

March 1965

60 Cents

QST

devoted entirely to

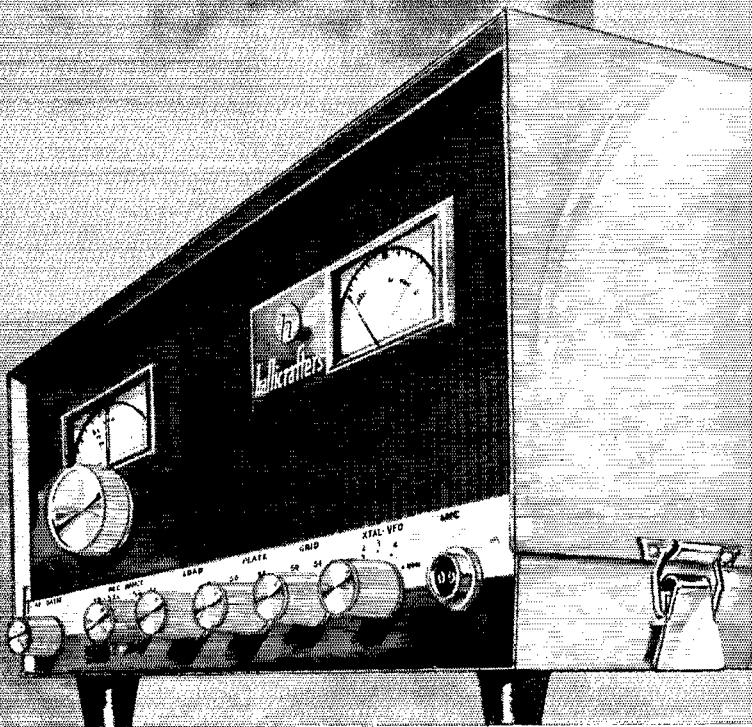
amateur

radio



PUBLISHED BY THE AMERICAN RADIO-RELAY LEAGUE

*Bye
Bye
Birdie*



Efficient filters and selected injection frequencies make the NEW SR-46 and SR-42 VHF transceivers virtually immune to FM and TV interference.

Interference-free reception is only one of many advantages in the new SR-46. Complete six meter band coverage is another. Or full two meter coverage, if you prefer, in the companion SR-42 unit. Both give you double the usual bandspread, through use of dual tuning ranges. A neutralized nuvistor front end boosts sensitivity, and eleven tuned circuits increase selectivity while suppressing interference. Push to talk, of course.

Thorough field testing, before production, by hundreds of operators, assures you of years of trouble-free performance. It all adds up to your top VHF value. See the SR-46, or the SR-42, at your distributor today.

FEATURES

Frequency Coverage: 50 to 52 Mc and 52 to 54 Mc (144 to 146 Mc and 146 to 148 Mc in the SR-42). **Power Input:** 10-12 watts. **Power Supply:** 115 VAC and 12 VDC (vibrator and line cord optional extra). **Transmitter Crystals:** high frequency type; provision for four (one furnished), plus external VFO, switch-selected from front panel. **Tubes:** 10, plus zener diode oscillator control and four diodes (11 tubes, 2 zeners and four diodes in the SR-42). **"S" Meter** automatically switches to RFO. **Cabinet:** "snap-off" type for easy access. **Size:** 5½" high, 12⅞" wide, 8¼" deep. **Shipping Weight:** 17 lbs. **Amateur Net Price:** \$189.95.

New **SR-46**

SIX METER VHF TRANSCEIVER
and SR-42 for two meters

Export: International Div., Hallicrafters.
Canada: Gould Sales Company, Montreal, P. Q.

*"Quality through
Craftsmanship"*



hallicrafters

5th & Kostner Aves., Chicago, Ill. 60624

When
you're No. 1,
you
have
to try
twice
as hard

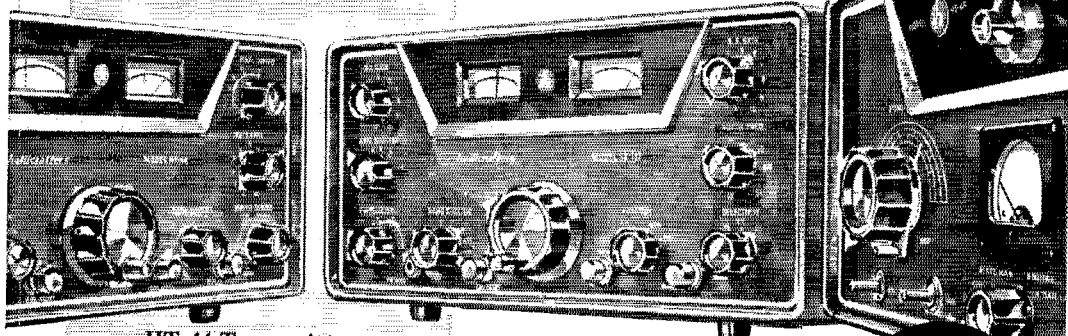
Every year for 31 years, Hallicrafters has engineered more high performance amateur radio equipment than any other manufacturer in the world. For the last 30, we've had to fight every inch of the way.

In 1933, we had less than a dozen competitors. In 1964 we have over two dozen (at last count). Naturally, they all want to be the leader.

Early in the game, we learned that staying ahead of the crowd would depend on two things: Dedication to the needs of *all* amateurs; and very superior, *progressive* engineering.

So it's no coincidence that our SR-150 and SR-160 amateur transceivers *alone* offer *both* Receiver Incremental Tuning and Amplified Automatic Level Control. Or that we manufacture 19 products to answer *any* amateur requirement, while our largest competitor makes fewer than half that number.

Visit Our Booth at the
1965 SSB Show
Statler-Hilton Hotel
Tues. March 23rd
12 Noon-9 P.M.



- HT-44 Transmitter
- SX-117 Receiver
- HT-45 Amplifier



- SR-150 Transceiver
- SX-122 G.C. Receiver

*"Quality through
Craftsmanship"*



hallicrafters

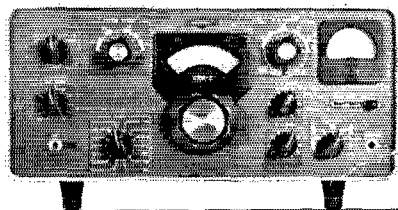
5th & Kostner Aves., Chicago, Ill. 60624

P.S. We'll send you complete specifications twice as fast, too!

Export: International Div., Hallicrafters. Canada: Gould Sales Company, Montreal, P. Q.

COST
!COST
COST
C!O!S!T!
COST
COST!!!!!!!!!!!!!!!!!!!!

Why is it the most expensive is often the most economical? A paradox? No! First, with any purchase, and especially with ham equipment, you want self-satisfaction. Next, you want a good investment. *What better satisfaction* than to know you have the finest. When you purchase Collins you get such features as complete station compatibility; frequency stability; frequency calibration; more QSO's per kilocycle; mechanical filters; dual or single PTO control; automatic load control; negative RF feedback; light weight; simplicity and styling. And Collins is still the only equipment which has all ten of these features—and is still unexcelled in any of them. *What better investment* can you have than in Collins equipment—proven over the years by such famous units as the 32V series, the 75A series, the S/Line—and in the end costing less than the lower-priced units. Collins is interested in protecting your investment by not introducing new models and styles every year or so just to stimulate sales. As one of our customers told us, "You can't afford to buy less than Collins." See your Collins dealer. Ask for a demonstration. Then you'll know why Collins is the finest. Why it costs so little to own.



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

STAFF

JOHN HUNTOON, W1LVQ
Editor

RICHARD L. BALDWIN, W1IKE
Managing Editor

E. LAIRD CAMPBELL, W1CUT
Assistant Managing Editor

GEORGE GRAMMER, W1DF
Technical Editor

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

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

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

ROD NEWKIRK, W9BRD
SAM HARRIS, W1FZJ
HELEN HARRIS, W1HOY
JEAN PEACOR, K1IJV
JOHN TROSTER, W6ISQ
Contributing Editors

MARJORIE R. BREWER
Editorial Assistant

LORENTZ A. MORROW, W1VG
Advertising Manager

EDGAR D. COLLINS
Advertising Assistant

DAVID H. HOUGHTON
Circulation Manager

J. A. MOSKEY, W1JMY
Assistant Circulation Manager

OFFICES

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

Subscription rate in United States and Possessions, \$6.00 per year, postpaid; \$6.50 in Canada, \$7.00 in all other countries, 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 1965 by the American Radio Relay League, Inc. Title registered at U.S. Patent Office. International copyright secured. All rights reserved. *Quedan reservados todos los derechos* Printed in U.S.A.

INDEXED BY

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

—CONTENTS—

TECHNICAL —

Oscar III Orbital Predictions and How To Use Them <i>Harley C. Gabrielson, W6HEK</i>	11
Making Use of the Oscar III Telemetry Signals <i>Arthur M. Walters, W6DKH</i>	16
The Whys of Transmission Lines <i>George Grammer, W1DF</i>	19
Getting Acquainted with RTTY <i>Irvin M. Hoff, K8DKC</i>	24
RTTY Reception for Beginners <i>Douglas A. Blakeslee, W1KLK</i>	28
Single-Band Combos... <i>Elmer T. Schorle, Jr., W3GSC</i>	32
A Switchable Four-Element 80-Meter Phased Array <i>Dana W. Atchley, Jr., W1HKK</i>	48
The Mini-Mono-Monimatch <i>James W. Rush, Jr., W4EWL</i>	54
Recent Equipment: The Gonset Sidewinder 2-Meter Transceiver.....	64
Technical Correspondence.....	68

BEGINNER AND NOVICE —

Have You Got 'Em? — Harmonics, That Is? <i>Lewis G. McCoy, W1ICP</i>	45
---	----

OPERATING —

VE/W — 1963-1964 Results.....	57
Using the National Calling and Emergency Frequencies <i>George Hart, W1NJM</i>	60
Jurisdiction of the Emergency Coordinator.....	88

GENERAL —

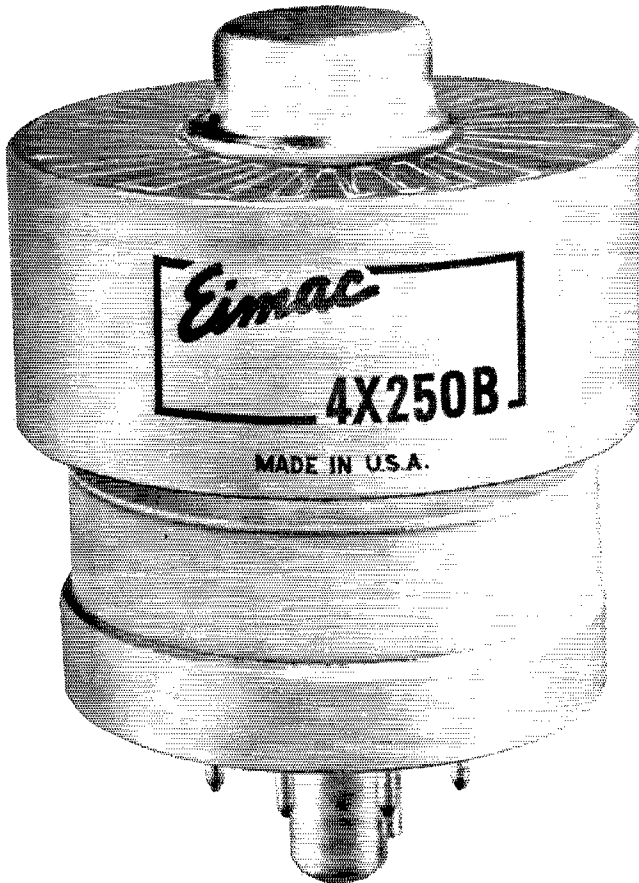
What ARRL Means to Me... <i>Millard P. Christle, W1QJB</i>	41
Hamming From Your Fallout Shelter.....	44
DXMANSHIP — Phase I <i>John G. Troster, W6ISQ</i>	53
ARRL Awards Honor Roll For 1964.....	59
Building Fund Progress.....	76
Members Are Saying.....	76

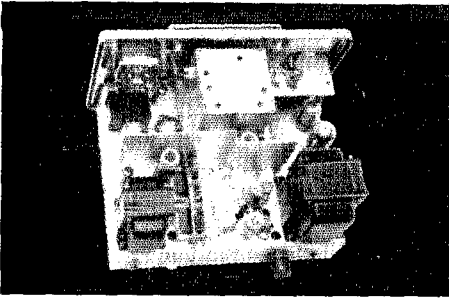
ARPS... ..	88	"It Seems to Us".....	9
Coming Conventions.....	10	New Books.....	67, 70
Correspondence From Members.....	72	Operating News.....	93
Feedback.....	43	Operator of the Month.....	166
Hamfest Calendar.....	75	Our Cover.....	10
Happenings of the Month.....	42	Silent Keys.....	156
Hints & Kinks.....	71	Station Activities.....	104
How's DX.....	77	World Above 50 Mc.....	82
Index to Advertisers.....	174	YL News and Views.....	86
		25 Years Ago in QST.....	164

EIMAC

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

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





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

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

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

FEATURES

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

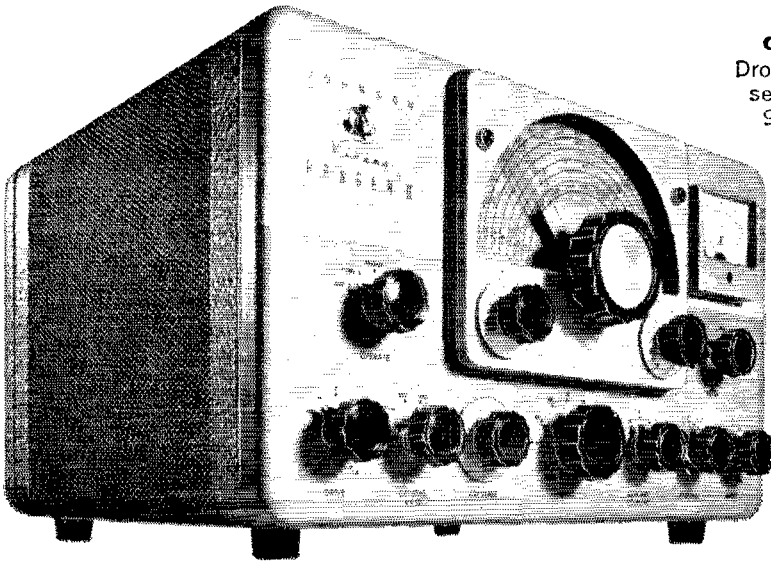
EASY TUNING

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

RANGER II

COMPLETE CATALOG

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



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

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed OBS, 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	W3LYE	Roy A. Belair	415 Brighton Road	Wilmington 19809
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua 18252
Maryland-D. C.	W3QA	Bruce Boyd	415 Wickham Rd.	Baltimore, Md. 21229
Southern New Jersey	K2BG	Herbert C. Brooks	500 Lincoln Ave.	Palmyra 08065
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive	Buffalo 26
Western Pennsylvania	W3GJY	John F. Wojtkiewicz	1400 Chapin St.	Conway

CENTRAL DIVISION

Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9YX	Ernest L. Nichols	RFD 7	Bloomington 47103
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauna Trail	Portage 53901

DAKOTA DIVISION

Minnesota	W00PX	Mrs. Helen Mejdrich	Route 3	Atkin
North Dakota	W0HVA	Harold A. Wenget	805-3rd St., S. W.	Minot
South Dakota	W0RRN	J. W. Sikorski	1900 S. Menlo Ave.	Sioux Falls

DELTA DIVISION

Arkansas	W5DTR	Curtis L. Williams	Route 3, Box 230	Little Rock 72205
Louisiana	W5PAM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington
Mississippi	W5EAIM	S. H. Hairston	2321-27th Ave.	Meridian
Tennessee	W4UVP	William Scott	115 East Holston Ave.	Johnson City

GREAT LAKES DIVISION

Kentucky	K4QIO	Mrs. Patricia C. Schafer	732 Greenridge Lane	Louisville 7
Michigan	W8FX	Ralph P. Thetreat	27209 W. Six Mile Road	Detroit 48240
Ohio	W8AL	Wilson E. Weckel	1317 Logan Ave., N.W.	Canton 44703

HUDSON DIVISION

Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	K2IDB	Maline S. Johnson	266 Cypress St.	Masapequa Park, L. I.
Northern New Jersey	W2CVW	Edward F. Erickson	13 Robert Circle	South Amboy 08879

MIDWEST DIVISION

Iowa	W0NTB	Dennis Burke	1418 Douglas Ave.	Ames 50010
Kansas	W0ALA	C. Leland Cheney	8114 Levitt Dr.	Wichita 67207
Missouri	W0TPK	Alfred E. Schwaucke	Edgar Star Rte	Rolla 65401
Nebraska	W0GCP	Frank Allen	Box 272	Gering

NEW ENGLAND DIVISION

Connecticut	K1GGG	Fred Tamm	28 Gresham St.	Milford
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine	W1PQ	Herbert A. Davis	1430 L.L.	Ellsworth Falls
New Hampshire	W1SWX/K1DSDA	Robert Mitchell	Box 38, RFD 1	Chester
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	K1MNP	E. Reginald Murray	3 Hillcrest Drive	Montpelier 05601
Western Massachusetts	W1BVR	Perry C. Noble	8 St. Dennis St.	Westfield 01085

