateur radio problems with Cyprus amateurs and Cyprus government officials.

## QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: e.g., cards for VP8s go to RSGB in Great Britain. W, K, VF and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

- Aden:* Amateur Radio Club, Signal Squadron, RAF Khormaksar, B.F.P.O. 69, London, England
- Algeria:* G. Devillo, 7X2RW, 21 Blvd. Victor Hugo, Alger
- Angola:* L. A. R. A., P.O. Box 484, Lusanda
- Antarctica:* KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMICBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.
- Argentina:* R.C.A., Carlos Calvo 1424, Buenos Aires, BA
- Austral/Antarctic French Lands:* via Malagasy Republic
- Australia:* WIA, 23 Landale St., Box Hill, E. 11, Victoria
- Austria:* Oe. V.S.V., Box 999, Vienna 1/9
- Azores:* via Portugal
- Bahama Islands:* **Bahama Amateur Radio Society, Box 913, Nassau**
- Bahrain:* (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
- Barbados:* **Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, St. Michael**
- Belgium:* U.B.A., Postbox 634, Brussels 1
- Bermuda:* R.S.B., P.O. Box 275, Hamilton
- Bolivia:* R.C.B., Casilla 2111, La Paz
- Brazil:* L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
- British Guiana:* D. E. Yong, VP3YG, Box 325, Georgetown
- Bulgaria:* Box 830, Sofia
- Burma:* B.A.R.T.S., P.O. Box 800, Rangoon
- Burundi:* via Congo (9Q5) QSL Bureau
- Canal Zone:* Ralph Harvey, KZ5RV, Box 407, Balboa
- Cape Verde Island:* Radio Club de Cabo Verde, CR4AA, Praia, Sao Tiago
- Cayman Island:* via Jamaica
- Ceylon:* 4S7WP, P.O. Box 907, Colombo
- Chagos:* via Mauritius
- Chile:* Radio Club de Chile, P.O. Box 13630, Santiago
- Colombia:* L.C.R.A., P.O. Box 584, Bogota
- Congo:* (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
- Congo:* (9Q5) U.C.A.R. QSL Bureau, B.P. 3748, Elisabethville
- Cook Island:* ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
- Costa Rica:* Radio Club of Costa Rica, Box 2412, San Jose
- Cuba:* ANRAC QSL Bureau, P.O. Box 6996, Havana
- Cyprus:* C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
- Czechoslovakia:* C.A.V., Box 69, Prague 1
- Denmark:* E.D.R. QSL Bureau, ØZ6HS, Ingstrup
- Dominican Republic:* R.C.D., P.O. Box 1157, Santo Domingo
- Ecuador:* Guayaquil Radio Club, P.O. Box 5757, Guayaquil
- El Salvador:* Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador
- Ethiopia:* Kagnev Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843
- Faeroes Islands:* P.O. Box 184, Torshavn, or via Denmark
- Fiji Islands:* P.O. Box 181, Suva
- Finland:* S.R.A.L., Box 10306, Helsinki 10
- Formosa:* (BV1US calls only) Taiwan American Radio Club, UNARSCAT, Box 8, APO, San Francisco, Calif. 96203
- All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China
- France:* R.E.F., Boite Postale 26, Versailles 78
- France:* (F7 only) F7 QSL Bureau, % Base MARS station APO, New York, N. Y. 09083
- French Oceania:* **Radio Club Oceanien, P.O. Box 374, Papeete, Tahiti**

*Germany*: (DL1 & DL5 only) MARS Radio Station, Hqtrs. 93rd Sig. Bn. APO, New York, N. Y. 09046 09175

*Germany*: (Other than above) D.A.R.C., Box 99, 8 Munich 27

*Ghana*: G.A.R.S. QSL Bureau, P.O. Box 3773, Accra

*Gibraltar*: RAF Amateur Radio Club, New Camp, RAF

*Great Britain* (and British Empire): R.S.C.B. QSL Bureau, (G2MI, Bromley, Kent

*Greece*: George Zaralis, P.O. Box 564, Athens

*Greece* (SV0s only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223

*Greenland*: via Denmark

*Greenland* (KG1, OX4 and OX5 calls only): KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023, KG1F-GK1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121

*Guam*: M.A.R.C., Box 445, Agaña, USPO 96910

*Guantanamo Bay*: Guantanamo Amateur Radio Club, Box 55, FPO, New York, N. Y. 09593

*Guatemala*: C.R.A.G., P.O. Box 115, Guatemala City

*Haiti*: Radio Club d'Haiti, Box 913, Port-au-Prince

*Honduras*: Jacobo Zelaya Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.

*Hong Kong*: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541

*Hungary*: H.S.R.L., P.O. Box 214, Budapest 5

*Iceland*: Islenzkir Radio Amatorar, Box 1058, Reykjavik

*India*: A.R.S.L. QSL Bureau, P.O. Box 534, New Delhi 1

*Iran*: Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205

*Ireland*: I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2

*Israel*: I.A.R.C., P.O. Box 4099, Tel-Aviv

*Italy*: A.R.I., Viale Vittorio Veneto 12, Milano 401

*Jamaica*: Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5

*Japan*: (JA only): J.A.R.L., Box 377, Tokyo Central

*Japan*: (KA only): F.E.A.R.L.-M., APO, San Francisco, Calif. 96525

*Johnston Island*: KJ6BZ, c/o MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305

*Kenya*: RSEA QSL Bureau, Box 30077, Nairobi

*Korea*: Korea Amateur Radio League, Central Box 162, Seoul

*Korea*: (HL9) HL QSL Bureau, Signal Section, USFK/ETUSA, APO, San Francisco, Calif. 96301

*Kuwait*: Alhaf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf

*Laos*: Houmphanh Saigasith, XW8AL, P.O.B. No. 46, Vientiane

*Lebanon*: R.A.L. QSL Bureau, P.O. Box 5245, Beirut

*Liberia*: Liberian Radio Amateur Ass'n., Post Box 1477, Monrovia

*Libya*: 5A QSL Service, Box 372, Tripoli

*Liechtenstein*: via Switzerland

*Luxembourg*: R. Schott, 35 rue Batty Weber, reh sur/Azette

*Macao*: via Hong Kong

*Madeira Island*: via Portugal

*Malagasy Republic* (Madagascar): P.O. Box 587, Tananarive

*Malawi*: 7Q7RM, P.O. Box 472, Blantyre

*Malaya*: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur

*Maldives*: via Alden

*Malta*: R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara

*Mariana Islands*: see Guam

*Marshall Islands*: KX6 QSL Bureau, via KX6BU, Box 414, FPO, San Francisco, Calif. 96555

*Mauritius*: Paul Caboche, VQ8AD, Box 467, Port Louis

*Mexico*: L.M.R.E., P.O. Box 907, Mexico, D.F.

*Midway Island*: KM6BI, Box 11, FPO, San Francisco, Calif. 96643

*Monaco*: Pierre Anderhalt, 3A2CN, 49 me Grimaldi

*Mongolia*: JT1KAA, Box 639, Ulan Bator

*Morocco*: A.A.E.M., P.O. Box 299 Rabat

*Mozambique*: L.R.E.M. QSL Bureau, P.O. Box 812, Laurencio Marques

*Netherlands*: V.E.R.O.N., Postbox 400, Rotterdam

*Netherlands Antilles*: VERONA, P.O. Box 383, Willemstad, Curacao

*New Zealand*: N.Z.A.R.T., P.O. Box 489, Wellington

*Nicaragua*: C.R.E.N. QSL Bureau, Box 925, Managua

*Nigeria*: QSL Bureau, P.O. Box 1044, Samaru, Zaria

*Northern Ireland*: via Great Britain

*Northern Rhodesia*: see Zambia

*Norway*: N.R.R.I., P.O. Box 898, Oslo Sentrum, Oslo 1

*Nyasaland*: see Malawi

*Okinawa*: O.A.R.C., APO, San Francisco, Calif. 96331

*East Pakistan*: Mohd. AP5CP, Tiger Amateur Radio Club, Dacca Signals, Dacca 6

*West Pakistan*: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore

*Panama, Republic of*: L.P.R.A., P.O. Box 1622, Panama 1

*Papua*: VK9 QSL Officer, P.O. Box 201, Port Moresby (or via Australia)

*Paraguay*: R.C.P., P.O. Box 512, Asuncion

*Peru*: R.C.P. Box 538, Lima

*Philippine Islands*: P.A.R.A. QSL Bureau, P.O. Box 4083, Manila

*Poland*: PZK QSL Bureau, P.O. Box 320, Warsaw 1

*Portugal*: R.E.P., Rua de D. Pedro V., 7-4°, Lisbon

*Puerto Rico*: KP4YT, P.O. Box 1061, San Juan, Puerto Rico 00902

*Rhodesia*: R.S.S.R., P.O. Box 2377, Salisbury

*Roumania*: Central Radio Club, P.O. Box 95, Bucharest

*Rwanda*: via Congo (9Q5) QSL Bureau

*Samoa (American)*: Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago 96920

*Saudi Arabia*: HZIAB, 7244th ABRON-COMM., APO, New York, N. Y. 09616

*Scotland*: via Great Britain

*Senegal*: Ch. Tenot, 6W8BF, P.O. Box 871, Dakar

*Sierra Leone*: Radio Society of Sierra Leone, P.O. Box 907, Freetown

*Singapore*: QSL Manager, M.A.R.T.S., P.O. Box 777

*South Africa*: S.A.R.L., P.O. Box 3037, Cape Town

*Spain*: U.R.E., P.O. Box 220, Madrid

*St. Vincent*: QSL Bureau, P.O. Box 112, St. Vincent, West Indies

*Surinam*: QSL Manager (PZIAR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo

*Swan Island*: Swan Island, West Indies via Tampa, Florida

*Sweden*: Sveriges Sandare Amatorer, FACE, Enskede 7

*Switzerland*: U.S.K.A., 6233 Buron/LU

*Syria*: P.O. Box 35, Damascus

*Tanzania*: RSEA, P.O. Box 2387, Dar es Salaam

*Trinidad and Tobago*: Les. A. Thomas, 9Y4LT, Los-Iros Road, Erin, South Trinidad

*Turks and Caicos Islands*: via Jamaica

*Uganda*: R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala

*Uruguay*: R.C.U., P.O. Box 37, Montevideo

*U.S.S.R.*: Central Radio Club, Box 88, Moscow

*Vatican*: HV1CN, Domenico Petti, Radio Station, Vatican City

*Venezuela*: R.C.V., P.O. Box 2285, Caracas

*Virgin Islands*: Graciano Belardo, KV1CF, P.O. Box 572, Christiansted, St. Croix, V. I. 00820

*Wake Island*: Jack A. Chalk, KW6EJ, P.O. Box 415, Wake Island 91930

*Wales*: via Great Britain

*West Pakistan*: Lahore Amateur Radio Society, P.O. Box 65, Lahore

*Yugoslavia*: S.R.J., P.O. Box 48, Belgrade

*Zambia*: Radio Society of Zambia, P.O. Box 332, Kitwe

## Strays

Teen-age hams: William Morris, WA5MUF, is collecting data on unusual or outstanding activities and accomplishments of teen-age hams, potentially for use in QST. Write him at 10040 Imperial St., El Paso, Texas 79924.

- - - - -

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.



# Strays



Nevada — The Southern Nevada Amateur Radio Club, Inc. is hosting the Second Annual SAROC Sahara Amateur Radio Operator's Convention, January 5, 6, 7, and 8, at the Hotel Sahara, Las Vegas, Nevada. For information, write P.O. Box 73, Boulder City, Nevada 89005.

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

January 21-22, 1967 — Florida State, Miami

April 22-23, 1967 — New England Division, Swampscott, Massachusetts

June 30, July 1-2, 1967 — ARRL National, Montreal, Quebec

The Foundation for Amateur Radio, Inc., with headquarters in Washington, D.C., announces its intent to make the third award of the John Gore Memorial Scholarship for either graduate or undergraduate study, full or part time. The scholarship pays \$250 for the academic year, and is subject to renewal.

Licensed radio amateurs who intend making a career in electronics or related sciences may now apply for the academic year 1966-67.

To be eligible, applicants must have completed one year in an accredited college or university and must be enrolled in a course of studies leading to a degree. They must also be radio amateurs holding a valid FCC license of at least a General class rating. Preference will be given to applicants from the area served by the Foundation — the District of Columbia, Maryland and Virginia, although those living elsewhere are not excluded.

Requests for application should be made not later than December 30, 1966, and should be addressed to: Chairman, Scholarship Award Committee FAR, Inc., 10224 Farnham Drive, Bethesda, Maryland 20814.

The Foundation for Amateur Radio, Inc., is a non-profit organization devoted to the advancement of amateur radio. It is composed of trustees representing radio clubs in the Washington-Baltimore area.

John W. Gore, W3PRL, in whose honor the scholarship was named, was until his death in 1960 the president of the Foundation. A prominent radio amateur in Baltimore for many years, he was a vice president of the Bethlehem Shipbuilding Corporation there.

## Feedback

A line was inadvertently left out of the caption on the top of page 49 in the "Hints and Kinks" section of November QST. The last three lines should read as follows: "Once the adapter is installed, tighten the nut. Be sure to loosen this nut before removing the adapter."

## Feedback

Don't worry, you fellows who are wiring the Heath SB-100. Our Man from Headquarters who said on page 45 of September QST that his didn't work the first time had made a wiring error. He points out that the mistake was easily corrected by using the "In Case of Difficulty" section of the SB-100 instruction manual.

## Stolen Equipment

While I was staying overnight in Montreal (Canada) September 28, a thief cut the cables and ripped my KWM-2, (serial 13638), d.c. power supply, (serial 10902) microphone, speaker, antennas and even the antenna mount from my car. I would appreciate any information on the equipment. Ned Culler, W3JW, 286 Wills Road, Connellsville, Pa. 15425.

On or about September 20, there was a theft from the Amateur Radio Club of the State University of New York at Stony Brook, L. I., New York, of one SR-42 v.h.f. transceiver (serial No. 442100.6000 (56). Of particular interest, the power cord, instruction manual, and D104 microphone were left behind. Any one or all of the club members will be glad to deliver the power cord to the thief in person! Should any pertinent information turn up, please collect call Myron Doucette, W2JFG, at 516-246-5921.

On August 24, a Lafayette HA-650 6-meter Transceiver, with crystals, microphone, carrying case and RCA alkaline batteries, was stolen from my car. Any information leading to recovery of the items would be appreciated. Reid Edles, WA2TBT, 31-21 54th St., Woodside, New York 11377.



Nearly 50 years ago, Albert Marsh, 1GP, helped Harry Horovitz get his first license, 1ETE. Mr. Marsh moved to another town and the two soon lost track of each other. Now, fifty years later at the Shelburne Hotel in New York City, the Quarter Century Wireless Association presented Harry (r.), now WA2MMN, with 50-year plaque. Guess who also showed up for the occasion? Yes, Albert Marsh. The "do you remember" talk went far into the evening and had to be resumed the next day on the air!



# Correspondence From Members-

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

## DECC

¶ The number and variety of awards available to amateurs for one kind or another of operating achievement is indeed staggering. Certificates are available for 100 or more countries, copying code, working the states or British Empire, etc.

Nevertheless, I propose one new award for those whose preference in the pursuit of our hobby makes it impossible to compete for any of the traditional awards. It is high time the ARRL provide concrete recognition to a comparatively small group of amateurs who labor at ham radio night after night, weekend after weekend, with none of the usual satisfactions. These are amateurs who find success in failure, achievement in disaster and pleasure in pain.

I suggest, therefore, the ARRL DECC, or Defeated Experimenter's Casualty Club. The philosophy of DECC is simply this: formal attention to those who tinker with gear, but who rarely, if ever, succeed. DECC awards should be issued on the basis of personal and equipment casualties. Soldering iron burns, lacerations from undeburred chassis holes, punctures from drill twists, and so forth would all qualify. A certain number of burned out transistors, resistors, capacitors and vacuum tubes submitted to the Award Committee would also be required for qualification, as would any major construction project which did not work after endless nights of testing, trouble-shooting and rebuilding. Wives should be allowed to submit evidence toward qualification. Holes inadvertently drilled in kitchen tables and solder burns on oriental rugs would fall into this category. A program of endorsements would have to be established to maintain interest in the award. Memberships thus conferred would be lifetime, except for those members who, even by accident, later construct a working piece of gear. They would immediately be disqualified and their membership in the elite DECC forever cancelled. — *Julian N. Jablin, W9IWI, Skokie, Illinois.*

## MEMBERSHIP

¶ Read with shocked surprise your editorial in October *QST* reporting only 30% of licensed amateurs are ARRL members.

With less than 1/3 representation and support it is commendable that the ARRL has accomplished so much for amateur interests. Any licensed amateur who has had personal experience with local or regional civic and scientific organizations will agree that the ARRL record of achievement on behalf of amateur radio is outstanding.

In the light of these facts, I am equally surprised at the splinter groups that have arisen for the purpose of undermining ARRL policies aimed at upgrading the status of amateur radio. The purely negative attitude and weakening effect of these groups will help focus attention on the accomplishments and positive objectives of ARRL in the forthcoming HamQuest 67.

The prime reasons for membership in ARRL so well outlined in your editorial deserve more

publicity and emphasis among licensed amateurs.

— *Ben Dahle, KBASG, Carmel, California*

¶ I am without a doubt the world's worst amateur radio fan. I'm normally not a joiner, but when ARRL membership renewal time comes around each year I renew it because I feel that as long as I am an amateur and hold that FCC ticket it is my duty to help support the organization that made it possible.

If some of the complainers lived in some of the foreign countries where they don't have the freedom of the air waves that we enjoy, I feel that more of them would be more likely to help the League and what it is trying to do. I have renewed my subscription in some of the leanest years I ever had and sometimes wondered where the next dollar was coming from.

It is because of amateur radio that I today hold my present position of Chief Engineer for WZIP and WZIP-FM. My construction of a transmitter that you had in the *Handbook* of some years ago led to the job offer.

I know some people will no doubt say what's so extraordinary about all this, that he went through high school and so on. But that's just it: I never went beyond the freshman year of high school through no particular fault of my own, but I was a victim of circumstances. — *Richard S. Allison, W3HQJ, Cincinnati, Ohio*

¶ Congratulations and a mighty salute to K6RCO/2 for his commentary (August *QST* Correspondence). The case for ARRL couldn't have been put better. It is a classic!

Just one additional point: if it were not for the ARRL those egotistical hyenas that publish magazine "X" couldn't be able to operate their all-bought stations at all, for there would be no amateur frequencies. — *Arthur Hallam, W3CLQ/5, New Orleans, Louisiana*

¶ I was shocked. . . .

The other day a young General Class who lives near me asked if he might see my latest *QST*. I thought it odd as it was the second month in a row he asked the same question. He said he wanted to see the DX results, to find out whether some stations he had worked submitted their logs. I said I've had mine for a week now and his should be here any day. He told me he didn't get *QST* nor was he a member. I asked if some of his other young friends who were licensed belonged. He said I was the only one around. Here is a fellow with WAS and WAC, trying for DXCC. It's not that he can't afford it; his rig is twice mine. I don't think we paying members should carry these freeloaders. Every application for League material should be checked against the membership list. I am certain many members join me in this feeling. — *H. V. Felder, K3RPY, Bethesda, Maryland*

¶ Why don't some of these freeloaders who claim \$5.00 is too much think of membership as a possible

Christmas or birthday gift? That's how I got my membership. — *Phil Smith, Stratford, Conn.*

¶ It seems to me that the ARRL should give the same services to non-members as it does to members. You have always worked for the good of amateurs, non-members as well as members, and I think it should remain that way. If this policy results in higher dues, OK. I still think it is the correct one.

Have you considered the possibility of making a service charge on all certificates, to members as well as to non-members? It seems reasonable to me that the applicant should pay the cost of processing his application. I see this as applying to certificates only, not to technical aid. A fair charge can be set and published for certificates, but this would be almost impossible for technical advice or other aid. — *David R. Coahran, WA7FNK, Pullman, Washington*

¶ Why doesn't the League up its dues to cover its expenses? Most organizations to which I belong have had to do so since 1960, and I'm sure that a reasonable boost in dues can be made if a simple explanation of expanding costs were given to the members. — *Glenn R. Markus, WA3CZT, Bowie, Maryland.*

¶ I don't see how you manage on such low dues. It seems to me that \$10 wouldn't be out of line. — *Robert J. Fulton, W9FII, Elmhurst, Illinois.*

### TWO QSTs?

¶ As a graduate student, married and devoting full time to a hospital internship, I have little time for operating activities and, I am sorry to say, even less time to devote to even a cursory review of the current *QST*. Thus, it makes little sense to continue my subscription, for in all honesty I have little interest in the technical articles which fill your publication. However, I would like very much to support the League in all its activities, and would be quite willing to pay a reasonable membership dues even without receiving *QST*. I think that there are perhaps others in my position. One possible solution would be to reduce *QST* to a somewhat lower budget ARRL journal, and to provide a larger glossy technical journal for those hams who are willing to subscribe to it at an additional cost. The basis for this suggestion is that it would seem that the publication cost of *QST*, taken out of all membership fees, is the villain here, and that the proposed plan above would free more dues money for ARRL activities, rather than subsidizing the publication of a technical electronics journal. — *Lewis F. Lester, K2KJV/W1BPE, Storrs, Connecticut.*

### DESIGN FOR DX

¶ Articles such as "Station Design for DX" and photos of outstanding DX stations may scare off some of the less-fortunately-endowed aspiring DXers. While there is no doubt that to be a consistent winner all the goodies usually described are essential, lots of DX can be worked with much less.

For example, W2HSZ has been sited in a large apartment building overlooking the N.Y. Central tracks (d.c. powered with lots of noise when trains go by), in the Bronx River valley (hills on both east and west sides at least as high as the antennas), antennas consisting of dipoles and various kinds of wire beams (non-rotatable), less than 500 watts input to a bedroom closet, self-imposed quiet hours for less TVI annoyance (8 P.M. to about 11 P.M.)

and last but not least, a non-permissive NYL. Still, over the last ten years confirmed countries stands at about 300, WAF-1, and WAZ have been earned, and at least 1000 QSLs have been collected. I achieved over 200,000 points in last DX test without breaking quiet hours nor staying up past midnight!

The moral of this story is: without a big array (for all hands) at least a kw., a perfect site and unlimited DXing hours you just ain't agonna beat W3CRA, W6AM et al, but you can still have a lot of fun and DX — which, after all, might be more important. — *Bud Enge, W2HSZ, Scarsdale, New York.*

¶ I fear that W3AFM's article with its casual reference to Yagis on 70-foot booms atop 100-foot towers, hilltop sites, etc., will prove most discouraging to some of the younger, DX-inclined members of our fraternity who simply don't have the means for such "station design."

If so, I suggest that they procure a copy of the July, 1959, issue of *QST* and read therein the article "Ivory Tower Confessions" by Don Mix, W1TS. Don's article has the added merit of being a minor masterpiece of wit and good writing. — *Rupert A. Lloyd, Jr., W3CGP, Angles-sur-Mer (P.O.), France.*

### CONTESTS VS. QRN

¶ October *QST* has some 22 pages covering some stupid QRM contest and nary a word about the most important Senate Bill 1015. Isn't a lack of QRN more important than some contest? Why don't you promote something important instead of teaching hams to be liars with your "Sunday Driver" contests? I cannot understand why the Senate Bill is nearly completely neglected and QRM Contests, appliances and their advertising so heavily pushed. There seems to be an increasing amount of Club Homebrew Contests around here and the chronic complaint I hear is that parts are hard to find. Naturally, nothing is advertised in *QST* so nothing is marketed. Can't the League see that it is responsible for turning hams into appliance operators by its advertising of built-up gear? If you'd advertise only parts and kits you'd perhaps begin to restore the word "amateur" to amateur radio, instead of pushing it out of existence — which will happen one of these days. — *Bill Ray, W6KZF, Mill Valley, California.*

[EDITOR'S NOTE: August 1965 *QST*, page 48, and August 1966, page 59, covered the "QRN" bill which, despite FCC urging, failed to pass this session of Congress.]

¶ In reading October *QST* about the ARRL DX competition, I would again like to strongly suggest that this be cut down to only one weekend for phone, one weekend for c.w.

It is just not fair to one's family to work for two week-ends in one contest. Nor is it fair to one's work and perhaps most of all it is not fair to QRM the bands for those not in the contest. Certainly the ARRL always considers the rights of all amateurs. You know the ham is balanced etc., etc.

Please consider these points and eliminate the 2nd weekend in '68, OK? Then, I will be an active participant and feel as if I'm not being unfair to my family or fellow ham. — *Dr. Louis Persons, W4P.JG, Fort Myers, Florida.*

[EDITOR'S NOTE: No participant has to work the full number of hours, and most of us don't.]



# Radio Control of Model Aircraft

Details of a Simple System Adaptable to Any Unmanned Mobile Unit

By Ross A. Hull\* and R. B. Bourne\*\*, WIAN

Here is another field in which the ham is destined to play a big part. As first shown the controlling of models by radio is not ham radio as we ordinarily understand it. On second glance, though, it becomes a series of techniques here and there and one to which the amateur falls back because he alone (aside from scientific institutions with a permanent laboratory) is privileged to do the transmission. The game is not check luff of problems as it is of details and it will be interesting to see just how far we can go in a year or so of activity. The work reported here was done exclusively by radio model airplane. It was simplified by the absence of station interference but was complicated by the absolute need for precise control from the very moment the radio message applied to gas airplane models should serve to offset the present state of legislation against their use in free and uncontrolled flight—EDITH.

THE application of ham radio in the operation of controlled model aircraft airplanes and auras has received relatively little attention to date. It cannot be said that those individuals who have played with radio controlled models invariably reveal a tremendous enthusiasm for their game. During the last few years, coinciding with the development of successful gasoline-engine-driven model airplanes, we have seen a steady climb in the interest in the subject and have been called upon quite frequently for details of a practical system.

Most hams are usually far from being one-lubby men and one obviously, almost invariably, an enthusiast in the other sciences and the arts. A minimum interest in ham radio, as a requisite, model building, and photography, is almost the rule. We happen to be built that way and our interest in aircraft led us this summer, to take an active interest in this problem of radio control. Fortunately, just as our interest really blossomed, we were able to take a brief trip to the soaring capital at Elmira, New York, and found (amongst the usual array of interesting things) a radio-controlled model sailplane, built by Carl W. Thompson, Jr., of Wilmington, and equipped with radio gear by H. M. Plummer, of Lancaster, Pa. QST.

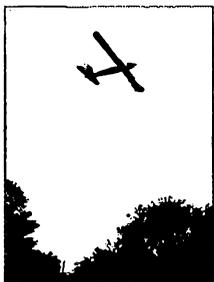


Photo Courtesy: H. M. Plummer, QST.

THE EXPERIMENTAL RADIO-CONTROLLED SAILPLANE IN FULL FLIGHT

Flitting as our model glider soared above the soaring ridge presents few real difficulties once the ship is in the air. Free-riding in smooth winds the model is 13 feet long, weighs 10 pounds complete.

W3DIA. The ship was arranged to fly ordinarily with right rudder and the appearance of an old-time sander emanated from the receiver serving to give an abnormal left rudder. The ship made general, successful loops with the control working but ultimately crashed and the experiment. We were fortunate enough to be able to acquire the remains and, on our return to Hartford, were able to go right ahead with an attempt as the control problem. Since that time we have had more than a hundred flights with some fifteen serious mishaps and the whole equipment has been rebuilt and rebuilt until substantially nothing is left of the original. But if anyone thinks that the program was tedious work, they're crazy! We have had our full share of thrills in this ham game—but the business of controlling a dizzy airplane galloping across the sky by sheer will.

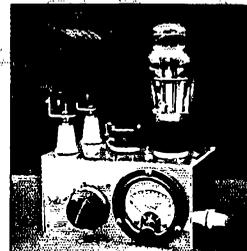
**THE PROBLEM**  
A casual glance at the problem would lead anyone to imagine that it is all a perfectly simple business. All one needs is a receiver of receiver that produces enough change in the plate current of an output tube to operate a relay of some kind, the relay then being connected to a control device which produces the necessary effect. Closer examination, however, reveals a host of problems which are juicy morsels for any

# The "QSL Forty"

A Compact and Inexpensive 3.5- and 7-Mc. Transmitter

By Fred Suter,\* W8QBW-W8QDK

IN THE June, 1936 issue of QST appeared an article by Mr. Fred Edmunds, W2FDY, which to the present writer's way of thinking is highly inspirational. (But let's drop this "present writer" stuff and have a real ham talk in the first person singular. OK?) In fact it is even more than inspirational; it fairly stampedes one into action. At any rate it stampeded me, and this resulted here at W8QBW rig sketches page 618,



WITH CHASSIS AREA THE SAME AS THAT OF A HETTINGER, THIS LITTLE RIG PACKS QUITE A WALL

and 6L6 tubes, Tri-tet, mongrel and straightly circuits with all kinds of valves and coils. And I can't leave the Dawn! A tiny transmitter using the 6L6 tube, straight circuit, on a new classic 3 1/2 by 5 1/4 inches, which would light a 40-watt G. E. Mazda dummy load to more than full brilliancy. Now if you will measure your QSL card and find that it is 3 1/2 by 5 1/4 inches you will see why this one was christened the "QSL 40."

My original thought in this was to arrive at a simple oscillator with amp enough to excite that Joe Tube which is the dream of every new ham. A 6L6G runs a 300-watt amplifier—as Mr. Edmunds puts it in his article, "that two-stage set-up would be a nice rig for e.w.m.," a very minor understatement! But when I found out how

the little fellow went to town both here at W8QBW and at W8QDK the big tube idea faded down to about 84 and the 200-volt transformer went on the shelf and it still there. R.I.P.

Now, as to results. On 40 meters the rig has worked up to 100 miles for this QSL 40, which is in Cross Pointe, Mich., along the shore of Lake St. Clair. A report of QST is unusual, 88 and 89 being rather the rule. The poorest report so far is 84 from WYUAG in Seaside, Oregon, about 1775 miles and 85 next nearest is 85 from W4LIZ, Reno, Nevada, about 1950 miles. When W8QDK went on the air for the 2nd time in July, 1937, the first 2d CQ's resulted in 24 QSO's, on 40 meters, all during daylight hours. Surely no reasonably minded ham can demand more from a \$135 bottle.

**THE PHOTOGRAPHS**  
Looking at the photographs it will be noted that in front of the plate-coupler lens and the plate meter. On the side are the key landing posts, at the back a 3-pin socket for the power and on top are the coil, tube, crystal and protective pilot bulb. Underneath is an a.f. choke, a resistor, three tubular condensers and, of course, the motor and 100- $\mu$ f. midget. There isn't much which could be left out except perhaps the pilot bulb, but as this with its socket costs but 14 cents it is good inexpensive crystal insurance. The cost of all this exclusive of crystal, which every ham

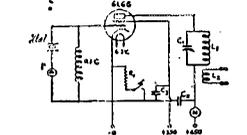


FIG. 1—THE TRANSMITTER CIRCUIT DIAGRAM

- C1—100- $\mu$ f., midget, 100VDC MFC-100-55.
- C2—100- $\mu$ f., paper tubular, 100VDC (Aerovox 100-5).
- C3—100- $\mu$ f., paper tubular, 50VDC (Aerovox 50-5).
- C4—100- $\mu$ f., paper tubular, 50VDC (Aerovox 50-5).
- C5—200- $\mu$ f., 7.5 choke (National R100).
- C6—100- $\mu$ f., electrolytic (1 triplet 221).
- M—100- $\mu$ f. millimeter (1 triplet 221).
- L1—7 Mc. 18 turns No. 14 enamel, diameter 2 1/2 inches, length 1 1/2 inches.
- L2—21 turns No. 16 diameter 2 1/2 inches, length 1 1/2 inches.
- L3—21 turns No. 16 or end of L2. Same on both bands.

(February 1938)

QST for

October, 1937

With this issue, QST's Fiftieth Anniversary Year comes to an end, and with it the series of "QST Classics." In this last group we're treating you to the title pages of a few pace-setters—a classic on filter design, the single-wire fed "Windom" antenna, the first rotatable beam, the first electronic keyer, the first popular articles on the e.c.o. and on model-airplane control. And last but not least, the QSL Forty—which needs no introduction to any ham of the middle 30s.

If the articles in this "Classic" series have given the younger generation temporal perspective on developments whose impact made a lasting impression, and have given the graybeards a few nostalgic moments, we are satisfied. The choice of articles has not always been easy, and many meritorious contributions have had to be omitted. Any old timer could come up with a few favorite candidates of his own, but we couldn't print 'em all!

The electronic key makes dashes as well as dots, at speeds from 15 to 100 words per minute. Speed is quickly regulated by turning one control.

## Electronic Keying

BY HARRY BECHER,\* W4LIE

An Electrical "Bug" Which Makes Both Dots and Dashes

NO DOUBT the desirability of a semi-automatic key which would make dashes as well as dots has occurred to many amateurs. No one, however, seems to have designed a key of this sort which is practicable for home construction.<sup>1</sup> Realizing the need for such a key, the author some time ago started work on one which would do the job electronically. As might be expected, the early attempts were crude and in one way or another did not fulfill all the specifications that such a device as this should. Since the work was done in spare time the whole works would be obsolete, sometimes for months, until a new idea would suggest itself.

The final circuits presented here are in our estimation foolproof and simple. The parts necessary are readily obtainable, and cost about what one would have to spend for a good speech amplifier. The heart of the device is the so-called triode Type 885, used in a modified sweep-oscillator circuit, with the rest of the apparatus to adapt it to practical electronic keying applications. In 10 hands of a good operator the device is capable of sending perfect dots at speeds from 15 to 40 words per minute. Three convenient controls—overall speed, dash length, and dot length—permit the operator to set the characteristic beat to suit his style of sending. With the key thrown to either the dot or dash position a characteristic begins immediately, and a train of characters will follow if the key is held down; however, if the key



is released the action is immediately to cut off the characteristic. Pressing the key always starts a new characteristic. At any given speed the space between dashes in a train of dashes is exactly the same as the space between dots in a train of dots; this is set automatically by electronic means. All characters in a train are the same length.

**How It Works**  
In the following explanation of the electronic key it is necessary to keep in mind the characteristics of the 885 grid tube, which is a miniature thyratron. Like all thyratrons, the grid is effective as a control element only in determining the plate voltage at which the gas in the tube will ionize; once ionization occurs the gas loses control and the plate-cathode circuit behaves as though there were no grid in the tube. As the gas with other gas tubes, a certain minimum voltage is necessary to maintain ionization; at a critical voltage known as the extinction potential the ionization ceases and there is no current flow in the cathode-plate circuit. The extinction potential is a constant for the type of tube (in the case of the 885 it is about 15 volts) and is independent of the grid bias. The breakdown or starting potential, however, is determined directly by the grid bias and can be varied over a range of 30 to 300 volts, approximately. The effective plate-cathode resistance is quite low when the tube is ionized, and is extremely high when there is no gas ionization; we have, therefore, a tube in which the transition from no plate current to high plate current is extremely abrupt. This is an ideal characteristic for keying applications.

\* 26 South Main St., Milltown, N. J.  
There is a caudal ray in this type available commercially, but mechanical construction of the necessary motorizations may well beyond the capabilities of the average amateur—Ed.

April 1940



# YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,\* WB6BBO

## A YL Club is . . . . .

"CLUB," according to Webster, "is an association of persons for some common object . . . meeting periodically." There is no more literal illustration of that definition than the many YL clubs. We all have other affiliations, literary, cultural, patriotic, social, fraternal, and the neighborhood group who meet regularly, even though we ladies see each other daily. But the YL organizations are different in "tone" from these many others. That "common object," amateur radio, flavors the conversation before the meeting, governs all the stages of the formal business proceedings, is very probably the theme of the program, and, in the chatter following adjournment, again is the major subject.



The Ontario Trilliums, sent this picture of the five YLs who made YL history in VE-land in 1932 as the first YL group in Canada. They posed for a picture this summer, still as active as ever. Left to right VE3CLT, VE3BBO, VE3EUY, VE3BII, VE3DGG.

A YL club is a luncheon, or an afternoon, or an evening meeting. It's licensed women amateur radio operators — Novice, General, Extra Class, and, in some cases wives of operators who, while unlicensed, have been included in the membership because of their interest. The anonymity of our call letters is a camouflage on the air where our voices are the only identification of the YL, so that these meetings are an excellent place to unmask the gals who prefer c.w. or RTTY.

For the newcomer to Amateur Radio it's association with women who speak the same language, and a chance to gain even wider circles of friends, and those many other "fringe benefits" that are open to the YL operators alone.

\* YL Editor, QST. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001

A club is — familiar sentences: "conditions were rough but I got that new country . . ." "we changed the antenna system and . . ." "I'm hoping for a new receiver before the next YL/OM . . ." or "so you're WA2XXX why don't you get on fone?" It's putting faces on fists, and voices, and calls. It's a business meeting: correspondence from YLRL; from the adopted DX-YL's; official bulletins from ARRL; plans to man the radio booth at the USO; results of club participation in Field Day, with a ripple of laughter and a flurry of comment over the wind-storm and the tent; or a serious discussion over the comparative qualities of the candidates for ARRL, or YLRL offices. It's discussion of contests, and nets; and as warm a welcome to the new gal with the ink of the FCC signature still damp on her license, as to the QCWA member who just transferred to the community.

Within the club is the answer to the question: If I join, what's in it for me? Whether it be on the wide scope of the international groups, or the local gals' monthly meeting, it's women on an equal conversational level of QSL's, certificates, net participation, local Public Service activity, contests, conditions, equipment . . . you name it, it's there, each woman's personal interest within the whole scope of the amateur service. Most of all it is the personal touch of association with a group whose "common object" is one of the most rewarding of the many organizations that are exclusively feminine.



Edie McCracken, K1EKO. 1967 YLRL President. Edie works all bands 80 through 10, but prefers 75 phone, and 15 and 20 meter s.s.b. especially contest operation.



The very active MINOW'S held a get together at the Walla Walla, Washington Hamfest, enrolled three new members, and sent this picture. Left to right, Front row: K7RBE, W7IXR, K7RAM, K7TWQ, WA7BDD, and K7MFS. Back row: WA7DXI, K7JRB, K7UBC, W7NOB, K7PVG, W7FE, W87FE.

### Karla Hambel, K8HDO

Karla Hambel, K8HDO, is a most remarkable YL. Karla was born with what even the doctors considered an almost insurmountable handicap of no arms, with her hands at her shoulders, and as if that weren't enough, one leg longer than the other. It was their opinion that she would not only be unable to feed herself, or write, but probably she wouldn't be able to walk either.

No one thought to tell Karla that she couldn't do these things so she not only did them, but she made exceedingly

good grades in high school, and at Oberlin College. Her original desire was to be a teacher, but she went with the Goodwill Industries instead where, in 1965, she was named "Goodwill Worker of the Year."

Her Amateur operation has been as successful as all her other activities. Especially active on 75 meters, Karla was Net Control Station on the Ohio State Phone Net, with BPL as the result of her traffic work. She is also active on the Ohio a.s.b. nets, and works DX on 15 meters.

Karla's desire is to help other handicapped people, and to make the functions of the Goodwill Industries known to more persons. Considering her successful record up to now, it is a pretty good conclusion that she will do just that. She doesn't seem to know what the words impossible, or can't mean.

### SEASON'S GREETINGS

Listen dear old Santa Claus  
Bend an ear this way,  
Please make sure the OM's know  
What I'm going to say.

Some gals want a brand new rig,  
Another wants a key,  
And a lot of QSL's  
They'd all like to see.

All YL's would like to have  
Certificates a-plenty.  
If you have them in your pack,  
Please give each one twenty.

It's obvious my little brain  
Isn't very bright,  
Please send me, dear Santa Claus  
Lots of news to write.

And, before the deluge of greetings start on the air, and in the mail, my own wishes for a very happy Holiday Season to all of you.

QST



### December 1941

... This month's cover depicts a mighty rugged tank circuit for 112 Mc. The inductance is in the form of a short horseshoe magnet on the two "poles" of which is mounted the split-stator condenser. George Grammer, W1DF goes on to describe the 112-Mc. rig which incorporates this piece of gear. It is adapted for use with a vibrator power supply. This feeds a 6V6GT for the oscillator. The rig is modulated by a 6N7 with a 6J5 speech amplifier. Simple but good.

... In another article, George discusses at length the requirements for and the standardization of 112 Mc. emergency gear.

... K. B. Warner, in his editorial, points out that some items such as mercury-vapor rectifier tubes are getting scarce and reminisces about chemical rectifiers, sync. jobs, kenotrons and the like. He says the real answer is in conserving the life of the rectifiers we have by operating them properly, without overload, and as little as possible. He also suggests greatly increased use of 160 meters, what with the imminent loss of 80 meters to the military.

For good measure, he gives some pointers on learning to copy on the mill.

... Nice article with plenty of pictures describes the doings at the Gallups Island U.S. Maritime Service Training Center. They have a live-wire Ham Club and put on quite a show at the New England Division Convention in October.

... The famous Paragon RA6 is now 25 years old, it says here. Bet there are some of them around even now (1966). We'd love to have one for the Museum.

... Ostensibly for the Junior Constructor, there is a lot of meat in an article on Meter Shunts. A lot of us today might profit by this dope.

... Anticipating the need for mobile operation on a greatly expanded scale, Vernon Chambers, W1JEQ has a really compact 2 1/2-meter receiver. It is a super-regen, of course, and has two stages of audio. Reminds me of my first super-regen, in that I, too, had two stages of audio and the Magnavox speaker could be heard half a mile down wind. It was Armstrong's original circuit.

... Here's a ham, Leo Sadowsky, W2OFU who got his ham ticket even though he is deaf, inarticulate and blind. Picture shows him at his rig along with the famous Bob Gunderson, W2JIO, his instructor. Leo copies code by the sensation of feeling engendered by a strong 60 cycle note in the earphones. What a guy!

... Clinton DeSoto, W1CBD describes a vacuum Tube Voltmeter, the total cost of which is \$17.00. This is good reading right now for any one wishing to construct one. (No guarantee on costs today).

— W1ANA

# The World Above 50 Mc.

1215-1300 2300-2450 3300-3500 4400-4500 5650-5925 10,000-10,500 21,000-22,000 50,000-?

CONDUCTED BY SAM HARRIS,\* W1FZJ

## Plain Talk About Antennas

**E**VEN the most inexperienced novice will admit that his antenna is an important part of his station equipment. Unfortunately, even old timers are occasionally guilty of assuming that a terminated feedline is evidence of a good radiator. Actually, all a good v.s.w.r. indicates is that most of the power leaving the transmitter stays out there somewhere.

It doesn't tell you that power is reaching the antenna although except in rare cases it is acceptable evidence that your feedline is neither open nor shorted and has some sort of power dissipating load on the far end. It might mean that you forgot to remove the dummy load and connect the antenna or it might mean that you have a well-matched antenna. It does not tell you whether your antenna is any good either for transmitting or receiving signals. As a matter of fact the only practical way to check antenna performance is to use it.

Now naturally one assumes that you have measured your v.s.w.r. and that some effort has been made to minimize it. Remembering that while it is permissible to monitor v.s.w.r. at the transmitting end of the feedline the matching adjustments should be made with the indicator as close to the antenna as possible, for maximum indicator sensitivity.

On-the-air checks will be greatly facilitated if you have the foresight to top off your antenna stick with a comparison dipole. The comparison antenna need not be a simple dipole but should be simple enough to insure proper and known operation. A pair of dipoles stacked a half-wave apart and fed in phase will, for instance, yield a gain of four db. under almost any situation and make an ideal comparison antenna. The procedure for checking antenna performance under these circumstances is obvious. It is important, however, to be sure that the level indicator on the receiver means something. The switching system used to change antennas should maintain the line impedance and hopefully allow the antennas to be switched rapidly (one half second or less).

A comparison antenna mounted above the main beam is not always practical. In this case another location can be selected. Any comparison antenna is better than none. Naturally as high and in the clear as possible is always best. The comparative measurements made under these circumstances will not be as meaningful but in general they tend to favor the main antenna and a little experience will yield usable results.

There are, of course, numerous other methods

of evaluating your antenna performance. Most of the alternatives however, are ways of evaluating your system performance as a whole. (Like winning contests, breaking records or maintaining long-haul schedules, etc.) The important thing is to use some system which will tell you whether your near-super blooper is giving you 16 db. gain as advertised or 6 db. as is likely.

## V.h.f. DX

Moonbounce on 432 Mc. anyone? GM3IQL writes the following: "May I seek the cooperation of the enthusiastic 'Moonbouncers' of the U.S.A. We of the v.h.f. group of the 'Dunfermline Radio Society' would very much like to arrange a few skeds on 432 Mc. with any moonbounce group in the States. Anyone interested in working GM by this mode should contact me at the following address: Andy Lawrence, GM3IQL, 2 Castleblair Lane; Dunfermline, Fife, Scotland." There should be some takers on this request Andy. Hope so, and good luck to all of you.

From XE1PY: "I was able to obtain nine Motorola mobile units which I have converted to operate on 145.450 Mc., five of which are in operation by XE1FE, XE1CA, XE1IG, XE1GE and XE1PY. All are being operated into antennas with gains of 13 to 17 db. XE1CA and myself expect to have 1 k.w. final inputs shortly. XE1CA and XE1PY are on standby daily from approximately 1400 GMT until 0300 GMT and the others from about 2300 until 0300 or later. All stations operate a.m., and skeds are held on Sunday and Wednesday at 0230 GMT. Six-meter activity remains about the same as in the past with the following stations active: XE1GE, XE1FE, XE1IG, XE1CT, XE1CA and XE1PY. Occasionally XE1RN, XE1SC, XE1FU, XE1TW, XE1CU and XE1ANN also operate 50 Mc. In San Luis Potasi XE2GGL and XE2EEL are active. All are on a.m. with the exception of XE1ANN who is on s.s.b. and XE1PY who is both a.m. and s.s.b." Very good to know there is so much activity out your way.

## Aurora

Seems that just about everyone on 144 Mc. and a few stations on 50 Mc. caught the auroral session of September



Southern California V.H.F. Club "on location." From left to right: WA6RIK, W6UFJ, WA6ARC, WA6WIZ, WA6WKF, W6FNE, K6YUL.

\*P.O. Box 1738, Arecibo, Puerto Rico 00613.

3 and 4 and all concerned considered it "fantastic." However, the stations to whom it was of the greatest interest are those who had "firsts." The "firsts" 432-Mc. auroral contact ever reported was held at 0027 GMT on September 4 between W9AAG and K9AAJ. Dallas, W9AAG gave Lee the same report as his two-meter aurora signal (good) and K9AAJ's report to him was readable but weak. W9AAG runs 30 watts to a 2C39 with a 40-element yagi and K9AAJ is running 450 watts to a 96-element beam. Dallas reports that he was receiving both tropo and aurora signals from Lee. The aurora-reflected signal was a little higher in frequency than the tropo and he had his choice of pure tropo, mixture of both or just the aurora signal, depending on setting of the dial. During this same opening Dallas heard stations on 144 Mc. from Massachusetts to Colorado as well as a few W5's including W5UGO/5 and W5RCL.

Another "first," this one on 144 Mc., was due, in part, to the enthusiasm of an SWL. Sez W6GDO: "First aurora I've ever heard! WB6KAP said he was hearing aurora on 15 meters so we made a test on 144 Mc. No soap! We then tried 50 Mc. with marginal auroral note heard. Then Don Kellum, an SWL in Vashon, Washington, (Seel He is enthusiastic!) called on phone to tell me he had copied my 144-Mc. s.s.b. while I was testing with WB6KAP. He then called W7WVE in Seattle and Dick and I made it S9 on s.s.b. on 144 Mc. I also worked K7ZIR (c.w.) at Portland, Oregon and heard K7AAD. WB6KAP worked W7WVE and K7ZIR on c.w. I was first heard at 0100 GMT by the SWL and signals were good here from 0200 to 0600 GMT." Congratulations to all of you boys and keep up the good work!

Apparently the recent auroral sessions have not been as good on 50 Mc. although the few reports we have received sound good. From K1WHS we hear that on August 30 he worked stations in 6 states including 5 call areas plus VE3 on 50 Mc. On September 3 he worked everything from Maine to the Carolinas and as far west as Iowa and Minnesota with all states in between worked. In addition VE1, 2, 3, and 4 were all copied during the aurora. Arn's new six meter rig is getting results! K3MSG notes that while copying W1AW code practice on 40 meters Aux. 30 he noticed the auroral note and on tuning to 50 Mc. found a fine auroral opening on August 30. And in South Carolina WA4LTS sez that on September 3 50 Mc. brought in 7 call areas and 15 states worked.

Auroral reports for 144 Mc. were received from the Province of Quebec (VE2BZH) to Virginia (WA4ISR) to Oklahoma (K5IQL) and the previously mentioned report from W6GDO in California. VE2BZH noted that the session started for him on September 1 at about 2200 GMT and lasted until 0800 GMT on the 2nd. During that time he worked stations in 10 sections with good reports both ways. VE2JO, VE2TT (s.s.b.), VE2BMQ and VE3AGA were also active during the aurora. K9AQP/1 writes that although he was unable to work anyone with his 15 watts on c.w. from the top of Pack Monadnock in New Hampshire he heard W9BRN, W3PMG, K2IEJ, K1EVU, K2YCO, K1BKK, VE3BGA, W8AEC, K3ZDQ and K8ZES plus a number of others during the aurora of September 3. K3CFA netted a new state, Rhode Island, when he worked K1ABR during the same session and brought his total to 18 states worked. on 144 Mc. Joel also worked a number of stations in 1 and 2 lands plus several VE2's.

At Winchester, Virginia, WA4ISR worked his first auroral contact (of the evening) about 1730 and stayed with the opening until 0300. During this time he worked 17 states in 6 call areas plus VE3 bringing his total to 23 states worked on 144. Only state heard that wasn't worked was Kentucky (W4HJQ). K5IQL at Yale, Oklahoma, sez that the aurora was in and out on September 3 but there was a conspicuous absence of s.s.b. signals. (EPT sez they were on c.w., Frank.)

K8PBA, K9DZY, K9HMB and W0DQY were all participants in an auroral contact via s.s.b. on the 3rd. Reports were 5 7A or better. W8PT reports working WABFDY via aurora on August 29 and hearing 1s, 2s, 3's and VE3's on the 30th via aurora. W8QOH sez: "The aurora of September 3 was far and away the best in my five years on two meters. WWV was sending a 'W2' forecast and a quick check of 144 Mc. showed the session already in full swing at 1900 EST. The opening continued without letup until finally gave up at 0100. Beam directions shifted rapidly from 45 degrees east of north, through due north and as



WB6GFD mans the 1296 position for the San Fernando Valley Radio Club. W6SD/6 atop Magic Mountain in the Los Angeles section. (June V.H.F. Contest) The club's 4 band effort netted 176 exchanges with a multiplier of 16.

far west as 60 degrees west of north at which heading W8YMG in Kansas was worked. Activity was high, with over 100 c.w. stations logged. Some of them in normal tropo range have never been heard before or since, so the activity is there, but everyone is listening and few making noise." Paul is hoping to set up skeds with western states who still need Ohio on two meters.

A final report on aurora received from Ed, W1HDQ: "Very good aurora on the night of October 3. First observed it on six and two around 1830 EST and worked W9BRN on 144 Mc. with a strong c.w. signal. Seemed to be few DX signals here, though W9BRN was in most of the evening. Heard stations calling WA9DOT in Wisconsin but never heard him here." Thanks Ed, that's the only report received to date concerning that particular session.

Signals that sound like aurora may not always be of auroral origin. In this day of large satellites, space probes and you-name-it in orbit, it behooves us all to check closely on any strange signals we hear on the v.h.f. bands. W0LER, Minneapolis, gives a prime example: "At 0413 Sept. 26 I heard W9QXD, Chicago, calling CQ on 144 Mc. He sounded like aurora, but much stronger. After a 10-minute QSO we heard W9BOZ calling, and had a short QSO, after which he called CQ again, but started to fade out, and soon was gone. The optimum heading for the beam was changing, ending in the northeast. It sounded very much as if the signals were being reflected from something in orbit.

The morning prior to this a space probe was launched from Wallops Island, and they exploded a copper-barium mixture at an altitude of about 500 miles. Was this the source of our 'auroral' reflection? Any similar observations?"

### 144 Mc. and Up

Diligence and patience are beginning to pay off for a few of the 1215-Mc. enthusiasts. K1YON sez: "Success at last!" Ted worked W1HDQ/1 on Talcott Mountain from his home QTH (14 miles) for his first 1215-Mc. contact. APX 6's were used at both ends. WB6IOM in Los Angeles has been keeping skeds on 1296 Mc. every Sunday with W6DXJ and sez that during September the signals were always useable on c.w. and three out of four times the signals from WB6IOM were readable on s.s.b. in San Diego. Pete, WB6IOM, is presently working on construction of a 16-foot paraboloid for all bands up to and including the 3300-Mc. band. K6UMV is also working on antennas. Don has built prototype antennas for the Aries Satellite on 432, and 223 and a collinear on 1296 Mc. He is running tests now on pattern shapes and impedance of each.

In answer to the quip "Where do the W1's get all those

dishes?" (Jan. '66 QST), W1DNK/K1NGJ sez: "Here, right now, I have two 10-foot dishes for the taking. Just have to lug them away. Any takers?" Sounds like a good deal to me! Know what would happen if I was still in that area? You fellas just never would 'a seen the offer! But there's a problem: this zuv's on Nantucket Island, a 30-mile ferry ride from Woods Hole, Mass!

Down here in Puerto Rico it's easy to tell when winter is coming upon us just from the OVS reports received. A good percentage of the v.h.f. group is preparing to build or already building new equipment for the favored band or bands. K3LLR is planning a 1296-Mc. converter, a 432 converter and preamp and a 2-meter preamp. K4EJQ sez: "Trying like mad to finish the 500-watt amplifier on 432 as well as the half kw. on 144 Mc. Each rig about three quarters finished but I have a hot iron and few parts. Started a new converter for 144 Mc. Got up nerve enough to stack a couple of long yagis on 144 and it helps quite a bit. Started cavity number 2 for 432 Mc." Sounds like Jim will have a busy winter!

W4HHK wants to start working on his UPX 4 for 1296 Mc. and would like to hear from anyone who has successfully modified this unit. Paul sez that skeds plus good tropo conditions are paying off on 432 Mc. Skeds with stations in Texas at distances of from four to five hundred miles produced contacts on September 3, 24 and 25. Stations worked were W5AJG and W5LPT. On October 2 contacts were made with W5AJG, W5LDV and W5UKQ (Louisiana). The last contact makes it ten states for Paul on 432 Mc. Equipment used at W4HHK was the 18-foot dish, 300-watts output and transistor r.f.-crystal converter with 75A3.

At Cocoa Beach, Florida, WB4YD is working on a 420-Mc. converter tripler, and in Las Vegas, K7ICW is building a 432-Mc. 500-watt final P.A. designed for class AB<sub>1</sub> operation using 4CX250B's. Al tells us that on September 4 during a tropo contact with W6DQJ signals peaked up so much that the boys shifted to 432 Mc. K7ICW immediately received W6QDJ (running 400 watts on 432.039) RST 2 2 9 with QSB.

At Kalamazoo, Michigan, W8CVQ sez best conditions on 432 Mc. were observed on September 10 when WA9IUV was worked. Walt (W8CVQ) is working on an f.m. system for 432 Mc. for his winter homework. At Cleveland, Ohio, W8FAZ agrees that September 10 was really good on 432 Mc. Joe sez: "W8BRMC's signal climbed steadily in signal strength until by 2130 EDT it was saturating the receiver system here! No local has ever been so loud at this location (including 144 Mc.). At 2130 contact was established but my signal was reported very weak. A checkup after the QSO showed no r.f. at the end of the dipole of the Yagi and it turned out that a lead to the milliammeter had been severed. But I worked W8BRMC! Fantastic!" Joe also tells us that W8BRMC has 250-watts input and a 96-element collinear up 90 feet. He is on ATV holding skeds with W8PSX daily, on the hour from about 7:00 to 10:00 p.m. EDT. W8PSX has about 9-watts input and an 11-element Yagi up 65 feet. Other ATV enthusiasts in the area are W8EMO and W8LAU. Out in California the ATV bug is strong with W6QDP, WB6LJI, K6MWN, W6VCF W6TZZ, W6WJW and W6SGD.

K6SQH writes that he now has his 220-s.s.b. rig on the air and is getting consistently good reports (S 9) from K6VYP 150 miles away. Next project sez Bill is a pair of 4CX300A's and an 80-element antenna. He also reports that there are about 30 regulars on or near 22.075 Mc. in his area and they "are getting up a head of steam on this 220 s.s.b. and digging out the 10A's etc." 220 Mc. seems to be coming into its own too! W8PT is running meteor-shower scatter schedules with W1AZK and W0EYE on 220. Results nil to date but the boys expect better results in the major showers. Jack (W8PT) called our attention to a goof we made in the September column. Station he worked on 432 Mc. was W5CKY in Jackson, Mississippi and not W5RCI as stated.

### 50 Mc.

From Connecticut and Kentucky we have RTTY news. WA1ANP writes that he is working on an AFSK teletype station for six meters running 25-watts input. John sez that W1ORI and K1YBZ are also working on 50-Mc. teletype gear. K4FPW at Louisville, Kentucky, hopes to complete his v.h.f.-h.f. RTTY control panel and convertor within the next few months. Otto is also putting up a



VHF problem Down Under. VK3NR says the Kookaburra bird wreaks disaster upon lightweight 144-Mc. beam elements. Noel's daughter, Lisa, did the sketch and while she may have exaggerated the size a bit it is in fact, quite a big fat bird.

ground plane for six and two meters with six and two omni-directional dipoles. Not much skip news for 50 Mc. recently but Dave, K1WHS, tells us that on September 10 there was a nice duct opening out to Ohio. The only stations on the air out there were K8MMLM, K8UQA and WA8OXC, all on s.s.b. WB2VVJ reports that the Southern New Jersey 6-meter net meets every Friday evening at 2000 on 50.9 Mc. Nice to know when and where those elusive southern New Jersey stations can be found.

An interesting contact between K2SUO and WA6AKM/MAI in the Caribbean on 50 Mc. was reported by K2SUO. Most interesting part of the event was that Serafino was using a G 50 with about 27 watts out into 6 elements 30 feet up. Word received from WB2VFX, WA3ELA, WA4YXK and K8AQA all indicate the same conditions on 50 Mc. "Skip is all but dead and ground wave is picking up a bit," so say the boys. WA4FZV, W8MBH and WA9FIH report the only opening heard on 50 Mc. during September was on the 23rd when each of the boys heard one or two skip stations.

WA6WKF reports a nice contact with XE2IO on August 22 and WA4FIO mentions an excellent opening to Puerto Rico and Cuba on August 31 (too late for his last report). Fred has started a wintertime project of reconstructing his instruments and gear from tubes to transistors. Good luck, fella. Homework for WB6GIB consists of conversion of his Knight C-100 into a six-meter transceiver. Bill plans to try solar power with this rig. WA8GRI sez his absence from the v.h.f. bands is due to the fact that at present he is converting all v.h.f. phone operations to s.s.b. Looks like everybody is building!

Roger Zaruba, WB2OYK sez: "There is F<sub>2</sub> on six! At 1500 on October 2 I heard a Spanish speaking a.m. station on 50.195 Mc. After a few minutes I was able to get the prefix of his call, CE. His QTH was given as Santiago, Chile. Signals were about 5-7 and he remained strong with little QSB. There was another CE station who I couldn't identify. I couldn't make a two-way contact. Rig here is an 1HX30 and 5-element beam at 30 feet. Receiver is an HA350, CN50K combo. Watch for F<sub>2</sub>!" O.K. Roger, we will!

(This report is worthy of special attention, for it gives a clue as to when to look for north-south DX on 50 Mc. During the two previous solar activity peaks it was regularly observed that there were short periods of exceptionally high maximum usable frequency just before or just after pronounced ionospheric disturbances. Note that this report refers to Oct. 2, and there was an excellent auroral opening on the 3rd. If we are to have South American openings on 50 Mc. before the current solar cycle reaches its peak about 2 years hence, they will almost certainly occur just before or just after auroras. Keep track of auroral dates, and watch for recurrences approximately 27 days later. "A word to the wise —!" — W1HDQ)

**SWITCH  
TO SAFETY!**





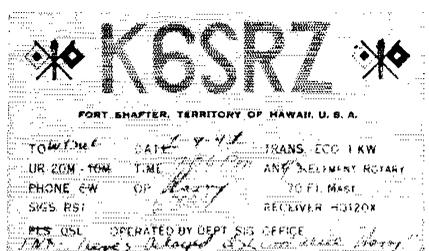
CONDUCTED BY ROD NEWKIRK,\* W9BRD

**Who?**

Where were you and what were you doing at 1700 GMT, December 7, 1941? Ever since that fateful Sunday of long ago it's been an annual pastime for older W/K generations to exchange reminiscences of the moment. We recall being in QSO with W6RMP of Sacramento on 20's high c.w. end. He interrupted his transmission with a

in. Watch out for ten this spring! But the "How's" Bandwagon is overdue to tour 20 meters this month, so let's hitch up Jeeves and hit the road. . . .

20 c.w. is the theme of dispatches filed by Ws 1AYK 1CNU 1ETV 2JBL 3HMK 3JZJ/9 4YOK 7VRO 8QXQ, Ks 1ZJA 3FKU 5MHG/6 9UTY 0DEQ, WAs 1GVT 1DGT 1FGN 4WIP 5EQA 6SLU 8GGN 8MCO 8MGD 8PYL 9MQL, WBs 2LBJ 2LXD 2UHZ 2YVZ, 6LEX 6OLD and 11ER concerning the radiotelegraphy of CEs 1AD 1DN (14,005 kc.) 0200 GMT, 1LA 2OR 3AG 3CJ 6AC (2) 4, CM2s BD JB O, WS (3) 22, CN8s FF MZ (85) 20, COs 2BO (1) 2, 2FC (17) 1, 6AH 6MD 21, 8H 23, CPs 1BX (9) 1, 1IW 5AQ 5EZ, CRs 4AE (6) 0, 6AI (60) 17, 6CK (4) 20-23, 6FY 19, 6GO (1) 21, 6JJ (20), 7TZ, CTs 1DJ 7, 1IK 1OI 1VB (60) 7, 2BO (21) 22, Cxs 1AAC (80) 21, 1BC 1FB (10) 0, 3BBD 21, DMs 2ADC 2BDN 2CJN 3LOG 3NBJ 4BO 4PL, DU's 1MS 13, 1OR (40) 19, 1VM (75) 14, 7SV 8, EAs 6AR 6BH (30) 20, 8DQ 8FE 8FG (60) 21, 9AM 9AP (28) 10, 9CC (25) 15, 9EO (15) 21, EIs 2BA 4, 2S 22, 3AK (60), 4AZ (45) 0, 9J 22, ELs 2D (25) 23, 2J (45) 13, 2X (60), 2Y 3F, EPs 2BQ (55) 18, ETs FMA USA (50) 14, P8TT/FC (5) 17, FB8s XX YY (100) 5, FG7s TD (12) 10, XF (21) 11, XJ XK (45) 22, XT XX (65) 18-19, FK8BG 7, FL8s HM (70) 18, MC RA, FM7s WK (50) 21, WQ (39) 20, FR7s ZD (50), ZN, FY7s YG (30) 6, YJ (18) 0, GB2LS, GCs 3PLX (32), 4LI 8HT 7, GDs 3RWF 5SF (86) 11, GM3SVK 14 of the Shetlands, HAs 1SB 2ME 3GF 3KNA 3MB 4FG 4KYB 5A 5CQ 5FE 5FW 5KDDQ 0, 6NC 6NE 6NI 7PJ 8KUC 8KWO 8UH 9KOB, HCs CV MF (5) 23-1, OG (80) 23, H8s LC (45) 23, XAL (10) 21, HKs 3BAE (38), 4BQ (20) 23, 4EX 5YC 7AHM (37) 4, 7DI (60) 21, 7XI (55) 22, HL9TH (35) 18, HP1BR, HRs 1KS 2BS 5LB, HZ3TYQ (44) 22, IT1s AF (20) 16, AGA AGI CDS DZS GAI SBT SEU (50) 13, ZGY, three dozen JAs, JAs 2BI (69) 14, 2BY 2DO 2DWZ 2HO 2JW 2KFO 2TH 3BIP 3CKI 3IG 3KEM 3ZP 4DGG 4OK 4OR 4VR/3 5AB 5GZ 6AA 6BXA 6ELB 6RU 6YCU 7ARW 7AZL 7FS 7IJ 7NI 8AA 8BB 8BFI 9BE 0AC 0BBB 0BVO 0WW 0XD, JTIAG (30) 1-2, JXs 3P (60) 16, 5CI (21) 0, 6AF (38) 14, KAs 2DJ 2DW 2KS 7AB (41), 8JT, K6Bs CG 16, CZ (40) 9-10, KGs 4CX 6AAY (70) 14, 6AIG (15) 11, 6AQA 8-11, 6IG 6NAA (18) 12, KJ6LD, KL7s CEX TI, KM6BJ (50) 15, KP6AZ 4, KRs 0CO 12, 6JS (47) 13, 6OS 13, 6TW 8DG, Ks 4CC 6AA 6AY (10) 3, 6BH 4, 6EJ (29) 2, KV4s AA (79) 20-22, CI (35) 21, DR, KX6s BQ (20) 12-13, EN ER (60) 10, KZs BC GN TX (60) 22, LJ2T, LU's 1ZA 1ZD (70) 7, 1ZX (20) 1, 2ZG (50) 12, 6ZC (25) 12, LZs 1BC 1BM 1FF 1HP 1KZ 1KS 1SP 1VM 2AW 2FZ 2KG 2KKR 2KZ 2KL 2KSK 2KSL, M1H, MP4s BDF BEU (60)



K prefixes meant off-the-mainland DX 25 years ago.

QRX. After a brief pause he came back with TURN ON YOUR BC SET and a very hurried 73. That was the last QSO for our parallel 6L6s till we eagerly hauled 'em out of the cellar for a go at 28 Mc. five long years later.

This silver anniversary of the bombing of Pearl Harbor reminds us that one of amateur radio's most famous QSOs remains unfinished. Let's go over the story again as related by W2RJ, then W2TNC, in a 1954 QST.

. . . On the morning of December 7, 1941, at about 0700 Hawaiian time, I was operating K6SRZ at Fort Shafter on 14,200-ke. 'phone, working a station in the Colorado-Utah area. As you no doubt can well imagine, there came a bit of confusion around there at that particular moment. The operator of the mainland station heard some of the fracas in the background and asked us — W2GQY and myself — what all the noise and fuss was about. We said QRX while we look outside and find out. I don't think we ever did come back to the guy. For all we know he may still be holding the circuit open, waiting for our reply.

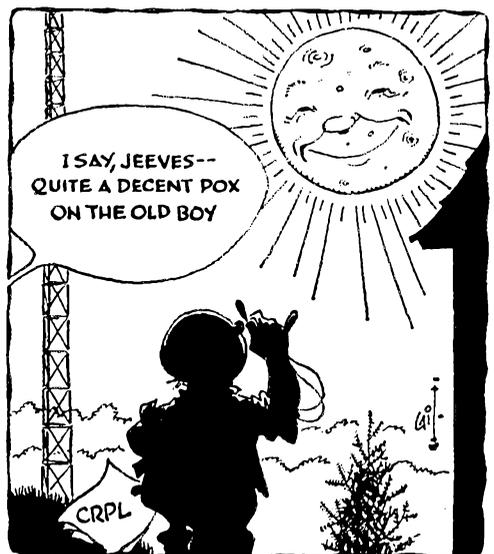
Inasmuch as he is one of the few Stateside persons who actually heard the commotion that morning, we would like to establish his identity. [We have been] unsuccessful in locating the old K6SRZ logs for that period.

It's unlikely that the end of this K6SRZ contact still stands by for the answer to his inquiry. But who was he, and what became of him? A recent letter from W2GQY confirms that the mystery is still unsolved.

**What:**

After some bewitching, bothering and bewildering false starts improved autumn conditions finally took hold. The week end DX clan is really beginning to clean up on 28 Mc. In addition to persistent African openings, scattered reports of W/K-Europe 10-meter work are finally dribbling

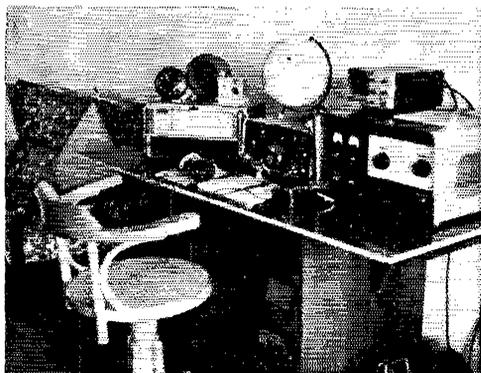
\* 7862-B West Lawrence Ave., Chicago, Ill. 60456.



13, BFK, OAs +KF (10) 20, 4PF (65) 23, 4UO 4VE (31)  
 13, 8D/3, OD5s F/C (75) 21-22, EE (60) 21, EJ EK (20)  
 0, EL LX 22, OK4CM/mm, OXs 3BX (75) 19, 3LP (30)  
 23, 5AO 1, OYs 2AD (20) 23, 2H 2J (37) 21, 2YL 3H (6),  
 3SL (49) 23, 6FRA 15, 8P, 20J 22-23, 9IM (75) 12,  
 PE2EVO, P1Is IC/mm, KMIA, PJs 2MI 1, 2AIE (12) 10,  
 3CC (21), PZ1HD (15) 22, RABEM (80) 8 of Moscow, SMs  
 1CJV 11, 0AFN 3, 0AHQ 0, OBXN (12), 0CBE 0K Y (22)  
 1, SUAs AR (20) 21, DL (60) 21, GA 18, IM (70) 1, SVIDS,  
 TAs 1AV (48) 20, 2AC (35) 20-21, TF2s AK (36) 15, WJQ  
 WJU (33) 2-23, WJW (30) 2, TI2s CJH 0, KR 22, PZ 14,  
 TR8s AG (62) 2, TT6AR, TU2BK (60) 2, TY2BC (70) 21,  
 UAs 1KED (19) 2 of F.L.L., 2AG 2DX 2FJ 2KAP 2KAT  
 2KBD 9BG 9CC 9CM 9G 9EE 9EM 9ES 9EV 9FN 9FW  
 9GF 9GW 9IH 9KAG 9KA 9QA 9KB 9KN 9LU 9MR  
 9OA 9OH 9OU 9PC 9PG 9PP 9PT 9PV 9WC 0AG 0BP  
 0EJ 0EQ 0ER 0FC 0KAE 0KGF 0KFK 0MA 0NR (3) 13,  
 0R5s AU CV HS IF IS KBE KBV KHQ KNP KNH KNW  
 MN QA SP SR TJ TJ UN WJ WL XG ZM ZO, UC2s AA (30),  
 AX CR 2, IA 8, KAC KAC KW KCX 11-12, KBE (10) 3,  
 KIM KMZ OM OZ WJ WP TA, UD6s LA AY (23), BR  
 BV 3-4, BZ (13), CE (70) 9, UF6s FN AM 3-4, QB, UG6s  
 AW WJ (60) 15, UH8s AA 3, BO (50) 18, BZ (29), DE  
 (100) 6-7, DII DC (12), KAA (65) 13, NA, UI8s AI (5)  
 1-2, AP AX (60) 17, DA FB CI (15) 17, HG IK (68) 7,  
 KAD 3, KIA (85) 16, KID (70) 6-7, KIA (70) 8, KTC  
 (70) 14, LC LK (33) 18, MF, UJ8s AC KAA (100) 6, MC  
 (45) 5, UL7s AA BG BX (26), FM (52) 12, GQ (22) 1-2,  
 GW JE (25) 2-3, KDD (70) 9, NB 2, QS RN SA YK,  
 UM8s AI (20) 3, AP (58) 4, KAA (40) 10, KAI (40) 2,  
 UN1s BC BK 4, BN BR 22, UO5PK (57) 3, UP2s AY (55)  
 4, BV BZ 4, KBA KBC (60), KCF KNP NK (70) 0, NR  
 NV 0-1, PT 21, UO2s AB KBQ 22, KCT KCS (62) 3,  
 UR2s KAE KAW LO (23), UT5s AV (35) 4, BP (50),  
 BQ BX (20) 4, FI HF HP KKE KSB LF (17), LT, UV3s  
 ER TQ, UWs 9EA 2, 9EX (6) 1, 9OA 9OV/mm (13) 14-15  
 in the arctic, 0AF 0FK 0JA 7, UY5s AN (35) 4, HH,  
 VE1AED/SU (85) 21, VKs IRD (29), 6RS 7GK 7-8, 7SM  
 (50) 7, 8HA (2) 17, 9BJ/p 8, 9CJ 6, 9FZ 9GN (60) 11-12,  
 9GW (51) 11, 9TB (60) 11, 9YW 0MI (80) 4, VO1GF (50)  
 1, VPs 1LP 23, 2AZ (60) 21, 2GLE 2GTL (40) 2, 2KJ (64)  
 23, 2LS 8, 2RS (47) 12, 5AR 6AK 6BW 7DJ 7NP 14-23,  
 7NQ 7NT 8HJ (50) 1, 8HY 8IN (15) 1-2, 8IQ (4) 0, 8IU  
 (24) 2, 8IY (40) 21, 8JA (55) 22, 8JD (4) 1, 9BO 9BP 9DL  
 9EP 9FW (60), 9FX (30) 4, VOs 7HY 7VY 8AI 8AW 13,  
 9BC (60) 22, 9BJ, VRs 2DK (35-45), 2EK (55) 8, 2ER  
 4CR (15) 13, 6TC 7, VSs 5JC 16, 6FK 16, 6FO 9ADF  
 (65) 21, 9ALV (19), 9ARV (50) 14, 9ASP (100) 17, VU2s  
 DIA (35) 14, GW (60) 17, KH JI JN LE (15) 15, NX 17, SV  
 (15) 14, TS XO (30) 11-12, W5VVW/KS6 4, WA5NOS/  
 KL7 (60), XE5 1AAG 1EK 1AIMU 1NL 1VU 2AAF 3EEL,  
 YA1HW, YNs 1AA 1SL 3KM (40) 4, YO5 2BS 2BV 2CJ  
 2FU 2KSD 3CR 3JL 4KAF 5CP 5IC 6XU 7DL 7DO 8CF  
 8ME 8OV 9EM, YSs 1DHE 1DHS 2OB (75) 10, 2RC (72)  
 5, YVIs AB EN (45) 1, multitudinous YUs, ZBs 2A AM AP  
 (95) 18, ZCs AK (65) 19, GB (17) 13-14, JU 3, TX (25)  
 7, ZDs 5G 14, 5M 14, 7IP (57) 22, 8BUU (2) 8J (55) 18,  
 8JN 8WK 8WZ (30) 8-20, ZEs 1CQ 4J8 22, 5JJ 8JJ 8JN,  
 ZL5AD (18), ZPs 5OG (25) 22, 9AY 0, ZSs 1ANT 16 of  
 Antarctica, 8L 15, 4S7s EA 15, EC (33) 16, EG (33) 17, NE,  
 4X4s HJ (4) 21, JC JR (60) 1, QA QG SK TP BV VG WN  
 3-4, 4U1TU, 5A3TT 4, 5R8AM, 5W1AZ (45) 4, 5X5s  
 SA (5) 20, 8R (5) 22, 5Z4s IR (50) 19, JD (47) 20, 606BW  
 (40) 21, 6W8s BB BL (20) 23, CQ (10), DD DG (34) 1,  
 6Y5s AK BB (35), FH (35) 13, GH 23, XG, 7Xs 3VJ (70)  
 21, 0AII (30) 12, 0AP (78) 9, 8J1AF (20) 16, 9G1s FQ  
 (35) 21, FY (10), 9H1s AD AK 20, AP, 9J2s GJ (40) 16,  
 JC (27), WR (15) 17, 9K2AK, 9M5 2AV 15, 2ED 15, 2FR  
 (52) 17, 2FZ (10) 16, 2LN 15-17, 8RS, 9Q5s IA LJ (60)  
 13, QO 21, QR (50), RI, 9V1s JW 14-15, JY 15, LK 15, MO  
 (15) 16, MT (75) 16, NM NV 17, 9X5s AB (35) 20, SA 19,  
 9Y4s DS (100) 11, LT 11, TR VT and VU (20) 11-12.  
 Note the lively upsurge in polar-path work with VU2s and  
 central Russia.