NORTHWESTERN DIVISION

Alaska *	KL7ENT	Daniel R. Wright	915 Eagle St.	Anchorage
Idaho	K7HJR	Raymond V. Evans	Route 3	Twin Falls 83301
Montana	W7YFN	Joseph A. D'Arcy	1119 East 5th Ave.	Anaconda
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave.	Portland
Washington	W7PGY	Robert B. Thurston	7700-31st Ave., N.E.	Seattle 98115

PACIFIC DIVISION

East Bay	K6LRN	Richard Wilson	107 Cordova Way	Concord
Hawaii	K1H0ZF	Lee H. Weal	45-601 Lulu Rd.	Kaunaloa 96744
Nevada	W7CMB	Lechard M. Norman	652 Utan St.	Boulder City 89005
Sacramento Valley	W6BTY	George R. Hudson	2309 Meier Way	Sacramento
San Francisco	W6AUD	Hugh Cassidy	77 Coleman Drive	San Rafael 94901
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno
Santa Clara Valley	W6ZJZ	Jean A. Gimelin	10835 Willowbrook Way	Cupertino

ROANOKE DIVISION

North Carolina	W4BNV	Barnett S. Dodd	420 West Franklin St.	Salisbury 28144
South Carolina	W4PED	Charles N. Wright	711 Merriwether Dr.	North Augusta
Virginia	W4QDY	Robert L. Fellmar	1057 Dune St.	Norfolk 23503
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554

ROCKY MOUNTAIN DIVISION

Colorado	K9TTB	Donald Ray Crumpton	P.O. Box 223	Alamosa
New Mexico	K5LQL	Newell Frank Greene	P.O. Box 406	Dexter
Utah	W7OJD	Marvin C. Zitting	P.O. Box 1813	Salt Lake City 84110
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601

SOUTHEASTERN DIVISION

Alabama	K4KJD	William S. Crafts	Route 3, Box 233	Athens 35611
Canal Zone	K2STD	Thomas B. DeMeis	P.O. Box 1111	Balboa
Eastern Florida *	K4SHH	A. L. Hamel	220 N.E. 35th St.	Pompano Beach
Georgia	W4RZL	Howard L. Schouher	P.O. Box 1902	Columbus 31902
West Indies (P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llover	Urb. Truman
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.	Rio Piedras, P. R. Fort Walton Beach 32518

SOUTHWESTERN DIVISION

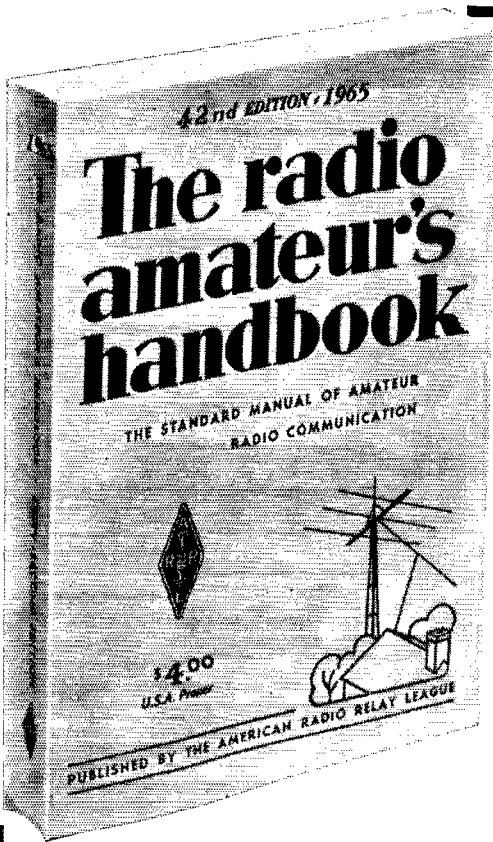
Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.	Phoenix 85017
Los Angeles	W6NFG	John A. McKowen	16205 South Broadway	Gardena 90247
San Diego	W6LRU	Don Stanifer	4427 Pescadero	San Diego 92107
Santa Barbara	W460KN	Cecil D. Hinson	1934 Coventry Court	Thousand Oaks

WEST GULF DIVISION

Northern Texas	W5BNG	L. L. Harbin	4515 Calmont	Fort Worth 76107
Oklahoma	K5K7W	Bill F. Lund	1220 S. Owasso	Tulsa 74120
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskridge St.	Houston

CANADIAN DIVISION

Alberta	VE8TG	Harry Harold	1834-5th Ave.	N. Lethbridge, Alta.
British Columbia	VE7PB	H. W. Savage	4653 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4FW	William H. Horner	6 Hart Ave.	Winnipeg
Maritime	VE1WB	D. K. Weeks		Harvey Station, N. B.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2DR	C. W. Skarstedt	62 St. Johns Rd.	Pointe Claire, Montreal 33, P. Q.
Saskatchewan	VE5QC	Mel Mills	P.O. Box 801	Saskatoon



1965 EDITION NOW AVAILABLE

THE STANDARD reference work and text for everyone—radio amateurs, engineers, lab men, technicians, experimenters, students, purchasing agents.

*A*nnual revision is a feature of the *Handbook*, always with the objective of presenting the soundest and best aspects of current practice. The big, 1965 Edition contains new descriptions of equipment. Semi-conductor and vacuum tube tables are brought up to date. Every important aspect of amateur radio is covered: transmitting, c.w., a.m., sideband, radio-teletype; receiving; mobile; v.h.f.; propagation; antennas; construction; theory; charts; diagrams; transistors; vacuum tubes; station assembly and operation. The complete handbook!

\$4.00 USA proper \$4.50 US Possessions and Canada \$5.50 Elsewhere
Clothbound Edition \$6.50 USA, Possessions and Canada, \$7.00 Elsewhere

The **AMERICAN RADIO RELAY LEAGUE**, Inc.
NEWINGTON, CONN. 06111

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



Past Presidents

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

Officers

President HERBERT HOOVER, JR., W6ZH
900 Wilshire Blvd., Los Angeles, California 90017
First Vice-President WAYLAND M. GROVES, W5NW
1406 West 12th Street, Odessa, Texas 79761
Vice-President FRANCIS E. HANDY, W1BDI
225 Main St., Newington, Connecticut 06111
Vice-President ALEX REID, VE2BE
240 Logan Ave., St. Lambert, P. Q., Canada
Secretary JOHN HUNTOON, W1LVQ
Treasurer DAVID H. HOUGHTON
225 Main St., Newington, Connecticut 06111

Secretary & General Manager Emeritus. A. L. BUDLONG, W1BUD

General Manager JOHN HUNTOON, W1LVQ
Communications Manager FRANCIS E. HANDY, W1BDI
Technical Director GEORGE GRAMMER, W1DF
Assistant General Manager RICHARD L. BALDWIN, W1IKE
Assistant Secretaries PERRY F. WILLIAMS, W1UED
RAYMOND HIGGS, K1FLG GARY L. FOSKETT, W1ECH
225 Main St., Newington, Connecticut 06111

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

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

DIRECTORS

Canada

NOEL B. EATON VE3CJ
R.R. 3 Burlington, Ontario
Vice-Director: Colin C. Dumbille VE2BK
116 Oak Ridge Drive, Baie d'Urfee, Quebec

Atlantic Division

GILBERT L. CROSSLEY W3YA
734 West Foster Avenue, State College, Pa. 16801
Vice-Director: Edwin S. Van Deusen W3ECP
3711 McKinley St., N.W., Washington, D.C. 20015

Central Division

PHILIP F. HALLER W9HPG
6000 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: Charles M. Bove W0MXC
1611 1/2 East Lake St., Minneapolis, Minn. 55407

Delta Division

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

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2979 Observatory Ave., Cincinnati, Ohio 45208
Vice-Director: Charles C. Miller W8JSU
4872 Calvin Drive, Columbus, Ohio 43227

Hudson Division

HARRY J. DANNALS W2TUK
R.F.D. 1 Arbor LA, Dix Hills, Huntington,
N.Y. 11743
Vice-Director: Stan Zak E28JO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

ROBERT W. DENNISTON W6NWX
Box 631, Newton, Iowa 50208
Vice-Director: Sumner H. Foster W6GQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa 52403

New England Division

ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, Conn. 06340
Vice-Director: Bigelow Green W1EAE
236 Marlboro St., Boston, Mass. 02116

Northwestern Division

ROBERT B. THURSTON W7POY
7700 31st Ave., N.E., Seattle, Wash. 98115
Vice-Director: R. Rex Roberts W7CPY
837 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 W4AKC
764 Colonial Drive, Rock Hill, S.C. 29730

Rocky Mountain Division

CARL L. SMITHE W9BWJ
1070 Locust St., Denver, Colo. 80220
Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah 84403

Southeastern Division

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

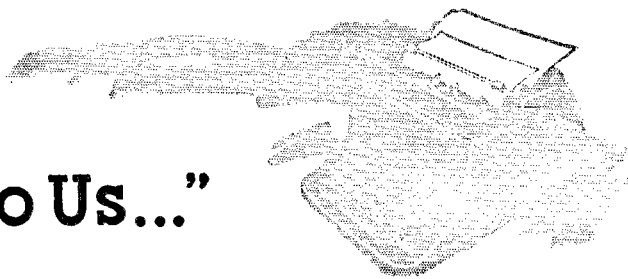
Southwestern Division

HOWARD F. SHEPHERD, JR. W6QJV
127 South Citrus Avenue, Los Angeles, Calif. 90036
Vice-Director: John F. Martin W6ECP
1135 Crest Drive, Encinitas, Calif. 92024

West Gulf Division

ROEMER O. HEST W5OKF
P.O. Box 1656, Corpus Christi, Texas 78403
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla.
73159

"It Seems to Us..."



CB — HAM PROSPECTS

MENTION of the Citizens Band to any group of hams is certain to raise some hackles if not cause outright mayhem. Much of our disdain for CB is merited; some of it is not. Let us, with open minds, examine some factors which have led to that antipathy.

One is that Class D CB operates in a portion of the spectrum once available to amateurs. Ergo, they stole our band! The fact is, however, that 11 meters was *never* an amateur band as such. It was and is assigned by FCC to "fixed and mobile" services, which covers most anything other than broadcasting and amateur. Some years ago the League requested and obtained a special arrangement for amateur sharing. We still remain of the view, as stated in our formal opposition, that FCC used questionable judgement in establishing CB operation in this portion of the spectrum in lieu of amateurs. But there is no justification for an anti-CBer attitude because he is using "our" band, any more than we can properly take individual offense at commercials now in 14,350-14,400 kc. Or any more than former commercial users of 21 Mc. can logically be bitter toward individual amateurs because we now have "their" band.

There have been conflicts in the press. We are angry—and properly so—when TVI caused actually by CB operation is blamed on "some amateur." But we've seen some examples of the reverse situation as well. There have also been times when newspapers have headlined some CB constructive communications activity as "ham" accomplishments. So we think we're about even on that score.

There can be no doubt that, in a substantial percentage of class D CB operation, the original concept has been perverted. Has this been entirely the fault of the individual user? We think not. Rather, a major share of the blame can be placed squarely on manufacturers who over-promoted the service with little or no ethical consideration of the regulations (and still do!); on magazines which winked at the rules while encouraging DXing, QSLs, certificates, and the like; and on FCC which found its Pandora's box too fantastically large a job of rules enforcement to accomplish.

The *individual* CBer had no one successful

national organization (and still hasn't) to coordinate his aims, to keep him informed, to set up self-imposed standards and policing, to guide the growth of CB in a proper direction. Numerous local groups made valiant attempts, but they were not sufficient. The CBer was swept up in a cataclysm of headlong growth, not of his own making or direction. He fell into operating practices and procedures sometimes idiotic, often illegal. There was no one to tell him any different. He has been the victim, rather than the cause, of the CB fiasco.

Many CBers are persons with an honest interest in radio communications. The serious ones are in the same position as were you and we in our preamateur days. Fortunately for us, we had no CB ogre to get us off on the wrong foot. A few serious individuals and groups in CB have accomplished some constructive activities in the field of communications organization—disaster relief, parade liaison, and similar events. On occasion, we must grudgingly admit, they have equalled or outshone amateur performance. They could not have accomplished this were they all indeed the nitwits we blindly choose to believe.

Are they, then, basically good prospects for conversion to the ham ranks? We think so! Having begun to make a name for themselves by CB participation in some aspects of local public service, if they can be encouraged to come over to ham radio they will have an opportunity to participate "in the public interest, convenience and necessity" on a more wide-spread basis. Thousands have already so graduated.

Some of our readers are undoubtedly already aghast at the preposterous suggestion there is any good in CB. We can visualize a few magazine editors sharpening their pencils to charge the League with some nefarious plot, knowing that blind hate of CB is a popular amateur pastime and that anti-CB comment will win them accolades based on emotion rather than objective consideration. So, a warning: Let no one misconstrue our words as a suggestion that amateur standards be lowered to permit easier transfer from CB to amateur. The League is currently attempting to upgrade standards for the amateur service, not

(Continued on page 10)

(Continued from page 9)

reduce them. There is to be no special treatment. CBers will have to enter the ham ranks under established regulations, the same as any other citizens.

If FCC carries through with its proposed restrictive CB rules, a lot of present CBers will no longer have a legitimate medium of exploiting their interests. Some may continue, in violation of the rules. The more conscientious will have two choices — give up much communications activity, or join the ham ranks.

COMING A.R.R.L. CONVENTIONS

- March 26-28 — Delta Division, Memphis, Tennessee
April 3-4 — Midwest Division, Des Moines, Iowa
April 21-25 — New England Division, Swampscott, Massachusetts
July 2-5 — ARRL National, San Jose, California
July 9-11 — West Gulf Division, Oklahoma City, Oklahoma
October 1-3 — Ontario Province, Sudbury

DELTA DIVISION CONVENTION

Memphis, Tennessee March 26-28

The Delta Division ARRL Convention will be held Friday, Saturday and Sunday, March 26-28, at the Chisca Plaza Hotel, in Memphis, Tennessee. Convention activities will include talks on antennas, receivers, transmitters, transistors, DX, v.h.f., MARS and portable electric plants, as well as amateur equipment exhibits. A v.h.f. seminar will be conducted by Paul Wilson, W4HHK, with Sam Harris, W1FZJ, QST contributing editor for v.h.f. Other League officials will also be on hand. Special activities are planned for wives and children.

Convention registration is \$2, and banquet/dance tickets are \$4.75. Rates at the Chisca Hotel are: singles, \$5.75 to \$7.50; doubles, \$8.25 to \$10; suites, \$15 up; motel (connected to the hotel) singles, \$8 to \$10; doubles, \$10 to \$12; suites, \$22 up. Requests for registration and/or hotel reservations may be sent to Bill Littles, WA4-DPJ, Chisca Plaza Motor Hotel, Linden and Main, Memphis.

MIDWEST DIVISION CONVENTION Des Moines, Iowa April 3-4

The Midwest Division ARRL Convention will be held in Des Moines, Iowa, on Saturday and Sunday, April 3-4, at the Kirkwood Hotel. The program will embrace most phases of amateur radio, with group sessions on DXCC, v.h.f., MARS, RTTY, mobile and ARPSC; FCC examinations will be administered; a c.w. speed contest will be held; and many other activities are planned including a Royal Order of the Wouff Hong initiation ceremony.

They'll be cast adrift — a fertile field for amateur newcomers.

Let's invite them into our club code and theory classes, or help them individually. Let's direct their enthusiasm to the expanded fields of amateur experimentation and communication — yes, and to the contests and routine activities which provide much of the enjoyment in amateur radio. Let's not hold against any amateur prospect the fact that he has a CB background. QST

With the ARRL Executive Committee planning its April meeting during the convention, those present will include ARRL President Hoover, W6ZII; 1st Vice-President Groves, W5NW; General Manager Huntoon, W1LVQ; Communications Manager Handy, W1BDI; Canadian Director Eaton, VE3CJ; Dakota Director Compton, W0BUO; Midwest Director Denniston, W0NWX; and ARRL General Counsel Booth, W3PS. Other speakers and guests will cover a wide variety of subjects, from antennas to Project Oscar. Distributors and manufacturers will exhibit the latest in amateur equipment.

Ladies' activities will include a hospitality room, a special women's luncheon and a millinery show, with the latest styles in hats and wigs, complete with live models. Dancing Saturday night will be to music provided by a name dance band.

Room reservations may be made by writing directly to the Kirkwood Hotel, 4th and Walnut, Des Moines, Iowa 50309. Prices start at \$6.50 for singles, \$9.50 for doubles and \$10.50 for twins. Convention pre-registration is \$7.50 per person, if postmarked before March 16; the cost will be \$9.50 at the door. Prices include the Sunday afternoon banquet. Registration requests should go to the Des Moines Radio Amateur Association, Convention Committee, P.O. Box 1031, University Place Station, Des Moines, Iowa 50311. "Talk-in" transmitters will be in operation on 3.970, 29.6 and 50.4 Mc.