**20** phone developments, reported by Ws 2DY 3HKN  
 4YOK, K1ZJA, Was 4WTP 5AER 6BSO/1 8CGN  
 8MAS 8PKG, WB2s LBJ LDX UFN UHZ YVZ, VP7DJ  
 and s.w.l. W. P. Kilroy, feature the presence of CE6EJ 1,  
 GNR8B 4, CPRAP 2, CRs 5SP 21, 6CO (196) 23, 6GO  
 (201), 6HG 7AP (198) 11, 7FM (230), 7GW (230), 8AB  
 (238) 21-23, 8LA 7, 9AH (198) 11, CT3s AT (115) 21,  
 AV (206) 23, DU1RS (204) 12-13, EAs 6BG\* (110) 21,  
 6BJ\* (115) 11, 8AH (230) 17-18, E16AY 0, EL5V F 21,  
 R 20, S (140) 19, FB8s WW 12, XX (204) 5, YY (100) 5,  
 F18C\* (110) 17, FK8s AB (206) 5, AC (235), BG (112)  
 6, FL8RA (140) 20, FM7WN (190) 22, FO8A 6, FW8RC  
 (245) 6, FR7ZD (187) 3, FY7s YL (225) 19, YM (211),  
 GCs 2LU/p (235), 8HT (230) 22, GD3TU (200) 11, HA5s  
 DU (235) 23, FE (215) 5, HGs 2OA (17) 16-17, 5RZ (294)  
 21, 5NW (108) 13, IH89s DL (366), GR (336), H18NXO 1,  
 HKs 20Q (103) 22, UGM 2, 7YB (202), H189s KW (208)  
 12, TB (214) 11, HP9FC/mm (115) 11, H18Js JR RG SO  
 (114) 21, HSs 1HC (110) 16-17, 4AK (115) 15 both taboo for  
 W/K/VU/VOs, HAs ICN (223) 19, 3SJ (260) 20, HZ1AB  
 (202) 1, IS1s DMN (135) 22, GF SMN 20, ITISAL, JAs  
 1BZ 13, 6AFL 14, 8NU 12, K3LZC/4X (254), KA2KS  
 (250) 7, KB6s CP (206), CZ (210) 12, KC4VOS (227) 13,  
 KC6BW (245) 8, KGs 4BD (220) 9, 6AAY (320) 8, 6ALW

13, 6IF (117) 13, KJ6CF (325) 4, KL7s CKQ (228) 3, FRY,  
 KM6CE, KR6s BA (273) 14-15, CL (245) 7, CO 12, JMI  
 (215) 11 KJ (228) 15, JW 12, UA 12, UL (240), KS6BK  
 (270) 5-6, KV4CF (102) 0, KW6CJ (260) 10, KX6s BQ  
 (300) 10, BU 13, BX (225) 22, DB (330) 5, DC (310) 7,  
 EN, KZ5s AM NH (232) 7, LX1DB (116) 19, LZ1BZ  
 (213) 23, MP4s BDP (113) 15, BEU (113) 19, BFX (273)  
 15, DAN 21, MAH (262) 19, OAA6s BJ 2, 1 22, OD5s BA BZ  
 (270) 20, EP (330) 6, OEs 1SF (194) 21, 5HBL (286) 20,  
 OH0s NI (123) 15, NJ (246) 6, OK6KAR (110) 10, ON8UG  
 (241), OXs 3BX (110) 13, 5AR (170) 19, 5BO (233) 1,  
 OYs 2f (210) 18, 8RJ (204), PJ2MI 23, PZ1BX (277)  
 11, SV0s WL of Crete, WV (120) 11, TF2WJN (205) 22,  
 TGs 8IA (133) 7, 9EP (330), OAA 4, TI4JP (234) 21, TR8s  
 AD\* (225), AG (140) 20, TU2BA, USARTEK (110) 13-14  
 of the Ukraine, UAs 9CF (213) 2, 0AI (200) 0, 0EH (125)  
 17, 0YE (219) 15, UD6s BR (220) 3, RV (116) 5, UF6FE  
 (244) 12, UH8AY (286) 15, UI8s AG (130) 11, MIN (215) 2,  
 UL7BF (210) 14, UO0s PK (120) 6, WS (116) 17, UR2AR  
 (225) 16, VEs 1AED/U (237) 11, 2BUJ/SU (141) 21,  
 3FJZ/SU (130) 18, 3FZU/SU (214) 22, VKs 6KK (103)



9M8RS, in cozy Kuching quarters, runs an Eddystone  
 888A inhaler and an SB-400 driving homespun grounded-  
 grid 813s. A ground-plane usually does the radiating on  
 14,040-14,060-kc. c.w. or 14,180-14,220-kc. s.s.b. You  
 may know Nor better as old VS4RS.

9, 6PM (235) 9, 7SM (200) 6, 7ZL (127) 7, 8AV (202) 12,  
 9AF (222) 12, 9AG (217) 12, 9BW (105) 11, 9DJ (218) 12,  
 9GN 12, 9IK (110) 14, 9NI (137) 12, 9XI (150) 15, 9LN  
 (140) 7 of Antarctica, 0MI (180) 4-5, VO1AQ, VP: 1AB  
 (123) 7, 1HB (289) 21, 1WS (277), 2KD 16, 2KAI (251)  
 21, 2MH (222) 23, 2SY (225) 22, 2VU (111), 5RB (160) 23,  
 6RG (160) 23, 7NA (230), 8IK (216) 1, 9BN (110) 23,  
 VOs 8AR (230) 12, 8AX (197) 7, 9EF (190) 22, 9G (197)  
 13, 9RH (195) 22, 9IC (192) 12, VRS 2DI (235) 12, 2EK  
 2FC 7, 4LN (237) 5, 6TC (176) 5, VSs 5MH (120) 11, 6AJ  
 14, 9ARL (118) 14, 9ARV (190) 0, 9OC (198) 22, VU2s  
 CK (163), NR (166, 250) 2, W7ALE/KG6 13, Was 5ING/  
 K7L 0PNJ/KG6 (216) 12, XE1IHM, XPIAA (233) 2,  
 XT1AC (252) 3, XW8s BJ (184) 13-14, BS (236) 13, YAs  
 1DAN (250) 17, 1JC (147) 18, 3TNC (225) 2, Y03GY 4,  
 YS1s AG (112) 8, TA (290) 2, YU2RAZ, YV5s AMP  
 (126) 8, BAE (230) 23, BXR, ZG4CN (230) 2, ZD9FE  
 (210) 9, ZF1GC 1, ZPs 5CF (123) 22, 7BAI (117) 12, ZSs  
 2MI (170) 13 of Marion isle, 8L (212) 13-14, 3A2BF (141)  
 20, 487NE (218) 16, 4U1TU, 5As 3TT 5TU (275) 18,  
 5H3JR (265) 20-21, 5N2AAF (210), 5R8AK (120, 233)  
 12, 5U7AK (237) 20, 5Z4AR (210) 18-19, 601AU (218)  
 17, 6W8CZ (160) 9, 6Y5DAI 1, 7Q7s EC (198) 11, PS 17,  
 7X6AM (160) 18, 8J1RL (160) 12, 9G1EC (227), 9K2AM  
 (165) 17, 9L1HX (230) 17, 9Ms 2DW (120) 17, 2MY  
 (301) 10, 2OV (120) 17, 6MR (130) 16, 9N1s BG MM  
 (206) 12, 9Q5s CW (200) 6, CZ (155) 6, GI 1, HF (215)  
 21, HT (286) 21, OD (300), PI 1, SH (230) 21, SS (149)  
 22, 9U5BB (138) 17-20, 9V1Y (210) 14, 9X5AV (103)  
 22 and 9Y4VT, the few asterisks going for non-s.a.b.ers.  
 As average skip shortens on 14 Mc., more and more DX  
 appears to be fleeing downward to dodge U. S. phone sub-  
 band QRAL. And they're heading for more spacious 15 and  
 16, perhaps.

Next month we'll have the DX story on other bands,  
 (15 phn) Ws 2DY 3HKN 4YOK 8MLX, K1ZJA, Was  
 4WTP 8CGN 8MGD 9MQI, WB2s LBJ LDX SCK,  
 VZ7 J: (15 c.w.) Ws 1CNU 2BAI 3HKN 3JZJ/9, Ks  
 1ZJA 3VME 5MHG/6 901Y, Was 1 EYF 5EQA 8CGN  
 8MCC 8MGD 9MQI, WBs 2LBJ 2LDX 2UHZ 61EX,  
 WNs 4RVS 508Y 5PUQ 68AZ 7FLR 8TYF: (40 c.w.)  
 Ws 1AYK 2JHL 3HKN 8QXQ, Ks 1ZJA 2MVF 3FKU  
 8YSO 901Y, Was 8CGN 8MCC 8MTB, WBs 2LDX

2UHZ 2YVZ 6OLD, WNs 5PUQ 7FLR 9PQY; (80 c.w.) WISWX, Ws 6SLU 8MCQ 9MQI; (10 phone) WAs 2LDX 2VFA 4WIP 8SGN 9MQI, G3IDG, 11ER; (10 c.w.) W9TGN, WA2VFA, WB2LX, G3IDG, 11ER; (40 phone, 75, etc.) K1ZJA, WB6OLD and tuner Kilroy telling the tale, in addition to "How's" correspondents now pounding their mills Jeevesward. QTC? QRV!

**Where:**

**AFRICA** — "This station is going QRT early next year," writes G0IKL. "The QSL bureau will close at the same time." KOCER/1 of ARRL will advise us when a replacement Somalia bureau is lined up. . . . W1KE of Hq. learns that OK1PD has concluded 7G1A work. QSLs for that station should go via Czechoslovakia's CAV bureau. "If you've never received your QSL from 7G1A, send another," Dick urges. "Some were lost." . . . W7WLL, who has added FL8HM to his QSL responsibilities, is told officially by the U.S.P.O. that International Reply Coupons postmarked U.S.A. can be redeemed in this country only at post office branches of issuance. . . . W5KGJ, W/Ks-only QSL aide to 9Q5DS as of September 23, 1966, has a new address: 2112 Graham Av., Oklahoma City, Okla., 73127. Non-W/Ks can QSL 9Q5DS to J. DeBois, % OTRACO MECANO, P.O. Box 98, Kinshasa 1, R.C. . . . W7VRO became an honorary member of ARRL for outstanding QSL assistance rendered in behalf of ZS1XR. . . . W2GHK's DXpedition of the Month facility began dispensing 9J2BK confirmations in October. Stu still seeks ZD8AR logs for QSOs made on October 23-25, 1965.

**ASIA** — There is rhyme and reason to those U.S.S.R. Nine and Zero calls. K3KMO, courtesy W7MKW, relays the pattern from International Short Wave League's Monitor: UA9/UV9/UW9 A-B, KA-KB, Chelyabinsk; C-E KC-KD, Sverdlovsk; F-G KE-KG, Perm; H-I KH-KI, Tomsk; J-L KJ, Tyumen; M-N KM-KN, Omsk; O-P KO-KP, Novosibirsk; Q-R KQ-KR, Kurgan; S-T KS-KT, Orenburg; U-V KU-KV, Kemerovo; W KW, Bashkir; X KX, Komi; Y KY, Altai, UA0/UV0/UW0 A-B KA-KB, Krasnoyarsk; C-D KC-KE, Khabarovsk; E-F KF, Sakhalin; G KG, Khabarovsk; I KI, Magadan; J KJ, Amur; L-M KK, Primorsky; O-P KO-KP, Buryat; Q-R KQ, Yakutsk; S-T KS, Irkutsk; U-V KU, Chita; W KW, Krasnoyarsk; Y KY, Tuvinia; and Z KZ, Kamchatka.

**OCEANIA** — Accentuating the negative: WB2LX is informed there's no ZM7 in Cosmaria; in fact there's no Cosmaria in ZM7. . . . FAA's KG6APA tells WIBGD of ARRL that he's never used his KG6AGA label. . . . VK3CO assures K0VFN he has no connection with 9K2 confirmations. . . . W2GQY-W4ANL ran across an old batch of unmailed K6SRZ QSLs from his pre-WW-II Hawaiian days. The postage on each is conspicuous, a mere 1-center. Talk about the ravages of inflation — remember those two deliveries per day?

**EUROPE** — G3IDG, who gives many a 21-Mc. newcomer his first G. comments: "Your Novices seem to QSL direct 100 per cent. I find it difficult to get over to them the fact that DX stations cannot follow suit. As of October 3rd overseas postal rates from the U.K. have been raised, and it just is not practicable to QSL direct to WNs. We are not all of the landed rich, as most W/Ks seem to be (that's how it appears to others, I can assure you, when 15-year-olds air-mail QSL cards) and, while we are only too willing to QSL, it must be via bureaus." Verily, all DX-working U.S.A. stations should keep self-addressed stamped envelopes on file with their local ARRL QSL Bureau managers. G3IDG states a generally valid rule of QSL supply-demand. . . . W1DGT and SM6UU iterate that many SMs now are assigned the SM0 prefix, former suffixes remaining the same. "The change was made primarily because of the heavy SM5 QSL load." Wonder how the remedy is working out, especially for the beleaguered chap who inherited the SM0 QSL load! . . . ZB2AS informs W8BEK that ZB2 BB and F should be in

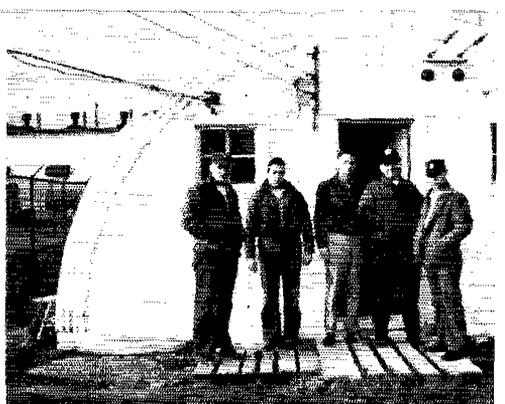
quotation marks. . . . NRRL's LA4ND verifies the prefix switch for Norwegian outposts, Svalbard (Spitzbergen, Bear, etc.) now is JW, Jan Mayen is JX, and Norway's antarctic area stations will sign 3Y calls. . . . The mailbox indicates that many of us are unaware that UT5 and UY5 are supplementary Ukrainian prefixes, and that UV and UW stations are simply new-style UAs. . . . W2GHK says GC2LU/p QSLs hit the post in mid-October.

**HEREABOUTS** — WIWPO of ARRL's busy DX Century Club Desk certifies W2CTN for a very special "DXCC". "Jack has been QSL manager for stations located in at least 100 countries. So far no one is able to come up with 'CTN-handled cards from a century's worth because a few are on the ITU/PCC Ban List. This 'DXCC' via Jack could eventually happen, though." . . . The month's "QSLers of the Month" turn out to be CN8FC, CP1BX, CRs 4AJ 6GO, CX9AAU, DL5HH, EL2AT, FP8CA, JA10A, KS4CC, OD5EJ, OE3REB, ON5DI/LX, OX4FC, SP8AVB, UC2BF, UH8BO, VK9GN, VP2KJ, YU3NP, YV5BXB, 9Q5LJ, 9Y4s LT and VU, all saluted in "How's" dispatches filed by W8QXQ. WAs 4WIP 5HEC 6B8O/1 8CGN 8MGD, WB2s UFN and WW1. QSL agents Ws 3HNK 4N1F 6LDA, K2s MGF and MYR also draw applause. Any especially quick QSL action you feel should be acknowledged here? . . . Al! The following italicized brethren hunt hints on prying pasteboards from reluctant mentioned: W1BP Y, AP5HQ, JT1AG; W1SZE, HR2HA '57, ST2DB '57, TF2WCK '57, VP5BL '58, VQ4GB '59, Z83J '59; W81FN, HL9KJ, VU2AJ, ZB2AR/mm, 6W8BL; W4RGR, UPOL-10; W1ABPG, FG7XL, KR6GF, XW8s AX and AZ. Got a gimmick? . . . Know of any overseas stations needing Stateside QSL help? Pray put them in touch with volunteers K2KTK, WAs 4UHK 4WRW 8AII, 9AQI and D. Krall, WA7FLR/6, 152 La Sonoma, Alamo, Calif., 94507.

**SOUTH AMERICA** — "Do not expect prompt QSLs from VP8/D of South Orkneys," cautions WA1DJG. "His mail service is necessarily slow." . . . WA6B8O/1 says the same for KC4VOS, a guest at Russia's Vostok antarctic outpost. "He won't be back until next April, so don't expect QSLs before then." . . . WB4EDD (ex-WN4YZC) advises, "QSLs for my operation as VP1DX can go via W4HGW, GMIT and GMD required, as well as s.a.e. with unaffixed postage." . . . Here's a good spot to restate that "How's" has no space to duplicate data already available in the *Callbook*, but listings may be repeated after six months or so if there is fresh evidence that the information remains useful. Now let's check specific items, bearing in mind that each is necessarily neither complete, accurate nor "official". . . .

- CE3CJ, V. Osorio, 1895 Julio Prado St., Santiago, Chile
- CO2RO/CO4, J. Horsky, Box e-22, Piestany, Czechoslovakia
- CO7HC, Box 64, Camaguey, Cuba
- CR6GO, A. Branco, Box 73, Luso, Angola
- CR6IX, P.O. Box 82, Nova Lisboa, Angola
- CTs 1QT 3AT (to W6ITD)
- CTs 2YA 3AU, Yasmé Foundation, P.O. Box 2025, Castro Valley, Calif.
- DL4/DL5 c/o MARS Radio Stn. Hq. 93rd Sig. Bn., APO, N. Y. N. Y. 09175
- E8AH1, T. Nonnekens, Parque Guajara 59, La Laguna Tenerife, Canary Islands
- EL9NB, Box 548, Monrovia, Liberia
- EP2GF (to W2NSD/1)
- ET3GB (via K5LRE)
- FL8HM (via W7WLL)
- GD3RWF (to G3RWF)
- HB0AFH (to HB9AFH)
- HI8IBA, P.O. Box 951, Santo Domingo, D.R.
- HK1QO/TJ8/am, H. Olarte, B.P. 5370, Douala, Cameroun
- HM1DM (via JA3AYU)
- HS4AK, A. Kosko, P.O. Box 11-121, Bangkok, Thailand

VK0MI recommends high-pass filters to indignant and dignified residents of Macquarie Island. They're always dressed for dinner. (Photo via G. Johnston, W1s BPY and WPO) At another isolated outpost, right, the staff of Adak's popular KL7AIZ takes time out for the camera — (left to right) K5OZL, WA4KJR, visitor K2QDN, WA2NPU and K3GAT.





9V1s JG and JW, left and right, teamed up with 9V1s LG NQ and NR to demonstrate amateur radio at Raffles School, Singapore, in early August. The Viceroy, AR-88 and a long-wire produced 23 countries and many W/Ks. (Photo via WB6BMW)

11s AMP/M1 CAQ/M1 SGS/M1, P.O. Box 22, Salerno, Italy

- I0RB (via W2GHK)  
 IPIJT (via I1CSG)  
 K1RNL/mm, R. Johnson, OE Divn., USS *Ranger* (CVA-61), FPO, San Francisco, Calif., 96601  
 K2DET/KV4 (to K2DET)  
 K4VOS (to K0YKJ)  
 KL7FRY, F. Cunningham (W8DGP), GE Co., APO, Seattle, Wash., 98736  
 KZ5GN (via W7VRO)  
 MP4DAN (to DJ4AB)  
 OA8AE, K. Branscome, Box 2192, Lima, Peru  
 OD5EJ (via SM0AIO)  
 OX4FC (to XPIAB)  
 PA9GT (to W6ITH)  
 PZ1BX, P.O. Box 2003, Paramaribo, Surinam  
 SP6SO (via WA1DJG)  
 SV1DS, J. Szuropoulos, Ekateo 20 St., Athens, Greece  
 SV0WL (via W3CJJK)  
 TA1s AV DS (via SM0KV)  
 TA2s BK FM YO (via DJ2PJ)  
 TF2AK (via W4AIA)  
 TF2WJN, W. Rogers, Box 47, FPO, New York, N.Y., 09571  
 TF2WJU (via W4VBB)  
 TR8AG, G. Vallier, B.P. 157, Libreville, Gabon  
 UI8BO (to OK1ADM via CAV)  
 UP2NV, Box 310, Kaunas, Lithuanian S.S.R., U.S.S.R.  
 VE3RIZ/SU, J. Argyie, CFPO 5019, Bellville, Ontario, Canada  
 VK2BIH (via W1BIH)  
 VK2BRF (via W1TX)  
 VP1DX (via W4HGW)  
 VP2GT, Box 21, St. Georges, Grenada, W.I.  
 VP8IQ (via CX2AM)  
 VP8JD, British Antarctic Survey, Port Staulev, Falkland Islands  
 VP9FC (via WA2VID)  
 ex-VQ1GDW (to CX9AAN)  
 VQ9AA/d (via W4ECI)  
 VQ9s BC/d TC/d (to VQ9s BC TC)  
 VQ9G (via W2GHR)  
 W22XY/KW6, P.O. Box 188, Wake Islands  
 W6BGT/KJ6, P.O. Box 444, APO, San Francisco, Calif., 96305  
 WA5NOA/VP9, P.O. Box 44, 1934th Comm. Sqdn., APO, New York, N.Y., 09856  
 XPIAB, R. Davidson, Box 142, 2001th Comm. Sqdn., APO, New York, N.Y., 09121  
 YAIDAN, E. Daniels, c/o U. S. Embassy, Kabul, Afghanistan  
 YA1NSD (to W2N8D/1)  
 YS1RCP (via YS1O)  
 ZD5G, C. Wintle, Box 434, Mbabane, Swaziland  
 ZF1EP (via W4PIG)  
 ZS1ANT (via SARI)  
 5A3TW, P.O. Box 2390, Tripoli, Libya  
 5N2AM, C. Rust, Box 9141, Lagos, Nigeria  
 5N2AA, S. Bedford, P.O. Box 3380, Lagos, Nigeria  
 6O1GB, G. Butler, c/o U. S. Embassy, Mogadiscio, Somalia  
 6O1KH (via IARC of Germany)  
 ex-6Y5BB, H. Stockwell, VE3BCU/W4, 1000 Marsh Rd., Charlotte, N. C., 28209

- 7Q7PBD (via W2GHK)  
 9A1DFD (to I1DFD)  
 9J2BK (via W2GHK)  
 9M6NQ, J. Wallich, Box 399, Jesselton, Sabah  
 9Q5DJ (W/Ks via W5KJG; see preceding text)  
 9Q5WE, P.O. Box 1559, Bukavu, R. C.

Ws 1ALP 1APU 1AYK 1BPY 1UED 1WPO 1YYM 2DY 2FX 2JBL 34NK 4CCB 5KJG 7VRO 8QXQ 9GFF, Ks 3FKU 3UMM 4PRT, WAs 4WIP 6BSO/1 6SLU 8GDR 8GCN 8PKG, WBs 2AMO 2UHZ 6JEX, W. Kilroy, DARC's *DX-MB* (DLs 1EP 3RK), DX Club of Puerto Rico *DXer* (K14RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4MVB), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WB2HXD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025) and VERON's *DX press* (PA0-FX LOU TO VDV WWP) supplied the preceding directory. Got some bitties for the kitty?

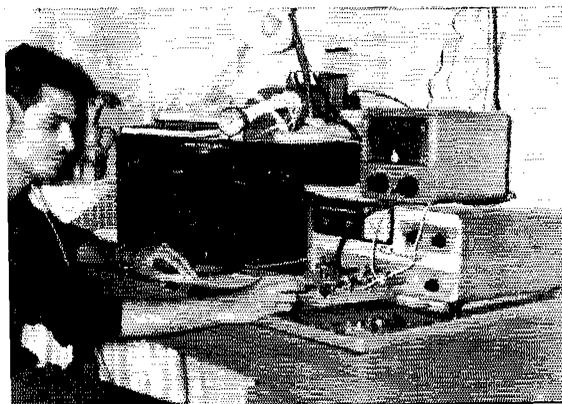
### Whence:

OCEANIA — W7FNE/mm writes encouragingly from Djakarta while aboard SS *Hudson*: "Arrived here in early September and I applied to local authorities for permission to operate my linear. Tonight, about three hours before sailing time they came aboard and said yes, it would be okay with them. Unfortunately, the necessary paperwork wouldn't come through before departure. Shucks! The official said next time I should come up and see him and he would let me on the air. Not sure when that will be, but watch for W7FNE/8E1 one of these days. Indonesia has turned an important corner and it's just a matter of time until they're on the DX bandwagon. I've helped them all I can with information, crystals and old QSTs. If some of you OMs would pitch in with dispensable ham literature, etc., to help them get started we'll all have a new country to work. You can write my friend at marine radio PK1-W. Donald, Djakarta Radio, c/o Gang Spoor IV-69, Djakarta, Indonesia. A few kind words from the States would be welcomed." — VK0MI was in East Melbourne Hospital the end of Oct. and is QRT through the end of the year. W1BPY says his WAS hunt for N. H., R. I. and Vt grows desperate. You rare New Englanders may find Col around 14,080 kc. during the wee hours Pacific patter via the clubs press: VKs 4SS and/or 5XK anticipate Lord Howe isle action about now on 20, 40 and 80 meters. . . . VK5NO watches for the States on 1802 kc. at 1045-1200 GMT. H18XAL, KL7FRY and ZD7RII are other roodies heading for 160. . . . ZL1HW's log lists some nine thousand different W/Ks. . . . VK9AM plays hard to get from Nauru on 21-Mc. a.m. but W4CHA plans to help VK9RH unrarify Norfolk island for a few months.

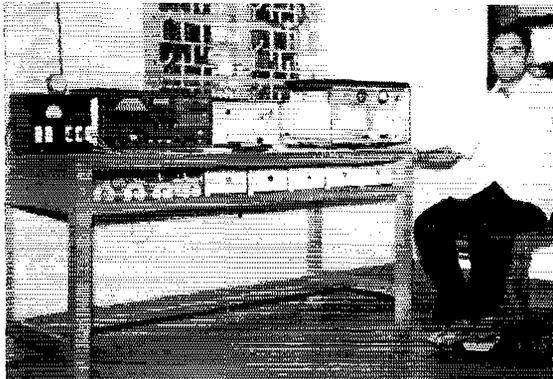
ASIA — Boy Scouts go hand in glove with amateur radio wherever they may be. For example, WB6BMW reports 9V1JG officiating as 9V1SF at a recent Singapore Scout Jamboree, working DX on 20 and 40 phone and c.w. . . . More reciprocity news from WA6TCY: 4X40C/W6 fired up in late August for six fast countries including QSOs with the homeland, 4X4s HL and DK. MP4DAN is quite popular from Das island on 15 s.a.b. . . . HS1AK is said to be HS1AK's new tag, an item still off limits for W/K/VE/VOS and other International Telecommunications Union signatories.

AFRICA — W6ITH claims the first Madeira reciprocal A license for a Yank, UT3AT. Reg also holds CT1QT and PA9CT credentials. . . . Peace Corpsman WA6LBP writes, "Guinea is becoming rare again, for the government issued no new licenses for the past year. The only two licenses here at present are 7G1s L and IX (OK3LX), both inactive." As W1IKE confirms, former 7G1A is back in Czechoslovakia. . . . HK1QQ signed portable-TJ8 for a spell with hopes of claiming TJ8QQ and other rare African tags. W9GFF nailed Herman as HK1QQ/TJ8/am. . . . W2GHE says VQ9G is K0BKW, ZD9BE signed special Tristan call ZD9A for a spell, and Q7PBD is back with Malawi friends. . . . Afrigrams via literature of aforementioned clubs and groups: A British scientific team may keep VQ7s HY and/or VY available from the Aldabras into next year. . . . VQ8AI's recent absence was due to a blitzed power transformer. . . . 5N2s AAW and AAX made good their Danomey threats as TY2BC in October.

FL8HM, who favors 15- and 20-meter DXing, resides permanently in Djibouti as a government communications supervisor. (Photo via W7WLL)



VU2JN catches his share of DX with an S-40, v.f.o. 50-watter and dipole. Jayaram teaches at Trivandrum College of Engineering, site of this tidy layout. (Photo via WA6SLU)



... ZS3XG is well-traveled DJ7XG. ... NT1AC took a very dim view of those October 20-s.s.b. pile-ups.

**EUROPE** — "I'll be on Crete for two years," announces E SVØWL (W3CCL). "I plan a lot of hamming — s.s.b., RTTY and some c.w. At present I'm using a 328-1, 758-1, Model 19 and ground-plane. A tower, beam and linear are coming up. I operate 20 and 15 mostly but 10 is checked regularly. On week ends watch for SVØWL around 2000 GMT, 14,300-14,330-ke. sideband or 14,090-ke. radioteletyp." You may have worked Bill previously as DL5CL. . . . . Jellystone Park officials point out that SMØKY is not on Bear Island. [Yvyrick, Boss. — Jeeves] (You're not always so funny, either, Jeeves.) Anyway, if you work three members of the Swedish Railway Radio Club whose membership includes fifty hams in seven SM call areas, you'll earn a fancy sheepskin called SVJF. Full specs are available from SM.3WB. . . . . Blaupunkt-Werke (AMB), the prominent German firm, makes available a handy eight-page booklet for recording DXCC, WAS, etc., progress. DL7CW says they're gratis; just write the outfit at 32 Hildesheim, Postfach, Dept. BTG, Germany. . . . . EA8AH, via W4CCB, says five EA8 QSOs between December 20, 1966, and March 20, 1967, may qualify a W4KVE for the Tenerife Eternal Spring award. QSOs must include exchange of the previous day's minimum and maximum local temperatures, a tricky switch. One lucky e-trant might even qualify for a paid trip to EA8-land if plans work out. Check details with Tenerife Eterna Primavera Award, P.O. Box 215, Tenerife, Canary Islands. . . . . That was HB9AFH signing HB9AFH in Liechtenstein with fast c.w. contest action in November. . . . . His AAI and SGS lugged RTTY gear to San Marino in August for keyboard-style DXpeditionary work. W2FX tells W1LVQ that many W4s were worked. . . . . G3-DDG has QSO'd 150 Novices in 22 United States on 21 Mc. Allan tiles a plea for shorter CQs and more careful listening by WNs, as well as brief initial transmissions confined to log essentials. KN, incidentally, means no callers, please. . . . . 1HRB caused early October DXCitement as 10RB in a United Nations neutral pocket. . . . . A European s.s.b. net on 7046 kc. is directed by GW3AX. VERON's DXpress says breakers from all continents, phone or c.w., are entertained.

**SOUTH AMERICA** — There's cozy coexistence far south of the border where Yank KC4VOS is based with the Russian Antarctic Expedition at Vostok station, WA6BSO/1 finds him rolling through around 14,227 kc. at 0230 GMT and says he'll be there well into '67. . . . . WA1DJG learns that VP8JD, South Orkneys, should be workable on 14,031 kc. for another year or more. Steve's with the British Antarctic Survey team. . . . . Enzo Sommaruza, jr., son of the late CX2AJ, is determined to reactivate his father's famous call on DX bands. FB, OM! . . . . . WB1EDD writes, "I'm planning a trip to British Honduras this month and have been assigned the call VP1DX. I'll use c.w. on 160, 80 and 40 meters at night, concentrating on higher bands during the day. I'm expecting to work a batch of 80- and 40-meter Novices and will also try s.s.b." Ben will

stay with VPIPV. . . . . Southern addenda via club news sleuths: KC4USB of Byrd station occasionally shows on 14,222 kc., 0700 GMT. . . . . Easter's CP8AC surprises guys on the low brink of 20 and 40 c.w. around 0100 GMT. . . . . LU6ZC puts Deception Isle on 7012 kc. at 0700 or so, while LU5 IZG and 2ZG give VP8EG local QRM on 20 and 10 c.w. on South Orkneys. Elsewhere the VP8 situation shapes up as IJ1 IQ JA on 14-Mc. c.w., IJ2 20 a.m., CW 7- and 14-Mc. s.s.b. from the Falklands; 1K IN IU IY on c.w. in the antarctic vicinity; and 1V due to offer 20-meter cude from South Shetlands this month.

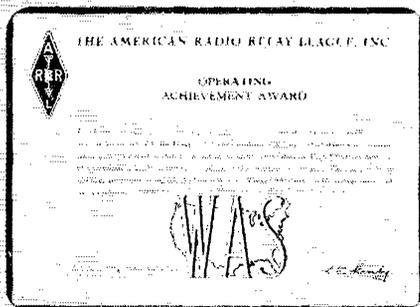
**HEREABOUTS** — GY5BB, big multiband noise from the Caribbean for some time now, goes back to VE3-BCU/W4 in Charlotte this month. Doc will wish he had that call back when pile-ups get rough. . . . . W7FNE/rmn, after a round-the-world swing aboard SS Hudson, remarks, "I maintained skels with K3JH every day on 14,030-ke. c.w. This may be some sort of record for one-frequency DX. I ran about 750 watts to a simple vertical, so the secret must be Joe's big-bertha antenna. I copied K3JH fine business near North Borneo when he forgot to turn on his final." (These grounded-grid rigs have advantages, Jeeves.) [Not necessarily, Boss — you never could get push-pull '10s neutralized. — Jeeves] . . . . . New-comer VP9FC hopes to provide more than his share of Bermuda phone contacts on 10 through 75. . . . . K2MFY signs up with the giant-killers by working good stuff on 7 Mc. with his 45-watt Adventurer and inverted vee. . . . . DL1CR/W3 figures he's probably the first U.S. reciprocity licensee from his country. "Been working from W3APO, Lancaster, but I hope to be on the air soon with my KWM-1 and doublet on 15 meters." Fritz signed DL1CR/LUX in '56, also OE9YZII earlier this year. . . . . WA5HEC, Columbus, Miss., finds his state still in heavy demand among the overseas crowd. Ken's 100 watts and two-element dual are available for schedules. . . . . October activity by FP8s CS and CY helped commemorate St. Pierre & Miquelon's 150th anniversary of French affiliation. . . . . K1CAH and W4PIC are mentioned in conjunction with October's ZFIEP effort. . . . . VPIs AD JM RC and TC all frequent 14,332 kc. at 2000-2300 GMT. . . . . Ws 1BGD, 1BPW, 1PFA, 1WPO, 1YAL, K1AMP, W3s GBK and SAW were programmed for the lively 16th annual New England DXCC meet at Waltham early in November. QST

## Strays

### Stolen Equipment

An LK-2000 Linear Amplifier was stolen from a parked trailer at the recent sideband convention at the Newporter Inn, Newport Beach, California. A manufacturer's prototype, it carries the trade name "BTI," Serial No. 1743. A reward of \$200 has been offered for information leading to its return. Brad Thompson, P.O. Box CCCC, Indio, California 92201.

Worked any Novices lately? W4KN had fun working and confirming Novices alone for his WAS. This was only the second time this has been accomplished and certified (W1WPO did it about 13 years ago). W4KN's certificate dated October 20, 1966 bears the number 17,326, an indication of the continuing popularity of the League's WAS Operating Achievement Award.





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
 LILLIAN M. SALTER, WIZJE, Administrative Aide    GEORGE HART, WINJM, National Emergency Coordinator  
 ROBERT L. WHITE, WIWPO, DXCC Awards    ELLEN WHITE, WIYYM, Ass't. Communications Mgr.  
 GERALD PINARD, Club Training Aids    PETER CHAMALIAN, WIBGD, Communications Ass't.

**Big Seasonal Traffic Expected from Viet Nam.** Just about a year ago the first MARS channels were opened to Viet Nam. March, 1966 *QST* (page 94) carried the story. It was stressed that whenever any of the messages are transferred from military to amateur channels the re-file must bear VIET NAM VIA MARS in the preamble, so the origin and proper handling may be apparent to all. (There are no provisions for third-party interchange on amateur channels with this country.) The exact procedure necessary in making a refile from MARS to Amateur message form also was indicated in March *QST*.

As of this December we report that the three services have continued to operate and expand the number of Military Affiliate Radio System stations active in this morale sustaining work. According to latest accounts there are now 35 stations in VM in the operation . . . some four times the early traffic capability. All things point to the expectation that there will be a very heavy volume of Christmas and New Year Greetings from the lads overseas. To make service from overseas as good as possible, the services, while welcoming message filings from the families and close friends of servicemen, suggest that amateurs and MARS members *not* solicit publicly or unnecessarily for such traffic originations, with a view to avoiding the overloading and delayed service that would be expected from unwarranted soliciting of traffic.

In making a delivery of any traffic from service personnel, may we again urge operators to use utmost tact and thought in order not to cause any alarm or concern. Instead of just the terse announcement that you "have a message" it is better to say, "I have greetings . . . from Viet Nam for you." The services are suggesting the fullest use of our ARL-texts to keep messages concise, so that more traffic handlings can be completed in the time the frequencies are open for communication, and more people served.

**New . . . MTX Numbers Will Expand Fixed Texts Available To Servicemen.** The Chiefs MARS USA, USN and USAF have adopted several new and additional fixed text messages and formally asked ARRL to include such messages in its group of numbered texts. The League is honored that its basic ARL-texts have become a generally useful instrument for home-contacts and with the first 1967 reprinting of our CD-3 (Numbered Texts) plans to

add the following new texts, exactly as put forward by the Joint MARS Panel. These are identified as MTX (military group) numbers. To avoid confusion the distinguishing numbers are in the same continuing series they will bear when they become part of the ARRL CD-3 Numbered Radiogram List. (Category VII. Military will be added to the present texts: I. Relief-Emergency Use. II. Thanks or Social Messages. III. Anniversaries. IV. Weddings and Birthdays. V. Greetings and Seasonal and VI. Miscellany.)

We publish herewith the new list of texts and the distinguishing numbers that in *either* MARS or amateur channels may denote the full meaning indicated. The purpose of immediate publication is to permit the widest use feasible, at the earliest, and so that on the MARS circuits at least, these meanings can be thus transmitted, saving circuit time during the holidays.

Number	Text
EIGHTY SIX	Everything well here. Hope all well there. Will write later.
EIGHTY SEVEN	Send . . . . .dollars as soon as possible.
EIGHTY NINE	Am sending . . . . .dollars immediately.
NINETY	Arrive at . . . (place) . . . safely. Will write as soon as possible.
NINETY ONE	I am in the hospital and receiving excellent care. Will write soon. Don't worry. My new address is . . . . .
NINETY TWO	Please arrange quarters for . . . . . days.
NINETY THREE	Have been reassigned to . . . . . Will write as soon as possible.
NINETY FOUR	Will travel on temporary duty orders to . . . (place) . . . on . . . (date) . . .
NINETY FIVE	Will arrive . . . (place) . . . on . . . (date) . . .
NINETY SIX	Send no further mail. Will send new address soon.
NINETY SEVEN	Leave granted. Should arrive on . . . . . (date) . . . . .
NINETY EIGHT	Leave denied. Will write later.
NINETY NINE	Please arrange transportation to meet me.

Precaution: Where NUMBERS fill out or complete any MTX text, *figures* must be used, avoiding confusion with MTX/ARL designators which are always spelled out.

MARS use of the new MTX fixed texts was effective 1 November 1966. While decoding can take place prior to re-file into amateur circuits, as it always must on amateur channels if a receiving amateur *does not have* the ARL-list (from CD-3) the numbers can be used, as above, if a receiving station has available this December *QST* list of MTX-numbers. If and when handling on amateur circuits, and

referring to the above list without decoding, all traffickers may use MTX just as ARL is ordinarily used . . . with MTX-substituted carefully for ARL in the CD-3 procedure for handling all numbered text messages in amateur-band work.

**Holiday Suggestions; Use Those NCEFs.** The National Calling and Emergency Frequencies base their claim to your attention on the fact that thousands of amateurs constantly are tuning back-and-forth across the designated spot frequencies 24-hours a day. The easy (and reliable) way, if you send your Thanksgiving and Christmas messages early, is to file 'em right now to send from your personal station via your SECTION NET. An alternative way is to use the NCEFs, 3550-, 3875-, 7100 kc., and 29.64- 50.55 and 145.35-Mc. (the full-time NCEFs) to find stations at specific points in the states other than your own. Also 7250- 14050- and 14225 Kc. are useful NCEFs. All of them ought to be kept busy, every day, and used properly and to the full, by every amateur, between the nightly Section-Net sessions that you can know about by consulting the Net Directory or Station Activities in QST.

How to Use the NCEFs? For the first 5-mins., every hour you don't! Whatever your interest refrain from transmitting then. (This is the time for listening at these points for emergency *only* calls.) Right after, and at all other times, send *directional* Qs, calls with your traffic lists, of the destination points of your traffic. This is designed to be the way, on these frequencies, to get a taker at or near any W/VE destination. When you get a taker, for traffic or rag chew, who answers on this NCEF, both stations should move to another agreed upon frequency for handling the traffic or further conversation. That leaves the NCEF clear for *first calls*.

**Suggestion to Traffic Netters.** The NCEFs are for you too! "The net" is a prime means of operating with fun and efficiency and will remain your first responsibility. But think how traffic can be supplemented, and some obtained for delivering in your state, if you make a point of doing what all amateurs are asked to do for emergency and disaster monitoring. Put a receiver on the appropriate NCEF and constantly bend an ear, whenever you are home or in the shack.

**Sending Your Radio Greetings for the Holidays.** Don't let this holiday season go by without remembering the distant friends by radiogram! As the Postmaster General says, "start them early." Unless your daily amateur work is in the traffic group, you should put your message(s) in standard form, either by filling out the spaces on an ARRL message blank, consulting the text of *Operating an Amateur Radio Station* or the convenient *Operating Aid No. 9A* (gratis from ARRL).

**How to Start Your Traffic.** Your Section Net, whose frequency and time of operation is given in the ARRL Net Directory, can most often solve any slight problem of a reliable

handler for routing your traffic. (Any OVS, ORS or OPS should be glad to arrange for drafting and originating any traffic through his station for anyone *not* on the air!) But we're on the air; how to do it? An hour or two before the time for net operation you tune up quietly on the net frequency, so not to bother anyone. When the NCS comes on at net time, call in, during the roll call or in answer to the general net call. When recognized just give the number and destinations of messages. Give the city, if in your state. Cover all distant points by merely saying you have "thru" traffic. The NCS will tell you to stand by, and then or later, tell you which station to give your traffic to. The message can be considered on the way, once you have cleared with the station you are paired off with, and the operator receipts (R) for the message. Enter this call and the time and date (handling data) right on the message for the record. In receipting the operator has pledged his responsibility to see the message on its way accurately as speedily as possible.

Other Methods: Yes, you can make a project, on the air out of combing the bands for a dependable station near the destination for your

## BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Sept. Traffic:

Call	Orta.	Recd.	Rel.	Del.	Total
K6BPI	4561	2595	2430	165	9751
W3CUL	452	1297	1203	71	3023
K5FBE	142	996	995	1	2134
K0ONK	115	859	837	12	1823
W7BA	7	652	603	45	1307
W6RBY	140	533	314	140	1157
W6GYH	125	521	502	6	1154
K6BET	5	552	440	112	1109
W3EAL	79	438	546	9	1072
W1PFX	134	505	398	27	1064
W0LGG	20	516	451	27	1014
W7DZX	3	482	420	5	910
WB6QNY	26	409	333	53	821
W45HON	0	393	393	0	786
W6ZJB	15	336	331	85	767
W7HMA	17	334	329	8	688
K3MYS	125	296	252	12	685
W3VR	93	297	261	7	658
W44RQR	7	475	132	25	639
W44GK	27	303	288	5	623
W6WJP	79	314	173	71	567
W9JUF	12	314	235	4	565
W7LQE	18	339	270	20	547
W8RYP	19	267	226	35	547
W6EOT	3	274	267	0	544
W6HGE	46	317	293	16	542
W6WQ	25	267	245	0	538
W5ORJ	12	2	260	258	62
K7FCY	15	262	214	41	532
WA9CCP	219	173	132	2	526
WB2HZY	28	248	211	34	519
W6MLF	9	256	245	8	518
WB2ORL	18	248	233	6	505
WA7DXL	238	209	20	29	505
Late Reports:					
W4LEV (Aug.)	195	396	303	88	982

### More-Than-One-Operator Station

K6MCA	28	314	301	13	656
BPL for 100 or more originations-plus deliveries					
WA4BMC 235	W40GG 134	WA6QQM 114			
W4PQP 190	W1TXL 132	W4RFA 106			
WA3ATQ 184	W44HJM 131	W44AJY 102			
W22VYS 154	W9ANR 130	K9PBA 102			
K5FRH 153	W7PI 123	Late Report:			
WA4FEM 75 150	WA6GSA 123	WA9CJU (June)			
W4ILE 144	WA5AGN 114				113
K7CTP 138	WA6EDN 113	WA4PDM (Aug.)			
W2OF 136	K5MJY 112				106

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: WA2UPC, K6IOV, WA6CFJ, WA0LAW.

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCAL a message total of 500 or a sum originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

message, if you enjoy casual operating and insist on handling the message direct, instead of by systematic relaying. But this is often considered less practical than the experience of using the organized nets and their NTS interconnection. We would suggest using the established c.w. and voice nets, the *organized* amateur way to handle formal message intelligence, rather than chance it to those with main interests in other directions than traffic. Best of success with your amateur operations in the Holiday Season.

— F. E. H.

### ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Iowa	Owen G. Hill, W6BDZ	Aug. 17, 1966
Western New York	Charles T. Hanson, K2IHTK	Aug. 17, 1966
Idaho	Donald A. Crisp, W7ZNN	Aug. 17, 1966
Maritime	J. Harley Trimmer, VE1MX	Oct. 10, 1966
Nevada	Leonard M. Norman, W7DPV	Oct. 22, 1966
New Hampshire	Robert C. Mitch-III, W1SWX	Oct. 25, 1966
San Francisco	Hugh Cassidy, W6AUC	Nov. 19, 1966
Delaware	John Thompson, W3BCD	Dec. 10, 1966
Southern Texas	G. D. Jerry Sears, W5AIR	Dec. 10, 1966
Mississippi	S. H. Hairston, W5EMM	Dec. 15, 1966
Alabama	Edward L. Stone, K4VHW	Dec. 26, 1966

In the Northern Texas Section of the West Gulf Division, Mr. L. L. Harbin, W5BNG, and Mr. Spero J. Spiro, W5PCZ, were nominated. Mr. Harbin received 338 votes and Mr. Spiro received 275 votes. Mr. Harbin's term of office began Sept. 12, 1966.

### CLUB COUNCILS AND FEDERATIONS

Amateur Radio Council of Arizona, Gary M. Hamman, W7CAF, Secy., 1420 E. Missouri Ave., Phoenix, Ariz. 85014.  
Chicago Area Radio Club Council, Inc., Karl Kopetzky, K9AQJ, Secy., 1052 Loyola Ave., Chicago, Ill. 60626.

Federation of E. Mass. AR Assns., Eugene H. Hastings, W1VRK, Secy.-Treas., 28 Forest Ave., Swampscott, Mass.  
Los Angeles Area Council of ARCs, Inc., Gene M. Kistler, W6GKZ, Secy., 10218 10th Ave., Englewood, Calif. 90303.  
Michigan Council of ARCs, Evelyn R. Penny, W8HYL, Sec., 17422 Kinloch, Detroit, Mich. 48240.

Ohio Council of ARCs, James W. Benson, W8OUU, Secy., 2463 Kingspath Dr., Cincinnati, Ohio 45231.

Puget Sound Council of ARCs, Herb Graham, K7ZEP, Secy., 12030 — 68th Ave., So., Seattle, Wash. 98178.

Radio Soc. of Ontario, Inc., A. MIFEN, VE3RX, 95 Lord Seaton Rd., Willowdale Ont.

San Diego Council of Amateur Radio Organizations, Inc., D. Decker, W6TAD, Secy.-Treas., 5901 Streamview Dr., #3, San Diego, Calif. 92105.

Tulsa Council of Amateur Radio Clubs, Larry Russell, K5ZCJ, Secy., 11322 East 4th Place, Tulsa, Okla. 74128.

### A.R.R.L. AFFILIATED CLUB HONOR ROLL

Honor Roll clubs are those whose *entire* membership consists of members of the League.

June '66 QST, page 100, has already appeared with the first section of our Honor Roll. We're now happy to print a second list with additional names. All affiliates showing 100 per cent ARRL membership according to their Club Report sent in in early '66 are included in these two annual listings. Each year our listings are most largely compiled from data given us in or supplementing the current Club Annual Report (CD-18) forms. Next February we plan again to forward to every active ARRL-affiliated radio club the form for new annual filings. This is then examined in connection with the Board's 51 per cent requirements for continuing affiliation and also for further QST 100%-listings.

We're proud to present a list of the Honor Roll clubs that will receive our 100% ARRL Club certificates.

Amateur Radio Tech. Society of St. Louis, Mo.  
Bandhoppers Radio Club, Ferguson, Mo.

Binghamton Amateur Radio Assn., Binghamton, N. Y.  
Central Indiana Mobile Radio Club, Beech Grove, Ind.  
Chetimachi Amateur Radio Club, Thibodaux, La.  
Chisholm Trail Amateur Radio Club, Inc., Duncan, Okla.  
Fort Venango Mike and Key Club, Seneca, Pa.  
Las Vegas High School ARC, Las Vegas, Nev.  
Magic Valley Radio Amateurs, McAllen, Tex.  
The Mike and Key Club of Greenville, S. C.  
Norfolk County Radio Association, East Walpole, Mass.  
Order of Boiled Owls, West Hempstead, N. Y.  
Prairie Amateur Radio Club, Galesburg, Ill.  
Rome Radio Club, Inc., Rome, N. Y.  
Santa Clara County AR Assn., San Jose, Calif.  
Society of Amateur Radio Operators, Inc., Castro Valley, Calif.  
South St. Louis Amateur Radio Club, Webster Groves, Mo.  
Washington Radio Club, Washington, D. C.  
Windblowers VHF Society, Inc., North Caldwell, N. J.

### ELECTION NOTICE

To all ARRL members 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 received at ARRL on or before 4:30 p.m. 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, zip code and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

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.

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code to facilitate checking membership.)

Communications Manager, ARRL [Place and date]  
225 Main St., Newington, Conn. 06111

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.

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
Santa Barbara	Dec. 9, 1966	Cecil D. Hinson	Aug. 10, 1966
Colorado	Dec. 9, 1966	D. R. Crumpton	Feb. 14, 1967
Sacramento Valley	Dec. 9, 1966	J. F. Minko, III	Feb. 25, 1967
Eastern Florida	Dec. 9, 1966	Albert L. Hamel	Feb. 25, 1967
Orange	Dec. 9, 1966	Roy R. Maxson	Mar. 1, 1967
Northern New Jersey	Dec. 9, 1966	Edward R. Erickson	Resigned
North Dakota	Jan. 10, 1967	Harold L. Sheets	Mar. 8, 1967
Missouri	Jan. 10, 1967	A. E. Schwaneke	Mar. 11, 1967
Maine	Jan. 10, 1967	Herbert A. Davis	Mar. 12, 1967
Minnesota	Jan. 10, 1967	Herman R. Kopschke, Jr.	Mar. 15, 1967
North Carolina	Feb. 10, 1967	Barnett S. Dodd	Apr. 10, 1967
Michigan	Feb. 10, 1967	Ralph P. Thetreau	Apr. 10, 1967
British Columbia	Feb. 10, 1967	H. E. Savage	Apr. 10, 1967
Alberta	Feb. 10, 1967	Harry Harold	Apr. 10, 1967
Washington	Feb. 10, 1967	Everett B. Young	May 3, 1967
Los Angeles	Mar. 10, 1967	H. G. Garman	May 18, 1967

**DXCC NOTES**

Reference is made to the DXCC Note, page 90, January 1966 QST. Announcement was made therein of the addition to the countries list of Ebon Atoll (HC) and Cormoran Reef (TI). The action was based primarily on authorizations issued by recognized representatives of the Ecuadorian and Costa Rican governments. Information developed subsequently indicates that the named countries claim no jurisdiction and that the authorizations were invalid. Accordingly, there was no choice but to revoke the earlier action and delete the two locations from the countries list.

Because of the unusual circumstances surrounding this activity, a more detailed explanation is in order.

In the summer of 1965, Charles W. Swain, K7LMU, and Donald A. Miller, W9WNV, among others, were planning a DXpedition to the South Pacific. They noted that some maps (e.g., Rand McNally 1963) showed Cormoran Reef as under the jurisdiction of Costa Rica and Ebon Atoll as under the jurisdiction of Ecuador. On July 25, 1965, in a letter to Swain, the Consul of Costa Rica in Los Angeles authorized operation on Cormoran using the call K7LMU/TI9C, provided the amateur radio rules of Costa Rica were observed. On July 26, 1965, by a similar letter, the Consul of Ecuador in Los Angeles authorized operation on Ebon using the call K7LMU/HC8F, adding, "Since this is sovereign territory of Ecuador, you will abide by the regulations of amateur radio in Ecuador during your operation."

Copies of the letters were mailed by the amateurs involved to the Federal Communications Commission with the request that, if acceptable, they be forwarded to the ARRL Awards Committee. Upon receipt of the letters from FCC, the Committee considered all information then available, including the maps and the copies of authorizations from the named consuls. The Committee particularly noted the statement that the consulates had contacted Quito and San Jose, respectively, to obtain operating permission. The Committee thereupon acted to add the two islands to the countries list, and announced the action in January 1966 QST. Based on this action, the DXpedition plans were completed and several thousands of amateurs were provided with new-country contacts.

Subsequently, it was determined that the maps relied upon were inaccurate, that the consuls had mistakenly issued the authorizations, that they had not checked with their home administrations as claimed, that the two areas are actually within the United Nations Trust territory and under United States Administration. After learning of these most unfortunate errors, the Awards Committee reluctantly concluded that Cormoran Reef and Ebon Atoll do not meet

the criteria for separate status recognition and that they must be withdrawn from the list. To rule otherwise would have resulted in lowering the stature of the countries list. It, deeply regrets no credit can be given to those who spent many hours attempting contacts on the basis of the original announcement.

The ARRL Executive Committee, at its late-September meeting, was in receipt of a request from W9WNV to review the action of the Awards Committee. After extensive discussion, the Executive Committee found no basis on which to remand the question to the Awards Committee.

In view of numerous requests for clarification on what country confirmations from KX6SZ/Ebon might be claimed for, and inasmuch as Ebon has been shown to be part of the Marshall Islands (KX6). DXCC credits for KX6SZ/Ebon confirmations may be claimed for Marshall Islands only.

**DX Test Feedback**

The major goof this year is the error concerning the score of WA6UUS (now W6EWN). His c.w. score was erroneously disqualified and should have appeared as the second high East Bay code total with 185,801 points. Additionally, this raises the Northern California DX Club total aggregate to 4,798,268 points. Our sincere apologies, Lindy. Additionally, WA2UWA should have appeared in the countries/band box with a total of 31 countries on 80 meters. A transcription error resulted in an incorrect score for the Louisville's Active Radio Operators Club of Kentucky. Their aggregate score should have appeared as 823,361.

(Got your DX Test logs yet? New more convenient logs and the necessary dupe sheets are ready and waiting.)

**SUGGESTED  
OPERATING FREQUENCIES**

**RTTY 3620, 7040, 14,090, 21,090 kc.**  
**WIDE-BAND F.M. 52.525 146.94 Mc.**

**GMT CONVERSION**

*To convert to local times subtract the following hours:*

ADST -3, AST -4, EDST -4, EST -5, CDST  
-5, CST -6, MDST -6, MST -7, PDST -7,  
PST -8, Hawaiian -10, Central Alaska -10.

A convenient conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

## DX CENTURY CLUB AWARDS

The annual December listing for the DXCC and the DXCC Honor Roll cannot appear in this issue due to unusual workload and administrative circumstances. The annual list and the Honor Roll will appear in the January issue of QST.

From September 1 through September 30, 1966, DXCC Certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

### New Members

K2MGE...315 K9ECE...310 W2GQN...302 DTZG...270 XEICE...262 W6NWZ...246 K4IKR...244 K2KER...243 JA4BJO...237 K3UZY...232	WB4BMV...162 1L1CL...149 W4SALB...142 W49NC...141 SM5BFJ...140 K4LFC...130 W47BOB...129 JA1GTF...125 W4TXE...123 W4NML...120	YU1ST...116 K5YAA/VO1...112 W1AA...112 W47BOA...111 DL2DK...110 O8KDM...110 K1OTA...109 W8XG...109 K1LMS...108	K4AVC...108 OH0VF...108 WA4VAL...108 P2RJK...106 W4SMU...106 DJ4VX...105 K1WJL...105 W45HEC...105 DL1DAA...104 VE8AQL...104	SM6CPG...103 WB2PXU...103 DM2BYN...102 HB9AGO...102 W6HFC...100 HM2BD...102 SP9RB...102 W1DAY...102 K2HWF...101 K3OIO...101 WA0HMP...101	G3OLN...100 K4BP...100 K4ILW...100 W78FX...100 W78FF...100 WA8NQC...100 WA9JDT...100 W6DCP...100 WA0BSZ...100
--	---	--	--	--	---

### Radiotelephone

VK6MS...325 W2GQN...282 W4GZIQ...229 W2MVR...207 W6EUF...201 JA4BJO...197 WA9GSW...165	KH6BB...162 DL2DM...158 1L1CL...146 VE3WQ...136 K4LFC...128 W2ESC...120 W4TXE...120	W6ABJ...118 K5BXG...111 W1AA...110 W4TRG...109 W0YDB...109 DL9CQ...108 JA4ZA...107	K9VWY...107 SM6AMD...107 K0SPH...105 W6OMR...104 W18ER...103 K1TYD...103 W8BRL...103	HM2BD...102 LA4IJ...102 W4T2T...102 W1DAY...101 W18ER...101 WB2BE...101 DJ6VH...100	K3RPY...100 BX6BW...100 PA0POB...100 WA3AFO/4...100 W6MRU/4...100 W7HLH...100 W7ZPV...100 WA0HMP...100
--	---	--	--	---	---

## A.R.R.L. ACTIVITIES CALENDAR

Dates are shown in GMT

Dec. 2: CP Qualifying Run — W6OWP  
 Dec. 14: CP Qualifying Run — W1AW  
 Jan. 5: CP Qualifying Run — W6OWP  
 Jan. 7-8: V.H.F. Sweepstakes  
 Jan. 11-15: CD Party (c.w.)  
 Jan. 17: CP Qualifying Run — W1AW  
 Jan. 21-22: CD Party (phone)  
 Feb. 3: CP Qualifying Run — W6OWP  
 Feb. 4-5: DX Competition (phone)  
 Feb. 4-19: Novice Roundup  
 Feb. 10: Frequency Measuring Test  
 Feb. 15: CP Qualifying Run — W1AW  
 Feb. 18-19: DX Competition (c.w.)  
 Mar. 4-5: DX Competition (phone)  
 Mar. 18-19: DX Competition (c.w.)  
 June 10-11: V.H.F. QSO Party  
 June 21-25: Field Day

Dec. 3-4: N. E. QSO Party, Connecticut Wireless Assn. (p. 126, last issue).

Dec. 4, 18: 160 Meter Tests (p. 101, last issue).

Dec. 10-11: New Hampshire QSO Party, Nashua Mike and Key Club (p. 130, last issue).

Dec. 10-11: Zero District QSO Party (p. 103, this issue).

Dec. 17-19: Ohio QSO Party, Upper Arlington Radio Club (p. 113, last issue).

Jan. 7-9: Va. QSO Party, Roanoke Valley Amateur Radio Club (p. 116, this issue).

Jan. 23-29: La. QSO Party, Lafayette Amateur Radio Club (next issue).

Feb. 10-12: QCWA QSO Party (next issue).

Feb. 11-12: Me. QSO Party (next issue).

## CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Dec. 14 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Dec. 2 at 0500 Greenwich Mean Time on 3500 and 7129 kc. **CAUTION!** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Dec. 14 becomes 2130 EST Dec. 13.

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

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0030 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230-0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230-0320 GMT practice on those dates:

Date Subject of Practice Text from Oct. QST  
 Dec. 5: *It Seems to Us*, p. 9  
 Dec. 8: *Why Key Clicks?*, p. 11  
 Dec. 16: *Yagi vs. Quad*, p. 20  
 Dec. 20: *V.F.O. Stability . . .*, p. 26  
 Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition  
 Dec. 28: *Linear and Nonlinear Circuits*, p. 57  
 Dec. 30: *Mixer Circuits*, p. 58

## W1AW SCHEDULE, DECEMBER 1966

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.-3 A.M. EST, Saturday 7 P.M.-2:30 A.M. EST and Sunday 3 P.M.-10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed December 25 and 26.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	.....	.....	.....	.....	RTTY OBS <sup>3,7</sup>	.....	.....
0030	.....	.....	.....	.....	Code Practice Daily <sup>1</sup> 10-13 and 15 w.p.m.	.....	.....
0100	.....	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0120-0200 <sup>4</sup>	.....	.....	7.080	3.555	7.080 <sup>6</sup>	3.555 <sup>6</sup>	7.080
0200	.....	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0205-0230 <sup>4</sup>	.....	.....	3.945	50.7	145.6	1.82	3.945
0230	.....	.....	.....	.....	Code Practice Daily <sup>1</sup> 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.	.....	.....
0330-0400 <sup>4</sup>	.....	.....	3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS <sup>3</sup>	.....	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>
0410-0430 <sup>4</sup>	.....	.....	3.625	14.095	7.045	14.095	3.625
0430	Phone OBS <sup>2</sup>	.....	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0435-0500 <sup>4</sup>	.....	.....	7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS <sup>1</sup>	.....	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0530-0600 <sup>4</sup>	.....	.....	3.555 <sup>6</sup>	7.080 <sup>6</sup>	3.555	7.255	3.555
0600-0700	.....	.....	7.080	3.945	3.555	7.255	7.080
0700-0800	.....	.....	3.945	7.255	3.945	3.555	3.945
2000-2100	.....	14.280	21/28 <sup>5</sup>	14.095	21/28 <sup>5</sup>	14.280	.....
2100-2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300-2345	.....	7.255	21/28 <sup>6</sup>	21.1 <sup>6</sup>	21/28 <sup>6</sup>	7.255	.....

<sup>1</sup> C.W.OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.

<sup>2</sup> Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.

<sup>3</sup> RTTY OBS (bulletins) on 3.625, 7.045 and 14.095 Mc. 170/850 cycle shift optional in RTTY general operation.

<sup>4</sup> Starting time approximate. Operating period follows conclusion of bulletin or code practice.

<sup>5</sup> Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.

<sup>6</sup> W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.

<sup>7</sup> Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1s QIS WPR NPG. \* Times/days in GMT. General operating frequencies approximate.

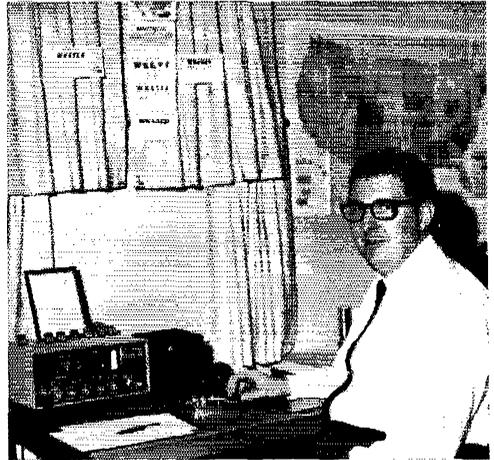


# Strays

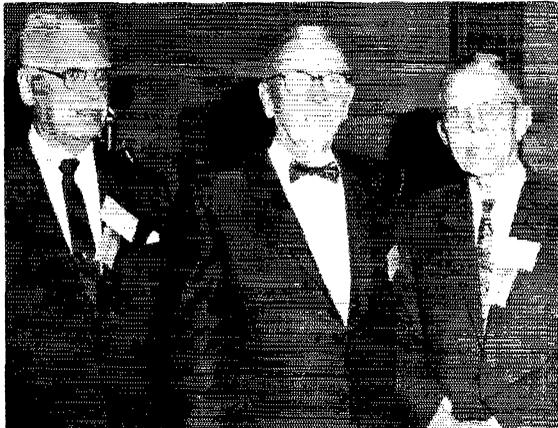


An amateur radio exhibit was set up by the Ottawa Amateur Radio for Scouting 66 for a Boy Scout Display and Exhibition held in Ottawa, Canada. Actually, it was a joint exhibit with the Boy Scouts World Bureau with the objective being to promote interest in amateur radio in general and in the annual Boy Scout Jamboree-on-the-air. Nearly 60,000 people attended the show and the amateur radio station was one of the most popular exhibits. Shown in the photograph are VE3DFM (seated), VE3EWE (center), and VE3CDG.

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.



Here's Hugo Van Paassen, WN6SLU, the first amateur to qualify for the "Mighty Midget" award. (See QST, February 1966, p. 54.) Hugo completed his 10-watter just prior to receiving his Novice license, which arrived in March. Just about four weeks were required to work 10 different ARRL sections and receive the QSLs. All of Hugo's contacts took place on 40 meters. Quoting from his letter, "The whole trick in making contacts is in waiting for the local QRM to die down, usually after midnight local time on a weekday night when school is in session. Also, the skip has to be working well, and there should be no electrical storms within several thousand miles. All three of these conditions are satisfied about once a week and then, look out!" Hugo's contacts include both sides of the country and, for far out DX, he submitted a QSL from Pago Pago, American Samoa. Well done WN6SLU!



Pioneer speakers at an Antique Wireless Association historical meet at the Franklin Institute, Philadelphia are (l. to r.) Clarence Tuska, co-founder of ARRL, Paul Godley leading participant in the 1921 trans-atlantic tests, and, Roland Bourne, W1ANA, Curator of the ARRL Museum. The two-day series of programs included papers on early tube development, history of old NAA, Grebe receivers and pioneer telegraph equipment. In addition there were demonstrations of early amateur detectors and audio amplifiers which aroused considerable interest. Other speakers for the occasion were curators from the Smithsonian and Dearborn Science museums. (Photo courtesy Bruce Kelley, W2ICE)

— . . . —

Along about this time of year the Jr. Operator begins to think more about Christmas vacation and hamming it up rather than his school work. If his English teacher gave a punctuation assignment he might work cross-hand — his lesson with his hobby. Here is an example:

- . (period) — Bird's eye view of a vertical antenna.
  - (dash) — Horizontal 40-meter antenna.
  - (hyphen) — Horizontal 20-meter antenna.
  - [ ] (brackets) — A broken 6-meter Squalo.
  - ( ) (parenthesis) — Two mobile whips traveling in opposite directions.
  - : : (two colons) — Tube socket.
  - ? (question mark) — A 10-meter whip that has hit a bridge.
  - ! (exclamation point) — A 10-meter whip that hasn't hit a bridge.
  - / (slant bar) — Vertical antenna on the side of a hill.
  - @ (at mark) — A rhombic, of course.
  - }%&?%#e\*?%# — QRM, what else?
- (from Auto-Call)

• 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

**DELAWARE**—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. RM: W3EER.

Net	Freq.	Local Time	Day
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2100	Wed.

Renewal: W3RDZ as OO. K3ZMI reports from Ottawa U., Ottawa, Kans. WA3DYG has a new kw. generator emergency operation. WA3DUM's dad is WA3DUH, not WA3DUH as previously reported. Re HamQuest 67. Join one of the following groups: Kent County ARC meets the 2nd Tue. of each month at 8 p.m. at the Kent County Court House, Dover. The Six and Two ARC meets the 1st Tue. of each month in Dover, W3UDR secy. The Delaware ARC meets the 2nd Tue. of each month at 8 p.m. at N.C. Co. Engrg. Bldg. on the Kirkwood Highway. The First State ARC meets the 4th Thurs. of each month at 8 p.m. at the WDEL transmitter site on Shiply Rd, Traffic: W3EEB 160, WA3DUM 6, WA3CRU 3, K3NYG 2, WA3DYG 1, W3HKS 1, W3IYE 1.

**EASTERN PENNSYLVANIA**—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3CBH, K3YVG, K3MVO, W3EML. PAMs: W3FGQ, W3SAO. New appointments: WA3ERA as EC for Pike county; K3RTX, WA3AIB and WA3AFI as ORSs; W3FGQ and WA3EEC as OVSs. Amateurs interested in traffic work will be welcomed to the Penn. Training and Traffic Net (PTTN) nightly on 3610 kc. at 2230Z. The PTTN had a QNT of 363 with QTC 266. EPA C.W. Net had QNT 308 and QTC 280. EPA Emergency Phone and Traffic Net had QNT 661 and QTC 303. New Gear Dept.: K3VRP/K3WKG have an HBR KW; WA3GIW an HT-32A and SX-101A; K3PLT RTTY gear; WA3BSV a 20-meter inverted 'Y'; K3MVO a Drake R4A receiver; K3DSM an HRO-500; WA3FGS a 20-meter beam and SB-301 and SB-401. WA3AFI now has a 1st-class commercial ticket. WN3GHP, stationed at Great Lakes, Ill., is looking for EPA stations on 7.154 kc. from the Sunbury area. K3HTR assisted operations at NSS during Armed Forces Day. W3NNL hopes to make DXCC before his 20 years are up. Nets now being organized: c.d. in Bucks County, see W3BUR; AREC in Dauphin County, see K3HHB; club and AREC in Cumberland County, see K3YRM; RTTY traffic net, see K3YVG. Visiting hams: WB6BBO and OM visited W3CUL. W3EML attended the Great Lakes Division Convention. W3VR attended the Antique Radio Conference, Franklin Institute. W3AES visited K3KDP/WA3AAZ. W3OY attended the Roanoke Valley ARC meeting. New club officers: North Penn ARC—K3ROK, pres.; K3HNW, vice-pres.; W3ADX, secy.; K3OZB, treas. Penn Wireless ARC—K3BNS, pres.; W3LCY, vice-pres.; K3AHI, secy.; K3IQH, treas. Delaware 16-high ARC—W3IZI, pres.; WA3BME, vice-pres.; WA3BQX, secy.; WA3ATK, treas. Abington ARC—WA3CNC, pres.; W3VAP, vice-pres. K3MDG has been discharged from the V.A. Hospital and moved to Lansdale. WA3CFU is a senior at West Pittston High. We'll soon close the books for 1966, a banner year for EPA. XYL K3NZD and I extend Season's Greetings and a prosperous '67 to all. Traffic: W3CUL 3023, W3EML 1072, K3MYS 685, W3VR 658, K3MVO 290, K3PIE 286, WA3ATQ 241, WA3CTP 218, K3YVG 190, W3FGQ 163, WA3EQ 134, WA3AJT 129, WA3BSV 102, WA3AZ 92, W3KIJ 88, W3CBH 82, W3MPX 76, W3ZRQ 75, WA3AFI 72, K3TNL 54, K3FSV 53, WA3BYH 51, W3VAP 49, W3JEX 38, K3WAJ 35, W3OY 34, WA3AJT 30, WA3FWT 29, WA3CFU 28, W3FAP 25, K3RTX 25, W3AES 23, WA3CCC 22, K3KTH 21, WA3BBI 19, WA3AIB 18, K3KKO 18, K3MDG 12, K3PWW 11, W3ELI 10, K3MHD 10, W3WEU 8, W3BUR 7, WA3EMY 6, K3HHB 6, W3OML 5,

W3PVY 5, WA3BZO 4, W3ID 3, WA3DE 2, W3BKF 2, W3HNP 2, W3NNL 2, WA3CKA 1, K3NZD 1.

**MARYLAND-DISTRICT OF COLUMBIA**—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, K3OAE, W3PRC, W3UE, W4ZNV. PAM's: W3JZY, K3LFD.

Net	Freq.	Time	Days	Sess.	QTC	Ave.
MDD	3643	0000Z	Daily	30	317	10.5
MDDS	3643	0130Z	Daily	30	64	2.1
MEPN	3820	2300Z	M-W-F	22	67	3.0
	3820					
MEPN	1700Z	1700Z	S-S			
MSTN	50150	0100Z	Daily	23	27	1.2

Appointments: All active OESs have received new certificates as OVS. K3OAE is the new RM for MDD. W2N1Y/3 was appointed OO. K3URE is a new OBS; WA3EEQ a new ORS. New Gear: WA3CBC is on with a Clegg 66er. Operation: WA3EOP and WA3ELA swapped Novice for Tech; both are active on 6 meters. WA3EOP is trying to get U. of M. station, W3EAX, into MSTN. W3JZY is working s.s.b. on the lower bands but will be back on v.h.f. come winter. WA3CFK is publishing the *MDD Flyer* and reports the Cumberland Valley Two-Meter Net has been reactivated on 145.62 Mc. Sat. at 2200 local time. K8KZF/3 is organizing a Post Office Net (PON) in Maryland. K3CYA tagged a Russian intruder in the 14-Mc. band. New QTH: K3EJF is at Elk Neck State Park with the Maryland Park Service at North East. General interest: W3ODQ, W3ECP and WA3BNL were among the 800-plus hams enjoying the Foundation Hamfest at Gaithersburg. W3KKY and W3QA gave a demonstration of antique detectors at the Antique Wireless Association National Meet in Philadelphia Sept. 24. The power company cured a power leak that gave K3LLR bad QRM on 6 meters. WA3BYW is working on his ORS application. W3TMZ has been busy helping several nearby hams with antenna installations. After 3 weeks vacation W3MCG is raring to go for fall/winter activities. Silent Key (reported by W3ECP): W3PBW died Sept. 3. Traffic: (Sept.) W3TN 162, WA3CFK 145, WA3BTA 128, W3LBC 120, K3LFD 107, K3GZK 99, K3JYZ 99, WA3EEQ 79, K3OAE 48, W3PRC 44, WA3CVM 38, W3PQT 30, W3ZNV 23, WA3HNL 21, W3ECP 20, WA3CBC 18, WA3ERL 14, K3URE 10, WA3FOP 9, W3MCG 9, K3ZIX 8, WA3CEK 5, K3NCM 5, WA3FXJ 4. (Aug.) W3PQT 216, K8MZY/3 200, WA3BDK 22, WA3BYW 3.