OUR COVER

Paul M. Wilson, W4HHK, is dwarfed by his 18-foot dish installation. Center of the antenna, currently set up for 432 Mc., is 35 feet above ground. The equipment includes a SCR-584 el-az mount, and an FPS-3 radar platform. Dish with supporting frame and counterweights weighs about 2400 pounds! V.h.f. enthusiasts attending the Delta Division ARRL Convention in Memphis, March 26 through 28, are invited to inspect the moonbounce installation in nearby Collierville. W4HHK (A4HHK) is a member of Third Army Mars.

Oscar III Orbital Predictions and How To Use Them

BY HARLEY C. GABRIELSON,* W6HEK

If you plan to communicate through Oscar III, you will need to develop your own tracking data to determine when the satellite is within line-of-sight range of your station. You will also wish to determine what your relative azimuth heading to the satellite will be at the time of acquisition, what general path the satellite will follow while it is within your range, and the time and azimuth heading at which the Oscar III signals will be lost when it disappears below your horizon. In planning two-way communication via Oscar III, you'll also want to know when the station you wish to contact will acquire and lose the satellite signals. All of this pertinent information may be extracted from the general orbital predictions using the methods described in this article.

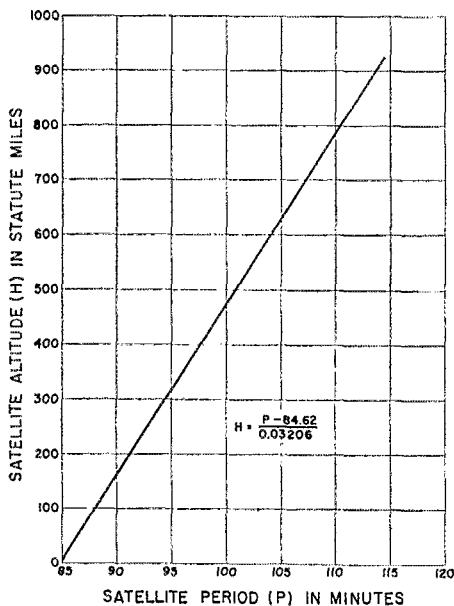


Fig. 1—Satellite altitude vs. orbital period (minutes).

Data Broadcasts from Project Oscar

Project Oscar Headquarters at Foothill College, Los Altos, California, will disseminate general orbital prediction messages¹ once Oscar III is known to be in orbit around the earth. These

* Project Oscar, Inc., Foothill College, Los Altos, Calif.

¹ Present plans call for c.w. bulletins to be broadcast on 3507.5, 7015, and 14,030 kcs. RTTY broadcasts will be on 3620 and 7040 kc. The 20-meter RTTY frequency and s.s.b. frequencies on 80, 40 and 20 meters will be announced by the time this article is in print.

messages will be similar to the ones produced for Oscars I and II. Each prediction message will identify the time of origin and will give Oscar III orbital parameters upon which the predictions are based. The text of the messages will contain a tabulation of orbit numbers and, with each orbit number will be given the "official" south-to-north equatorial crossing time (GMT) and equatorial crossing longitude (degrees *west* of Greenwich). The messages will be available daily from W6EE (the Oscar Headquarters station) and possibly from W1AW and other relay points. The prediction messages will be sufficiently complete for you to make your own predictions if you plan full tracking and use of Oscar III.

Your Operational "Range" for Oscar III

The first requirement in using the general prediction data and, indeed, making use of Oscar III is to determine your maximum reception range of the satellite. Whenever Oscar III comes within "view" of your antenna, it should be possible for you to hear it and to make use of the satellite. The higher the satellite altitude, of course, the farther away you should be able to hear it. If you know the orbital period of Oscar III, its altitude may be found from the altitude/period graph of Fig. 1. A graph of orbital altitude versus map range is given in Fig. 2. (Map range is the distance measured along the surface of the earth from your location to the point on the surface of the earth directly below the satellite. This point is known as the *sub-satellite point*.) Your operational range with respect to Oscar III may be drawn on a map of your area. A circle having a radius equal to the reception range with the center at your QTH will give the picture (with due regard taken for obscuration of nearby hills, etc.). This "acquisition map" will come in handy during the forthcoming Oscar III flight.

The longest possible period of reception and use of Oscar III will occur when the satellite passes directly over your location. Your map shows this as the diameter of the range circle. You can find the velocity of the sub-satellite point by dividing the circumference of the earth (25,000 statute miles) by the orbital period (in minutes). You can then divide the diameter of your range circle (in miles) by the sub-satellite velocity (in miles-per-minute) to obtain the time duration (in minutes) of your longest possible period of reception.

The Earliest Acquisition Time

The earliest acquisition time for Oscar III may be determined if you know how long it takes the satellite to travel to your latitude from the equa-

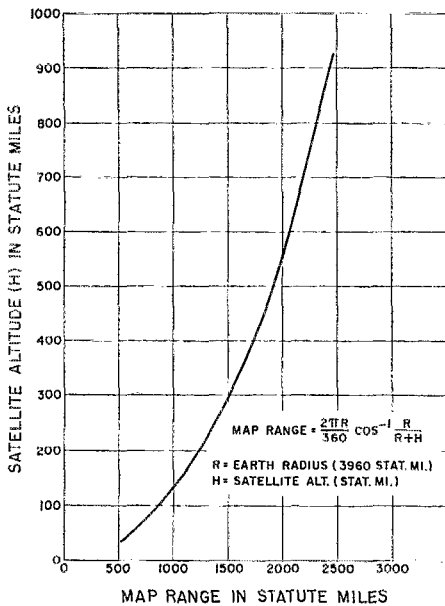


Fig. 2—Satellite altitude above earth vs. map range (statute miles).

tor.² Fig. 3 tabulates this information for given values of orbital period and orbital inclination. The desired time is given as a per cent of the total orbital period so the graph applies to any near-circular orbit, regardless of the period. Using Fig. 3, you can determine the travel time Oscar III requires from the equator to your QTH, or to the latitude of the southernmost point of your range circle. The latter information will tell you the time lapse between the equatorial crossing and the instant you will be able to hear a south-to-north Oscar III pass. This time lapse may be added to the predicted equatorial crossing time (always given for an "official" south-north pass) to obtain your earliest acquisition time for a south-to-north pass.

² Orr and Walters, "Orbital Predictions for Oscar III," *QST*, February, 1965.

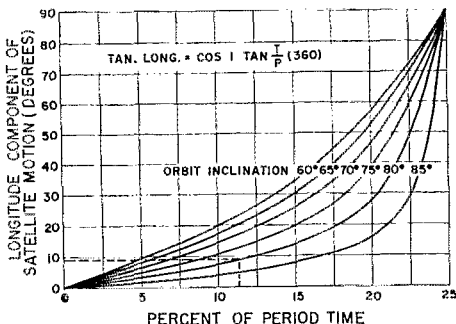


Fig. 4—The component of satellite motion parallel to the earth's equator. A satellite having an orbital inclination of 80°, as discussed in the text, will have an apparent eastward "drift" of about 9°.

In the same manner, you can determine the travel time between the northernmost limit of your range circle and the equator. This figure will give you the time it takes Oscar III to travel from that point to the equator during a north-to-south pass. Subtracting the southbound travel time from one-half the orbital period will give the time taken by the satellite to travel from the "official" equatorial crossing at the beginning of an orbit to your earliest acquisition time for north-to-south passes.

Equatorial Crossing Longitude

The following step determines the *Equatorial Crossing Longitude* for a satellite pass directly over your location. Two equatorial longitudes are involved, one for northbound passes and one for southbound passes. The longitudes in question are called *Station Reference North* (SRN) and *Station Reference South* (SRS). To derive SRN and SRS equatorial longitudes it is necessary to know the approximate pattern of motion of the satellite as it whirls around the earth. Two distinct motions contribute to this pattern. First, the rotation of the earth adds a component to the apparent satellite motion which shifts the orbit westward about *one degree for every four minutes of time* (15° per hour). It is necessary to know the

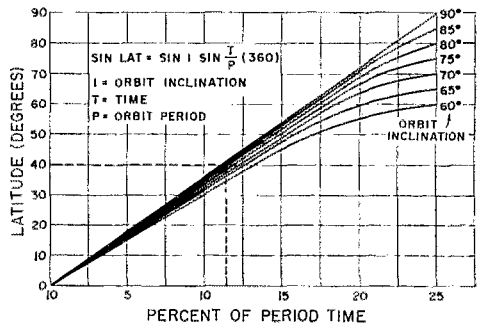


Fig. 3—Travel time of Oscar III to reach your latitude from the equator, expressed as a percent of total orbital period. If your latitude is 40°, for example, and Oscar III has an orbital inclination of 80°, the satellite requires about 11% of total period time to travel the distance from the equator to your latitude.

component of satellite motion parallel to the equator, and this may be determined from Fig. 4. The time scale is shown as a per cent of the total orbital period so the graph is applicable to any near-circular orbit, regardless of the period.

Second, many satellites are launched toward the southeast to take advantage of the rotational velocity of the earth as an aid in achieving orbital velocity. It is assumed Oscar III will be no exception. As a result, such satellites travel in a northeasterly direction during the first and fourth quarters of each orbit and in a southeasterly direction during the second and third quarters of each orbit (Fig. 5.)

We are now armed with enough information to establish the Station Reference Longitudes (SRN and SRS) at the equator. Let's first consider Sta-

tion Reference North (for a south-to-north pass). From Fig. 3 we determine travel time for Oscar III from the equator to your latitude. This time can be divided by 4 to obtain the westward "drift" (in degrees) of the orbit due to the rotation of the earth during the travel time. Fig. 4 provides the longitudinal component of satellite motion directed to the east. It only remains to combine the two components of motion properly with your longitude (expressed in degrees west of Greenwich) to arrive at the equatorial SRN point. The location of the SRS point is found in a like manner. In the latter case, the combination is first referred to the point at which the satellite crosses the equator southbound after an overhead pass. The resultant southbound equatorial crossing is then referred back to the equivalent official equatorial crossing longitude at the beginning of the orbit to obtain SRS.

An example is worth five thousand words at this time! Let's assume an approximate 500-mile circular orbit for Oscar III having a period of 100 minutes, and an inclination of 80° to the axis of the earth. What will be SRN and SRS for Joe Ham in Columbus, Ohio (40°N , 83°W) and what will he do with this intriguing information? Fig. 3 shows satellite travel time from the equator to his QTH as about 11 minutes. During 11 minutes the earth will have rotated about $2\frac{3}{4}^\circ$. From Fig. 4, the given orbital inclination during this time carries the satellite 9° to the east. This "drift" is combined with the westward movement of the orbit (as the earth rotates to the east

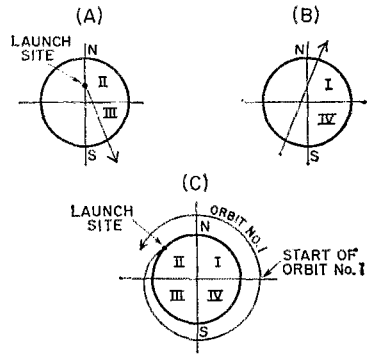


Fig. 5—The orbital period of Oscar III may be divided into quarters about the earth, the first quarter being the one immediately after the start of orbit one, on a northbound pass. If Oscar III is launched from California (A), it will achieve orbit in the second quarter, and will travel in a south-eastward direction through the third quarter, across Antarctica, and into the fourth quarter (B). A side view of the orbit is shown in (C).

the orbit appears to move to the west, to an earth-bound observer) for a total shift of $6\frac{1}{4}^\circ$ eastward. To pass directly over Columbus, Ohio, therefore, the satellite will have to cross the equator on a south-to-north pass at $83 + 6\frac{1}{4} = 89\frac{1}{4}^\circ$ west longitude. (Knowing this, Joe Ham will be alerted to Oscar prediction broadcasts, particularly those that call out equatorial crossings in the vicinity of 89° west longitude!)

Contrariwise, for north-to-south passes over Columbus, the satellite will move a total of $6\frac{1}{4}^\circ$ east during the time it travels from Columbus to the equator, and will cross the equator at $76\frac{3}{4}^\circ$ west longitude, heading south. As a southbound equatorial crossing is not an "official" one, being merely the midpoint of an orbit, this crossing point must be referred back to the "official" northbound equatorial crossing at the beginning of an orbit, which is on the other side of the earth. Merely add one-half the earth diameter (180°) to determine the "official" equatorial crossing point of $256\frac{3}{4}^\circ$ and then subtract one-half the orbital period progression (one-half $25^\circ = 12\frac{1}{2}^\circ$) to obtain the SRS reference of $244\frac{1}{4}^\circ$ west longitude, which is over Borneo. (Joe Ham will be alerted to equatorial crossings in this vicinity, too!)

"The BIG Picture"

You can now add several items of interest to your "acquisition map" to increase its utility in making predictions, as shown in Fig. 6. Mark the SRN longitude point on the equator. Also mark the point where a typical, nearby northbound pass over your station crosses the equator. Draw a line through your location and the equatorial SRN point, and a second parallel line through the equatorial crossing point of the "typical" pass. These two lines represent two sub-satellite tracks for Oscar III passes which go through your range circle. Draw lines parallel to the equator

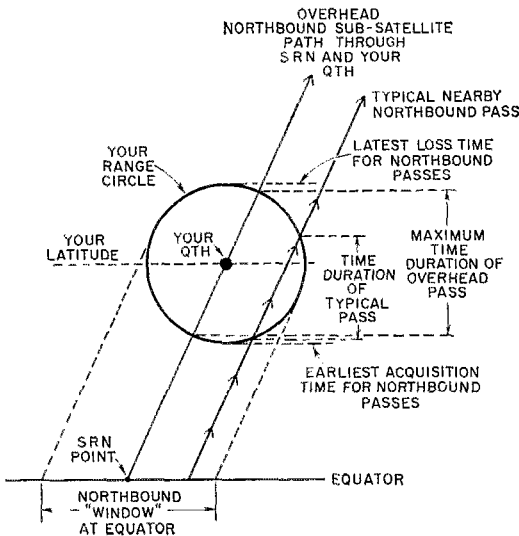


Fig. 6—An acquisition map of a typical northbound pass of Oscar III. Broadcast of equatorial crossing points (SRN and SRS) from W6EE will define "acquisition window" for orbital predictions.

and tangent to your range circle at the northern and southern limits of the circle. These lines mark your earliest acquisition and latest loss times.

Next, add two more tangents to the range circle parallel to the northbound sub-satellite track. The equatorial interception points define your northbound "acquisition window". When the *Oscar III* predictions show an orbit crossing between these two points, the satellite will intercept your range circle and you will be able to use *Oscar III*. A similar procedure will work with southbound passes and the SRS point.

Putting the Information to Use

Congratulations! You are now a tracking "expert" and in an enviable position to make use of *Oscar* prediction data to the fullest. You may use your "acquisition map" to pinpoint the route of *Oscar III* as it passes over your vicinity. If, for example, the predicted southbound equatorial crossing longitude is 5° east of your SRS point, you can draw a projected track line across your range circle through the point at your latitude 5° east of your location, parallel to the known sub-satellite track. Along this new line you can measure the time period from the early-acquisition line to the loss-of-signal line. You can also measure the length of the line within your range circle to determine the duration of use of *Oscar III*.

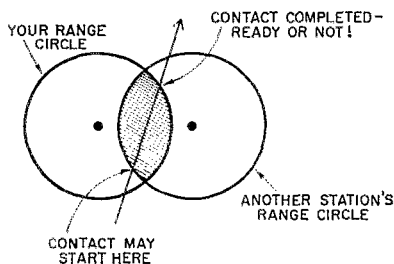


Fig. 7—Satellite track of *Oscar III* passes through range circles of two v.h.f. stations for "repeater" QSO.

The map presentation will also provide you antenna "aiming" information. It shows the azimuth setting required to direct your beam to the point of initial acquisition, and permits you to program the beam to track the satellite during the pass.

The final step in using the "acquisition map" is to draw a range circle about the location of a distant station you wish to schedule via *Oscar III*. The satellite track must pass through an overlapping portion of the two range circles (Fig. 7). Contact via *Oscar III* will be broken when the sub-satellite track leaves either one of the circles.

If you do not have access to the *Oscar* prediction bulletins, don't give up hope. If *Oscar III* can once be located and tracked, it should be possible for you to establish the orbital period from your own observations. Recent articles describe various techniques for making your own predictions.³ Orbital inclination is difficult to determine, but it is sufficient to use an estimated value of 80° .

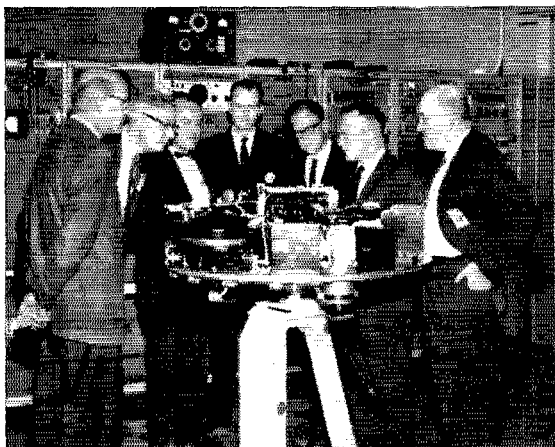
Your map efforts will be expedited by mounting the map on a flat surface with two clear plastic overlays. The range circle, the reference sub-satellite track(s), the "window" limits and the lines of acquisition and loss are drawn with a grease pencil on the bottom sheet. The top plastic sheet can then be used as a work sheet for each orbit as it comes along.

The *Oscar* Association hopes to broadcast prediction times for passes over many of the major cities in all continents. By following the outlined procedures, it is possible for you to generate these prediction times for your location. Much of the work may be done in advance, leaving you free to concentrate on achieving an *Oscar III* translator QSO. Good luck!

QST

³ Hilton, "Making Your Own Orbital Predictions from Doppler Measurements," *QST*, March 1962. Giro, "Planning *Oscar's* Orbit With Ease," *CQ*, June, 1962. Orr, "Oscar 1 — A Summary," *QST*, October, 1962. "Communicating Through *Oscar III*," *QST*, May, 1964. "Using The *Oscar III* V.H.F. Communication Satellite," *QST*, August, 1964.

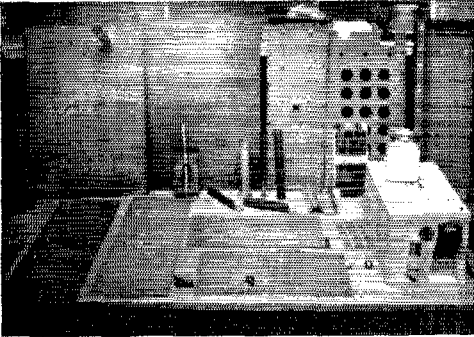
Strays



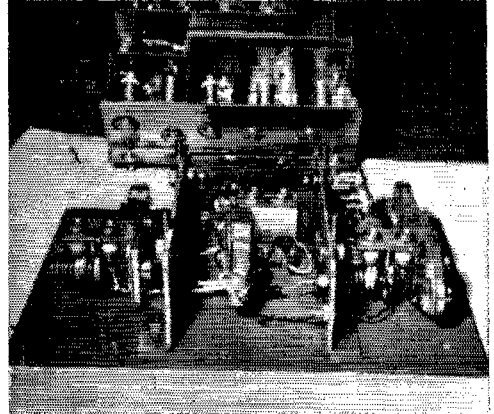
To get some background on a QST story which will appear in a future issue, several members of the ARRL Hq. staff made a trip to RCA's Princeton, N.J., Astro-Electronics Division, where they were given a red-carpet tour of the laboratories by H. L. Schwartzberg, W3VQQ, Manager of the ComSat Project. Left to right above, inspecting the innards of a Tiros weather satellite (OT-1), less solar array structure and antennas, are W1HDQ, W1DF, Glen Corrington, Tiros/TOS project engineer, W1CUT, W1LVQ, W1IKE, and W3VQQ. In the background is the Tiros engineering ground station used during all launches for direct read-out of engineering information.

Oscar III

Some Photographs Taken During Final Check-Out



Components for Oscar III box. At right is a special flight approved battery. The panels are made of magnesium-lithium, the lightest commercial metal available.



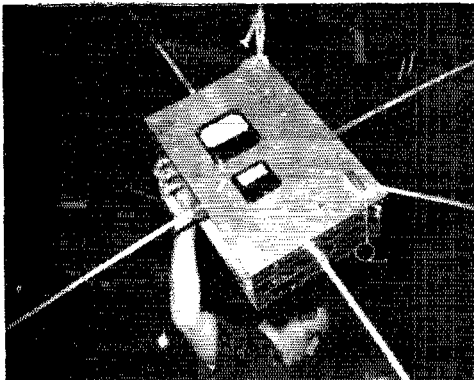
The 3-stage linear amplifier of Oscar III. Capable of better than 1-watt p.e.p. output at 145 Mc., this transistorized amplifier has intermodulation products lower the -35 db below one tone of a two-tone test signal. The entire package is less than six inches long.



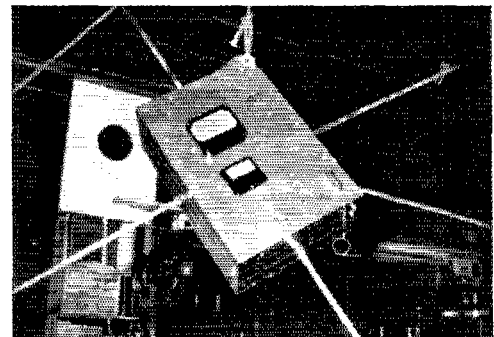
Almost three years of effort end in the successful operation of amateur radio's first spectrum translator. From left to right: Al Horley, ex 9M2TC, Bill Orr, W6SAI, Bill Eitel, W6UF, Don Norgaard, W6VKP, and Lance Ginner, K6GSJ.



Don Norgaard, W6VMH, makes some last minute adjustments to Oscar III before final A-okay is given. Ed Hilton, W6VKP removes the test supply as Oscar III is readied for flight battery, which occupies the center of the case.



Lance Ginner, K6GSJ checks Oscar III while a two-tone test signal is radiated by a test generator on the bench. In flight, the meter panel is removed and the flight panel is substituted.



Four antennas are used, with a fifth element acting as a counterpoise to establish a reference ground.

Making Use of the Oscar III Telemetry Signals

BY ARTHUR M. WALTERS,* W6DKH

THE Oscar III amateur radio space satellite incorporates three channels of vital telemetry data that will be transmitted to ground observers on 145.85 Mc. These channels will tell just how Oscar is behaving in his "out of this world" environment. This information is necessary to check the operation of the translator equipment, and also to provide data for future Oscar satellites. It is hoped that radio amateurs throughout the world will monitor the telemetry channels, in addition to using the translator. This article will illustrate how easy it is to "read" the telemetry signals and the proper way to interpret the readings. Calibration curves are included which translate the pulse information into the parameters measured.

A separate telemetry transmitter in Oscar III is driven by the telemetry equipment. It has an output power of about 25 milliwatts and is keyed on and off by several sources in a programmed manner. If all goes well, the keyed signals will tell the ground observer a number of things about conditions aboard the satellite.

The Telemetry Gear

A block diagram of the telemetry equipment is given in Fig. 1. The telemetry transmitter is actuated by a keyer which is driven from several sources, all of which are controlled by a rate multivibrator. The keying pattern is divided into two major parts, each of which lasts for four seconds. The first part of the sequence connects the telemetry transmitter to the diode matrix HI generator. The output from the matrix is a series of dots and spaces which make up the Morse Code greeting HI which is Oscar's signature. The word HI is sent twice at a rate of about 8 dots per second, taking four seconds to complete the sequence. The binary divider chain switches AND gates Nos. 1 and 2 so that the HI generator drives the keyer stage. Next, the transmitter and keyer are switched to the telemeter pulse generators. There are two of these, and they are selected one after the other; AND gates 1 and 2 control the switching, and AND gates 3 and 4 make the choice of generators. The first train of pulses from No. 1 generator

represents T_1 , the temperature of the transistors in the final amplifier of the translator. The pulse burst lasts two seconds.

AND gates 3 and 4 now switch the keyer to pulse generator No. 2, which represents T_2 , the temperature of the main battery case within Oscar III. This reading indicates the average ambient temperature in the satellite. This 2-second pulse burst is followed by the HI signal, signifying a repetition of the telemetry cycle (Fig. 2).

The telemetry signals are a form of pulse-width modulation, and the pulse-width signals are triggered by the rate multivibrator. This multivibrator has a nominal frequency of 64 c.p.s. at 25° C. at a nominal battery voltage of -18 volts. Environmental tests have shown that changes in the multivibrator frequency for moderate temperature variations are quite minor and may be neglected unless the actual temperature of the package is greatly different than the design value.

The frequency of the rate multivibrator is arranged to vary as the potential of the -18 volt supply changes. Thus, as the main silver-zinc battery deteriorates over a period of 3 or 4 weeks, the rate of the pulses will decrease from about 69 c.p.s. at the beginning of orbit to around 37 c.p.s. after the main battery goes dead and the telemetry switches over to the solar-cell-charged auxiliary battery. The

telemetry

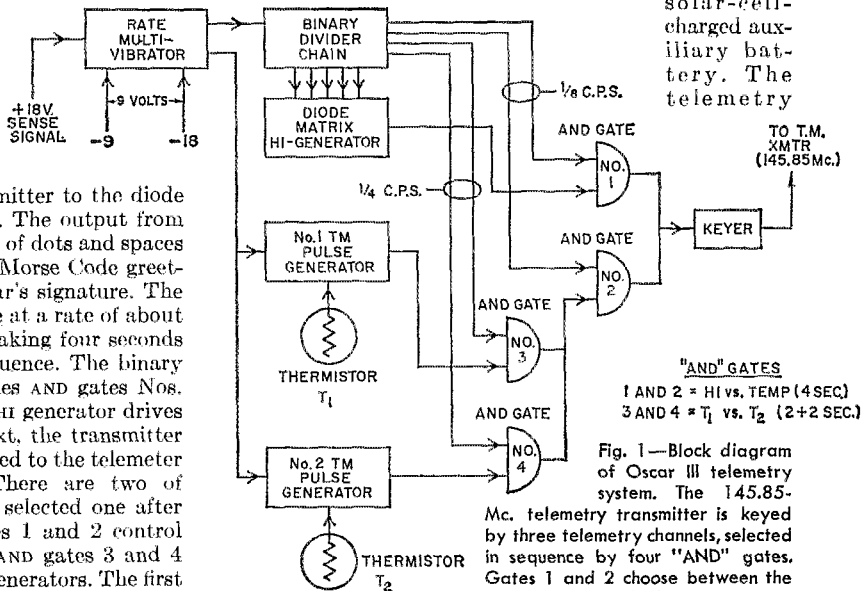


Fig. 1—Block diagram of Oscar III telemetry system. The 145.85-

Mc. telemetry transmitter is keyed by three telemetry channels, selected in sequence by four "AND" gates. Gates 1 and 2 choose between the identifier HI and the temperature channels. Gates 3 and 4 choose between the two temperature channels. Calibration curves for the three channels are given in Figs. 3 and 4.

* Project Oscar, Inc., Foothill College, Los Altos Hills, Calif.

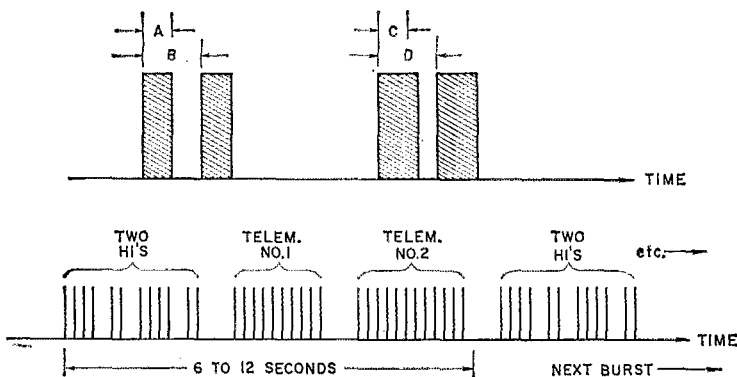


Fig. 2—A representation of the telemetry channels. Two HI's in Morse code are transmitted, followed by two bursts of telemetry. Each burst consists of a series of pulses, and each represents a temperature measurement made at a specific point in the satellite. The pulse rate of the complete sequence is related to the battery voltage and the duty cycle of the pulses in the two telemetry bursts conveys temperature information. The ratio of pulse width (A) to repetition rate (B) may be measured on the screen of an oscilloscope. One complete sequence (Channel 1, for example) should be expanded to fill ten divisions on the screen of the scope, and the duty cycle (A/B) may be read directly in percentage.

calibration curve for primary battery voltage versus pulse rate is shown in Fig. 3.

The telemetry pulse generators are Schmitt trigger circuits with a thermistor as one of the bias-control resistors. (A thermistor is a temperature-sensitive element whose resistance varies in accord with external temperature.) The circuits have been adjusted so that the pulse width is about 50 per cent (a square wave, as shown in Fig. 2) at normal operating temperature. The pulse width varies from about 20 percent at 0° C. to approximately 80 per cent at 60° C. Fig. 4 is a graph showing the relationship of battery voltage to pulse width, or duty factor.

Telemetry Measurements—Battery Voltage

Figs. 3 and 4 provide the necessary conversion data that will permit the ground observer to make

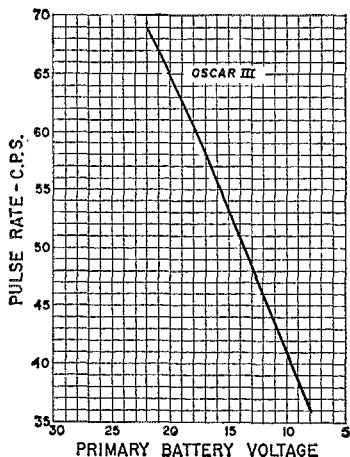


Fig. 3—Calibration curve for primary battery voltage as represented by pulse rate (cycles per second). The graph is linear, and may be reproduced by drawing a straight line through two reference points: At 22 volts, the pulse rate is 68.7 c.p.s., and at 8 volts the pulse rate is 36.0 c.p.s.

the necessary measurements from the data telemetered from Oscar III. The only ground apparatus required is a sensitive v.h.f. receiver, an inexpensive oscilloscope, and a calibrated audio oscillator. Fig. 5 shows the equipment used to determine the pulse rate, which is the measure of primary battery voltage. The oscilloscope is connected to the output of the detector stage of the receiver and the receiver audio section is used only for monitoring purposes. During the telemetry bursts a "buzz" will be heard. The telemetry signal is tuned in and the audio oscillator adjusted to display a stationary pattern on the scope. There are many frequencies that will do this, but the proper one will be the same as the pulse rate, and will be between 35 and 75 cycles. During the early life of the satellite, the pulse rate is expected to be about 60 cycles, so this is a good starting point for initial oscillator setting. When the Lissajous pattern is stable, the audio frequency may be read from the dial of the oscillator. This is equal to the pulse rate (or pulse repetition frequency) of the keyer and represents battery voltage, as shown in Fig. 3.

Telemetry Measurements—Temperature

Fig. 6 shows the equipment adjusted to determine the pulse width and the two temperature measurements telemetered from Oscar III. An audio oscillator is not required. To accomplish the pulse-width reading, the oscilloscope sweep should be synchronized on the incoming signal (taken from the detector stage of the receiver). It is necessary to know whether the detector output of your receiver goes positive or negative with incoming signal, to prevent confusion of the "mark" and "space" portions of the telemetry signals.

In the presence of noise, there will be "jitter" in the synchronizing, so that an "educated average" will have to be taken. Sweep speed and horizontal-amplifier gain are adjusted so that one pulse cycle (one telemetry measurement) expands

to fill ten horizontal divisions on the screen. It is now possible to read directly the percentage of pulse "on" time to the time of full cycle (Fig. 2). A direct reading is possible if the pattern is adjusted to fill exactly ten horizontal divisions. Record pulse width of the first pulse train (T_1), followed by the pulse-width reading of the second train (T_2). The pulse width readings may be converted to temperature by means of Fig. 4.

The III signal serves only the purpose of identification and as a timing signal to enable the ground observer to distinguish T_1 from T_2 , and

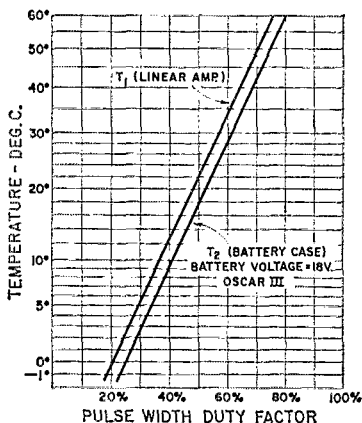


Fig. 4—Calibration curve for pulse width, representing temperature (degrees Centigrade) at two points in Oscar III. Curve T_1 is for the temperature of the linear amplifier, and Curve T_2 is for the temperature of the battery case. If, for example, the pulse width (ratio A/B, Fig. 2) is 60%, T_1 is 34° C. and T_2 is 28.5° C. This graph is plotted on Keuffel & Esser 359-51, Semi-Logarithmic, 1 cycle \times 10 to the inch paper. The graph is linear, and may be reproduced by drawing straight lines through two reference points on each curve. These are: Curve T_1 , 20% pulse width is at -0.5° C. and 70% pulse width is at 49.5° C.; Curve T_2 , 20% pulse width is at -2.2° C. and 70% pulse width is at 42° C. It is recommended that these curves be redrawn on large graph paper for greater accuracy and that Figs. 3 and 4 be used merely for reference.

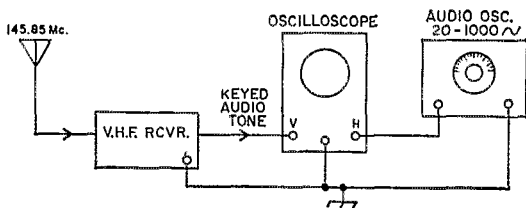


Fig. 5—Determining pulse rate of Oscar III. A stable v.h.f. receiver, plus an inexpensive oscilloscope and an audio oscillator are all the tools needed. The dial calibration of the audio oscillator should be checked against a standard (the power line, for example) for accuracy. A Lissajous pattern is created on the screen of the scope, and the audio frequency of the oscillator is adjusted to make the pattern stand still. The pulse rate of Oscar III is then equal to the audio frequency. Use Fig. 3 for conversion of pulse rate to primary battery voltage.