**SOUTHERN NEW JERSEY**—SCM, Edward G. Raser, W2ZI—SEC: W2BZJ. RMs: WA2BLV, WA2UPC. PAM: W2ZL. The Combined SNJ/NNJ ARPSC and NJPN Net Dinner at Bhares Tavern, Sept. 17 was a big success with some 42 present. The SJRA 50th Anniversary Dinner Sept. 10 had over 400 present. A fine report was received from WB2VJ on AREC activities in his area. He reports a new v.h.f. net now is operating Fri. at 2000 on 50.9 Mc. WB2VFX also sent in a very comprehensive OES report. New OVS certificates have now been sent to former OESs. K2BG has been appointed OO Class II and IV. SEC W2BZJ sent a letter to all ECs stating his aims and hopes for building up a strong AREC and v.h.f. net group in S.N.J. Over 300 attended the SCARA Picnic at Egg Harbor Lake, Aug. 28. WA2UPC sent in a written report on the SNJ/NNJ combined meeting held near Freehold prior to the SFT. Arthur Linsinbilger, blind operator of Trenton, recently received the call WB2YPI and will be on the air soon with a 6-meter rig. K2ARY sent his OBS transmissions faithfully, as did W2SBD. WA2DVU is the new NCS for NJPN. Thurs. W3QJ2 is now using a rhombic on 20 meters. W2HAZ is back on N1N after 8 years. WA2UPC entered Trenton Junior College. The DVRA held its Annual Clam Bake at the club grounds. WB2FJE is a new member of NJPN. WA2WLN is a new ORS. N1N reports for Aug. 31 sessions and 212 traffic. Traffic: (Sept.) WA2BLV 229, WA2UPC 122, W3YYP 79, WB2TEN 58, W2RG 31, W2ZI 30, K2SHE 18, WB2YCI 17, WA2DVU 10, W2BEI 8, WA2KAP 7, W2BZJ 6, WB2SBD 6, W2HAZ 4. (Aug.) WA2BLV 147, WB2TEN 115, WA2WLN 12, WB2SBD 9.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVL. RMs: W2EZB and W2FEB. NYS C.W. Net meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 2200

GMT; NYS C.D. on 3510.5 and 3993 kc. (s.s.b) at 0900 Sun. and 3510 kc. at 1930 Wed.; TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT; NYS County Net on 3510 kc. Sun. at 1000 and 2400 GMT on Mon. Congratulations to W2OE on making the BPL W2AWK has been appointed EC for Onandaga County. K2ISO renewed as EC for Wyoming County. Our SEC, W2RUF, is actively recruiting ECs from those areas not represented or whose present EC is inactive. Your club is invited to make recommendations directly to her. The new official V.H.F. Station appointments are now available. Write to K2IUK if you are interested. We are attempting to form a statewide v.h.f. traffic net with liaison to NYS C.W. and NYSPTEN. Anyone who feels that he could be helpful in organizing this system is invited to contact either K2HUK or W2IUF. The Syracuse V.H.F. round-up was well attended and the fine technical talks by WIHDQ, W3SDZ and W2IMU were well worth the trip. F.m. operation on 146.94 Mc. (wide-band) continues to snowball as far as activity is concerned. F.m. repeaters are springing up in all likely and unlikely places. The f.m. group is attempting to coordinate effort in order to present a unified proposal to the FCC for a rules change in order to extend the usefulness of this mode for emergency operations. W2EUP, 505 Main St., Elenezer, N.Y., has agreed to continue to act as coordinator. This year's SET was the best ever. W2SEI has accepted appointment to the Eastern Area staff on NTS. W2RUF spoke at a recent RAGS meeting on AREC. W2AHSK spoke to the LARA on closed circuit TV. K2LCT spoke to the GRAMS on "Hints and Kinks." W2AKND spoke to the SIARC on RTTY. The SIARC elected W2LZM, pres.; K2BWK, vice-pres.; W2YHD, secy.; W2BMM, treas. The ARATS Club 2-meter project is rolling again. Chemung County AREC is offering a certificate to all amateurs who work five members on 2 or 6. SASE to W2AZBD. Traffic: W2OE 413, K2SEI 405, K2SSX 242, W2RUF 194, K2KTK 143, W2AE/2 115, W2GAL 88, W2FFB 61, W2RHJ 59, W2UFI/4 43, K2IMI 30, W2RFQ 30, K2OFV 25, K2RYH 25, K2MQN 23, K2DNN 19, W2OAM 18, W2NNA 16, W2IUF 15, W2PNW 14, W2FCG 12, W2BOYE 8, W2TPV 6, W2NZA 5.

**WESTERN PENNSYLVANIA**—SCM, Robert E. Gawryla W3NEM—SEC, K3KMO, PAM (v.h.f.): K3VPI. RMs: W3KUN, K3SOH, W3MFB, W3UHN. Traffic nets: WPA, 3585 kc. daily 0000 GMT and KSSN, 3585 kc. Mon. through Fri. 2330 GMT. New General Class ticket holders are W3ELB and W3GEF. K3SMB has a new Lafayette HA-410. K3ZHH and W3BGE are National Merit Scholarship semi-finalists. W3IMG and W3PNI have moved into the Cumberland Valley. K3ZUZ was named to head up the MARS station at Letterkenny Army Depot. WPA welcomes K3RZE, ORS, who moved from EPA to WPA. K3HKK now is on the air with new RTTY equipment. K3HKK/3 scored 14,280 points during the Sept. V.H.F. QSO Party. K3CXZ now has a "halo-on-a-herse" for a second 6-meter mobile station. The Two Rivers Amateur Radio Club reports via *Spark Gap* that its Second Annual Corn Roast at Renzie Park was a great success. The Nittany Amateur Radio Club reports the Ninth Annual Pennsylvania QSO Party was a gigantic success and wishes to thank all Pennsylvania hams for their help. K3EXE and W3AEPQ have found new adventures on 2-meter c.w. K3CFA increased his 2-meter standing during the opening the first part of Sept. Endorsements: K3JCZ and K3SID as ECs; K3EDO as OBS; K3FFJ as (O); W3BOZ and W3TAS as OPS; W3CA, W3KQD, W3KUN, W3LOD and W3RUI, as ORS. Most of the information for this column is taken from club bulletins and newsletters. If your club and club members would like to be represented here, please send information to your SCM, 1463 N. Allen St., State College, Pa. 16801. Traffic: W3NEM 229, W3KUN 106, W3LOS 83, W3AKB 77, W3BLZ 73, K3PYS 55, W3AKH 31, K3SOH 31, K3KMO 20, K3RZE 20, W3OEO 17, W3ELZ 7, W3ADWQ 6, W3YA 6, W3AEPQ 5, W3GJY 5, K3CXZ 4, W4ZAU/3 4.

### CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU, RM: W9AGU, PAMs: W9VWJ, W9ACCP and W9KLB, (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	T/c.
IBN	3940	1400Z	Sun.	No report
ILN	3760	0000Z	Daily	2:11
NCPN	3915	1200Z	Mon.-Sat.	1:87
NCPN	3915	1700Z	Mon.-Sat.	2:06
ILL PON	3925	1700	Mon.-Fri.	3:03
ILL PON	51.28	2000	Mo. & Thurs.	22
ILL PON	145.5	2000	At-W-F	58
TNT Net	145.36	2100	Sun.-Fri.	174

The Illinois gang is sorry to hear that W9IBI is hospitalized with a serious heart attack. However, his condition is reportedly improving. New officers of the San-

gamon Valley Radio Club, Inc., are W9GEG, W9UYP, W9AGUM and W9RZC. From early reports received, the SET on Oct. 8 and 9 had many participants. Also received were numerous announcements of code and theory classes conducted by the various clubs of the section. Those interested should contact the clubs for schedules. K9MDO, W9NJB, W9RSV and W9NIP were elected officials of the Worth Township Amateur Radio Club. W9ERH's new QTH is the University of Detroit. K9QQQ has moved to South Bend where he has accepted an electrical engineer position with Bendix. W9JJE has a new tilt-over tower. W9GRJ was named Ham of the Month by the Tri-Town Radio Amateurs Club. K9FHV has moved from Murphysboro to Granite City. K9AUD has enrolled at the University of Illinois, at Urbana. K9PEN, W9LRI, W9OCCQ, W9AEXZ, W9JLQ and W9MNL are the newly-elected officials of the Chicago Suburban Radio Association. The Ninth Regional Net had a traffic count of 445 for Sept., according to RM/9RN W9QLW. The Starved Rock Radio Club banqueted W9VOK Oct. 10 upon his 25th anniversary as a radio amateur. W9YH has installed a new Zepp 130 in Height. W9AEPH received his A-1 Operator certificate. K9PPX has a new TA-36 beam. A new DXCC member is K9AXS. W9AKM has a new Drake R4 receiver. W9LYV is now a General Class licensee. W9LNC vacationed in V7-Land. W9CWH gave a talk at Northwest ARC on emergency operations and message-handling. W9CCP is the only recipient of the BPL award this month. Traffic: (Sept.) W9ACCP 526, K9KZB 252, W9AXR 216, W9EJV 200, W9AGUM 175, W9AIHU 104, W9DOQ 99, W9NSPA 98, W9ELL 92, K9AVQ 83, W9NXG 80, W9ASEO 69, K9BTE 62, W9HOT 58, W9RNS 49, W9AMRU 26, W9IDY 22, W9PRN 20, W9NFS 19, K9HSH 16, W9ARLA 14, W9HJM 9, W9AHSZ 5, W9AFIH 4, W9LNL 4, W9YII 1. (Aug.) W9YH 23, K9RAS 1.

**INDIANA**—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX, SEC: K9WET.

Net	Freq.	Time		Sept. Mgr
IFN	3910	1330Z Daily	2300Z M-F	213 K9IVG
ISN	3910	0000Z Daily	2130Z M-S	358 K9CRS
QIN	3656	0000Z Daily		122 W9HRY

W9PMT, mgr. of the Hoosier v.h.f. nets reports Sept. traffic of 48. K9DHC, mgr. of RFN, reports Sept. traffic of 32. W9QLW, RM of 9RN, reports Indiana was represented 100% in Sept. QIN Honor Roll: K9VHY 27, K9HYV 20, K9RLW 20, W9HRY 18, K9VWJ 18, K9JDK 16, W9BDP 15, W9ZYK 15, K9EFY, mgr. of IPON, reports Sept. traffic of 21. W9AFTG and W9AFXE have built a kw. linear. W9PMT is the new mgr. of the Hoosier v.h.f. nets and K9DHC is the new mgr. of RFN. Welcome to W9JIV and W9ASGA, both from W5-Land, to the Terre Haute area. W9OIP has put up new antennas for 40 and 75 meters. Welcome to W9TUD, of Evansville, who has received his Novice Class license. The Tri-State ARC transmitter hunt was very successful. W9PFF is now on with a Swan 240. W9ABNX is enjoying a Swan 350 and W9MFFY is working a lot of DX with the Drake line. K9URA is building an HB receiver; started out with 6 tubes and is now up to 14 tubes. Amateur radio exists because of the service it renders. W9IUK made the BPL. K9JDK is back on the air with the Drake twins, and proud of his A1 Operator certificate. Traffic: (Sept.) W9IUK 565, K9IBG 405, W9OYI 310, W9ZYK 231, W9HRY 171, W9ADAG 9 132, K9HYV 108, W9UB 70, K9CRS 68, K9FZX 56, W9QLW 54, W9FIDQ 50, K9RIVQ 47, W9BWWY 42, K9VHY 42, K9JDK 38, W9AJHH 35, W9PMT 32, W9CC 31, K9EFY 30, W9SNQ 30, W9AGRI 29, K9JDK 27, W9MNT 27, W9YXX 25, W9FWH 21, K9DHN 20, W9DKR 19, K9FTJ 17, W9RTH 16, W9GFS 14, K9BBL 13, W9BWT 12, W9ALUG 12, W9AHH 9, K9ILK 9, K9LJZ/9 8, W9LJ 6, W9AJY 6, W9DOK 5, W9PZW 5, K9UEO 5, W9DZC 4, W9EJW 4, W9GJZ 3, W9CMT 2, K9YFT 2. (Aug.) W9BWWY 50, K9RLW 30, W9ALGQ 24, W9CMT 1.

**WISCONSIN**—SCM, Kenneth A. Ebnetzer, K9GSC—SEC: K9ZPP, RM: W9MIO, PAMs: K9HJS, K9AIR and W9NRP. New appointment: K9WXS as EC for Dane county. W9YT has rebuilt much of its gear and added RTTY. New officers of the MRAC are K9ZPP, pres.; K9WIG and W9JLU, vice-pres.; W9CIV, treas.; W9KILK, secy.; W9GPI, W9NLY, W9LCO, K9CMX, W9ATK and W9LVR, directors. Hope that W9ZF is enjoying his new QTH in Florida along with W9KJW, W9ICD and W9QYW, all transferred there recently. W9SQM has his HT-30 driving a 4-400-kw. amplifier. W9REC has received his General Class license. W9IDG is active with an NC-300 and Johnson 200 Invader. W9EWC is getting 20-mile QSOs on ham TV. K9GDF led the OOs with 11 notices in Sept. W9GJU received a BPL certificate for June traffic. W9IOWZ is active in Public Service activity aiding the Greenfield PD. W9IWK reports the Rock

County Emergency Net on 145.3 Mc. Sun. at 0130 GMT is doing very well. Net reports:

Net	Freq.	Time	Days	Sess.	QNT	QTC	Mgr.
REN	3985 kc.	1300Z	Mon.-Sat.	26	250	44	W9NRP
REN	3985 kc.	1800Z	Daily				K9HLS
WSBN	3985 kc.	2315Z	Daily	29	1051	312	K9IMR
WIN	3662 kc.	0115Z	Daily				WA9MIO
SWRN	59.4 Mc.	0300Z	Mon.-Sat.				W9CIU

Traffic: (Sept.) WA9NPB 188, W9DYG 174, W9KQB 133, K9MIR 108, WA9AW 94, W9CBE 78, W9NT 75, K9GDF 74, WA9NFQ 62, WA9QKP 57, W9NRP 49, WA9NVY 43, W9RTP 37, WA9KRF 36, K9UTQ 31, W9AYK 28, WA9-GJU 26, W9HPC 18, W9HQT 18, WA9NDY 18, WA9KLF 17, WA9DWZ 15, K9FHI 15, K9FHI 12, K9KJU 11, W9-LWY 9, W9HW 8, K9GSC 6, W9OTL 5, W9IRZ 4, W9SQM 2, K9ZMS 2, K9OSC 1, (Aug.) WA9DWZ 1, (June) WA9GJU 156.

### DAKOTA DIVISION

**MINNESOTA**—SCM, Herman R. Kopschke, Jr., W0TCK—SEC: WA0IEF. RMs: W0ISJ, WA0EPX. PAMs: K0QBI, WA0JKT, W0HEN, WA0DWM, MSN meets daily on 3595 kc. at 0030Z, MJN meets M-S on 3595 kc. at 0100Z. Noon MSPN meets M-S on 3820 kc. at 1850Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 kc. at 2400Z. MSTN meets M-F on 50.4 Mc. at 0430Z and Sat. at 0200Z. The PO Net meets Sun. on 3812 kc. at 1830Z. The SSB Net, on 3805 kc., has been reactivated and will meet at 1730Z. Appointments renewed: W0ISJ as RM, K0ORK as ORS, W0PHD as OVS, WA0LAW as ORS, W0YC as ORS, W0HEN as OVS/EC/OBS/PAM. New appointments: WA0BJY as EC. The C.W. Net members, in a recent election, voted by a close margin to continue the MSN and MJN operations on 3595 kc. rather than move to a different frequency. WA0KJF has a new TO keyer, WA0IEF has now worked Alaska to qualify for his WAS certificate. W0PET is teaching electronics in Minneapolis. WA0KWO and W0N0JF held a six-hour QSO on 15 meters recently. They wonder if this may be a record of some sort. W0UNC, WA0BJY, W0FZ and W0GKD are active on 2 in the Duluth area. The Rochester ARC is sponsoring a Novice study class. A new 100-ft. tower graces the penthouse on top of the Olmstead Co. Court House in Rochester, topped by 2- and 6-meter antennas. K0QBI has a new 50-ft. Rohn tower. K0YOF has a tower 76 feet above ground supporting a 6-meter beam and W0TCK finally got his 125-ft. tower up. A BPL award went to WA0EDN. Traffic: (Sept.) WA0JKT 215, WA0EDN 154, WA0EPX 127, WA0KJF 71, WA0-DVH 66, W0TCK 39, W0ISJ 38, K0ZRD 33, WA0LOH 31, WA0RQU 28, WA0JPR 20, K0FLT 19, WA0IEF 18, K0ICG 16, K0AQT/0 15, K0IGZ 11, WA0MIF 11, W0UMX 11, WA0DFT 10, WA0MVM 9, K0ORK 8, WA0LOB 5, W0KLG 4, WA0LMK 4, K0SXQ 4, W0-SZJ 3. (Aug.) WA0IEF 20.

**NORTH DAKOTA**—SCM, Harold L. Sheets, W0DM SEC: W0AYL. The Minot Amateur Assn. held a Halloween Party. W0HVA, W0HJU, K0HFK and W0-ELN have been busy on 2 meters and K0CLD will be on soon. W0HJU and W0HVA are working with 1296 Mc. The Grand Forks gang is back on 2 meters with several fixed and mobile stations on the air. W0DM has a new ground-plane up on the brace of his beam. The BARK group at Bismarck is active again. WA0EWW is on the air with a Galaxy 300. K0QYD should be back at his home QTH by now. WA0OAT has an HT-32 on the air in his new location. WA0MSJ is on s.s.b. now with a Pacemaker. W0PQW is on his annual goose-hunting expedition into Canada. WA0DVT has a new Water's Compressor on the air. The Forx Amateur Radio Club is meeting at the home of K0OVE and W0P0PK. The club publication, *The Feedline*, is being published again and a hang-up auction sale is in the making. WA0MND, Everett, was in St. Lukes Hospital in Fargo for check-up but has returned home much better. OM W0EJF was a guest at WA0GRX's home. W0KON is living at Coopers-town and busy with NTS on c.w. The Forx Amateur Radio Club received recognition for flood work at a local Red Cross Dinner. Traffic: W0KON/0 77, K0ITP 56, WA0AYL 10, W0DM 10, WA0GRX 3.

**SOUTH DAKOTA**—SCM, Seward P. Holt, K0TXW SEC: W0SCT. New officers of the Sioux Falls Amateur Radio Club are W0OXU, pres.; K0EEZ, vice-pres.; W0-RRN, secy.; Bill White (license coming) treas. K0PDW is moving to Las Vegas; New Mex. K0LKH and his XYL have returned to Rapid City for the final year at the School of Mines. WA0OY is assembling an SB-100 in his spare time. The So. Dak. S.S.B. Net reports 928 QNT, 138 QTC for Sept. So. Dak. C.W. Net reports 44 QNT and 10 QTC in ten sessions in Sept. K0GSY is off the air with receiver troubles and other interests. Traffic: W0-SCT 63, K0VYV 38, WA0LLG 34, W0FJG 8, WA0BKG 5, W0RVN 5, K0KQY 4, K0TNN 3, WA0CKM 2, K0JGM 2, WA0MWN 2.

### DELTA DIVISION

**ARKANSAS**—SCM, Don Whitney, K5GKN—SEC: WA5KTX. PAM: WA5GPO. RM: K5TYW. NMs: WA5-11S, WA5HNN, W5MJJO, K5IFP, K5AJQ, pres. of the Mississippi County Amateur Radio Assn., reports progress in the club's effort to build code and theory classes for citizen land licensees who desire an amateur license. This is a worthy project and I heartily recommend it to other clubs in the section. It's good to have former Arkansas SCM W5DTR active again on the OZK Net. A new certificate called the "Alley Cats" certificate is being issued to all stations who work WA5PPD, K5BOC, K5-YMU and WA5NCJ, all in Fort Smith. Net reports:

(Sept.)	Net	Freq.	Time	Day	Sess.	QTC	QNT	Net Time
	RN	3815 kc.	0001Z	Daily	30	55	636	563 Min.
	AFN	3885 kc.	1200Z	Mon.-Sat.	26	81	885	1684 Min.
	OZK	2790 kc.	0100Z	Daily	29	58	153	605 Min.
	AFON	3825 kc.	2130Z	Mon.-Fri.	22	187	244	660 Min.
(Aug.)	RN	3815 kc.	0001Z	Daily	31	43	660	509 Min.

Traffic: W5OBD 532, W5MJJO 301, WA5KEF 193, W5NND 147, W5CAF 43, K5EDH 30, K5TYW 19, W5YM 13, WA5-KAK 12, K5GKN 11, W5DTR 7.

**LOUISIANA**—SCM, J. Allen Swanson, Jr., W5PM—RM: W5CEZ. V.H.F. PAMs: W5UQR, WA5DXA.

Net	Freq.	Time	Day	Time	Net Time
LAN	3615	Daily		0030	WA5FNB
Delta 75	3900	Sun.		1330	WA5BVU
LAPON	3870	Sun.		1300	W5KC

WA5KTW now has a new HQ-50 and reports into the Delta 75 and RPEN. W5NQMM replaced his CB call with a loun call. W5CKP has been teaching radio theory. WA5MIF and WA5CAV are in college. In the SET Louisiana LAN, Delta 75 and local nets were all active. Ham-Quest 67 was presented to the GNARC at its September meeting. K5KQG has resigned as SEC because of a change in his business. W5SWS is the new secy. of the Chetimachi ARC. W5PGT, a new ORS, has designed a very beautiful station layout. W5PWX dropped the "N" from his call. WA5FKP is pres. of the Bolton High RC. K5YWG is back at work in Alex after an injury. W5BBV has a new trap doublet. W5OIA passed the General Class exam. W5EXI has completed his Heathkit keyer. WA5EBO has had 6-meter equipment trouble. W5JFB built a new 50-Mc. s.s.b. rig from the junk box, a grid-dip meter and put up a homebrewed skeleton shot for 2 meters. W5CEZ has had trouble with his 200-V. WA5KLF is NCS of the school student net and new pres. of Monroe ARS. W5MCC built a communications truck, the equipment that is, W5UK, the GNOARC station, is in State RACES. WA5OCH, the club station at USVLA, is most active. WA5EID is working on putting up his 15/20 beams. WA5HGX requests that any hams at LSUNO interested in forming a club please contact him. The Southwest La. Emergency Net meets Sun. at 2000Z on 3850 kc., according to WA5LQZ. WA5JOL is having s.s.b. rig trouble. W5ZBC is sporting a new kw. final. W5AJY edged out W5KC for division leader in the past DX Phone competition. W5-BUK is back chasing DX and has 300 now. W5SWS and WA5CAU, together with W5BV, keeps 3900 hot every morning at 1230Z. W5MIX reports the Jefferson ARC's recent steakfest was a grand success. WA5LGO put up a new beam and is hot after DX. Traffic: (Sept.) W5GHP 103, WA5JOL 146, W5MIXQ 135, K5OKR 122, WA5FNB 77, W5KRX 72, WA5KON 66, W5PGT 58, W5MBC 32, W5AJY 26, W5BJG 25, W5ZBC 24, WA5LQZ 18, WA5DXA 8, W5MCC 8, WA5HGX 7, WA5KLF 7, W5LGO 6, WA5-OCH 6, W5KC 5, WA5JVL 3. (Aug.) WA5KLF 12.

**MISSISSIPPI**—SCM, S. H. Hairston, W5EMM—SEC: W5IDF. W5LZS, W5GEL, W5EPT and W5PPI are doing a fine job on 3987.5 kc. Plans are in the works for a 2-meter Mississippi net. Anyone interested, contact W5-BAM, WA5JVD or W5ODV. WA5NLO is doing a fine job as Meridian NCS and also is working lots of 15 meters. W5CUU has a fancy beam array for 20, 15, 10 and 2 meters. W5VCS is now fixed and mobile with a new transceiver. W5WZ, W5OKQ, W5VRH, W5SBW and many others are handling lots of overseas traffic. WA2WBA/5 is a welcome addition to all of our nets. W5JHS, as usual, is really doing a fine job handling the Gulf Coast Sideband Net. Check into our nets: Gulfcoast Sideband Net, daily at 1730 CST on 3925 kc.; Miss. Sideband Net, daily at 1815 CST on 3888 kc.; "Miss" C.W. Net, daily at 1845 CST on 3647 kc. There are several local nets on 75 and 6 and 2 meters. Help them out. Traffic: W5WZ 102, WA2-WBA/5 87, WA5QI 23, W5BW 18, W5KDM 6.

**TENNESSEE**—SEC, William A. Scott, W4UVP—SEC: K4RCT. PAMs: W4PFP, WA4EWW. RM: K4UWH.

Net	Freq.	Days	Time	Sess.	ONI	OTC
TP	3980 kc.	Sun.	1400Z	30	1295	408
		M-Sat.	1245Z			
TSSE	3980 kc.	Tue.-Sun.	0030Z	22	1074	113
ETPN	3980 kc.	M-F	1140Z	22	274	46
TN	3635 kc.	Daily	0100Z	60	344	261
			0230Z			

The RATS is making plans for its Annual Tenn. QSO Party to be held in early '67. It will be better than ever. K4UWH reports a total of 25,600 in the W/Ve Contest. The Delta RC manned a booth at the Southland Mall opening in Whitehaven with 436 QTC handled. K4SXD is going to Microwave Repair School, Ft. Monmouth, N.J., after a short stay at home. W4FLW completed an SB-200 for a bigger signal from Dresden. Anyone not receiving the Tenn. Consolidated Roster should send a radiogram to W4VUP. Thanks to the section for fine participation in SET exercise. The QSL Bureau requests that you send your 5 x 9 envelopes or your cards will be destroyed. W7GBL is looking for Tennessee 160-meter skeds. Congrats to W4PQP and W4OGG on making BPL on originations. Traffic: W4PQP 272, K4UWH 268, W4OGG 234, W4FX 179, W4YEM 138, W4IBZ 113, W4YDT 98, W4CXY 74, W4WBK 62, W4UVP 56, W4FPF 35, K4COT 24, K4UMW 21, W4TKJ 20, W4A9EC 19, W4VTS 15, W4ACGK 11, W4AENW 10, W4TYV 10, W44IZB 9, W4TZB 9, W4FLW 4, W44DBG/4 3, W4SGI 3, K4SXD 2.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM. Lawrence F. Jeffery, W44KFO—SEC: W4OYL. Appointments: W4BEJ as EC and K4KIS as PAM. Endorsements: W4REJ as OBS. K4HOE as EC, W4M1WX as ORS, W440MH as OVS, W4SZB as KC and OPS, W44TPB as ORS.

Net	Freq.	Days	EST	Sess.	ONI	OTC	Mgr.
EMKPN	3960	M-F	0630	22	405	101	K4KIS
MKPN	3960	Daily	0830	30	420	113	W44KFO
KTN	3960	Daily	1900	30	878	261	W44AGH
KYN/KSN	3600	Daily	1900/1700	46	327	299	W4BAZ

The calls of the college club stations in Kentucky are St. Mary's, W44ABF; W. Ky. U., W44DQM; U.K., W4JP; E. Ky. St., W44MCT; U. of Lvl., W44YGT; Murray St. W44ZTF. The Louisville 6-Meter Net has been reactivated by PAM K4KZ and is now the Falls City Area Traffic Net and meets M-T-F. K4FPW takes care of V.H.F. Official Bulletins for Louisville. W4ISF has a new antenna system to replace the one lost in a wind storm. W44VWT and W44TTE have new keyers. W44BEO is now an ARPC member. WN4EBF is a new Novice in Central City. W44GHQ reports the Lexington Area 6-Meter Net meets Sun. and Wed. on 50.7 Mc. at 2100 EST. A few of those away at college are W44AIN, K4HSB, K4JOP, W44TPB, W44UAZ, W44YDO. Traffic: (Sept.) W44VUE 297, W44VWT 230, W44DYU 164, W44UAZ 158, W44AGH 150, W44HJM 144, W44KFO 105, K4DZM 83, K4NHY 79, K4YJU 75, W44TPB/4 74, W4BAZ 73, K4ZQR 60, W4KJP 50, W4ISF 49, K4MAM 42, W44GMA 41, W4NBZ 39, W44KKG 34, W4B4CC 32, W44IBG 32, W44GHQ 26, W4OYI 26, W4RCE 23, K4FPW 22, W44ZIR 18, K4VDO 17, W44BZS 12, W4CDA 12, W44AIN 11, W4BTA 10, K4LOA 10, K4HOE 9, W4EON 4. (Aug.) K4DZM 172, W44ZIR 39, W4OYI 29, K4FPW 7.

**MICHIGAN**—SCM. Ralph P. Thetreau, W8FX—Asst. SCM: K. E. Stecker, W8SS. SEC: K8GOU. RMs: W8ELW, K8QLL, W8EU, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: W8ELW, W8IBB, W8LPC, K8KMQ, K8MFO, W8MGQ, W8OCQ, K8QLL, W8RTN as ORSs; K8AQA, W8A8CTC, W8CVC, W8DHP, W8DXW, W8EFK, W8EMD, W8FX, W8AGRI, W8IBB, W8AKRH, W8MBH, W8AOLD, K8PBA, W8PT, K8VEX, K8XWO as OVSs; W8AAM, W8OCQ, W9JDR/8 as OPSs; W8CVC, W8ZHB as ECs. Silent Keys: W8AHW, W8AKR, W8APTE, W8TRP. New officers of the Southeastern Mich. ARA are W8KAZ, pres.; W8RQL, vice-pres.; K8PQ, secy.; W88NYK, treas.; W8GOE, sgt.; W8BHW, W8HID, board. K8DX has a new "modern" 80-ft. 4-wire "L" flatop, which works as well as fancy antennas on 80, 40 and 20! W8HKT retired Oct. 1, and received a new Vibroplex as a present. He will stay in Saint Joseph for the winter. K8PBA made the BPL on v.h.f. W8RRE is home recuperating from an auto accident. S.E. Mich. has 220 stations on 146.94-Mc. wide-band f.m., as of Aug. 1966. W8IWF splits operating time 50-50 on c.w. and phone. All Michigan hams again are invited to join the U.P. Net on 3920 each evening, c.w., s.s.b. or a.m., by W8OQH, W8AORC is now General Class. The SVARA (K8DAC) is buying and putting new gear in the Red Cross Bldg. The Elbow Benders Net meets each Fri. at 0130 on 1806 kc. In 7 years and 20 days K8PBA finally worked 60 Michigan counties on 2 meters. K8GNU now is vice-pres. of Van Buren County ARC. W8QHK is now General. The Van Buren County ARC now has W8ITU's

call, in memory of the deceased "Fausy." The Great Lakes Net has been reactivated on 3932 kc. at 0230Z. K8-BMU NCS, W8HDI and K8LNL are loaded with red, white and blue ribbons—ask 'em. K8SKZ traded a Halli Sr-42 on the new car. W8AQCV and W88RYW put up new towers. W8AMCQ needs Wyoming for WAS. W8-PYL has a new Hy-Gain Monoband on 20 and says it's fine for s.s.b. and c.w. W8SWF put up a new antenna. Traffic: (Sept.) W8IV 332, K8KMQ 329, W8A8GR 192, W88P11 184, K8HLR 159, W81WF 159, K8PBA 150, W8A-MAM 138, W8FLW 112, W8EU 80, W8APM 76, W8-LXY 75, W8IUC 70, W8IML 60, W8YAN 60, W8LRC 58, W8OQH 58, W8AQAF 54, W8AMCQ 44, W8AIAQ 42, W8FX 40, W8RTN 40, K8ZJU 40, K8VDA 36, W8FWQ 32, W8ACZJ 30, W8AJDF 28, W8PBO 22, W8UFS 21, W8A-PYL 20, W8ALXC 19, W8IUM 19, W8AOLD 17, W8QOK 17, W8BEZ 15, K8GOU 15, K8MFO 15, W8AORC 15, K8JED 14, W85DTR/8 12, W8SWF 12, W8AKMQ 10, W8DSE 8, W8AMVH 8, W8AGT/7 7, K8ACN 6, W8A8RYC 6, W8HQL 5, W8AUD 4, W8ADNZ 4, W8TPB 4, W8MRM 3, W8APWF 3, K8QJL 3, W8AAM 2, W8ZHB 2. (Aug.) W88BJD 113, W8YAN 60, W8OQH 37, W8AMQT 35, K8-ZJU 25, K8JJC 11.

**OHIO**—SCM. Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZV, W8DAE and K8LGB. PAMs: W8WV and K8UBK. K8UBK drove W8NAL and your SCM to the Findlay Hamfest where between 1700 and 2000 were in attendance with 800 amateurs registered. W8FX, Michigan's SCM, was there. W8AQ spent a week in the hospital. W8ACFJ is now an A-1 Operator. K8LGA vacationed in Mass. and N.Y. W8-LUZF is a new Novice in Piqua. K8BXT reports that W8OLL and W8APDG built and are using quad antennas. K8YPR moved to Pennsylvania. K8NJS moved to Boardman. W8ACJI has an Ameco #62. W8BBF received his General Class license and has the new S-Line and W88RBG put up a 60-ft. tower. The *Buckeye Net Bulletin* showed ten pictures taken at the RN Picnic in Mt. Vernon by W8LZE and K8LGB. K8YSO received his Extra Class license. Massillon ARC's *MARC Newsletter* says movies were shown of "Why Viet Nam" and "Darlington 500" and that W8OYL spent the entire autumn in the Philippines. K8DHJ drove your SCM to the Cincinnati Hamfest attended by 1898. Hidden transmitter winners were 6 meters by K4MED, 2 meters by K4MED and 3/4 meters by W44JIO. A tornado touched down in the Cleveland area and W8APQL, Acting EC for Cuyahoga County, along with W8OZA, GMS, OKE units 2-5 and 7, P.J.N. S.U.S. K8AJJ, BIE, GVK, JGH, JSE, MBV, MFK, MMM, OBX, OCT, SOX, VMC, YVK, W8GEO, GFV, IMO, PXL, SDO and TTA, participated in establishing communication. W88SH is now General Class. The Canton ARC elected K8SWE, pres.; W8TUY, vice-pres.; W88NCK, secy.-treas.; W8NAL and K88MY, trustees. K88SQK is working for G.E. on Shemva in the Aleutians. W8JAR is back on the air after being off for 12 years. Greater Cincinnati ARA's *The Mike & Key* tells us that W8RPL spoke to the club on "Me, my club and the ARRL." Inter-City RC's *IRC News Bulletin* says K8-UGA has a new baby son and W8OQ is back on c.w. after trying s.s.b. W88RAF is now General Class. K8-AGA has gone mobile with a Swan 350 and K8PTM is in School of Dentistry at Ohio State U. A new traffic net, the Ohio Late Net (LN), has started on 3580 kc. at 0300. V.H.F. High Banders' *The Log* informs us that W8-WSH has a new baby girl. The Halbeck & Wilcox ARC held a picnic. Southeast ARC's *Ham Fax* announces the start of on-the-air code practice. Youngstown U. ARC's officers are W8AGV, pres.; K8ZDZ, vice-pres.; W8-LPQK, secy.-treas.; K8ZZS, act. mgr. K8HGJ is after his Master's at Western Reserve. K8ZHD is going to U. of Cincinnati. W88BF is now General Class. K8LUV is using new SB-100 and SB-200. WN8UCU is a new Novice in Youngstown. W88CV is now General Class. WN8SAQ has a new Twoer. Parma RC's *PRC Bulletin* says W8-CZM left for Utah. W8APLC has replaced K8MYA as secy. of the club and the club has started its code and theory classes. Mt. Vernon ARC held its annual picnic and transmitter hunt. W88KNS has a new baby girl. Westpark's Radiops tells us W8AJW won 1st place nationally in the N.Y. QSO Party as well as top honors in the N.Y. Long Island QSO Party. W88RYP made the BPL. Steubenville Area ARC's officers are K8APH, pres.; W8-CWY, vice-pres.; W8DYF, secy.; K8LQM, treas.; K8-VBH, Radio Officer.

Net	Sess.	OTC	Percentages
OSSB	50	943	15.8
BN		269	8.06
OBN	16	127	8.

Traffic: (Sept.) W81RYP 547, W88PMN 352, W88FSX 320, W8GHT 263, W8A8CG 236, W88CFJ 231, W88YGT 187, K8UBK 150, K8LGA 149, W8BZX 146, W8DAE 128, K8-VSO 125, W8NAL 120, W8TV 103, W8OOU 94, W8QZK 84, K8BYR 77, W88NSL 67, W88PZA 66, W8GOE 64, W8TFC

62, W8QCU 59, W8ERD 58, K8DLHJ 52, K8BNL 45, W8OE 45, W8MHO 43, W8FGD 41, W8ALM 41, W8APQI 38, W8AJXJ 31, K8LGB 30, W8HTR 28, W8LZE 23, K8-DDIG 18, W8DQD 18, W8LTC 16, W8ARWK 16, K8LFI 14, W8WEG 14, W8RKP 12, W8MNO 10, W8LAG 6, W8-QIH 6, W8FEQ 4, W8ABND 3, K8RMIZ 2, K8LRK 1, (Aug.) K8DDG 31, K8LRK 4, (June) W8HKB 2.

## HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2JGG. Section nets: NYS on 3670 kc, nightly at 2400 GMT; NYSPTEN on 3925 kc, nightly at 2300 GMT; ESS on 3590 kc, nightly at 2300 GMT. Appointments: WB2YV as ORS and WB2RWB as OVS. Endorsements: K2HNV and WB2HZY as OPSS; W2PKY and W2THE as ORSs; K2-BGU as OVS and W2AWF as EC. Amateur regulations was the forum discussion at the Albany Club. Antenna construction, painting and a new linear are the projects at the RPI Club. W2SZ, W2YGC spoke to the Schenectady Club on the aircraft flight control center at the Albany Airport. In New Rochelle, a Tel. Co. representative spoke on Laser communications devices. W8TYR was the featured speaker on microphone analysis at the Westchester County Club. WA2ZPD reports 125 watts on 2 meters. The Union College Club, W2UC, has a 24-hour service to accept student traffic. They report a new 80-meter dipole. W2EAF is a new member of Navy MARS. Assisting with a new four-element beam at WB2GAIN were WB2YV and WB2DXL. WB2UHZ assisted WB2YVZ in both theory and code. Congrats. We congratulate our two HPL winners for Sept. traffic, WA2VYS and WB2HZY. A new exciter and linear are under construction at WB2FOA. W4CLW, traffic mgr., installed a rig for Novices at W2SZ. During tropo openings Sept. 1 and 3, K2DNR worked 17 new DX stations on 144 mc. Traffic: WB2HZY 519, WA2VYS 227, WB2UHFZ 64, K2SSX/2 59, WB2CYZ 38, K2SJM 48, W2ANV 40, W2BXP 38, WB2YV 38, W2-DXL 34, W2TRP 27, W2PFY 19, W2HGB 18, WB2OTR 18, W2SZ 16, WA2WGS 15, WB2FOA 10, WA2ZPD 10, K2HNW 9, W2UC 9.

**NEW YORK CITY AND LONG ISLAND**—SCM, Blaine S. Johnson, K2IDB—Asst. SCM, Fred J. Brunjes, K2DGL. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	K2UFT — RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW — PAM
VHF Net	146.25 Mc.	1900 P5SnM	W2EW PAM
NYS/EP	3932 kc.	1600 Daily	WB2DXM — PAM
NLS(Lo)	3630 kc.	1845 Nightly	WB2SLI — RM

NYCLAREC Nets: See Dec. 1965 column for skeds.

New appointments: WB2FAJ and WB2QKJ as ORSs; WB2JW and WB2STQ as ORSs. The MARS 2-Meter Link between K2UBG and K2MWN is now active. WA2-RUP/6 says "hello" to the NLI gang and will be looking for you guys on the air. The OPPOSUMs meet every Sun. at 0800 local on 146.8 Mc. WA2PMM picked up Michigan for his 18th state on 2 meters. WB2MBU is looking for some 6-meter c.w.-type operators to talk up a storm. WB2-EMJ belongs to the school film club and needs some actors for a movie. The Kings 15-Meter AREC Net meets every Wed. at 2030 local time on 21.37 Mc. so there's your chance to join a 15-meter AREC net! WA2OAO, who has given many fine years of devoted service as EC of Bronx County, now finds he must resign and tend to other things. The SEC and SCM wish to thank him for all his efforts in guiding the Bronx AREC. WA2PSL has been appointed the new Bronx County EC. WB4APN/2 is playing s.s.b. on his new SB-100. The Amateur Radio Luncheon Club now meets at 1215 noon the 3rd Thurs. of the month at "60 East" Club, Lincoln Building, N.Y.C. If you're in town, "C'mon down!" saveth W2PF, chief luncher. WA2VKK, up there at Ithaca College, is doing a "news" show on WICB-f.m. WA2YDN is at Ithaca, too! K2UYG is resting his pair of hot little 4-250As while he works the K2GL "Contest Super-Station"! W2HQV is way out in Oakland, Calif., at Merritt College while his brother, WB2CMD, is over here in East Meadow. WB2-UQP received his General Class license last summer while at Camp KIPQ. WB2UGP reports that his brother is setting up at Michael AFB in Tacoma, Wash., as WN2-WIF/7. Hey, I got the old Poly-Corun 62 going again with an eleven-element beam behind it so I can check into the V.H.F. Net on 2 meters. Been doing it for better'n a week now and you should hear how some of these younger fellows are handling traffic. The Old Pro's gotten 'em going like they were born to it. Care to give it a try? Officers of the Cardinal Hayes HSRC are WB2SCF, pres.; WB2SHZ, vice-pres.; WB2TUT, treas. WA2QGG is the new chairman of Rockaway ARC's station, K2-UHD. Dogzone if I didn't hear a WA2TAQ-type signal coming out of the new Lynbrook QTH on 2 the other night! WB2UDD is congratulated on winning his Gen-

eral. W2NTZ put the new Swan 350 on the air and W2-PF observed that it's doing real well. W2DP spent his Sept. vacation in good old Cape Cod with his Galaxy-5. K2OUD is the new president of Flatbush ARC. WB2-TOM has new converters on 420 and 1215. Shucks, W2SEU couldn't quite get the 88 elements up on 220 and had to settle for only 44! WB2UKQ built an audio preamplifier which does exceptionally well with 60 cycles but is rather flip with other frequencies in the spectrum. He's coaxing it! Traffic: (Sept.) WA2UWA 478, WB2RBA 173, K2UBG 119, WB2NGZ 98, WB2DXM 96, W2EAV 81, WB2SLI 80, WB2QKJ 70, W2GKZ 57, WA2RUE 56, WB2PTS 44, WB2-RQF 36, WB2UQP 33, WB2OMX 28, WA2PMW 24, WB2-PFY 22, K2UFT 22, WB2NBU 17, WA2RAR 15, WB2-EUH 14, W2DBQ 13, W2EMJ 12, WB2UGP 11, WB2AEK 10, WB2TCS 10, W2EC 8, WB2TUH 7, WB2CB 6, W2PF 6, WB2UV 6, WB2HLX 5, WB2AWX 4, WB4APN/2 3, K2-DGI 1.

**NORTHERN NEW JERSEY**—Acting SCM, Louis J. Amoroso, W2LQP—Asst. SCM, Edward F. Erickson, W2-CVW. SEC: K2ZFI. ARPSC Section Net schedules: (all times local in effect)

NJN	3695 kc.	Daily	7:00 P.M.	WB2AEJ	RM
NJ Phone	3900 kc.	Fx Sun.	6:00 P.M.	W2PFV	PAM
NJ Phone	3900 kc.	Sun.	9:00 A.M.	W2ZI	PAM
NJ 6	51,150 kc.	Mo-W-Sat.	11:00 P.M.	K2VNL	PAM
NJ 2	146,700 kc.	Tue.-Sat.	10:00 P.M.	K2PTZ	Mgr.

AREC net skeds are available from K2ZFI. New appointments: WB2WVH as ORS, W2CVW as OVS. WA2-TEK has activated a N.J. P.O. Net Sun. at 6 P.M. local time on 3900 kc. WB2SEZ has taken over as NCS on the NJN and is doing a fine job. W2PEV has a homebrew 6146 rig on 2 meters with an eight-element beam and is finding many of his old friends. WB2YO ran an organized message service from a professional society convention in Philadelphia. WB2VUJ has joined MARS. The AREC Traffic Net in Northwest N.J. now has 11 members. 50,360 kc., 8:45 P.M. local. W2ZKE also has joined MARS. WB2KTO has a DXCC total of 170/151, and made 35,520 points in the N.J. QSO Party. WA2SRQ is boiling the moisture out of his rig after vacationing in Long Island. W2VMX an K2UXJ visited W1AW. WB2ICH has entered his second year at Rutgers. WN2YQP is a new member of the Navesink Emergency Net Sun. on 145.8 Mc. at 9 P.M. Mike has 12 states worked so far. WB2-WNH and his XYL WN2YOZ are having a lot of fun on 80 meters. Jim with traffic and Jane on the Novice band. K2RDX has designed a new antenna balun to overcome corrosion. WB2MXZ finally got his beam up again after FD. WB2JKU is serving in the Armed Forces in Viet Nam. New officers of the Tri-County ARA are WA2ASM, pres.; W1CKT/2, vice-pres.; WB2HSZ, secy.; WB2NJJ, treas. The club meets every Mon. evening at the Plainfield Red Cross 7th and Lee Place. WA2ASM broke 100K points in the VE/W Contest with a new dipole. WB2UCS has 47 states on 6 meters and 12 states on 2 meters. K2UCY is maintaining OBS schedules on 146.25 Mc. Mon. and Fri. at 6:45 P.M. and Wed. on 145.80 Mc. in spite of illness. Bill complains of slack in AREC and traffic activity in his area. WB2URD and other college students find homework keeps them off the air. W2LQP is now the Acting SCM for Northern New Jersey and W2CVW is Asst. SCM. I would like to thank everyone for the fine cooperation I have received in the past three and one-half years. I know that you will give Lou the same support that you have given me. I still will be seeing you in my capacity as Lou's assistant. Traffic: (Sept.) WB2OHK 505, WB2WVH 105, K2VNL 93, WA2TEK 92, WB2URD 72, K2KQD 53, W2CVW 52, WB2SEZ 46, WB2UZY 27, WB2VTT 26, W2PEV 25, WA2TAF 24, WB2YO 20, WB2-WNH 17, WB2UJ 15, WB2RAMO 13, W2TFM 12, W2DRV 10, K2EOP 10, W2LQP 10, K2ZFI 10, WB2QJF 6, WB2-KTO 5, WA2CCF 4, K2MFX 4, WB2OUQ 3, WA2ASM 2, W2JDH 1 (Aug.) WB2KTO 8, WA2SRQ/2 4, (July) WA2-SRQ/2 6, W2VAIX 3, (June) WA2SRQ 9.

## MIDWEST DIVISION

**IOWA**—SCM, Owen G. Hill, W0BDZ—Asst. SCM, Bertha V. Wilhits, W0LGG. SEC: KOBRE. Thanks to the Iowa ARRL members for their vote of confidence. As this is my first report it may not be as complete as it might be. KOBRE is now Midwest Division Asst. Director. In looking over the files I find numerous certificates that need endorsing. Please get your activity reports in as soon as possible. KOVDY will have his 6-meter rig on the air soon. W0PPE reports Iowa present Sept. 9 and he made several contacts. The Iowa 75-Meter Phone Net reports QNT 1204, QTC 179 in 26 sessions. The Iowa 160 Phone Net reports ONI 603, QTC 15 in 30 sessions. The Iowa 75-Meter S.S.B. Net meets daily except Sun. on 3970 kc. at 7 P.M. (CDST). The Roosevelt High Radio Club, D.M., is sponsoring a QSO Party for the Zero District

Dec. 10-11. This is a chance to work rare counties. Traffic: (Sept.) WÖLGG 1014, WÖLXC 450, WÖJEG 71, WÖULS 71, KÖASR 58, WÖAMH 30, KÖBRE 25, WÖAJUT 23, WÖADYV 22, WÖLJW 20, KÖKAQ 19, KÖTFT 17, KÖTDO 14, WÖBKR 12, WÖIYH 12, WÖAFY 9, WÖNGS 6. (Aug.) WÖLXC 206.

**KANSAS**—SCM, Robert M. Summers, KÖBXF—SEC: KÖEMB, RM: WÖJIL, PAM: KÖJHF, V.H.F. PAM: WÖHAJ, WÖAKSK, KÖDGU and KÖBYS has joined the list of Silent Keys. The JARS, in Kansas City, is looking for QSTs prior to 1923. Hams in Salina now spend at least one night a month at home. NYLs now hold get-acquainted meetings. The first hostess was Irene Hatch, the NYL of KÖKED. The annual watermelon feed of the Salina Club turned out to be quite a juicy affair. A father-daughter team, WNÖPCM and WNÖPCL now is active on 2 meters in Topeka, WÖYMG and WÖDEA now have facsimile operations. OVS WÖFII reported a real fine score for the Sept. V.H.F. Contest. WÖKSY has been endorsed as ORS. WÖKSY is spotting a new Drake R-4 and T-4X. WÖCCW reports skeud with WÖAKHN, 130 miles air line on 2 meters. A new v.h.f. net is starting on 52.525 Mc. in the north-central part of the state and extends into the northwest in the near future it is hoped. Two new alternate net controls on HBN are WÖHKS, WÖBBI. Top traffic-handler on the net in Sept. was KÖTEY. AREC Nets are from 3 zones as follows: Zone 10 AREC Net, QNI 24, QTC 2, Net Mgr. WÖVRZ, Zone 15 AREC Net, QNI 41; C.W. Net QNI 10, QTC 1; 6-Meter EM, QNI 15, QTC 7; Zone 13, QNI 41, QTC 0. Traffic: WÖAMLE 389, KÖGZP 172, WÖLLE 114, KÖJMF 83, WÖAKGZ 77, KÖBXF 63, KÖEMB 63, WÖCCW 53, WÖAV 43, KÖVB 31, KÖMRI 29, KÖGI 17, WÖEMQ 15, KÖKED 15, WÖFDJ 14, KÖMZZ 9, WÖKSY 6, KÖLPE 5, WÖLLE 4.

**MISSOURI**—SCM, Alfred E. Schwaneke, WÖTPK—SEC: WÖBUL, KÖAEM is now EC for St. Louis County, replacing KÖJPL, now manager of the Show-Me Net (SMN) and RM. WÖFLL is Clay County EC. KÖJPI is ORS and OPS. Appointments renewed: KÖGSV as OO, KÖBWE as OPS, WÖFLL as PAM, KÖAIB is RACES-C.D. Radio Officer for the K.C. Area with KÖORB as alternate. An alternate c.d. control station has been set up by KÖORB at his office under the call KÖVRB. WÖJJSY joined the Silent Keys. The ARC of Central Mo. (WÖSKY, Sedalia) had a display of 80-, 40- and 6-meter gear with RTTY during the CB convention at the State Fairgrounds. A radio club has been organized at Kirksville State Teachers College. WÖDGG and WÖLUE are attending UMR at Rolla. WÖFMD is net recorder for MON. WÖCCWV is at Lackland AFB, Tex. KÖUVC is in the Peace Corps in Africa. KÖIHY has moved to Arkansas, completed second Master's degree and is on the faculty of Onachita University. WÖKYE installed a 50-ft. tower, a new TO keyer and received a WAC certificate. WÖHQR has a new Galaxy III with home-made power supply. OO reports were received from KÖJPI and WÖQWS. Sept. net reports:

Net	Freq.	Time	Days	Sees.	QNI	QTC	Mgr.
MEN	3895	2330Z	M-W-F	13	174	8	WÖBUL
MoSSB	3963	2100Z	M-Sat.	26	653	154	KÖTCB
MoPON	3810	2100Z	M-F	21	284	201	WÖHVJ
MTTN	3940	2300Z	M-F	21	220	46	WÖEML
MON	3580	0100Z	Daily	30	196	201	WÖWYJ
QMO	3580	2200Z	Sun.	4	19	—	WÖAFK
MSN	3715	0300Z	Daily	30	85	24	KÖONK
MNN	7063	1800Z	M-Sat.	25	64	13	WÖUUD
PHD	50.4	0130Z	Tue.(GMT)	4	63	—	WÖFNL

Traffic: (Sept.) KÖONK 1823, KÖAEM 201, WÖHVJ 164, WÖZLN 113, WÖTDR 106, KÖYGR 103, WÖFMD 84, WÖBMO/Ö 80, WÖUD 74, WÖEEE 67, WÖJIE 64, KÖTCB 47, WÖAFK 27, WÖLVE 24, WÖKKBZ 23, WÖTPK 22, WÖRTO 20, WÖBAZ 19, KÖJPS 17, WÖHQR 15, KÖOYV 15, WÖBUL 14, WÖACH 12, WÖGEBJ 12, WÖAKYB 12, KÖORB 8, KÖENH 4, WÖFLL 4, WÖEML 3, WÖGQR 2, KÖYIF 2. (Aug.) KÖORB 16, KÖJIS 6. (July) KÖJPS 26.

**NEBRASKA**—SCM, Frank Allen, WÖGGP—Appointments: WÖANVZ as OO. Net reports for Sept.: Nebr. Emergency Phone Net, WÖAGH, QNI 1595, QTC 92. Nebr. C.W. Net (NEB) WÖGZH, QNI 120, QTC 43. Western Nebr. Phone Net, WÖNIK, QNI 555, QTC 51. Dead End Net, WÖMCK, QNI 384, QTC 41. Nebr. AREC Phone Net, WÖRIZ, QNI 168, QTC 4. Nebr. Morning Phone Net, KÖUWK, QNI 1077, QTC 53. Nebr. AREC C.W. Net (NACN), WÖEEL, QNI 10. Nebr. Storm Net, no report received for Sept. Nebraska Centennial cards and certificates are being given in large numbers with a fine turnout of Nebraska hams. The Nebraska Amateur Hall of Fame is gaining momentum with WÖFZZ spearheading the program. Traffic is pick-

ing up on all Nebraska nets as winter sets in. Traffic: WÖGZH 257, WÖKGD 143, WÖANUK 133, WÖLOD 51, WÖLOY 42, KÖJFN 29, KÖUWK 29, WÖBV 21, WÖGVJ 21, WÖAMOB 19, WÖKHE 16, KÖQKW 16, WÖPDE 14, WÖQFI 10, WÖGGP 10, WÖLLQ 10, WÖPCR 10, WÖYFR 10, WÖGEQ 7, WÖIBB 7, KÖVTD 7, KÖDVG 6, WÖERW 6, WÖHOP 6, KÖIXY 6, WÖEEI 5, KÖFTJ 5, WÖLJO 5, WÖQWP 5, WÖADXY 4, WÖIXD 4, WÖNIK 4, WÖJAV 3, KÖFRU 2, KÖOAL 2, WÖIXF 1.

## ZERO DISTRICT QSO PARTY

Dec. 10-12, 1966

sponsored by

The Roosevelt H. S. ARC of Des Moines

Rules: 0200-0500 GMT Dec. 10, 2300 GMT Dec. 10-0300 GMT Dec. 12. All bands may be used, as well as both c.w. and phone. Stations may be worked once per band (phone and c.w. are considered separate bands). Call CQ Ø.

Exchanges: Ø stations send QO number RS(T) county and state, all others send number, RS(T) and state, province or country.

Scoring: One point per contact and multiply by the number of states (maximum 8) added to the number of different counties worked. Ø stations use states, provinces and foreign countries (and other Ø district counties) as a multiplier.

Awards: Certificates to first and second place in each state, province and foreign country and to the top scorer in each Ø district county.

Frequencies: 1815 3575 3950 7075 7230 14,075 14,300 21,075 21,290 28,600 and u.h.f. and v.h.f. bands. Novices try 3720 7165 and 21,110.

Any station interfering with traffic will be disqualified.

Logs showing dates, times, stations worked, exchanges, bands and modes and claimed scores. All should be accompanied with an s.a.s.c. and sent no later than Jan. 10, 1967 to the Roosevelt H.S. ARC, c/o Cliff Davidson, 5200 Shriver Ave., Des Moines, Iowa 50312.

## NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, John J. McNassor, W1GVT

—SEC: W1PRT, RM: W1ZFM, PAM: W1YBH, Sept. net reports:

Net	Freq.	Days	Time	Sees.	QNI	QTC
CN	3640	Daily	1845			
CPN	3880	M-S	1800	30	479	172

CPN high QNI: W1GVT 28, W1YBH 25, K1SRF 23, W1MPW 22, K1EIC 21, W1LUH 20, K1LFW 18, W1AGBA 17, W1FVU 16. SEC W1PRT is working to establish an AREC state-wide net as discussed at the EC meeting held at ARRL. AREC members are urged to assist local ECs to get the net going soon as possible. The Oct. SET created considerable interest and activity with good cooperation from nets, clubs, ECs, AREC, etc. The New London Hamfest was a great success. W1QV is pleased to be N.E. Director for the next 2 years. The Hartford County ARA's code and theory class is held Thurs. P.M. at ARRL. Officers of the Conn. Council ARC '67 are W1WHQ, pres.; W1EFW, vice-pres.; K1VII, secy.; K1FEM, treas. Waterbury ARC's officers are K1OQK, pres.; K1WLG, vice-pres.; K1OYF, secy.; W1GTE, treas. W1LUV is a new General Class licensee. K1MRI received the 500 County award, all 50-Mc. A3 operation. W1ZJJ/VEL returned to the Hartford area. The Slo-Speed C.W. Net meets at 2200 GMT on 3748 kc.; the Conn. Council Net Wed. at 6:30 P.M. on 3930 kc. We would like to have more 2- and 6-meter traffic nets operating in 1967. Contact the SCM for details. New Official VHF Station certificates are available. See page 112 Oct. QST for details. Send the SCM a radiogram for applications. My sincere thanks to all who have helped so much to make the duties of SCM a pleasure to perform. Your continued help is needed to make Connecticut the activity leader! All amateurs are invited to aid their clubs in support of HamQuest 67. A Merry Christmas and a Happy New Year to All. Traffic: (Sept.) W1EFW 474, K1LMS 106, K1EJR 131, W1NWM 119, K1OQG 97, W1AIV 96, W1A-FNJ 80, K1STM 72, K1EIC 67, W1BDI 64, K1SXF 56, W1GVT 55, W1ALP 52, W1KAM 47, W1MPW 42, K1SRF 37, W1QV 36, W1KUO 32, W1YBH 31, W1LUH 29, W1A-DEM 22, K1UUD 20, K1BXC 18, W1AIFN 15, K1QPN 15, W1AIDU 14, K1YGS 11, W1FDO 9, W1BNB 8, W1-GBR 7, W1ZL 4. (Aug.) W1DEM 13, W1ZL 6. (July) W1CTI 6.

**EASTERN MASSACHUSETTS**—SCM, Frank Baker, Jr., W1ALP—W1AOG, our SEC. received reports from ECs, W1s QAN, STX, LVK, K1s DZG, ERO, PNB, W1ABZJ. New appointments: W1XQF No. Andover, W1HPV for N.E. States Emerg. Phone Net as ECs; W1OFK, K1s FWF, GKA, W1s DPX, BFD as OVSs; W1ABFD as OPS, W1AOGSA/1 as ORS, Endorsed: K1BGK as PAM for 6, K1PNB as RM for Novice 80 C.W. Net, W1ADLT as ORS, W1ADD is the new RO for Lynn, W1ZAE, ex-W1CBX, is back in Brevard, N.C. W1ALP had LO-Nite at his QTH, with W1s UIR, AOG, HPV, OFK, K1PNB and XYLs. The 6-Meter Crossband Net had 22 sessions, 287 QNIs, 9 traffic, EM2MN had 22 sessions, 212 QNIs, 108 traffic, W3ROQ/1 is back on the air, W1UOH is home after a long trip over the Pacific, W1ALP attended the Norfolk County RA meeting at W1AZR's QTH, W1AWA, W1AZR and K1KXZ spoke at the Chelmsford ARA. Congrats to our N.E. Director and Vice-Director on their reelection, W1SB and W1AEB are Silent Keys, K1QGV is new in Quincy on 6, W1FDN is on 2, Danvers ARA's new officers are K1TWJ, pres.; W1JLX, vice-pres.; W1ZMO, secy.-treas, W1VMD showed pictures of the club's ED and CD activities, The T-9 Club met at W1IIB's, K1DCB has a new Tri-beam, W1VAH built a 500-ke. s.s.b. generator, The Massachusetts Club now meets at the G.A.R. Hall, High St., Hanson, the 3rd Tue. of the month, W1EYX is going to Italy to work, The South Shore Club held a meeting, W1AFSI is becoming active in our nets, K1BUE got the Viking 2 fixed and now is on 20 c.w. W1KLG has a new 67 Mercedes Benz, W1EOT has WAS and DXCC is next on 15 and 20, K1DZG went to VOI-Land and stayed with VOIEI, W1MPY and VE1NZ visited him, The Somerville Club meets Fri. at 1900, New officers are W1EFHJ, pres.; W1AIFJ, vice-pres.; K1YUB, advising W1ADJY is teaching electronics at high school, W1UOP is working 15 DX, W1s MYO, LR and JAJ are on 75, K1LDC is out of W1s, HKG, VRK, THH, KCO, K1s CRK and LD went to the New London Hamfest, W1AGS, 71 has a new final, with 4CX250B, 450 watts, EM2NN had 64 QNIs, 38 traffic, 13 sessions, NCSs are W1s EUL, EVD and FPF, Code practice is given on 3733 kc. Mon., Wed. and Fri. by W1s EBF, EUU and K1PNB, The Townsend AREC meets on 50.52 Mc, the 1st Mon, K1ESG is busy on nets as NCS, W1DAL is back on the nets with a new transmitter, K1VPI says the Needham Emerg. Net is back on, W1ZLX has certificates for 1st place, Mass. QSO Party 65, Norfolk County, Mass. 66 QSO Party, W1AJYB/1 says W1AIX will be active in traffic this year, W1ADPX is working DX on 2 and 6, K1ETT has an indoor joystick on 20, W1MRQ, VE1, from Prince Edward Island, Canada, had a swell time operating as DX, K1YUB is busy at B.C. W1TKG is on many bands, K1QDD is going to MIT, K1NAY spoke on MARS at the Wellesley Club, K1LZY and W1EPZ are having rig troubles, K1EJH worked Del. for state No. 11 on 2 and now is at W1YK, K1RNL/MM, on the USS *Ranger*, wants to thank many people for their help with traffic, PA0FAS was at a meeting of the Quannapowitt RA, The Framingham Club has started meetings, The Capeway RC met at W1GFL, W1VZSS tells us that there are 11,042 hams in Mass., 3709 in E. Mass. and 2333 in W. Mass. Traffic: (Sept.) W1PEX 1064, K1CLM 163, W1EMG 151, W1AOGSA/1 151, K1PNB 133, K1ESG 83, W1AIEYV 78, K1GK 55, W1UIR 55, W1DAL 52, K1EYF 51, W1DGM 47, W1AIEHH 46, W1OFT 43, W1CTR 36, W1AIEYV 30, W1ZLX 28, W1AET 26, W1AOG 21, K1EYM 21, W1VZSS 21, K1RCD 19, W1MX 16, K1WJD 13, W1ADPX 12, K1VOK 10, K1ETT 9, W1AIED 8, W1MRQ 7, W1ADLT 6, K1LQC 5, K1YUB 5, W1AED 4, W1IHL 4, K1OKE 4, W1AFST 2, K1LQC 2, (Aug.) W1OJAF 113, K1WJD 23, W1AETU 21, K1BGK 16, (July) K1WJD 14, (June) K1WJD 15.

**MAINE**—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG, PAMs: K1WQI, K1ZVN, RM: K1TZH, Traffic nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 on 3940 kc. Mon. through Sat., Pine Tree Net, daily at 3596 kc. at 1900, W1SNE, of Rockland, passed away recently. He was active in most of the nets also the round-table rag-chews and active on many of the bands 80 through 10 meters, also 2 meters. He will be sadly missed by all who knew him along the way, W1POT has his USA-CA 1000 award, W1AEB has put out a *Pine Tree News Letter* for stations interested in that net with lots of information in it, W1ROM is building an s.s.b. 6-meter transmitter, W1QDV is on 2-meter facsimile, W1AFNU has a General Class ticket now, The certificate endorsements have been very good and at this time just about up to date, Traffic: K1WQI 76, W1GU 55.

**NEW HAMPSHIRE**—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1YSD, PAM: K1APQ, RM: W1DYE.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mar.
GSPN	3842	2300Z	M to F	26	791	99	K1APQ

GSPN	3842	1330Z	Sun.	—	—	—	—
VTNH	3985	2230Z	M to F	22	61	23	K1UZG
NHPON	5982	2400Z	M to F	23	—	—	K1BGK
MVARJC	5082	2100Z	Mon.	4	—	—	K1DVK
CPB	28.6	2315Z	Thurs.	—	—	—	W1JB

K1YSD, our new SEC. can use help to improve our N.H. emergency setup, K1MNK is the new Strafford County EC, Endorsements: K1AC, as ORS, W1ET as OPS, K1DVK as EC, Central New England Net's new officers: K1VHT, net mgr.; K1WUD, asst. net mgr.; W1AIEYV, secy.-treas. New N.H. hams: W1AFBC, W1AFJX, W1N1GWX and W1N1GNK, K1YSD has a new HW-12, W1EVN is going on RTTY, W1PYM is home from California, W1YMJ is active on MARS frequencies, K1ODC is a new resident of N.H. The Nashua Mike & Key Club held its Annual Baked Bean Supper and new OVS certificates were presented to W1BXM, W1CTW, W1DUB, W1IQD and W1QKA, K1NHN won the C.W. DX Contest and K1OBT won the phone part, Traffic: (Sept.) W1ALE 43, K1BGI 18, K1PQV 12, W1SWX 7, K1YSD 7, W1EVN 5, W1MHX 4, (Aug.) W1ALE 34, K1BGI 33, K1PQV 13.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: W1YNE, PAM: W1TXL, RM: W1BTV, V.H.F. PAM: K1TPK, New appointment: K1SXY as OES, R1SPN report: 30 sessions, 484 QNI and 74 traffic, The W1AQ Club of Rumford issued the following WRI certificates: No. 86 to W1A9EZP, No. 87 to W1A1BLC and No. 88 to W1A1BFD, The following club members participated in a DX-Petition to Washington County, R.I., to assist hams in obtaining that county for the WRI certificate: K2KMF/1, K1HMO, K1CZD, K1LII, K1LXQ and K1AMG, The club members recently installed a beam and completed work on the club station, K1EWL has returned to college and W1KWA has returned to Rhode Island after spending some time working in New Hampshire, The Fidelity ARC elected W1AEEJ, pres.; W1A1BOP, secy.; W1N1GGD, treas, SET messages were received from the following: W1s WLG, QLT, FEQ, YKQ, BTY, AFO, POP, HJF, JFF, IUM, K1s VYC, ABR, TPK, VPK, W1ACSO, W1N1GBO and K1N1CLQ, The SET Operation was a huge success in Rhode Island because of the fine operation of AREC units and all traffic nets, Traffic: W1TXL 407, W1YKQ 94, W1BTV 81, K1TPK 43, K1VYC 33, K1YVN 28, K1YEV 19, W1AEEJ 17.

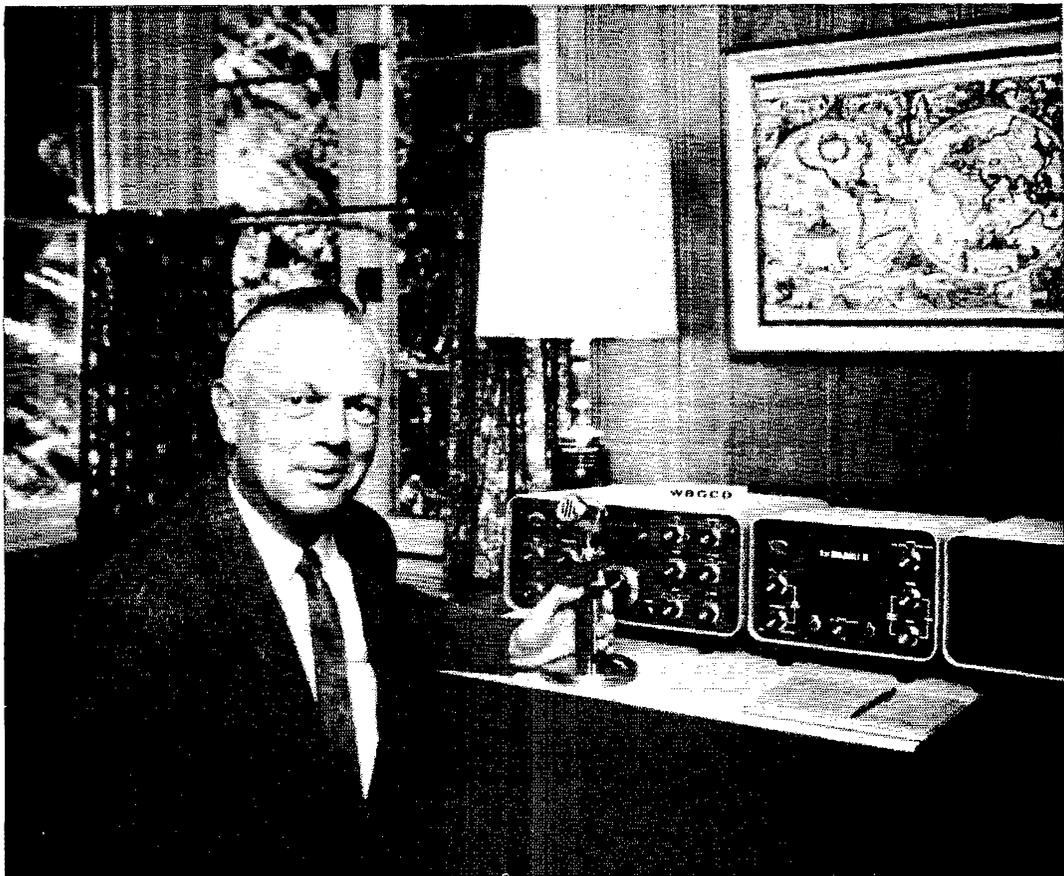
**VERMONT**—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA, RM: K1UZG, Net reports for Sept.

Net	Freq.	Time	Days	QNI	QTC	NCS
Gr. Mt.	3855	2230	M-S	478	11	W1VMC
Vt. Fone	3855	1400	Sun.	130	0	W1UCL
VTCD	3990/45	1500	Sun.	21	8	W1AD
VTNH	5885	2230	M-F	69	28	K1UZG
VTSP	3909	2300	M-S	758	55	W1CBW
		1330	Sun.			

The Burlington Amateur Radio Club, Inc. has elected W1N1GFC, W1A1BOP, W1HRG, W1VSA, K21OW/1 as trustees, K21OW/1 was elected president, W1VSA treas. and Fran Hall is clerk, The CVARC once again will sponsor the Vt. QSO Party to be held next Feb. 18-19, Traffic: (Sept.) K1BQB 273, K1UZG 25, K1MPN 13, W1FRT 7, W1KJG 2, (Aug.) K1UZG 22.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—SEC: K1IJU, C.W. RM: K1LJV, With the return to fall activity we now have information for this section of QST, courtesy of the club bulletins (without which we'd have darn little to report!) From *Hampton County*: W1A1GJO and W1A1GAB are new members of the club, W1ANA was the speaker at the Sept. meeting; K1LDT is chairman of the "HamQuest Membership Drive"; K1PMK is the new presy.; an electronics class is to be held prior to each meeting; W1A1BNB has a new SR-100; W1UFP is active in MARS, from *Hamrad* (Pittsfield): W1DDW is active on 160; K1TBN is a stamp collector; W1A1CPD is working on an s.s.b. rig; W1ADHI has one of the most beautiful set-ups in the area, from *Montachusett Club*: New officers are W1FKT, pres.; K1ZDX, vice-pres.; W18FXX/1, 2nd vice-pres.; W1VBT, secy.-treas.; W1BYH, trustee, from *Fall Valley Amateur* (Springfield): Speaker of the month—W1CLX, —on DX, The club net meets at 9 P.M. Sun. around 28.6, New club members are K1R1JW, K1UXN, W1N1GCC and W1N1FVN, The New England Teen-Age Net meets Tue., Wed. and Thurs. at 7 P.M. to handle traffic on 3.88, Anybody is welcome, K1ZOC is back on 15 after a spell in the hospital, End of information from club bulletins, Individual reports were received from K1LJV, W1YK, W1DWA, K1WZY, W1EOB and W1DWW (less than one-tenth of the reports we should get), The Fall W1N1 Pic-

(Continued on page 108)



*Goodwill towards men  
is the essence  
of amateur radio*

David W. Nurse, W8GCD  
President, Heath Company

# ANNOUNCIN

**The NEW 2K-2 floor console \$675.00**

In three short years the original 2-K set new standards for high power performance in the amateur service and established a tradition of excellence throughout the entire amateur world. Now the 2K-2 reaches new levels of achievement in electronic and mechanical designs.

**The NEW 4-K "Commercial" floor console \$980.00**

Four kilowatts PEP on SSB, two kilowatts continuous duty CW, linear AM or FSK. The 4-K has been specifically designed for commercial and military services requiring extra power, extra reliability and yet contained in the same compact cabinet as the 2-K.



All 2K-2 and 4-K models are available for operation on any frequency from 3.5 mc to 30 mc.

6% FINANCE CHARGE • 10% DOWN OR TRADE-IN DOWN • NO FINANCE CHARGE IF PAID IN 90 DAYS • GOOD RECONDITIONED APPARATUS • Nearly all makes & models. Our reconditioned equipment carries a 15 day trial, 90 day warranty and may be traded back within 90 days for full credit toward the purchase of NEW equipment. Write for bulletin.

**TED HENRY (W6UOU)**

**BOB HENRY (W0ARA)**

**WALT HENRY (W6NRV)**

# G!

## *A dynamic new line of Linear Amplifiers for the amateur, commercial and government services*

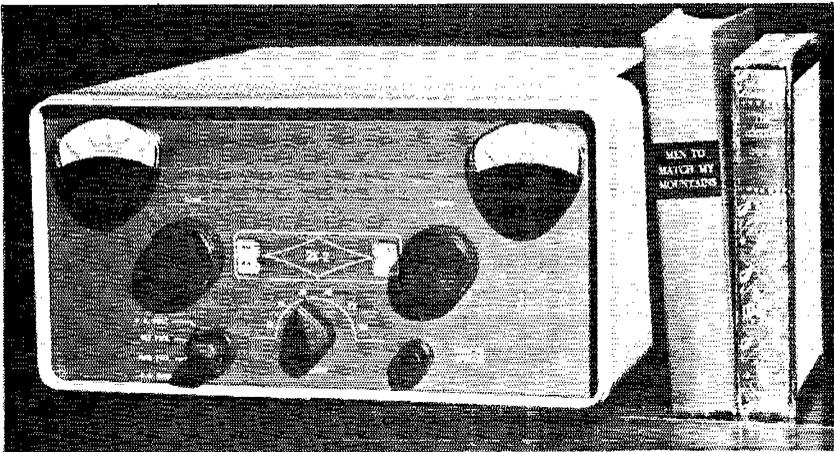
### **The NEW 2KD-2 desk model \$675.00**

All the famous 2-K power and reliability in a smaller, lighter two piece configuration with separate power supply. The total weight of both RF desk and power supply is 75 lbs.

### **The NEW 2KR-2 RF deck only (no power supply) \$425.00**

For those who want to provide their own high voltage, filament and relay power supplies, we offer the RF deck only of the 2KD-2 desk model.

For the discriminating user the 2K-2 and 4-K will be available shortly in automatic tune designs . . . called the 2K-2 auto and 4-K auto. They are designed to achieve either remote or local control of six channels with fully automatic operation.



Write for complete descriptive literature

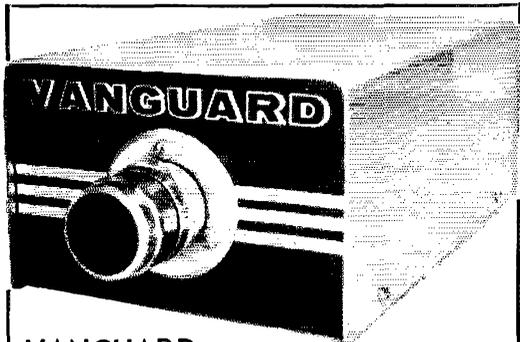
**Henry Radio Stores**

CALL DIRECT . . . USE AREA CODE

Butler 1, Missouri	816 679-3127
11240 W. Olympic, Los Angeles, Calif.	213 477-6701
931 N. Euclid, Anaheim, Calif.	714 772-9200
6116 N. 27th Ave., Phoenix, Ariz.	602 AM 4-3895

East Coast Rep.: Howard Laughrey, 2 Elizabeth St., Chappaqua, N.Y. 10514, (914) CE 8-3683

*"Worlds Largest Distributors of Short Wave Receivers"*



**VANGUARD  
MODEL 501**  
Made in USA.

**\$279.95** SHIPPING  
COLLECT  
COMPLETE WITH LENS

## SUB-MINIATURE SOLID STATE TV CAMERA

FOR CLOSED CIRCUIT OR AMATEUR TV

- Measures only 2 3/4" x 4" x 7" (excluding lens and connectors).
- Weighs only 3 1/2 lbs.
- Advanced circuitry utilizing 35 semi-conductors most of which are silicon.
- Resolution guaranteed to exceed best capabilities of standard 525 line TV receivers.
- Field-effect input circuit provides noise-free video. This is a VANGUARD exclusive.
- RF output 30,000 microvolts adjustable for channels 2-6.
- Video output 1.5 V p-p composite with standard negative sync.
- Viewable pictures obtainable from as low as 1 ft. candle of illumination to bright sunlight.
- Vidicon controlled automatic light compensation eliminates electric eye and provides error-free compensation for light level changes of up to 120 to 1.
- NEW VANGUARD "HI-FI" vidicon enables use of any 8 mm movie lens instead of 16 mm lens required by other TV cameras.
- Electronically regulated power supply and thermally compensated circuits eliminate change in picture quality when line voltage and temperature fluctuate.
- All parts guaranteed for 1 year (except for open filament on vidicon or breakage).

Dealer inquiries invited. Exclusive territories available to those qualified for CCTV service and installation.

**VANGUARD LABS**

196-23 Jamaica Ave.  
Dept. S-12

Hollis, N.Y. 11423

(Continued from page 104)

nic was held at W1BVR's cabin in Lanesboro with a pretty good attendance. WIDWA won the West. Mass. July CD Party. Traffic: (Sept.) WIDWA 80, W1BVR 50, WIDWV 32, K1WZY 26, W1EOB 2, W1YK 2. (Aug.) K1WZY 38.

### NORTHWESTERN DIVISION

**ALASKA**—Acting SCM, John P. Trent, KL7DG—Alaskan amateurs hearts were saddened by the death of our recent Acting SCM, Daniel R. Wright, KL7ENT, on Oct. 8 in the State of Washington from a heart attack. Dan was president of the Anchorage Amateur Radio Club and active as an instructor of amateur radio on his own free time. He gave unstintingly of himself to the development of our hobby in Alaska. The Northland Amateur Radio Club put "A Ghost Town On The Air" by traveling to Chitna, Alaska on Halloween. KL7FKO and KL7CDG handle blood bank radio traffic through Alaska. KL7BTP expects wedding bells soon. KL7DG is teaching general theory for NARC classes. KL7FLS, the mother of five, is active in Army AARS and the able secretary of NARC. The Anchorage Amateur Radio Club is active with winter meetings. KL7FNW graduated from the Novice ranks. KL7OT, from Aniak, Alaska, is YLI dog team musher from Kuskodwim country. KL7FJZ helped the NARC get Amateur Radio Week in Alaska. KL7FE will address the NARC on a.s.b. techniques. KL7CZ is on Middleton Island for the PAA. KL7CUK joined the QWCA. KL7PJ is the new owner of Yukon Radio Supply. W17FERL has a Drake 1-A and is studying for General. W17FOX is mending after an auto accident. KØCSJ/KL7 is on vacation to the lower 49. The PARCA is having a family dinner for YLs, XYLs and their OMs for a pre-Christmas get-together. The latest member of NARC's training program is 83-years-young Frank Loder, who is well on the way to a Novice ticket. The NARC received its ARRL charter in October.

**IDAHO**—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes at 0200 GMT on 3935 kc. Mon. through Fri. New appointments: K7CPC as OO and K7HLR as ORS. We need SEC, EC, OO, OPS, ORS, OVS and OBS applicants. Congratulations to new FARM net officers: W7YBS, mgr., and W7GGV, net control. The Lewiston-Clarkston Club set up club station W7JJD at the Nez Perce County Fair. W7GMC and your SCM attended the ARRL Northwest Division meeting at Walla Walla. W7CVJ and W7GCT provided emergency communications for the Moscow area following a fire in the telephone building. Among those assisting were K7NDX, K7CCT, W7MUL, W7LOF, K7ROE, W47DDF, W7OZJ, W7QEL, W7IY, W7IDT, W47EWW, K7THX and the Idaho C.D. Net. W7IY is net control for the early C.D. Net at 1415 GMT and W7YON is net control and W7GUQ and K7OSX are alternate net controls at 1515 GMT on 3990.5 kc. Farm Net traffic (Aug.): 22 sessions, 542 check-ins, 93 traffic handled. (Sept.) 20 sessions, 512 check-ins, 110 traffic handled. Traffic: (Sept.) W7HLR 370, W7GMC 182, W7GGV 32, W7ZNN 10, W47EWW, 5. (Aug.) K7HLR 171, W7GGV 58, W7IY 15.

**MONTANA**—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RZY.

Montana Traffic Net	3910 kc.	M-F	1800 MST
Montana RACES	3996.5 kc.	1-3rd Sun.	0900 MST
Montana PON	3885 kc.	Sun.	0900 MST
Billings AREC	3915 kc.	Sun.	0930 MST
Great Falls AREC	3910 kc.	Sun.	0915 MST

New appointments: W7VNE as EC of Deer Lodge County. W7RZY and W7TYN attended the Division meeting of the ARRL at Walla Walla. W7KJX attended as an observer. The Simulated Emergency Test was a great success in Montana. New calls in the Butte Area include W47FBJ, W47FOB and W47FLB. K7JXL and the gang in Great Falls are reorganizing the Big Sky Radio Club. The Billings Club is starting its annual membership drive. K7SYQ has a new 350 on. K7TZZ is on with a TR-3. K7AZF is teaching in Washington. W7TPD is moving to Miles City. W7WVL is now working in Anaconda. K7GK recently took a trip to the Chicago Area. W47ANY is a new call in Libby. Montana is very much in need of a c.w. traffic net. If you are interested in such a net, contact your SCM. Traffic: K7LDZ 151, K7DCH 60, K7FGJ 34, K7MRZ 18.

**OREGON**—SCM, Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH. Section nets:

Net	Time local	Freq.	Days	Mgr.	NTS
OSN	1900	3585	M-F	K7IFG	

# SOLID STATE FREQUENCY CONVERTERS

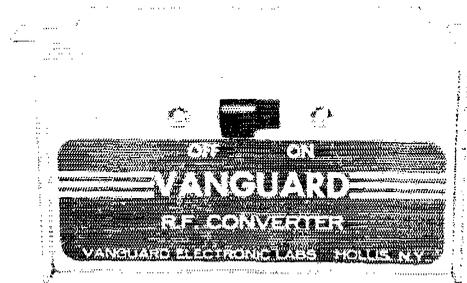
WORLD'S LARGEST SELECTION OF STOCK FREQUENCIES

Available in the following frequencies from stock:

	Model	Input mc	Output mc
2M	301-D	144-148	50-54
	301-E1	144-145	.6-1.6
	301-E2	145-146	.6-1.6
	301-F	144-146	28-30
	301-Q	144-148	14-18
	301-R	144-148	7-11
	301-S	143.5-148.5	30-35
6M	301-B1	50-51	.6-1.6
	301-B2	51-52	.6-1.6
	301-C1	50-54	7-11
	301-C2	50-54	14-18
	301-J	50-52	28-30
20M	301-G	13.6-14.6	.6-1.6
CB	301-A1	26.5-27.5	.6-1.6
	301-A2	26.8-27.3	3.5-4.0
40M	301-K	7-8	.6-1.6
CHU WWV	301-L	3.35	1.0
	301-H	5.0	1.0
Int'l. Marine	301-I1	9-10	.6-1.6
	301-I2	15-16	.6-1.6
	301-M	2-3	.6-1.6
Aircraft	301-N1	118-119	.6-1.6
	301-N2	119-120	.6-1.6
	301-N3	120-121	.6-1.6
	301-N4	121-122	.6-1.6
	301-N5	122-123	.6-1.6
	301-N6	123-124	.6-1.6
Fire Police VHF Ma- rine etc.	301-P1	154-155	.6-1.6
	301-P2	155-156	.6-1.6
	301-P3	154-158	7-11
	301-P4	154-158	104-108
	301-P5	156.3-157.3	.6-1.6
Weather	301-W1	162.55	1.0
	301-W2	162.55	10.7
	301-W3	162.55	107.0
CUSTOM MADE	301-X Your choice of any one in- put and output frequency between .6 and 163 mc.		

(4-6 weeks delivery on custom converters)

For prompt shipment please include postal money order or cashier's check. COD's must include 20% deposit. New York City residents add 5% sales tax. New York State residents add 2% sales tax.



ANY CONVERTER  
NOW ONLY

**\$16.95**  
ppd.

except 301-X, \$18.95 ppd.

The model 301 uses 3 of the very latest type epitaxial planar UHF transistors for unsurpassed gain and low noise at all frequencies. It can operate from 6 to 18 volts (positive or negative ground) without any significant change in gain or frequency. The circuit consists of a tuned R.F. amplifier, crystal controlled oscillator and a low noise mixer. More than 30 high quality parts carefully assembled and tested. Sensitivity is better than 1/2 micro-volt for a 6 db signal to noise ratio even at 160 mc.

- Enclosed in a sturdy 16 gauge, 3 1/8" x 2 3/8" x 1 3/4" aluminum case with mounting ears, transfer switch and two SO-239 (UHF) receptacles.
- 100% made in the U.S.A.
- 2 year guarantee on all parts including transistors!
- Free 24 hr. SPECIAL DELIVERY anywhere in the U.S.A. if you send a money order or cashier's check. With personal checks allow 2 weeks to clear the bank before shipment can be made. No shipments made on Saturdays, Sundays, holidays, and 2 weeks in August.

## OPTIONAL ACCESSORIES:

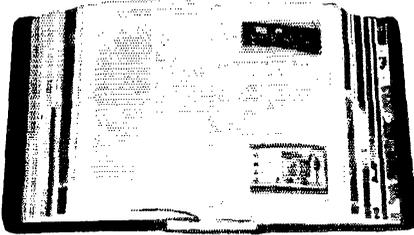
9 volt battery eliminator with 110 volt cord. Only \$2.95 ppd.

R.F. cable adapters in 6", 12" or 18" lengths with PL-259 plug on one end (mates with converter). Other end your choice of Motorola male or female, RCA, BNC or PL-259. Price \$1.25 each postpaid cable with 2 plugs.

# VANGUARD LABS

Dept. S-12  
196-23 Jamaica Ave.  
Hollis, N.Y. 11423

# QST PROTECTOR!



As QSTs get older, they become more valuable. Are your 1966 copies being scattered about the shack? If so, why not file them neatly. The best way to accomplish this is to place them in sturdy, good-looking QST Binders.

Finished in reddish-brown fabricoid with stiff covers, each Binder holds twelve issues of QST, opens to any page and lies flat. Your copies are protected and always available for easy reference.

- Holds 12 issues of QST
- Opens to any page and lies flat
- Protects and preserves your copies
- QSTs always available for reference

**QST BINDERS (POSTPAID)**  
Each—\$3.00

Available only in the United States  
and Possessions

**AMERICAN RADIO RELAY  
LEAGUE**

Newington, Conn. 06111

BSN	1200-1830	3825	Daily	K7IFG	NTS
AREC	1900	3875	Daily	WA7AHW	

The new manager of the AREC Net is WA7AHW, appointed by W7AJN upon recommendation. He reports net sessions 30, attendance 490, maximum counties 15, 1 QST, 66 contacts, W7DEM reports for the Grants Pass area. W7EEJ now is WA7EEJ, WA7CGW and WA7CKL now are using a Heath Twoer. Stations with 2-meter I.M. are WA7EY, W7TCT and WA7ADW. Traffic: W7ZB 186, WA7CHD 73, W7GUH 64, W7ZPH 63, W7DEM 14, W7AJN 5.

**WASHINGTON**—SCM, Everett E. Young, W7HMQ —SEC: W7UWT, RM: W7OEB, PAM: W7LEC, V.H.F., PAM: W7PGY, NTS nets:

WSN	3535	Daily	0200Z	QNI 379	QTC 483	Sess. 30
NTN	3970	Daily	2030Z	QNI 925	QTC 660	Sess. 30
WARTS	3970	Ex-Sun.	0100Z	QNI 783	QTC 163	Sess. 26
NSN SLOSPEED	3700	Ex-Sun.		QNI 404	QTC 135	Sess. 28
NWSSB	3945	Daily		No Report		

Walla Walla Valley lads again put on a great Hamfest, W7PGY, Northwestern Division Director, conducted a very FB session at which programs for the coming season were set up. Attending were SCMs from Montana, Idaho, Oregon and Washington, SECs from Montana, Idaho and Washington, Washington RM and PAM along with RN7 Manager and TCC Rep. The meeting, held in Walla Walla Sept. 23, must be considered very successful. ORS/OPS, K7JHA, says the Tech. Net again is going along Sun. on 3970 kc. RM/OO/OI's W7OEB says the Richland ARC had a tough go during the summer. K7PVF-PVG were seen among the gang at Walla Walla. K7KSF is recovering FB from surgery and now operates from a hospital bed in the shack. K7VNV was among first to get on with "Hamquest 67." K7PVM now is at Burien and works at PNA. ORS/EC W7GYF took in the CBN Set-To on Snoqualmie Pass in Sept. and reports a good turnout. ORS W7AIB states the Clallam County ARC has been assigned the call W7FEL as a memorial to deceased past-president, Bob Burke. EC W7AJV sends in an inactivity report. OBS K7CHH keeps the bulletin service going and now is rebuilding the Final. ORS/OPS W7RXH now is heard with a new 30-1-1. OBS W7GVC tells us Walla Walla County will have a new EC soon. SEC W7UWT reports K7PXA is the new EC for Clallam County. EC/OPS W7MCW uses all home-brew both ways. BEARS report entries are coming in for the first Washington Section QSO Party. K7RSB is in charge. Amateurs participating in the dedication of Sanderson Airport Shelton, were W7JHK, WA7AGR, K7KTC, K7GPL, K7MVI, W7GJL, W7HMJ and W7PRW. Grays Harbor ARC report its float won first prize in the Aberdeen parade. Elected to QCWA posts at the Portland meeting were K7CNE, chairman; W7CLN, vice-chairman. Congrats to W7AEF on a very fine program. W7AEA is the new trustee for W7DK. Radio Club of Tacoma. Thirty-two hungry, but interested participants attended the picnic at W7IG. W7PUG and WA7ANG are receiving plaudits for 2-meter activities, re. repeaters on 2 at 146.76 and 146.34 Mc, with out at 146.58 Mc. Your SCM and XYL W7VHV completed a vacation to Calif., Nev., Ariz., Utah, Colo., Wyo., Ida. and Ore. Traffic: W7BA 1307, W7DZX 910, W7HMA 688, K7TCY 532, WA7DXI 505, W7ZCE 420, W7ZIW 404, K7CTP 317, W7IEY 289, W7PI 192, W7BTB 123, K7JHA 123, K7NB 79, W7GVC 63, W7OEB 62, W7APS 47, W7MCW 44, W7HMQ 32, W7KZ 21, K7ZVA 16, W7GYF 15, W7RXH 15, WA7CXD 13, W7AIB 9, W7AXT 9, W7EVV 9, W7AAO 3.

## PACIFIC DIVISION

**HAWAII**—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL, PAM: WOPAN/KH6, RM: to be announced, V.H.F. PAM: KH6EEM, Join a net now.

Net	Freq.	Time	Days
League Appointee	7.290 Mc.	0700Z	Wed.
Friendly	7.290 Mc.	2030Z	M-F
No Ka Oi	7.290 Mc.	2230Z	Sat.
50th State	3.895 Mc.	0500Z	Tue.-Sat.

RACES nets (40, 10, 6 and 2) various, Coordinate with KH6GG. May I take this time to wish you and yours the best of holiday greetings and best wishes for the coming year. KH6AFM has undertaken another license class, W5-MTX/KH6 has been holding down 10 and 15 meters from his Aiea QTH. Dr. John L. Wick, from KG6IG, concluded his Navy doctoring on Chichi Jima in the Benn Islands. John heads for CONUS while Lee and Hal run KG6IG. WN2VED/KH6 has been quite active on 40 meters. K2ASA spent some time in Tachikawa AB Hospital. Reports are she is fine. KH6FRO has been quite

# Now The Heathkit® Single-Banders Feature New Performance & Value

- Upper/Lower Sideband On All Models • Improved Design & Styling • Improved Audio & AVC Response • ALC Input For External Linear Amplifiers • More Convenient Control Locations

HW-12A 75-meter

**\$99<sup>95</sup>**



- 200 watts P.E.P. SSB transceivers • Choose 80, 40, or 20 meter model • Single knob tuning with 2 kHz dial calibration • Operate fixed or mobile with appropriate Heathkit power supply • Crystal filter type SSB generation • High-performance receiver • Built-in S-meter, VOX, PTT, and ALC

Now An Improved Version Of The SSB Transceiver That Opened Up A New Era In Amateur Radio . . . the number of Single-Banders you hear on the air is proof of their popularity, so now Heath has improved on these favorite transceivers . . . to bring you even greater economy and better performance.

Practical Improvements For Operating Convenience . . . the microphone input & gain control, plus bias adjustment are now located on the front panel for ease in changing from fixed to mobile operation. An added function switch position controls the optional HRA-10-1 plug-in crystal calibrator. And the power connectors are now fully compatible with Heath SB-Series power supplies.

Engineered With Heath "Know How." The receiver features 1 uv sensitivity, 2.7 kHz selectivity, and slow AVC action for optimum SSB reception. Transmitted carrier and unwanted sidebands are at least 45 db down. Here is the performance you expect in high priced equipment:

Designed For Easy Assembly. Over 90% of the components mount on a heavy-duty circuit board. Alignment is easy, requiring only a broadcast receiver, VTVM with RF probe, and a dummy load.

Heathkit  
"KW Kompact"  
The Perfect Kilowatt  
Linear For Your  
Single-Bander



Single-Bander Plus KW Kompact Puts You On-The-Air With A Full KW P.E.P. Input SSB For Less Than \$400! KW Kompact tunes 80-10 meters. Features built-in SWR meter & antenna change-over relay, ALC output. Matches 52 ohm coax. Choose HP-14/HP-24 power supply.

- Kit HW-12A, 75 meter, 15 lbs. . . . . \$99.95
- Kit HW-22A, 40 meter, 15 lbs. . . . . \$104.95
- Kit HW-32A, 20 meter, 15 lbs. . . . . \$104.95
- GH-12, Push-To-Talk & VOX Mike, 2 lbs. . . . . \$6.95
- Kit HRA-10-1, Plug-In 100 kHz Crystal Calibrator, 1 lb. \$8.95
- Kit HP-13, DC Power Supply (mobile), 7 lbs. . . . . \$59.95
- Kit HP-23, AC Power Supply (fixed station), 19 lbs. . . \$39.95
- Kit HS-24, Mobile Speaker, 4 lbs. . . . . \$7.00
- Kit HA-14, KW Kompact, 10 lbs. . . . . \$99.95
- Kit HP-14, High Power Mobile Supply, 10 lbs. . . . . \$89.95
- Kit HP-24, High Power Fixed-Station Supply, 22 lbs. . \$49.95

**SPECIFICATIONS — RF Input:** 200 watts PEP. **Sideband generation:** Crystal lattice band-pass filter method. **Stability:** 200 Hz per hour after warm-up. **Carrier & unwanted sideband suppression:** 45 db. **Frequency coverage:** HW-12A, 3.8—4.0 MHz; HW-22A, 7.2—7.3 MHz; HW-32A, 14.2—14.35 MHz. **Receiver sensitivity:** 1 uv for 15 db (S+N)/N ratio. **Receiver selectivity:** 2.7 kHz @ 6 db, 6.0 kHz @ 50 db. **Output:** 50 ohm fixed (unbalanced). **Operation:** LSB, USB. **Audio output:** 1 watt @ 8 ohms. **Mike input:** Hi-Z. **Tube complement:** Fourteen tube heterodyne circuit; (3) 6EA8's mic. amp. VOX relay amp., IF amp., RF amp., Recvr. mixer; (5) 6AU6's, VFO, VOX amp., IF amps., Xmr. mixer; (1) 6BE6, VFO isolator (HW-12A), Het. osc. and mixer (HW-22A & HW-32A); (1) 12BY7 Drivers; (1) 12AT7 Xtal. osc., product det.; (1) 6EB8 Audio amp. and output; (2) 6GE5 RF output. **Power requirements:** 800 VAC @ 250 MA peak, 250 VDC @ 100 MA, —130 VDC @ 5 MA, 12 VDC or VDC @ 3.75 amperes. **Cabinet dimensions:** 6½" H x 12¼" W x 10" D.



## FREE CATALOG

Describes these and over 250 kits for stereo/hi-fi, color TV, amateur radio, shortwave, test, CB, marine, educational, home and hobby. Save up to 50% by doing the easy assembly yourself. Mail coupon or write Heath Company, Benton Harbor, Michigan 49022

HEATH COMPANY, Dept. 9-12  
Benton Harbor, Michigan 49022

Enclosed is \$ \_\_\_\_\_, plus shipping.

Please send model (s) \_\_\_\_\_

Please send FREE Heathkit Catalog.

Name \_\_\_\_\_

(Please Print)

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Prices & specifications subject to change without notice.

AM-175

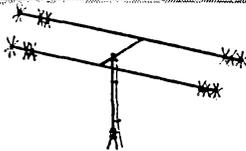


# CRAMPED FOR SPACE?

**NOW . . . MINIATURIZED,  
QUALITY ANTENNAS FOR . . .**

- APARTMENTS
- SUBURBAN HOMES
- PORTABLE USE

featuring heavy wall  
aluminum and stainless  
steel construction  
throughout



## 6-10-15-20 METERS

The time proved B-24 4-Band antenna combines maximum efficiency and compact design to provide an excellent antenna where space is a factor. New end loading for maximum radiation efficiency. No center loading.

Oper. Freq.	6-10-15-20 Meters
Power Rating	600 Watts AM
Turn. Radius	7'
Total Weight	11 lbs.
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

**Model B-24  
Net \$59.95**

## MULTIBAND COAXIAL ANTENNA FOR 6-10-15-20 METERS

Needs no ground plane radials. Full electrical 1/2 wave on each band. Excellent quality construction. Mount with inexpensive TV Hardware.

Power Rating	600 Watts AM
Total Weight	6 lbs.
Height	12'
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

**Model C4 Net \$34.95**



## 40 plus 10 METERS

New end loading for maximum radiation efficiency. No center loading employed. Element length only 18.5'...boom 10'.

Oper. Freq.	40 and 10 Meters
Power Rating	1000 Watts AM
Single Feed Line	52 ohm coax.
SWR at Resonance	1.5 to 1.0 max.
Total Weight	22 lbs.

**Model B 4010 Net \$79.50**

## RUGGED 6 METER BEAM

Rugged construction with no holes in elements or boom to weaken antenna. Heavy wall seamless aluminum and stainless steel throughout.

Power Rating	1000 Watts AM
SWR at Resonance	1.4 to 1.0 max.
Impedance	52 ohms
Longest Element	9'8"
Boom	12'

**Model B6M5  
Net \$24.95 each  
Two for \$44.50**

Write for Mini-Products' Miniaturized Antenna Catalog.

If there is no stocking distributor near you... order direct from factory. Free shipping to your QTH and we will prepay the costs in continental U.S.A.

DISTRIBUTORS WANTED IN KEY AREAS. Write for details to... Tom Venable, K3JZJ, Sales Manager

**Mini-Products, Inc.**

1001 West 18th Street, Erie, Pennsylvania

• LEADERS IN COMPACT ANTENNAS •

active chasing DX. WOPAN/KH6 recently was made an A-1 Operator. Larry also pumps the Official Bulletins to the Far East. KG6AIG continues to do a fine job down on Guam with his QTC work. WB6HXQ has moved to the islands with his family. Jon is quite avid in c.w. and 2-meter work. WA4YOK/KG6 has applied for AREC membership. KH6KS and KH6AFC leave the islands to homestead their ranch in Oregon. Jim and Hazel spear-headed the local s.s.b. club. KH6BZF presented the Ham-Quest 67 kick-off speech to the Honolulu and Wahiawa ARCs. Remember to support your League—the League. Traffic: KG6AIG 145, KH6BZF 20, KG6IG 1, WOPAN/KH6 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. W7JOO is the new superintendent of Hydro-Generation at Hoover Dam for the city of Los Angeles, Nevada has a new certificate for working all counties in Nevada. For more information write County Award, Box 2534, Reno, Nev. W7YKN reports the Reno Area is ready with communications for Nevada Admission Day Parade. WB6GCV, now WA7GAQ, is chief operator for the city of Los Angeles communications at Boulder City. WA7ECT is busy with c.w. traffic. WA7-CFS appointed WA7ERY as AEC for Fallon. K7ICW is busy on the v.h.f. and u.h.f. frequencies. K7RKH has several new v.h.f. and u.h.f. units. The Southern Nevada f.m. group on 146.94 and 147.5 Mc. is busy trying to get a location for a mountain-top repeater before winter. WNTFBF built an electronic keyer. Ex-W7KOH is a Silent Key. W7BIF, EC for Boulder City, is on the air with a vertical and SBE-34. WA7EL operated his station at the J.C. Fair in Las Vegas. K7OHX has some HB projects started besides his c.w. traffic-handling. Traffic: WA7CFS 34, K7OHX 15, WA7BEU 9, W7KOH 4, W7PBV 4, W7YDX 4.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB. ECs: WB6MXD, K6RHW. W6SMU, WA6TQJ. RM: W6LNZ. PAM: WA6YYK. Sacramento Valley was represented at the annual NCN Luncheon at Livermore by W6LNZ and WA6JDT. New S.V. members to NCN are W6BLW, Oroville; W6HKM, Crescent City, and WB6HNC, Roseville. For a list of ARPSC nets in this section see last month's QST. WN6-RIM is now WB6RIM and is the son of K6VVO. WN6TOA is on assignment to DU-Land and will miss the Sweepstakes and the Novice Roundup. W6BCN became a Silent Key Aug. 12. WA6JDT got the tower and beam up again with the help of WA6SLU. The first hour of operation was hopeless until it was discovered that the transmitter would work better if it was connected to the coax line. Your SCM would appreciate more news to print. Traffic: W6LNZ 121, WB6QMT 22, WB6EAG 20, W6OFK 14, WA6CXB 3.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC Bill Ray reminds all Es that Form 5s are expected the first of each month. W6IWF reports that the station at Red Cross Regional Headquarters in San Francisco, W6CXO, is in fine shape after work by WA6DPI and W6FKS on the emergency power generator. W6BIP and W6JXK helped at the Red Cross station during the SET. WA6IVM and W6UDL are holding classes for a handicapped group in San Francisco. WB6KHI still is working to get his RTTY gear operating. W6GQA was delighted to see his photo in Oct. QST as the holder of the longest unbroken string of FMT test participation. WA6MGG is operating portable from Sunnyside. W6WLW attended the NCN luncheon at Livermore in Oct. The Marin Club held its annual auction in Oct. WB6GVI still hopes to get a low-powered 6-meter rig on the air soon. WA6SFB reports results good on 432 Mc. during the Sept. V.H.F. Party. Also operating in this party from W6FEN's QTH on Veeder Mountain was WA6STS, back from a summer in the East. WA6JUV reports a big improvement from San Francisco City in the V.H.F. Contest—one station worked while last year he couldn't nail even a singleton. WA6IVM gave a talk on frequency measurement at the Sept. meeting of the San Francisco Radio Club. The Greater Bay Area Hamfest this year was the best ever with K6OJO getting a lot of credit as chairman of the event. Recent KPFA programs (Sat. 10:15 a.m. on 94.1 Mc.) have included W6JWF giving an outline of SET activities, W6HSA on the activities of the San Francisco Radio Club and K6OJO and WA6AUD on the hamfest. A newcomer to the section, W6JXR, reported a large traffic count. W6CIS, former Division Director, has retired from state service after 39 years. W6CYO claims that he will make DXCC by the time the snow melts. WB6AIS finds a lot of DX coming through from U.A.-Land. W6-RZS says that he will be active again soon. The San Francisco Section Net continues to meet Mon. and Fri. at 3900 kc. and the Red Cross SET traffic was handled over the net this year. Drop a line to the SCM and receive a copy of the section Courier plus a generous, free supply of Form 1s for reporting activity. Traffic: W6-JXK 201, W6KQF 134, W6WLW 132, WB6OGF 23, WA6-

THE **HEART**  
 OF ANY  
 TRANSCEIVER  
 IS ITS  
**VFO STABILITY**

so, Compare  
 the steady  
 "heartbeat"  
 of the

**GALAXY V**  
 with that of its  
 strongest Competitor!

Every Galaxy V that comes off our line goes through this exacting test! It amounts to a 90 minute "electrocardiogram" on VFO stability, the "heart" of any transceiver.

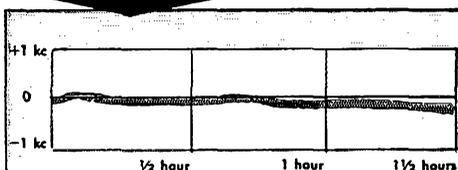
Every Galaxy's VFO stability must meet our exacting low-drift requirements! *The personal drift-chart of every Galaxy that comes off the line goes with the unit to its new owner.*

It's just one of many Galaxy requirements to insure the set's owner of the standard of performance we feel he is entitled to get! Others include *vibration testing* (a real torture test); *full power* (300 watt) *key down testing* over several hours; *actual on-the-air contacts* to assure superior audio quality; and a *final test of scope and sweep alignment of the filter.*

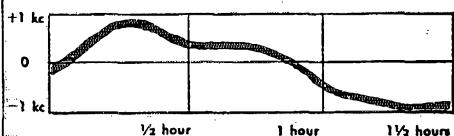
And speaking of filters—The super-selective filter in the Galaxy is no "Johnny-come-lately"! For over 2 years it has been the *most selective filter* in any Ham transceiver, and it still is! It is just 2.1 kc wide (-6 db points) and this, coupled with the shape factor of 1.8:1 means it is just 3.78 kc wide (at the -60 db points) *where the strong signals are!* THAT MEANS YOU HEAR LESS INTERFERENCE! Don't be MISLED! ...Shape Factor alone does not tell the story. A barn with a nice shape factor of 1:1 is still broad as a barn where the INTERFERENCE is!



EVERY GALAXY OWNER  
 RECEIVES HIS SET'S  
 "HEARTBEAT" RECORD!



This is the "heartbeat" of a Galaxy V picked at random from our assembly line! Note the minimum of drift in a 1 1/2 hr. test!



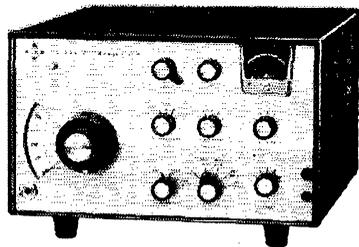
This is the "heartbeat" of a well-known competitor's transceiver. (Also picked at random.) Note the excessive drift that occurred during the same 90 minute test period!

**GALAXY V**

The most Powerful—Reliable—  
 Rugged Transceiver Anywhere!

\$420

80-40-20  
 15-10  
 Meters  
 300 Watts

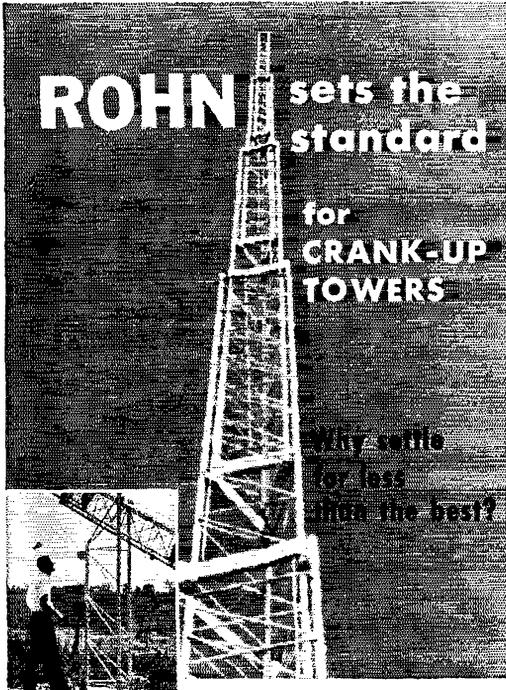


See the GALAXY V! Write us for the name of the Dealer nearest you!



**GALAXY ELECTRONICS**

Dept. QST-12M • 10 South 34th Street • Council Bluffs, Iowa 51501



**ROHN sets the standard for CRANK-UP TOWERS**

Why settle for less than the best?



K7ASK

**TWO CATEGORIES TO CHOOSE FROM**

**Standard Duty Guyed in Heights of 37 - 54 - 88 - 105 and 122 feet**

**Heavy Duty Self Supporting and Guyed in Heights of 37 - 54 feet (SS) 71 - 88 feet (guyed)**

**ROHN has these 6 IMPORTANT POINTS:**

- Ease of Operation**—roller guides between sections assure easy, safe, friction-free raising and lowering. **Strength**—welded tubular steel sections overlap 3 feet at maximum height for extra sturdiness and strength. **Unique ROHN raising procedure raises all sections together**—uniformly with an equal section overlap at all heights!
- Versatility**—designed to support the largest antennae with complete safety and assurance at any height desired!
- Simple Installation**—install it yourself—use either flat base or special tilting base (illustrated above) depending on your needs. **Rated and Tested**—entire line engineered so you can get exactly the right size and properly rated tower for your antenna. The ROHN line of towers is complete. **Zinc Galvanized**—hot dipped galvanizing a standard—not an extra—with all ROHN towers! Prices start at less than \$100.

**SEND FOR ROHN TOWER HANDBOOK**

—\$1.25 Value  
 —**ONLY \$100** postpaid (special to readers of this magazine). Nearest source of supply sent on request. Representatives world-wide to serve you. Write today to:



**ROHN Manufacturing Co.**

P. O. Box 2000

Peoria, Illinois

"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers, and installers of complete communication tower systems."

AUD 20, WA6IVM 19, W6BWW 15, W6CYO 6, W6DAMP 5, K6TZN 5, WB6GVI 4, WB6IMO 4, WA6SFB 3, WB6KHI 2, WN6TBC 2.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPU—WN6UNY is a new Novice in Stockton. WA6UAA is attending Fresno State College. WA6BTK is back in Nebraska attending the University. K6AXV got rid of the old coax and is replacing it with some new stuff. WA6ZLP is on 6 and 2 meters. WA6FUF is working on home-brew test equipment. W6RRN is having rotating problems. WA6ZRZ is the new president of the Porterville Radio Club. K6ROU has a new SB-400, and is moving to a new QTH. W6OHT is chasing DX with a new TH-6 beam. K6AJU is a new ORS. W6ADB says there is nothing new. W6BWK operated from the QTH of K6-CPQ during the June V.H.F. Contest. WB6PCQ is having problems with her linear amplifier. WB6HVA has a beam up on an 80-ft. tower. W6BJJ still is working on his s.s.b. exciter. W6QON heated up his soldering iron and put in some ALC in his Swan transceiver. With school starting and getting settled after the summer activities seem a little slow. However, I want to take this opportunity to wish each and every one of you hams a Very Merry Christmas, and a Prosperous and Happy New Year. Traffic: K6AJU 264. WB6HVA 253, WB6PCQ 210. W6ADB 149, WA6SCE 30, W6ARE 3.

**SANTA CLARA VALLEY**—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: W6VZE. RM: W6QMO. Our new SEC is W6VZE, of Burlingame. Charlie has been the EC for Burlingame for some time and has done a fine job of coordinating both the Red Cross and c.d. activities there. He plans to meet with the various AREC groups and ECs in the section. Let's get behind him and bring our section standing on emergency communications up. Many groups in the section took part in plans for the 1966 SET and your new SEC was active in this organization. Our thanks to WA6HVN for his work as SEC. Hal is pres. of the SCCARA and plans to remain active in Red Cross coordination. The West Valley Radio Club now has an emergency net with the following actives: WB6CUE, WB6QJW, WA6QJW, WB6SQB, W6TPL, K6VSQ, WA6YDF and WB6OKS. The Santa Cruz Radio Club held a joint meeting with the West Valley Radio Club at Cabrillo College in Oct. WA6UDE is editor of the club's fine bulletin. The *Northern California Net Bulletin* is ably edited by WB6HVA. W6ADB and W6LNZ. Activity on the net remains high and those interested in learning c.w. traffic operation are invited to check into the net at 0300Z on 3635 kc. daily. K6RTU, pres. of both the Foothills Radio Club and CCRC, was the guest speaker at the Sept. meeting of the Palo Alto Club, speaking on historic radio tubes. K6HMO, of Farion Electric, was the guest speaker at the SCARS. WB6CPQ is reported as a Silent Key. He was SCARS member No. 199. W6ZRJ, K6GK, W6DEF, WB6NXX and WA6CVU attended the NCN Luncheon in Livermore. K6GK reports wousy conditions on both 7 and 3.5 Mc. for traffic work. W6OII is active on MTN. W6AUC is working W4EXX on traffic schedule and is busy as OO. W6SAW is working RTTY traffic operations on 80 and 20 meters. W6YBV is liaison to RN6 and PAN. K6DYX works RTTY bulletins and is handling FAX on 2 meters to W6SHK. WB6NXX is now working RN6. W6MMG is operating on PCN. W6VWX reports that he was active during the recent CD Party. Dave is busy as the new pres. of NCDXC. WB6LZF is active on several phone nets. W6DQY works 2 meters. W6RSY was active on RN6 and PAN and QNI NCN during September. W6ASH is EC with SPECS. W6RFF is active on NCN. OO reports of active operation were received from W6ASH, W6UMI and W6SAW. W6AUC reported active OO contacts but had no OO report. W6DEF's AREC area participated in the SET. Traffic: W6RSY 1157, W6YBV 416, K6DYX 258, WB6NBX 198, W6SAW 92, W6DEF 90, W6ZRJ 37, K6GK 35, W6OII 27, W6AUC 14, W6VZE 7, W6ASH 6, W6RFF 6, WB6LZF 4.

**ROANOKE DIVISION**

**NORTH CAROLINA**—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDY. SEC: W4MFK. RMs: W4AANH and K4CWZ. PAMs: W4AJT and W44LWE. V.H.F. PAM: W4HJZ. W44QLP says he finally made WAS, has the needed QSLs for WAC and DXCC now is 70/60 with the same ole DX-60 and dipole. WB4BGL earned WAS on 80 and 40 meters. WA4VNV used a swimming-pool broom as a makeshift antenna mast while at the beach. WA4ZLJ and WA4ZLK are debugging their homebrew Handbook 432-Mc. rig. W4NAP has been appointed EC for Rockingham County and has been having fun on the low bands with a new EICO-753. W4ULE has a new 110-ft. tower with a new six-element 6-meter and fifteen-element 2-meter beams on it. K4VAZ is stacking two eight-element beams for 2 meters on a 100-ft. tower. WA4IXW is putting together an EICO-753 kit for mobile

# EIMAC

## 3-400Z's used in prototype 6-meter linear amplifier for 2 kW PEP at 50 MHz

The prototype Swan linear amplifier shown here uses two EIMAC 3-400Z triodes in grounded grid circuitry to achieve two kilowatts PEP input at 50 MHz. Drive power is less than 100 watts PEP. The prototype amplifier features a tuned cathode circuit for low intermodulation distortion, and uses a pi-network plate tank circuit. The new linear may be driven with modern six-meter SSB transceivers, and offers real operational economy at 50 MHz.

Swan chose EIMAC 3-400Z's because these compact, high-mu power triodes are ideal for grounded grid operation. They can provide a power gain as high as 20 in a cathode-driven circuit.

For more information on EIMAC's line of power tubes for advanced transmitters, write Amateur Services Department, or contact your nearest EIMAC distributor.

### 3-400Z TYPICAL OPERATION

(Minimum IM Distortion Products at 1 kW PEP Input)

DC-DC Plate Voltage.....	2500 V
Zero-Sig DC Plate Current*.....	73 mA
Single Tone DC Plate Current.....	400 mA
Single Tone DC Grid Current.....	142 mA
Two Tone DC Plate Current.....	274 mA
Two Tone DC Grid Current.....	82 mA
Peak Envelope Useful Output Power.....	560 W
Resonant Load Impedance.....	3450 ohms
IM Distortion Products.....	-35 db**

\* Approximate

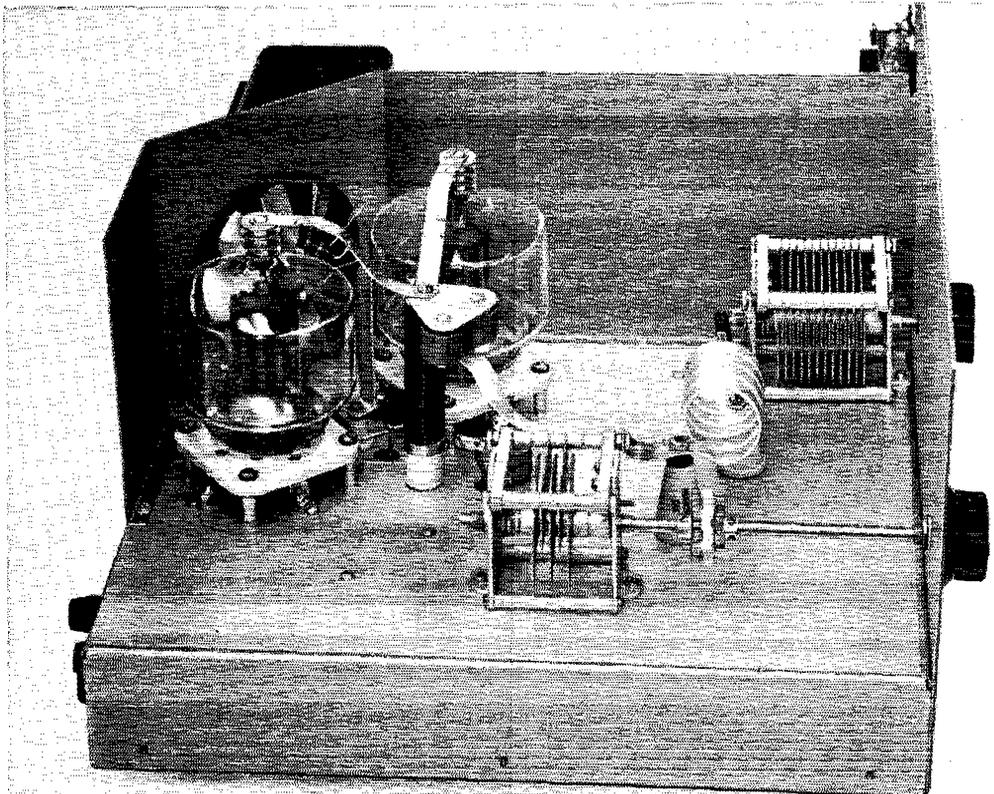
\*\* -35 db or more below one tone of a two tone test signal.

We have a new brochure entitled "Linear Amplifier and Single Sideband Service." Write for your copy.

**EIMAC**

Division of Varian

San Carlos, California 94070



# A FIRST CLASS FCC LICENSE

...or your money back!



**Y**OUR key to future success in electronics is a First-Class FCC License. It will permit you to operate and maintain transmitting equipment used in aviation, broadcasting, marine, microwave, mobile communications, or Citizens-Band. Cleveland Institute home study is the ideal way to get your FCC License. Here's why:

Our electronics course will *quickly* prepare you for a First-Class FCC License. Should you fail to pass the FCC examination after completing your course, you will get a *full refund* of all tuition payments. You get an FCC License ... or your money back!

And only CIE offers you new, up-to-the-minute lessons in all these subjects: Logical Troubleshooting, Microminiaturization, Single Sideband Technique, Pulse Theory and Application, Boolean Algebra, and many more.

You owe it to yourself, your family, your future to get the complete details on our "proven effective" Cleveland Institute home study. Just send the coupon below for FREE book or write to Cleveland Institute of Electronics, 1776 E. 17th St., Dept. QT-49, Cleveland, Ohio 44114.

## ENROLL UNDER NEW G.I. BILL

All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, OR are in service now, check box in coupon for G.I. Bill information.

MAIL COUPON TODAY FOR FREE BOOK

**CIE** Cleveland Institute of Electronics  
1776 East 17th Street, Cleveland, Ohio 44114

Please send me your FREE book, "How To Get A Commercial FCC License."

Name \_\_\_\_\_ (please print)

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Occupation \_\_\_\_\_ Age \_\_\_\_\_

Check here for G.I. Bill information.

Accredited Member National Home Study Council  
A Leader in Electronics Training ... since 1934

QT-49

use. K4YEC is helping to get the Rockingham County AREC organized.

Net	Freq.	Time	Days	QTC	Mgr
NCN (E)	3573 kc.	2330Z	Daily	239	K4CWZ
NCN (L)	3573 kc.	0300Z	Daily	152	WA4ANH
THEN	3865 kc.	0030Z	Daily	138	K4ODX
SSBN	3938 kc.	0030Z	Daily	114	WA4LWE

Traffic: (Sept.) W4EYN 267, W4OTE 156, K4BUJ 137, WB4BGL 134, W4HJS 118, K4CWZ 111, W4LWZ 104, W4-IRE 95, WA4UFQ 77, WA4NUO 59, WA4YVW 46, WA4-CFN 44, K4EO 39, W4UWS 39, K4PKF 36, WA4FJM 22, WA4ZLK 20, W4RWL 19, K4VQD 18, W4BNU 16, W4AJT 14, WA4UVH 12, WA4VTY 9, WA4ANH 7, K4ZKQ 6, K4CVJ 3, K4TTN 3, WA4GMB 1. (Aug.) W4LEV 982, W4UWS 88, WA4UFQ 56, WA4FJM 29, K4PKE 18.

**SOUTH CAROLINA**—SCM, Clark M. Hubbard, K4-LNJ—SEC: WA4ECJ. Asst. SEC: W4WQM. RM: K4-LND. PAM: WA4RUB.

SCN	3795 kc.	000Z/0300Z	Daily
SC SSBN	3915 kc.	0000Z	Daily Sept. Traffic 202

School has taken its toll of operators, especially on the SCN. The younger operators have to put school first. WA4ECJ organized an outstanding program for the SET. W4CE will have RACES in operation on 3993.5 kc. The SCSSBN will be on watch 2100Z. W4JA has added a Clogz 22er on 2 meters and is in RACES. WA4UYT, at Clemson U. from the Georgia section, is as active as school will permit on SCN. WN4DXX, 13 years old, is racking up DX. WA4LPV is at Georgia Tech. K4HDX is getting the bugs out of the radio gear in his air coupe. W4PED, W4NTO, K4OCU and W4JA hold SCN together. The Rock Hill Hamfest had an excellent EC meeting. Traffic: WA4ECJ 61, W4WQM 55, W4PED 50, K4LNJ 48, W4NTO 20, W4JA 14, WA4JCF 9, WA4QKQ 9, WB4CUF 6, WA4LDM 5, WN4BZA 4.

**VIRGINIA**—SCM, H. J. Hopkins, W4SEJ—SEC: K4LMB. Asst. SEC: K4ASU. PAM: W4OKN. RMs: W4-SHJ, K4LJK, WA4EUL. The Virginia QSO Party will be held Jan. 7 and 8, 1967. See details elsewhere in this issue. The SET for 1966 is new history. There was plenty of traffic but not enough stations to do all the jobs or to cover the section properly: the section phone and c.w. nets need better coverage regularly. W4KFC is the new Roanoke Division Director and W4ACY is the Vice-Director. W4KFC is mobilizing with a new Swan. Welcome back to Virginia, old-timer W4IA. K4PIK visited ARRL Hq. The Virginia ARPCSO organization cooperated with the state RACES headquarters during the SET and members manned the Hq. station near Richmond. Plan now

## VIRGINIA QSO PARTY

January 6-9, 1967

sponsored by  
The Roanoke Valley Amateur Radio Club

**Rules:** 1800 GMT January 7 to 0200 GMT January 9. No power limit or minimum time limit. The same station may be worked on additional bands. Call CQ VA. Virginia amateurs residing in independent cities will use a neighboring county in the contest exchange for the duration of the contest. Phone and c.w. are considered separate contests requiring separate logs.

**Exchanges:** Va. stations send QSO number, RS(T) and County. All others send number, RS(T) and state, province or country.

**Scoring:** One point per contact (Va. stations may work other Va. stations). Va. stations multiply QSO points by the number of states, provinces, countries and Va. counties worked. Others multiply points by the number of different Virginia counties worked.

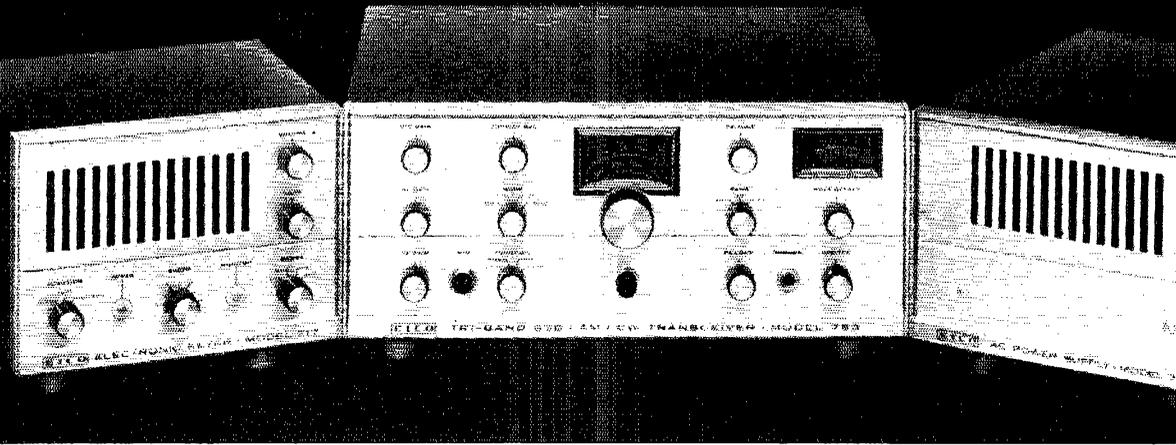
**Awards:** Certificates to the highest scoring station in each state, province or country. Va. stations will compete for 1st through 5th place certificates.

**Frequencies:** Suggested frequencies: c.w. 3560 7060 14,060 21,060 28,060; phone 3830/3930 7205/7235 14240/14340 and 21310/21410.

Logs showing dates, times, stations contacted, bands, mode and location and FINAL SCORE must be received no later than Feb. 1967. Send logs to the Roanoke Valley ARC, Box 2002, Roanoke, Virginia.

A 3-band SSB Transceiver Kit for \$189.95  
 An Electronic Keyer Kit for \$49.95  
 A Solid-State AC Power Supply Kit for \$79.95

# Who gives you ham gear so COMPLETE at prices so low?



## Who else but EICO

*Pro* all the way, from concept to execution — that's what ham editors say about EICO. Critical customers agree, and like the low price, too.

They've made the 753 kit, for example, the industry's hottest seller. And the new 717 Keyer seems headed for the same fate.

Highlights of both give you some inking why:

The EICO 753 is a complete 3-band transceiver, offering SSB/AM/CW operation with conservatively rated 200 watts PEP on all modes (rated for maximum efficiency rather than maximum possible input power). A new Silicon Solid State VFO provides full coverage of the 80, 40, and 20 meter bands. Assembly is made faster and easier by VFO and IF circuit boards, plus pre-assembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The EICO 753 is at your dealer now, in kit form and factory-wired.

**FEATURES:** High level dynamic ALC prevents flat-topping even with extreme over-modulation. Automatic carrier level adjustment on CW & AM. Receiver offset tuning (10 kc bandwidth) without altering transmit frequency. Front panel selected STANDBY, VOX, or P-T-T opera-

tion. Unique ball drive provides both 6:1 rapid band tuning and 30:1 vernier band-spread with single knob. The Model 753 is an outstanding value factory wired at \$299.95

**EICO Model 751 AC Supply/Speaker Console:** Provides all necessary operating voltages for Model 753. Incorporates PM Speaker, conservatively rated components and silicon rectifiers for minimum heat and extended trouble-free life. Includes interconnecting plug-in cables. Kit \$79.95 Wired \$109.95

**SPECIFICATIONS:** Output Voltages: 750 volts DC at 300ma, 250 volts DC at 170ma — 100 volts DC at 5ma, 12.6 volts AC at 4 amps. INPUT VOLTAGE: 117VAC.

**EICO Model 752 Solid State Mobile Power Supply:** (Not Shown). For use with 12 volt positive or negative ground sys-

tems. Fully protected against polarity reversal or overload. Output voltages identical to Model 751. Input voltage 11-14 volts DC.

Kit \$79.95 Wired \$109.95

The ideal accessory for the CW ham—the fully automatic 717 Electronic Keyer, it provides self-completing/clean-cut dots, dashes, and spaces accurately timed and proportioned from 3 to 65 WPM in four overlapping switch-selected ranges with vernier control of all speeds within each range. Matches EICO 753 in appearance to make it a perfect table-top companion unit.

**FEATURES:** Output Contacts — 25 volt-ampere dry-reed SPST relay. Built-in adjustable tone and volume oscillator with a 3 x 5 inch speaker for monitoring. Can be used as a code practice oscillator.

Kit \$49.95 Wired \$69.95

For FREE catalog and Amateur Radio brochure write to EICO 131-01 39th Ave.,

QST-12, Flushing, New York 11352

**EICO**

# Announcing . . .

A brand-new addition to the ARRL family of publications for the radio amateur.

**THE RADIO AMATEUR'S OPERATING MANUAL** is ideal for the newcomer who wishes to learn, and the Old Timer who wishes to brush-up on operating procedures, or who is becoming active in a new phase of amateur radio and needs information regarding this "new" facet.

**THE RADIO AMATEUR'S OPERATING MANUAL**, was written by George Thurston, W4MLE, from his extensive background both as an amateur operator and as a professional journalist.

*The Operating Manual is a most comprehensive treatise, with chapters on:*

Operating an Amateur Radio Station	The National Traffic System
General Operating Practices	The Amateur Radio Emergency Corps
Message Handling	The Radio Amateur Civil Emergency Service RACES
Nets and How They Operate	The American Radio Relay League
The Amateur Radio Public Service Corps	

*plus an appendix containing:*

Glossary of Terms	Numbered Radiograms
Operating Aids	Prefix and Countries Lists

**THE RADIO AMATEUR'S OPERATING MANUAL** will provide a guide and a ready reference source on good operating practices found most effective over the years.

**THE RADIO AMATEUR'S OPERATING MANUAL**, publication No. 24 of the Radio Amateur's Library, deserves a place on the bookshelf of every amateur who prides himself on good operating procedures.

**\$1.00** *Postpaid*  
U.S.A.—\$1.25 *Elsewhere*

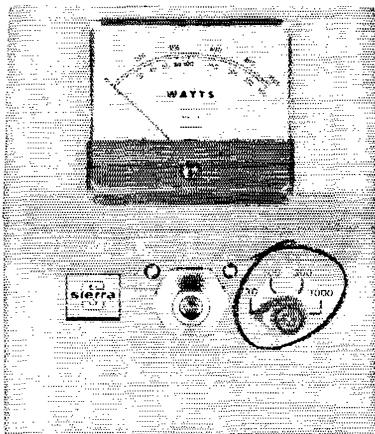
The **AMERICAN RADIO RELAY LEAGUE, Inc.**  
NEWINGTON, CONN. 06111

*The  
Radio Amateur's*  
**OPERATING  
MANUAL**

**\$1.00**

- OPERATING PRACTICES**
- MESSAGE HANDLING**
- NETS**
- EMERGENCY COMMUNICATIONS**
- ARPSC**
- RACES**
- OPERATING AIDS**
  - CHARTS**
  - TABLES**
  - Q SIGNALS**
  - ABBREVIATIONS**





## Here's a Switch for You

You'll find it on the front of every Sierra 401A Series Termination Wattmeter. By controlling selection of power ranges, it helps you read 50-ohm systems between 2 and 1000 MHz with unprecedented speed.

Expanded scale on left-hand side of the instrument meter lets you read low-power ranges as easily as high. For example, you can read 2 watts on the 1000-watt model. With one wattmeter, you can measure output of both low-power portable and base transmitters.

Sealed aluminum housings (no bellows, no air vents) preclude coolant leakage. Dielectric is long-life, non-carbonizing, silicone fluid. All four models use Sierra "Twist-Off" Connectors for quick field changes.

Prices are \$195 (120 w), \$275 (250 w), \$325 (500 w), and \$450 (1000 w). For full information, mail coupon to Sierra/Philco, 3885 Bohannon Drive, Menlo Park, California 94025.

**SIERRA ELECTRONIC DIV.**

OF

**PHILCO**

A SUBSIDIARY OF *Ford Motor Company*

CLIP AND MAIL TODAY

Please send complete information on Sierra Model 401A Series termination wattmeters to:

Name .....

Co. Title .....

Company .....

Address .....

City ..... State ..... Zip .....

to originate message traffic to and from friends and relatives. Traffic: (Sept.) W4SZT 206, W4DVT 205, WA4QHZ 205, W4RHA 185, WA4DXJ 182, K4LJK 134, W4ZM 121, W4NLC 107, WA4EUL 100, WA4URN 93, K4FSS 60, K4ITV 57, WA4UMX 57, K4ASU 52, W4OWE 48, WA2-UF1/4 43, W4KFC 41, WA4DAI 40, K4MLC 37, W4OKN 23, W4BWF 22, K4SDS 22, K4LMB 21, W4TE 20, WA9-JRK/4 18, K4BAV 17, W4BOA 17, WA4FEY 17, K4VCY 16, WA4NJG 15, W4SHJ 15, W4KX 13, W4ZMT 13, W4OP 12, WA4QOC 12, W4JUI 11, W4WG 10, WA4PBG 9, K4-MXF 8, W4MK 6, W4LK 3, W4PTR 1. (Aug.) K4LJK 222, W4OWE 79, WA4UXL 24, K4VCY 13, WA4QOC 8.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC, W8SSA, PAMs: K8CHW, W8IYD, RMs: K8TPF, W8LME. Phone Mgr.: WA8RQB. C.W. Mgr.: W8HZA. Nets meets on 3570, 3890 and 3905 kc. The Monogalia Wireless ARC conducts code and theory classes. WA8FCM is looking for WVA from WA4ECY on 20 at Pensacola. W8SSA has a new mobile rig. K8TPF, K8CKX and W8-HZA would like to see more stations in the WVN CW Net. Last month in 29 sessions 123 stations handled 88 messages. K8MYU was active in the Illinois QSO Party. WA8FTE and WA8CKN are new ECs for Jefferson and Preston Counties. The Logan County Emergency Net meets Sun. on 2300 at 3870 kc. The QVA West Va. chapter held a fine dinner meeting in Charleston. WA8-AKU and WA8PCZ are conducting 29.6 tests between Wheeling and Charleston. WA8PXF was semi-finalist in the National Merit tests. The WVN Phone Net held 20 sessions with 555 stations handling 121 messages. K8TPF reports WVN PON with 13 sessions, 178 stations and 131 messages. Have you signed up a new ARRL member in the HamQuest 67 program? Traffic: K8TPF 308, W8CKX 77, W84ZA 66, W8MIX 25, WA8QZO 20, K8BIT 19, WA8-QND 18, W8GUL 17, WA8PXF 12, WA8NDY 10, W8SSA 9, W8JM 4, W8MQB 4, WA8PH 3, WA8LAL 3, WA8RHT 3, K8WMIQ 3, WA8APM 2, K8CHW 2, WA8CRW 2, W8-ETX 2, K8HHH 2, W8HQO 2, WA8KAN 2, WA8RQB 2, WA3FKB/8 1, K8CPT 1, WA8IE 1, WA8ICZ 1, WA8-IMY 1, WA8LFW 1, WA8PDJ 1, K8QYG 1, K8SOR 1, W8VYI 1, K8ZDY 1.

### ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Donald Ray Crumpton, K0TTB—Asst. SCM: Hank Hankinson, WA0NQL. SEC: W0SIN. The major Colorado nets are:

Columbine Net	0200Z	3989 kc.
Colorado Code Net	7:15 Daily	3870 kc.
High Noon Net	Daily	3989 kc.

The Arapahoe Radio Club has been granted affiliation with ARRL Membership and activity in Arapahoe County still is increasing. More 2-meter AREC stations are being activated. A section project is underway to work up a formula which would permit different categories of stations to compete on equal terms during Field Day for a Colorado trophy. Suggestions from clubs or individuals on such a formula would be appreciated. Drop WA0NQL a card. Another area where coordination is sadly lacking is the spreading of information as to when and where code and theory classes are being held. One goal of this office is to try to gather the information and then see that it gets out to clubs, parts houses, Scouts, etc. Along this line, this is why we need closer liaison between clubs. Wake up the club secretary and ask him to drop NQL a card, or even use the traffic nets. The Colorado University Radio Club, WOYQ, Boulder, handled 100 pieces of traffic a month reports K1YRF. The above report was written by Asst. SCM WA0NQL. Traffic: K0DCW 80, K0ZSQ 76, K0FDH 56.

**NEW MEXICO**—SCM, Bill Farley, WA5FLG—Los Alamos and Albuquerque are both helping the amateur cause by giving code and theory classes. They report good turnouts and interesting classes. The Oct. meeting of the Albuquerque Club was to have been held at the antenna range at Sandia Corporation. WA5LVD in Gallup, reports that 6- and 2-meter activity should show an increase since he and W4COP, at Ft. Defiance, Ariz., hold a regular schedule. Don has just been appointed an OVS. A reminder to all ECs, you are required to report each month to our SEC. We need these reports and ask your help in this matter. Time is running out for K5ONE, fellows, so let's not give him any time to reconsider. Have you noticed the inactivity from the shack of K5ECQ? Could this have anything to do with the date coming up? A new call in Albuquerque and a permanent resident of "the Land of Enchantment" is W5PNY, ex-K0RHU. Harry is now a graduate student at U. of N.M. and will teach next fall. Welcome. Traffic: W5URW 37, W5DMG 34, WA5FLG 30, K5VXJ 28, W5WZK 10, WA5MCX 4, W5PNY 2.

Our antenna beams have rocked the industry like a bombshell! Imagine a full size 3-element 20 meter beam, with a 20' steel boom, so packed with material that its shipping weight is 26 lbs., yet it sells for only \$22! Or a full size 5 element 15 meter beam, absolutely complete in every respect, for only \$28. Why, some of our competitors sell thin wire dipoles for more money! See our QST ads of the early 1950's for comparison with the values here.

## ALL-BAND VERTICALS

### QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

### ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

### EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

### SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

### AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8OJC, WA2LVE, YSIMAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

**FLASH!** Switched to 15 c.w. and worked KZ51KN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters . . . . . \$14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters . . . . . \$16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . \$18.95

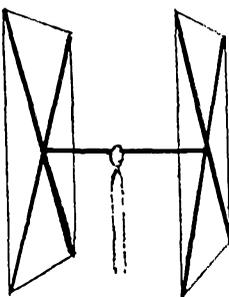
HOW TO ORDER: SEND CHECK OR MONEY ORDER. WE SHIP IMMEDIATELY UPON RECEIPT OF ORDER BY RAILWAY EXPRESS, SHIPPING CHARGES COLLECT.

**GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139**

## QUADS

### NEW! NEW! NEW! CUBICAL QUAD ANTENNAS

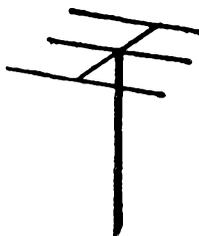
— these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are much lower than even the bamboo-type:



TWENTY METER CUBICAL QUAD. \$25.00  
 FIFTEEN METER CUBICAL QUAD. 24.00  
 10-15-20 CUBICAL QUAD . . . . . 35.00  
 10-15 CUBICAL QUAD . . . . . 30.00  
 15-20 CUBICAL QUAD . . . . . 32.00  
 (all use single coax feedline)

## BEAMS

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36' of tubing for each 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 7/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.



2 El 20 . . . . . \$16	4 El 15 . . . . . \$25*
3 El 20 . . . . . 22*	5 El 15 . . . . . 28*
4 El 20 . . . . . 32*	4 El 10 . . . . . 18
2 El 15 . . . . . 12	7 El 10 . . . . . 32*
3 El 15 . . . . . 16	4 El 6 . . . . . 15
8 El 6 . . . . . 28*	

\*20' boom

# ABSOLUTELY

# NEW

## TRI-EX

# W-51

### FREE STANDING TOWER.

### SUPPORTS 9 SQ. FT. OF ANTENNA.

Shown with internal Ham M rotator and 2" mast.

### INCLUDES

- **FREE: RIGID BASE MOUNT**
- **PRE-DRILLED TOP PLATE — For TB-2 thrust bearing.**
- **HIGH STRENGTH STEEL TUBING LEGS. Solid rod, "W" bracing.**
- **EASY MAINTENANCE — No guys or house brackets needed.**
- **RISES TO 51 FT. — Nests down to 21 ft.**
- **HOT DIPPED GALVANIZED AFTER FABRICATION! All welding by certified welders.**

### IMMEDIATE DELIVERY

# \$362<sup>60</sup>

FREIGHT PREPAID INSIDE CONTINENTAL U.S.A.

## Iri-Ex TOWER CORPORATION

7182 RASMUSSEN AVE., VISALIA, CALIF.

**UTAH**—SCM, Gerald F. Warner, W7VSS—SEC: W7-WKF. RM: W7OCX Section nets:

BUN	Daily	7272 kc.	1930Z
UARN	Sat.-Sun.	3987.5 kc.	1500Z

Our thanks to W7LQE and K7SOT for a fine job of organizing the amateur radio exhibit at the Utah State Fair this year. The exhibit handled over 600 formal messages, and took a third-place Fair prize as well. W7RQT and a group from Ogden operated from Willard Peak during the Sept. V.L.F. QSO Party. W7OCX reports that TWN has moved to 3570 kc., no change in time. Congratulations to W7NPU for his clean sweep in the '66 DX Test for the Utah section. W7LQE made the BPL for Sept. traffic. Traffic: W7LQE 547, W7OCX 150, W7VTJ 122, W7JHM 52, K7HEN 8, W7VSS 6.

**WYOMING**—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: WA7CLF. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7ZHT, WA7DNZ. Nets: Pony Express, Sun. at 0830 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. The Casper Club's younger group showed up the old-timers on Field Day by bringing home the SCM Field Day trophy. WA7EWC had a nice vacation in Spain and thereabouts last summer. K7LBW is settled in his new QTH and plans to get on the air soon. Casper College has applied for a club station license. K7WNP is back at Yale getting some book learning. WA7AXX has moved to Cheyenne. The v.h.f. boys didn't do so well this summer because of conditions and local line noise. Look for some home brew filters soon. Traffic: WA7CLF 31, W7NKR 15, WA7BPO 8, K7AHO 6, W7CQP 4, WA7EWC 3, K7YPT 2.

### SOUTHEASTERN DIVISION

**ALABAMA**—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML. RM: WA4EXA. PAM: K4WHW. Merry Christmas from all Alabama ARRL Officials. Sept. net reports (times in GMT):

Net	Freq.	Time	Days	Sess.	Ave. T/c.	Ave. QNT
AENB	3575	0100	Daily	53	1.5	4.8
AEND	3525	2400	Daily	27	1.2	7.3
AENH	50.7	0200	Sun./Tue.	8	1.0	23.75
AENM	3965	0030	Daily	30	2.5	44.20
AENO	50.55	0115	T/T/Sat.	13	0.0	12.90
AENP	3955	1230	Mon./Sat.	26	1.1	9.9
AENR	50.52	0115	Wed./Fri.	9	0.1	17.9
AENT	3970	2230	Daily	32	1.0	4.9

All interested RTTYers, contact W4USM, North Alabama hams handled communications for the Flying Petticoats Air Derby. WA4EDF and WA4EEC are now on 6. WA4-WGF has new beam, tower and emergency power. W4-HYO and W4WIA are active on 2. Traffic: WA4EXA 114, K4HJX 113, WA4UXC 84, K4AOZ 78, WB4ADT 47, WA4-GGD 37, K4NUW 34, W4USM 33, K4CFD 32, WA4EEC 30, WA4PYO 22, W4FVY 21, K4WHW 21, K5RSI/4 16, WA4PIZ 15, K4KJD 11, WA4YOP 10, W4NML 7, K4DJJ 6, K4ADK 5, WA4WLD 3, W4EON 1, WA4WGF 1.

**CANAL ZONE**—SCM, Mrs. Lillian C. Smith, KZ5-TT—Asst. SCM: Russell Oberholtzer, KZ5OB. SEC: KZ5MV. Organization of a local 2-meter net for local traffic handling from h.f. nets, and also a 2-meter repeater project is underway. New stations on 2 meters are KZ5AG, KZ5JC, KZ5OW, KZ5IK and KZ5KR. New General Class licenses are KZ5IK and KZ5LH. A new Novice Class licensee is KZ5CNN. The USAFSO MARS Club took a moonlight yacht trip to Taboga Island in Oct. KZ5FX is working on beams for all five h.f. bands. Certificates will be sent to each station handling USAFSO MARS Annual "Operation Christmas" traffic during the holiday season. Traffic: KZ5MV 60, KZ5FX 7.

**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4-SJH—SEC: W4YIT. RM C.W.: W4LUV. RM RTTY: W4RWL. PAM S.S.B.: W4OGX. PAMs: W4SDR, W4-TUB. V.H.F. PAM: WA4BMC. W4ILE now is an OTC member. The new Ft. Myers Club call is W4LX. WA4-LBM is scheduled for the Air Force. W4KRC finally went v.h.f. MARS. The new name of Brevard Eng. College is the Fla. Institute of Technology. The call still is WB4ABK. WA4GEP/4 is pres. WA4UJD won first prize in the Dade QSO Party and a cruise on the *Bahama Star*. WA4WZZ now is comm. chairman of Lakeland Red Cross. The Orlando Club's new officers are W4PAO, pres.; WA4YZH, 1st vice-pres.; K4PXF, 2nd vice-pres.; WA4-VCD, secy.; WA4S11, treas. K4BNE is doing an FB job boosting ham radio in his local paper. Are you aware of the c.w. traffic net that operates on 3651 kc. at 0830 EST every day? It's a small net as nets go and its speed is your speed. K4KDN is manager. Must be the summer traffic slump that causes nets to show such a big check-in total and yet such a small traffic total. Any other an-



# BIG SOUND! SMALL INVESTMENT

MODEL 410 VFO—SWAN 350 TRANSCEIVER—117XC POWER SUPPLY—MARK I LINEAR

 Illustrated above is a complete Swan station for SSB, AM, AND CW. You can transmit and receive on all 5 bands with your 350 transceiver, and when used with the Mark I linear amplifier, you're at the legal power limit. Switch in the Model 410 outboard VFO and you're all set for separate transmit and receive operation. Yet this complete home station, with proven Swan performance, reliability, and craftsmanship is yours for substantially less than any other comparable equipment.

 **SWAN 350 TRANSCEIVER  
5 BANDS—400 WATTS**

Setting new standards for the industry. Includes full coverage VFO . . . features crystal lattice filter with shape factor of 1.7 and ultimate rejection of better than 100db . . . providing excellent selectivity and superior audio quality. \$420

 **MODEL 410 FULL COVERAGE  
EXTERNAL VFO**

Eight tuning ranges of 500 kc each. When used with the Model 22 dual VFO adaptor, the 410 provides separate transmit and receive frequency control. Model 22 Adaptor . . \$25      **MODEL 410 . . \$95**

 **MODEL 117XC MATCHING  
AC POWER SUPPLY**

Includes speaker and phone jack. . . . . \$95

 **MARK I LINEAR AMPLIFIER**

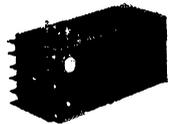
5 bands, 2000 watts PEP input. Uses two Elmac 3-400Z triodes. Built-in power supply. \$475  
Tubes \$68 pr.

 **12 VOLT DC  
POWER SUPPLY**

MODEL 14-117 . . . . . \$130

 **CRYSTAL CONTROLLED  
MARS OSCILLATOR**

5 Channels, Model 405X,  
less crystals . . . . . \$45

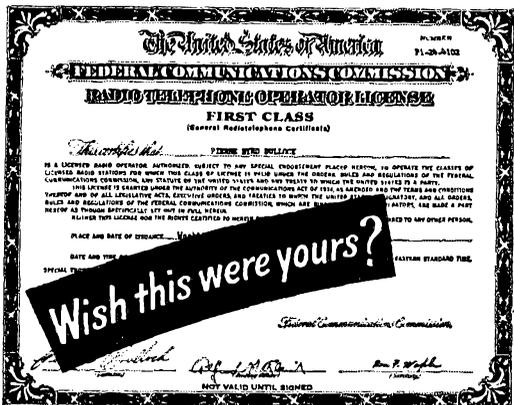


- PLUG IN VOX UNIT . . . . . \$35.00
- CRYSTAL CALIBRATOR KIT . . . . . \$19.50
- SIDEBAND SELECTOR KIT . . . . . \$18.00

See the complete Swan home station at your dealers today.

 **SWAN**  
ELECTRONICS    Oceanside, California

# You earn your FCC First Class License



## or your money back!

### THERE'S A WORLD OF OPPORTUNITY FOR THE MAN WITH AN FCC LICENSE

All it takes is a few spare hours a week and NRI's FCC License Course to open the way to increased opportunities in Communications. With an FCC License, you're ready to operate, service and install transmitting equipment used in aviation, broadcasting, marine, mobile and Citizens-Band communications.

What does it take? Men with absolutely no training or experience in Electronics complete the course in 10 months. A Technician or man with some background can easily cut that time in half. And because NRI has a greater enrollment than any other school of its type, training costs you less than comparable courses offered by other schools. Further, **YOU MUST PASS your FCC exams or NRI refunds your tuition in full.**

Get full details about NRI FCC License Course plus other home-study plans offered by NRI, oldest and largest school of its kind. Mail coupon. No obligation. No salesman will call. NATIONAL RADIO INSTITUTE, Washington, D. C.

**Available Under NEW  
GI BILL.** If you served since  
January 31, 1955, or are in  
service, check GI line in coupon.

**MAIL for FREE CATALOG**



**NATIONAL RADIO INSTITUTE**  
Electronics Division 19-126  
Washington, D. C. 20016

Please send me complete information on FCC License Training and other NRI courses, as checked below. (No salesman will call.)

- |  |   |
|--|---|
| <input type="checkbox"/> FCC License             | <input type="checkbox"/> Radio-TV Servicing         |
| <input type="checkbox"/> Complete Communications | <input type="checkbox"/> Industrial Electronics     |
| <input type="checkbox"/> Aviation Communications | <input type="checkbox"/> Electronics for Automation |
| <input type="checkbox"/> Marine Communications   | <input type="checkbox"/> Basic Electronics          |
| <input type="checkbox"/> Mobile Communications   | <input type="checkbox"/> Math for Electronics       |

Check for facts on new GI Bill.

Name \_\_\_\_\_ Age \_\_\_\_\_  
PLEASE PRINT

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL

saver? Traffic: (Sept.) WA4RQR 639, WA4SCB 623, WA4-BMC 311, W4ILE 295, WA4NEY 264, W4FPC 198, WB4-AJV 151, WA4FGH 139, K4SJJ 122, W4JUV 116, WB4ATW 97, W4SDR 90, W4FPF 78, K4BNE 77, W4AKB 59, WA4JH 58, K4ILB 54, WA4HJD 52, WB4ROM 50, W4KRC 49, WA4DEL 48, WA4CJQ 42, W4EHW 42, W4SAMK 38, W4-YDC 38, K4DAX 35, K4KDN 35, W4OGX 35, W4GDK 33, WN4DDO 32, W4GM 32, W4VPO 32, WA4OHQ 30, W4IYT 27, W4TUB 23, W4NUH 20, W4BKC 19, W4TJM 19, W4DYO 16, K4LPS 16, WA4IVE 15, WA4AIKE 15, WA4PWF 15, WA4WNE 14, W4TQL 13, WA4WZZ 12, WA4FVZ 11, WA4WOW 10, K4EBE 9, K4IEX 8, K4I-NTP 8, WA4TXV 7, K4LNE 7, WB4PR 7, W4IUV 5, W4CWI 4, WA4QLZ 3, WB4CAP 2. (Aug.) WA4PWF 26, W4FWZ 17, WA4NBE 16, W4IYT 15, WN4DDO 10. (Aug. correction) WA4PDM 125.