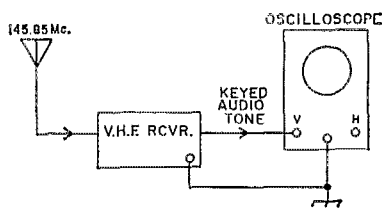


Fig. 6—Determining pulse width of Oscar III. The two temperature measurements shown in Figs. 2 and 4 may be made with this equipment setup. Oscilloscope sweep is synchronized internally.

does not enter into the readings as such. If desired, the pattern may be traced on the oscilloscope with a grease pencil for later measurement.

Be sure to make accurate records of your measurements. Log the date, time (GMT), and orbit number. The Oscar Association would appreciate receiving your data, which should be mailed to: Project Oscar Headquarters, Foothill College, Los Altos, California, U.S.A. Your participation and support in this activity will make future Oscars possible!

QST

Strays

Those interested in Oscar satellite predictions are invited to write Thomas W. Petrie, 2459 Overlook Rd., 75, Cleveland Heights, Ohio 44106, for full details. Tom has access to a large, high-speed digital computer (UNIVAC 1107) and a computer program for calculating satellite predictions.

OSCAR III USERS: REMEMBER 3rd-PARTY RULES

V.h.f. men using Oscar III facilities for international communications may be faced with questions on international third-party communications for the first time since they left the "d.e. bands." A reminder then: 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. amateurs on behalf of third parties only with amateurs in the following countries: Bolivia, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela. Canadian amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Mexico, Peru, U.S. and Venezuela.

The Whys of Transmission Lines

Part III—Putting the Antenna and Line Together

BY GEORGE GRAMMER*, W1DF

THE half-wave dipole is the basis for most amateur antenna designs. Different types of lines can be used to feed power to it. The line should just carry power to the antenna and not get into the radiating act itself. When this is so, the dipole does all the radiating, and one dipole is the same as another no matter how power may be fed to it. This obvious fact is too often overlooked. Amateurs frequently let themselves be dazzled by some trick name tacked on a dipole-plus-feeder combination, but names don't do the radiating.

The best place to feed a half-wave dipole is at the center. The dipole is a balanced antenna — that is, it is symmetrical about its center. To maintain this symmetry a balanced line — *i.e.*, a parallel-conductor line — should be used. The dipole *can* be fed at one end, but this also upsets the symmetry of the system.¹

If the impedance at the center of the antenna matches the characteristic impedance of the transmission line the two can simply be connected together and the line will operate without standing waves. One advantage of this matched operation is that the line length has very little effect on the coupling required between the line and the transmitter. Another is that the losses in the line are least, for a given length, when the line is properly matched. The line losses can either be very important or completely unimportant. They are quite important at v.h.f. even when the best possible job of matching is done. They are unimportant at the lower frequencies, even with a considerable mismatch. The only exception here is when a major error is made in selecting the proper type of line for the use to which it is to be put.

A matched antenna system is actually matched only for one frequency. At best, the system will stay matched over only a small band. As the 7-, 14-, and 21-Mc. bands are narrow, in terms of percentage, an antenna that is matched at the center of one of these bands should work over the entire band without having the s.w.r. get too large at the band edges. But you can't do quite as well with antennas of this type on 3.5 and 28

Mc. Here it is best to cut the antenna for the section of the band that interests you most.

Matched Antenna Systems

Since the dipole has a center impedance of about 70 ohms, it will match a line having a characteristic impedance of 70 ohms, or something close to it. (A small — *e.g.*, 20 per cent or so — discrepancy doesn't cause any difficulty. When 70-ohm or 75-ohm line is mentioned it is to be understood that any impedance in that immediate vicinity is meant.) There is a polyethylene-insulated two-conductor 75-ohm line available for this purpose (Amphenol 214-023). The antenna is simply cut in the center and a connection made to each line conductor, as in Fig. 1A.

In spite of the fact that it is desirable to keep the system balanced, a good many amateurs use

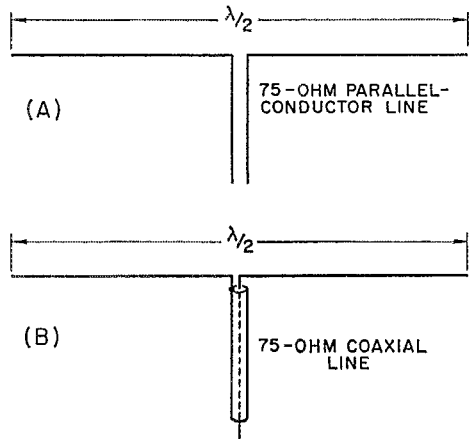


Fig. 1—Using 75-ohm line to match the center impedance of a half-wave antenna. The antenna length in feet is equal to 468 divided by the frequency in megacycles.

75-ohm coax for the same purpose, as in Fig. 1B. This is not the best practice, although it will work. One side of the dipole is unavoidably connected to the *outside* of the outer conductor as well as to its *inside*. This makes the outside of the coax line a part of the antenna system. Thus the outside of the line radiates — but not in any predictable way, because everything depends on where and how the line is installed and how

*Technical Director, ARRL.

¹An exception to this is when *two* dipoles are fed from a parallel-conductor transmission line. An example is described shortly.

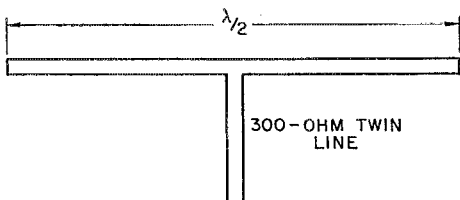


Fig. 2.—The folded dipole. The antenna length is calculated in the same way as for a single-wire dipole.

long it is. The principal thing to be said for this system is that the coax line is easy to get.

Very often, 52-ohm (a nominal value) line is used instead of 75-ohm. It is not matched as well by the antenna, but the mismatch is not serious. It has the same disadvantages as 75-ohm coax.

The Folded Dipole

The advantages of matched operation also are realized with the *folded dipole*, shown in Fig. 2. The folded dipole has two half-wave conductors side by side. One is continuous, but the other is cut at the center for making connection to 300-ohm twin line. The two conductors are joined at their ends.

The wires radiate in parallel. In this respect, the pair is equivalent to a single half-wave dipole. But splitting the conductor into two parts has the effect of making the antenna impedance, as seen by the line, four times the impedance of a single-wire dipole. Thus at the point where the transmission line is connected the antenna impedance is approximately 300 ohms — just right for matching 300-ohm line.

Twin line can be used for the folded dipole itself, but ordinary TV line won't stand the mechanical stresses too well if the antenna is long. There is a special heavy-duty line available (Amphenol 214-022) which is better. TV ladder line also can be used for the dipole. The spacing between the dipole wires can be anything up to a few inches, so practically any construction that will keep the wires parallel can be used.

"Open-Wire" Feeders

Fig. 3 shows a half-wave dipole fed at the center through *open-wire* parallel-conductor line. This is line having mostly air insulation, such as the TV ladder line mentioned earlier. Here there is no attempt at matching the antenna to the line. Consequently there are fairly pronounced standing waves on the line. However, the high s.w.r. doesn't cause an undue power loss in open-wire line. The principal penalty is that more attention has to be paid to the coupling between the line and transmitter. The advantage is that the antenna can be made to take power at practically *any* frequency.

A transmission line operating with a high standing-wave ratio is often called a *tuned line* or *tuned feeder*. Actually, the only tuning necessary is that required for coupling the trans-

mitter to the line. The line can be any length. However, it does help simplify the transmitter coupling a bit if a resonant length is used. Such a length, as you have seen, will be some multiple of one-quarter wavelength.² The line will "look like" a resistance at its input end in such a case, provided the antenna itself is resonant.

On the other hand, in this open-wire system the dipole doesn't have to be exactly resonant. Since there is no attempt at matching the characteristic impedance of the transmission line, the antenna doesn't *have* to look like a pure resistance, of just the right value, to the line. The over-all length of wire in the system, including both the dipole and the transmission line, is of more interest. It is this over-all length that determines whether or not the system as a whole is resonant. One line wire plus one side of the dipole (the length *L* in Fig. 3) should be a whole-number multiple of a quarter wavelength if you want the system to be resonant. The formula

$$\text{Length in feet} = \frac{234}{\text{Freq. in Mc.}}$$

will give the length of a quarter wave as accurately as is necessary.

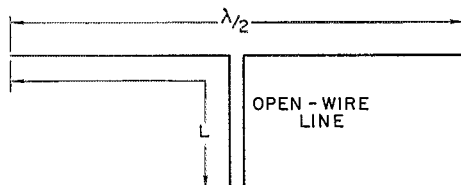


Fig. 3.—Half-wave dipole fed with open-wire line.

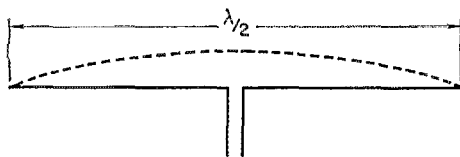
Multiband Operation

The simplest multiband antenna, and the most versatile, is the one shown in Fig. 4, using open-wire feeder. Since the amateur bands are harmonically related in frequency, we can take advantage of the fact that wires have harmonically-related resonances. The fundamental frequency of a center-fed wire is the one for which its length is a half wavelength. At twice the frequency each *side* of the antenna is a half wavelength long, so at this frequency the transmission line is feeding a pair of half-wave dipoles end-to-end. The current distribution is shown in Fig. 4, which also shows the other resonances up to the fourth multiple.

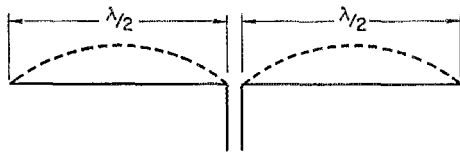
You should note a few especially interesting things in these drawings. In the second-harmonic case the polarity of the current is the same in both sides of the antenna. There is no reversal such as there is in a continuous wire of the same over-all length. This difference comes about because we have, in effect, two half-wave antennas driven in push-pull, rather than a single antenna a full wavelength long.

There is a somewhat similar situation at the

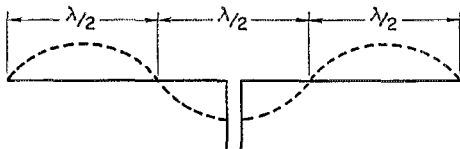
²"The Whys of Transmission Lines," Part I, January, 1965, *QST*.



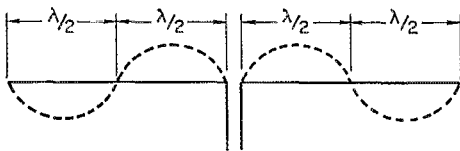
FUNDAMENTAL - F



2nd. HARMONIC - 2 F



3rd. HARMONIC - 3 F



4th. HARMONIC - 4 F

Fig. 4—Harmonic operation of a center-fed antenna. If the antenna is a half wavelength long at 7 Mc., for example, it will also be resonant in the 14-, 21- and 28-Mc. bands.

fourth harmonic. Here, too, the currents in the half-wave sections connected to the line have the same polarity. However, when we go out along either wire we find that the normal reversal occurs in the next half-wave section.

This type of current distribution occurs at all even multiples of the fundamental frequency. Note also that at the second harmonic the current is minimum where the feeder is connected. Although the voltage distribution isn't shown, the voltage is highest at these same points, just as in the cases discussed earlier. This means that the impedance is high at the connection point. If the antenna is resonant, it is a resistance rather than an impedance, and is of the order of several thousands of ohms. This same condition exists at all even multiples of the fundamental frequency.

Odd Harmonics

Now look at the drawing for the third harmonic. Here we have the normal current distribution for a wire three half-waves long. The antenna current has its largest value right where the transmission line is connected. The

voltage must be lowest at this point, so the impedance (or resonant resistance) of the antenna is low — more like the impedance at the fundamental.

Thus for all odd multiples of the fundamental, the current distribution is the same as in a simple continuous wire of the same over-all length, and the impedance at the feed point is low. The impedance goes up a little with each odd harmonic — to a little over 100 ohms at the third harmonic and to about 120 ohms at the fifth harmonic.

Because these figures do not differ too greatly from 70 ohms, it is possible to operate an antenna on its odd harmonics when it has been matched on its fundamental. The match is not as good as at the fundamental, but it is not so poor as to result in excessive line loss. Such operation does not really qualify the antenna for multiband work, because only a few bands — not a consecutive series — can be covered.

If the antenna is fed with 50- or 75-ohm line you should not try to operate it at even harmonics of the frequency for which it is matched. The line losses would be excessive because of the high s.w.r.

Transmitter-to-Line Coupling

Nowadays nearly all transmitter final tank circuits are designed for coupling into resistive loads of 50 to 75 ohms. A properly-matched coaxial line will "look like" such a resistance, and when a matched coax line is used there is no difficulty in making the final amplifier load up to the rated input. But if the load isn't properly matched, or some other type of line is used, you may have problems. The loading and tuning adjustments offered by the transmitter usually will give you some leeway — even if the matching at the antenna isn't perfect you may still be able to get the power input you want. Again, you may not.

You can get around troubles of this sort by using a special coupling circuit — a *transmatch* — between the output of the transmitter and the input end of the line. As we saw earlier, the input impedance of the line is not the same as the line's characteristic impedance unless the line is perfectly matched by the antenna.³ If the s.w.r. is greater than 1 to 1 the input impedance may differ widely from Z_0 . If the line is connected directly to the transmitter, the latter may see a load that it can't handle. The transmatch takes the line input impedance and transforms it to what the transmitter wants.

It also does two other things. Practically all transmitter output circuits are single-ended — one side is grounded to the chassis, which is the right way to do it for coax line. What to do when a balanced line is used, as in Figs. 1A, 2 and 3? The transmatch easily handles this one: it provides the means for going from a balanced line to coax. In addition, it adds selectivity between the transmitter and the line — selectivity that often is badly needed. It is an

³"The Whys of Transmission Lines," Part II, February, 1965, QST.

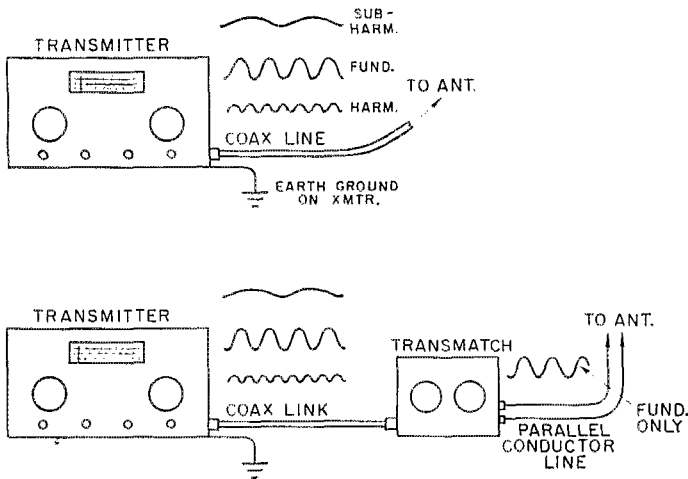


Fig. 5—The transmatch provides means for matching your transmitter's output impedance requirements, for going from a balanced transmission line to coax, and for filtering out frequencies that shouldn't be allowed to reach the antenna.

unfortunate fact that most transmitters "put out" not only the frequency you want, but also harmonics of that frequency—and, in some cases, lower frequencies too, when lower frequencies are present in the stages leading up to the final amplifier. The transmatch is a circuit that, among other things, is tuned to your desired output frequency, and so helps in keeping the unwanted frequencies from reaching the antenna.

Using the Transmatch

Fig. 5 shows how it is connected, and Fig. 6 is a typical circuit. It isn't the only circuit

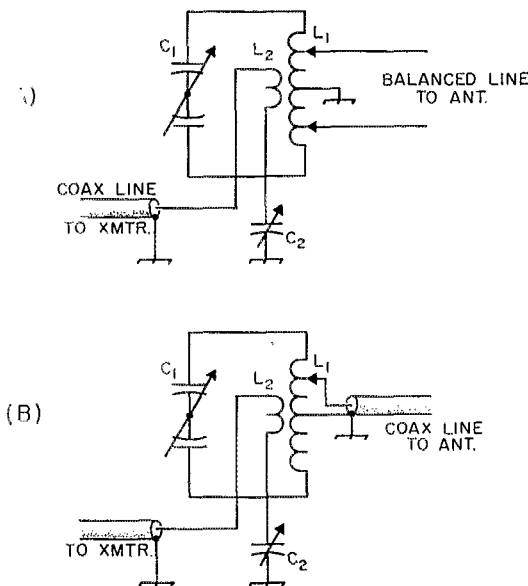


Fig. 6—A representative transmatch circuit.

that can be used, but is probably as versatile as any. The circuit formed by L_1 and C_1 is tuned to your operating frequency. If the line is the parallel-conductor (balanced) type the wires are tapped on L_1 at equal numbers of turns from the center. The loading is adjusted by changing the positions of these taps. L_2 couples the power to L_1 , and C_2 gives you a means for tuning this link circuit. A coax line goes from here to your transmitter's output terminal. Between these two adjustments you can transform a wide range of line input impedances into 50 or 70 ohms (whichever is the Z_0 of the coax line from the transmatch to the transmitter).