**GEORGIA**—SCM, Howard L. Schonher, WA4ZL—Asst. SCM: James W. Parker, Sr., WA4GP. SEC: W4-DDY. RM: W4CZN. PAMs: K4PKK, WA4JSU, W4KR, WA4WDE, K4GHR, W4LRR is active on 144 Mc. WA4-GAY will be operating from WB4DTN at Young Harris College. WA4RAY is a consistent NCS for GSN. WA4-AJY made the BPL for the first time in 5 years. WB4CNC is the club station at Griffin Vocational School. W4HBS has new "Drake twins." W4FQX rebuilt the quad with good results. W4HYW was active in the Wash. and Penna. QSO parties.

Net	Freq.	Time (GMT)	Sess.	QNI	QTC
GSN	3595	0000 & 0300	60	482	219
GSSN	3975	0100	30	921	150
GTN	3718	2200	30	169	86
GPSN	3975	1730	19	86	49
GTAN	3855	1650 Sat, 2130 Wed.	8	75	41

K4YZE is a new OVS. K4UUM visited Columbus. WN4-DMF is new in Alamo. WA4LLI is on a new job but hopes to resume activity. WA4BUH is the new call of the NYL of W4YE. W4GXU wants 50 watts on 160 at night. Traffic: (Sept.) W4FOE 206, WA4RAY 161, K4BAI 153, W4PDM 149, WB4MDG 155, WA4AJY 114, W4CZN 110, K4NFP 81, W4DDY 80, WA4JSU 78, WA4WQU 61, W4-TFL 44, W4IBS 37, W4RZL 37, WA4WDE 28, W4FQX 22, W4HYW 21, WA4OVS 20, K4YZE 16, K4UUM 15, WN4DMF 12, WA4LLI 10, W4YE 8, W4GXU 6, WA4JES 2. (Aug.) W4MCM 280, W4HYW 27.

**WEST INDIES**—SCM, Albert R. Crumley, Jr., KP4-DV. The Puerto Rico Amateur Radio Club is planning a huge "Fiesta" during Dec. and all KP4s will be notified in advance. Hurricane Inez passed about 70 miles south of Ponce, while KP4ES and the Ponce gang continuously stood by to render communications as required in that area. KP4ID and the Red Cross Net are operating as scheduled, but they require additional operators at Red Cross Hq. on schedule nights. KP4WT reports she was very active during Inez, working into the Antilles Weather Net, Red Cross, Civil Defense, MARS and CAP Nets. PRARC meeting night for all members is the 2nd Fri. of each month in the WIPR Radio-TV building in Hato Rey at 8 p.m. The 6-meter boys report frequent openings to the States, especially in the afternoon periods. I need those monthly reports on the first of the month, fellows. Traffic: KP4WT 246.

**WESTERN FLORIDA**—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4ALLE. PAM: WA4FLJ. RM: W4BVE. Section net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC
WFPN	3950 kc.	2300Z	Daily	30	487	157
QFN	3651 kc.	2330/0300Z	"	60	—	—

Pensacola: W4AXP is getting the bugs out of the 8X-101 with the help of W4IPV. K4SOI has his SB-200 going. W4NOG is building a new ham shack. K4COV's FB ham shack is complete with paneled walls. WA4BYI still is QRT with rig trouble. Milton: K4NMZ got tired of commuting and moved to Pensacola. Fort Walton/Edlin AFB: The W. Fla. Net Picnic drew a nice crowd of about 80. Edlin ARS and Playground ARC donated prizes. The EARS has to move but should be in new, larger quarters soon. WA4HNI retired from the Air Force and is devoting full time to hamming. Panama City: Six mobiles took part in the first 2-meter transmitter hunt; W4FOX won. W5MPK/4, the hidden bunny, held open house at Tyndall after the hunt. DeFuniak Springs: K4JWE and WB4BYO have ordered gear for 2 meters. WA4OZ has taken up sailboat racing. Marianna: Your SCM visited old timers, W4ATA, W4IRO, W4PHV and K4ZTQ. WA4ED, who has been ill, is missed on WFPN. Traffic: WA4EOQ 128, W4BVE 121, K4NMZ 67, K4BSS/4 59, K4VND 25, WA4-JIM 20, WA4FLJ/mm 15.

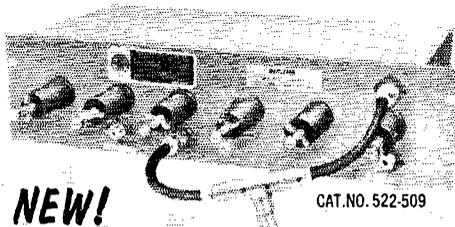
### SOUTHWESTERN DIVISION

**ARIZONA**—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7NHL. The Copper State

# What's **NEW** in Communication Antenna Systems?



"CHECK THESE  
CPC DEVELOPMENTS  
AS STARTERS!"



**NEW!**

CAT. NO. 522-509

## CAT. NO. 522-509 DUPLEXER

CAT. NO. 522-509 Duplexer for 450-570 Mc is an entirely new duplexer providing isolation in excess of 100 db between the transmitter and receiver at the transmit frequency and in excess of 40 db at the receive frequency. This isolation is maintained for transmit to receive separations of 2 to 20 Mc.

**NEW!**

## CAT. NO. 220-509 SUPER STATIONMASTER

is a second generation antenna growing out of 30,000 STATIONMASTERS and ten years of experience with this type array. The new antenna has all the qualities of its predecessor, plus new features not now available in any antenna made for the land mobile services.

Because of its exceptional bandwidth, the SUPER STATIONMASTER is produced in three ranges which cover the VHF band, 150 to 159 Mc, 157 to 166 Mc, 165 to 174 Mc. A 10 db-10 Mc wide version, CAT. No. 455-509, is available to cover 450 to 470 Mc in two ranges.

CAT. NO.  
220-509

**NEW!**

## WIDER ADAPTABILITY FOR THE POPULAR CAT. NO. 251-509 2.5 db VEHICULAR GAIN ANTENNA

CAT. NO. 551-509 consists of the radiating element of Cat. No. 251-509 equipped with a mounting stud to fit the standard GE, RCA, or IPC Roof Top Mounts.

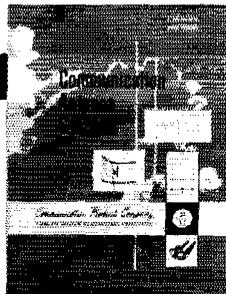
CAT. NO. 554-509 consists of the radiating elements of Cat. No. 251-509 and an adaptor to fit the standard Motorola Roof Top Mount.

CAT. NO.  
551-509

CAT. NO.  
554-509

**NEW!**

Additional CPC antennas and accessories are being featured in the CPC Handbook now going to press. Watch for them!



Then, check this new 64-page Antenna Handbook for up-to-the-minute specifications and data covering the complete CPC line of base station antennas, vehicular antennas, railroad and aircraft antennas, accessories, cable systems etc. For installers and specifiers of two-way mobile radio equipment, there is a special laboratory and field-tested data section. Reserve your copy now!

Address Inquiries to:

MARLBORO  
NEW JERSEY 07746  
Tel. (201) 462-1880

LOS ANGELES  
CALIFORNIA 90065  
Tel. (213) 245-1143



*Communication Products Company*  
DIVISION OF

**PHELPS DODGE ELECTRONIC PRODUCTS  
CORPORATION**

# Repeat Performance

2nd Hamboree Tower Sale

**NOW-  
the Best is  
even Better!**

*A New & Improved*  
**E-Z WAY TOWER**

At a special low Hamboree Sale price.  
MODEL RBS- 40G **\$2195**  
for antenna heights  
to 41 ft. Tower Only  
Hot Dipped Galvanized Finish

THESE FAMOUS E-Z WAY FEATURES...

**CRANKS UP & DOWN**

Puts your beam at exactly the right height.

**TILTS OVER**

E-Z access to beam and rotor.

**NO GUYS**

Carries 7.2 sq. ft. of antenna area fully extended in 60 mph winds. No Guys!

*Plus* THESE NEW IMPROVEMENTS.

**SUPERIOR GEARED WINCHES**

Now standard equipment on towers, ground posts and tilt-over posts.

**PRE-ASSEMBLED UNITS**

Most components of towers and mountings are now pre-installed at factory. E-Z installation at site.

**SEALED PACKAGING**

More protection against parts loss and damage in transit.

Choice of mounting kits for RBS-40  
(Price shown includes tower)

Tower & Wonder Ground Post-GPRBS40G **\$288.00**  
Tower & Tilt-Over Post-TORBS40G **305.55**  
Tower & Building Attach Kit-BARBS40G **222.85**



*New Winches!*

Special sale prices effective only on orders for shipment in December, 1966 and January-February, 1967.

**E-Z WAY**  
*Products, Inc.*

P.O. BOX 17196 TAMPA, FLORIDA 33612

yet meets Mon. through Friday on 3878 kc. at 0230 GMT. Endorsements: K7NHL as RM. Appointments: W7DQS as ORS; W7GNP, WA7BIA and WA7BVU as OVSS. W7TLG has a new Heathkit SB-200 linear in operation. W7CIC is the proud owner of an SX-101A Mark III and SP44 Panadapter. WA7AOW, the Arizona State Fair station, was active during the Fair. The log was computed, analyzed and printed on a computer, thanks to K7HIGZ, Head Programmer at Valley National Bank. A daily recap was displayed showing the number of stations worked in each state at any one time. Is this the nation's first? A new Wickenburg station is W7DQS, who is ex-K9KTL. K7VOR transmits code practice Mon. and Thurs. on 50.340 Mc. from 0100 to 0159 GMT and ARRL Official Bulletins beginning at 0200 GMT. Fine reports were received from OOs K7RUR and K7OIX. OESs W7AYY, and WA7ECR and RM K7NHL. Traffic: K7NHL 306, W7CIC 142, K7PLO 13, W7FKK 11, W7DQS 4.

**LOS ANGELES**—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC; W. R. Calkins, W1KUX; B. RAJs; W6-BHG, W6QAE, WB6RRO, PAAs; K6MDD, W6MIZ, W6ORS, BBLers for Sept.; K6EPT, W6GYH, W6MLF, W6WPF, WA6VFM/6 and WB6QXY. WB6BBO's was low because of vacation. K6IOV keeps c.w., phone and RTTY skeds. WA6KWV is willing to sell her AD 26 and TU. K6MDD reports 110 amateurs signed the WA6VFM/6 guest book at the Los Angeles County Fair at Pomona. W6TXJ is off 6 meters, the 8N2 is down for repairs. K6CDW is building a new antenna. W6BAJZ/6 is returning to the East Bay section. WA6UCR reports installation completed, four-position station (1 or 4 operators); a.m., l.m., s.s.b. and c.w. modes; power input 100 watts to 1 kw.; 160, 75, 40, 20, 10 and 2 meters; emergency powered. WB6GGL has a new 60 ft. tower. W6CXK is working DX. WB6QWJ received S.S.B.-WAC for 3 months operation with a Swan-350. K6BPC is erecting new antennas and overhauling equipment. W6IBD is erecting a new beam and reports 28 Me. is opening up nicely. WA6ORJ reports that new officers of the Tri-County Amateur Radio Assn., Pomona, are K6IDQ, pres.; K6QYD, secy.; WB6OWV, treas.; K6RAG, QRM editor. Meetings are held the 2nd Mon. of each month. Pomona First Federal, 399 N. Garco, Pomona, WA6ORJ holds W6HAW, W6-EZT, EP2EZ, formerly #8 of Upland, Calif., returned from Iran and is now #7. Havre AFR, Mont. WB6PIO is busy with school. W6PTZ reports that severe radar interference is plaguing the 432-Mc. band. W6QJW is inactive preparing to change QTH to the San Diego section. WB6RWF is modifying and improving equipment. WA6-YMY's doctor advised him to slow down or else. K6IYW reports the OM still is on the sick list. *Support your section level nets:* EBN, Mon. through Fri. at 1615Z and Tue. through Sat. at 0230Z on 50.500 kc.; SCS, daily at 0230Z and 2000Z on 50.400 kc.; SCN daily at 0300Z on 3600 kc. Traffic: (Sept.) W6GYH 1154, K6EPT 1109, WB6-QXY 821, W6WPF 567, W6MLF 518, K6MDD 400, WB6-BBO 380, W6QAE 342, K6IOV 305, WA6KWV 269, WA6-YFM/6 150, W6FD 134, WB6QGM 117, WA6TWS 113, W16KZI 110, WA6WKF 89, W6BTY 87, K6IYW 82, W6-TXJ 77, K6GDW 63, W6BHG 53, K6ASK 51, WB6TMC 49, WB6KIL 47, W6MLZ 38, WB6QMF 31, WA6TYR 30, W6DGH 27, W6RKGK 24, K6KA 19, W6USY 18, WB6-AEL 17, W6BMZ/6 15, W6DQX 15, K6LJ 15, W6TN 12, PCP 10, WA6UR 6, WB6GGL 5, WB6OUD 5, W6CX 3, W6HUJ 3, K6UMV 3, W1KUX/6 2, K6EA 2, WB6QWJ 2, W6ORS 1. (Aug.) K6IYW 245, WB6HRH 108, WA6TYR 26, W6SRE 2, WB6PIO 1. (July) WB6MSU 15.

**ORANGE**—SCM, Roy R. Maxson, W6DEY—K6ZQB is back after a year's cruise off Vietnam aboard the USS *Endurance*. WB6LCO constructed a CG amplifier using 2-811s. EC WA6TAG is back from vacation and reports the new Asst. EC is WB6QAH and WN6RXO. K6FS, WA6DNI, K6ILE, WB6RAT, WA6OC, WN6SDG, WB6-MMA and W6RID are new AREC members. WB6QAK is the new EC for 75 meters, relieving K6LJA who did an FB job. OO W6RAM was back from a trip to Oregon in time to make the P.M.T. RM WA6ROF is back in college. W6FBR, up to 209/195 countries and leaving for a visit to PI, advises the Desert RATS elected K6LFK, pres.; WB6QAH, vice-pres.; WB6SMT, secy.; WB6GTU, treas. SCN, on 3600 kc. at 0300 GMT daily. K6IME mgr., reports traffic 713, QNT 602, SuCalSis, on 50.4 Mc. at 0230 and 1900 GMT daily. WB6JFO mgr., reports traffic 445, NCSs and WA6WKF, WB6JFO, WB6MYU, WB6ODU, WA6VXJ WB6HRH, WB6QXY, WB6QGM, Liaison stations are WB6JFO, WB6HTY, WA6TWS, K6IOV, WA6OQM, WA-QWI, CHOP at K6MICA, retired from IIC Oct. 31 and his QTH will be Santa Ana. The Barstow ARC welcomed W6DEY and W6PJU at its Sept. meeting. The Orange Section AREC Net meets every Sun. at 9 AM local time on 3965 kc. W6WRI is SEC. Traffic: (Sept.) W6ZJB 767, K6MCA 658, WB6JFO 355, WA6OQM 185, K6IME 121, WA6ROF 78, WA6IDN 46, W6WRJ 19, KOYVN/6 13, K6ZPE 11, WB6LCO 8, W6EYI 4. (Aug.) WB6NGE 5.

# DRAKE **2-C** RCVR & **2-NT** CW XMTR



*Basic pair for all Hams...  
Novice or General*

**Receiver  
Model 2-C  
\$229.00**

*Excellent  
performance  
at low cost*

• Triple Conversion • Crystal-controlled First Converter • 500 kc ranges for 80, 40, 20, 15 and 10 Meters • Also any 500 kc range between 3.0 mc and 30 mc by inserting an accessory Crystal • Temperature-compensated VFO Tuning • Selectable Sidebands without retuning • Three Bandwidths—.4, 2.4, 4.8 kc at 6 db • Solid-state Audio, Product and AM Detectors, AVC Amp and Xtal Osc • AVC Switch (Fast, Slow and Off) • SSB, AM and CW with AVC and S-meter • Works Break-in CW with 2-NT Xmtr • 19 Tubes and Semi-Conductors • Dimensions: 11 $\frac{1}{16}$ "W x 6 $\frac{3}{32}$ "H x 9 $\frac{3}{32}$ "D. Wt.: 13 $\frac{1}{2}$  lbs.

Accessories available: 100 kc Calibrator, Q Multiplier, Matching Speaker, Noise Blanker, Crystals for other ranges.

**CW  
Transmitter  
Model 2-NT  
\$129.00**

*Built-in  
essentials and  
accessories*

• 100 Watts Input (can be reduced to 75 watts for novice) • Operates Break-in CW, Semi Break-in CW or Manual CW with Drake 2-C or other receivers • Automatic Transmit Switching • Side Tone Oscillator built in • Antenna Change-over Relay built in • Pi-Network output with fixed loading • Lo Pass Filter against TVI built in • Drop-out delay of change-over relay adjustable • CW Coverage on 80, 40, 20, 15, 10 Meters • Simplified Tuning • Frequency Spotting without xmtr output • Grid Block Keying • Code Practice in stand-by position • 13 Tubes and Semi-Conductors • Dimensions: 9 $\frac{7}{8}$ "W x 6 $\frac{3}{32}$ "H x 9 $\frac{3}{32}$ "D. Wt.: 12 $\frac{1}{2}$  lbs. Accessories available: Antenna Matching Network, VFO, and Crystals.

All prices are Amateur Net. See your distributor or write for free brochure.

**R. L. DRAKE COMPANY • MIAMISBURG, OHIO 45342**



## BIG-K

1000 watt (p.e.p.) mobile antenna at a mini-power price! Quick-connect high power inductors for 160/80-40-20-15-11-10 meters have exceptional figure of merit—"Q"—measures 230 on 80, rises to 350 on 15 meters! Webster invites comparison of this sky power antenna particularly its high efficiency space wound coils, suspended—not molded—inside a protective all-white housing. Also compare the precision-machined, hinged column assembly that releases coil/whip for right-angle lay-down. Lockup is fast, positive.

Install BIG-K—give your mobile signal a real sendoff. Two handy lengths for bumper and deck mounting: 93" and 77" overall, respectively. And use the money you save to buy a fine Webster antenna mount.

\*160-meter coil 300W p.e.p.

### and band-spanner

Want a fully streamlined antenna that will handle 500W p.e.p.? Buy Band-spanner. Single antenna covers 80-40-20-15-11-10 meters and MARS. Raising or lowering top whip contacts internally exposed inductor turns, sets exact resonance. Two models: 117" and 93" overall. Fiberglass column and stainless steel top whip.

### mounts

Model SHM, single hole de luxe mobile mount.



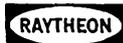
Model THMD, de luxe 3-hole mobile mount.



Model BCM, bumper chain mount. (Spring not supplied)



Write for free descriptive brochures



RAYTHEON COMPANY

213 East Grand Avenue, South San Francisco, California 94080

**SAN DIEGO**—SCM, Don Stansifer, W6LRU/WA6-VII—The San Diego V.H.F. Club will hold its Fourth Annual Christmas Party Dec. 7 at the Campus Chuck Wagon. The Oct. meeting of the San Diego DX Club was held at the home of President W6LZL. The San Diego Council of Amateur Radio Organizations has received official confirmation that the 1969 Southwestern Division Convention will be held here to coincide with the 200th anniversary of the discovery of San Diego. The council needs your support now and also that of your club. If your club isn't represented, make it the first business of the next meeting. New members of the San Diego V.H.F. Club include WB6AXW and WB6UAW. K6RYI has a new shack at his new San Diego home. WA6TAD attended the Air Force MARS Conference in Fresno in Oct. WA6OSB reports the San Diego 2-Meter F.M. Net check-ins totalled 57 in September, of which 31 were home-based, 12 mobile and 4 portable. The newest appointment is WB6NMT as an QVS. Traffic: (Sept.) K6-BPI 9751, W6EOP 544, W6BCF 542, W6VNG 538, W6-GMM 277, W6ECP 228, WB6NMT 40, WB6MPD 25, W6-LRU 18, WA6TAD 9. (Aug.) WB6NMT 36. (July) WB6-NMT 51.

**SANTA BARBARA**—SCM, Cecil D. Himson, WA6-OKN/WOCUG—SEC: WB6NDP. The Santa Barbara ARC held several successful transmitter hunts during the last few months. WA6THG reports on a very interesting trip to 8-Laud visiting ham friends who all seem to have 100-ft. towers. WA6PFF is doing fine after surgery. W6-JPP was reported entertaining after a recent SBARC transmitter hunt. WB6NDP is organizing the public service effort in the Santa Barbara area. Technical sessions for higher classes of licenses are being conducted by K6GV and WB6AJU, of the Simi Valley ARC. K6GV also is a new QCWA member and he had 15 or 20 extra licensed years left over. WB6TCD is the new ARPSC station in the Larvin Community Center to serve the Simi Valley. K6AAK has purchased a new ham shack in the Bass Lake area.

### WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI, PAM: W5BOQ. RM: W5LR. K5AVX presented K5PAW with a 7-lb. 10-oz. baby girl Aug. 14. W5BCB, is the granddaddy and I guess we will start calling Milt Paw, as in his call. The North Texas Emergency Net held its annual picnic at Lake Proctor near Brownwood Oct. 9. I hope to have a report for next month. Brownfield held its annual "free" swapest Oct. 29-30. At last we have a prospect for the West Gulf Division for 1967. A group in the West Texas area has expressed a desire to have the convention. More next month. I think it will be a good idea as we have not had a convention in West Texas before. WA5-AGN made the BPL and has also qualified as OPS. Bill is doing a fine job as NCS for the NTTN. W5QKF, West Gulf Division Director, reminds me that we are behind with our donations to the Building Fund. If you have not made a donation, why not send Doc something. This is your Building, your League and your Division. Traffic: (Sept.) WA5AGN 212, K5DBJ 144, K2EIU/5 89, K2-GKK/5 54, K5LZA 44. (Aug.) WA5AGH 125, K2GKK/5 32.

**OKLAHOMA**—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5ZCJ. RM: W5-QMJ. PAM-75: WA5RTQ. The Oklahoma Central V.H.F. Club had very good results operating the information Booth at Oklahoma State Fair at Oklahoma City. We are glad to hear that W5UYQ, will continue as Vice-Director in the West Gulf Division. W5GAK is being transferred to New Mexico. WNSPSA reports he has worked 33 states and 6 countries in 3 months. Congratulations to WA5OEM on his new job in St. Louis with the Red Cross. New officers of the Electron Benders at Tulsa are K5ZCJ, pres.; K5OOV, vice-pres.; WA5DBM, sec.; W5GZD, treas. New amateurs in Tulsa are WN5QPC, WN5QNA, WN5-QMZ and WN5QKO. WA5CHD has started another code and theory class at the Enid Amateur Radio Club room. Vinita amateurs have reorganized their club with K5-BPV, pres.; WA5IMO, vice-pres.; WA5QGT, secy. Sponser Traffic Net: QNI 497, QTC 80. OPEN: QNI 169, QTC 27, OLZ: QNI 76, QTC 50. I want to thank the many people who gave words of encouragement and help during my first year in office as SCM. Traffic: (Sept.) K5TEY 2134, WA5HUN 786, WA5AOB 164, K5VFR 153, K5MJY 112, W5QNJ 67, WA5QEL 51, W5FEC 47, WA5NTL 38, W5TKT 37, K5DLP 29, W5FWW 22, WA5KZA 19, W5-PAL 17, W5MTX 16, W5DRZ 14, W4SKJ 10, W5UYQ 9, WA5FVJ, W5EHC 8, W5FKI, 6, WA5OHX 5, K5OCX 4. (Aug.) W5MFX 20, W5EHC 16, WA5MDN 10, W5-FKL 7.

**SOUTHERN TEXAS**—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5KLV. RM: K5ANS. Hurricane Inez has been the most unpredictable in history.



## How Maude and Charlie Grubb planted a Christmas Tree farm with U.S. Savings Bonds

It's now a holiday all year round for Maude and Charlie Grubb of Kelso, Washington. In July they retired from their jobs and moved out to their Christmas tree farm.

Six years ago the Grubbs bought fifteen acres of hill land with U. S. Savings Bonds. Then they began planting and building.

Today their farm is covered with little Douglas firs growing into Christmas trees.

And they've also built a hunting and fishing lodge.

Savings Bonds have a nice way of growing into a tidy sum for retirement.

Another nice thing about Bonds: while your dollars are being set aside for your future, Uncle Sam is using them to help back our men in Vietnam.

Start buying Savings Bonds today where you work or bank.



## Buy U.S. Savings Bonds



*The U. S. Government does not pay for this advertisement. It is presented as a public service in cooperation with the Treasury Department and The Advertising Council.*

**NOW PAYING**  
**4.15%**  
WHEN HELD TO MATURITY

The  
*Christmas Gift*  
 that  
*Lasts All Year*

**QST**

He won't turn up his coat collar  
 to hide it.

He won't have to exchange it  
 for one with longer sleeves.

He won't read it once and  
 shove it out of sight.

It won't shrink.

And he'll like it whether he  
 smokes or not.

**QST is the one present that's always  
 suitable, always welcome—a  
 monthly reminder that you think  
 enough of him to give him something  
 he really wants.**



ARRL Membership with QST \$5  
 \$5.25 in Canada, \$6 elsewhere

**THE AMERICAN RADIO  
 RELAY LEAGUE, INC.**

Newington, Connecticut 06111

At this writing she has been playing havoc for eighteen days and still is going strong. All emergency nets in Southern Texas have been watching this hurricane. Many reports from South Texas Emergency Coordinators indicate "ready." K5HZR, Buxar County EC, is working for a larger emergency power plant for the San Antonio ARC. PAM W5KLV reports that W5EMU is now out of the hospital after major surgery. W5VPO reports that newly-elected officers of the San Antonio ARC are W5VPO, pres.; W5BDN, vice-pres.; W5ABD, treas.; W5AJPT, secy.; W5FYN, sgt. at arms. Plans are underway for the best National ARRL Convention ever at San Antonio in 1968. Make your plans now to be on hand. K5MWC now is set up at College Station ready for action. Congratulations to K5HMF Brazoria County EC, who has just been commissioned a 1st Lt. in the Texas State Guard and will serve as communications officers in the 203rd Defense Group attached to the Angleton Security unit. A big hand to W5NGW, a very active Official Observer, who finds time to do a hang-up job of editing the *W5ES Bulletin* of the El Paso ARC. Southern Texas has lost two fine amateurs with the passing of W5GLS and W5EV. Net activities in our section are being well attended. The percentage of check-ins is very good. Traffic: W5BGE 304, K5HZR 246, W5ATR 49, W5LNV 39, K5QQG 14, W5HWY 13, W5TFW 9, K5HMF 6, W5BRZ 2.

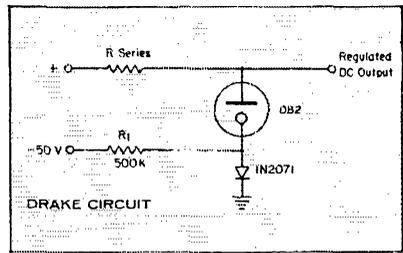
**CANADIAN DIVISION**

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM APN; VE6ADS, PAM S8BN; VE6ALQ, ECs: VE6SA, VE6SS, VE6AFJ, VE6XC, VE6AFQ, ORS: VE6BR, OPSs: VE6HM, VE6SS, VE6BA, VE6ADS, OOs: VE6HM, VE6TY, VE6AKV, OBSS: VE6HM, VE6AIF. By the time this report is read the two big chores for October, the test and the Boy Scout Jamboree will be over. I would like to thank all who took part in these activities. Our SEC reports that things are shaping up very well, and he hopes to do some reorganizing this winter to better AREC with more balance across the province. The OOs report that there still are a few bad boys who have to be checked. The APN and SSB nets are improving and picking more traffic each month. Look for APN and SSB every night at 1900 on 3770 kc., APN on Mon., Wed. and Fri. and S8BN on the other nights. Thanks to all the liaison stations. Fellows, has your club nominated anyone yet as your next SCM. Time is getting short. At this time I should like to thank all who have supported me in any way. A Merry Christmas and a Happy New Year to you all. Traffic: VE6FK 60, VE6HM 52, VE6XC 40, VE6ADK 15, VE6AKA 15, VE6AKV 15, VE6SS 7, VE6VN 7, VE6SA 6, VE6TG 5, VE6FS 3, VE6FZ 3, VE6AFQ 2, VE6AHV 2, VE6ATG 2.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB—We congratulate VE7ABL on making Class A and now we hope to hear him on 3755. The BCAREC meets at 0100 GMT on 3755 kc. We need more check-ins from many places in B.C., with or without traffic. VE7ACM and XYL, also VE7XV and XYL, paid a visit to England. VE7AA is happy as he now has a boy to go with his daughter. VE7QC and VE7ASY have gone s.s.b. For the past several months my reliable reporters of happenings in B.C. have failed to write. Please send us your reports. VE7PO is a Silent Key. Several years ago he held SEC and other League appointments. The B.C. Slow Net, 0200 GMT, and the BCEN, 0400 GMT, meets on 3650 kc. Check-ins sure are needed and a good place for you to begin your traffic experience is on BCEN. VE7KD is active on 6 meters. VE6ATG was VE7BMN. VE7BLO did well in the VE/W Contest: VE7QB also entered. It is nice to hear so many old calls with the original owner appearing on 2 meters. VE7AWC, VE7AWD, VE7AEX and VE7EP, all mobiles, have a complicated transit system. VE7APU failed to read instructions until too late and plugged a new 12-volt receiver into 110 volts. Traffic: (Sept.) VE7ASY 204, VE7BLO 20, VE7QB 16, VE7BAV 11, VE7BLS 11, VE7DH 9. (Aug.) VE7ASY 340.

**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and R. P. Thorne, VO1EI, SEC: VE1HJ. Deepest sympathy is extended to the relatives and friends of VO1AU and VE1AOT, who have joined the ranks of Silent Keys. The St. Croix Valley ARC recently held a dinner and dance in St. Andrew with over 50 in attendance. VO1CU was declared the winner of the Premier Smallwood Field Day Trophy. VO1AA is now an honorary member of SONRA. Ex-VO1IU is now VO2AK. Recently-elected officers of ARCON include VO1HN, pres.; VO1FA, vice-pres.; VO1BI, secy.; VO1DI, treas. VO2RE has transferred from Battle Harbour to Halifax and soon will have his VE1 call. This report concludes over 10 years of service by the writer. I would like to take this opportunity to thank the many amateurs who have assisted during this period. Your support has been much appreciated. The incoming SCM is Harley Grimmer, VE1MX. We wish him success in his new post. But remember this success, in part, depends on

# The steadier signals are regulated by Sylvania VR tubes



If you've heard better signals lately, we'll venture the guess that one of the reasons is the closer attention being paid to good voltage regulation in modern transmitters and receivers designed by manufacturers and avant-garde experimenters.

You'll also find that, in most instances, good voltage regulation is being achieved through the use of VR tubes -- and for good reason: No component today can provide a virtually constant output voltage quite so easily and economically as a VR tube.

What's more, improvements in VR tube design have eliminated faults in earlier types. Take the Sylvania OB2, for instance. Our engineers have eliminated the "E-jump," that nasty tendency of the tube to break out of its constant-voltage region at certain load current. Another design feature greatly reduces the possibility of the tube going into oscillation because of its negative resistance characteristic. These advances make the Sylvania OB2 almost faultless.

Almost, that is. There's one situation where regulation can be lost. Suppose power is interrupted momentarily, then restored while the oscillator tube or a similar tube load is still "hot." In that event, the power supply is loaded so heavily that it cannot reach the required VR tube ionizing voltage, and regulation is lost.

But, where there's a will there's a way, and in this case a clever one, used in the Drake R4A receiver. A negative source of 50 volts is applied to refire the VR tube, as shown in the accompanying schematic. With the VR tube operating, diode D1 is forward-biased and conducts the VR tube current to ground. However, should the VR tube lose ionization, the negative voltage (through R1) will reverse-bias the diode and, in turn, the sum of both supply voltages will appear across the VR tube, reigniting it. Thus the circuit can operate with less than normal supply voltage, or restore regulation should the VR tube go out.

And remember that Sylvania has a family of types to meet virtually any transmitter or receiver design consideration. In addition to the OA2, OB2, OA3, OB3, OC3, OD3 and 5644, there are the high-reliability miniature types GB-OA2WA and GB-OB2WA.

If you want steadier signals, see your Sylvania Distributor for the data on these VR tubes, or write the Sylvania Electronic Components Group, Sylvania Electric Products Inc., 1100 Main Street, Buffalo, New York 14209.

73,

*The Gang at Sylvania*

**SYLVANIA**  
SUBSIDIARY OF  
GENERAL TELEPHONE & ELECTRONICS **GTE**

# NEW HAM RING!

14K GOLD RING WITH  
YOUR NAME & CALL ON TOP!

Letters  
&  
Numerals  
Individually  
Soldered On Top  
(Not Engraved)



Only \$24.95

(Direct from  
Manufacturer)

(Puerto Rican Residents Add 5% Insular Excise Tax)

ARTY KOLSON KP4CPT

Kolson Joyeros

P.O. Box 1788

Ponce, Puerto Rico 00731

Dear OM:

Please send me my Ham Ring (Allow 2 weeks for delivery):

I enclose my check or money order for \$24.95 in full payment (No charge for shipping).

Send C.O.D. I will pay Postage & C.O.D. charges

If I am not completely satisfied, I may return the ring within 5 days of receipt for a full cash refund and without obligation.

I am interested, but would like more information.

NAME .....  
(Please Print)

ADDRESS .....

CITY ..... STATE .....

ZIP .....

Please print your Name (up to six letters only) and Call in square exactly as you wish it to appear on the Ring:



MY RING  
SIZE IS

.....

you. Harley will appreciate your continued cooperation and assistance in the performance of his duties. Traffic: VE1OM 10, VE1AAX 9.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—The Ontario ARRL Division Convention was an extremely fine effort. The Niagara ARC is to be congratulated on its excellent work. I would like to congratulate the Windsor Club on winning the Canadian Trophy for the Annual ARRL Field Day Contest. The Trophy is known as the Keith Russel Memorial Annual Award and is sponsored by the Radio Society of Ontario, VE3CDX, VE3ASQ, VE3DSQ and VE3CSO, members of the Northwau ARC, Toronto, worked in the recent V.H.F. Contest from the top of Mt. Mansfield, Vt. VE3BTY reports that activity will start soon at the U. of Waterloo. This month we tip our hats to VE3BWM, of the Clinton ARC. Al is not only an EC but also is editor of the club paper, *Genitor*. His work as control station during the SET was one of the finest. VE3MH is now in Ottawa. VE1ASI, now in Clinton, will be VE3 soon. The Ottawa ARC has made application to hold the Ontario Division ARRL Convention in the late fall of 1967. VE3CSF, of Ottawa, will be locating in Winnipeg soon. I hear that the London ARC is tuning up a red-hot plan for the 1967 Field Day. It was nice to see some of the old gang from Hamilton ARC at the Falls Convention. VE3AVL, of Toronto, came in 8th in the recent RTTY-DX Contest with a score of 57,176 points. Congrats Gwen. I regret to announce the passing of VE3BF, of Scarborough. Lou was well known and will be missed by many. It was nice to see representatives from Kitchener and Cornwall at the Convention. More ECs are required for AREC. Write or radio VE3EUM or VE3NG. Traffic: VE3DGB 102, VE3GCE 98, VE3CYR 89, VE3NG 73, VE3DVE 72, VE3ATI 58, VE3EBH 51, VE3GI 50, VE3FHV 49, VE3BLZ 43, VE3BUR 40, VE3AUI 32, VE3FGV 24, VE3AWE 22, VE3AFA 10, VE3DU 19, VE3WW 19, VE3ECC 18, VE3TT 16, VE3YO 4.

**QUEBEC**—SCM, J. W. They, VE2OJ—SEC: VE2ALE, RM: VE2DR. Your SEC is rapidly contacting all ECs. Your efforts in all things pertaining to AREC is requested. At a very interesting forum at the Ontario Convention AREC and net operation in general was discussed and yours truly learned many things from W2RUF and VE3AUM. The recent radio blackouts on frequencies below 28 Mc. gives good food for thought—in case of an emergency during one of the worst of these on h.f. how well are our v.h.f. nets equipped to handle the situation over the long haul which may be required? We have a new OO, VE2TT. Rae has a very well equipped station and remember, if you should receive his reports they are intended to aid you. Don't forget to give all the time you can afford to the Intruder Watch. For information call or drop a line to VE2ZM. VE2AM/W4 was a welcome visitor to the Lakeshore DARTS and DRAUGHTS. Flip tells us he will be a regular comer to the Quebec c.w. and phone nets. It is with great regret we record the passing of one of our best-known amateurs, VE2SF, who was proponent of all good things and as controller kept the PL Net in the best of order. Traffic: VE2DR 112, VE2AUI 80, VE2OJ 72, VE2BLL 46, VE2BRD 39, VE2AJD 38, VE2AGQ 32, VE2BWL 31, VE2BVY 30, VE2BGJ 28, VE2ALE 20, VE2EC 17, VE2CP 9, VE2AZQ 8.

**SASKATCHEWAN**—SCM, Mel Mills, VE5QC—Congratulations to VE5FY and his Masonic team for their fine effort on behalf of candidate VE5HR. Congrats to Harold and all the Masonic hams from around the province who did so well. The AREC did an FB job on the SET week and with a good check-in with the weather assisting. This is the last call for assistance to the Saskatoon Amateur Radio club on its Centennial History of Amateur Radio in Canada. Clubs all across Canada and the States have assisted and this is going to be a terrific volume. Send all material to the SARC, Box 751, Saskatoon, Sask., Canada. In winding up, follows a very very Merry Christmas to all and all the best for 1967, Canada's 100th Birthday! Traffic: VE5HP 50, VE5LM 41, VE5IR 5, VE5JR 5, VE5PV 4, VE5CX 3, VE5EF 3, VE5FA 2, VE5LK 2, VE5PI 1, VE5PZ 1. **QST**

**SWITCH  
TO SAFETY!**





# CHRISTMAS CHECK LIST FOR GONSET AMATEUR EQUIPMENT

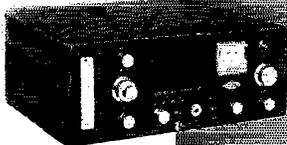
I WANT



SPECIAL



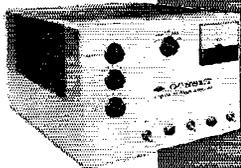
CHRISTMAS



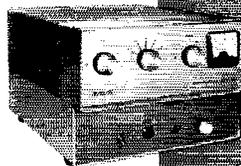
PRICES



SEE

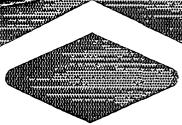


YOUR



DEALER

Check off your choice(s) and leave this page where your XYL is sure to find it.



## GSB-II TWO-METER TRANSCEIVER (900A)

For SSB, AM, and CW operation, the GSB-II Two-Meter represents the most in versatility, compactness, and dependability—ideal for ham shack or mobile installations. This rugged, easy to operate transceiver covers the entire 2 meter band in four 1 Mc segments, delivers a full 20 Watts PEP. Power supplies are available in AC and DC Versions.

## GSB-VI SIX-METER TRANSCEIVER (910A)

Covering the entire 6 meter band in 1 Mc segments, the 910A operates on SSB, AM and CW with  $\frac{1}{2} \mu\text{V}$  sensitivity and 2.5 Watts audio output. For maximum dependability, all low level circuits are solid state. Matching power supplies in AC or DC versions are available.

## COMMUNICATOR IV TRANSCEIVER

Available in 2 and 6 meter versions, the Communicator IV delivers a powerful AM signal with high level speech clipping. The crystal-controlled, AM transmitter offers a selection of any 6 frequencies at 24 Watts input power. Built-in AC and DC power supply.

## G-50 COMMUNICATOR

A six-meter fixed station transceiver, the G-50 is rated at a full 48 Watts, crystal or VFO. RF stage provides high S/N ratio and high sensitivity. Excellent image rejection, 7 Kcs selectivity, dual conversion and other top features make the G-50 an excellent DX selection.

## 903-A AND 913-A POWER AMPLIFIERS

For 2 and 6 meter systems, the 903-A and 913-A may be coupled to any exciter supplying 5 Watts. Operating as class AB for SSB, and class C for AM, CW, MCW, FSK, FM and PM, they have an extended range to cover MARS, CAP and other frequency allocations. Peak input is 500 Watts on all bands with the exception of a 300 Watt maximum for AM.

## GSB-201 SSB RF LINEAR AMPLIFIER

Here's the last word in amplifiers for the 80, 40, 20, 15, and 10-meter bands. Gonset's GSB-201 delivers 10 db gain with maximum power input ratings of 2000 Watts PEP, SSB, 1000 Watts on CW and 400 on AM.

# GONSET<sup>®</sup>, INC.

A Subsidiary of LTV Ling Altec, Inc.  
1515 South Manchester Avenue, Anaheim, California

# NEW callbooks

GET  
YOUR  
COPY  
NOW!



Over 60% of listings  
changed in only a year!

Over 275,000 QTH's in the United States edition  
plus other features ..... \$5.95  
The Foreign edition lists over 127,000 QTH's  
plus other features ..... \$3.95

See your favorite dealer or order direct (add 25c for mailing in U.S., Possessions & Canada. Elsewhere add 50c).

Radio Amateurs Reference Library  
of Maps—Order Your Set Today!



**WORLD PREFIX MAP**—Full color, 40" x 28", shows prefixes on each country . . . DX zones, time zones, cities, cross referenced tables ..... postpaid \$1.00

**RADIO AMATEURS GREAT CIRCLE CHART OF THE WORLD**—from the center of the United States! Full color, 29" x 25", listing Great Circle bearings in degrees for six major U.S. cities: Boston, Washington, D.C., Miami, Seattle, San Francisco & Los Angeles ..... postpaid \$1.00

**RADIO AMATEURS MAP OF NORTH AMERICA!** Full color, 29" x 25" — includes Central America and the Caribbean to the equator, showing call areas, zone boundaries, prefixes and time zones, FCC frequency chart, plus informative information on each of the 50 United States and other Countries ..... \$1.00

**WORLD ATLAS**—Only Atlas compiled for amateurs. Polar projection, six continents, prefixes on each country . . . full color, 16 pages ..... postpaid \$1.50

Complete reference library of maps—set of 4 as listed above .... postpaid \$3.00  
See your favorite dealer or order direct.

WRITE FOR  
FREE  
BROCHURE!

RADIO AMATEUR

callbook INC.



Dept. A, 4844 W. Fullerton Ave.  
Chicago, Ill. 60639

## 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. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. **Changes are shown in heavy type.**

- W1, K1, WA1 — Providence Radio Ass'n., W1OP, Box 2903, Providence, Rhode Island 02903.  
W2, K2, WA2, WB2 — North Jersey DX Ass'n., P.O. Box 505, Ridgewood, New Jersey 07451  
W3, K3, WA3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.  
W4, K4, WA3, WB1 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.  
W5, K5, WA5 — Hurley & Saxon, K5QUH, P.O. Box 9915, El Paso, Texas 79989.  
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, California 92106.  
W7, K7, WA7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.  
W8, K8, WA8 — Paul R. Hubbard, WA8OXY, 921 Market St., Zanesville, Ohio 43701.  
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.  
W0, K0, WA0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minnesota 55921.  
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.  
VE2 — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.  
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario.  
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.  
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan  
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.  
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia  
VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N.W.T.  
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.  
VO2 — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador.  
KI16 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701  
KL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687  
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902  
KV4 — Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820  
KZ5 — Ralph F. Harvey, KZ5RV, Box 407, Balboa, C. Z.  
SWL — Leroy Waite, 39 Hanum St., Ballston Spa, New York 12020

## IMPORTANT NOTICE

### Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code*. Your promptness will help you, the postal service and us. Thanks.

W8FYR SEZ

Say *Merry Christmas* with  
**KIRK**

Rugged  
Construction  
High Efficiency



Low Q  
Multi-Band  
Arrays

# SUPER-QUAD

2-3-4 Elements or more

**2 El.  
10-15-20  
\$69.95**

*Write for Complete  
brochure of  
individually priced  
components and  
Multi-Element arrays*

**2 El.  
6 Meter  
Array  
\$29.95**

**Separate  
2 El.  
10-15  
Array  
\$59.95**

CHRISTMAS GIFT  
CERTIFICATES AVAILABLE

**Interlaced  
2 El. 6  
3 El. 2  
Meter  
Array  
\$37.90**

NOTE CHANGE IN NATIONAL  
DISTRIBUTION POINT FROM  
MIAMI, FLORIDA, TO

 **KIRK** *Electronics*

6151 DAYTON-LIBERTY ROAD DAYTON, OHIO 45418  
PHONE: AREA CODE 513 — 835-5028

Associated with U.S. Fiberglass Company

12 AMP. ALLOY JUNCTION SILICON RECTIFIER. Use at 6 Amps for a safety factor of at least 200%. 50 PIV @ 40¢;



100 PIV @ 60¢; 150 PIV @ 70¢; 200 PIV @ 75¢; 250 PIV @ 80¢; 300 PIV @ 85¢; 350 to 400 PIV @ 99¢.

SALE: 160 AMP. WESTINGHOUSE SILICON DIODES. Guaranteed 50 PIV or better. Unused 1st quality. Worth many times our sale price of \$3.85 each. (With built-in heat sink \$4.85)

12 AMP. DIFFUSED JUNCTION SILICON RECTIFIER. 50 to 100 PIV 30¢ each  
600 PIV @ 1 AMP. Silicon @ 32¢ each  
800 PIV @ 1 AMP. Silicon @ 42¢ each



HALLICRAFTERS HA-6 TRANSVERTER with Hallcrafters P26 P.S. \$160.00.

WHIPPANY LI'L LULU 6 meter receiver \$59.00.

P & H LA400 C Linear Amplifier (1 KW) Factory Wired \$125.00.

COLLINS KWS-1 \$695.00; COLLINS 30S-1 \$995.00.

HALLICRAFTERS HT-33 (KW Linear w/4CX300A's) \$250.00.

COLLINS R388/URR RECEIVER. (.5 to 30.5 Mcs.) \$450.00.

SPECIAL PURCHASE PL-259A (831SP) 35¢ each while they last!

METER PROTECTOR. Handles continuous overload of 1 amp, and momentary 10 Amp. overload. (See page 33 Sept. 66 QST). 98¢.

5U 4GB SILICON Octal direct plug-in substitute. \$2.95.

5R4Y Silicon Octal direct plug-in substitute. \$4.95.

B & W CG-51 Watertight coax cable. Antenna connector. Orig. boxes w/full instructions. For RG8/U or RG11/U, etc. (Reg. net \$11.85). Special \$8.85.

SARKES TARZIAN Type S5018 Tube replacement silicon rectifier. For 5U4, 5V4, 5T4, etc. 600 PIV @ 750 Ma. F.W. (Reg. \$12.00 net) Special \$7.50.

Remember, Barry has the most diversified tube stock in the country! We specialize in hard-to-find types. Tell us what you need. Also: we buy unused tubes, send lists. We are authorized factory distributors on tubes for Eimac, Machlett, Penta, Raytheon, Westinghouse, Varian and many others.

WHEN IN NEW YORK DROP IN AND SAY HELLO! MON. TO FRI. 9 TO 5:30; SATURDAY 10 A.M. TO 2 P.M. Parking Lot 501 Broadway. Free parking on street Sat.

BARRY ELECTRONICS DEPT. Q-12  
512 BROADWAY, NEW YORK, N. Y. 10012  
WALKER 5-7000 (Area Code 212)

Enclosed is money order or check and my order. Prices FOB, N.Y. Shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overage will be refunded. Fragile tubes shipped via Railway Express. Minimum order \$5.00.

Send 10c for current "Greensheet" catalog #18 of 72 pages. Write for your copy.

Send information.....

Name..... Title

Company.....

Address.....

City..... State.....

It is with deep regret that we record the passing of these amateurs:

W1CGU, Albert C. Heskey, Newtonville, Mass.

W1UUG, Calvin L. Davis, Machias, Me.

ex-K10NX, George H. Carlson, Marlborough, Conn.

K10PJ, Francis M. Fossa, Nashua, N. H.

W1PWW, Benjamin W. Caldwell, Bangor, Me.

W1RRR, Elio G. Cavallini, Kingston, Mass.

ex-W2BF, Laurence W. Franklin, Bergenfield, N. J.

W2ECC, Robert Pheifer, Medford, N. J.

W2HCM, Edward C. Hudowalski, Albany, N. Y.

W2HXP, Edward G. Austin, Fanwood, N. J.

W2IUU, George F. Haderer, Jr., East Quoque, L.I., N. Y.

W2NkF, John E. Dehler, Plain View, N. Y.

W2SXO, Wilbur R. Stites, North Plainfield, N. J.

WB2WXX, Eileen P. Shaw, Saddle Brook, N. J.

K3OCI, Peter A. Robinson, Dover, Del.

W3QVJ, John W. Lambert, Bethel Park, Penn.

W3RIV, Kenneth I. Challstrom, Erie, Penn.

W4AJUP, Charles E. Hilbert, Dunedin, Fla.

W4OXQ, William H. Wooten, Kings Mountain, N. C.

K4TVA, William E. Burnett, Hopewell, Va.

W4VS/W7CL, Wilson Moore, Falls Church, Va.

W5EV, Graham W. Fuller, Maria, Texas

W5GLS, George N. Sharp, Pasadena, Texas

W5MDF, Boyce Harrell, Smithville, Texas

K5VYN, James I. Norton, New Iberia, La.

W6GCA, Albert T. Margo, Porterville, Calif.

W6HKN, William E. Asbury, Pollock Pines, Calif.

WB6KJ, Roy E. Greene, Lakewood, Calif.

W6QGI, Elmer A. George, Los Angeles, Calif.

W6RSK, Roy C. Pierce, Pacific Palisades, Calif.

WB6SPW, Renato E. Ghidella, Napa, Calif.

W6SYW, Nicholas E. Powers, Los Altos, Calif.

K6YVN, Clifford B. Simmons, La Puente, Calif.

W47FEZ, Cortis L. Wingerson, Seattle, Wash.

ex-W7KOH, Joe K. O'Neill, Henderson, Nev.

ex-W7NBP, Clarence W. Stemen, Warren, Ariz.

W8AHV, Paul G. Bauerle, Lansing, Mich.

W8AKR, Franklin Richards, Bangor, Mich.

W8QMB, Crawford E. Clurg, Ravenna, Ohio

K8TIP/5, Terry W. Creighton, Commerce, Texas

W8TRP, Edmond G. Hait, Detroit, Mich.

W8CYQ, Donald J. Angus, Indianapolis, Ind.

W9DXH, Lester J. Spry, Elkhart, Ind.

W9MP, William B. Ferguson, Hinsdale, Ill.

W9VFF, Harold A. Davison, Danville, Ill.

WA0DDG, Gary C. Liebling, Kansas City, Mo.

WA8HTY, Gary L. Creason, Kansas City, Mo.

VE2SF, Harland B. Wilder, Town of Mount Royal, Que.

VE4QD, Bernhard Ursell, Brandon, Man.

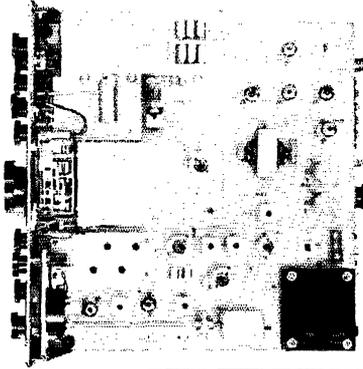
VE7PO, Clarence R. D. Ferris, Sidney, B. C.

VK2ADC, G. S. McLeod, Beverly Hills, Sydney, Aust.

## Low Loss Coax

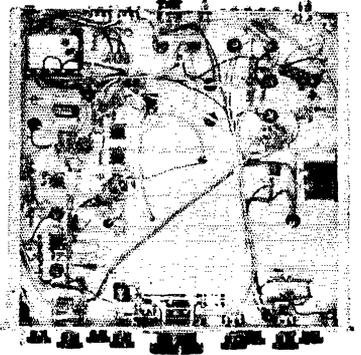
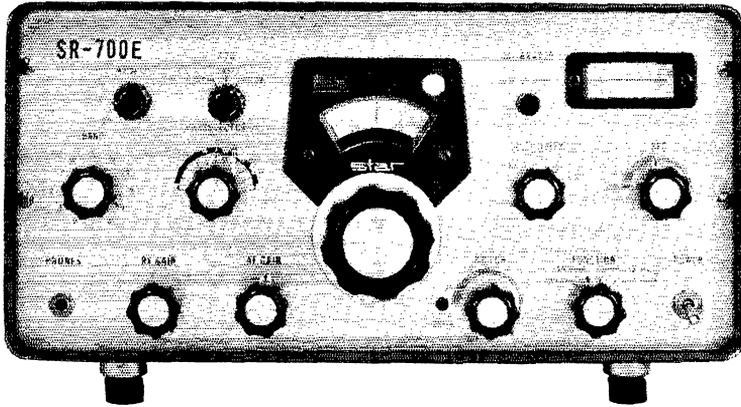
(Continued from page 17)

The main feeder run should be cable similar to 1/2-inch Alumifoam because of its low-loss characteristics. Since the cable is designed to be bent upon installation, there is no electrical or physical damage in bending it, even on a radius as small as ten times the o.d. of the cable. The cable should be terminated to match with the transmitter cable connector (type N or splice). The type N connector is better than the PL-259 because of its lower v.s.w.r., greater power-



it's  
very  
evident...

from  
every  
angle!



From every angle, the superior design features, fine craftsmanship, and high QC quality of Starline equipment shines out . . . to guide you to sparkling and most pleasurable performance.

**The SR-700 E Receiver:**

Full ham band coverage 10 thru 75 . . . triple conversion . . . high stability VFO . . . precise dial reads to 1 KC, with electrical zero set . . . bridge T notch filter . . . variable selectivity . . . .5-1.2-2.5-4 KC built-in . . . and everything else you would expect in the very best . . .

\$395.

(Speaker ST-7 . . . \$15)



The unique Star "accepted" symbols on your Interstar Communication equipment indicate the equipment has been triple quality controlled: in production; at export QC acceptance; and again when imported. These careful steps by the manufacturer and by Interstar's engineers assure you of highest reliability, created thru the pride of workmanship of Japan's finest manufacturer of amateur communications equipment.

Test tune this fine equipment at your favorite amateur supply house. Ask him about the unique Interstar satisfaction warranty. Or write for descriptive literature.

PHONE: 212 252-4300



inter star

# ANNOUNCING HOTEL SAHARA'S 2<sup>nd</sup> ANNUAL SAROC

Sahara Amateur  
Radio Operator's Convention

JAN. 5, 6, 7, 8, 1967



**Exciting Entertainment . . .** Congo Room  
Shirley Bassey & The Osmond Brothers

**Luxurious Accommodations . . .**  
1,000 beautiful rooms with a special SAROC  
ROOM RATE OF ONLY \$10 single or double,  
plus tax (Jan. 4-9)

### SAROC . . . Special Events

- Manufacturers' Exhibits
- Technical Talks (Fri.-Sat., Jan. 6-7)
- MARS Luncheon (Sat., Jan. 7)
- Ladies Day Program (Sat., Jan. 7)

Technical Program and Presentations—  
Master of Ceremonies  
Ray Meyers, W6MLZ

### Registration Fee: \$9.50

Registration includes:

- Three Cocktail Parties
- Midnight Show and Drinks in the  
Sahara Congo Room
- Sunday Sahara Hunt Breakfast

### MAKE RESERVATIONS NOW!

Mail Coupon to John Romero  
Hotel Sahara • Las Vegas, Nevada

Name \_\_\_\_\_ Call \_\_\_\_\_

Address \_\_\_\_\_

Arr. date and time \_\_\_\_\_ Lgth. of stay \_\_\_\_\_

Accommodations desired (check one)  
 single       double       twin

Registration fee of \$9.50 enclosed  
(Please make checks payable to  
SAROC, HOTEL SAHARA)

(Deadline for advance reservations, Dec. 31, 1966)

# SAHARA!

LAS VEGAS, NEVADA

handling capability and improved radiation characteristics. For still lower system v.s.w.r., the conversion splice is the wiser choice.

The antenna end of the main feed line should be terminated by the same procedure as the transmitter end. Jumping from the solid-sheath cable to the antenna is accomplished by means of a short length of RG-8A/U or T-4-50. The cable loops once around the rotator and is terminated as you now terminate in your antenna.

In conclusion, solid-aluminum-sheath cable can be reasonably expected to deliver more power to the antenna because of its low v.s.w.r. and lower attenuation characteristics. Combining solid-sheathed, foamed-polyethylene dielectric, aluminum-shielded coaxial cable and low-v.s.w.r. connectors gives a feeder connecting system which, at v.h.f. and u.h.f., may deliver as much as 70 per cent more power from transmitter to antenna in a comparatively short run. **QST**

## Technical Correspondence

(Continued from page 46)

Essa II. The picture is centered just off Vancouver Island with a weather front paralleling the coast of Washington and British Columbia. Vancouver Island can be seen faintly in the right center of the picture.

The equipment used here was a synchronizer designed by Wendell Anderson, K2RNF, which appeared in *QST*, November 1965. The lamp driver is from a surplus facsimile machine.

In order to reduce time and complication in reproduction of weather-satellite pictures a system for printing directly on positive paper was developed here. In this system the 2400-cycle amplitude-modulated signal is demodulated by a bridge rectifier, Fig. 1. The resultant signal has a bandwidth of about 1800 cycles and is filtered by an 88-millihenry toroid coil and a 0.08-microfarad capacitor. The output of the demodulator is applied to a bridge modulator which is arranged to produce minimum output at maximum output from the demodulator. The carrier generator used was a Jackson 655 audio generator operating at 2200 cycles. This frequency was chosen to reduce interference from the original 2400-cycle signal. The 2400-cycle signal and the 2200-cycle carrier are adjusted to produce an 80-percent modulated signal with an amplitude large enough to drive the lamp driver.

The demodulator diodes are high-voltage silicon types (Sarkes Tarzian 1N2484). The bridge modulator diodes are surplus 1N799s. The input transformer,  $T_1$ , is a 5000-ohm-to-voice-coil output transformer. The photographic paper was Du Pont Velour Black R-1 developed according to the instructions on the package.

This unit has been used with a surplus facsimile light driver and has produced pictures of good quality. — Jack Spillane, W7UGV, 2010 N.W. 60th, Seattle, Washington 98107.

## SWITCH TO SAFETY

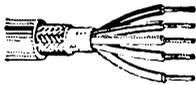
# better sent . . . better received

with Belden wire and cable  
. . . easy to use packaged lengths.



### Antenna Rotor Cables

Sturdy, flexible, plastic insulated cable for rotor applications. Color coded. Chrome, vinyl plastic jacket resists sun and aging.



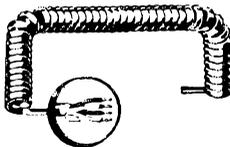
### Power Supply Cables

Excellent mechanical and electrical characteristics for long service life. Special jacket offers maximum resistance to abrasion and ozone. Use as power supply cords and interconnecting cables. Ideal for remote control circuits, special press-to-talk microphone circuits, and other applications.



### Shielded Hook-Up and Grid Wire

Provide most effective TVI suppression. Vinyl insulated with tinned copper braid shield. Available from 24 AWG to 12 AWG.



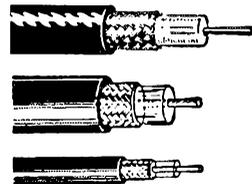
### Coiled Microphone Cable

Provides low impedance for mobile microphone applications. Neoprene jacket remains flexible at low temperatures. Available with or without shielded conductors.



### Ham Transmission Lines— Parallel Type

Uniform quality control provides uniform impedance. Brown polyethylene for best weather resistance and lowest losses.



### Ham Transmission Lines— RG/U Type

Designed for lowest losses, longer service life, and maximum dependability. Cables are essentially flat with no peaks in attenuation to reduce signal on either high or low frequencies.



### FOR FULL INFORMATION CONTACT YOUR BELDEN ELECTRONIC DISTRIBUTOR

The Belden line gives you maximum efficiency with lowest losses under all conditions of operation. There's a Belden wire or cable to meet every ham transmitting and receiving need. Shown here is only a small portion of this complete line.

8-7-G

**Belden**

BELDEN MANUFACTURING COMPANY • P. O. BOX 5070-A, CHICAGO, ILLINOIS 60680

*"Your Friendly Supplier"*



OFFERS

THE *hallicrafters*  
SX-146 AMATEUR BAND RECEIVER



The Hallicrafters SX-146... Amateur Band Receiver of advanced design, employing a single conversion signal path and pre-mixed oscillator chain to assure high order frequency stability and freedom from adjacent channel cross-modulation products. Employs a high frequency quartz crystal filter and has provision for the user installation of two more crystal filters. Tranceives with HT-46.

SX-146 \$269.95  
HA-19 100 Kc Crystal Calibrator \$19.95

ALSO IN STOCK: HT-46 Transmitter \$349.95

USED EQUIPMENT SPECIAL

SX-111 \$139.95  
SX-140 \$59.95

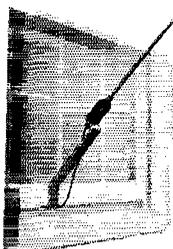
WRITE FOR LATEST COMPLETE LIST

**Evans RADIO**

P. O. BOX 312 FONE CONCORD, N. H.  
603-225-3358

the NEW  
**"Vacationer"**

**PORTABLE ANTENNA**  
with Non-Shatterable Base



- 20-15-10-6-2- Meters
- Very Low SWR
- Folds to 19 inches
- Weighs only 2 pounds
- Complete for 5 Frequencies

**\$24.50**

ask your local dealer  
or

Patented

**DPZ CORPORATION**

P. O. BOX 1615  
JUPITER, FLORIDA 33458

**What Wives Think**

(Continued from page 60)

**Summary**

The evidence shows that by far the majority of ham husbands do keep ham radio in proper perspective. As a result, their wives have become avid boosters, since they appreciate it as a source of needed relaxation for their husbands and, frequently, as a source of friends for themselves as well. Wives directly participating in ham doings have even a higher regard for it. For a few wives ham radio is not a blessing in the home, but often these problems work themselves out in time with the application of mutual understanding and common sense on the part of the husbands. There may be too much chatter on the air about the hobby itself, but the OM who wants stimulating conversations can get them going without too much difficulty. In summation, then, wives rate ham radio as the best of hobbies for their sweethearts. Fellows, be thankful for your good fortune!

**Acknowledgments**

To each wife who returned a questionnaire, the author extends his gratitude for permitting him to put your story into words. Tnx and 88s.

QST-

**Drake 2-NT**

(Continued from page 44)

in the set ( $C_{11}$  in the manufacturer's circuit diagram) will do the trick. The big advantage of the keying system used in the 2-NT is that shaping can be done without danger of causing chirp, a feature which oscillator keying does not have.

As the control circuit used for break-in and semibreak-in work should be of interest to c.w. men it is shown here in Fig. 2A. It is similar in principle to the one used in the Drake T-4X ("Recent Equipment", May 1966 QST) but differs in detail. With the key open, the 0.22- $\mu$ f. capacitor is charged to about -16 volts (point C) and the plate current of the 6EA8 triode is cut off. Point B is essentially at this same potential, through  $CR_2$ .  $R_1$ , which is part of the keying circuit (not shown) for the sidetone oscillator, is approximately 150,000 ohms, so point A is about -100 volts from ground. Thus the 0.01- $\mu$ f. capacitor is charged to the difference between these two voltages, with B positive with respect to A. When A is grounded by closing the key, the capacitor discharges a positive pulse through  $CR_2$  to the grid of the 6EA8, driving the tube into sudden conduction and giving the relay a head start. Simultaneously, the 0.22- $\mu$ f. capacitor discharges through  $CR_1$ , and the grid of the tube stays at ground as long as the key is closed. On opening the key the capacitor again begins to charge, the charge time being regulated by the setting of  $R_2$ , and eventually the bias becomes high enough to cut off plate current and turn off the relay.

QST-

# Gateway



## *to Amateur Radio!*

- ★ HOW TO BECOME A RADIO AMATEUR
- ★ THE RADIO AMATEUR'S LICENSE MANUAL
- ★ LEARNING THE RADIO TELEGRAPH CODE
- ★ OPERATING AN AMATEUR RADIO STATION

Anyone starting out in amateur radio will find these publications a necessary part of his reading and studying for the coveted amateur radio operator's ticket. Written in clear, concise language, they help point the way for the beginner. Tried and proven by thousands upon thousands of amateurs, these ARRL publications are truly the "Gateway to Amateur Radio."

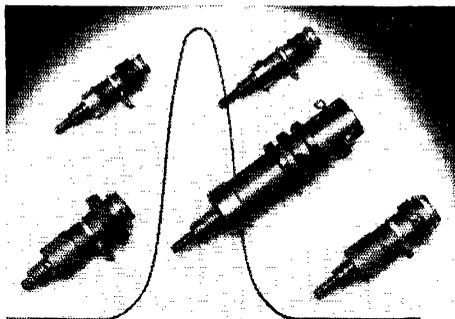
**\$2.00**

POSTPAID

The American Radio Relay League, Inc.—Newington, Conn. 06111

## ARPS

(Continued from page 70)



### Adjustable RF Coils On Resinite Forms

Moderately priced resinite coils are used frequently for construction projects in amateur and experimenter publications. These coils give dependable performance and are stocked nationwide.

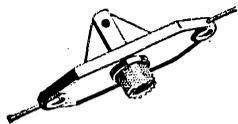
Series 20A .079 uh to 1.25 mh  
Series 21A .68 uh to 12.5 mh  
Series 22A 5.7 uh to 125 mh



Write for full line catalog  
**J. W. MILLER CO.**

5917 So. Main St. • Los Angeles, Calif. 90003  
AVAILABLE NATIONALLY FROM  
DISTRIBUTORS AND MAIL ORDER HOUSES.

### HYE-QUE ANTENNA-FEEDLINE CONNECTOR

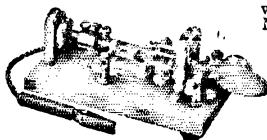


New 3-in-1 molded plastic-and-metal fitting provides: coax feeder connection, heavy copper leads to elements, antenna center support. Hye-que 1 connector fits standard PL259. Reinforced, weather protected, ultra-efficient. At your ham store, or \$2.95 pnd. Companion insulators, 2 for 99¢ pnd. Includes complete instructions.

**BUDWIG MFG. CO.** P.O. Box 97A, Ramona, Calif. 92065

### ENJOY EASY, RESTFUL KEYING

With **VIBROPLEX**



Sending becomes fun instead of work with the SEMI-AUTOMATIC Vibroplex. It actually does all the arm-tiring nerve wrecking work for you. Adjustable to any desired speed. Standard models have polished Chromium top parts and gray base. Deluxe models also include Chromium Base and red finger and thumb pieces. Five models to choose from, priced at \$19.95 to the 24K Gold Plated Base "Presentation" at \$39.95.

### VIBRO-KEYER

Works perfectly with any Electronic Transmitting Unit. Weighs 2½ lbs., with a base 3½" by 4½". Has Vibroplex's finely polished parts, red knob and finger, and thumb pieces. Standard model \$18.95; Deluxe model includes Chromium Plated Base at only \$24.95.

Order today at your dealers or direct

**THE VIBROPLEX CO., INC.**

833 Broadway New York, N. Y. 10003

**FREE  
Folder**

the total representation in all the Region and Area Nets. This figure was arrived at by adding the number of sections in each Region, multiplying it by the total number of sessions that the net should have held (30 or 60, depending on the net's pattern) and dividing it into the number of sections times the number of sessions they were actually represented in the Region net. For the Area net, replace Section by Region in the above procedure.

On behalf of the Public Service branch of the Communications Department, we would like to wish each and every one of you the best during this holiday season. May your traffic loads be comfortable.

No comments from K1WJD, he's busy analyzing the results of EAN's participation in the SET. W9DYG comments that CAN is ready and waiting for the onslaught of traffic during the December rush. W6VNVQ notes that conditions on 80 have been improving each night so that he has been able to observe an occasional EAN session. He is looking for alternate NCSs, so anyone who is qualified and interested get in touch with W6VNVQ. W1EFW sends an excellent report and indicated that this month was the best in the representation department since he took over as manager. Special kudos to Maine which has come from no where to missing only one session. WA2GQZ finally had 100% reporting for Sept. This is the first time since April and the fourth time this year. Joe is hoping for better representation, especially from all sections. K3MVO shows a full house on 3RN and some pretty good representation, too. K5IBZ comments that RNS had better representation this month, but fell down on the traffic. Is there ever a month when everything goes right? K7JHA comments that things picked up on RN7, including better representation and more traffic. W8CHT spent most of the SET with three tape recorders going and he is now in the process of wading through thousands of feet of tape. W9QLW can't understand why everyone is so reluctant to QNG when the regular NCS doesn't show. (We don't either—Ed.). K7NHL has high hopes that the return of TWN to 80 meters will also improve their traffic, representation and just about everything else.

*Transcontinental Corps:* W3EML has lost a few of his top men who are feeling the pressures of school work (study now, handle traffic later, fellows). Bill is still in great need of night owls who will take the PAN to EAN schedules. If you're interested, drop Bill a line (or message). W9JUK appears to have three openings for Station F schedules. Otherwise, he has a full house of hard working fellows. W7DZX is having some trouble clearing the PAN to EAN traffic so any of you fellows on the east coast who are interested in that late sked get on the ball and let your TCC Director know. Christmas means mucho traffic and we gotta get it cleared.

### September report:

Area	Func-tions	% Suc-cessful	Traffic	Out-of-Net Traffic
Eastern	120	84.0	2166	825
Central	90	83.3	1323	649
Pacific	120	79.1	2518	1259

Summary 330 82.1 6007 2733  
TCC Roster: Eastern Area (W3EML, Dir.) — W1s BGD EFW NJM, K1s TKS ZND, W2s GVH SEI, K2s KTK RYH SIL/8S, W4s BLV UPI/4 UPC, W5s AEJ DXM OHK, W3s EML FAF NEM, K3MVO, W4s DVT ZM, K4KNP, WA4UMX, W8s CHT RYP, K3s KMQ NJW QKY, Central Area (W9JUK, Dir.) — W40GG, WA4WWT, K4DZM, W5GHP, WA5JOL, W9s DXY DYG JUK KQB VAY YT ZYK, W4s BWY IZR NFS, W6LCX, WA6MLE, K6AEM.

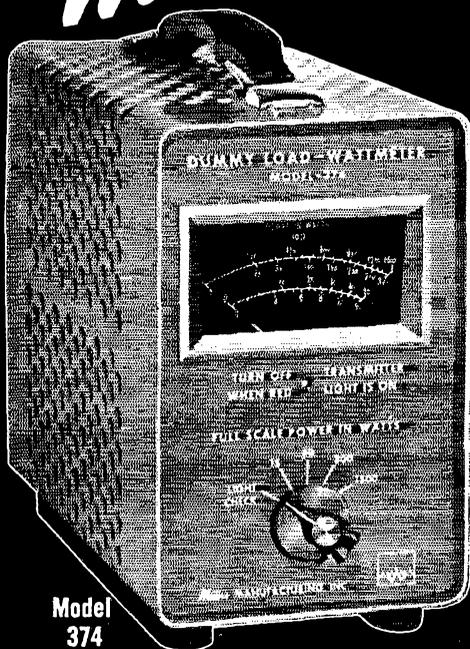
### Net reports:

Net	Sessions	Check-ins	Traffic
N. Mex. Roadrunner	22	497	66
7290	42	1355	870
HBN	30	389	537
North American SSB	26	734	751
Mike Farad	32	448	410
ISSB	21	475	1736

QST

*Waters* ...for happier hamming  
in the New Year

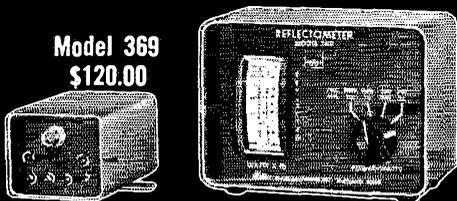
**So now we make 2!**



**Model 374**  
**\$135.00**

**NEW DUMMY LOAD/WATTMETER**  
**Reads to 1500 Watts!**

We've added another Dummy Load/Wattmeter to the Waters line! It's the Model 374 and shows power output to a full 1500 watts over a frequency range of 2 to 30 mHz. Four calibrated scales (0-15; 0-50; 0-300; 0-1500) read watts to  $\pm 5\%$  accuracy. Load Impedance: 52 ohms. VSWR: 1.3 : 1. Weight: 12 lbs. Over-temperature warning light.



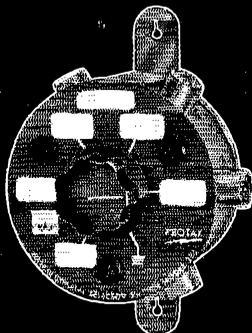
**Model 369**  
**\$120.00**

**REFLECTOMETER**

Measures both forward and reflected power simultaneously on unique double meter. Covers 3 to 30 mHz at 52 ohms on two separately set forward scales of 200 and 1000 watts, (20 and 200 watts reflected) to insure accurate readings. Comes complete with directional coupler.

**Model 375**  
6-position with  
rear axial connectors  
**\$13.95**

**Model 376**  
5-position with  
side radial connectors  
**\$12.50**



**PROTAX™ ANTENNA SWITCHES**  
**with Automatic Grounding**

The Water PROTAX™ Coaxial Antenna Switch automatically grounds the entire antenna system when the shack is shut down. Readily handles a full 1000 watts and comes complete with knob and escutcheon plate with erasable marking panels. (Model 376 has mounting bracket.)



**WATERS**  
MANUFACTURING INC.  
WAYLAND, MASSACHUSETTS

Waters Quality Products Are Sold Only Through Waters Qualified Distributors

## XMAS GIFT SUGGESTIONS

**F**or that budding new amateur:  
See page 141

**F**or the newcomer or oldtimer:  
See page 130

**F**or the amateur who wants his  
QST file neat and protected:  
See page 110

**F**or the amateur who wants  
comprehensive information on  
operating procedures: See pages  
118, 119

**D**on't delay. Place your  
order now to allow  
plenty of time for arrival  
before Christmas

## LOOK...NO HOLES!

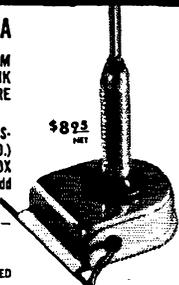
### FITS ANY C.B. OR HAM ANTENNA

THIS RIGID RUSTPROOF ANODIZED ALUMINUM ANTENNA MOUNT FASTENS TO YOUR CAR TRUNK LID IN MINUTES . . . AND NO BODY HOLES ARE NECESSARY!

SEE THESE SUPERIOR MOUNTS AT YOUR DISTRIBUTOR/DEALER OR REMIT \$4.95 (check or M.O.) TO E-Z MOBILE ANTENNA MOUNT INC., P.O. BOX 277, ALGONAC, MICHIGAN (Michigan residents add 4% sales tax) PHONE 313 794-7343

SPECIFY ANTENNA MOUNT HOLE DESIRED (3/8"-3/4"-SMALL OR MEDIUM BALL)

\$8.95  
NET



DEALER INQUIRIES INVITED

## E-Z MOBILE ANTENNA MOUNT

PATENT PENDING

## 10-15-20M QUADS

\*Pre-Cut \*Pre-Tuned \*Triband  
2, 3 & 4 ELEMENT QUADS  
FIBERGLASS OR BAMBOO

from \$59.95

- ROTATE WITH TV ROTOR
- HIGH F/B RATIO
- VERY LOW SWR
- LOW Q BROADLY TUNED
- HIGH GAIN
- EASY TO MATCH
- LOW WIND RESISTANCE
- ONE FEED LINE FOR 3 BANDS. NO SWITCHING

Ask about 6-meter quads

WRITE DEPT. A

406 Bon Air Dr.

Temple Terrace, Florida

Phone 988-4213

**Skylane** PRODUCTS

## TVI Is Still With Us

(Continued from page 51)

built-in requirements for a permanent solution to a TVI case is the need to keep the rig as it was checked out, assuming it was operating satisfactorily. Both the Field Engineering Bureau and TVI committees can be embarrassed by statements they make to a complainant to the effect "why the transmitter was checked out last month (or week) and did not cause TVI." Obviously, if proper grid current is exceeded, keying changed to the bad, or other important changes made, we have a new situation. It is necessary for the amateur to evaluate the changes promptly.

Out of several hundred thousand BCI and TVI cases encountered during the past 37 years, you would expect a few unusual ones. One that I cite to audiences is that of a physically big amateur and a physically small TV-set owner, living across the street from one another in an eastern city. The Bureau's engineer was dispatched from his headquarters to bring about a solution of the TVI situation. Using all his tact, diplomacy and arguments he had the case under control when a remark by one of the parties started the fracas all over again. The amateur invited the TV set owner out of his house and engaged him in fisticuffs. It was a short fight. The TV set owner, however, had courage, and after nursing his wounds, engaged the ham in his yard. The assault case went to the local prosecuting attorney, but was settled out of court. There was no more TVI reported. The ham, in the case, apparently operated a clean transmitter.

In another famous recent case, the amateur made the mistake of castigating his unwilling (TV) listeners. Although the Bureau made repeated efforts to quiet the situation, it was a hard sell job. The Bureau's engineers, both in the field and Washington, supported the technical position of the amateur and gave him their assistance. Yet an article in another radio magazine brought up the subject of "Gestapo" techniques against the ham. Sometimes it seems you can't win for losing.

In another case, the amateur caused wide spread BCI, yet when his rig was checked out by the visiting inspector there appeared to be no cause for complaint. After two trips, it developed that our friend has a 500 w rig in the attic and this he kept concealed. He was stopped from causing QRM. By means of field strength measurements, the Bureau has proved cases of overpower or conditions of change in power input. The average TVI case handled by the Bureau is routine, which enables the workload to be kept under fair control. One unusual case may take fifty times the man hours of a routine case.

Perhaps the nicest endings to TVI cases are those where the complainant becomes an amateur, having been converted all the way. QST



**XMAS SALE!**

**DOUBLE BONUS**

**\$25**

WORTH OF  
Transistors  
Rectifiers  
Condensers  
Knobs, Coils  
Resistors  
Diodes, etc.  
Add 25¢ for handling.

**PLUS FREE**

CHOOSE ANY

**\$100** ITEM FREE

**BOTH GIFT PAKS FREE WITH \$10 ORDERS**

Space Saver, 3 Amp Switching

**POWER TRANSISTORS**

2N1755  
2N1760

**3 for \$1**

**20 WATTS**



**HIGH POWER \$1**

PNP 100Watt/15 Amp HiPower  
TO36 Case! 2N441, 442, 277,  
278, DS501 up to 50 Volts ea.

**1. AMP 800 PIV**



**SUBMINIATURE 4 for \$1**  
**RECTIFIERS**

**10 WATT ZENERS**

<input type="checkbox"/> 3.0	<input type="checkbox"/> 1.00
<input type="checkbox"/> 6v	<input type="checkbox"/> Each
<input type="checkbox"/> 9v	<input type="checkbox"/> 70v
<input type="checkbox"/> 12v	<input type="checkbox"/> 80v
<input type="checkbox"/> 14v	<input type="checkbox"/> 90v
<input type="checkbox"/> 20v	<input type="checkbox"/> 100v
<input type="checkbox"/> 24v	<input type="checkbox"/> 110v
<input type="checkbox"/> 30v	<input type="checkbox"/> 124v
<input type="checkbox"/> 45v	<input type="checkbox"/> 150v
<input type="checkbox"/> 60v	

**SILICON CONTROL RECTIFIERS**

PRV	1 AMP	3 AMP	PRV	1 AMP	3 AMP
25	<input type="checkbox"/> 35¢	—	200	<input type="checkbox"/> 81¢	95¢
50	<input type="checkbox"/> 45¢	<input type="checkbox"/> 45¢	400	<input type="checkbox"/> 1.25	1.50
100	<input type="checkbox"/> 61¢	<input type="checkbox"/> 69¢	*TO-9, w/3 leads N Stud		
150	<input type="checkbox"/> 69¢	<input type="checkbox"/> 81¢	TO-9		

WORLD'S MOST POPULAR

**\$1 PARTS PAKS**

FACTORY TESTED

**SEMI-KON-DUCTORS**

- 3 INFRARED DETECTORS, with leads .....\$1
- \$25 SURPRISE PAK: transistors, rect, diodes, etc. \$1
- 40 PRECISION RESISTORS, 1/2, 1, 2W; 1% values \$1
- 30 CORNING "LOW NOISE" resistors, 5% too! \$1
- 60 TUBULAR CONDENSERS, to .5mf, to 1Kv, asst \$1
- 40 DISC CONDENSERS, 27 mmf to .05 mf to 1KV \$1
- 60 TUBE SOCKETS, receptacles, plugs, audio, etc. \$1
- 30 POWER RESISTORS, 5 to 50W, to 24K ohms .....\$1
- 50 MICA CONDENSERS, to .1mf, silvers too! .....\$1
- 10 VOLUME CONTROLS, to 1 meg, switch too! .....\$1
- 10 ELECTROLYTICS, to 500mf, asst P/P & tubulars \$1
- 50 RADIO & TV KNOBS, asstd, colors & styles .....\$1
- 10 TRANSISTOR ELECTROLYTICS: 10 mf to 500 mf \$1
- 50 COILS & CHOKES, if, rf, ant, osc, & more .....\$1

- 3 2N706 500MW, 300MC NPN PLANAR, TO-18 ....\$1
- 4 2N35 TRANSISTORS, npn, by Sylvania, TO22 ...\$1
- 4 2N255 POWER TRANSISTOR EQUALS, TO3 case \$1
- 2—500 MC, 2N708 NPN Silicon planar TO46 ....\$1
- 15 NPN TRANSISTORS, 2N35, 170, 440, no test ....\$1
- 85 WATT 2N424 PLANAR, silicon, TO-63 npn, ... \$1
- 10 NPN SWITCHING TRANSISTORS, 2N338, 440 ....\$1
- 25 ZENERS GLASS SILICON DIODES, no test .....\$1
- 2 "TINY" 2N1613 2W, 100MC, TO46 case, npn \$1
- 15 PNP TRANSISTORS, CK722, 2N35, 107, no test, \$1
- 4 BIDIRECTIONAL TRANSISTORS, 2N1641 types ...\$1
- 3 2N711 300MW, 300 MC, PNP MESA, TO18 .....\$1

**1 WATT ZENER DIODES**



**3 For \$1**

| Volts                        |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|
| <input type="checkbox"/> 10 | <input type="checkbox"/> 15 | <input type="checkbox"/> 22 | <input type="checkbox"/> 32 | <input type="checkbox"/> 47 | <input type="checkbox"/> 68 | <input type="checkbox"/> 100 |
| <input type="checkbox"/> 12 | <input type="checkbox"/> 16 | <input type="checkbox"/> 24 | <input type="checkbox"/> 36 | <input type="checkbox"/> 51 | <input type="checkbox"/> 75 | <input type="checkbox"/> 110 |
| <input type="checkbox"/> 13 | <input type="checkbox"/> 18 | <input type="checkbox"/> 27 | <input type="checkbox"/> 39 | <input type="checkbox"/> 56 | <input type="checkbox"/> 82 | <input type="checkbox"/> 120 |
| <input type="checkbox"/> 15 | <input type="checkbox"/> 20 | <input type="checkbox"/> 30 | <input type="checkbox"/> 43 | <input type="checkbox"/> 62 | <input type="checkbox"/> 91 | <input type="checkbox"/> 130 |

**2-Amps "GLASSMIKE" SILICON RECTIFIERS**



PIV	Sale	PIV	Sale
50	9¢	600	69¢
100	13¢	800	51¢
200	19¢	1000	69¢
400	29¢		

**SILICON CONTROLLED RECTIFIERS**

PRV	7 AMP	16 AMP	25 AMP
50	<input type="checkbox"/> 48¢	<input type="checkbox"/> 70¢	<input type="checkbox"/> .90
100	<input type="checkbox"/> 70¢	<input type="checkbox"/> 1.20	<input type="checkbox"/> 1.50
200	<input type="checkbox"/> 1.05	<input type="checkbox"/> 1.70	<input type="checkbox"/> 2.10
300	<input type="checkbox"/> 1.60	<input type="checkbox"/> 2.20	<input type="checkbox"/> 2.70
400	<input type="checkbox"/> 2.10	<input type="checkbox"/> 2.70	<input type="checkbox"/> 3.00
500	<input type="checkbox"/> 2.80	<input type="checkbox"/> 3.30	<input type="checkbox"/> 3.80
600	<input type="checkbox"/> 3.00	<input type="checkbox"/> 3.90	<input type="checkbox"/> 4.30

**6000 PIV 200 MA SILICON RECTIFIERS**

- 35 TWO WATTERS, asst incl: A.B., 5% too! .....\$1
- 75 HALF WATTERS, asst incl: A.B., 5% too! .....\$1
- 60 HI-Q RESISTORS, 1/2, 1, 2W, 1% & 5% values \$1
- 10 PHONO PLUG & JACK SETS, tuners, amps .....\$1
- 10 TUBULAR ELECTROLYTICS, to 500 mf .....\$1
- INFRARED PHOTO DETECTOR TRANSDUCER .....\$1
- INFRARED PARABOLIC REFLECTOR & FILTER .....\$1
- 40 WORLD'S SMALLEST COND., to .05mf .....\$1
- 4 TRANSISTOR TRANSFORMERS, asst. worth \$25 \$1
- 2 CLAIREX PHOTO ELECTRIC CELL, CL607 .....\$1
- 60 CERAMIC CONDENSERS, discs, npo's, to .05 ..\$1
- 40 "TINY" RESISTORS, 1/10W, 5% too! .....\$1
- 10 TRANSISTOR SOCKETS for pnp-npn transistors \$1
- 30 MOLDED COND'S, mylar, porc, black beauty \$1

**SILICON POWER STUD RECTIFIERS**

AMPS	25 PIV	50 PIV	100 PIV	200 PIV
3	<input type="checkbox"/> —	<input type="checkbox"/> 5¢	<input type="checkbox"/> 9¢	<input type="checkbox"/> 19¢
15	<input type="checkbox"/> —	<input type="checkbox"/> 22¢	<input type="checkbox"/> 40¢	<input type="checkbox"/> 65¢
35	<input type="checkbox"/> —	<input type="checkbox"/> 50¢	<input type="checkbox"/> 75¢	<input type="checkbox"/> 1.19

AMPS	400 PIV	600 PIV	800 PIV	1000 PIV
3	<input type="checkbox"/> 25¢	<input type="checkbox"/> 35¢	<input type="checkbox"/> 45¢	<input type="checkbox"/> 65¢
15	<input type="checkbox"/> 90¢	<input type="checkbox"/> 1.35	<input type="checkbox"/> 1.59	<input type="checkbox"/> 1.79
35	<input type="checkbox"/> 1.90	<input type="checkbox"/> 2.50	<input type="checkbox"/> 2.75	<input type="checkbox"/> 2.95

**750 MIL TOP HAT AND EPOXIES**

PIV	Sale	PIV	Sale	PIV	Sale
50	<input type="checkbox"/> 5¢	600	<input type="checkbox"/> 19¢	1400	<input type="checkbox"/> 75¢
100	<input type="checkbox"/> 7¢	800	<input type="checkbox"/> 24¢	1600	<input type="checkbox"/> 95¢
200	<input type="checkbox"/> 9¢	1000	<input type="checkbox"/> 40¢		
400	<input type="checkbox"/> 11¢	1200	<input type="checkbox"/> 59¢		

**10¢ FOR OUR "67" BARGAIN CATALOG ON: Semiconductors Poly Paks Parts**

**POLY PAKS**

TERMS: send check, money order, include postage—avg. wt. per pak 1 lb. Rated, net 30 days. CODs 25%

P.O. BOX 942 M

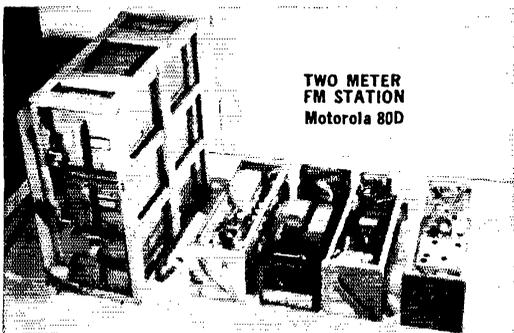
SO. LYNNFIELD, MASS.

"PAK-KING" OF THE WORLD

- 30 TRANSISTORS, rf, lf, audio osc-ifs, TO5 no test \$1
- 3 2-WATT PLANAR TRANSISTORS, 2N697, 100mcnpn \$1
- 4 2N33 & NPN SILICON transistors, Transistoron \$1
- 10 ZENERS REFERENCES stud, asst types .....\$1
- 25 GERMANIUM & SILICON DIODES, no test .....\$1
- 25 TOP HAT RECTIFIERS, silicon, 750ma, no test \$1
- 10 FAMOUS CK722 TRANSISTORS, pnp no test ....\$1
- 10 30-MC TRANSISTORS, silicon, TO18, no test \$1
- 3—2N705 MESA, 300 mc, 300 mw, pnp, TO18....\$1
- 10 2-6AMP RECT's, studs, silicon, 50 to 400 V ....\$1
- 10 PNP SWITCHING TRANSISTORS, 2N404, no test, \$1

## SB-300/SB-400 Modifications

(Continued from page 21)



TWO METER  
FM STATION  
Motorola 80D

Transmitter, receiver, power supply, plug into rack containing interconnecting cable. Rack is 9" wide x 21" high x 18" deep.

Receiver is Sensicon model, using cavities for front end tuning.

Transmitter output is 30 watts. Uses push-pull 2E26 driven by 2E26.

Units are in good condition, but may have occasional tube missing. Alignment instructions and crystal formulas supplied, but no crystals.

Base Station (Rx, Tx, 110 VAC power supply, rack) \$70  
Mobile Station (Rx, Tx, 12 VDC power supply rack) \$65  
12 VDC supply, ideal for converting 6 volt 80D to 12 volt 80D. \$15

Bendix MRT6B with 64 volt vibrator supply, convertible to 110 volts by changing transformers. Can be operated by Motorola AC supply. A few of these left in stock. \$40

Control head (useful for parts) \$ 1  
Weatherproof speaker (horns) \$ 2

Send check or money order to:  
(Illinois residents add 4% sales tax)

DuPage FM, P. O. Box 1, Lombard, Illinois 60148

### UNITED BRONZE CO.

705 Bancroft Way Berkeley, Calif. 94710

Aluminum:  
Satin Finish  
Face, Back-  
ground Red-  
Blue-Black  
or Gray



Bronze:  
Satin Finish  
Face, Deep  
Statuary  
Bronze  
Background

9" x 3 1/2" Raised Letters and Border

"Add Class to Your Shack" with this hand-crafted cast bronze or aluminum plaque. Your name and call handsomely cast for posterity. This plaque is more than just a nameplate. It's an attractive addition to your little corner of the world. Nothing like this available anywhere on the ham market at these prices. Satisfaction guaranteed or money back.

Cast Alum. ....\$5.75 ea. Cast Bronze .....\$7.25 ea.

PPD in U.S.A. Sorry, no c.o.d.s.

Furnished With Mounting Screws.

## OPPORTUNITIES

... for **ELECTRONIC  
TECHNICIANS**

Communication Associates, Inc. has openings for electronic technicians (ham license desired) to work in the field of single sideband. Excellent company benefits including profit-sharing, major medical health insurance, educational benefits, etc. Within easy reach from Nassau, Suffolk and New York.

For information contact:

Mr. Werner Brack  
Communication Associates, Inc.  
1208 Third Avenue  
New Hyde Park, New York 11040  
Telephone 516-488-2323

AN EQUAL  
OPPORTUNITY EMPLOYER

allows the receiver to be controlled by the transmitter l.m.o., or by its own l.m.o. The selection is made with a rotary switch,  $S_2$  (Fig. 2), which is mounted in the hole formerly occupied by the phone jack on the front panel of the receiver. The modification permits transceive operation while using the transmitter l.m.o. It enables the operator to tune the receiver without disturbing the transmitter frequency, a useful feature when the operator wishes to monitor a nearby frequency but wishes to continue operating on his own frequency.

The circuit changes are shown in Fig. 2. The phone jack is removed and can be relocated on the rear chassis panel if desired. A small rotary switch,  $S_2$ , is mounted in the empty hole. Next, capacitor  $C_{14}$  is removed from the r.f. circuit board and a length of RG-174/U cable is connected to the hole vacated by  $C_{14}$  (the hole closest to the front of the receiver), connecting it to the bottom of the board. The opposite end of the cable connects to lug 2 of  $S_{2A}$ . One lead of  $C_{14}$  is connected to the remaining vacant hole in the board, but from the bottom side. The other lead of  $C_{14}$  is soldered to the inner conductor of a second length of RG-174/U. The opposite end of the cable is connected to lug 1 of  $S_{2A}$ . The shield braid is grounded on this, and all other coax cables used in the modification. Finally, a third length of coax cable is connected between lug 3 of  $S_{2A}$  and the spare phono jack,  $J_3$ , on the rear panel of the receiver (below the mute jack).

In the transmitter, connect a length of RG-174/U from the spare phono jack,  $J_1$ , on the rear panel of the transmitter (under the mute jack), through a 0.01- $\mu$ f. capacitor, to lug 11 of FS2R. This will supply the output from the transmitter l.m.o. to the receiver. The interconnecting cable between the transmitter and the receiver should be made from RG-62/U line.

### Operation

When operating the two units together,  $S_1$  should be in the receiver position. The b.f.o. and heterodyne oscillators in the receiver will then be used in transmit as well as transceive operation. The desired mode is selected by setting the function switch to the proper position. The transmitter may be used without the SB-300 if  $S_1$  is in the transmitter position.

If the receiver modifications are made a slight frequency shift may occur in the transmitter when  $S_2$  is switched because of the change in load on the l.m.o. This shift may be corrected by installing a 470-ohm resistor from lug 4 of  $S_{2B}$ , to ground.

These modifications have greatly increased the flexibility of operation of the SB-300/SB-400 combination. I have been using this system for about two years and have had excellent results.

QST



**\$12.95 W2AU FOUR PURPOSE BALUN \$12.95**

**BALANCE YOUR ANTENNA • STOP YOUR COAX FROM RADIATING • HELP ELIMINATE TVI • IMPROVE YOUR RADIATION PATTERN PLUS F/B RATIO**

- Broad-banded 2-32 mc. • Center hang-up hook for inverted Vees • Handles full legal power, 2KW PEP • Built-in lightning arrester • SO239 RF connector for coax transmission feed line eliminates center insulator • Withstands up to 600 lb antenna pull • For use with all type antennas fed with unbalanced coax line • Weighs only 6 1/2 oz. 1 1/2 diam. 6" long • 2 Models: 1:1 matches 50 or 75 ohm unbalanced coax to 50 or 75 antenna load. 4:1 matches 50 or 75 ohm unbalanced coax to 200 or 300 ohm.
- W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad \$64.95
- W2AU Super-Fibreglas 2 element 10-15-20 meter quad. Complete quad \$99.95

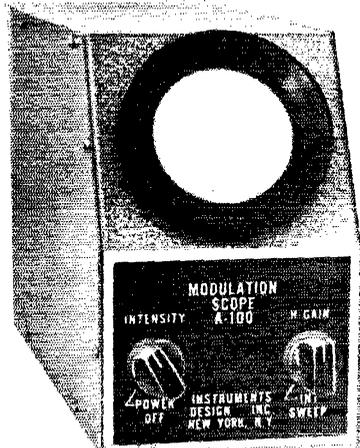
**DIRECT/5:1 REVERSE VERNIER DRIVE**

The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one 3/8" hole. High torque, low back lash, smooth and permanent movement, coaxial spindles, 1/4" shaft dia.

Model 4111/RV \$1.95



actual size



- AM, CW or SSB
- Wave envelope or trapezoid patterns
- No tuning required
- Up to 60 Mc
- Will handle 5W to 1 KW
- Uses standard connectors
- Internal sweep
- Size: 9 1/2" deep, x 5 1/2" high, x 3 1/2" wide
- Weight: approx. 5 lbs.

**\$2995**



**SQUALO MOBILE/FIXED ANTENNAS**

**2 - 6 - 10 - 15 - 20 - 40 METERS**

SQUALO is a full half wave, horizontally polarized, omni-directional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. The square shape allows full electrical length in compact dimensions. Direct 52 ohm Reddi Match feed provides ease of tuning and broad band coverage.

**ON A MAST ON YOUR CAR OUT A WINDOW.**



ASQ-2	2 Meter,	10" Square	\$ 9.95
ASQ-6	6 Meter,	30" Square	13.95
ASQ-10	10 Meter,	50" Square	19.50
ASQ-15	15 Meter,	65" Square	23.50
ASQ-20	20 Meter,	100" Square	32.50
ASQ-40	40 Meter,	192" Square	66.50

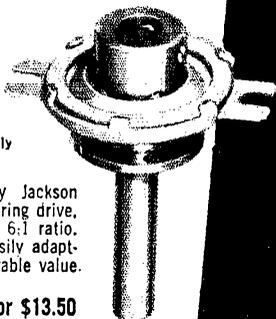
**VERSATILE MINIATURE TRANSFORMER**

Same as used in W2EWL SSB Rig— March, 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered). The ideal transformer for a SSB-transmitter. Other uses: Interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x 3/4" w. x 3/4" d. New and fully shielded.



**PRECISION PLANETARY-VERNIER for exceptionally fine tuning**

Shown approximately actual size



Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, 1/4" dia. Shaft 1 1/8" long: 6:1 ratio. Vv FB for fine tuning. Easily adaptable to any shaft. Comparable value. \$5.95 Model 4511. DAF. \$1.50 ea. 10 for \$13.50

**BULLS EYE BUYS AT ARROW**

**ARROW ELECTRONICS INC**

900 Rte. 110, Farmingdale, N.Y., 516 — M Y r t l e 4-6822

65 Cortlandt St., N.Y. 7, N.Y. 212 — D l g b y 9-4730

525 Jericho Tpke., Mineola, N.Y. 516 — P l o n e e r 2-2290

18 Isaac St., Norwalk, Conn. 203 — 838-4877

225 Rte. 46, Totowa, N. J. 201 — 256-8555

# RADIO HANDBOOKS

● **BEAM ANTENNA HANDBOOK** by William Orr, W6SAI. New edition. Theory, design, construction and the installation of rotary beam antennas! SWR data! Multiband beams, 40 meter beams, 20 meter DX beams! How to make your beam work! 200 pages. \$3.75

● **VHF HANDBOOK** by Orr, W6SAI and Johnson, W6QKI. First complete Handbook covering the VHF spectrum! Many VHF construction projects! Design and construction of VHF transmitters, receivers and antennas! Make your VHF station work! \$2.95

● **ELECTRONIC CONSTRUCTION HANDBOOK** by Robert Lewis, W8MQU. All about design—construction—layout and testing of electronic equipment. Non-technical guide for kit-builders and your best key to better performance of your equipment! \$2.95

● **ALL ABOUT CUBICAL QUAD ANTENNAS** by W6SAI. Construction and tuning data. Multi-band Quads. Charts, drawings and photos for your Quad. Full complete data on home-made Quad antennas. The new X-Q Quad. \$2.85

● **5-9 SIGNALS** by William Orr, W6SAI. Inexpensive DX antennas for your station! Multiband ground plane, \$5 beam antenna, 2 and 6 meter beams, Demi-Quad beam, and others! \$1.00

● **NOVICE & TECHNICIAN HANDBOOK** by W6SAI and W6TNS. All about amateur radio in nontechnical language! How to learn the code. How to assemble your ham station. Transmitters! Receivers! DX! How to Get QSL cards. \$2.95

● **BETTER SHORTWAVE RECEPTION**, by Wm. Orr, W6SAI. Your introduction to shortwave radio. How to hear DX. How to buy a receiver. Amateur radio. How to align your receiver. Antennas! QSLs. Getting your ham license. \$3.25

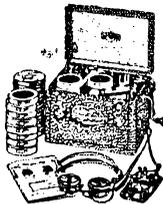
At your radio dealer now!

Add 15¢ per order to the publisher:

**RADIO PUBLICATIONS, Inc., Wilton, Conn.**

## EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher**. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready. No QRM. Beats having someone send to you.



**ENDORSED BY THOUSANDS!**

The **Instructograph Code Teacher** literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System**. Write today for full particulars and convenient rental plans

## INSTRUCTOGRAPH COMPANY

5071-Q NORTH BROADWAY, CHICAGO, ILL. 60640  
4700-Q S. Crenshaw Blvd., Los Angeles, Calif. 90043

**DX - - DX - - DX - - DX**  
**SHORT PATH QSL-ing**

**DON'T** WASTE MONEY  
WASTE STAMPS  
WASTE COUPONS

**DO** SAVE TIME  
BEAT THE COMPETITION  
RAISE YOUR SCORE  
QUICKER

90% of active DX stations have "STATE-SIDE" QSL managers. Our expanded "QSL MANAGERS DIRECTORY" lists over 2000 of these managers and has now been up-graded to a complete service—you receive:

**THE QSL MANAGERS DIRECTORY**  
QUARTERLY SUPPLEMENTS listing changes—deletions—additions.

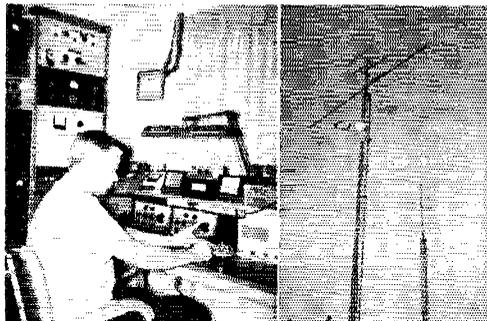
A COMPLETE LIST OF QTH's for the above managers.  
**TOTAL PACKAGE PRICE** (U.S. and CANADA) \$9.00 per year.  
(\$4.00 elsewhere—airmail) SEND ORDER TO:

**BOOKBINDER PUBLISHING CO.**

DEPT. D P.O. Box 54222 TERMINAL ANNEX  
Los Angeles, Cal. 90054 (Founder W6GSV)  
European Agent: **DX NEWS SHEET—GEOFF WATTS**  
62 Belmore Road, Norwich, NOR72T ENGLAND

## September V.H.F. QSO Party Results

(Continued from page 68)



**K7ICW** is an outstanding "regular" from Nevada who really has to work for the few contacts shown on his log. He is in there trying every time with an excellent setup, running 600 watts on six and two, 25 watts on 432 and an interesting antenna farm, 8-L on 6, 20-L on 2 and 44-L on 432 Mc. Nice going All!

### Santa Clara Valley

WB6KAP 231R-106-19-ABCDE  
WB6KBZ/6 1650-165-10-AB

### ROANOKE DIVISION

#### North Carolina

WA4BVW/4 1717-101-17-AB  
WA4TJH 246-41-6-AB  
W4HTZ 182-27-6-AB  
W4FDQ/4(W4FDO, WA4BBY) 2250-150-15-AB

#### South Carolina

WA4LTS 5292-189-27-ABD

#### Virginia

K48UM 2556-127-18-ABCD  
W4TRC/4 (7 ops.) 5040-207-24-ABD

#### West Virginia

K8WVP 150-15-10-AB  
W2UPT/8 (4 ops.) 2750-121-22-BCD

### ROCKY MOUNTAIN DIVISION

#### Colorado

W0AIY 108-54-2-AB  
WA0HFS 14-22-2-AB  
K8REG/0 (W4REX, K8REG) 29-29-1-A

#### New Mexico

W5IXR/5 20-10-2-AB

### SOUTHEASTERN DIVISION

#### Alabama

K4ABT 484-61-8-A  
K4VHW 108-68-6-AB  
K4REI/4 392-56-7-A  
K4UEC 180-36-5-AB  
W4DBQ 114-38-3-A  
WB4ALN 26-13-2-A

#### Georgia

K4HQI 162-27-6-A  
K4YZE 6-6-1-B

### SOUTHWESTERN DIVISION

#### Arizona

W7DAY/7 (5 ops.) 60-20-3-AB

### Los Angeles

WB6GFD 1470-70-15-ABCDE  
W6PIZ 1243-06-11-ABD  
W46FJ/6 120-24-5-AB  
W6QCV 112-28-4-A  
WN68JT 28-28-1-B

#### Orange

K6HMS 488-50-8-BD  
WB6PIO 27-9-3-AB

#### San Diego

WA6ZQU 245-49-5-AB  
WB6BTH 150-30-5-AB  
WB6JLC 120-30-4-B  
WB6MEL 30-10-3-A  
W6NLO/6 (W68 BLL, NLO) 1560-119-12-ABC

### WEST GULF DIVISION

#### Northern Texas

K5TVB 134-67-22-A  
WA5LPA 84-42-2-A  
WA5BTY 56-14-4-AB  
WA5LUM 53-53-1-A

#### Oklahoma

W5WAX 624-52-12-AB  
W5LOW 38-19-2-AB  
K5CBA 32-16-2-AB  
K5CFM (K5CFM, WA5JRH) 1188-99-12-AB

#### Southern Texas

WA5AUA 305-61-5-AB

### CANADIAN DIVISION

#### Quebec

VE2BZH/2 1260-90-14-AB  
VE2BHQ 260-25-10-ABD

#### Ontario

VE3BGA 804-67-12-AB  
VE3AB 180-40-10-ABCD  
VE3BPR 320-18-10-BD  
VE3BSM 290-58-5-B  
VE3CRA/3 189-27-7-AB

VE3DSE 185-20-5-BD  
VE3GAF 172-43-4-AB  
VE3DNR 140-35-4-B  
VE3BVR 108-16-6-BD  
VE3CIT 64-16-4-AB  
VE3CIV 58-29-2-A  
VE3ZZZ (VE338 ABE BON) 3888-183-27-ABCD

VE38AU (10 ops.) 1938-114-17-AB  
VE3VM/3 (VE38 CBG DVE) 481-121-4-B

QST

# NOW INSTANT CREDIT, INSTANT SHIPMENT ON OPEN ACCOUNT OR TIME PAYMENTS

Trigger has cut the red tape of time-consuming credit investigations and interminable delays! If you are the holder of any *major* credit card such as:

- Town & Country   
  American Express   
  Carte Blanche   
  Diner's Club, Etc.

we will grant you *instant credit* on Open Account or Time Payments—on either brand new equipment, or like-new equipment. Just pick up the phone and call us (no collect calls, please) or write and your goodies will be on their way the very same day. If you live in the Chicago area, drop in and take the merchandise home with you. What's more, there is no carrying charge, up to 25 days, on Open Account. Or you can take advantage of Trigger's easy budget terms at a very low interest rate. Merely give us the name of your credit card, and its number, and tell us what you want. You can also get a substantial trade-in on your present gear.

For a real eye-opener, visit Trigger, located near the junction of Routes 64 and 42A, where there's plenty of free parking.



*No company processes foreign orders and inquiries with greater dispatch than Trigger.*

## NEW EQUIPMENT ON LOW BUDGET TERMS

- |               |           |          |
|---------------|-----------|----------|
| SWAN          | DRAKE     | SBE      |
| HALLICRAFTERS | HY-GAIN   | NATIONAL |
| JOHNSON       | REGENCY   | WELLER   |
| AMECO         | WATERS    | SHURE    |
| ASTATIC       | NUMECHRON | DOW-KEY  |
| FINCO         | CDR       | B & W    |
| HAMMARLUND    | UNGAR     | EICO     |

and other major brands

## LIKE-NEW EQUIPMENT ON LOW BUDGET TERMS

- Ten-Day Trial   
  30-Day Guarantee   
  Trades Accepted

Tops in performance and appearance, thoroughly reconditioned, clean-as-a-pin; alignment, calibration as good as new. Write for complete listing and prices.

another important  
**TRIGGER** service:  
**WE BUY USED HAM  
GEAR FOR CASH**  
PROMPT SERVICE...  
PROMPT CASH!

### SPECIALS OF THE MONTH FOR DECEMBER

7553B.....\$495	EICO 753FW.....\$239	NCX5.....\$399
3251..... 379	S85..... 67	HRO50TIR..... 137
30L1 W/572BS... 419	S118..... 59	HRO500..... 1350
516F1 AC..... 69	S120..... 39	NCL2000..... 549
518F2 AC..... 84	SX110..... 87	VX501 VFO..... 179
KWM1 CONSOLE... 67	SX122..... 199	DX60..... 67
KWM DC SUPPLY... 57	SX140..... 77	HM32..... 29
KWM2 MOBIL HT... 57	HT37..... 229	UTI SUPPLY..... 19
DRAKE TR3..... 379	HT40..... 57	HEATH GOO..... 19
DRAKE TR4..... 519	HAS VFO..... 49	SWR BRIDGE..... 12
DRAKE RA..... 289	RANGER II..... 149	KNIGHT T150..... 77
DRAKE RA4..... 349	HO100C..... 117	ELMAC PMR7..... 40
SWAN 240..... 189	HO105TR..... 127	GONSET GR211... 37
SWAN 350..... 349	HO110..... 127	24 HOUR CLOCK.. 7
SBE 34..... 339	HO180..... 259	100KC XTAL CAL. 9
SB2LA LINEAR... 209	NC125..... 79	75S1 CW FILTER. 27
INTERCEPTOR... 269	NC155..... 117	HEATH BALUM SET 9

TRIGGER Attn: W9IVJ

Q1266

7361 North Avenue  
River Forest, Illinois

Amount

RUSH THE FOLLOWING:

Enclosed

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

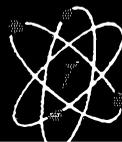
ORDER BLANK TO: trade ur present gear, order equipment, sell ur gear for cash.

A SMALL DEPOSIT WILL HOLD ANY UNIT ON LAY-AWAY.

STORE HOURS

Weekdays 11:00 A.M.—8:00 P.M.  
Saturdays 9:00 A.M.—3:00 P.M.

TELEPHONE (312) 771-8616

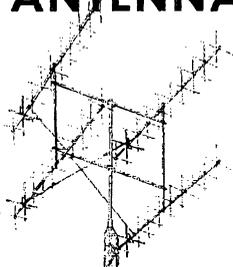


**TRIGGER** Electronics  
7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305  
(WEST SUBURBAN CHICAGO)

SUNDAY TELEPHONE  
SERVICE  
11 A.M.—3 P.M.

# VHF/UHF ANTENNAS

**FOR  
MORE  
DX PUNCH**



The standard of comparison in amateur VHF/UHF communications. Cush Craft antennas combine all-out performance with optimum size for ease of assembly and mounting at your site. They can be mounted vertically, horizontally, in pairs, quads, or virtually any combination allowing you to design the antenna system to meet your exact requirements.

A144-11	2	meter	11 element	\$14.95
A144-7	2	meter	7 element	11.95
A220-11	1 1/4	meter	11 element	12.95
A430-11	3/4	meter	11 element	10.95
A144-20T	2	meter	Multi polarized	29.50
A 50-3	6	meter	3 element	15.95
A 50-5	6	meter	5 element	21.50
A 50-6	6	meter	6 element	34.95
A 50-101	6	meter	10 element	54.95
A 26-9	6 & 2	meter	10 element	29.95

SEE YOUR DISTRIBUTOR OR WRITE FOR CATALOG

**Cush Craft** 621 HAYWARD STREET  
MANCHESTER, N. H. 03103

**NEW  
TIE CLASP  
FOR  
A.R.R.L.  
MEMBERS**

**WA2VDO**

Your Ham Call custom-  
engraved \$1.75  
With cuff-links \$3.25

APOLLO ENGRAVING 191 N. Hickory St. Massapequa, N.Y. 11758

**"HOW TO MAKE MONEY  
IN  
Mobile Radio Maintenance"**

AUTHORITATIVE GUIDEBOOK  
ABOUT THE BOOM IN TWO-WAY MOBILE RADIO.  
GIVES FACTS, FIGURES, PAY RATES,  
WRITE TODAY! **FREE**

LAMPKIN LABORATORIES, INC. Mfg. Div. BRADENTON, FLA.

**LEARN CODE**  
the right way—with  
**Code Sound Language!**

de W3CVE

"The specialized language of sound" brings you a complete study of the International Morse Code. Satisfied users say—"Complete in every detail!"—"Easy to learn!"—"CSL is the best!"—Increase YOUR receiving speed, master the code now!

CSL NR 1 & NR 2 (1 tape) for the prospective Novice, Technician, General or Amateur Extra First. 3 to 25 wpm.

CSL NR 3 & NR 4 (1 tape) for the advanced operator with a sincere desire to copy code sounds at rapid speeds. How to copy behind, etc. 25 to 55 wpm. Both tapes, plenty of copy—plain and scrambled, numerals and punctuation.

Magnetic tape, 7" reel, dual track, 2 hours. Immediate delivery. Send check or money order. (Specify which tape.) \$6.95 each.

Both tapes on one order, only \$13.50.

SOUND HISTORY RECORDING Box 16015, Washington, D. C. 20023

## The Selectoroid

(Continued from page 20)

must be connected. Be sure to make the connections as shown; otherwise the toroid won't work. Also, scrape the enamel covering from the winding leads in order to get a good electrical connection.

A 2 × 5 × 7-inch aluminum chassis is used to house the filter. However, any suitable container, such as a Minibox, could be used as long as there is room for all parts. The layout isn't critical. Machine screws, 1 1/4 inches long, rubber grommets, and washers are used to hold the toroids. The screw is mounted to the chassis with a nut, the toroid is centered over the screw, then a 3/8-inch diameter grommet and washer is placed on the screw and the grommet and washer tightened down with a nut.

### Connecting It Up

The Selectoroid is designed to work from either the headphone or speaker output from your receiver.  $J_1$  can be plugged into the headphone jack on the receiver and  $S_1$  turned on. The "on" position of  $S_1$  puts the Selectoroid in the circuit and turns on the a.c. The third position grounds the input to the filter, so switch to the last position, which is a straight-through connection feeding the receiver output through the unit without actually going into the filter circuits. The ground position on  $S_1$  is to reduce any stray coupling.

You'll find that the selectivity is extremely sharp and you may be aware of a "ringing" effect on signals. This ringing is due to the very sharp selectivity. Some amateurs object to this while others don't seem to mind. If you don't like the ringing, experiment with different capacitors in the filter circuits as described earlier. It only takes minutes to try them and you may find a passband condition that suits you better than the very sharp setup as described. However, you don't have to leave the filter in all the time. It's there when you need it, and as we said earlier, "If you can't hear 'em, you can't work 'em."

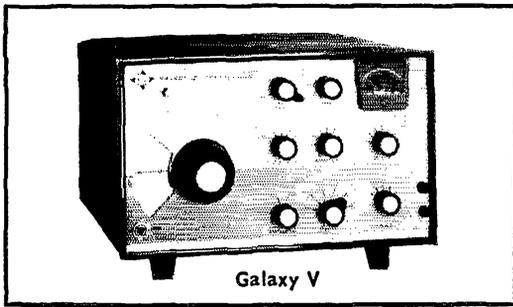
## Gimmicks & Gadgets

(Continued from page 34)

was tacked to the south wall of the attic. Although maximum radiation is at right angles to the plane of the antenna, some side response exists, making it possible to work in all directions but with reduced efficiency off the ends of the antenna.

During an hour of casual listening with an SR-42 transceiver, several W2 stations in New York and New Jersey were copied Q5 while using the Lazy-II. Stations as far north as Massachusetts were also received well above the noise level of the receiver. Many of the stations heard were more than 100 miles away, offering proof that the antenna was performing satisfactorily.

An antenna of this type should deliver comparable performance on 6 meters, provided care-



Galaxy V

**LOOK** at your low Monthly Payment  
AFTER JUST \$5<sup>00</sup> DOWN

Galaxy V 80-10m Transceiver .....	(14.98)	\$420.00
Galaxy 2000 Linear .....	(16.06)	450.00
Galaxy COMM-1 Transceiver .....	(17.69)	495.00
AC35 AC Supply (110v only) .....		79.95
AC35/220 AC Supply (110-220vAC) .....		89.95
DC35 12vDC Supply .....		99.95
RV-1 Remote VFO .....		69.95
RX-2 Special VFO (MARS, etc.) .....		89.95
Crystals for Special VFO .....		6.50
DAC-35 Deluxe Accessory Console .....		99.95
CAL-35 Crystal Calibrator .....		19.95
VX35 VOX .....		29.95
MMB Mobile Mounting Bracket .....		7.95
ZMM Hi-Angle Mobile Bracket .....		3.00
MS-1 Mobile Speaker .....		2.99
SC35 Speaker Console .....		19.95
NOX-1 Novice Adaptor for Galaxy V .....		24.95
REJ-1 Rejector Notch Filter .....		39.95
AC Supply for Above .....		6.95
CW-1 CW Monitor .....		29.95

Order \$50 or more of new Galaxy Equipment & we'll ship PREPAID (our expense) in USA.



# AMATEUR ELECTRONIC SUPPLY

4828 West Fond du Lac Avenue  
Milwaukee, Wisconsin 53216  
Phone (414) 442-4200

MILWAUKEE STORE HOURS: Mon & Fri-9 am to 9 pm;  
Tues, Wed, Thurs-9 am to 5:30 pm; Sat-9 am to 3 pm

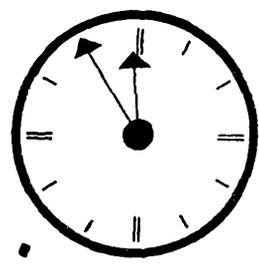
**IMPORTANT!** - Be sure to send all Mail Orders and Inquiries to our Milwaukee store, whose address is shown above. VISIT - Please do not write the following Branch stores - they are set up to handle walk-in trade only-

**CHICAGO, ILLINOIS**  
6450 Milwaukee Avenue  
Phone (312) 763-1030

**ORLANDO, FLORIDA**  
19 Azalea Pk. Shpg. Ctr.  
Phone (305) 277-8231

CHICAGO & ORLANDO STORE HOURS: Mon, Wed, Thurs - 12 to 9 pm; Tues & Fri - 12 to 5:30 pm; Sat - 10 am to 4 pm

**NOW  
is the  
TIME . . .**



Terry Sterman, W9DIA  
Proprietor

To get our deal on any new GALAXY equipment



Ray Grenier, K9KHW  
Mgr. Mail Order Sales

USE HANDY COUPON BELOW

CHECK THESE GALAXY FEATURES:

- 300 watts - conservatively rated
- "Smallest" of the hi-powered transceivers
- Selectable Sideband
- 2.1 kc McCoy Filter
- Complete 80-10m Coverage
- Stability - Personal Drift Chart of every Galaxy V that comes off the line goes with the unit to its new owner

**ORDER TODAY! - DIRECT FROM THIS AD!**

To: **AMATEUR ELECTRONIC SUPPLY**  
4828 West Fond du Lac Avenue  
Milwaukee, Wisconsin 53216 Q

I am interested in the following new equipment:  
\_\_\_\_\_

I have the following to trade: (what's your deal?)  
\_\_\_\_\_

Ship me the following New Equipment:  
\_\_\_\_\_

I enclose \$ \_\_\_\_\_ I will pay balance (if any)  
 COD  1 year  2 years  3 years

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_

Send Reconditioned Equipment Bulletin

# TUNAVERTER

**NEW MODELS! NEW PRICES!**

— TUNABILITY — USABILITY — QUALITY —

Marine  
Police  
VHF



Amateur  
160 M  
to  
2 Meters

TUNABLE, CALIBRATED solid state converters to change your auto and home radios into excellent, sensitive, selective, calibrated Amateur and VHF receivers!

- 6-1 reduction tuning!
- HF-2 gang tuning!
- VHF 3 gang tuning!
- FREE 24" conn. coax!
- 2 WEEK MONEY BACK GUARANTEE!
- Plug into auto radio!
- BC & ham ant. inputs!
- 100% American Made!
- 9 volt btry powered!
- Mute terminals!
- Size 2 1/4" X 3 1/2" X 4 1/2"

### Models for AM-FM!

BAND	MODEL	COVERS	OUTPUT	PRICE	
Marine	Marine	2.0-3.0 mc	550 kc	\$19.95 ppd	
Shortwave & WWV time.	SW	9.3-10 mc	800 kc	\$19.95 ppd	
		14-18 mc	1500 kc	\$19.95 ppd	
160 meters	160	1.8-2.0 mc	550 kc	\$19.95 ppd	
75 meters	75	3.8-4.0 mc	800 kc	\$19.95 ppd	
CB & 10 M	273	26.9-30 mc	1500 kc	\$29.95 ppd	
6 meters	504	49.5-54.5 mc	1500 kc	\$29.95 ppd	
2 meters	1450	144-150 mc	1500 kc	\$29.95 ppd	
Police, fire, & Marine.	}	308	30-38 mc	1500 kc	\$29.95 ppd
		375	37-50 mc	1500 kc	\$29.95 ppd
		1564	150-164 mc	1500 kc	\$29.95 ppd
Aircraft	1828	118-128 mc	1500 kc	\$29.95 ppd	

Special VHF Model outputs up to 15 mc. add \$5.00

### Models with Tunable BFO for SSB-CW-AM-FM!

160 M	1600	1.8-2.0 mc	550 kc	\$24.95 ppd
80 M	800	3.4-4.1 mc	550 kc	\$24.95 ppd
75 M	750	3.8-4.0 mc	550 kc	\$24.95 ppd
40 M	400	6.97-7.325 mc	550 kc	\$24.95 ppd
20 M	200	14.0-14.35 mc	830 kc	\$24.95 ppd
15 M	150	20.975-22 mc	1500 kc	\$24.95 ppd

Output kits for use with home radios, (state output) \$1.25

HERBERT SALCH & CO. Dept. Q, Woodsboro, Texas 78393

## MARIN AMATEUR RADIO SUPPLY

COMPLETE STOCK ALL BRANDS  
BUY & SELL USED

70 Woodland Avenue  
San Rafael, California 94901

ful attention is given to the dimensions and to the matching. Complete data covering antennas of this variety is given in the *ARRL Antenna Book*, Chapter 4. An outdoor version of the Lazy-II could be fashioned by mounting the elements on 1 X 1-inch lumber support arms. It would then be possible to rotate the array, and greater efficiency should be possible since the antenna would then be out in the clear. — WICER

## Station Design for DX

(Continued from page 56)

effective output-power) may be built in the forward part of each character without loss of the rounded-corner. This is done by use of a very high value of filter capacitor in the high-voltage power supply. At W3AFM, 120  $\mu$ f. are used. It should be noted that, in the case of linear amplifiers, output is not a direct function of plate voltage as in the case of Class C grid-driven amplifiers. For grounded-grid amplifiers the gain is nearly always constant (below saturation) at 10-13 db. (output power 10-20 times input power). Thus, to use this technique effectively, the driving stage and conceivably its driving stage should also be provided with high-capacitance filters. The technique should also be useful for handling modulation peaks. It has no value unless, as is usually the case, the h.v. power-supply regulation is imperfect.

### Station Clock

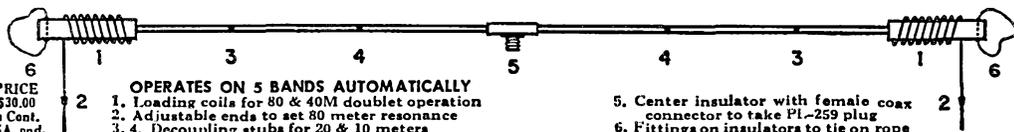
The station clock should always run on GMT, and logs should be kept that way. Digital 24-hour types, such as the Tymeter Numechron, are preferable to round-face clocks. The map-clock, made by Geochron, is an interesting and useful guide to propagation and is a hobby in itself. It shows automatically the sun's position, daytime and nighttime zones, and corrects for seasonal changes.

Size is about 3 feet wide by 2 feet high by 4 1/2 inches thick. A Mercator transparency moves imperceptibly, according to time of day, across a red dot at the middle of the map, representing the sun's zenith position. The red dot moves even more slowly,  $\pm 23 1/2^\circ$  in latitude and a few degrees in longitude, forming annually a thin figure of eight (the analemma). Most impressive, the precise daylight and nighttime zones are continually displayed. The clocks are made by Geochron, 2515 Palms Place, San Mateo, California, 94401

(Continued on next page)

## LRL-66 ANTENNA 66' LONG. 80 THRU 10M

Power rating 2 Kw. P.E.P. or over on 80, 40, 15 On 20 and 10 1 Kw. P.E.P. Transmitter input



PRICE  
\$30.00  
in Cont.  
USA, ppd.

OPERATES ON 5 BANDS AUTOMATICALLY  
1. Loading coils for 80 & 40M doublet operation  
2. Adjustable ends to set 80 meter resonance  
3, 4. Decoupling stubs for 20 & 10 meters

5. Center insulator with female coax connector to take PL-259 plug  
6. Fittings on insulators to tie on rope

LATTIN RADIO LABORATORIES

Box 44

Owensboro, Kentucky

What's the best antenna heading to hear a 6W8?  
 What time is it in Zanzibar?  
 How many IRC's for a letter from a ZP?  
 Are the Dodecanese in Asia?  
 Is a ZE in DX Zone 38?  
 What's the address of the  
 Venezuela QSL Bureau?

Find all the  
 answers fast  
 with the  
**BRAND-NEW**  
**4TH EDITION**  
**OF W9IOP'S**  
**SECOND OP**  
**\$1.00**



Put vital world-wide DX data at your fingertips with this 10½" circular calculator. Shows beam headings, time differences, postal rates, DX zones, QSL bureaus, many more DX facts... at a glance! The fully-revised 4th Edition is now at your nearby E-V ham microphone headquarters, or send \$1.00 to:

ELECTRO-VOICE, INC.,  
 Dept. 1263Q, 631 Cecil Street  
 Buchanan, Michigan 49107



**PLATE TRANSFORMERS—\$39.95**

3600-0-3600 VAC @ 1000 Ma., CCS, with 120/240 VAC 60 cps primary. Commercial quality units manufactured by Wagner Electric Co. measure 13" high, 12" wide, and 9" deep. Net weight is 85#. Price \$39.95 F.O.B. Minneapolis. One year unconditional money back guarantee. Terms: Check or M.O. with order. Immediate delivery. Write or phone:

**PETER W. DAHL CO.**

3314 Diamond Drive Tel: (915)-751-4656 El Paso, Texas 79904

**ALL NEW TRANSISTORIZED  
 CW MONITOR AND  
 CODE PRACTICE  
 OSCILLATOR**



**JUST \$9.95 COMPLETE**  
 (except battery)

Use as CW monitor... use as code practice oscillator. This new complete unit from hth Electronics is powered by a standard 9-volt battery, contains a built-in speaker, on-off switch with individual volume and tone controls for a loud, clear tone without clicks or chirps.

**NO EQUIPMENT MODIFICATION**—Simply connect spade lugs to terminals of CW key, plug in jack, turn on and adjust volume and tone controls... operates automatically... no accessory relay... no pickup antenna... no battery drain until key is depressed.

Precision Engineered. 100% Warranted.  
 Designed and Developed in U.S.A. (foreign mfg.)

**ORDER TODAY! Allow 2 weeks for delivery.**

**NEW HIGH POWER  
 DUMMY ANTENNAS**



Model 525

Gentec Dummy Antennas permit transmitter adjustments under electrical conditions duplicating actual antenna conditions, but converting and dissipating electrical power as heat, preventing radiation and eliminating TVI, QRM and associated problems. Transmitters readily peaked for top DX operation.

**SPECIFICATIONS—DC to 250 MCS. (50 Ohm Units)**

Price	\$1.95	\$11.95	\$19.95	\$19.95	\$19.95	\$29.95	\$29.95
Model	507	525	525L	525B	510U	510N	510B
Term's	UHF	UHF	N	BNC	UHF	N	BNC
VSWR (max)	1.05	1.1	1.05	1.05	1.1	1.05	1.05
Power	7W	125W	(250W ICAS)		500W	(1KW ICAS)	

Terms: C.O.D. plus postage or ppd in U.S.A. when check included with order.

Write for Free Literature (50 and 70 Ohm Units)

GENTEC INCORPORATED, P.O. Box 233, Raritan, New Jersey

**ELECTRONIC HOUSE, P.O. BOX 873, TARZANA, CALIF.**

Gentlemen: Dept-1 Ship to:

Please ship me \_\_\_\_\_ NAME \_\_\_\_\_  
 CW monitor and code practice oscillator(s) @ \$9.95. Enclosed is \_\_\_\_\_ ADDRESS \_\_\_\_\_  
 cash  check CITY \_\_\_\_\_  
 money order for STATE \_\_\_\_\_  
 \$ \_\_\_\_\_

# COMMUNICATIONS

- ENGINEERS
  - SR. TECHNICIANS
- ## EUROPE-ASIA

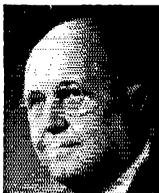
LOCKHEED has openings at all levels including design and specification analysis, traffic handling analysis, equipment installation, test and performance evaluation of troposcatter and all types of communications systems.

If you are interested in long-term, challenging positions in the US and overseas — investigate LOCKHEED'S outstanding benefits including employee savings plan, education refund program, pension plan with 10-year vesting privileges, paid medical plan, etc. Then send your resume to Mr. H. F. Fey.

# LOCKHEED

## ELECTRONICS COMPANY

A Division of  
 Lockheed Aircraft Corporation  
 P.O. Box 446  
 Metuchen, New Jersey  
 An Equal Opportunity Employer



Before you buy or trade, wire, write, call or drop in to see WARD, W2FEU

Be Sure to Write for Our Latest Used List

**ADIRONDACK RADIO SUPPLY**  
 185-191 W. Main, Amsterdam, N.Y. 12011  
 Phone: 518-842-8350

Ward J. Hinkle, Owner

### Acknowledgements

(Continued from previous page)

In preparing this series, lots of helpful correspondence developed in connection with sending out preliminary draft texts and accumulating information. My special thanks to W1WILS, K2HILB, W2GHHK, W2JIT, W2PCJ, W2VCZ, K3OKX, K3TVU, W3BMX, W3GRF, W4AO, W4BPD, W4FFV, W4KFC, W4YHD, W5VA, W6AM, W6SAI, W8BRA, W9HHA and KH6DVD.

### Author's Sequel

Not all that was in my head got onto paper. Not all of what did get on paper is clear. Also, a couple of errors are worth correcting:

Transmitters should be at least be mentioned in a tract like this. Essentially all top DX stations in W/K land use kw. finals. About half these are home-built. It may help those who plan home construction of this kind, to relate a point-of-view developed from experience. This is, that it pays to buy components of first quality right from the start. For example: Westinghouse Oz-Paks, Ebert mercury power relays, B & W Type 800 chokes and Linemaster 632-S foot-switches are fine products now in use at W3AFM but each was preceded by a cheaper one. The predecessors now are in a junk box . . . a total loss. Cheaper does not mean more economical.

Referring to Part I, Sep., on antenna siting. There are three zones under consideration, namely: 1. Near-zone ( $I^2R$  losses) under the antenna, 2. The reflection zone, 3. The far-zone (horizon clearance). Take a site such as W3CRA's on Fig. 2. Frank Lucas has perhaps the strongest signals coming out of W/K land. His near-zone  $I^2R$  loss is negligible; he uses a balanced horizontal radiator and a reasonable antenna height of  $\lambda/2$ . His take-off lobe is formed within the first fraction of a mile, on a nearly ideal sloping forezone. This low-angle lobe is able to clear the horizon because of his high altitude in reference to surrounding terrain. If the antenna were situated back over the ledge of the hill on a level plateau, so that the antenna could not see the sloping foreground, then his take-off angle would be only that determined by the height of the antenna over the plateau.

Some questions have been raised about the curved coordinates in Fig. 2. This is  $4/3$  earth-radius paper. On it, radio rays passing through the refraction of standard atmosphere are straight lines. To construct such paper, draw a level straight line. From the center of this line mark off distances in miles. Then drop down for various heights according to the formula:

$$d_{mi} = 1.4 \sqrt{h_{ft}}$$

The opening remarks of Part III were mostly intended for Table I rather than Table II. Table I appears in Part I, September.

	Median Antenna Height (ft.)	Median Boom Length (ft.)
Table I: Contesters	74	36
Table II: DXCC	65	24

Contesters are more heavily equipped than DXCCers.

In Part III, 75A4 mod (4) refers to the r.f. stage.



## telrex "BALUN" FED INVERTED "V" ANTENNA KITS

► SIMPLE-TO-INSTALL, HI-PERFORMANCE ANTENNA SYSTEMS:

- 1 KW P.E.P. Mono-Band Kit . . . 1KMB1V/81K . . . \$21.95\*
- 2 KW P.E.P. Mono-Band Kit . . . 2KMB1V/81K . . . \$26.95\*

\*Kit comprises, encapsulated, "Balun," copperweld, insulators, plus installation and adjustment instructions for any Mono-band 80 thru 10 Meters. Also available 2, 3, 4, 5 Band Models.

Mfd. under Telrex Pat. No. 2,576,929

Write for TELREX PL67

TELREX COMMUNICATION ENGINEERING LABORATORIES  
 ASBURY PARK, N.J. 07712



## this is the new Clegg "66'er"

plenty of power, fixed or mobile operation—all the features you'd want in a top quality, 6-meter transceiver.



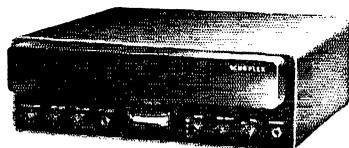
*Just look at what you get in this compact, high-power, ultra-sensitive successor to the famed 99'er.*

**SUPERSENSITIVE RECEIVER** • Dual conversion design with sharp 8 KC selectivity for freedom from birdies, tweets and spurious signals. • S Meter doubles as tuneup meter for transmitter. • Full 49.9 to 52.1 mc coverage for accurate dial readout—excellent band spread. • Sharp cut-off, adjustable squelch. • Excellent AGC performance. • RF stage provides optimum usable noise figure—freedom from cross modulation and overload. 0.5 uv sensitivity captures weakest signals. • 2 watts audio output with internal speaker. Provision for external speaker. • Effective automatic noise limiter.

**POWERFUL TRANSMITTER** • High efficiency, 22 watt final amplifier, driven by straight-through amplifier for low-low harmonic output. • Dual self-contained, solid-state power supply for both 115 VAC or 12 VDC operation. • Push-to-talk with provisions to automatically switch Apollo Linear and external VFO. • Broadband, multi-tuned exciter stages for rapid QSY and freedom from spurious outputs—no TVI problems! • High level modulation with speech clipping for top talk power. • Transmitter frequency spotting switch. • Operated with 8.3/12.5/25 mc crystals. Ideal for MARS, CAP. Wide variety of accessories for CD application. See the Clegg "66'er" today. \$249.95. Microphone \$10.50. Squires-Sanders, Inc., Martinsville Road, Millington, N. J. 07946.

Squires  Sanders

# ECHOPLEX



Model EP-63-JR-1

Kahn Research Laboratories' patented ECHOPLEX, EP-63-JR-1, provides commercial operators and advanced amateurs with one of the major communications system improvements of recent years.

- Signal-to-noise gain of 5-to-1 makes a 1 kw SSB transmitter produce the same signal/noise as a 5 kw SSB transmitter.
- Reduces the effects of fading by transmitting same information three times (time diversity).
- Allows you to identify your signal from non-echoplex signals thus easier to read through QRM.
- Can be used with existing amateur or commercial SSB or AM transmitters and receivers.

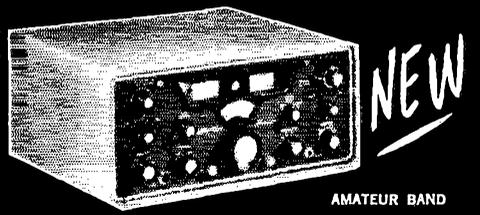
**\$399.60** TERMS THROUGH  
GENERAL ELECTRIC CREDIT CORP.

For Further Information Write Dept. Q-126

81 SO. BERGEN PL., FREEPORT, L. I. (11520)  
(516) FR 9-8800



NEW YORK'S MIDTOWN HEADQUARTERS  
FOR WORLD FAMOUS **hallicrafters**



**"Hurricane" SR-2000 Transceiver**

Again, from Hallicrafter, the ultimate in quality performance! Professional electronic engineering and exclusive Hallicrafter circuitry assure you dependable quality. See it at Grand Central Radio and see why it's the choice experts prefer.

**\$995.**

P-2000 AC  
POWER SUPPLY  
**\$395**

ALL HALLICRAFTERS in stock for Immediate Delivery  
Complete Audio Demonstration Dept. Depend on Us!

Eventually,  
Everyone comes to

**GRAND CENTRAL  
RADIO Inc.**

Hours:  
8:30 to 6  
Including  
Saturday

1 DOOR  
EAST OF  
LEXINGTON  
AVENUE

124 EAST 44th ST., N.Y.C. MU 2-3869



**DUMMY  
LOAD**

52 ohm, non-reactive  
film oxide R.F. unit. All  
band, all power to 1 KW.  
SWR 1.2 to 1.

Kit \$7.95 postpaid.  
Wired, add \$2  
HAM KITS

Box 175 Cranford, N. J.

**CQ de W2KUW  
5% BONUS!!**

Paid over any top offer for any piece of aircraft or  
ground radio units, also test equipments. All types of  
tubes. Particularly looking for 4-250 • 4-400 • 833A  
• 304TL • 4-1000A • 4CX5000A et al. 17L • 51X  
• 390A • ARM • GRM • GRC • UPM • URM • USM  
units.

TED DAMES CO. • 308 Hickory St., Arlington, N.J.



**BROAD BAND BALUN** \$10 net ppd.  
in U.S.A.  
• Flat in the amateur bands  
from 3 to 30 Mcs. • Full legal power • Fully  
weather sealed • Matches coax to antenna or  
balanced line. • Improves efficiency and radia-  
tion pattern.

Two models, 1 to 1 or 4 to 1 impedance ratio  
Size 1 1/4" OD x 4" long. Wt. 4 oz.

FUGLE LABS 1835 Watchung Ave., Plainfield, N.J.

**Happenings of the Month**

(Continued from page 73)

**Southwestern Division**

*For Director:*

John R. Griegs, W6KW, and Ray E. Meyers, W6MLZ were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

*For Vice Director:*

Thomas J. Cunningham, W6PIF, and William G. Welsh, W6DDB, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

**West Gulf Division**

*For Director:*

Roemer O. Best, W5QKF, and Fred E. Ellis, W5PTZ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

*For Vice Director:*

Ray K. Bryan, W5UYQ, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly re-elected as Vice Director of the West Gulf Division for the 1967-1968 term without membership balloting.

On motion of Mr. Groves, unanimously VOTED that Charles G. Compton, Gilbert L. Crossley, and Noel B. Eaton, with F. E. Handy and David H. Houghton as alternates, are appointed a Committee of Tellers to count the ballots in the current election.

The Committee was in recess for luncheon from 12:10 P.M. to 1:15 P.M.

The Committee examined a request of Donald A. Miller, W9WNV, to review the action of the ARRL Awards Committee concerning the status of Cormoran Reef and Ebon Atoll on the DXCC Countries List. After extended discussion, the Committee did not find sufficient reason to direct the Awards Committee to review its action, and requested the President to so inform Mr. Miller.

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

- |  |                             |
|--|-----------------------------|
| Arapahoe Radio Club                            | Littleton, Colo.            |
| Hereford Amateur Radio Klub                    | Hereford, Texas             |
| Hope High School Amateur Radio Association     | Providence, R. I.           |
| Long Island Mobile Amateur Radio Club          | Great Neck, N.Y.            |
| Monroe County Radio Communications Association | Monroe, Mich.               |
| Northland Amateur Radio Club                   | Anchorage, Alaska           |
| Platinum Coast Amateur Radio Society           | Melbourne, Fla.             |
| R. F. Hill Amateur Radio Club                  | Perkasie, Bucks Co., Penna. |
| Virginia Beach Amateur Radio Club              | Virginia Beach, Va.         |

The Committee next examined the detailed report of the Stanford Research Institute in fulfillment of its contract with the League for an extensive study and evaluation of the Amateur Radio Service, and directed the General Manager to procure additional copies so that they might be made available to telecommunications officials, member-societies of the International Amateur Radio Union, etc.

There being no further business, the Committee adjourned, at 5:30 P.M.

JOHN HUNTOON   
Secretary

**SWITCH  
TO SAFETY!**



# NEW DRAKE 2 and 6 Meter FET Converters

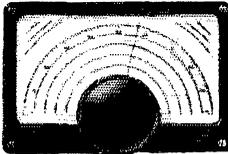
Drake engineering and the recent development of Field Effects Transistors made possible 2 and 6 meter converters that out-perform the best available tube and transistor converters.

**FEATURES:** • **Low noise**—typically 2.5 dB for 2 meter converter • **Improved cross modulation performance**—minimum of 20 dB improvement over available tube converters • **Uniform gain across band:** 15 dB  $\pm$  0.5 dB over 4 MHz bandwidth • **Entirely solid-state** • **Zener regulated crystal oscillator** for improved stability • **Improved image rejection**—minimum 70 dB • **Low spurious response** • Companion solid-state power supply and VHF calibrator available

For further information on SC-2 and SC-6 write:

**R. L. DRAKE COMPANY**

540 Richard Street  
Miamisburg, Ohio 45342



## EDDYSTONE

MANUFACTURED BY  
EDDYSTONE RADIO LIMITED  
BIRMINGHAM, ENGLAND

### OTHER COMPONENTS

#598 FULL VISION DIAL  
Ball bearing drive, free from backlash. Reduction ratio 10:1. Dimensions 6" x 4 1/4". Selected for HBR 8-11-12 Receivers.  
Price \$9 postpaid.

898 Geared Slow Motion Drive 110:1 ratio 500 division logging scale \$21.50 postpaid 843 Slow Motion Drive \$6.00 Diecast Boxes for exceptional R.F. Screening \$2 to \$4.15 Detailed catalogue on request.

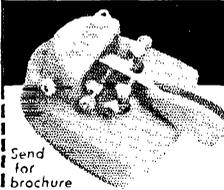
BRITISH RADIO ELECTRONICS, LTD.  
1742 Wisconsin Avenue, N.W. WASHINGTON 7, D. C.



### VOODOO MAGIC TIE CLASP

QSL CARDS REPRODUCED  
IN PERMANENT METAL  
GREAT GIFT IDEA  
We also do business cards  
Send Card and \$3.50 to

GIFT SHOP - Box 73, Northfield, Ohio 44067



## Faster CW - BETTER READABILITY

AUTRONIC KEY 19.95 AUTRONIC KEYS 79.50

Preferred by better operators

**ELECTROPHYSICS CORP.**

898 W. 18th St., Costa Mesa, Calif.

## "J BEAMS"

50mc • 144mc • 220mc • 432mc

On V.H.F., the antenna is half the battle of getting out. Get the story on J Beams—number of elements, boom lengths, feed impedance, db gain. These features are what make better beams.

RAY STAIR W9CEJ recently purchased a Skybeam. When asked how it worked, he said, "I used to hear THEM, now they hear ME!"

50 MC New 4-6-8-10 element beams. Add elements without discarding old beam. Inverted (Pat.) balun assures full coverage with very low SWR over entire band.

144 MC "Skeleton Slot" antennas. Skybeams with taper element positioning. Hottest Yagi manufactured. Moonbouncers. 4 polarizations.

220 MC "Skeleton Slot" antennas with concentrated gain plus guaranteed SWR less than 1.5 to one over the entire band.

432 MC "Skeleton Slots", high gain easily stacked. 10 element Skybeam. 14 and 24 element "Long Johns" with multiple reflectors. New! . . . 28 element cross Yagi Moon-bouncer.

### COMMERCIAL ANTENNAS MADE TO ORDER

We can supply 300 ohm impedances . . . king sized hardware for the big arrays. Matching harness for any band. Also Rohn towers, CD rotators, cable, flat line, etc. • Write and ask for pamphlet on "Stacking" . . . free. Let us prove why the J Beam is better.

See your distributor  
or write us

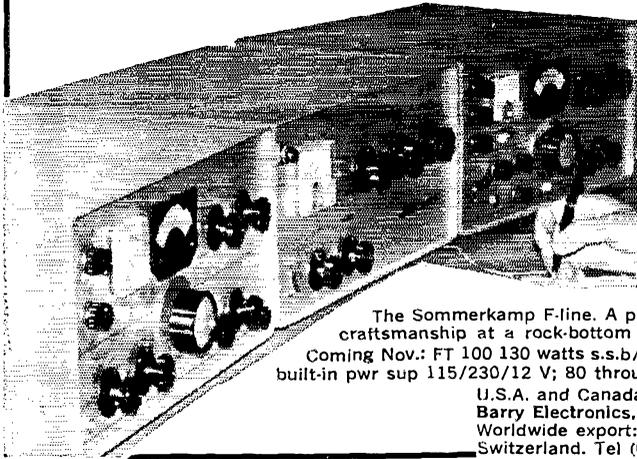
**GAIN, INC.**

Dept. Q-12, 27 East 112th Place Tel. 312-568-1973  
CHICAGO, ILLINOIS 60628

FR-100B double conversion superhet. 80, 40, 20, 15, 10 mtrs. 1st i.f. 5355-5955 kc; 2nd i.f. 455 kc; one mech filter 4 kc for a.m.; one mech filter 2.1 kc for s.s.b.; one xtal filter 500 cycle for c.w. 100 kc xtal calib; b.f.o.; noise limiter; built-in pwr sup 115/230 vac. 60 cps. Sensitivity 0.5 microvolts. Transceive plug. 12 tubes, 10 diodes. dial calib 1 kc. 12 x 15 x 7 inches. \$250.00

FL-200B 130 watts s.s.b./c.w./a.m. Same bands and size as FR-100B. v.f.o.; one mech filter 2.1 kc; carrier and sideband suppression 50 db; built-in ant relay; vox. anti-trip; built-in pwr sup 115/230 vac. 60 cps; upper & lower sideband; transceive plug; 13 tubes, 7 diodes. Supplied with plugs. \$350.00

FL-1000 1 k.w. grounded grid ampl. Same bands and size as other equipments. 115/230 vac. 60 cps. \$200.00



The Sommerkamp F-line. A product of German engineering and Japanese craftsmanship at a rock-bottom price. Will ship to any place in the world. Coming Nov.: FT 100 130 watts s.s.b./c.w./a.m. Transistorized transceiver, 3 tubes; built-in pwr sup 115/230/12 V; 80 through 10 meters + 11 meters ..... \$475

U.S.A. and Canada sales:

Barry Electronics, 512 Broadway, New York, N.Y. 10012.

Worldwide export: Tokai, Lugano 3, Box 176,

Switzerland. Tel (0066/091) 88543. Telex (0045) 59314

## USE CHRISTMAS SEALS



**FIGHT TUBERCULOSIS  
and other  
Respiratory Diseases**

## EXCELLENT SELECTION—AT EXTREMELY LOW PRICES—48 HOUR DELIVERY

**JAN  
CRYSTALS**

Thousands of frequencies in stock. Types include HC6/U, HC18/U, FT-241, FT-243, FT-171, etc.

SEND 10¢ for catalog with oscillator circuits. Refunded on first order.

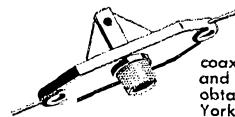
2400C Crystal Drive, Ft. Myers, Fla. 33901

## RADIO TELETYPE EQUIPMENT

TELETYPE MODELS 28 ASR, 28 KSR, 28 LPR, 28 LARP, 28 LXD, 28 LBXD1, 14, 15, 19, Page printers. Perforators, Reperforators, Transmitter-distributors, Polar Relays, Collins Receivers 51J-3, R-388, 51J-4, R-390A. Hammarlund SP-600JX. Frequency Shift Converters.

**ALLTRONICS-HOWARD CO.**

Box 19, Boston, Mass 02101 Tel: 617-742-0048



## BUDWIG HYE-QUE

coax fed DIPOLE center connector and HQ-2 end insulators can be obtained in New Jersey and New York States at:

- Federated Purchaser, Inc. Springfield, N.J.
- Federal Electronics, Inc. Vestal, N.Y.
- Genesee Radio & Parts Co., Inc. Buffalo, N.Y.
- Ft. Orange Radio Distr. Co., Inc. Albany, N.Y.
- Higgin & Sheer, Inc. Poughkeepsie, N.Y.
- Adirondack Radio Supply Amsterdam, N.Y.
- Williams Radio Supply Co., Inc. Highland Park, N.J.
- Federated Purchaser, Inc. Shrewsbury, N.J.
- Harvey Radio Co., Inc. New York City and L.I.

**DOUGLAS A. SMITH, W2BZR—Representative**  
P.O. Box 273, Chatham, N.J. 07928

QUICK WEDGE SCREWDRIVERS • MILLER WIRE STRIPPERS

**NOW**

**EXCLUSIVE 66 FOOT MOR-GAIN 75 THRU 10 METER DIPOLE**  
**NO TRAPS — NO COILS — NO STUBS — NO CAPACITORS**  
*Fully Air Tested — Thousands Already in Use*

**NEW BEAM**



**MULTIBAND SECTIONS**      **FULLY GUARANTEED**      **PATENT ALLOWED**  
 40% Copper Clad wire—Under three lbs. Air Weight—Rated for full legal power—AM/CW or SB—Coaxial or Balanced 50-75 ohm feed—VSWR under 1.5 to 1 at most heights—Rust resistant hardware—Drop-proof insulators. Completely assembled, ready to put up. Model 75/40 Amateur Net \$25.00. Terrific Performance—No coils or traps to break down or change under weather conditions—Fully Guaranteed. MODEL SB20 "SHORTY" 10 & 20 METER TRAP BEAM—\$53.95

**NEW SUPER HEAVY DUTY DIPOLES 66' LONG. RATED 4KW PEP-2000 POUND BREAKING STRENGTH—DELTRIN CENTER & CERAMIC END INSULATORS—OUT PERFORM FULL SIZE DIPOLES;**  
 75/40 SHD \$30.00; 75-20 SHD \$35.00; 75-10 SHD \$42.00

MODEL 40/20 .....	\$17.00	• 36 FEET LONG
MODEL 80/40CW .....	\$27.00	• 69 FEET LONG
MODEL 75-10 .....	\$35.00	• 66 FEET LONG

ORDER DIRECT OR WRITE FOR FULL INFORMATION

**MOR-GAIN**

P.O. Box 6006  
Alexandria, Virginia 22306

OR THRU YOUR FAVORITE DISTRIBUTOR

Phone: 703-768-7766; Nights and Holidays 703-780-2171



**DUMMY LOAD**

52 ohm, non-reactive film oxide R.F. unit. All band, all power to 1 KW. SWR 1.2 to 1.  
Kit \$7.95 postpaid.  
Wired, add \$2  
**HAM KITS**  
Box 175, Cranford, N.J.