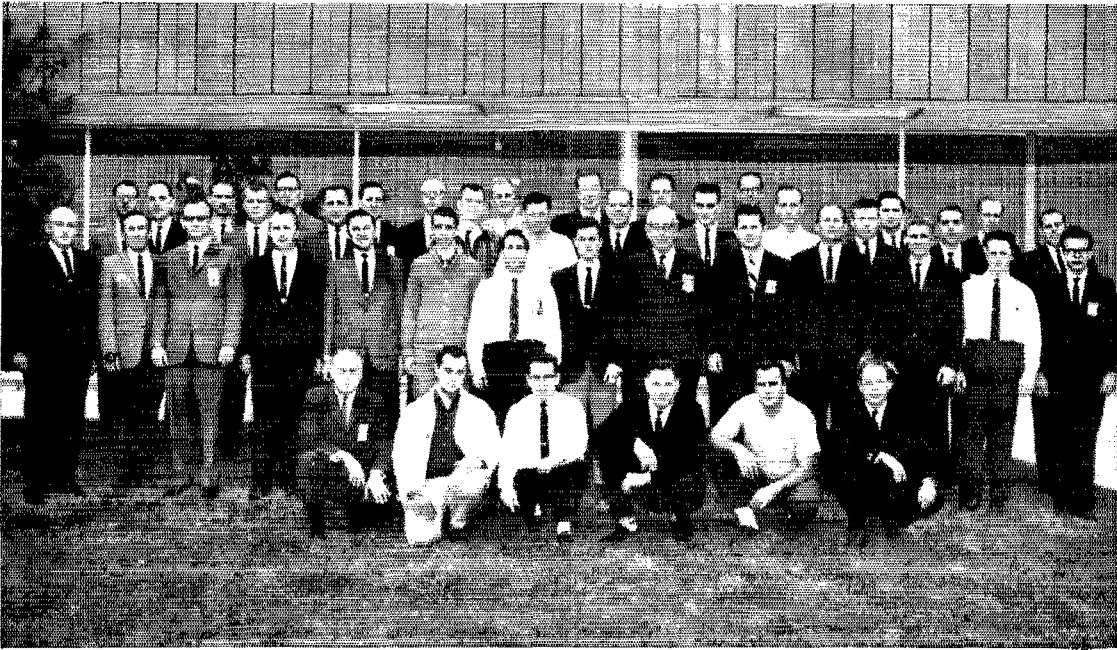
The method used for coupling to a coax line feeding the antenna is shown at B. It is very similar, the only difference being that the outer conductor of the line is connected to the center of the coil and only one tap is used. The coax link circuit to the transmitter remains the same. So does the method of adjustment.

The benefits of the transmatch circuit do have their price—you have to fix things so L_1C_1 can be tuned to each band you want to use. This usually means that L_1 is a plug-in coil. L_2 is generally made part of the same coil assembly, since it is advantageous to change it, too, for various bands. The same capacitors can be used for all bands, though, over at least the 3.5–30 Mc. range.

The adjustment of a transmatch is easy if you have a bridge such as the Monimatch. Such a bridge is inexpensive and is an almost indispensable station accessory. However, you can arrive at a reasonably satisfactory adjustment simply by varying the tap positions, along with the settings of the two capacitors, while performing the normal tuning and loading operations on your transmitter. After a little cut-and-try you'll find the transmatch settings that let you load up the final amplifier to the input you want. **QST**



Dr. R. B. Janes, of RCA Electronic Components and Devices, lectures to a group of interested RCA people and ARRL Hq. staffers during a recent symposium on The State Of The Art Of Semiconductors, held at the RCA Semiconductor plant, Somerville, New Jersey. Included in the day's activities were a tour of the laboratories and technical sessions dealing with diodes, transistors, SCRs, MOSs (metal-oxide semiconductors) and other semiconductor devices. Heads, left to right: Ken Aitkin, W2OUY, John Spooner, K2JCG, George Grammer, W1DF, George Hanchett, W2YM, Marty Bell, W2JSX Laird Campbell, W1CUT, Dick Baldwin, W1IKE, John Huntoon, W1LVQ, Ken Bucklin, W2CDP (foreground), Lee Aurick, K3QAX, John Wilhelm, W3SNI, Ed Tilton, W1HDQ, Harold Vance, K2FF, Walley Pond, WA2JXO, and Dr. Janes.



This group picture bears evidence that an amateur radio background plays a significant part in the ability to design, develop, build, and to orbit, U.S. space hardware. Out of a technical force of 600, there are about 50 hams at the RCA Astro-Electronics Division, Princeton, New Jersey. These space-center hams have participated in projects that are enough to make the space enthusiast's mouth water. Relay, Tiros, Score, ComSat, Nimbus, Lunar Orbiter, Ranger, SERT and Air Force projects are on the list of projects, with such fascinating jobs as NASA tape Camera, Nimbus Tape Recorder, Nimbus battery, and Environmental Simulation all in a day's work. First row, right to left: W2FCY, K2ENW, W2PCS, K2OHU, K2PMY, W2UAS. Second row: K2UKM, WA2VEQ, W2FQY, K2EJK, W2KFH, W3ZMC, WA2ZYU, WB2OMS, K2GXQ, K2VLC, WB2BIW, K4PCP, W3VQQ. Third row: WA2WFM, K3IUU, K2KPA, W2VJN, K3UDH, WA2KHY, WA2SDJ, K2ZFD, WB2FGJ, K2THS, W2NQB. Fourth row: WA2THH, W2RHD, WA2TDR, W2ABG, WB2JSX, W2HTD, K3JXH, WA2HIR, W2PGI, WA2VLL, W2WGH, K3NPQ. Not present for the picture taking: W2KKM, K2DZS and W2GGT.

Receiving Radioteletype

Converting the RTTY Signal into Pulses for the Printer

BY IRVIN M. HOFF,* K8DKC

The third article of the RTTY series by K8DKC outlines in broad strokes the method by which an incoming signal is changed into a form suitable for actuating the magnets in a teleprinter. A demodulator of advanced design will be described in a subsequent article. In the interim, the article immediately following in this issue has practical circuits for the RTTY beginner anxious to make his newly-acquired machine do its stuff.

A teleprinter operates from on-off d.c. pulses. The closed-circuit ("on") condition is called "mark" and the open-circuit ("off") condition is called "space." Ordinary Morse code is similar in many respects.

When a receiver with b.f.o. on is tuned to a c.w. signal a tone is heard in the headset or speaker during key-down ("on") and noise is heard during key-up ("off"). The relationship between these two conditions is called the "signal-to-noise" (S/N) ratio. In ordinary c.w. it is customary to use relatively low r.f. gain to optimize this relationship and make it easier for the operator to distinguish between the signal and the undesired noise.

Frequency-Shift Keying

If the transmitter is kept on the air at all times and keyed by switching back and forth between two slightly-separated frequencies, the signal-to-noise ratio can be greatly improved. The improvement is of little benefit in aural reception, but if automatic means are used to interpret the signal, this frequency-shift keying (called f.s.k.) offers distinct advantages. In fact, f.s.k. still remains one of the most practical methods that can be used for automatic reception of signals.

The f.s.k. system is a standard method of transmitting not only RTTY but high-speed commercial Morse as well. Various frequency shifts are in common use, but the universal "standard" is still 850 c.p.s., and the majority of amateurs use this value. Many enthusiasts have found marked improvement in reception on crowded frequencies using 170-c.p.s. shift. Among other advantages, this allows using the highest selectivity that the receiver offers—usually 500-c.p.s. bandwidth—for maximum rejection of unwanted signals.

Since the transmitter stays on the air continuously but shifts between two different frequencies, the over-all effect is that of two c.w. stations 850 c.p.s. apart. The frequency in the no-typing or closed-circuit condition is called "mark" and is an "on-off" frequency when keyed. The other frequency is the open-circuit condition or "space," and is exactly the opposite of mark, or "off-on."

* 1733 West Huron River Drive, Ann Arbor, Michigan 48103.

It can be seen, then, that either mark or space actually contains all the information transmitted. Indeed, certain advanced types of receiving equipment make particular use of this very feature.

Receiving the RTTY Signal

Three items are needed to print messages from radioteletype signals:

- 1) A good communications receiver.
- 2) An f.s.k. demodulator (often called a "converter").
- 3) A teleprinter.

The receiver separates the particular station desired from others; the f.s.k. demodulator changes the incoming signal into on-off d.c. pulses; and the teleprinter changes these electrical pulses into mechanical motion to print the message.

The Receiver

In general, any receiver usually considered adequate for single-sideband reception will do well on RTTY. The receiver is used for the same purpose as in receiving a c.w. signal—that is, to change the incoming radio frequency into an audio frequency that can be used, in this case, by the RTTY demodulator rather than by the human ear. A product detector (as used for s.s.b.) is preferred over the diode detector found in older a.m. and c.w. receivers, as it not only provides an improved signal-to-noise ratio as a general rule, but also simplifies the use of a.g.c. in the receiver, which at times can be helpful.

Since the mark and space signals are separated by only 850 cycles at most, it would be nice to have a selectivity position on the receiver of about 1.0 kc. Most receivers do not offer exactly this bandwidth, but one manufacturer does have a 1.0-kc. position; another has a 1.2-kc. position, and yet another has optional filters available for 1.5 kc. These same manufacturers offer a more narrow position for c.w. reception which works very well for 170 c.p.s. shift. However, the optimum bandwidth of the receiver would be about 250 c.p.s. for narrow-shift reception.

The c.w. operator usually adjusts his receiver to give approximately a 1000-c.p.s. audio tone for copying code. In a carry-over from com-

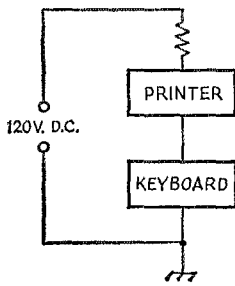


Fig. 1—The local loop.

mercial practice, however, amateur RTTY demodulators usually are designed for a tone of 2125 c.p.s. for mark, and space then becomes 2975 c.p.s. The b.f.o. in the receiver must be properly set so these audio tones will result. Many receivers with fixed-frequency b.f.o. will not pass 2975 c.p.s. However, a very simple modification ordinarily will make this possible, and most receiver manufacturers already have information available on request for this change, if needed. Under some circumstances, tones of 1275 for mark and 2125 for space are used, but in general, it is easier and more practical to make the simple changes in the receiver rather than to use special filters in the demodulator.

Frequency stability is quite necessary in RTTY, particularly when using narrow shift. Late-model receivers intended primarily for s.s.b. reception are usually much more stable than their predecessors, and are set on lower sideband to receive normal RTTY.

The Demodulator

There are many different types of demodulators, just as there are many types of boats or automobiles or airplanes. While thinking of airplanes we can point out that there are two basic types in use — the propeller plane and the jet plane using no propeller. Then there are combinations where jet engines drive propellers, or — in some earlier military types such as the B-36 — where both propeller engines and additional jet engines are used.

In RTTY, we now have our new "jet-type" demodulators as well as the older "propeller-type" units. The latter still have some advantages and will not disappear immediately. The "propeller-type" are based on f.m. principles and the "jet-type" are based on a.m. principles. Certain features of both types are similar, and in fact, only recently has it been found that even the older types can benefit immensely from the application of some of the newer (a.m.) principles.

However, let us start by referring to the most simple demodulator that one could build. We mentioned that the teleprinter needs on-off d.c. pulses. In the second article,¹ a typical "local loop," for controlling the printer by the keyboard, was shown. Look at Fig. 1. In this

case, the keyboard is nothing more than a switch that opens or closes the circuit. We could replace it with any type of device that would also open and close the circuit, such as a relay or a vacuum tube operated as a switch. Look at Fig. 2.

If the grid is saturated with a positive voltage the tube will conduct and act as a short-circuit (there will be some voltage drop across the tube, so it acts more like a low-value resistor), and the magnets in the printer will be closed. Alternatively, if a sufficiently large negative voltage is applied to the grid the tube will stop conducting and act instead as an open-circuit. The printer's magnets will then open.

This tube then is called a "keyer tube." A typical keyer tube requires a bias voltage of about +15 to +20 volts for saturation of the grid and perhaps -30 to -40 volts for complete cutoff. Many older circuits use a relay instead of a keyer tube, but these introduce problems which make their continued use unsatisfactory.

Fig. 3 shows a block diagram of a simple demodulator for RTTY use. In this case a limiter is used to keep the audio voltage constant and thus overcome the undesirable effects that could occur when the output of the receiver changes with fading signals. This simple demodulator completely ignores the mark tone at 2125, and concentrates instead on just the space tone of 2975 c.p.s. The filter provides audio selectivity for this purpose. This space tone is then fed to the "detector" stage, which is essentially a rectifier that converts the audio into a d.c. pulse for the printer.

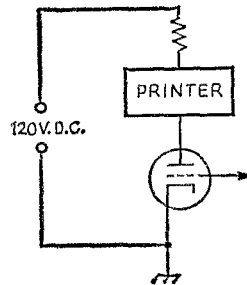


Fig. 2—Loop using a keyer tube for operating the printer from a properly-processed incoming signal.

In this simple demodulator positive bias voltage is kept on the grid so that the printer will remain in mark. When a space signal is passed through the circuit, it puts a negative voltage on the grid that is strong enough to override the fixed positive bias, and the magnet circuit opens. Proper adjustment of the positive bias will produce reasonably satisfactory results, and in addition to having a very simple demodulator that works, one gets the further advantage of having a printer that will not operate at all until the space signal is received.

This very simple single-filter demodulator works quite well under ideal circumstances such as one would normally find in 2- or 6-meter v.h.f. work. However, on the lower frequencies such ideal circumstances rarely exist. It is not at all uncommon for the mark or space frequencies to fade independently ("selective fading")

¹"The Teletype Machine," January, 1965, *QST*, and "Operating the Teleprinter," February, 1965, *QST*, were the first two articles of this series.

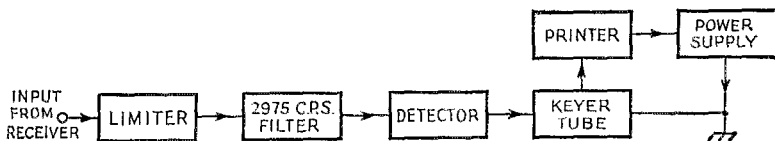


Fig. 3—A simple RTTY "demodulator," "Converter," or "terminal unit" (all three terms are used.) This circuit discards the mark portion of the f.s.k. signal and uses only the space signal.

or for static bursts, poor signal-to-noise ratio, random noise, impulse noise, back scatter, or nearby c.w. stations to interfere with proper demodulation of the signal. For these reasons it is customary to take advantage of the fact that both mark and space are transmitted alternately. A slightly more sophisticated demodulator, then, uses filters for both tones — one eventually providing the positive voltage for the mark condition and the other providing the negative voltage for the space condition.

To get a sharper change from positive to negative at the keyer tube grid, some circuits use neon bulbs as trigger devices. Other units use special tube circuits which are much more sensitive to smaller variations in voltages.

A very simple demodulator that uses inexpensive parts has been featured for a number of years in the *ARRL Radio Amateur's Handbook*. It is called the W2PAT RTTY converter. (Demodulators have been formerly called "converters" and sometimes are still referred to as "terminal units" or TUs.) This will work adequately where modest performance is required. If cost is a paramount factor, units of this type might serve the purpose satisfactorily. Fig. 4 shows a block diagram of the W2PAT converter.

Improving the Simple Demodulator

Continuing our analogy to airplanes, these simple units so far described would perhaps be the small, inexpensive and simple "training" planes. They work pretty well for fair-weather flying, but would quickly bog down when the going gets rough. For all-weather flying, additional "instruments" are needed to add the versatility and performance required.

Fig. 5 shows an advanced demodulator based on the above simple principles.

The input bandpass filter in this case would be about 1.0 kc. wide. Its purpose is merely to restrict the input to the demodulator to the

frequencies of interest. Since many receivers used for s.a.b. have only 2.1- or 2.5-ke. i.f. selectivity, it is apparent they will pass signals which have no bearing on the RTTY signal and may often disrupt what would otherwise be perfect copy. Also, since all receivers have *some* hum in the audio output, an additional benefit of the bandpass input filter is that it prevents this hum from reaching the RTTY demodulator. The additional improvement is substantial in weak-signal detection where the receiver has not been readjusted by the operator. This point has not been sufficiently stressed by other authors, who would lead one to believe that a narrow filter in the receiver would satisfactorily replace a good audio bandpass input filter. Use of *both* would be optimum.

The limiter again keeps the signal at essentially constant output. As long as the receiver is correctly tuned, the output voltage of the mark detector will be the same as the space voltage from the space detector. Consequently, it is usual for the one detector to be arranged for positive (+) output and the other for negative (-) output.

The low-pass filter eliminates the rectified audio "ripple" from the desired d.c. pulse. (The requirements for this will be considered in a subsequent article.)

As long as the receiver is correctly tuned for placing the mark and space signals properly in their respective filters, the output from the low-pass filter should vary uniformly from mark to space. However, such ideal circumstances seldom last for long. If the transmitter drifts and the local operator does not make an appropriate correction, the voltage for mark might become greater than that for space. If no means are provided to correct automatically for this difference, "distortion" commences. Although the average printer can handle large amounts of distortion adequately, eventually a point is reached where the system no longer will print faithfully.