**HAM'S CARIBBEAN RETREAT!**  
**Go foreign Antigua, W.I.**

Hotel Beachcomber  
73, Bill Wyer, VP2AZ/Ex-VE3BP,  
G2ZB-DXCC  
Box 10, Antigua, W.I.  
Caribbean DXpedition Headquarters

*The Little Gift that makes the BIG DIFFERENCE* in the enjoyment of your hamming hours and the prestige of your station

<b>PERMANENT</b> —Personalized logbooks for home QTH. Stiff cover, ring binder. 8 1/2" x 11" in black, brown, bone, blue, red .....	<b>\$3.50</b> ppd	For Mobile Use: Flexible cover, ring binder. 4 1/4" x 9 1/2" in black, brown, bone	<b>\$3.00</b> ppd
Contains sheets for 800 QSOs, WAS and DXCC check sheets, page for future skeds. Gold imprint of your name and call on cover.		Contains sheets for 800 QSOs. Gold imprint of your name and call on cover.	

• Additional Sheets, 800 QSOs, each style binder, \$1.00 ppd  
For that added touch you deserve, look to Denman where quality and economy go hand-in-hand.

**DENMAN SYSTEMS • Box 540, Ventura, California 93002 • Enclose check or money-order—Don't forget your call.**

**YES!**



I would like to become a member of ARRL and help support its many services to amateurs and amateur radio. Here's my \$5.00 (\$5.25 from Canada, \$6.00 elsewhere). Sign me up for a year's membership and twelve big issues of QST!

My name ..... Call.....  
Street .....  
City ..... State..... Zip.....

*(Please see the other side of this page for a list of available League publications.)*

**THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111**  
QS-1266

Give "him" or "her"  
THE ALL-SEASON

# Gift

GREATEST VALUES EVER OFFERED



INCOMPARABLE  
*telrex*  
**BEAMS**

Also: Rotator-Selsyn-Indicator Systems, Inverted-V-Kits, "Baluns," Towers, "Bertha" Masts, 12-Conductor Control Cable and Co-ax. Send for PL67.

The design, craftsmanship and technical excellence of Telrex —

"Beamed-Power"  
"Balanced-Pattern" Rotaries

have made them the standard of comparison throughout the world! Every Telrex antenna model is engineered, precision machined, tuned and matched, then calibrated for easy and correct assembly at your site for repetition of our specifications without 'cut and try' and endless experimentation.

COMMUNICATION SYSTEMS SINCE 1921

Communication Engineering Laboratories

**telrex**

ASBURY PARK, NEW JERSEY 07712, U.S.A.

**SURPLUS NEEDED**  
Guaranteed highest prices. Shipping paid. We'll buy, trade or give you new equipment of your choice. Send list or telephone for immediate quote. Payment in 24 hrs.

**MILITARY ELECTRONICS CORP.**  
SPACE ELECTRONICS DIVISION  
4178 PARK AVE., BX., N. Y. 10457 • (212) CY 9-0300

**TIE BARS IN STERLING SILVER FOR ARRL MEMBERS**

Engraved With Your Call **\$5.95**

Also available in Cuff Links, Key Chains, Belt Buckles

M. WEITZNER Inc.  
169 Deer Park Ave, Babylon, N.Y. 11702

I would like the following League publications shipped to me postpaid. I am enclosing payment of \$\_\_\_\_\_ (These prices apply only to the USA.)

Ship to this address:

NAME ..... CALL .....

STREET .....

CITY ..... STATE ..... ZIP .....

- |  |   |
|--|---|
| <input type="checkbox"/> <b>ARRL HANDBOOK</b> \$4.00<br>The standard comprehensive manual of amateur radiocommunication    | <input type="checkbox"/> <b>A COURSE IN RADIO FUNDAMENTALS</b> \$1.00<br>Use this in conjunction with the Handbook  |
| <input type="checkbox"/> <b>UNDERSTANDING AMATEUR RADIO</b> \$2.00<br>Written for the beginner—theory and how-to-build it. | <input type="checkbox"/> <b>ANTENNA BOOK</b> \$2.00<br>Theory and construction of antennas  |
| <input type="checkbox"/> <b>VHF MANUAL</b> \$2.00<br>A new and thorough treatment of the amateur v.h.f. field              | <input type="checkbox"/> <b>SINGLE SIDEBAND FOR THE RADIO AMATEUR</b> \$2.50<br>The best s.s.b. articles from QST   |
| <input type="checkbox"/> <b>LICENSE MANUAL</b> 50¢<br>Complete text of amateur regs, plus Q&A for amateur exams            | <input type="checkbox"/> <b>THE MOBILE MANUAL</b> \$2.50<br>The best mobile articles from QST   |
| <input type="checkbox"/> <b>HOW TO BECOME A RADIO AMATEUR</b> \$1.00<br>All about amateur radio and how to get started     | <input type="checkbox"/> <b>HINTS AND KINKS</b> \$1.00<br>300 practical ideas for your hamshack   |
|  | <input type="checkbox"/> <b>OPERATING MANUAL</b> \$1.00<br>The techniques of operating your amateur station—DXing, ragchewing, traffic, emergencies, etc. |

(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

# ADD PUNCH AND CLARITY TO YOUR SIGNAL!



- Instantaneous Limiting Action
- No Appreciable Distortion
- Completely Compatible with SSB
- Talk Power Gain at Least 10 db
- Optimum Frequency Response
- Installs In Microphone Lead
- All Solid State Printed Circuitry

## NEW! COMDEL SPEECH PROCESSOR MODEL CSP-11

A prototype of the CSP-11 has proved itself an effective communication aid on the amateur bands over several years. Its prominent feature is the instantaneous limiting action without the harmonic distortion which often makes the use of conventional speech clippers marginal, particularly with SSB transmitters. Designed for relatively insensitive high impedance microphones—a gain control is provided—the unit will enhance the intelligibility of voice signals considerably under difficult conditions. "MIL" design and construction is employed throughout for high reliability and long life. Power is obtained from internal batteries (6 "D" cells—life exceeds 300 hours) or external source.

Free brochure will be sent on request

PRICE: \$111.00 Postpaid in U.S.A. (Mass. residents add 3% tax)

**COMDEL INC. 218 Bay Road Hamilton, Massachusetts 01982**

## GENERATOR SPECIAL!

**FOR PORTABLE OR EMERGENCY POWER.** Produces 1 KW, 110/120 VAC when driven at 4000 RPM. Weight 23 pounds, including voltmeter, 2 1/4" v-belt pulley, switch, 2 AC outlets. Drive it with your car engine or with 3 HP engine. Requires 12 volt, 120 ampere hour battery. Perfect for MARS or RACES emergency power—**IDEAL for FIELD DAY.**

Regularly \$79.95. While they last \$39.50 FOB Dallas  
Send check or money-order

Briggs & Stratton engines. Regularly \$58.85. Sale \$44.00 FOB Dallas

**INTERSTATE ELECTRIC CO.**  
7164 Elmridge Drive, Dallas, Texas 75240

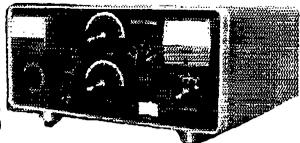


Can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Bigtrades, easy terms. Used bargains

**VAN SICKLE RADIO SUPPLY CO.**  
Gene Van Sickle, W9KJF, Owner  
4131 N. Keystone Ave.  
On the northeast side of  
Indianapolis 5, Indiana



**NOW!**  
in Easy  
to Build  
Kit Form!  
**ONLY \$249.95**  
Less Tubes



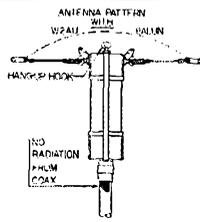
**Bandit 2000B**

(Set of Cetron Tubes available for \$58)

Grounded grid operation, 2000 watts PEP (twice average DC), 80, 40, 20, 15, 10 meter operation . . . 115 or 230 volt operation . . . Relay operated with exciter controls . . . Solid state rectifiers . . . Many other features . . . size 14 3/4" x 6 3/4" x 14" deep . . . Weight 45 lbs. Available in color to match Drake or Collins. No extra charge.

**Hunter Sales, Inc.** P.O. Box 1128  
University Station,  
Des Moines, Iowa 50311

## W2AU BALUN LETS ENTIRE ANTENNA RADIATE!



**STOP WASTING YOUR SIGNAL! REMEMBER, YOUR ANTENNA IS THE MOST IMPORTANT PIECE OF GEAR YOU OWN.**

- No Radiation from Coax
- No Center Insulator Needed
- Perfect for Inverted Vees (Use Hang-up Hook)
- Built-in Lightning arrester
- Broad-Band 3 to 30 Mc.
- Takes Legal Power Limit
- Two Models:  
1:1 50 ohm coax to 50 ohm balanced  
4:1 75 ohm coax to 300 ohm balanced
- A must for Inverted Vees, Doublets, Quads, Yagis etc.

**\$12.95** AMATEUR NET

W2AU Complete pretuned Fiberglass Quad . . . . . \$99.95

W2AU Complete pretuned Vinyl Quad . . . . . \$64.95

**UNADILLA RADIATION PRODUCTS**  
Unadilla, New York 13849

# HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or credit discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is no charge for zipcode when you furnish it. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.

(8) No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.

(9) Due to the lightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

*Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

FREE: New York Radio Club cordially invites New York City area hams and SWLs to its regular monthly meetings Second Monday of each month at George Washington Hotel, 23rd St. and Lexington Ave., promptly at 8 P.M. All are welcome. W2ATT, New York Radio Club.

OLD Old Timers Club now over 650 members with verified 2-way contacts before 1926. Life membership \$15.00. Bi-monthly "Spark Gap Times" \$2.50 annually. Roster free to members. Write Secretary, W5VA, Box 840, Corpus Christi Texas 78403.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

WANT Calbooks, catalogs, marazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C. 28025.

WANTED: all types of aircraft or ground radios. 17L 618F or 8388, 390, GRC, PRC, 51 IRVX, Collins linear amplifier. Type 304. Especially any item made by Collins Radio Ham or commercial. Aircraft type tubes and test equipment generally. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.Y.

SELL, swap and buy ancient radio set and parts marazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory test equipment. Electraircraft, Box 13, Binghamton, N.Y. 13902.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Canton, Chicago 6, Ill.

TOPPING All offers for any piece of aircraft or ground radios, tubes or test equipment. In a hurry? Cash-in-advance arranged. Turn those unused units into money. Air Ground Electronics, 64 Grand Place, Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Cego Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7359.

MANUALS for surplus electronics. List, 10¢. S. Consalvo, 4003 Roanne Drive, Washington, D.C. 20021.

WANTED: Collins Parts. BC-610, GRC-2, Antodyne, Bethpage, L.I., N.Y.

TELETYPE: Buy 28s, sell parts. W4NYF, Schmidt.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 37 E. Hoover St., Ann Arbor, Michigan. Tel. Normandy 8-8262.

RTTY Gear for sale. List issued monthly. 88 or 44 mhy to-roids, five for \$1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TOOOBES: 6146B, \$4.00; 6CW4, \$1.40; 417A, \$3.95; 6360, \$3.45; 6146, \$2.55; 5894, \$15.50. All new, boxed guaranteed. No nulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 4442, Stirling, N.J. 07980.

FM Equipment Schematic Digest: A comprehensive collection of Motorola schematic diagrams covering low-band, high band and 450 Mc equipment, manufactured between 1945 and 1954. Crystal circuit constructions and a wealth of technical data included in 92 pages. Price, \$3.95 prod. Two-Way Engineers, Inc., 1100 Tremont St., Roxbury 20, Mass.

QSLs??? "America's Finest!!!" Samples 25¢. DeLuxe 35¢. (retundable). Sakkers, W8DED, Holland, Michigan.

QSLs's. samples 20¢. QSL Press, Box 281, Oak Park, Ill. 60303.

QSLs "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

C. FRITZ For better QSLs! Bringing hams greater returns for over a quarter-century. Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Ill.)

QSLs: Moyers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

QSLs-SMS. Samples 10¢. Malgo Press, Box 373, M.O., Toledo 1, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton N.J. 08638. Samples, 10¢.

QSLs. See our new "Eve-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXX, 1944 N.M.-18, Gladwin, Mich. 10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave., St. Louis, Mo. 63118.

DON'T Buy QSL cards until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago, Illinois 60639.

SUPERIOR QSLs, samples 10¢. Hamsco, Box 773, Hobbs, New Mex.co.

QSLs, finest, YLRL's, OMs, samples 10¢. W2DJH Press, Warrsburg, N.Y. 12885.

HUNDRED QSLs, \$1.00. Samples, dime. Holland, R #3, Box 649, Duluth, Minn. 55803.

QSLs, SWLs, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers K0AAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (retundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWLs, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs 300 for \$4.35. Samples 10¢. W9SKR, George Vesely Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLs 3-color glossy, 100, \$4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Kidge, Milford, N.J.

QSLs Kromekote 2 & 3 colors attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLs-100 3-color glossy \$3.00; silver slobe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLs Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

RUBBER Stamps \$1.15 includes tax and postage. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLs \$2.50 per 100. Free samples and catalog. Garth, Box 510, Juliard, N.J.

QSLs—Free samples. Attractive designs. Quick Service, W7IIZ, Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for \$1.00 or 10 for \$3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

QSL Cards, Quality printing. Samples 15¢. Sargent Press, 19 Glen Ave., Lynn, Mass.

COLORFUL QSLs. Very artistic—very different: Samples 10¢ or SASE. Colorful QSLs, M. A. Berliner, 833 Crowden Dr., Cincinnati, Ohio 45224.

QSLs. Glossy coated, 3 and 4 colors, 100- \$2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSL Rubber stamp 3" x 5", \$5.00. Other ham stamps, \$1.00 up. Set sample impressions 5¢ postage. Wes's W1FP, RFD Amesbury, MA 01913.

SINCE 1937, QSLs by WILMS. Sheehan Press, 23 West St., Stoneham, Mass. 02180. Samples 10¢. Catalog, 25¢.

QSLs: Quality with Service. Samples free with zip. R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

QSLs 300 for \$5.00. 25¢ samples, K2HVN, 860 Atlantic St., Lindenhurst, N.Y.

AWARD Winning QSLs. Very artistic. Very colorful. High gloss colors including glow in dark type. Samples 10¢ or SASE. Colorful QSLs, 510 Riddle Road, Cincinnati, Ohio 45220.

QSLs. Radio Press, Box 17112, San Diego, California 92117.

QSLs. Second to none. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

QSLs 32 samples. Catalog 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

DON'T Buy QSLs until you see our free samples. Wilshire Printing, P.O. Box 292, Crowley, Texas 76036.

RUBBER Stamps. 3 line address \$1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

CASH Paid for your unused Tubes, and good Ham and Commercial Equipment. Send list to Harry, W2LNI, Harry Electronics, 512 Broadway, NYC 10012. Call 212-Walker 5-7000.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

ADD Photo-Stamps to QSLs. Your H&W photo (returned) made into glossy, perforated, gum-backed sheet of 100 postage stamp size photos: \$3.00. Free sample, literature, C. J. Photos, 163 Riva, Milltown, N.J. 08850.

N.Y.C. Area QST's mid-1938 to date, rate \$2.00 per year. IRE Proceedings same rate. You may shipping. G. F. Schiffmayer, 186 Maple Ave., Metuchen, N.J.

WANTED: Tubes, all types, write or phone W2ONV, Bill Sierano, 243 Harrison Avenue, Garfield, N.J., Tel: Garfield Area code 201-471-2020.

NOVICE Crystals 80-400, \$1.05 each. Also other freqs. Free list Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

RTTY Channel Filters, octal mounted, 2125/2975 cps, \$5.95 per, 88 mhz. toroids, uncase'd, 5 for \$2.50, Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

WANTED: Model #28 Teletype equipment, R-388, R-390A, cash or trade for new amateur equipment. Alltronic's—Howard Co. Box 19, Boston, Mass. 02101 (617-742-0048).

SELL: CQ, QST, Handbooks, old IRE Proceedings, any quantity. Buy: Old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

WANTED: For personal collection: QST, May 1916: Learning the Radiotelegraph Code, 3rd edition; How to Become a Radio Amateur, Edition 10; The Radio Amateur's License Manual, Edition 7, 10, 11, 12, 15 and 16. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

WANTED: Johnson 240-305-2SSB adapter. Good condition. Pay top price. Will pay shipping costs. Roy Bechtel, 5609 Seminole Street, College Park, Maryland, Tel: (301) 747-5584.

HEATH HO-10 signal monitor completely wired and in perfect operating condition in A-1 shape. Will ship to first offer over \$60.00. Send check or money-order to Pete Chamalaf, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107, (Shinnecock Continental U.S. and Canada only).

COLLINS Owners: Tired of out of band operating when working DX-split frequency? Avoid bandswitch changing with our new kit that installs in 60 seconds. \$/Line, \$21.95; KWM-2, \$11.95 postpaid. Front End Conversions and updates, 75A-4, \$69.95; 75-S series, \$34.95. 72-hour service. VCZ Sales, Box 15, Ramsey, New Jersey 07446.

TOROIDS, 88 mh, uncase'd, \$/2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

COLLINS Owners! A wired kit, \$5.00! No soldering! Holes! Chassis Removal Switch In-Out! (State Model). Kit Kraft, B-763, Harlan, Ky.

WANTED: Agcorder PT-6 type tape recorder, any condition. Will also consider Viking. Need schematic for Knight T-100. Ray Sherwood, W9DRY, 727 Garfield Ave., Aurora, Illinois 312-896-9813.

WANTED: HRO-50 or HRO-60; VLF coil sets E, F, G, H, J and VHF set AD for HRO-60. Bill O'Brien, 14 Laurel St., Rockville, Conn. 872-0000.

SELL: Eimac 4X250B tubes. Guaranteed gud condx. \$6.50 each, \$10,000 paid prepair in U.S.A. Send check or m.o. Everett Stidham, Jr., W5JLO, 722 So. 30th, Muskogee, Okla.

SELLING Hallicrafters HT-44 transmitter, \$165.00; matching PS, 150-120 power supply, \$65.00; HT-41 linear, \$195.00. Package deal: \$495.00. All in exclnt condx. Pick up only, sry. WA9-KHT, 2224 W. Fletcher St., Chicago Ill. Tel: 935-0309, after 6 PM.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

HALLICRAFTERS S-36A, and S-37, excellent. J. C. MvKim, 505 1/2 Figueroa, Folsom, California 95630.

STAINLESS Steel Hardware. Small quantities. Send SASE for list. Arlington Stainless, Section B, Box 2641, Baltimore, Md. 21215.

TV Cameras. Vidicon-Orthicon, industrial new and used lenses, vidicons, pan, tilts, zooms, industrial suppliers camera reconditioning and repair. Closed Ckt TV Center, Inc., Rte. 46, Little Falls, N.J. Tel: 201-256-7379.

COLLINS 75A-2, 3 filters, vernier dial, book, \$375.00; Eico 753, solid state VFO, A.C. supply. Factory aligned, \$325.00. New HG-10 VFO, \$30.00. New factory aligned HO-10 Ham-Scan IF, 455 Kc., \$45.00. WA8QMK.

HW12, 22, 32 (owner); Convert your rig to three bands for a total cost of \$28.50. This price includes new front panel and dial. Complete assembly manual only 50¢ or send for free brochure. DRC Kit, 215-28 Spencer Ave., Queens Village, N.Y. 11427.

DON'T Struggle with the code! The Codemaster system is a planned program of code learning on magnetic tape which brings you from scratch to 15 WPM. Thousands have learned by this method. Two-hour tape, \$5.95, postpaid. Brochure free. Codemaster, Box 29-A, Portsmouth, R.I. 02871.

FOR Sale: Collins K-W-1, 1000 watt AM/CW xmt, mint condx, extra tubes and VFO, \$950.00. Make offer. New NC-60B revr. Chapp, L. B. Cox, W7ACD, Cottonwood, Ariz. 86326.

K4YRR Estate, Hallicrafters SX-101A rec, HT-37 exciter and Heathkit SB-200 linear. Exclnt condx, make reasonable offer. Brigman, Box 257, Norcross, Ga. 30071.

COLLINS S/Line: 75S-3, \$400.00; 32S-3, with 116F-2, \$575; 30L-1, \$400. Like new in immaculate condx; with entire package receive Astatic 10-D with G stand, Tom Storch, 139 Greenway Road, Lido Beach, N.Y. 11561. Tel: 516-GE2-1253.

SALE! Invader 2000, W4SD.

WANTED: Military, Commercial, Surplus ... Airborne, Ground, Transmitters, Receivers, Testsets, Accessories, Especially Collins. We pay cash and freight. Ritco Electronics, Box 156, Annandale, Virginia. Tel: (703)-560-5480 collect.

SB-300, \$225.00; Ham-M rotator with control box, \$65.00; Tri-Ex THD-354K, 54 ft. tower with all guy-wires and accessories needed for installation; \$125.00, plus shipping. HP-13 power supply, \$45.00. Write: WA2SJJ, 215-28 Spencer Avenue, Queens Village, L.I., N.Y. 11427.

JOHNSON Matchbox, 250W, \$30.00; DX-60, like new, professionally wired; \$65.00. Joe Nester, W3KUN, Emporium, Penna.

CODE-O-MATIC Keyer; keys your transmitter from tones recorded on your home tape-recorder, \$29.95. H & M Engineering Lab, 2606 Immanuel Road, Greensboro, N.C.

GOING Sideband: All equipment int. one owner, original cartons, manuals. New Eimac A68A M1070 AC/DC power supply, cables, complete \$165.00 Globe HG-303; companion V-10 VFO, Cables, new, \$90.00; Vibroxip bug, leather carrying case, \$15.00. Newest HO-110A, beautiful, \$175.00. Firm, Bob Salituri WB2KBS, 2728 Kings Highway, Brooklyn, N.Y. 11229. Tel: ES 7-4285.

GALAXY V and AC 35 supply for sale, immaculate, brand new. Used exactly 10 hours. Original purchase price \$560.00. Will sell both for \$380.00. Write F. Klein, 35 Newton Dr., Nashua, N.H. or call 603-889-2971 after 5:30.

COLLINS 75A-4, 3 filters, vernier dial, book, \$375.00; Eico 753, solid state VFO, A.C. supply. Factory aligned, \$325.00. New HG-10 VFO, \$30.00. New factory aligned HO-10 Ham Scan IF, 455 Kc., \$45.00. WA8QMK.

DX-100B, three extra 1625's, homebrew antenna coupler, \$100. KIROO. Tel: 237-1772.

FREE 20 word classified advertisement with one year's subscription to Ham's Market Newspaper, only \$2.00 per year. Sample copy on request, Box 13934, Atlanta 9, Ga.

MERRY Christmas! From Evansville Amateur Radio Supply. Let us help you save those \$5 on Drake, Swan, Galaxy, Hy-Gain, SBE, New-Tronics, Eico, Mars and many more. Send a stamped envelope to us at 1306 Division, Evansville, Indiana. Bill Ogg, WA9RMO.

TCS "WW" Collins receivers wanted for Novices. Adverse price and condition. B. T. Scharbach, 502 Scheurmann, Essexville, Michigan 48732.

SELL: National HRO-60 receiver with A,B,C and D coils, and matching speaker. \$150.00. John T. Chandler, 3904 Brenda Lane, Annandale, Virginia 22003.

NOVICE Station: HQ-100, Viking Challenger, 122 VFO, all working and in good condition. Take all, with manuals, for \$150.00. Sorry will not ship. Looking for mobile and RTTY. Frank Fallon, WA2YVK, 116-64 231 Street, Cambria Heights, N.Y. 11411. Tel: 212-528-1168.

SELL: Viking 500 complete with power supply and 2 spare 4-400A tubes, \$300.00, excellent condition. Ship collect at your direction, in original cartons. Erwin Oeller, W2BY, 104 Munson Avenue, West Hempstead, N.Y. 11552.

FOR Sale: QSTs, 1938 through 1965. CQs 1953 to mid-1964. Some issues missing. Best offer takes. Write for details, Stuart Campbell, Rte. 2, Box 535, Vashon, Wash. 98070.

HEATHKIT: Marauder transmitter, speech compressor, \$245.00; Warrior kilowatt linear, spare tubes, \$175.00; manuals. Package deal: \$390.00. H1P-21 microphone, \$20.00; HM-10A tunnel dipper, \$27.00; GR-151A portable transistor radio, \$15.00. Exclnt condx. A. Karger, 33 Elliott Street, Beverly, Mass. 01915. Tel: 1-617-922-8029.

SELLING: Heathkit HW-32 transceiver, \$87.00. Other optional accessories available. Also have Matchbox, allband antenna coupler, Model 250-23 at \$25.00. Marsh, 16 Dellwood Court, Colonia, N.J.

SELL: New SB-34 with microphone, \$345.00. W6BLZ, 528 Colima, La Jolla, California 92037.

NCX5 Mark II, NCXA power supply. Recvr, Sec. used few times. Trans, sec. never. Gene Auger, WA0JTT, 1340 So. Wheeler, Saint Paul, Minn. 55116.

EICO 753 and AC supply. Excellent condition, with original cartons and warranty cards, \$250.00. Unaltered BC-346Q, \$60.00. Charles Cranfill, W3VCN, Worton, Maryland.

BARGAINS: HW22 with 12VDC HP-10, used very little, with books, \$105.00. Heathkit, new, unbuilt, no time, H-14, "KW Compact" linear with HP-14, 12VDC mobile supply, \$165.00. "Cantenna" HN-31, \$8.50. Bud variable low-pass filter, \$4.00. Unused Honeywell W612B, 12VDC mobile supply with instructions, \$20.00. Bell, Box 488, Altadena, Calif. 91001.

CLEGG ZEUS, PTT, Variac controlled and manual: \$350.00; new equipment, never used. Ameco PV-144 preamp, \$9.50; Ameco CMA all-frequency converter, \$35.00; DK60-G2C relay 12VDC, \$8.00; Raytheon semi-directional carbon mike, \$5.00. include transportation charges. Phil Zarch, WB2ASR, 2728 Kings Highway, Brooklyn, New York 11229.

FOR Sale: SB-100, SB-200, SB-300. Wanted: any kit to wire and repair, preferably Heathkit. Most Heathkits in stock. Business references on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

JOHNSON Viking Vallant II (used 1 yr) and Hallicrafters S-76 (works like new). First certified check or money-order over \$300 for xmt and \$60 for revr takes them. WA0KOJ, Sharon, No. Dakota.

WANTED: SX-88. State condition and price. W9JKC, Byron Sharpe, Box 366, Glencoe, Ill. 60022.

EXCELLENT 3V2, \$125.00; 388URR (51J3), \$300.00. K6MDA, 4919 Pecan Grove #227, San Antonio, Texas.

LIKE-New, Collins 75A-4 S/N 3663, with matching speaker, reduction tuning, dial lock, 500 cycle 3.1 Kc filters and instruction book, \$400.00. W5REV, 1608 William Brewster, Irving, Texas. Tel: 214-BL4-7429.

COLLINS 75S-3, 32S-3, new, \$950.00; Hallicrafters SX-88A, factory serviced, \$325.00; KWM-2, AC\*DC supplies, PTO unit, New-Tronic mount, Waters equippeu, \$1050.00. W8JOR, 4810 Haddington, Toledo, Ohio.

KWM-2 plus 516-F2, \$695. Sorry, no shipping. K6SQZ, 11214 Ferina St., Norwalk, California. Tel: 864-5454.

\$282 for SBE-34. One year old, with less than fifteen hours of air-time, in superb condition, guaranteed by first class licensed engineer. College student needs funds and will ship to any point in Continental United States. Manual and power cords included. Lynwood Jordan, Box 21531, Emory University, Atlanta, Georgia 30322.

HW-22, HA-23 power supply, speaker, mike, xtal calibrator. All in excellent condition: \$160.00. James B. Clayton, 1700-30 Murfin Ave., Ann Arbor, Michigan, 48105.

9-ROOM split-level house, paneled ham shack 25 ft. by 11 ft. adjoining TV-room, 8-ft. console, 50-ft. Rohm fold-over tower. Mosley TA-33 Tribander, Telrex 2-meter, 80-meter and 40-meter Inverted Vees, swimming pool, 50 minutes express bus to New York City. Relocated. Hank Jordan, WB2IYO, 9 Surrey Drive, Hazlet, N.J. Tel: 201-264-1141.

NATIONAL NC-109 rcvr in good condition, with xtal calibrator and manual. All for only \$68.00. Used only 15 months. U pay shipping. Dayton Jones, WA3DVI, 224 West Willow Grove Ave., Philadelphia, Penna. 19118. Tel: 215-CH8-2947.

SELL: Clegg ZS and PS/Mod unit, \$400.00. Art. WA9IQP, 811 Franklin River Forest, Illinois 60305.

LAFAYETTE HE-35A, 6 meter transceiver. Good condition. Will sell \$30 or trade for ART-13 or 3 meter equipment. Write: Paul, WA9IHV, 407 N. Maple, Benton, Illinois 62812.

HAMMARLUND HQ-180A, in carton, never used, 24-hour clock timer packed separate. Will fit into set. First \$300. K2HAM.

APACHE With SB-10, like new, with manuals, \$180.00. LRL-66 antenna 80-10 meters, \$15.00. Stan Davis, WB2HZK, 84 Studley Street, Rochester, N.Y. 14616.

SELL: HQ-170C, excellent, \$185.00. SR-42 xtals mike, \$95.00; Globe VFO and Globe Chief amplifier, \$45.00. Joe Ehrler, W200, 221-20 104th Ave., Queens Village, N.Y. Phone 212-HO5-0912.

DRAKE 1A SSB Receiver, like new, \$125.00; Heathkit HX-20 SSB transmitter, excellent condx, \$145.00, with instruction manuals. Both for \$260.00. K2RAG, Chris P. Bednarek, 225 Alexander Ave., Nesconset, N.Y. Tel: 516-265-4391.

20A, HQ-140-XA, Both in good condition. Best offer. Dan Lindstrom, K9GJX, Duke University Physics Dept., Durham, N.C.

KWM-2, 312B-5, MP-1, PM-2, 136B-2, 351D-3, CC-1, Hy-Gain Trap Traveller, Mosley mobile, Webster Band-Spanner, and loaded with whip antennas, \$1400.00. Package deal only, 30-LL, \$350.00. W. H. Jay, K4TWK, Box 516, Douglasville, Ga. Phone: 404-942-3192.

SELL: 75A-2 with crystal calibrator, C-E Sideband Slicer and Q-multiplier, speaker, \$195.00. Eldico SSB-100F with silicon rectifiers, \$235.00. Manuals for all above included. R. W. Emmott, W2AI, 29 East Madison Ave., Florham Park, N.J. 07932.

SELL IRE Proceedings Jan, 1931, thru May 1935; Jan, 1936 thru Dec, 1938. Best offer. Ted Hansen, W9IX, 733 N. Washington, Park Ridge, Ill.

SELL: Johnson 6N2 xmt-rmt condx: \$75.00. R. P. Brehm 862 First St, Menasha, Wis. 54952.

SELL Or Trade for handmans, Viking II, excellent, \$75.00. VFO, \$15.00. WOSTM, 3810 Lindlavia, Des Moines, Iowa 50310.

WANT Test equipment for ham and mobile servicing. Lampkin, Measurements, Bird, etc. Sell Sixer, Twoer, K8UZX.

FOR Sale: Hallicrafters HT-9 transmitter, in good condition, all coils, spare final tube. J. P. Hyde, W4BGS, Nokesville, Va. 22123.

TRANSmitters-Recivers repaired by radio engineer. Lab equipment. J & J Electronics, Windham Road, Canterbury, Conn. Tel: 203-546-9126.

KWM-2 and PM-2 50-400 cps supply with speaker, \$80.00. HW-32, \$90. Used by physics teacher. Stan Rohrer, Wakarusa, Indiana 46573.

SELL: CO, QST 25¢ ea., Popular Electronics, 15¢ 1953-1965, Gordon Edwards, W4ABF, 5220 Backlick Rd., Springfield, Virginia.

DRAKE R4 Receiver, like new, original carton. Not a scratch, actual running time 20 hours. Sale \$260.00. Ira Fishelberg, W2ZLD, 2606 Atlantic Ave., Longport, N.J. 08403.

MERRY Xmas and a Happy New Year from WOCVU. See you in 1967 at Montreal.

FIRST \$20.00, plus shipping, gets a D-104 mike and G-stand. Robert Burns, 522 E. Center, Warsaw, Ind.

FOR Sale: HT-32A, \$230.00; HQ-170A/c, \$235.00; Johnson Thunderbolt, \$250.00; 600-watt modulator with tubes and filar, \$80.00; 6-HCA CT12A, a 65-watt-meter transmitter with power supply, \$35.00 each; 960MC RCA rack xmt, driver power supply and receiver, \$50.00 complete per above set. Surplus units, test equipment, transformers, chokes filter condensers and parts. Write for list, W3BBV, P.O. Box 722 York, Penna. 17405. Tel: 717-854-6037 evenings.

DX-60, \$55.00; VF-1 VFO, \$10.00; Millen 90800 xmt, \$25.00; three 829Bs, new, \$9.00 each; CC-3 rcvr, \$20.00; (Vinegard mod. E4-F18 ant. booster), \$5.00; BC-455-B 7.6 Mc rcvr, \$8.00; Eico 221 VTM with probes, \$20.00; BC-221, KX-3 power supply, make offer; 6V to 600V Dynamotor, \$10.00. Martin Huyett, W5PKI, JBU, Box 1081, Siloam Springs, Ark. 72761.

FOR Sale: KWS-1 plate transformer, \$75.00; Variac 115V/20 amps., \$25.00; Eimac SK-400, SK406 combination, \$10.00; Heath HT-11 Q multiplier, \$8; D-104, W/G-stand, \$15.00; HQ-13 Ham-Sear, \$60.00; power supply, 3 KV/4 amps, 115V primary, \$50.00. James Craig, 172 White Birch, Portsmouth, N.H. 03801.

FOR Sale: Kilowatt SSB Linear amplifier, Heath HA-14 and AC power supply HP-64, like new, used less than 10 hours, both for only \$125.00. Tom Jones, 86 Wing Road, APO New York 09845.

WANTED: Control unit for Ham-M rotator. K4LAO, Robert Cates, 811 Laurel Dr., Aiken, S.C.

SELL: Complete mobile unit, AF-67 w/p/s, PMR6A w/p/s, 12V Antenna, car, coax, relay, what you offer? J. J. Schenck, 450 Miranda Rd., Pittsburgh, Penna. 15234. W3JWV.

GONE Transceiver: sell perfect Hallicrafters SX-117; not a mark. Ship collect. First check for \$125. Steinhardt, W3LHZ, RD #1, Dallas, Pennsylvania 18612.

SELL: 75A-4 500-cycle mechanical filter (F4551-05), new \$32.00. E. Drozdick, 30 Neco St., Medfield, Mass. 02052.

6-METER AM, transmitter, built around International STP-50; Astatic T-3 mike; FCU-2 converter and p/s. Best offer. G. W. Pettif, 150 W. Chestnut St., Kent, Ohio 44220.

WANTED: Collins station-control SC-101 and SR-150 for cash. WB6KID, 8050 Irondale, Canoga Park, Calif. 91306.

COLLINS KWM-2, AC supply, Samsonite Carrying case, spotless, never mobile, \$795.00. WA6KUA, Box 100, Glendale, Calif.

MINT Condition: HT-37, \$215.00; SX-101A, \$200.00; Heathkit Warrior Linear, \$108.00. Will ship F.o.b. Orville Houder, Box 303, Spooner, Wisconsin 54801.

COMPLETE 2M station: HW-30, 6-cl. Hi-Par 2M beam, ic, 2 xtals, 17 ft. cable. All in excellent condx, used less than 2 hours, \$55.00 for lot. Will ship. Robert Heath, WN4DDR, Woodberry Forest School, Woodberry Forest, Va.

NATIONAL HRO-50-T w/xtal calibrator and 5 coils: \$130.00; K6TXA, 441 21st St., Manhattan Beach, California 90266. (Los Angeles).

TELETYPE regenerative repeater, TT-63A, may be used as a receiving converter also; like new, \$23.00. Power supply, 120V/0-250 Ma., all solid state, run whole loop, \$8.00. Repeater/rotor, typing, sync motor, \$40. tape, \$3/cass. Hq-129X, \$60; Twoer with DC, \$35. Saturn S3 halo w/xrfrm, \$9. Van 'N' Slot, W2ZLT, 302Z Passaic, Stirling, N.J. 07980.

WANTED: Part-time small manufacturer or individual capable of converting pocket size transistorized fm receiver to receive single frequency 162.55 Mcs. Receiver selected should be from reliable, consistent source. Write G. W. Berry, P.O. Box 707, Newark, N.J.

FOR Sale: KWM-2, \$725.00; 30L-1, \$360.00; MP-1, \$60.00. Fred Oster, 1133 27th St. N.E., Cedar Rapids, Iowa.

FOR Sale: 1 ZX-101A, 1 two meter Ameco Nuovistor converter and power supply, 1 six meter Ameco Nuovistor converter and power supply. All for \$275.00. U pay express. Zito, 9900 Pine, Niagara Falls, N.Y.

HAMMARLUND HQ-110-AC receiver with clock, manual, and a speaker. Newest model, recent serial No., original owner, in excellent condx, \$125.00. WB2RJJ, Robert Schenck, 22 Greenwich St., Bergenfield, N.J. 07621.

COLLINS 75A-4, Serial No. 4179. Absolutely immaculate. Vernier dial, 800 cycle and 3 Kc. filters. Will ship prepaid in U.S. for first cashier's check for \$425.00. B. Ripley, Box 1336, Phoenix, Arizona 85001.

SELLING: Collins 32S-1 and 75S-1 w/p/s; Mosley TA-33 Senior Beam, 80 thru 10 vertical; D-104 mic w/stand, keyer plus odds & ends for \$900. All mint condx. Will deliver radius 200 miles. John Dearing, WA0CEC, 1712 Ave. G, Fort Madison, Iowa.

NEED Engineer with First Class license, transmitter and maintenance duties, no announcing. Will train if necessary. Contact: R. J. Biter, Chief Engineer, KRVN AM/FM, Lexington, Nebraska 68850. Phone 308-324-3271.

DUMONT 294A oscilloscope. Needs minor alignment. Best offer or suitable trade accepted. Pick-up preferred. AR-88 Receiver, 200 countries worked with it. Best cash or trade offer (over \$135) accepted. K3MNI, 8361 Langdon Street, Philadelphia, Penna. 19152.

TRANSFORMER And filter choke for 2-150, 6-150, transformer: Pri. 117 VAC sec. 900-350-0-350-900 @ 250 Ma., 150 volt bias tap, 2.5 amp. fil. 1-6.3 volt fil. Choke: 10 hz @ 250 Ma. Set \$12.00 shipment prepaid. C.R. tube for DI-1 3API @ \$6.00. P & H Electronics, 426 Columbia, Lafayette, Indiana 47901.

WRL's Bluebook saves money. These prices, without trades, cash or charge: KWM-2, \$652.50; 75SB, \$404.10; SX-101A, \$188.10; SX-111, \$143.10; HA-225, \$76.45; AF-67, \$44.95; King 500C, \$269.10; 753, \$161.10; HX-50, \$233.10; HQ-170-C, \$179.10; 2B, \$188.10; NC-270, \$134.10; Galaxy 300, \$161.10; and more. Free list. WRL, Box 919, Council Bluffs, Iowa 51501.

FOR Sale: Excellent Collins station, KWM-2, \$690.00, 516F-2, \$69.00, 30L-1, \$325.00, 312B-5 \$210.00; D1-1, \$28.00. Make offer for complete station. Can have local ham check for you. Bob Heaton, K9RDL, 5735 Winthrop Ave., Indianapolis, Indiana 46220.

JOHNSON Viking 500 and Collins 75A-4. Both A-1. \$400.00 each. WB2TTC, 18 Allerton Ave., Middletown, New York. Tel: 914-343-7287.

VHF Station, Ameco TX-62; Tecraft Criterion Conv.; Hallicrafters HA-26 VFO; Lafayette KT-320 rcvr; Ameco CN-144 rcvr. Best offer over \$225.00. W3CTK, Richard Vuillequez, 701 Broadwater Court, Rock Hill, Mo. 63119. Tel: W01-3976.

WILL Sell complete set QSTs in Binders. In excellent condition. Run January 1955 - October 1966. S. J. Hooper, WB6FN, 650 Gordon Dr., Charleston, W. Va.

30L-1, like new, in factory carton. Will sell for \$350.00. W5MUG, 2469 Paden, Jackson, Miss.

FOR Sale: HT-32, \$200.00; NC-303, \$200.00. In exelnt condx. K4EKS, 252A Hawkegun Pk, Frankfort, Ky. Phone: 227-6064.

FOR Sale: Gonset G-76 with 12V transistor power supply, \$125.00; CE-10B with 20 meter coils, xtal, no Q1, \$45.00; Johnson 6N2 with spare 5894 final tube, power cable, \$75.00. Will ship collect, no trade. Fred C. Heffken, W8CRS, R#3, Glouster, Ohio 45732.

ESTATE Liquidation offers. Big list. Paradd Engineering Service, 284 Rte. 10, Dover, N.J. 07801.

FOR Sale: Unbound QSTs 1955 less Sept. 1958 through 1965, Unbound CQs, 1952 less August, 1953, 1954, 1955, 1956, less August; 1957 less Jan. and Feb., 1958 through 1965, excellent condition, \$2.50 for complete volumes, \$2.00 incomplete volumes. W2UPJ, 20 Asb Drive, Neptune, N.J. 07753.

SELL or trade: Stainless G-24 24-inch tower, 5/10/20 foot sections available. Good to 350 feet, \$3 ft. Need S-Line rcvr or xtr. Wanted: IRE/IEEE Professional Circuit Transactions. Advise nos, available and price desired. W4YHD, 6800 Hampshire Rd., McLean, Va. 22101.

SELLING: HT-37, \$225.00; SX-111, \$135.00. Both good condition. FOB Hartford, Conn. Hy-Gain Hy-Tower, \$50. Excellent condition. Cannot ship—you dismantle and pick up vicinity of New London, Conn. HRO, early model with 2.5-volt tubes. Very poor condition. Best offer, FOB Hartford, Conn. J. Huntoon, C/o ARRL, Newington, Conn.

GOING VHM: Viking II with HG-10 VFO, \$130; 75A1 with sprk, \$150; IM-11 SR plus other assorted goodies! K3FXB, 1927 Lincoln Ave., Wyomissing, Penna.

SELL: National 190 general coverage receiver in excellent condition, like new appearance, 100 kc. calibrator, speaker, \$125.00. D. Robinson, 501 Keystone Drive, New Kensington, Penna. 15068.

SELLING: Hallcrafters SSB/AM/CW kilowatt, SX-101 MK III, HT-32A, HT33, speaker, manuals. First certified check for \$650.00. Will deliver within 100 miles radius. Princeton YMCA Radio Club, K3PWW, 120 John Street, Princeton, N.J. 08540.

HEATH HW-12, HP-13 and HP-23 power supplies, cables, GH-12 mike, HS-24 sprk, Hustler antenna, Hy-Gain body mount and spring. All recently purchased new. Kits expertly assembled. Eveything unconditionally guaranteed perfect in every respect. Operated only few hours. Outstanding performance. Kits and antenna cost \$270.00. Sell for \$210.00. W. G. Blankenship, Jr., WA4GNW, 6709 Green Meadow Court, Louisville, Ky. 40207.

WASHINGTON D.C. area: Collins KWM-2, 516F-2, 30L-1, 312B-3, 189A-2. Mint condition, \$1295.00, K4LYW, 8114 Blairton Road, Springfield, Va. Tel: 451-2371.

B&W 6100 xmit freg. synthesizer controlled in exc. cond. \$375 or best offer, will throw in Dow-Kev relay, Marc Finckelstein, 610 W. 41st Ave. Bronx, N.Y. 10467.

FOR SALE QSTs 1930 to 1965. Excellent condition. Best offer, W4BK-N, 603 Bunkers Cove Road, Panama City, Florida 32401.

SELL: DX-40, \$35.00; SX-99, \$60.00. Certified check or money-order. You pay shipping. WA2MTI, 21 Napoleon St., Newark, N.J. Tel: MI-2-1805.

APACHE SB-10, \$200.00; RME DB-23 Presclector, \$35.00; Vibroplex Original, \$15.00; SX-99, \$40.00. For sale, William Sander, 2210 Pike St., Durham, N.C. 27707.

KNIGHT T-150 for sale. \$60.00. Excellent condition. Johnson T-R switch, \$18.00. Wayne Hall, W3PBO, 1400 Owens Road, S. E. Washington, D. C. 20021.

SEASON'S Greetings to all from "D.B." and Paul, W4UDQ and W4HHK-A4HHK, Box 430, Collierville, Tennessee 38017.

RTTY-Model 15 S/R machine, 14 TD, 14 typing reperf., AN/FGC1 converter, almost brand new w/spares. Not junkers. Excellent condition and now operating. All \$200 cash and carry. CE100V, \$400.00; CE-600L, \$175.00; both for \$500. 75A-4, \$375.00, in A-1 condition. Will ship. W8NLT, Mel Swillinger, Charleston, West Virginia 25304.

SPECIAL-Field Day Power \$39.50; Portable or Emergency. See our display ad on page 161. Interstate Electric.

SALE: Hammarlund HQ-110 with 24-hour clock, \$120.00. WA6PXG, 40 Laurel Ave., Millbrae, Calif. 94030.

WANTED: Obsolete tubes, de Forest spherical audion, Marconi, Weintent, Tefunken, Moorehead, Phillips, Brighton, Welsh, 798 E. K, 610 Monroe Ave., River Forest, Ill. 60305.

DRAKE 1B, \$170.00; 2BQ, \$25.00; HX-20, \$130.00; HR20, \$75.00; HP-10, \$25.00; HP-2, \$25.00. F. M. White, WA2JDW, 848 Broad St., Srewsbury, N.J. 07701.

FOR SALE: 75A-1, \$175.00; 32V, \$100; 30L-1, \$350.00; KWM-1 with 516F-1 AC supply, \$300. Collins CC carrying case, \$70. All in good condition. Cleaning house, W3VDA, P.O. Box 1333, Harrisburg, Penna. 17105.

COLLINS 75S-3/200 cycle filter, perfect, \$425.00; Hallcrafters HT-44 used one year, \$295.00; DX-20, good, \$22.00. Will ship prepaid in continental U.S.A. Larry Kaplan, 56 Carver Terrace, Yonkers, N.Y. 10710. Tel: 914-599-6636.

FOR SALE: Heath Seneca 6 and 2 Transmitter, plate modulated, in mint cond, \$150.00; Eico 730 Modulator, \$50.00; Hallcrafters SX-24, with sprk, \$40.00; Johnson Viking 6-2 converter, \$35.00; Clack 99'er, with mfg. manual, \$125.00, with 6 crystals, 6 meters wide spaced HI-Pr 6 meter beam \$15.00. H. Brown, K3TXB, Fairless Hills, Penna. Tel: 215-943-5786

6N2/Valliant, \$225.00. Srv. won't split. Will ship. HO-10, \$50.00. Firm, W0CUC, Cravaack, Box 1007, Sioux Falls, South Dakota 57101.

HAM TV. Toshiba 7038 Vidicon, \$5.00; RCA 7038 Grade C, \$10.00; Vidicon socket, \$2.00. 15.75 Kc crystals, \$14.00. RCA Image Orth 5820, \$10.00. W82GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, New Jersey 07012.

P&H Electronics Linear amplifier, Model LA-400C, \$150.00; Johnson Ranger II transmitter, \$175.00; Micro-Match Model No. 261, 262 (new), \$30.00; Vibroplex DeLux Bug key, chrome, \$15.00; Eico Signal Generator, wired, Model 315 (new), \$50.00; Squalo antenna (new), \$8.50. (Srv. no shipping on amplifier or transmitter). Cost plus postage on others. LA-7-8506 after 6 PM. Mrs. Herbert S. Willcox, 39 Woodbine St., Auburndale, Mass. 02166.

MUST Sell for college: Heath DX-60A, HR-10 with xtal calibrator, HG-10 VFO, HM-10A "tunnel dipper"; all still in kit form, opened only for inspection, plus IM-11 VTVM with HV probe, already built, \$200 or best reasonable offer takes all. (deal for beginner. K0FDZ, Lavern Wiig, 522 West Washington, Winterset, Iowa 50273.

MOVING Into apartment, must sell, like new SR-150, PS-150, 30L-1, Electro-Voice 729 SR mike, Robn 50 ft. foldover tower, Ham-M rotor, 4-element Hornet Triband beam, Telrex 80-40 inverted V, new fiberglass element quad, never been assembled. Complete set extra tubes. Waters Hybred Coupler, low-pass filter, Cesco SWR reflectometer, B&W antenna switching, field strength meter, 1 KW dummy load, RCA volt/hmyst. Everything guaranteed perfect and like-new. Will ship, with manuals, in original cartons. All for \$125.00. Will sell beautiful BR home, with ham equipment, \$18,500.00. Cvet over \$22,500. Send S&SE for photos. Also have insulo-graph, new, \$35.00. WA4LBY, 1112 Robmar Rd., Dunedin, Florida 33528.

DRAKE 2A, 2AC, 2AQ, SRL SB-175, V-10, PSA-63. All for \$250.00 or best offer, K9BWL, Box 43, Cedarburg, Wis.

COLLINS Station for sale: 75S-3B receiver w/500 cycle filter, 325-3 transmitter, 516-F2 power supply, 312-B4 station control. Station is one year old, mint condition, price: \$1200.00. W9-CFK, Porter Barnes, 2922 Muensterman, Evansville, Ind. Tel: 812-4259857, Evincins after 6 PM.

EXCELLENT Gonset G-50 six-meter transceiver, six crystals, 3 element Cush Craft beam, \$225.00; Hallcrafters SX-42, H-42 VFO, mike and crystals, 8 element Telrex boom, \$200. Heath HR-10, calibrator, speaker, \$60.00. Barry Altman, 601 Brightwater Court, Brooklyn, N.Y. 11235.

SALE: Mor-Gain 75/40/15 Novice special dipole antenna. Brand new, never unboxed, Regular \$25.00, only \$19.00. Tom Branton, Box 68, Dayton, Texas.

BACK Copies of QST from estate of W2ZSZ: Complete run from 1949 through 1964 (1950 missing), and 7 in 1965. All in xrlt cond. Best quote takes. Mrs. G. G. Reed, 21 Corbett Ave., Binghamton, N.Y.

FOR Sale or swap: APX-6, 1296 Mc. transceiver, clean, untouched, all intact. HQ-170AC, excit cond. BC-221F w/AC supply and cal. book. Make an offer. W1DEJ, 39-C Salmon Brook Dr., Glastonbury, Conn.

FOR Sale Or trade: G-E Co. mobile radio 2-channel telephone transmitter/receiver, equipped with 2-meter xtal, 146.94 Mc. Can also be used on marine frequency 156.3, 156.8 Mc. Complete with new control unit. Power and control cable. Shure mike 104B-104, Hy-Gain mobile antenna, G-E speaker and instruction manual. Watt: Collins 75S type recvr in trade, or \$375.00 in cash. WA3CBB, Box 93, Crescot, Penna.

SWAN 350 latest series still in warranty including 117XC power supply and 14X 12-volt module and cable. Like new. \$425.00. W. Dres, Box 273, Palos Heights, Illinois 60463.

DRAKE R-4 Receiver, 1 year old, little used. Carton, instruction book, extra crystals \$325.00. Will ship. L. E. Foltz, W4EG, Brownsburg, Ind. 46112.

WANTED: Heavy duty oil filled capacitors 2-100 mfd. at 250-6000V. Also need 25-30 Varicap, State price in your first letter. Bill Smitherman, WA4YFI, 2705 Riverside Dr., Knoxville, Tenn.

SACRIFICE SX-115 deluxe receiver, excellent condx, \$275.00 firm. Consider perfect HW-32 partial trade. Collins F455J31 filter, \$25. 12V car stereo tape player, all chrome, new, \$45.00. F455Z SSB filter, new, \$20.00. W4ETO, 13315-108th Ave. No., Seminole, Florida 33540.

HW-32 with AC power supply, both in excellent condition. \$130.00. K9TVC.

QUICK Sale: KWM-2: 30L-1, 312B5; 516A1; PM2; CC2. First certified check for package, \$1400; also HT-37, \$225.00; SX-111, \$125.00; SB-200, \$200; LA-400C, \$100; HW-12, \$110; HP-23, \$55.00; HP-13, \$35.00. All in perfect working condition. N6EJF.

NEED Money for college: Heathkit 20-meter Mono-Bander converted for Tri-Band operation with Dynalab modification kit. Excellent condition, \$150.00 or best offer. Marc Armstrong, WASGZC/5, Apartment 357, 316 Frye, Denton, Texas 76201.

SELL: 75A4 #3739 excellent condition, 3.1 and 1.5 Kc filters, \$395.00; HT-44 with matching a.c. supply, Little used, like new, \$295.00, BC-221C, a.c. supply and book, \$50.00, H. Taubin, W2GCW, 192-15A 69th Ave., Flushing 11365, N.Y. Tel: 454-2775.

FOR SALE: HT-46 Hallcrafters Transmitter in sealed carton, won as 2nd prize at the Foundation Hamfest, Best offer, W31DQJ, F. Gartrell, 281 Washington Road, Westminster, Maryland 21157. Phone 848-4028.

THOR VI by Clegg. Perfect condition, not a scratch. Excellent results, \$300 complete. Will deliver within 50 miles. WA3-AOF James, Unit 6434 Ardleigh St., Philadelphia, Penna. 19118.

HAMMARLUND HQ-170 AC, excellent condition, with noise immune amplifier, 20 meter speaker, \$250.00. W3ADAY, 1068 George Road, Meadowbrook, Philadelphia, Penna.

AMECO cns code oscillator, \$10.00; Knight MPZ adaptor, \$10.00; 70E8A PTO with dial, \$48.00, unused in original carton. Both prepaid Conn. BC221AH with book, \$33.00. W3AFM, 5800 Hillburne, Chevy Chase, MD. 20015.

FOR SALE: Assembled Heathkit "Shawnee" g-meter transceiver, HW-10, AC/D.C. mobile/fixd. Best offer, Mike Reiter, 58 Raleigh St., Rochester, N.Y.

COLLEGE Expenses: sell mint condition Eico 753 and AC supply in factory cartons, \$275.00. Will ship, Gerry Ladd, K4KAZ/1, 33 Bay State Road, Boston, Mass. 02215.

RITY Gear for sale. Model 14 TD, \$40.00; Model 14 receiving typing repurtorator, \$35.00. Very fine condition, Tom White, 10610 Royalwood Drive, Dallas, Texas.

SELL: 4X150's, \$4.50 each; 4CX250Bs, \$12.00 each; 4CX300As, \$16.00 each, many other types in my listing. Also have various panel meters at giveaway prices. Globe #303 90 watt all-band xmitr with extra 6146s, xtal, coax relay, all for \$28.00. S&S amp, 0.140y, Vtclac, \$3.00, send stamp for full listing. Samkofsky, 20 Eastern Parkway, Brooklyn N.Y. 11238.

SELL: HQ-170, \$200; Valliant I, \$175.00; HT-41, \$200; 933A tubes, etc. SASE for list. W8YHU, 921 South Woodside, North Canton, Ohio 44720.

FOR SALE: TX-1 and SB-10, \$195.00. Paul Werner, WA2BCP, 233 Cornelia St., Bonton, N.J. 07005.

FOR SALE: 2 el. 3-band quad Skyline with steel boom, Fibreglass arms, \$75.00. W2UGM, 66 Columbus Ave., Closter, N.J. Tel: 201-768-1884.

NEW And excellent reconditioned equipment at lower prices. Terms. Collins 75S-1, 75S-3, 75S-3B, 32S-3, 30L-1; Drake 2-B, R-4A Gonset GSB-101, G-50; Hallcrafters SX-101A, SX-117, HT-41, HT-32B, HT-37; Hammarlund HQ-110A, HQ-170A, HQ-180A; National NC-300, NC-303, NCX-3, NCX-5, NCL-2000, HRO-500. Much other equipment. Write for price lists. Henry Kadio Company, Butler, Missouri.

SELL SX-101, \$125.00; HT-37 mint condition, \$215.00; 70 ft. cranum tower, CDR TR-44 rotor, Triband antenna, \$100.00. W6DNQ, 492 S Anapaca St., Ventura, Calif. 805-463-8927.

SELL: Collins 32S-1 receiver, 75S1 transmitter, 516F2 power supply. Mint condition, low hours, \$675 firm. B. Green, W2-1PC, 51 Elmira St., Hicksville, N.Y. 11801.

HEATH HX-20, HR-20 matching power supplies HP-10, HP-20, mobile mount, with cables in good condition. Will ship collect: \$275.00. Jay Sims, 5537 Northern Hills, Tucson, Arizona.

WANTED: Power transformer 3600-0-3600 volts. 500 Ma. State specifications and physical dimensions. Bob Rutter, W5LGD, 4013 Cleveland Place, Metairie, Louisiana 70003.

EICO 723, 60 W.C.W., \$300.00; 25 W.H.B. Mod., \$15.00. Hallcrafters HA-5 VFO, \$40.00. Knight P-2 SWR/Power meter, \$8.00. WB2AEO, tel: 212-71-4518.

FIRST Certified check for \$100. (Buyer pays shipping) takes excellent 20-A and matching VFO and manuals. Lewis M. Ralston, 105 West Ann, Knoxville, Ill.

DX-60, \$50.00; Preselector, \$10; ARC-5, \$6.00; mobile rigs, 80m \$15.00; 10m, \$25.00; Select-O-Ject, \$10. WA3EWD, 407 Kerwin Rd., Silver Spring, Md. 2901.

SELL: Heath five-inch laboratory oscilloscope, Model 0-12. Little used, fine working order, \$40.00. Tunnel Dipper Model HM-10A, new, \$25.00; Ameco Nuviator preamp PV-144, new, \$9.00. All with manuals. WB2FGR, 786 Grand Terrace Ave., Baldwin, L.L., N.Y. 11510. Tel: BA3-0101.

WANTED: TA-33 Jr. or its equivalent. State age, condition specifications and best price. Carl Stecker, WN2ZCX, 1531 Deer Path, Mountainside, N.J. 07092.

HT-37. Purchased new in November 1961. Used only 1/2 hours. Logbooks since then. Immaculate in every way. Excellent reports on SSB, CW, AM, Firm at \$235.00, F.o.b. Kingston, N.Y. Original carton and manual. Lacey, WB2LZJ, RFD 1, Box 26, West Hurley, N.Y. 12491.

WANTED: National XCU-109 xtal calibr., NTS-3 speaker. W8-LX, 727 Floral Ave., Terrace Park, Ohio 45174.

SELL: Collins 75A-4 serial 3063 with manual, excellent condition; speaker, HT-32 transmitter; Electro-Voice 630 microphone; homebrew amplifier of 4-811A in parallel, rounded grid, built in prior supply, 10-15-20 meters. Pick up and take \$200 for \$800. Will entertain offers for each or all. Mrs. N. A. Beeton, Contact B. F. Fulton, K4NKK, 3308 Somerset St., Roanoke, Va. 24014.

KWM-2 and PM-2 power supply. In exclnt condx. Serial 15026. Waters notch/filter, \$800.00. Kelsie E. Lawrence, W4GED, 212 N.E. 3rd St., Satellite Beach, Fla. Phone 305-626-1939.

APACHE For sale. Excellent condition. Make offer. WB2VZU, Lawrence Scott, 17 Rainbow Drive, Hauppauge, L.I., New York 11788. Telephone 516-ANS-6929.

OOPS! Price of 100V immaculate in my November ad misprinted! Should be \$350.00 and not \$35.00. Bert Griffin, W2-MJA, 131 Hillcrest Dr., Wayne, N.J. 07470. Tel: 694-2281.

RADIO Operator, with Second Class FCC Telegraph Lic., needs only five months on an American vessel or ocean-going tugboat to endorse license, any help or leads will be appreciated. Write: Edie Halkitts, 511 Hawkins Rd. E., Selden, L.I., New York, N.Y. or phone 516-732-1929.

FOR Sale: 23 Acre ranch home of W6FPQ, 3 BR, 2BA large radio room with or without radio rec, and xmt; 40 ft tower, 30 and 10, Rwy nr town. Write Mike J. Fulmris, W6FPQ, Rte. 2, Box 759, Delano, California 93215.

SELL: NC-303 with calibrator, \$225.00. Collins 516E-1, \$75.00. Want clean HRO-60 with extra coils and accessories. Clark, 1030-20th, West Des Moines, Iowa.

DRAKE 2B plus calibrator, spkr/O-mult., xtals, \$215.00. Heath HX-20 SSB VFO 80-10 exciter plus HP-23AC, \$145.00. Manuals. Working perfectly. Cordiolit, 18071 Norwood, Tustin, Calif.

MAGAZINE Collection: QSTs 1940-1966; CQ 1949-1966. Many other ham and electronic publications. For sale, all or part. List available. W6NSS, 1962 Stearns Drive, L.A., Calif. 90034.

FOR Sale: HT-44 with P150AC, \$275.00; SX-117, \$250.00; SRE linear SB1LA, \$135.00. All are in excellent condition. WB2AUB, 72 Morewood Oaks, Port Washington, N.Y. or call 516-767-8078.

FOR Sale: Gordon rotor and indicator in gud condx with 75 ft. cable, \$250.00 or you make offer. Prefer to deliver within Ohio or to nearby state due to size. W8YNH, 3759 Crestwood, Canton, Ohio 44708.

SWAN-350, SW-512-DC supply, SW-117-VAC supply, Hallcrafters R-47 mobile speaker, Shure mike Model 40MC, NTC, baseball spring assembly (stainless). New-Tronics Mast MO-1, New-Tronics resonator RM-20, in exclnt condx. \$500.00. H. A. Friedsam, WA4OPY, P.O. Box 337, Ellwood City, Penna. 16117.

TA-33 JR beam, AR-22 rotator, 10 ft. triangular tower, low-pitch saxophone. Must sell; Reasonable. WA2SKA, 1361 E. 17th St., Brooklyn, N.Y. 11230 Call after 6 PM Tel: 212-DE9-0349.

HAM TV, Pair ATJ/ATK converted TV cameras with power supplies Pick-up deal. Make any offer. Reiss, RFD 1, Storrs, Conn.

CRYSTALS Airmailed: SSB, Nets, MARS, Novice, Marine, etc. Custom finished etch stabilized F12-43 .01% any kilocycle or fraction, 3500 to 8600 \$1.90. (Five or more same or mixed frequencies \$1.70) (Nets: Ten or more same frequency \$1.35) (1700 to 3499 and 8601 to 20,000 \$2.50). Overtones supplied above 10,000. 10 to 13,500 fundamentals \$2.95. Add \$0.45 each for .005%. HC-6/u metal miniatures above 2000 add 75¢ each. Crystal kits for most ARRL and other projects including "IMP", "SSB Package" and SSB Filter, mixer, oscillator, etc. Tell us your needs. Write for order-bulletin. Crystals since 1933. 106/crystal airmail return, 5¢ surface. C-W Crystals, Marshfield, Missouri 65706.

PRINTED Circuit Boards custom designed and processed to your diagram or layout. New timed process protects board from corrosion and gives good solderability. Send us your circuit for price and delivery time. Printed Circuit Design and Processing, 714 Walnut St., Rte. 3, Albertville, Alabama 35950.

ANTENNA Rotor AR-22 and/or Finco A-62 6&2 mtr. beam. Both excellent. Cheap. WB2OOK, 1129 Astor Avenue, Bronx, N.Y. 10469.

FOR Sale: Gonset Communicator III, 6 meter. With Turner 350 PTT microphone and three xtals, 50.18, 50.64, 51.30 Mc. No instruction book. \$100. Thomas Johas, W0BKV, 1622 High-ridge Circle, Columbia, Mo. 65201.

JOHNSON Viking Ranger, in exc. condx, \$130.00. Offers? First model with 11 meter band. Hale Anderson, 1821 Walnut, Cedar Falls, Iowa.

INCENTIVE Licensing? You need Post-Check, Amateur Extra and General Class FCC type exams, complete in detail and style, even to the IBM type answer sheets. A very good aid to learning and a Must in Preparation for FCC Amateur exams. General Post-Check consists of 297 questions and explained answers for only \$2.98. Extra Class, 115 questions and diagrams with explained answers, \$2.00. 139 questions of the 297 in the General Post-Check apply directly to Extra Class also. Get both for only \$4.50 postpaid. Post-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50222.

WANTED: B&W 51 SB or Heath SB-10. Sale or trade QSTs 1947-1948, September thru September 1966. W8DCB, Archibald Graham, 6275 Collesceve Pl, Cincinnati, Ohio 45224. Tel: 513-541-6456.

COLLINS 75S1 with Waters rejection tuning, \$320.00; 32S-1, \$320.00; 30S-1, Collins factory rebuilt with new 4CX1000, \$875.00. WA2FVX, Jack Grayson, Le Roy, N.Y. 14482. Phone 716-967-6134.

SELL: SX-96 receiver, good condition, \$105.00. WA7BVM, Wes Nielson, 2200 South 10th, Caldwell, Idaho 83605.

75A-4 in A-1 condition. Vernie knob, 3 Kc-500 cycle filters, \$350.00. New Allinger I:1 Q-tran balun, \$7.50. Al Wells, W8OPA, 3820 Elsmere, Cincinnati, Ohio 45212.

DRAKE 2B, mint, \$180.00; Beautiful Globe King 400B, \$125.00; Handbook key, \$15.00; Collis F-250A 85 mechanical filter, \$10.00; new IP-69C Panadaptor, \$20.00. K6JLM, 835 Valencia St., S.F. Calif. Tel: 415-282-3200.

FOR Sale: Drake 2B receiver, \$160.00; HP VTVM 400D, \$95.99; 12 VDC mobile transistor P/S, \$30.00. Other new items, meters, transformers, etc. F. Williams, 611 Cedar Lane, Teaneck, N.J.

THOR 6 six-meter transceiver with both AC and DC P/A, 60 watts, \$250.00. Will swap for 20 meter SSB gear. Yorktown Heights, N.Y. Tel: 914-245-4120.

SWAN 350, 19 months old, factory updated and aligned in August. 117-C power supply. Turner 90D microphone. Like new condx. \$400. WA1BMA, Buddy Grace, Box 207, Sudbury, Mass.

PRINTED Circuit Board, 2" square inch, Epoxy Fiberglass. (Details? Sample 10¢. Reiss, RFD 1, Storrs, Conn.)

FOR Sale: Collins 75S-1 receiver, 32S-1 transmitter and 516F-2 power supply, all for \$600.00. Linear with two 4-250s, \$100.00; Gonset G-50, \$200.00. Philip Will, W8HPB, 30 West St. Canal, Winchester, Ohio.

SELL: Hallcrafters SX-122 receiver \$180.00; National HFS 27 to 250 Mc receiver, \$85.00; 32V-2 with Collins NBFM modulator, \$100.00; LLM14 and BC-221 freq. meters, original cal. book, AC supplies, \$60.00 each; Johnson speed burr, \$10.00. All items in excellent condition and FOB Norfolk, Earl Crews, W4DBH, 2522 Shafter St., Norfolk, Va. Tel: 853-4903.

METERS Galore! A whole slew of high-quality meters at giveaway prices. A bunch of other stuff, too. Please send stamped addressed envelope for list. R. L. Baldwin, 26 Ridge Road, Simsbury, Conn.

SELL: Drake DC-3 mobile power supply for TR-3 or TR-4, Hustler mobile antenna with resonators for 20, 40, and 80, plus chain mount, mobile mike and speaker, all for \$120.00. K2KER, Box 147, RD #1, Colts Neck, N.J. 07722, 201-946-4225.

DRAFTED! Must sell: Collins 75S-1, \$275.00; Knight T-60, \$5.00; Giotto VFO deluxe, \$40.00; 10-mtr. beam, \$15.00; rotor, \$10.00. Will stocked with AC and measuring. Will deliver within 100 miles radius. Bill Pigott, WA0QO, 23129 Wachusett Road, Edmonds, Washington, Phone (206)542-4812.

HO-100 AC, \$80; DX-100, \$70; HR-45R with halo and 5 element beam, \$70; homebrew modulator, \$20.00; ID-60 APA Panadaptor with supply, \$30. Need cash. Make offer. WA2GZW, Whitney Point, N.Y.

VFO Hallcrafters HA-5 in new condx. Make an offer. W1KBO, Towdy, 52 Washington, Stoneham, Mass.

FOR Sale: Hammarlund HQ-110C, good condition. \$120. Bill Geiger, c/o Radio Station WAGE, Leesburg, Va.

SELL: SX-101A rcvr, good condx, \$125.00 plus T-60 xmt, \$25.00. Will separate. Dan Parrilli, WN9FSU, 3533 S. Emerald, Chicago, Ill. 60609.

NCX-5 Mark II and NCL-2000 in factory sealed cartons. New, \$1000. AC supply, \$95.00. K7HYZ, N. 308 Locust, Spokane, Washington.

COMPLETE! Novice station: DX-60, \$50.00. Twoer, \$35.00; Lafayette HA-230, \$50.00. Whole works for \$125.00. You ship. WA1FSK, Box 256, Ivorvton, Conn. 06442.

TR-4, \$480.00; AC-4, \$83.00; DC-3, \$123.00; R-4A, \$330.00; T-4X, \$330.00; MS-4, \$17.50; RV-4, \$83.00; factory-sealed boxes, warranted. Sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C.

SELL: HQ-180C rcvr, 1 year old, \$300.00. Mainline T/TI RTTY converter, \$125.00; Collins 310B, \$100.00; Model 14 typing report, with power supply, 14 TD with sync motor, both for \$90.00. HT-31, has paractics, \$50.00. Roy Norris, 101 Reeb St., Apt. 11, Auburn, Ala. Tel: 887-9850. After Dec. 15th, 1006 Euclid Ave., B'ham, Alabama.

432 Mc Converter! Convert from 432 Mc. to 7-30 Mc. Removed from missile guidance systems; size 2" x 3" x 3/4", complete with instructions, less crystal. Unused, \$2.95 each. We pay postage on prepaid order. C.O.D. sent \$2.00 with order. Send stamped addressed envelope for list. Alpha-Tronics, Dept. B., P.O. Box 31127, Aurora, Colo.

# Ham QUEST '67



Centuries ago the knight in shining armor sallied forth on various quests—to find the Holy Grail, to rescue a maiden in distress, to slay the fiery dragon.

Today, the League and several hundred local radio clubs have started out on a quest, too, to reach out for the 100,000 or so amateurs who are not affiliated with a local club or the League. We need the added strength these amateurs will bring to our fraternity, and these amateurs need the services, fraternalism and idea exchange provided by ARRL and club membership.

If you're a club member, and your club is not already embarked on HamQuest 67, you should request a club promotion kit from HamQuest 67, ARRL, Newington, Conn. 06111. Individual members and the club alike can earn prizes as they add members to the club and the League rosters.

And if you're not a club member, why not make it a point to drop in at the next meeting and see for yourself what it has to offer?

**ARRL membership with QST \$5, \$5.25 in Canada, \$6 elsewhere. Additional family members at the same U.S. or Canadian address, \$1.**

**THE AMERICAN RADIO RELAY LEAGUE, Inc.**  
NEWINGTON, CONNECTICUT 06111

HR-10 Receiver, \$65.00; Globe HG-303 transmitter, \$30.00; (Globe V-10) VFO, \$30.00. Separately or complete station, \$110.00. Tom Benewicz, WA2OBT, 11 Montrose, Allendale, N.J.  
FOR Sale: In excellent condition: Drake Model 2-B receiver, Drake Model 2-BO "O" Multiplier; Johnson Viking Adventurer transmitter with key and 40M-80M crystals. All for \$350.00. Will sell separately. Write Wayne Banks, 1207 Loch Lomand, Ct., Richmond, Va. 23221.

CODAX Automatic keyer. Used 30 hours. With mercury batteries and new spare red relay capsule, \$55.00. Bob Norloff, W4GFX/2, Box 164, Southampton, N.Y. 11968.

T-150, R-100 and all accessories for \$140.00 plus post. Has Worked All States and 31 countries. WB6PDP, Box 396, Scotia, Calif. 95565.

SELL: HT-37, excellent electrically, mechanically and in appearance. It didn't sell for \$245.00. Would you believe \$220.00?? F.o.b. Tucson, Arizona 85708. K7ZYK, 5815 Alexander St.

SELL: Collins 32V2, in excellent condition, with low-pass filter, TVI suppressed, mike, \$140.00. National HR050T1 band spread, general coverage coils. Matching speaker, \$160.00. A Levy, 139 Block Blvd., Massapequa, L.I., N.Y. Tel: PY8-8380.

HT-33B 2 Kw linear with final, \$395.00. HA1-70 keyer and Vibro-Keyer, \$65.00. Webster Bandspanner 36" base, \$18.00. Bill Jessee, W4GMM, Box 371, Lebanon, Virginia 24266.

NEED Money for flying. Sell Drake 2B, 2BO speaker, Ranger 1, Gonsel 201, Best offer. All guaranteed mint. K9RGH, 9600 S.W. Highway, Oaklawn, Ill. 60453.

COLLINS 32V3, spare 4D32 PA tube, homebrew SSB adapter, needs some work, \$150.00; DX-100, \$80.00; Regency ATC-1 hamband converter, \$25.00. Ted Shelly, KØDDB, Box 160, Manchester, Iowa.

SELL: HT-37, new condx, with manual, \$250.00. Roland Crider, K9VCM, RR #2, Culver, Ind. Tel: 842-3019.

TELEVISION Experimenters, used 5820 image orthicons, used 500 to 800 hours; what have you to swap? Cash price \$30.00. Carlton Scharf, W9QYH, 1605 Ridge Road, Green Bay, Wis.

SX-117 for sale, new tubes, w/tvce cables; worked 167 DX, 1 yr. old. \$250.00. Joe Poston, K9GCE, 309 Benton Dr., Indianapolis, Ind. 46227, Tel: 317-881-9771.

HEATH HR-20 SSB rcvr, \$105.00; Cheyenne xmtr, \$52.00, UT-1 P/S, \$12.00. All \$150. DX-100, perfect, \$85.00. K2ORN, 2536 River Road, Manasquan, N.J. 08736

FOR Sale: Viking Navigator, 6N2, Courier factory-wired, Viking VFO and Heath VFO. WØTEM/4, Box 248, Waxhaw, N.C.

SELL: Heathkit HW-32, \$120.00; Heathkit VHF-1 Seneca, \$150.00. W9JEO, RFD #2, Box 82, Toulon, Ill.

SELLING NCX-3 transceiver AC/DC power supply, \$300.00. Mike Mavor, 561 Van Duzer, Staten Island 10304.

SELL: Four 4/400A \$100.00 each; two of them new surplus. W6GMC, zip 91016.

SELL: DX-100, \$60; HE-80, \$50.00, W8GDC, 561 Elizabeth, Columbus, Ohio 43213.

B&W5100 transmitter, 6146Bs, final. No modifications, except professionally det. TVI. Original owner. Spotless, perfect work-in-condition. All bands, phone and c.w. Set spare tubes, including 6146s. Also Astatic #D-104 mike (new condx). All for \$189.00, cash & carry. George M. Clark, W2JBL, 123 Davis Ave., Hackensack, N.J. 07601.

RME 6900 rcvr with matching speaker, \$150.00; Ameco 6 mtr. Navistar converter with power supply, \$30.00. Home brew Novice transmitter, \$10.00. Home brew keyer, \$10.00 (electronic). No trades, please! W8ZGV, Harvey Lawrence, RD #2, Bath, N.Y. 14810. Phone PR6-6203.

FOR Sale: HQ-170A, w/s, \$260.00; HT-37, \$245.00; HA-10, \$110.00. Sorely, can't ship. All in excellent condx. Going trans-active. W3YPI, 104 Johns Ave., Gettysburg, Penna. 17325.

FOR Sale: Clegg 99'er, in good shape; \$95.00, including home brew mobile runat. Stan Israel, WA2BAH/1, 21 Hartford Avenue, Apartment 16, Newington, Conn. Connecticut 06111. Tel: 1-203-666-3250.