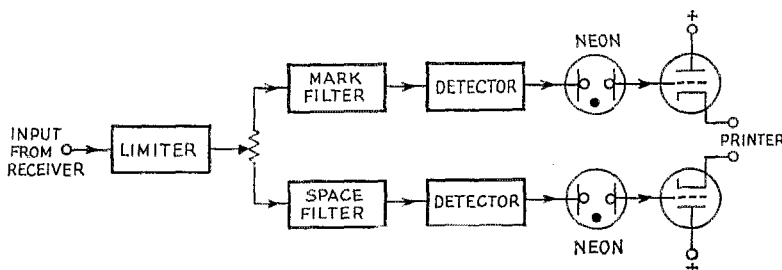


Fig. 4—Essentials of the W2PAT converter, which uses both components of the f.s.k. signal.

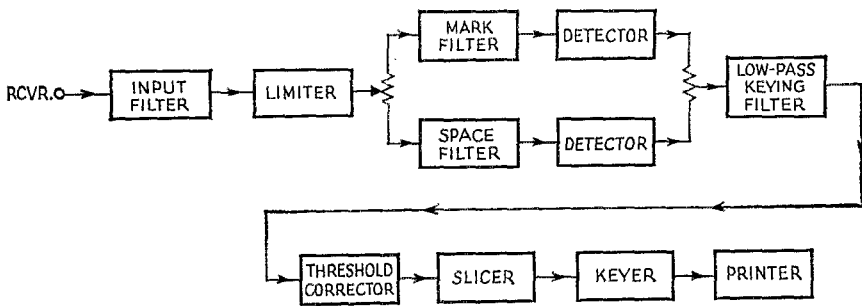


Fig. 5—An advanced type of RTT demodulator capable of printing accurately under difficult transmission conditions.

The threshold corrector, the circuit of which will be described in a later article, is an ingenious device which restores the balance between mark and space automatically. It was developed out of necessity for a different type of reception ("a.m." where no limiters are used), but we now find that it offers many advantages to high-performance f.m. demodulators as well. With such a device, simple drift or mistuning offers no problems to normal printing although, if carried to extremes, eventually a point is reached where good printing ceases.

The output of the threshold corrector provides a plus-and-minus signal to the "slicer" stage. A "slicer" can be called by other names just as well, and perhaps the term "trigger" would explain its action. The slicer is designed so that a small positive voltage will completely saturate

the tube and it will conduct heavily. A small negative voltage will completely cut off the tube and no conduction results. The output of the slicer will be a fixed voltage for mark and an opposite but fixed voltage for space. These voltages could be used directly to key the printer on and off, but the slicer tube cannot draw the current necessary to operate the selector magnets (60 ma. for parallel hookup). In fact, only a few low-cost receiving-type tubes can handle that type of current. Thus the slicer becomes a "buffer" stage and an additional keyer stage is used for direct control of the printer or printers.

(The fourth article of this series will appear in a subsequent issue. It will go into design considerations for the circuits described in block form in this article. — Editor.)

QST

Strays



This past summer the United States Information Agency put together an exhibit called "Communications — USA", staffed with a number of Russian-speaking students and communications people, and sent them off the USSR for six months. Before departure, the group was briefed in Washington by people from various segments of the communications industry, and W1KE from ARRL Hq. talked to them about ham radio. Included in the exhibit was a complete amateur station, and it turned out that one member of the group was Larry DeMilner, W8NRB. Larry was a very persuasive young man, and he was successful in achieving what nearly everyone had said couldn't be done — he obtained official Soviet permission to operate the exhibit's amateur station in the USSR, signing his own call sign UA1, UB5, or UA3. He operated in Leningrad signing W8NRB/UA1 in Kiev signing W8NRB/UB5, and in Moscow signing W8NRB/UA3. His first operation came on August 22, and he appeared more or less regularly from then until the first part of January. The pictures above show W8NRB (left) explaining ham radio to some of the thousands of Russian visitors to the ham radio booth and (right) ready for a quiet(?) session on the ham bands. (Those QSLs on the wall were provided by ARRL Hq. when the exhibit was being prepared, and do not represent QSOs made while the exhibit was in the USSR.)

RTTY Reception for Beginners

BY DOUGLAS A. BLAKESLEE,* WIKLK

WHEN the would-be RTTYer lugs home his first machine, the first thing he will want to do is to make it print. But first, the selector magnets should be checked with an ohmmeter to find out whether they are connected in series or parallel. The series connection will show 200 ohms and the magnets will require 30 ma. for operation. The parallel connection will measure 50 ohms and will need 60 ma. A local loop can then be constructed to supply the required current, and machine operation checked by using its own keyboard. However, the fascination of having an oversized electric typewriter in the shack will soon wear off, and you will want to see signals from your receiver printed out. You can not walk before you stand, so at this stage you may not wish to attempt the advanced converter designs in RTTY publications. But to see the thing print will take some form of converter or demodulator.²

The "Starter" Converter

The very simple "starter" converter circuit shown in Fig. 1 is only an afternoon's project, but will enable the beginning RTTYer to get his feet wet practically as soon as he has a machine. Only the space pulses are used in this converter. The 5763 keyer tube, V_1 , draws enough current to hold the printer magnets closed when there is no audio at J_1 . When a signal is heard its voltage is stepped up in the transformer and rectified by CR_1 , giving a negative-going pulse for each audio tone received. Thus the machine magnets are held in the mark condition until a space signal is received; the 5763 is then biased to cutoff by the negative pulse, and the magnet current is cut off. When the space pulse ends, the mark current

* Technical Assistant, QST.

¹ Hoff, "Operating the Teleprinter," QST, February, 1965.

² In this area the MARS people want their amateur members to show that they have an RTTY converter before they are issued a machine. MARS seemingly has learned that many amateurs get lost trying to build a converter that is too complex, and lose interest before they ever use the machines.

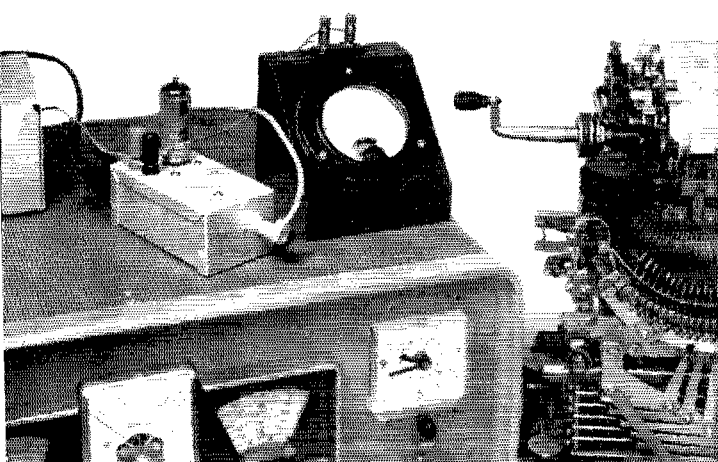
Advanced RTTY demodulators are highly developed pieces of equipment, but their fine points can't really be appreciated until after the shortcomings of simpler apparatus have been experienced. If you've just received your first teleprinter and are impatient to see it work, a simple demodulator or converter will satisfy that urge and give you some valuable experience.

again flows. In this way the machine receives the pulses as sent, and prints a letter. The circuit is self-limiting, in that plate current ceases the instant the negative pulse reaches the tube's cutoff bias, so all pulses strong enough to reach cutoff cause the plate-current pulse to be square-topped at a constant amplitude.

The circuit is constructed in a $4 \times 2 \times 1\frac{1}{2}$ -inch Minibox with the parts placed as shown in Fig. 2. The 10-watt resistor should be mounted for best cooling as it gets quite warm in operation. Care should be used in soldering the silicon diode, since excess heat may damage it. Otherwise, there are no special precautions to be taken.

After checking the wiring, connect the unit to a power supply and place a 0-100 milliammeter between binding posts E_1 and E_2 . After warm-up, the meter should show about 60 ma. plate current to the 5763 (for parallel operation of the magnets). If the current is much higher than 60 ma., enough resistance should be added in the B-plus lead to reduce the current to 60 ma. If the current initially is below 55 ma. with a 220-volt supply, the tube probably has weak emission and will not draw enough current to key the selector magnets.

Audio from the speaker jack of the receiver to be used should be connected to J_1 . Tune in a strong, steady carrier with the h.f.o. turned on. Turn on the receiver audio gain and watch the



The Starter RTTY demodulator is shown ready for use. The audio output of the receiver is connected to J_1 , and the teleprinter magnets are connected to the binding posts. The meter reads magnet current and is used as a tuning indicator.

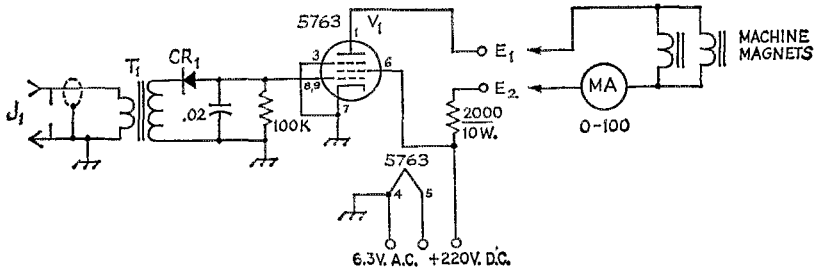


Fig. 1 — Circuit diagram of the simple converter. The 100,000 ohm resistor is 1/2-watt composition, and the 0.02- μ f. capacitor may be ceramic or Mylar type.

CR₁—Silicon diode, 400 volts p.i.v., 750 ma. (GE504, 1N540, etc.).
 E₁, E₂—Binding posts.
 J₁—Phono jack.

T₁—Audio output transformer, 5000-ohm primary, 3-ohm secondary (Knight 62 G 064 or an equivalent output transformer salvaged from a b.c. receiver may be used).

current meter. As the audio gain is advanced, the current should drop until finally it is reduced to zero. If the current increases with audio, diode CR₁ is wired in reverse.

For best operation the selector magnets of the Teletype machine should be wired in parallel—the 60-ma condition. Connect the magnets to the binding posts with the 100-ma. meter in series as shown in Fig. 1. The meter is an aid to tuning the signal correctly. Another good tuning indicator is an oscilloscope, if you have one. The vertical plates should be connected to the plate and cathode of the 5763. With the horizontal sweep set for about 30 cycles, it is possible to observe the output pulses directly.

Pick a strong commercial f.s.k. station that is testing at a steady rate to start with. Set your receiver to maximum selectivity, and tune through the RTTY signal. You will notice that the signal is made up of pulses on two frequencies, one 850 cycles or less lower in frequency than the other. Only one of the signals, has the space information that will provide correct copy with this system. It may be necessary to try both pulse signals to find the correct one. In receivers with no sharp c.w. selectivity the mark signal may be set to zero beat, where it will cause no interference to the space signal.

Turn on the machine. It will “run open” until the converter is turned on. The machine should then be silent until the audio gain is advanced, when it should start to print. Adjust the audio

gain of the receiver for best copy, or for the squarest-looking pulse on the scope. By trial and error adjustment of the audio note and the audio gain it is possible to get quite good Teletype copy. Remember that any QRM or noise will upset the apple cart, as the converter can not discriminate between them and the wanted signal.

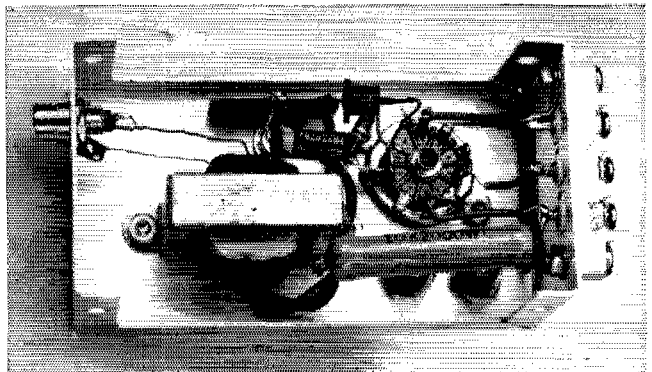
One Step Up

After a few days of listening, and perhaps getting the transmitter ready for f.s.k., you may decide that before you get on the air you'd like to have a better converter—not too complex or expensive, though. The converter shown in Fig. 3 is a development of the W2PAT circuit³ with changes to operate the magnets directly. Considering its moderate cost and relatively simple construction it will provide good, trouble-free operation.

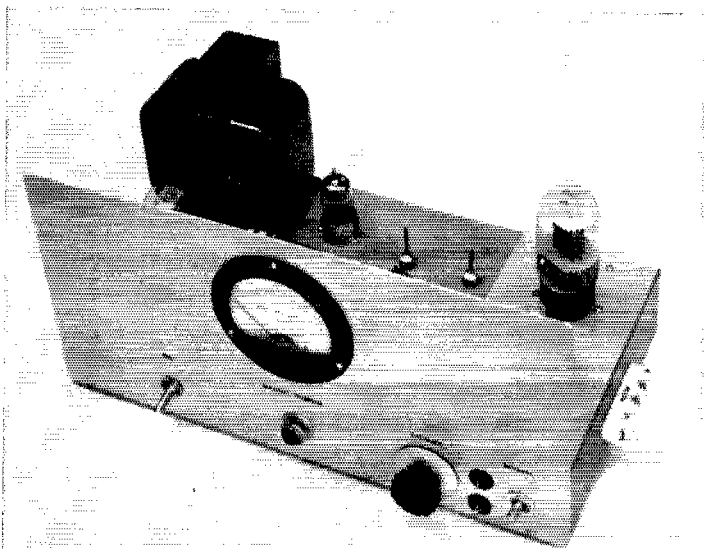
This circuit uses both components of the f.s.k. signal. The two audio tones resulting from b.f.o. detection in the receiver are taken from the speaker output jack, and are clipped to a maximum amplitude of about 1/2 volt by silicon diodes CR₁ and CR₂. This clipped signal is next amplified by V₁, with some additional limiting through grid saturation, and is then applied through R₁ to two tuned audio circuits consisting of L₁ and L₂ with their associated capacitors. These are adjusted for 850 cycles difference in frequency. L₁

³ *The Radio Amateur's Handbook*, chapter on specialized communication systems.

Fig. 2—Bottom view of the Starter demodulator. The audio input jack is at the left, and the power-supply terminal strip at the right. The two binding posts are just below the 10-watt resistor.



Front panel controls of the f.s.k. demodulator are the power-supply switch, pilot lamp, balance control, and reversing switch. The neon lamps are used as a visual indication of correct tuning, and the meter reads current to the teleprinter magnets. The adjustment slugs of the TV width coils may be seen behind the front panel.

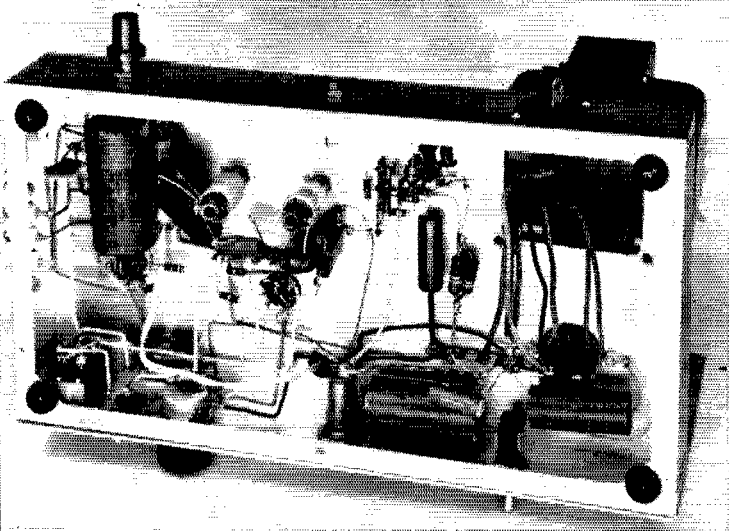


and L_2 are TV width coils, which work very well in this application. The signals peaked by the tuned circuit are applied, respectively, to detectors V_{2A} and V_{2B} . The outputs of the detectors are coupled to a combiner tube, V_3 , through neon lamps. The lamps provide a sharp make-break characteristic as they fire and extinguish, and are mounted on the front panel to do double duty as tuning indicators. A reversing switch is included at this point as an aid in tuning the RTPY signal. The combined signals form a single amplified output pulse in V_4 . This is used to control the keyer tube V_4 in the same way as the 5763 described in the "starter" converter.

The converter is built on a $13 \times 7 \times 2$ -inch chassis and has a $13 \times 6\frac{1}{2}$ -inch front panel. Two $\frac{3}{8}$ -inch holes are drilled through the panel and chassis for grommets into which the neon lamps make a press fit for viewing from the front. The rest of the construction should be no problem if

the normal rules about audio frequencies are followed. The power-supply voltage requirements suggest that components salvaged from TV sets would work nicely. The meter M_1 may be omitted to save cost, but if it is, a 0-100 milliammeter should be connected in series with the lead to the machine magnets, for initial testing. The shack v.o.m. may be used.