"HOSS-TRADER" Ed Moory says stop inflation at all costs: Down go prices on new equipment factory warranty display models. New Galaxy V transceiver and power supply, regular price, \$499.95. Cash price, \$399.95. Package deal, new Swan 350 and 117-KC supply and speaker, regular price \$515.00, cash price: \$429.95. SB-14, regular price, \$395.00, cash price: \$339.00. TR-4, \$489.00. -4X, \$339.00. R-4A, \$338.00; new NCX-5, \$685.00; cash price, \$479.00; NCL-2000, \$539.00; 32S-3, \$599.00; 75S-3B, \$499.00; 30L-1 factory warranty, \$439.00; new Mosley TA-33 beam and Ham-M rotor, \$184.95. Reconditioned gear: TR-3, \$369.00; HT-37, \$189.00; 2-B, \$179.00, SX-101A, \$179.00; TR-3, \$239.00; KVM-2, \$349.00. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone 946-2820 and ask for "Charlotte" or "Ed".

SB-300, SSB and AM filters, \$225.00, HO-10, \$60.00, WØRSK, 2300 South 4th Avenue, Sioux Falls, South Dakota 57105.

ANTIQUES: Very old, in good condition, horn skrs; loose couplers; xtal detectors; rcvrs; tubes, etc. Will sell or swap for modern equipment for my first rig. Perry Mercurio, Kingfield, Maine 04947.

FOR Sale: Telrex Triband Model TB-74, in excellent condition, complete with spec sheets, priced to sell. 100 feet CPH Ampheol RR-8/4, \$8.00. Jack R. Hildreth, 1 Stonehill Drive, Stoneham, Mass. Tel: 438-0755.

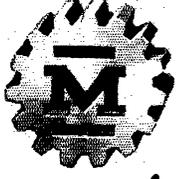
FOR Sale: Johnson Ranger, like new, Eico 720 in good condition; BC-348 good condition, and R-174, QRR receiver with power supply, for \$12.24, and 110 volt supply. All for \$175.00. WA5EZE, 2020 5th, Apt. 42, Lubbock, Texas.

SELL: Never used: Hy-Gain BN-12 balun coil, \$11.00. WA3-EIZ, 5200 Talbot Place, Baltimore, Md.

URGENT! Need to borrow 30' parabolic reflector for microwave mobile experiment. Craig McClellan, W6BNFX, 6301 W. 78th St., Los Angeles, California 90045. 213-670-0607.

HEATH HW-12 with Dynalab Triband conversion. Like new, will ship prepaid in original carton. \$125.00. WASLBC, 104 Palm Dr., Marlin, Texas 76661.

Designed for



Application



90672

**The No. 90672  
ANTENNA BRIDGE**

The Millen 90672 Antenna Bridge is an accurate and sensitive bridge for measuring impedance in the range of 5 to 500 ohms at radio frequencies up to 200 mc. It is entirely different in basic design from previous devices offered for this type service inasmuch as it employs no variable resistors of any sort. The variable element is an especially designed differential variable capacitor capable of high accuracy and permanency of calibration over a wide range of frequencies. A grid dip meter such as the Millen 90651 may be used as the source of RF signal. The bridge may be used to measure antenna radiation resistance, antenna resonance, transmission line impedance, standing wave ratio, receiver input impedance and many other radio frequency impedances. By means of the antenna bridge, an antenna matching unit may be adjusted so as to provide the minimum standing wave ratio on the radiation system at all frequencies.

**JAMES MILLEN  
MFG. CO., INC.**

MAIN OFFICE AND FACTORY  
**MALDEN  
MASSACHUSETTS**



**Index of Advertisers**

Adirondack Radio Supply.....	154
Alltronic-Howard Co.....	158
Amateur Electronic Supply.....	151
AMECO Subsidiary of Aerotron, Inc.....	5
American Radio Relay League, Inc.....	130, 167
<i>QST</i> .....	110
<i>Binders</i> .....	141
<i>Gateway</i> .....	159
<i>Membership</i> .....	118, 119
<i>Operating Manual</i> .....	160
<i>Publications</i> .....	150
Apollo Engraving.....	147
Arrow Electronics, Inc.....	136
Barry Electronics.....	139
Belden Manufacturing Co.....	148
Bookhinder Publishing Co.....	157
British Radio Electronics, Ltd. (Eddystone).....	142
Budwig Manufacturing Co.....	116
Cleveland Institute of Electronics.....	161
Collins Radio Co.....	146
Comdel, Inc.....	125
Communication Associates.....	150
Communication Products Co.....	153
Cush Craft.....	145
Dahl Co., Peter W.....	165
Damec Co., Theodore E.....	189
Davco Electronics, Inc.....	159
DenMan Systems.....	140
DPZ Corp.....	127, 157
Drake Co., R. L.....	146
DuPage FM.....	117
EICO Electronic Instrument Co.....	115
EIMAC a division of varian.....	153
Electro-Voice, Inc.....	153
Electronic House.....	140
Electrophysics Corp.....	144
Evans Radio.....	126
E-Z Mobile Antenna Mount, Inc.....	156
E-Z Way Products, Inc.....	157
Fugle Labs.....	113
Gain, Inc.....	153
Galaxy Electronics.....	157
Gentec, Inc.....	133
Gift Shop.....	121
Gonsel Div.....	158
Gotham.....	1
Grand Central Radio, Inc.....	156, 159
Hallerstatters Co., The.....	170
Ham Kits.....	105, 111
Harrison Radio.....	108, 107
Heath Co., The.....	159
Henry Radio Stores.....	161
Hotel Beachcomber.....	148
Hunter Sales, Inc.....	137
Instructograph Co., Inc.....	161
International Crystal Manufacturing Co., Inc.....	158
Interstar Corp.....	155
Interstate Electric.....	135
Jan Crystals.....	132
Kahn Research Labs., Inc.....	150
Kirk Electronics.....	152
Kolson Joyeros, Inc.....	154
Lampkin Labs., Inc.....	152
Lattin Radio Labs.....	154
Lockheed Missiles & Space Co.....	152
Marlin Amateur Radio Supply.....	168
Millen Manufacturing Co., Inc. James.....	142
Miller Co., J. W.....	112
Mini-Products, Inc.....	159
Mor-Gain.....	Cov. III
National Radio Co., Inc.....	124
National Radio Institute.....	158
National Tuberculosis Association.....	145
Poly Paks.....	134
Radio Amateur Callbook, Inc.....	148
Radio Publications, Inc.....	Cov. IV
RCA Electronic Components & Devices.....	114
Rohn Manufacturing Co.....	152
Saleh & Co., Herbert.....	138
Saroc.....	4
Sideband Engineers, Inc.....	120
Sierra Philco.....	143
Skylane Products.....	158
Smith, Douglas A.....	158
Sommerkamp Electronic GMBH.....	150
Sound History Recording.....	160
Space Electronics.....	155
Squire-Sanders, Inc.....	123
Swan Electronics Corp.....	131
Sylvania Electric Products, Inc.....	154, 160
Telrex Communication Engineering Labs.....	122
Tri-Ex Tower Corp.....	149
Trigger Electronics.....	161
Unadilla Radiation Products.....	146
United Bronze Co.....	146
United Transformer Co.....	Cov. II
U. S. Savings Bonds.....	129
Van Sickle Radio Supply Co.....	161
Vanguard Electronic Labs.....	108, 109
Vibroplex Co., Inc., The.....	142
Waters Manufacturing Co.....	143
Webster Manufacturing.....	128
Weitzner, Inc., M.....	160



## ***THE RECEIVER THAT PERFORMS THE WAY YOU EXPECT A RECEIVER TO PERFORM***

### **FEATURES:**

- Complete ham-band coverage 80-10 meters and portion of 6 meters
- Standard-equipment 9.5-10.5 Mc band provides WWV and 31 meter SWL band
- Three-position selectivity for optimum fidelity and QRM rejection
- Ultra-sharp CW filter
- Crystal-controlled BFO; separate AM and Product detectors; AF and RF gain controls
- Full AGC with selectable decay time; S-Meter; illuminated dial
- Fly-wheel tuning drive with high-ratio split gears; direct calibration on all bands
- Tunable rejection notch filter; extremely effective noise limiter
- Transmitter type VFO; crystal controlled first oscillator; built in crystal calibrator
- Low power consumption, permitting 12V battery operation when desired; AC supply available
- Full transistorization, diode selectivity switching, plug-in module construction, highest quality components
- Rugged, stable extruded aluminum chassis for extreme stability; textured grey metal cabinet; **FULLY GUARANTEED**

## **THE DAVCO DR-30**

*Get the receiver that does the job!  
Feature for feature the DR-30 is your best buy.*

### **HERE'S WHY:**

- *All solid-state featuring Field-Effect transistors in RF stages*
- *Most compact receiver on the market today but big enough to do the job*
- *Makes overloading and cross-modulation a thing of the past*
- *Unbelievable sensitivity — really pulls in the weak ones*
- *Contains all of the features you want at a price that's right*

All of the advanced capabilities ever wanted in a receiver are now available at a price within the range of every serious amateur. The all-transistorized Davco DR-30 is a compact (4" H X 7 1/4" W X 6" D) amateur-engineered receiver designed to provide exceptional performance under extreme environmental operating conditions. Sensitivity you won't believe, superior image rejection and extreme freedom from cross-modulation and overloading on strong signals are only a few of the reasons why the DR-30 is the receiver that does the job! Ask the ham who is using one now, check the many features included at no extra cost and you'll discover why the Davco DR-30 should also be your receiver. Many professional and commercial users have already discovered for themselves.

**DAVCO DR-30 \$389.50**

# **DAVCO**

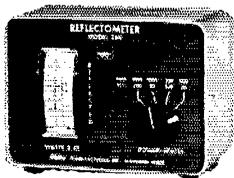
*For further information and illustrated brochure, write:*

**DAVCO ELECTRONICS, INC.**  
P.O. Box 2677, 2024 S. Monroe St.,  
Tallahassee, Florida 32304

# HARRISON ..... makes it so easy for you to give or get!



## Waters REFLECTOMETER



New Reflectometer with unique dial indicator reads both forward and reflected power on every transmission. Two separately set forward scales of 200 and 1000 watts (20 and 200 watts reflected) insure accurate reading. VSWR determined from reference chart. Comes complete with Directional Coupler.

Model 369 ..... \$120.

## MILLEN GRID DIP METER

Compact and completely self-contained. "Transformer" type AC supply. Frequency coverage: 1.7 mc to 300 mc. (Additional coils available to extend range to 220 kc.) Can be battery operated. Complete with carrying case. The "Old Reliable"!

Model 90651 ..... \$68.85

## MILLEN TRANSMATCH

Allows transmitter to work into 50 ohm unbalanced, for which it was designed. Converts multi-band antenna to 50 ohms between 3.5 mc and 29.7 mc. Matches 10 to 500 ohm unbalanced loads. Handles a KW.

Model 92200 ..... \$129.00

## Waters CODAX™ AUTOMATIC KEYS

Now . . . rhythm-smooth automatic CW — never anything like it! Feather touch double paddle with fully automatic spacing and timing from 5 to 50 WPM. 1500 cycle output can plug into mike jack to work USB, LSB or AM. Solid state circuitry with sealed "Reed" relay. Monitors own signal.

Model 361 ..... \$92.50

## HALLICRAFTER "T.O." KEYS

Smooth, precise CW transmission. Dots and dashes are self-completing and perfectly spaced. Calibrated for 10-25, 20-45, and 30-65 WPM ranges. Features include sidetone monitor, speaker, headphone jack, mercury-wetted keying relay.

Model HA-1 ..... \$79.95

## VIBROPLEX TRANSMITTING KEYS

### Super-Deluxe "PRESENTATION"

24-K gold plated base top. Super speed control main spring. Adjusts instantly to any speed. Red switch knob, finger and thumb piece. Jewelled bearings.

"Presentation" ..... \$39.95

Vibroplex "VIBRO-KEYER" .. \$18.95

"CHAMPION" Standard base—chromium finished top parts .. \$19.95

"ORIGINAL" Standard base ..... \$24.95

Deluxe, chrome base ..... \$29.95

"BLUE RACER" Similar to "Original" but just half its size .... \$24.95

Harrison is the shortest distance between two points — you, and the gift you want to give or get for Christmas. Here, at "Ham Headquarters, U.S.A." you'll find every item and service to make shopping easy for every ham and tyro alike.

73 *Bill Harrison* W2AVA

## Superex Combination

### HEADPHONE and BOOM MICROPHONE



High impedance Model AP-S dual headphones and high output (-50 db) ceramic mike. Complete with shielded cable and plug.

Model AP-SMB with dual headphones \$35.95

Model AP-SS-MB with single phone .. \$26.95

Model AP-S — headphones only .... \$24.95

## MORE "GOODIES" for GOOD HAMS!

ARRL RADIO AMATEUR HANDBOOK ..... \$ 4.00

RADIO AMATEUR CALL BOOKS,

U.S. and Foreign.

Both sent postpaid for ..... \$ 9.90

EDITORS & ENGINEERS RADIO HANDBOOK \$ 9.50

FANON-MASCO 2-STATION INTERCOM

Mod. EC-2 ..... \$ 9.95

PENWOOD 24-HOUR JUMP CLOCK ..... \$15.00

ARRL VHF RADIO HANDBOOK ..... \$ 2.00

WATERS "PROTAX" AUTOMATIC

GROUNDING ANTENNA SWITCHES

Mod. 375 (radial connectors) ..... \$13.95

Mod. 376 (rear connectors) ..... \$12.50

HARRISON RADIO OPERATORS

WORLD REFERENCE MAP

Postpaid folded ..... \$ 2.00

Postpaid in mailing tube ..... \$ 2.50

MONARCH VOM (20,000 ohm dc;

10,000 ohm ac.) MT200 ..... \$12.90

ASTATIC D104 MICROPHONE & PTT STAND \$30.72

CDR-TR44A ROTATOR ..... \$64.95

CESCO CM52 REFLECTOMETER ..... \$29.95

SIMPSON 260-5 VOM TESTER ..... \$55.00

HY-GAIN 18TD TAPE DIPOLE ..... \$69.95

BROWN CTL COMBINATION KEY ..... \$18.95

BROWN TWIN LEVER KEY ..... \$14.95

Mail orders carefully and promptly filled.

# HARRISON

225 Greenwich Street, New York, N.Y. 10007

(212) BA 7-7922

Long Islanders! Visitors!

Jamaica Store: 139-20 Hillside Avenue

(516) RE 9-4101

Index to Volume L—1966

**ANTENNAS AND TRANSMISSION LINES**

Antenna, The Conical Monopole (Pappenfus) . . . . . 21, Nov.  
 Antennas, Predicting the Sag in Long-Wire (Elenko, Jr.) . . . . . 57, Jan.  
 Arrays for 50 and 141 Mc., Building Your Own (Tilton) . . . . . 33, Oct.  
 Balanced & Unbalanced Lines, A Transmatch For (McCoy) . . . . . 38, Oct.  
 Beams for 50 and 144 Mc., Portable (Tilton) . . . . . 32, Jan.  
 Boom Drilling Aids (H&K) . . . . . 75, June  
 Coax, Low Loss (Desmond and Tuttle) . . . . . 15, Dec.  
 Filter, An Effective Low-Pass (Welsh) . . . . . 16, Jan.  
 Ham-M Rotator with long control lines, Using the (H&K) . . . . . 84, Sept.  
 Heath S.W.R. Meter, Building a Transmatch into the (Perera) . . . . . 20, Jan.  
 Keeping Feedlines Untangled (H&K) . . . . . 66, July  
 L Networks for Reactive Loads (Gordon) . . . . . 30, Sept.  
 Lazy-H Antenna, A V.H.F. (Gim. & (iad.) . . . . . 34, Dec.  
 Mobile Antenna, A Neat 50-Mc. (Tilton) . . . . . 14, May  
 Nonconductive Guys (Hamlin) . . . . . 28, May  
 Feedback . . . . . 99, Nov.  
 Open-Wire Line Spacers (H&K) . . . . . 45, Mar.  
 Station Design For DX (Rockwell)  
 Part I — Antenna Topics & Siting . . . . . 50, Sept.  
 Smith-Chart Calculations for the Radio Amateur (Hall)  
 Part I — Graphical Solutions of Transmission-Line Problems . . . . . 22, Jan.  
 Feedback . . . . . 76, Mar.; 10 June  
 Part II — Determining Actual Antenna Impedances. Feedback . . . . . 30, Feb.  
 76, Mar.  
 Telescoping Mast, A Mark II (Corgiat) . . . . . 96, Apr.  
 Tower Support, Inexpensive (H&K) . . . . . 74, June  
 Transmission Lines as Circuit Elements, A Review of (Jensby) . . . . . 34, Nov.  
 Two-Element Beam for 15, A (McCoy) . . . . . 41, Sept.  
 Varimatcher, The (DeMaw) . . . . . 11, May  
 Yagi Arrays for 432 Mc. (Tilton) . . . . . 19, Apr.  
 Yagi vs. Quad (Pitz) . . . . . 20, Oct.  
 "Zepp", Center-Fed for 80 and 40 (Gann) . . . . . 15, May  
 15-Meter Openings?, Novices—Are You Ready for (McCoy) . . . . . 34, Mar.

**AUDIO-FREQUENCY EQUIPMENT AND DESIGN**

Audio Limiter for C.W. (H&K) . . . . . 70, Feb.  
 CQ Machine for Voice, An Automatic (Taylor) . . . . . 75, Mar.  
 Filter Design, An Amateur Application of Modern (Wetherhold) . . . . . 14, July  
 Limiter, A Passive (Schleicher) . . . . . 22, Dec.  
 RTTY Filters, High-Performance (Hoff)  
 Part I — Improved Designs for Better Reception . . . . . 16, Aug.  
 Part II — High-Performance RTTY Filters . . . . . 34, Sept.  
 Selectroid, The (McCoy) . . . . . 18, Dec.  
 Station Control, Some Thoughts On (Blakeslee) . . . . . 27, Jan.  
 25 to 25,000 Cycles (Lange) . . . . . 30, July  
 Universal Modulator, 50 Watts (De Maw) . . . . . 25, Dec.

**BEGINNER AND NOVICE**

Balanced & Unbalanced Lines, A Transmatch for (McCoy) . . . . . 38, Oct.  
 Components, How To Substitute (McCoy) . . . . . 24, June  
 Heath S.W.R. Meter, Building a Transmatch into the (Perera) . . . . . 20, Jan.  
 Is One of These Your Problem? (McCoy) . . . . . 26, May  
 Mighty Midzet, The (McCoy) . . . . . 54, Feb.  
 Mighty Midzet, A Mate for the (McCoy) . . . . . 49, Apr.  
 Selectroid, The (McCoy) . . . . . 18, Dec.  
 Two-Element Beam For 15, A (McCoy) . . . . . 41, Sept.  
 Use A Monitor! (McCoy) . . . . . 29, Nov.  
 Wavebridge, The (McCoy) . . . . . 43, July  
 15-Meter Openings?, Novices—Are You Ready for (McCoy) . . . . . 34, Mar.

**COMMUNICATIONS DEPARTMENT**

ARRL Affiliated Club Honor Roll . . . . . 100, June  
 ARRL Program, The . . . . . 97, June  
 C. D. Article Contest  
 "A New Year's Resolution" (Johnston) . . . . . 97, Mar.  
 "DX Operating Procedures" (Hennigan) . . . . . 100, July  
 "Radiomanship" (Amis) . . . . . 103, Sept.

Club Councils and Federations . . . . . 99, June  
 Public Service Work . . . . . 97, June

**CONTESTS AND OPERATING ACTIVITIES**

Armed Forces Day  
 Announcement . . . . . 55, May  
 Results . . . . . 80, Oct.  
 ARRL Countries List . . . . . 90, Jan.  
 ARRL Intruder Watch . . . . . 10, May  
 C.D. Parties  
 Results . . . . . 92, Jan.; 103, Apr.; 101, July; 115, Oct.  
 CL and VA, On Using . . . . . 98, Sept.  
 Code Proficiency Issuances . . . . . 96, Mar.  
 Code Proficiency Certificate Issuances, More Top-Level . . . . . 98, Sept.  
 Code, Some Notes on Acquiring the (Johnston) . . . . . 62, Nov.  
 Conditions Good on 160 . . . . . 94, Feb.  
 Contest Calendar . . . . . 58, Jan.  
 Correct, Accurate Reports . . . . . 97, May  
 DX Competition  
 Announcement . . . . . 59, Jan.  
 High Claimed Scores . . . . . 54, July  
 Results . . . . . 58, Oct.  
 Announcement — 1967 . . . . . 58, Oct.; 14, Dec.  
 DXCC, About . . . . . 88, Jan.  
 DXCC Notes . . . . . 90, Jan.  
 DX Operating Notes . . . . . 30, Jan.; 67, Feb.; 158, Mar.  
 DXpeditions — A Caution . . . . . 9, June  
 Emergency Principles Determined in New Orleans  
 Meeting . . . . . 98, July  
 Field Day Rules Proposed . . . . . 89, Jan.  
 Field Day Rules Changes, About . . . . . 101, Apr.  
 Field Day, Rules 1966 . . . . . 52, June  
 Results . . . . . 66, Nov.  
 Field Organization, etc., Invitation to be in . . . . . 98, Mar.  
 FMT  
 Announcement . . . . . 94, Feb.; 99, Sept.  
 Results . . . . . 89, Jan.; 100, June  
 G B A (Moreau) . . . . . 55, Oct.  
 Goals . . . . . 84, Aug.  
 Handling Q Signals Correctly . . . . . 85, Aug.  
 High Speed Code Test . . . . . 98, Mar.; 102, Sept.  
 Identification, About . . . . . 85, Aug.  
 Individual Responsibility . . . . . 100, Sept.  
 ID Requirements & Phonetics . . . . . 98, Sept.  
 Listen Before Calling CQ . . . . . 96, Mar.  
 MARS Opens Viet Nam Circuits . . . . . 94, Mar.  
 NCEF, Standby Receiver on . . . . . 97, May  
 NCEPs, Using the . . . . . 97, May  
 Net Operations, Ideas That Can Improve Your . . . . . 86, Aug.  
 Novice Roundup  
 Announcement . . . . . 50, Jan.  
 Results . . . . . 55, July  
 Novice Roundup, About the . . . . . 96, Feb.  
 OES Becomes OVS . . . . . 112, Oct.  
 Official Observer Information . . . . . 99, July  
 Originating Traffic, Some Hints on . . . . . 100, July  
 Overseas Viewpoint . . . . . 99, July  
 Posts for Techs . . . . . 99, May  
 "QSL . . . Solid Copy" (Troster) . . . . . 51, Oct.  
 QSO Party  
 Ala., 134, June; Calif. 146, Oct.; Conn., 121, Oct.; Del., 117, Oct.; Fla., 136, Mar.; Ga., 138, May; Ill., 91, Aug.; Ind., 92, Aug.; Iowa, 122, Apr.; Kan., 118, May; La., 97, Jan.; Md.-D.C., 118, Oct.; Mass., 120, Sept.; Minn., 106, July; Mo., 114, Mar.; New Eng., 126, Nov.; N. H., 130, Nov.; N. J., 90, Aug.; N. Y. State, 104, June; N. D., 108, May; NYC-LI, 110, Feb.; Ohio, 116, Apr., 113, Nov.; Penn., 105, Sept.; Annual QCWA, 73, Jan.; R. I., 120, Mar.; S. C., 108, Aug.; Tenn., 106, Feb.; Vt., 118, Feb.; Va., 122, Jan.; Wash. State, 126, Sept.; W. Va., 138, Oct.  
 RTTY Assumes FCC Role . . . . . 97, Mar.  
 RTTY Sweepstakes  
 Results — Fifth Annual World-Wide . . . . . 69, Feb.  
 Sixth World-Wide . . . . . 98, Oct.  
 Section Net News . . . . . 95, Feb.  
 Simulated Emergency Test, ARRL 21st Annual . . . . . 82, Oct.  
 S.S.B., Achieving the Clean Signal . . . . . 84, Aug.  
 Sweepstakes  
 High-Claimed Scores — 1965 . . . . . 98, Feb.  
 32nd Phone — C.W.-Club Results . . . . . 72, Apr.  
 Announcement — 33rd ARRL . . . . . 112, Oct.

Sweepstakes Phone & C.W. Equipment Tabulation.....	56, May
Traffic Letters, A Special Word to.....	99, May
Tulsa Has an AREC Kit.....	99, Sept.
Use Those SEC Addresses.....	113, Oct.
VE/W Contest	
Results — 1965.....	54, June
Announcement — 1966.....	57, Sept.
VE1 Contest — Twelfth Annual.....	136, Jan.
VHP Nets.....	94, Feb.
V.H.F. Netting Invites You.....	98, June
V.H.F. QSO Party	
Announcement — September.....	66, Sept.
Results.....	June-60, Sept.; Sept.-62, Dec.
V.H.F. Repeaters & Contest Scoring.....	99, Sept.
V.H.F. Sweepstakes.....	88, Jan.
V.H.F. Sweepstakes	
Announcement.....	61, Dec.
Results — 19th ARRL.....	56, June
YL/OM Contest	
Rules — 17th Annual.....	86, Jan.
Results.....	88, July
Wanted: Code Practice Schedules.....	114, Oct.
Western Union Surplus Printers.....	98, July
97.73 — or Bust (Lieu)	
Part I.....	52, Oct.
Part II.....	58, Nov.

## CONVENTIONS

ARRL National — 1966.....	10, Jan.; 58, Feb.; 37, Mar.;	9, Apr.
Georgia State.....		10, May
Great Lakes Div.....		95, Oct.
Hudson Div.....		95, Oct.
Michigan State.....		56, Mar.
Ontario Province.....		71, Sept.
Roanoke Div.....		10, May
Rocky Mountain Div.....		10, June
Southeastern Div.....		10, Jan.
Southwestern Div.....		10, Apr.
West Gulf Div.....		10, May
West Virginia State.....		10, June

## EDITORIALS

ARRL Intruder Watch, The.....	9, May
Board Meeting.....	9, Apr.
DXpeditions — A Caution.....	9, June
Emergency Communications — A National Plan.....	9, Aug.
Fewer Newcomers.....	9, Feb.
Freeloaders.....	9, July
Furor.....	9, Nov.
HamQuest '67.....	9, Oct.
IARU Progress.....	9, Apr.
Late QSTs.....	9, Mar.
National Convention.....	9, Apr.
New Operating Manual.....	9, Dec.
QST Changes.....	9, July
RACES.....	9, Dec.
The All-Too-Silent Voice of The Booster.....	9, Sept.
Year in Review, The.....	9, Jan.
W6ZH — A Tribute.....	9, June
20 Meters and Down.....	9, Mar.

## EMERGENCIES

Civil Defense Radio Station, Setting Up A (Geiser).....	63, June
Emergency Communications — A National Plan.....	9, Aug.
Emergency Preparedness in Non-Metropolitan Areas (Wilson & Haase).....	49, Aug.
Hurricane Alma.....	67, Sept.
Mass. Governor Praises Amateurs.....	44, Feb.
Simulated Emergency Test, ARRL 21st Annual.....	82, Oct.
You and Emergency Communication (Hart).....	63, May

## FEATURES

A Letter From Our President.....	10, Mar.
Amateur Balance, The (Grenfell).....	55, Nov.
Amateur Radio — A National Resource (Hoover).....	21, Apr.
Amateur Radio Frequency Allocations & Use (Schmeling).....	61, Apr.
ARRL Awards Honor Roll for 1965.....	46, Apr.
As The Ham Sees ARRL (Waters).....	46, May
B.A.R.T. (Dittman).....	52, May
Event on Five Meters (Yerger).....	100, Nov.
For Safety's Sake (Morgan).....	56, Dec.
Red Cross Award to ARRL (photo).....	25, Apr.
Red Cross Plaque presented to ARRL (photo).....	26, Apr.
Red Wire to Post Three (Holt).....	52, Dec.
Station Design for DX (Rockwell)	
Part I — Antenna Topics and Siting.....	50, Sept.

Part II — Economics of Station Design and Construction.....	48, Oct.
Part III — (a) Station Configuration & (b) Receiver Topics.....	50, Nov.
Part IV — (a) Propagation Quirks and (b) Operating Tips.....	53, Dec.
TVI Is Still With Us (Kratokvil).....	50, Dec.
What Wives Think About Ham Radio (Ross).....	57, Dec.

## FICTION

Antenna Ranchero, The (Troster).....	74, Jan.
F.O.R.E. (Troster).....	78, Feb.
"QSL . . . Solid Copy" (Troster).....	51, Oct.
The Nature Lover (Troster).....	43, Aug.
Tower, The Invisible (Turner).....	35, Apr.

## HAPPENINGS OF THE MONTH

A Letter From Our President.....	10, Mar.
Amateurs & Members.....	41, Mar.
Amateur Radio as a Career.....	43, Mar.
Amateur Radio Weeks (photos) Ill., 73, June; New Orleans, 75, Sept.; Tenn., 75, Sept.	
August, D. J., W9CYQ.....	72, Dec.
Another Legal Victory.....	49, Jan.
Antenna Form 401-A Now Obsolete.....	48, Jan.
Anti-noise Bill Clears Senate.....	59, Aug.
ARRL Asks Low End of Two.....	47, Jan.
Board To Meet Early.....	66, May
Bove, Charles M., W6MXX.....	89, Oct.
Canadian Centennial Calls.....	38, Oct.
Canadian License Figures.....	60, Aug.
CB Operator Nailed Despite "Skip Call".....	60, Aug.
CB Request on Calls Denied.....	88, Oct.
Centennial Calls for Canada.....	48, Jan.
Change of Address or Name.....	72, June
Civil Judgment Against CB Licensee.....	60, Aug.
Cover Plaque Award (photos)	
W4WQZ, 43, Mar.; K1PLP, 39, Apr.; W2EEY/W1DCG/DJ0BV, 66, May; K3CFA, 74, Sept.; WA6FQG, 88 Oct.; W6GIL & K0HLZ, 85, Nov.; W1YLB, 85, Nov.;	
Director Election Results.....	74, Jan.
Dunn, Dr. Lawrence J., W2LP.....	89, Oct.
Election Notice.....	58, Aug.;
Election Results.....	84, Nov.
Examination Schedule.....	49, Jan.
Family Membership.....	89, Oct.
Family Operating Privilege Denied.....	88, Oct.
FCC Denies Fee Reductions.....	34, Feb.
FCC Denies Power Reduction.....	89, Oct.
FCC Dismisses Petition Against Contest & Playback.....	39, Apr.
FCC Examination Schedule.....	69, July
FCC Hamfest Attendance Suspended.....	67, May
FCC Personnel Changes.....	40, Mar.
FCC Policy on FM/TV Receiver Design.....	39, Apr.
FCC Seeks Engineer.....	93, Feb.
Finance Committee Report.....	62, Aug.
Foster, W6CQ, New Midwest Director.....	68, July
(Gov. Volpe/Mass. Amateur Radio Week — (photo).....	38, Mar.
Identify in English.....	72, June
Kentucky Call Plates Defeated.....	73, June
Kratokvil Retires.....	34, Feb.
K2BVC Award (Group photo).....	42, Mar.
Las Vegas Exam.....	49, Jan.
League Requests Ten-Meter RTTY.....	72, June
Massachusetts License Plates.....	72, Dec.
Minutes of Executive Committee Meeting.....	140, Jan.; 42, Mar.; 67, May; 70, July; 77, Sept.; 72, Dec.
Minutes of 1966 Annual Meeting of Board of Directors.....	70, July
More Amateur Radio Weeks.....	59, Aug.;
National Convention — 1967.....	81, Nov.
National Amateur Radio Week.....	75, Sept.
New Amateur Chief, W3BG.....	67, May
New Novice Question.....	75, Sept.
Overseas & Absentee Ballots.....	60, Aug.
Permanent Status Proposed for RACES.....	40, Mar.
Plaque to W4MVH for Service as Director (photo).....	80, Oct.
Prison Sentence for Citizen Bander.....	48, Jan.
Proposed Antenna Tower Rules.....	66, May
Queen's Counsel Honors for VE3RX.....	67, May
RACES Now Permanent.....	75, Sept.
Reciprocal Operating with Paraguay.....	66, May
Renewals by U.S. Amateurs Overseas.....	38, Apr.
Report of Membership & Publication Committee.....	61, Aug.
Report of Official Availability Committee.....	61, Aug.
Report of Planning Committee.....	61, Aug.
Report of Public Relations Committee.....	62, Aug.
Revised Articles & By-Laws.....	68, July

Second Prison Sentence.....	38, Apr.
Staff Notes.....	72, Dec.
Suspensions and Revocations.....	35, Feb.
Telephone Company Fraud Bills.....	59, Aug.
Temporary Traffic with 4U1ITU.....	88, Oct.
Tuska presentation (photo).....	77, Sept.
United Kingdom Reciprocity.....	56, Jan.; 68, Feb.
What Bands Available.....	85, Nov.
W6ZH presentation from W1QV (photo).....	69, July
W0NWX New ARRL President.....	68, July

## IARU NEWS

Amateur Radio in Yugoslavia.....	56, Apr.
Amateur TV in France.....	56, Apr.
Application Procedure — France.....	78, Sept.
Chilean President Thanks Amateurs.....	92, Oct.
Colombia Reciprocity.....	19, Jan.
DX Operating News.....	79, Sept.; 74, Dec.
DX Operating Notes.....	30, Jan.; 67, Feb.; 158, Mar.; 77, June; 144, July
European Band Plan.....	86, Nov.
Finnish Amateur Licensing.....	67, Feb.
First Foreigner Operates in England.....	31, Jan.
Flash! Third Party with Uruguay.....	87, Nov.
Foreign CNS Mobile Operation.....	81, July
Foreign PA0 Operation.....	73, May
Foreign QSL Bureau Notes.....	81, July
France — U.S. Reciprocity.....	81, July
Germany — U.S. Reciprocity.....	78, Sept.
Halligan, W9AC/W4AK & ARI President Dr. R. Sesia, IIFA (photo).....	74, Mar.
Ham Gear into Britain.....	86, Nov.
IARU Progress.....	9, Apr.
India/Israel — U.S. Reciprocity.....	65, Aug.
Israeli Amateur Radio.....	90, Oct.
Korean Examination Results.....	86, Nov.
London Exhibition.....	92, Oct.
LAIITU, Oslo.....	80, July; 74, Dec.
LA5IG SK.....	79, Sept.
LU Emergency Net.....	56, Apr.
Mexican Convention.....	73, May
New F1B Licensing Rules.....	78, Sept.
New IARU Members — Nicaragua & Czechoslovakia.....	80, July
New IARU Member — Nigeria.....	68, Feb.
New Norwegian Calls.....	86, Nov.
Notes and News.....	87, Nov.
Novice Class License Sought in Zambia.....	30, Jan.
OA4O DXpedition.....	152, Sept.
Polish Fair Operation.....	76, June
QSL Bureaus of the World.....	76, June; 75, Dec.
Reciprocal Operating Rules for HK.....	68, Feb.
Region I Committee (photo).....	71, Jan.
Region I Conference in Opatjia.....	73, May; 64, Aug.
Region I Executive Committee (photo).....	79, Sept.
ROAR International Friendship Award.....	31, Jan.
Swiss Win Antenna Case.....	86, Nov.
U.K. Reciprocal Operating Agreement (photo).....	54, Apr.
U.K. Reciprocal Operating Rules.....	74, Mar.
United Kingdom Reciprocity.....	56, Jan.
U.S. — United Kingdom Reciprocity.....	68, Feb.
WAC.....	74, Mar.
W6MLZ Wins Columbus Award.....	74, Dec.
W0NWX New IARU President.....	80, July
Yugoslavian Anniversary Award.....	92, Oct.
9G1 Amateurs QRT.....	76, June
9G1 Back on the Air.....	154, Sept.
50-Mc. Band dropped in Rhodesia.....	30, Jan.
9G1 Back on the Air.....	154, Sept.
50-Mc. Band dropped in Rhodesia.....	30, Jan.
1966 IARC Convention — Geneva.....	65, Aug.

## KEYING, BREAK-IN AND CONTROL CIRCUITS

Break-In Keying, More on S-Line (Hildreth).....	43, May
Break-In Monitoring with the HA-1 (Thompson).....	35, Dec.
C. W. Keying Monitor, A Better (Trueblood).....	23, Apr.
CWX, The (Fisher).....	20, Feb.
Feedback.....	54, Apr.; 67, July
CWX Control, The (H&K).....	67, July
Key Clicks?, Why (Grammer).....	11, Oct.
Feedback.....	53, Nov.
Keyer Weight, Homebrew (H&K).....	74, May
Keying, Low-Level Blocked-Grid (Grammer).....	11, Nov.
Station Control, Full Break-In (H&K).....	66, Apr.
Station Control, Some Thoughts On (Blakeslee).....	27, Jan.
Use A Monitor! (McCoy).....	29, Nov.

## MEASUREMENTS AND TEST EQUIPMENT

Audio Light Meter (H&K).....	63, Jan.
Audio Oscillator, Finding the Value of an Unknown Inductance With an (H&K).....	67, Apr.
Beacon-Signal Generator.....	72, Aug.
Capacitance Meter, Wide-Range (Goding).....	18, Sept.
Checking Resonant Frequencies (H&K).....	62, Jan.
Electrical Interference (Nelson)	
Part I — Causes and Identification.....	11, Apr.
Part II — Tracking and Cure.....	39, May
Heath S.W.R. Meter, Building a Transmatch into the (Perera).....	20, Jan.
L Networks for Reactive Loads (Gordon).....	30, Sept.
Oscilloscope, Simple Linear sweep for (H&K).....	71, Feb.
Pad Construction (H&K).....	44, Mar.
Power for the Noise Generator (Conley).....	48, Feb.
Receiver, A Noise-Locator (DeMaw).....	47, June
RTTY Filters, High-Performance (Hoff)	
Part II — Improved Designs for Better Reception.....	34, Sept.
RTTY Shifts, Checking (Hoff).....	35, May
Smith-Chart Calculations for the Radio Amateur (Hall)	
Part I — Graphical Solutions of Transmission-Line Problems.....	22, Jan.
Part II — Determining Actual Antenna Impedances.....	30, Feb.
Feedback.....	76, Mar.; 40, June
Test Generator, A Simple Two-Tone (Check).....	26, Aug.
Transistor 100-Kc. Standard & Harmonic Generator.....	28, June
Transistors, Field-Effect (George).....	16, Oct.
Transmatch, A 300-Ohm Standard For the (G&G).....	22, Oct.
Variometer, The (DeMaw).....	11, May
Voltmeter, A Readout A.C.-Line (G&G).....	20, July
25 to 25,000 Cycles (Lange).....	30, July

## MISCELLANEOUS GENERAL

A Letter From Our President.....	10, Mar.
Amateur Balance, The (Grenfell).....	55, Nov.
Amateur Radio Frequency Allocations & Use (Schmeling).....	61, Apr.
Amateur Radio on The Seven Seas.....	28, July
Anniversary Series — "Classic" QST Articles, January, page 41-46; February, page 62-65; March, page 59-65; April, page 68; May, page 77; June, page 80; July, page 82-83; August, page 68-69; September, page 82; October, page 96; November, page 92; December 80.	
ARRL Awards Honor Roll for 1965.....	46, Mar.
ARRL QSL Bureau.....	150, Feb.; 152, May; 156, July; 164, Nov.
As The Ham Sees ARRL (Waters).....	46, May
Astronet (Calkins & Guter).....	50, Feb.
Auto License Plates (H&K).....	48, Nov.
B.A.R.T. (Dittmann).....	52, May
Blind — "Auriliary Meter Dial".....	93, Mar.
Feedback.....	38, May
Boduch, WA2GX1 Receives Anne Sullivan Award.....	33, Sept.
Canadian Ham History.....	28, Nov.
Coax, Using Old (H&K).....	49, Nov.
Code-Speed Nomograph (H&K).....	74, June
Civil Defense Radio Station, Setting Up A (Geiser).....	63, June
Cycles, Cycles Per Second, or Hertz.....	48, Aug.
Easy Box, The.....	17, Sept.
Family Membership.....	52, Feb.
FCC Seeks Engineers.....	93, Feb.
Flying Submarine, New Jersey Ham Builds.....	65, May
G B A (Morreau).....	55, Oct.
Goldwater Operating WA7AOW (photo).....	81, Jan.
"Ham of the Year" Award.....	10, Feb.
Hamquest 67.....	47, Dec.
Headquarters Building	
Building Fund Progress.....	34, Jan.; 76, May; 63, Aug.
Members Are Saying.....	34, Jan.; 76, May; 63, Aug.
Help Your Library Help You.....	21, Mar.
Hick, Harry (Photo).....	46, Jan.
Improve Your Club's Training Program (Poss).....	55, Jan.
Jamboree On The Air (Gribi, Jr.).....	58, Sept.
Keeping The Log Book Flat (H&K).....	74, June
Key Base, A Heavy (H&K).....	67, July
"Little Black Box" (Vander Horek).....	33, Nov.
Lightning Calculator (H&K).....	48, Dec.
Meeting The Challenge (Watson).....	51, June
Museum Items Wanted.....	26, Jan.
My Friend, CR6CH (Barbosa).....	53, Aug.
New Books.....	79, Feb.
New MARS Chief K3AKK (photo).....	58, Jan.
Privilege — or Right? (Grenfell).....	55, Sept.
QST Abbreviations used in Text & Drawings, Some.....	57, Nov.
QST Congratulates.....	61, Jan.; 10, Apr.
QSL Card Mounts (H&K).....	74, May

Radio Frequency Management (Buss)	52, July
Rubber Feet (H&K)	49, Nov.
SJRA 50th	71, Dec.
Slow-Scan	
Twenty-Meter Tests	38, Sept.
TV Communications with Antarctica	20, Nov.
"Talking On Air" (Russell)	54, Nov.
Ten-Minute Timer (H&K)	75, June
TVI Television Forum (photo)	77, Feb.
Weekly Radio Program	26, Jan.
WWV to QSL "First-Day" Reception	53, Nov.

## MISCELLANEOUS TECHNICAL

Adapter for Mikes without P.T.T. Switch (H&K)	56, Oct.
Adapter Plug (H&K) (Feedback 77, Dec.)	49, Nov.
Cable Lacing, Another Method of Forming Vinyl (H&K)	57, Oct.
Chassis Mounting of Printed-Circuit-Type Transformers (H&K)	48, Dec.
Circuit Boards, "Unetched"	16, Nov.
Cleaning Crackle Finishes (H&K)	70, Aug.
Coaxial Shield Connectors, Neat (H&K)	66, Apr.
Connection Weatherproofing (H&K)	67, Apr.
Crystal V.F.O., Building a Simple (Noble)	18, Nov.
Crystals, Restoring Etched (H&K)	66, Apr.
Electrical Interference (Nelson)	
Part I — and Identification	11, Apr.
Part II — Tracking and Cure	39, May
Emergency Alignment Tool (H&K)	48, Nov.
Equalizing the Low-Voltage Requirements of the HW-12 and SB-100 (H&K)	49, Dec.
Filter Design, An Amateur Application of Modern (Wetherhold)	14, July
Gimmicks & Gadgets	
Lazy-H Antenna, A. V.H.F.	34, Dec.
One-Watt Rig for 40 Meters, A (Dwight)	40, Nov.
Transistor Supply, Zener-Regulated Low-Current	28, Sept.
Transmatch, A 300-Ohm Standard For The	22, Oct.
U.H.F. Oscillator, An Experimental	24, Aug.
Feedback	94, Sept.
Voltmeter, A Readout A.C.-Line	20, July
Hardware, Vibration-Proof (H&K)	85, Sept.
Heat Dissipating Plate Caps (H&K)	62, Jan.
Heath HW-32 Alignment (H&K)	74, May
Heath HX-20, Improved C. W. Operation of the (H&K)	44, Mar.
Hi-Fi and Electronic Organ Interference (McCoey)	32, June
HP-23 With The HW-12 And The SR-100, Using The (H&K)	75, May
HW-12 Rattle (H&K)	49, Dec.
HX-20 and HR-20 Dial Pointers (H&K)	74, June
Insulators, Toothpaste-tube Cap (H&K)	74, May
Is One of These Your Problem? (McCoey)	26, May
Key Clicks?, Why (Grammer)	11, Oct.
Feedback	53, Nov.
KWM Relays (H&K)	66, July
Mating Shafts of Different Diameters (H&K)	75, May
More Modifications for the Knight C-100 (Streeter)	58, Dec.
Neon Lamps (H&K)	56, Oct.
New Apparatus	
Ami-Tron Toroid Kit	17, Nov.
Broad-band Ferrite Baluns	17, May
Budwig Equipment Feet	39, Sept.
Essee PS-3	29, July
Johnson Insulated Terminals	45, Nov.
Meter Protector	33, Sept.
Meter Shield, New	88, Feb.
Millen No-String Illuminated Slide-Rule Dial	108, Oct.
Millen R.F. Switches	29, July
No Hole Mobile Antenna Mount	46, July
Omega Multirange PanelMeter Kit	108, Oct.
Polyphase Coaxial Switches	34, May
Quick On-off PL-259 Adapter	29, July
Semtech "Slimpacs"	100, Feb.
TRP Tuner/verter	35, Feb.
Vero Breadboard Kit	17, Nov.
Waters Reflectometer	56, Sept.
Nonconductive Guys (Hamlin)	28, May
Feedback	99, Nov.
Potentiometer Replacement (H&K)	84, Sept.
Printed-Circuit Cleaning Tool (H&K)	63, Jan.
Quick Connector (H&K)	48, Nov.
Removing Slugs From Greenlee Punches (H&K)	62, Jan.
Rotary Switch Contacts (H&K)	62, Jan.
Shaft Couplings (H&K)	71, Aug.
shrinkable Sleeve Eliminates Shielding Gap in R.F. Cable (H&K)	66, July
Silver-Plating Paste, Inexpensive (H&K)	75, May
Silver Polish in the Ham Shack (H&K)	71, Feb.

Smith-Chart Calculations for the Radio Amateur (Hall)	
Part I — Graphical Solutions of Transmission-Line Problems	22, Jan.
Part II — Determining Actual Antenna Impedances	30, Feb.
Feedback	40, June
Soldering Aid (H&K)	76, Mar.; 70, Aug.
Soldering-Gun Tip, Emergency (H&K)	85, Sept.
S.S.B. Transmitters, Telephone QRM from (Balmer)	34, June
Strengthening Feedthrough Capacitors (H&K)	48, Dec.
Technical Correspondence	
Active Filter for RTTY	46, Nov.
Alternator Power Supply	48, July
BC-221 Maintenance	78, Mar.
"Antenna" as an R.F. Wattmeter, The	79, Mar.
Cross-Modulation in Receiver R.F. Pentodes	41, June
CWX Control System, The	54, Apr.
Essa II	40, Sept.; 46, Dec.
Fire Protection	79, Mar.
Ground Planes, Phased	37, Aug.
Hertzies? Why Not?	39, Sept.
Improvisation — The Mark of the Amateur	48, July
I-177 Surplus Tube Tester, The	36, Aug.
Micro-Circuit Shift Register	78, Mar.
Monifiter	77, Mar.
Narrow-Band TV Using Pseudo-Random Dot Scan	46, Oct.
Noise Locator	46, Nov.
Polar Coordinate Converters, Note on	54, 55, Apr.
One Plus One = Solid Copy	79, 80, Mar.
On Using The 6EH7	49, July
Feedback	94, Sept.
Plastic Quad Frame	45, Dec.
Reactance Signposts	39, Sept.
Smith Chart, On Using The	40, June
Standards for Moonbouncers	77, Mar.
Transistor Regenerative Detector	40, June; 39, Sept.
Transistors for Amateur Applications, Low-Priced Premium	47, Oct.
TV Boosters	40, Sept.
TVI From Boosters	48, July
Vertical for 80-40	46, 47, Nov.
V.F.O. Stability	45, Dec.
Voltage Regulators	46, Nov.
W3QLV Crystal V.F.O., The	77, Mar.
Technical Topics	
Noise Figure & Receiver Noise	21, Sept.
Telescoping Mast, A Mark II (Corgiat)	96, Apr.
Toroid Cores, Miniature (H&K)	57, Oct.
Transformer, Improved Mounting for the Balanced-Modulator (H&K)	67, Apr.
Transformer Laminations, Cleaning (H&K)	66, July
Transistors, Field-Effect (George)	16, Oct.
"Unpotting" Permakay Filters (H&K)	48, Dec.
Work Light (H&K)	70, Aug.
WWV Moving to Colorado	39, June
S-Mc. Crystals with the SR-42 & SR-46, Using (H&K)	70, Feb.

## MOBILE

Beams for 50 and 141 Mc., Portable (Tilton)	32, Jan.
Mobile Antenna, A Neat 50-Mc. (Tilton)	44, May
Power Supply, A Transistorless 300-Watt Mobile (Exum & Johnson)	23, May
Feedback	52, Aug.
QSL Holder for Mobile (H&K)	62, Jan.
Super-9 The Simple (North)	29, Aug.
Feedback	70, Sept.; 53, Nov.
Transmitter/Converter Unit, A Ten-Meter Mobile (Rush)	29, Aug.
6 Meter "Rushbox", The (DeMaw)	11, July

## OPERATING PRACTICES

C.D. Article Contest	
"A New Year's Resolution" (Johnston)	97, Mar.
"DX Operating Procedures" (Hennigan)	100, July
"Radioman-ship" (Amis)	103, Sept.
CL and VA, On Using	98, Sept.
Code, Some Notes on Acquiring the (Johnston)	82, Nov.
DX Operating Notes	67, Feb.; 158, Mar.
G B A (Moreau)	55, Oct.
Identification, About	85, Aug.
ID Requirements and Phonetics	98, Sept.
Listen Before Calling CQ	96, Mar.
NCEFs, Using the	97, May
Originating Traffic, Some Hints on	100, July
Q Signals, Handling Correctly	85, Aug.
"QSL . . . Solid Copy" (Troster)	51, Oct.
S.S.B. Signal, Achieving the Clean	84, Aug.
Traffic Netters, A Special Word to	99, May

Part I.....	52, Oct.
Part II.....	58, Nov.

**POWER SUPPLY**

D.C. Power Supply, Variable-Voltage (Wagner).....	32, Nov.
Dual-Voltage D.C. Supply (H&K).....	70, Aug.
Dual-Voltage Power Supply Has Increased Efficiency (H&K).....	75, June
Electronically Regulated Supply, Using an Overload Relay with an (H&K).....	49, Nov.
Power for the Noise Generator (Conley).....	48, Feb.
Power Supply, A Transistorless 300-watt Mobile (Exum & Johnson).....	23, May
Feedback.....	52, Aug.
Power Supply, a Wide-Range Voltage-Regulated (Nydam).....	38, May
Feedback.....	38, May
Transistor Supply, Zener-Regulated Low-Current (G&G).....	28, Sept.
12 Volts at 500 Ma. — Regulated (Copp).....	50, July

**PROJECT OSCAR**

Oscar IV	
Due Dec 21.....	10, Jan.
(The World Above 50 Mc.).....	80, 81, Feb.
Project Oscar Wins Christopher Columbus Award.....	51, Jan.

**PUBLIC SERVICE**

A Busy Weekend.....	72, Sept.
Amateur Radio in the U. S. Coast Guard Auxiliary (Baldini).....	88, Nov.
Amateur Radio Public Service Corps (Hart).....	64, Jan.; 42, Feb.; 51, Mar.; 44, Apr.; 58, May; 66, June; 58, July; 54, Aug.; 67, Sept.; 84, Oct.; 79, Nov.
ARRL Simulated Emergency Test, 21st Annual.....	82, Oct.
Astronet (Oakins & Guter).....	50, Feb.
Civil Defense Radio Station, Setting Up A (Geiser).....	63, June
Convention ARPSC Meetings.....	14, Apr.
Diary of the AREC.....	65, Jan.; 48, Feb.; 52, Mar.; 46, Apr.; 69, June; 59, July; 56, Aug.; 68, Sept.; 84, Oct.; 81, Nov.
Emergency Communications — A National Plan.....	9, Aug.
How To Join The AREC (Hart).....	63, July
How to Register Your Net.....	67, June
Hurricane Alma.....	67, Sept.
Hurricane Betsey (Hart).....	28, Feb.
Jamboree On The Air (Gribi, Jr.).....	58, Sept.
Mass. Governor Praises Amateurs.....	14, Feb.
Military Fixed Texts.....	92, Dec.
Move Higher Precedence Messages First.....	102, Apr.
National Traffic System.....	66, Jan.; 60, May; 67, June; 60, July; 55, Aug.; 68, Sept.; 86, Oct.; 80, Nov.
Northeast Blackout.....	43, Feb.
NTS Net Procedures.....	54, Mar.
NTS Region Net Standings — 1965.....	45, Apr.
Our Reporters Are You.....	38, May
Public Service Work.....	97, June
RACES in ARPSC.....	59, July
RACES News.....	70, June; 60, July; 57, Aug.
RACES Plans, August 1 Deadline for.....	59, July
Rules for Region Representation in Areas Nets.....	44, Feb.
Simulated Emergency Test — 1965 (Hart & Chamalian).....	25, Mar.
Succeeding By Success.....	67, Dec.
Training Aids (New ARPSC Slide Collection).....	99, July
"Yanqui, Come Back" (S. Cook & R. Cook).....	50, May
You and Emergency Communication (Hart).....	63, May

**RECEIVERS**

HC-455 Unconverted (Holbrook).....	45, June
Mighty Midget, A Mate for the (McCoy).....	49, Apr.
Receiver, A Noise-Locator (DeMaw).....	47, June
Receiver, A Two-Meter Pocket (DeMaw).....	12, June
Super-9, The Simple (North).....	20, Aug.
Feedback.....	70, Sept.; 53, Nov.
Transceiver, The TR-2 (Dennisou).....	11, Aug.
Transmit-Receive Converter, A 100-Watt 2-Meter (Hall).....	35, Jan.
V.L.F. Receiver Without Tuning Capacitors or Coils, A (Tiffany).....	23, Oct.
3-Transistor Receiver, A 5-Band.....	51, Jan.
Feedback.....	10, Apr.
6 Meter "Rushbox", The (DeMaw).....	11, July

**RECEIVING**

"Bandspreading" A Plate Tuning Capacitor (H&K).....	67, July
B.F.O. for Converters, Instant (H&K).....	66, July
Drake TR-3, Offset Tuning and F.S.K. for the (Swanson).....	20, June

**Electrical Interference (Nelson)**

Part I — Causes and Identification.....	11, Apr.
Part II — Tracking and Cure.....	39, May
Filter, Selectable-Sideband Adapter (Fielder).....	71, Mar.
Frame-Grid R.F. Pentode, Improving Your Receiver With a (Balogh).....	22, Feb.
HRO-60 S.S.B. Modification (Crowell).....	16, Apr.
Power Feed For Antenna-Mounted Preampifier (H&K).....	70, Aug.
RTTY: Diversity Is Worth the Effort (Combs).....	40, Apr.
Transceivers, Accessory Package for (Schultz).....	18, Jan.
Transmitter/Converter Unit, A Ten-Meter Mobile (Rush).....	29, Aug.
Transistor Converter for 432 Mc., A Low-Noise (Brannin).....	17, June
Feedback.....	39, Aug.
Transistor Preampifiers for 50 through 432 Mc. (Tilton).....	36, Feb.
World Above 50 Mc., The (Harris).....	
More Noise About Noise.....	97, Apr.
420-Mc. Preamp.....	90, May
432-Mc. Preampifier, Part II.....	85, June
WWV Converter Circuit, A.....	28, June

**RECENT EQUIPMENT**

Delta VDX-5 Antenna Coupling System.....	33, May
Drake T-4X and T-4.....	30, May
Drake 2-C Receiver.....	42, Dec.
Drake 2-NT Transmitter.....	42, Dec.
Eico 753 S.S.B. Transceiver.....	68, Mar.
FEC Model 1200 F.S.K. Demodulator.....	41, July
Hallcrafters HA-26 V.F.O.....	46, Aug.
Hallcrafters HT-46.....	44, Aug.
Hallcrafters SX-146 Receiver.....	88, Apr.
Heath HM-15 Reflected-Power Meter, The.....	44, Nov.
Heathkit SB-100 Transceiver, The.....	45, Sept.
Heathkit SB-600 Communications Speaker, The.....	19, Sept.
Knight C-577 Compressor.....	76, Feb.
Knight-Kit TR-106 Transceiver, The.....	42, Oct.
Knight-Kit V-107 V.F.O., The.....	34, Oct.
Lafayette HA-650 50-Mc. Transceiver, The.....	66, Mar.
Lafayette 50-Watt Mobile Linear Amplifier.....	36, June
Millen Transmatch Junior.....	75, Feb.
Parks 432-3 Converter, The.....	44, Oct.
SB-34 S.S.B. Transceiver.....	38, July
Singer Metrics Panadaptor.....	70, Jan.
Squires-Sanders SS-1V Video Bandscanner.....	37, June
WRL Duo-Bander 81.....	42, Nov.
WRL Galaxy 2000 Linear Amplifier.....	68, Jan.
6-meter Transceiver, The Heath SB-110.....	72, Feb.

**REGULATIONS**

Amateur Radio Frequency Allocations and Use (Schmelzing).....	61, Apr.
Antenna Form 401-A Now Obsolete.....	48, Jan.
ARRL Asks Low End of Two for Weak Signals & A-1.....	47, Jan.
Centennial Calls for Canada.....	48, Jan.
Colombia Reciprocity.....	49, Jan.
DX Operating Notes.....	30, Jan.; 87, Feb.; 158, Mar.
Examination Schedule.....	49, Jan.
FCC Denies Fee Reductions.....	34, Feb.
Las Vegas Exams.....	49, Jan.
Privilege — or Right? (Grenfell).....	55, Sept.
RACES, Permanent Status Proposed for.....	40, Mar.
Radio Frequency Management (Buss).....	52, July
Reciprocal Operating Rules for HK.....	68, Feb.
Renewals By U.S. Amateurs Overseas.....	38, Apr.
U. K. Reciprocal Operating Rules.....	74, Mar.
United Kingdom Reciprocity.....	56, Jan.
U. S. — United Kingdom Reciprocity.....	68, Feb.
What Bands Available.....	85, Nov.

**RTTY**

Drake TR-3, Offset Tuning and F.S.K. for the (Swanson).....	20, June
F.S.K. for the HX-50 (H&K).....	48, Dec.
RTTY: Diversity Is Worth the Effort (Combs).....	40, Apr.
RTTY Filters, High-Performance (Hoff).....	
Part I — Improved Designs for Better Reception.....	16, Aug.
Part II —.....	34, Sept.
RTTY Ribbon Rejuvenation (H&K).....	67, July
RTTY Shifts, Checking (Hoff).....	35, May
Teletype-Printer Noise Reduction (H&K).....	71, Aug.

**SEMICONDUCTORS**

Circuits, Practical Tripler (Blakeslee).....	14, Mar.
Feedback.....	10, Apr.
C. W. Keying Monitor, A Better (Trueblood).....	23, Apr.
D. C. Power Supp. ly, Variable-Voltage (Wagner).....	32, Nov.
Diode Multipliers, Improving Output From (H&K).....	57, Oct.
Field-Day Gallon, A (Daughters).....	47, Mar.

Field-Day Gallon, Notes on the (Daughters).....	30, June
Field-Day Gallon, Further Notes on the (Campbell).....	31, June
Field Effect Transistor as a Stable Element (Hanchett).....	11, Dec.
One-Watt Rig for 40 Meters, A (Dwight) (G&G).....	40, Nov.
Power Supply, A Wide-Range Voltage-Regulated (Nydam).....	22, Mar.
Feedback.....	38, May
Receiver, A Noise-Locator (DeMaw).....	47, June
Receiver, A Two-Meter Pocket (DeMaw).....	42, June
Semiconductor Heat Sinks (H&K).....	85, Sept.
Super-9, The Simple.....	20, Aug.
Feedback.....	70, Sept.
Transistor Amplifier, High-Gain Voltage-Controlled (H&K).....	45, Mar.
Transistor Converter for 432 Mc., A Low-Noise (Brannin).....	17, June
Feedback.....	89, Aug.
Transistor Oscillator (H&K).....	71, Feb.
Transistor Power Supply (H&K).....	49, Dec.
Transistor Preampifiers for 50 Through 432 Mc. (Tilton).....	36, Feb.
Transistor Supply, Zener-Regulated Low-Current (G&G).....	28, Sept.
Transistor 100-Kc. Standard and Harmonic Generator.....	28, June
Transistorized Impedance Transformer (H&K).....	48, Nov.
Transistors, Field-Effect (George).....	16, Oct.
Tuning Capacitor Heat Sink (H&K).....	71, Feb.
U.H.F. Oscillator, An Experimental (G&G).....	24, Aug.
Feedback.....	94, Sept.
Varactor Converter for 50 to 432, A (Hess).....	19, Mar.
Varactor Diodes in Theory and Practice (DeMaw).....	11, Mar.
V.L.F. Receiver without Tuning Capacitors or Coils, A (Tiffany).....	23, Oct.
3/2-Transistor Receiver, A 5-Band.....	51, Jan.
Feedback.....	10, Apr.
6 Meter "Rushbox", The (DeMaw).....	11, July
25 to 25,000 Cycles (Lange).....	30, July
160-Meter "Solid Status" (Lally).....	57, Apr.

### SINGLE SIDEBAND

Filter Design, An Amateur Application of Modern (Wetherhold).....	14, July
Filter, Selectable-Sideband Adapter (Fielder).....	71, Mar.
HRO-80 S.S.B. Modification (Crowell).....	16, Apr.
S.S.B. Exciter for 7 Mc., A Simple (Fullinwider).....	30, Apr.
S.S.B. Transmitter for Transceive Operation, An (Karentz).....	11, June
S.S.B. Transmitter, Telephone QRM from (Balmer).....	34, June
"Stanley Steamer," The (Quinn).....	18, May
Test Generator, A Simple Two-Tone (Cheek).....	26, Aug.
Transmit-Receive Converter, A 100-Watt 2-Meter (Hall).....	35, Jan.
Transverter for 144 Mc., The (Ashley).....	25, Nov.
6/60 Special (Raydo).....	11, Jan.
700-Watt Linear Amplifier, A Low-Cost (McCoy).....	15, Feb.

### TRANSMITTERS

"Das Softenboomer 160" (DeMaw).....	28, Aug.
Field-Day Gallon, A (Daughters).....	47, Mar.
Mighty Midget, The (McCoy).....	54, Feb.
One-Watt Rig for 40 Meters, A (Dwight) (G&G).....	40, Nov.
S.S.B. Transmitter for Transceive Operation, An (Karentz).....	11, June
Transceiver, The TR-2 (Dennison).....	11, Aug.
Transmit-Receive Converter, A 100-Watt 2-Meter (Hall).....	35, Jan.
Transmitter, 180-Watt D.S.B. (Rush).....	22, July
U.H.F. Oscillator, An Experimental (G&G).....	24, Aug.
Feedback.....	94, Sept.
6/60 Special (Raydo).....	11, Jan.
160-Meter "Solid Status" (Lally).....	57, Apr.

### TRANSMITTING

Amplifier for 2 Meters, An All-Mode (DeMaw).....	11, Sept.
Circuits, Practical Tripler (Blakeslee).....	14, Mar.
Feedback.....	10, Apr.

Coaxial Neutralizing Capacitor (H&K).....	71, Aug.
CQ Machine for Voice, An Automatic (Taylor).....	75, Mar.
Crystal V.F.O., Building A Simple (Noble).....	18, Nov.
Field-Day Gallon, Notes on the (Daughters).....	30, June
Field-Day Gallon, Further Notes on the (Campbell).....	31, June
Field Effect Transistor as a Stable Element (Hanchett).....	11, Dec.
Filter, An Effective Low-Pass (Welsh).....	16, Jan.
Filter Design, An Amateur Application of Modern (Wetherhold).....	14, July
Grounded-Grid Amplifier, Evolution of a (Cooper).....	29, Dec.
Ranger II, Cooling for (H&K).....	85, Sept.
S.S.B. Exciter for 7 Mc., A Simple (Fullinwider).....	30, Apr.
"Stanley Steamer," The (Quinn).....	18, May
Transceive Modifications for the Heath SB-300/SB-100 Combination (Brekford).....	21, Dec.
Transceivers, Accessory Package for (Schultz).....	18, Jan.
TVI Filter For 50 Mc., A Simple (Copeland).....	34, Aug.
Varactor Converter for 50 to 432, A (Hess).....	19, Mar.
V.F.O. Stability (Tech. Corres.).....	45, Dec.
V.F.O. Stability — Recap and Postscript (Grammer).....	
Part I — An Examination of Some Design Principles, Old and New.....	22, Sept.
Part II.....	26, Oct.
432-Mc. Kilowatt Amplifier, The W1QWJ.....	11, Feb.
700-Watt Linear Amplifier, A Low-Cost (McCoy).....	15, Feb.

### V.H.F. AND MICROWAVES

Amplifier for 2 Meters, An All-Mode (DeMaw).....	11, Sept.
Antenna for 2 Meters, Quickie (H&K).....	56, Oct.
Arrays for 50 and 144 Mc., Building Your Own (Tilton).....	33, Oct.
Beacon-Signal Generator.....	72, Aug.
Beams for 50 and 144 Mc., Portable (Tilton).....	32, Jan.
Circuits, Practical Tripler (Blakeslee).....	14, Mar.
Feedback.....	10, Apr.
C. W. With the "Two-Band V.H.F. Station", Improved (H&K).....	75, May
Filter, An Effective Low-Pass (Welsh).....	16, Jan.
Microwave Oscillators, Stable (Jensby).....	33, July
Mobile Antenna, A Neat 50-Mc. (Tilton).....	44, May
Piston Trimmers, Low-Cost (H&K).....	63, Jan.
Receiver, A Two-Meter Pocket (DeMaw).....	42, June
Transceiver, The TR-2 (Dennison).....	11, Aug.
Transistor Converter for 432 Mc., A Low-Noise (Brannin).....	17, June
Feedback.....	89, Aug.
Transistor Preampifiers for 50 Through 432 Mc. (Tilton).....	36, Feb.
Transmit-Receive Converter, A 100-Watt 2-Meter (Hall).....	35, Jan.
Transverter for 144 Mc., The (Ashley).....	25, Nov.
TVI Filter For 50 Mc., A Simple (Copeland).....	34, Aug.
U.H.F. Oscillator, An Experimental (G&G).....	24, Aug.
Feedback.....	94, Sept.
U.H.F. Tuned Lines with Piston Trimmers (H&K).....	48, Nov.
Varactor Converter for 50 to 432, A (Hess).....	19, Mar.
Varactor Diodes in Theory and Practice (DeMaw).....	11, Mar.
V.H.F. Transmitters, Oscillator Instability in (H&K).....	45, Mar.
V.H.F.-U.H.F. Signal Source (H&K).....	58, Oct.
Weather Satellite.....	58, Mar.
World Above 50 Mc., The.....	81, Mar.
Aurora.....	94, Nov.
VK3ATN-K6MYC Moonbounce.....	104, Oct.
Moonbounce Down Under.....	84, July
More Noise about Noise.....	97, Apr.
One-Way California — Australia on 144 Mc.....	95, Sept.
Oscar IV (article & photos).....	80, 81, Feb.
Plain Talk About Antennas.....	84, Dec.
Solid State and the V.H.F.....	80, Jan.
50-Mc F2 DX Coming?.....	72, Aug.
420-Mc. Preamp.....	90, May
432-Mc. Preampifier, Part II.....	85, June
Yagi Arrays for 432 Mc. (Tilton).....	19, Apr.
6 Meter "Rushbox", The (DeMaw).....	11, July
6/60 Special (Raydo).....	11, Jan.
432-Mc. Kilowatt Amplifier, The W1QWJ.....	11, Feb.
5650-Mc. Record, Breaking the (Trollmani).....	82, June

# New from National

## The most versatile 5-bander on the market ...priced even lower than a kit rig!



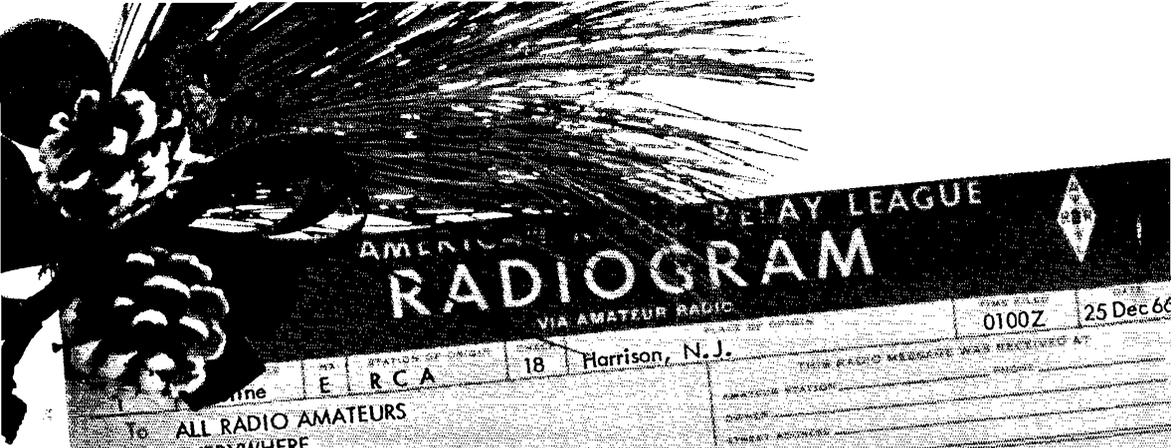
Here's the fastest way to move up from single band or triband operation . . . the all-new National 200. It's a fabulous five-bander, an ideal rig for mobile, portable, or home operation . . . and it's only \$359! For the first time at this amazingly low price, you get top-notch SSB, CW, and AM performance on the 80 through 10 meter bands . . . plus National's traditional quality and full One-Year Guarantee.

**National gives you these important features:** ■ Complete coverage of the 80 through 10 meter bands. ■ 200 Watt PEP input on SSB, plus CW and AM. — Separate product and AM detection plus fast-attack slow-release AGC. ■ Crystal-controlled front end and single VFO for high stability, and identical calibration and tuning rate on all bands. ■ Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent QRM on receive . . . plus solid-state balanced modulator for "set-and-forget" carrier suppression. ■ Operation from new low-cost AC-200 supply or from NCX-A or mobile power supplies. ■ ALC. ■ 45/1 planetary/split gear tuning drive. ■ Automatic carrier insertion in AM and CW modes. ■ Panel meter automatically switched to S-units on receive. ■ Universal mobile mount included.

**ONLY \$359.**  
with National's full  
One-Year Guarantee



**National Radio Company, Inc.**  
37 Washington Street, Melrose, Massachusetts 02176



AMERICAN DELAY LEAGUE  
**RADIOGRAM**  
 VIA AMATEUR RADIO



TO: ALL RADIO AMATEURS EVERYWHERE

STATION OF ORIGIN: **18 Harrison, N. J.**

TIME: **0100Z** DATE: **25 Dec 66**

TO: **E R C A**

THIS RADIO MESSAGE WAS RECEIVED AT:

RECEIVING STATION: \_\_\_\_\_

OWNER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY AND STATE: \_\_\_\_\_

THE HEARTIEST OF SEASONS GREETINGS MOST SINCERE WISHES  
 FOR HEALTH HAPPINESS AND PROSPERITY SOLID QSO'S  
 AND GOOD HUNTING

RCA Electronic Components and Devices, Harrison, N. J.

**REC'D** **SENT**

THIS MESSAGE WAS TRANSMITTED BY CHARGE OF A LICENSED AMERICAN RADIO OPERATOR... THE AMERICAN RADIO DELAY LEAGUE... THE PURPOSE OF THIS MESSAGE IS TO... THE DELAY LEAGUE IS A SERVICE TO THE RADIO AMATEUR COMMUNITY... THE DELAY LEAGUE IS A SERVICE TO THE RADIO AMATEUR COMMUNITY... THE DELAY LEAGUE IS A SERVICE TO THE RADIO AMATEUR COMMUNITY...

- |        |        |        |        |        |        |       |         |
|--------|--------|--------|--------|--------|--------|-------|---------|
| W1MTQ  | W2CWC  | K2HN   | K20AB  | W2RYI  | K2ZX0  | W3JSZ | W3V0P   |
| W1NLA  | K2CXG  | K2HR   | K20AS  | K2SAU  | W2ZY   | W3JYL | K3YAD   |
| W2ABG  | WA2CYE | W2HRC  | W20KO  | WA2SBH |        | W3KDT | W3YAM   |
| WA2AAE | W2CYR  | K2IAP  | K2000  | W2SDP  | K3AKI  | W3KFI | K3YBA   |
| K2AAB  | WB2CYU | W2IAR  | K20PV  | K2SJM  | WA3AMX | K3KGG | W3YPI   |
| K2ADR  | WA2CZX | W2IET  | K20QW  | K2SKK  | W3ATW  | W3KKG | K3ZEH   |
| K2ADY  | K2DJL  | W2IHF  | W20UY  | W2SLZ  | K3AWH  | W3KKX | K3ZLG   |
| K2AFW  | K2DKY  | WB2IXE | WB2PGO | K2SNH  | WA3BWP | W3KRA | W4FIQ   |
| K2ANB  | K2DKZ  | W2IYG  | W2PGW  | K2TJF  | WN3CLR | K3KSA | WA4PUZ  |
| K2ATK  | K2DPI  | WA2IJZ | K2POD  | K2TJT  | WN3CLS | K3KJV | W4VI    |
| K2AUM  | K2DQX  | K2JCF  | K2PPF  | W2TVU  | K3CPK  | W3LCA | W5CLE   |
| WA2AVT | K2DQY  | W2JFO  | K2PPT  | W2TVW  | WN3CUN | W3LEP | W5JQE   |
| K2BBX  | WB2ECB | W2JQE  | W2PZP  | W2UIJ  | WA3DWD | K3LHV | W5PCZ   |
| K2BBY  | K2EHF  | W2JSX  | W2QAU  | WA2UOV | W3EJA  | W3NOI | K8BON   |
| W2BC   | K2EIR  | WB2JXH | WB2QCT | W2UPC  | W3EOB  | K3OYV | W8KKE   |
| WA2BDE | K2EIW  | W2KAU  | K2QEX  | K2UUC  | W3EWR  | W3PGL | W8KYH   |
| W2BHL  | W2EJA  | W2KCN  | K2QON  | WN2VGY | WA3FAH | W3PNJ | K8KZE   |
| K2BTM  | K2ETF  | K2KDW  | WA2QPI | W2VHU  | W3FAL  | W3PSK | W80KN   |
| W2BVJ  | W2FZV  | K2KFZ  | W2QWH  | K2VMD  | W3FEI  | K3QAX | W8SUF   |
| W2BVS  | W2GCV  | K2KIZ  | K2QYO  | W2VYF  | W3FEY  | K3KQU | K8WNE   |
| W2CBL  | WA2GDY | WA2KNO | K2QYP  | W2WCT  | W3FSE  | W3RRV | W9EEP   |
| W2CBR  | WB2GEL | W2KRN  | K2RIV  | W2YJS  | W3FSS  | W3SNI | W9JOC   |
| K2CLN  | K2GHW  | K2LAP  | K2RMH  | W2YJZ  | W3FXE  | K3STT |         |
| W2GDP  | WB2GLA | W2LHS  | K2RMK  | W2YIM  | W3GJA  | W3SUR |         |
| K2CUB  | W2GQK  | K2LPQ  | K2RML  | K2ZON  | K3GZX  | K3SUZ |         |
| K2CVF  | K2GQW  | K2LVH  | K2RRE  | W2ZPD  | W3HJ   | W3SYN |         |
| K2CVS  | K2GZW  | WA2MWP | K2RVX  | W2ZWA  | W3HXY  | W3TLH |         |
|        | K2HKT  | WA2NDY | K2RVZ  | W2ZXL  | W3IGX  | W3VDY | KØTYP/2 |



RCA Electronic Components and Devices  
**The Most Trusted Name in Electronics**