When power is applied to the converter the neon lamps should first fire, and then die out as V_2 starts to draw current. An audio oscillator should be connected to J_1 and the tuned circuits adjusted for resonance on the frequencies chosen. (If the shack doesn't have an audio oscillator check with the local hi-fi bugs — they often have one.) For v.h.f., where the keying is audio frequency, the standard frequencies of 2125 and 2975 c.p.s. should be used. However, if operation is intended only on the h.f. bands, the tones may be any pair that can be passed by the receiver



The limiter and detector circuits of the f.s.k. converter are in the center of the chassis, with the power supply at the right. The 6Y6 socket is hidden below the 1-uf. capacitor at the left. The control on the rear deck is the magnet-current adjustment.

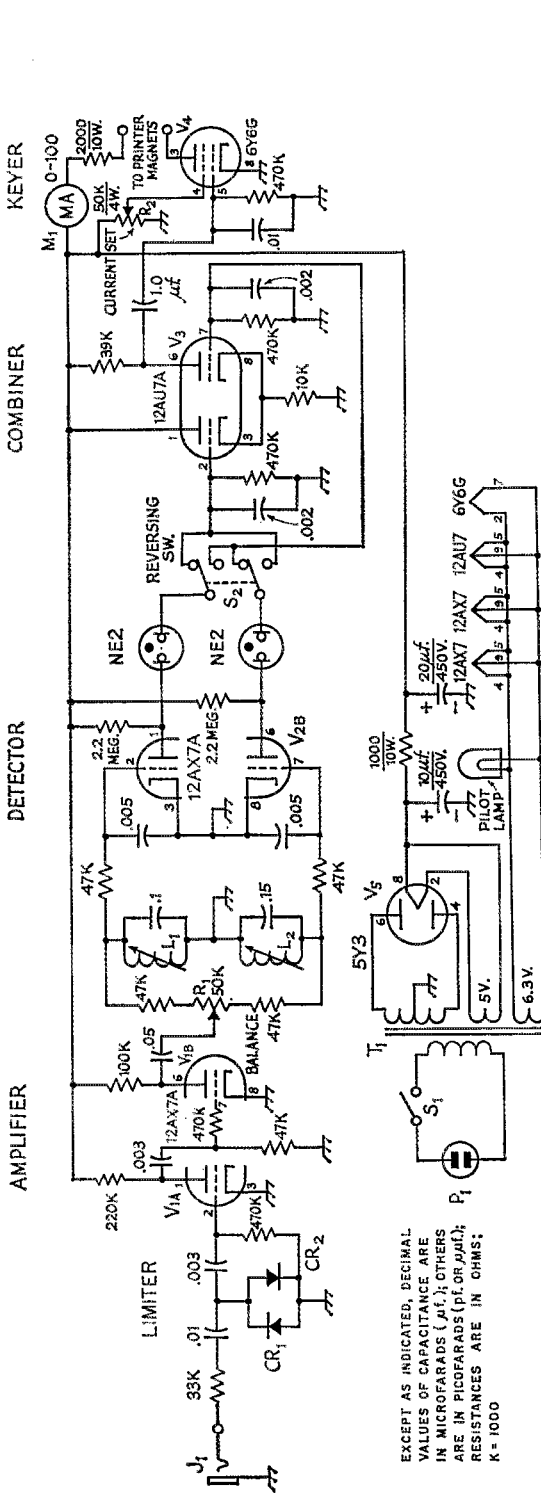


Fig. 3—Receiving demodulator for f.s.k. Teletype signals. Unless otherwise noted, resistors are 1/2-watt composition; capacitors of 0.01 μ f. or less may be mica or ceramic; larger values are 450-volt paper. Capacitors with polarities indicated are electrolytic.

- CR₁, CR₂—Silicon diode, 50 volts or more p.i.v.
- J₁—Phone jack.
- L₁, L₂—TV width coils, about 30 mh. (Miller 6319, Thorndarson WC-19, Meissner 20-1034).
- M₁—0-100 milliammeter.
- P₁—Chassis-mounting a.c. connector, male.
- R₁—50,000-ohm control, linear taper.
- R₂—50,000-ohm control, linear taper, 4 watts.
- S₁—S.p.s.t. toggle.
- S₂—D.p.d.t. toggle.
- T₁—Power transformer, 700 volts c.t., 100 ma., 6.3 volts, 3 amp.; 5 volts, 2 amp. (Stanco PC8409 or PC8411).

audio section without attenuation, are separated by 850 cycles, and are not harmonically related. Several sets of frequencies were tried with this converter, and all seemed to work equally well. As each tuned circuit is resonated, its associated neon lamp should first.

Connect the machine magnets to the converter and adjust R_2 for 30 or 60 ma., depending on whether the magnets are in series or parallel. Then tune in a signal on the receiver with the b.f.o. on, to provide an audio beat with the incoming signal. Set the balance control, R_1 , so that the lamps have equal brightness. If the signal is correctly tuned, both neons should be flickering on and off with the Teletype pulses. If the machine prints garbled letters, throw the reversing switch to the other position and try again. If you still can not copy anything, the station may have a shift other than 850 cycles, or some other speed than 60 w.p.m. Many commercial services do not use these standards any more, but most amateur stations do. After a few days' practice, one can guess whether a station has the correct shift and speed by listening to the audio output of the receiver.

Some Notes

While the above sounds fairly easy, one can run into plenty of problems when starting in a new field. In constructing and testing the two converters the writer found that the biggest stumbling block was the teleprinter itself. A Model 15 was used, and to a beginner it looked like a colossal stack of levers and gears.

Ohmmeter checks identified the proper connections for the magnets on the terminal strip on the side of the machine, and it turned out that they were wired for 30-ma. (series) operation. To put them in parallel, the common connection between the two was used as one side of the circuit and the two remaining terminals tied together. The combination then measured 50 ohms, but nothing happened when 60 ma. was passed

(Continued on page 168)

Single-Band Combos

Compact Lightweight Transmitter/Receiver Units for 6 and 10

BY ELMER T. SCHORLE, JR.,* W3GSC

The two transmitter/receiver units described here are designed for local regional coverage in emergency operations. Including provision for both a.c. and d.c. operation, they can be used interchangeably, without modification, in fixed-station or mobile service. Units of this basic type will also serve admirably for all short-range communications, and thus reduce congestion on the lower-frequency bands, as recommended in the ARRL Program.

FOR those who "roll their own," the small single-band receiver/transmitter combinations described here may be a guide to enjoyment, pride and economy. These 6- and 10-meter rigs were designed by the author, and built with the assistance of W3NAG, primarily to serve the needs of K3VAN, the club station of the WCAU Amateur Radio Association, in emergencies and other short-range work. Each unit includes a dual-conversion receiver, and an a.m. transmitter running at power inputs up to 15 watts. Built-in provision is made for operating from either 115-volt a.c., or 12-volt d.c. sources, so the units are suitable for both mobile and fixed-station use without alteration. The completed units measure only 11¼ by 8¾ by 5¾ inches, and the cost of components was about two thirds the price of the cheapest commercial rig with equivalent capability.

Receiver High-Frequency Circuits

The circuit of the high-frequency stages of the 10-meter receiver is shown in Fig. 1. A tunable first converter, consisting of a 6BJ6 r.f. amplifier and 6U8A mixer/oscillator, tuned

* 3172 Colony Lane, Plymouth Meeting, Penna.

by the three-section variable capacitor C_1 , translates signals in the 10-meter band to 1560 kc. A crystal-controlled second converter then translates the 1560-kc. signal to 262 kc., where it is fed to the i.f. amplifier of Fig. 3.

The 6-meter receiver high-frequency circuit, shown in Fig. 2, is slightly different. Here the first converter, which translates signals in the 6-meter band to frequencies in the 7- to 9-Mc. range, is crystal controlled. The second converter, covering the latter range, is the tuning element which also translates to 1650 kc., where the signal is fed to the i.f. amplifier of Fig. 3. This second



The 6-Meter Combo unit. The meter serves as a transmitter output indicator and receiver S meter as well as for measuring final-amplifier grid current, plate current, and plate voltage. Across the bottom of the panel are microphone jack, external crystal socket, crystal-selector switch, the two controls for the transmitter pi network, squelch threshold control and receiver audio gain control. The transmitter oscillator-spot switch is to the left of the dial.

converter, using a tube combination identical with the first, is tuned by the three-section capacitor C_1 . The system coverage is limited to 50 to 52 Mc. in this instance, the main reason being that local WCAU-TV takes Channel 2 signals (54-60 Mc.) from New York directly off the air if the microwave links fail, and we were sure that they wouldn't appreciate any interference from close-proximity overloading (K3VAN is in the same building).

Receiver I.F. and Audio Circuits

The diagram, with values both for the 1650-kc. i.f. used in the 6-meter receiver, and the 262-kc. amplifier used in the 10-meter receiver, is shown in Fig. 3. Following the two i.f. stages, a 6AV6 diode/triode serves the functions of diode

Except for the slide-rule dial, the panel layout of the 10-Meter Combo is identical with that used for the 6-meter unit.



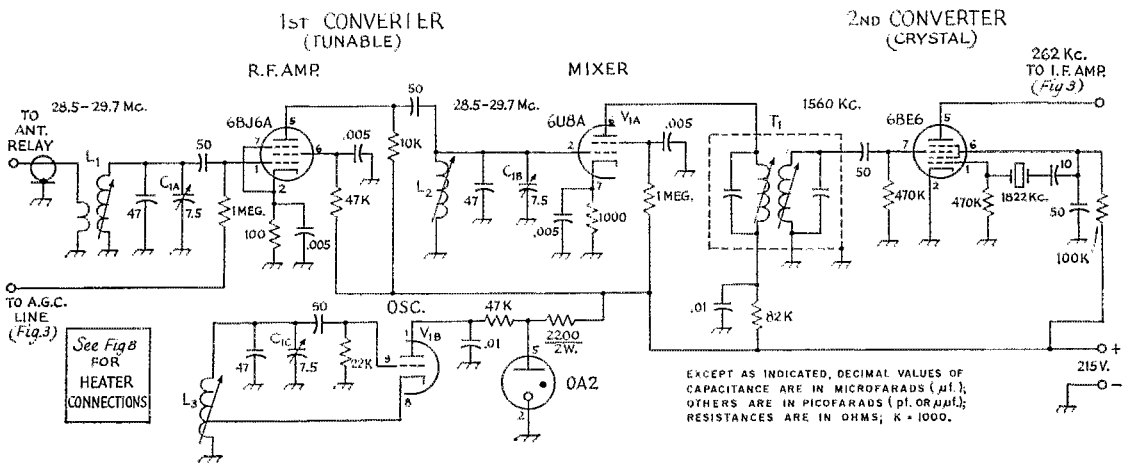


Fig. 1—High-frequency circuits of the 10-meter receiver. Fixed capacitors of decimal value are disk ceramic; others, are silver mica or NPO ceramic. Resistors are $\frac{1}{2}$ -watt unless indicated otherwise.

- C₁—Subminiature 3-section variable, approx. 7.5 pf. per section (Miller 1460 with all but two rotor and two stator plates removed from each section).
 L₁—6 turns No. 20 enameled, close-wound on $\frac{3}{8}$ -inch ironslug form; 2-turn link (CTC LS-5 form).

- L₂—Same as L₁, but 7 turns, and no link.
 L₃—Same as L₂, tapped $1\frac{1}{2}$ turns from ground end.
 T₁—1500-kc. i.f. transformer adjusted to 1560 kc. (Miller 13W-1).

detector, a.g.c. rectifier and first audio amplifier. The latter drives a 6AQ5 output stage which feeds a built-in 2 $\frac{1}{2}$ -inch speaker, or low-impedance phones or external speaker plugged into the output jack, J₁. Noise limiting and squelch is provided by the TNS circuit,¹ using a 12AX7 and 6AL5.

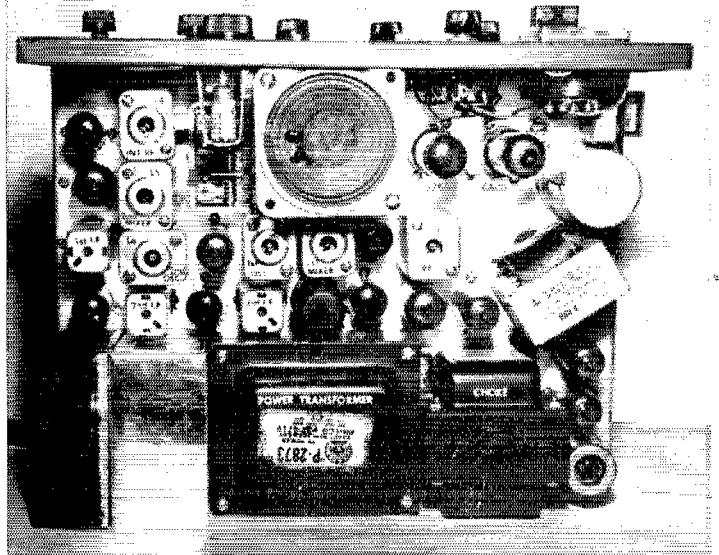
The meter (Fig. 6) may be switched for use as an S meter, as indicated in Fig. 3. The S-meter circuit is a common bridge arrangement with the variable cathode voltage of the a.g.c.-biased final i.f. amplifier working against the fixed cathode voltage of the audio-output stage.

¹ Scherer, "More on the TNS," *CQ*, May, 1954.

Transmitter Circuits

The transmitter circuits used in the two units are quite similar. In the 10-meter circuit, Fig. 4, the second harmonic of 7-Mc. crystals is picked off in the plate circuit of the first triode section of a 12BH7, and frequency is doubled to 28 Mc. in the second triode section of the same tube. Output from this section drives a 5763 final with pi-network output. The crystal switch S₁ selects either of two internal crystals, or any crystal plugged into the panel jack J₁. The frequency-spot switch S₂ may be used to apply 215 volts to the oscillator when the change-over relay (K₁, Fig. 7) is in the receive position; otherwise, plate

Top view of the 6-meter unit. The stages of the crystal-controlled receiver first converter are immediately below the speaker. Components of the 7-9-Mc. tunable converter, which follows, are in the upper left-hand corner. The 1650-kc. i.f. strip doubles back in the lower horizontal row of tubes and transformers. This row includes the detector and noise-silencer tubes. Power-supply components are lined up across the rear of the chassis, with the transistor supply and heat sinks to the left, power transformer at the center, and filter choke at the right. Modulator tubes and transformer are in the lower right-hand corner. In the upper right-hand corner are the transmitter tubes and a multi-section electrolytic capacitor combining all four 20- μ f. 450-volt capacitors used in each unit. The layout of the 10-meter unit follows the same general pattern, with the tunable first converter of the 10-meter unit replacing the tunable second converter of the 6-meter unit.



1ST CONVERTER
(CRYSTAL)

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F). OTHERS ARE IN PICOFARADS (pF. OR μ UF); RESISTANCES ARE IN OHMS; K = 1000.

2ND CONVERTER
(TUNABLE)

1650 Kc.
I.F. AMF
(Fig. 3)

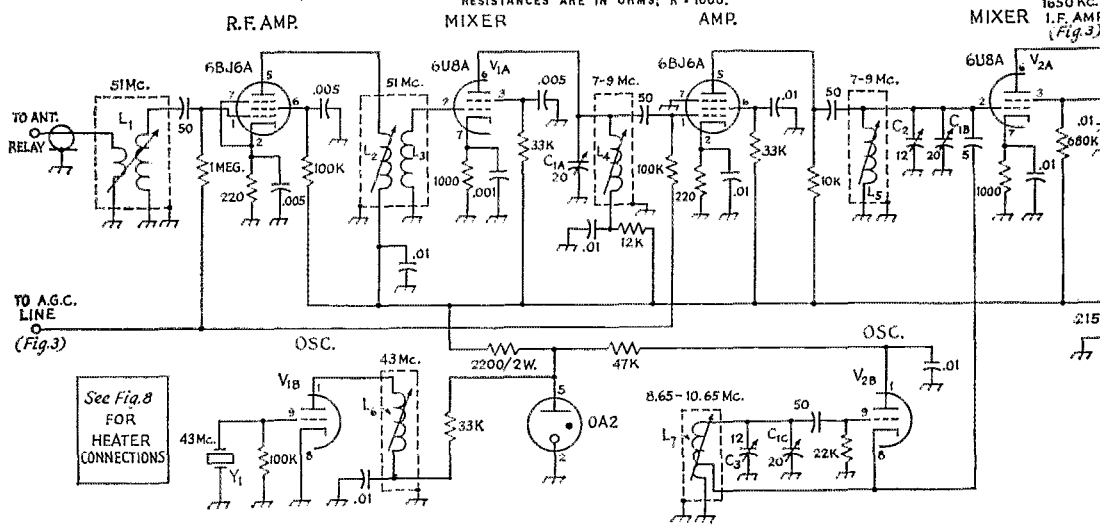


Fig. 2—High-frequency and tunable-converter circuits of the 6-meter receiver. Fixed capacitors of decimal value are disk ceramic; others are silver mica or NPO ceramic. Resistors are 1/2-watt unless indicated otherwise.

- C₁—Subminiature 3-section variable, 20 pf. per section (Miller 1460).
- C₂, C₃—12-pf. ceramic trimmer.
- L₁—9 turns No. 20 enameled, close-wound on shielded 1/2-inch iron-slug form; 3-turn link (Burstein-Applebee No. 18B120 form).
- L₂—Same as L₁, but no link.
- L₃—10 turns No. 20 enameled, wound on same form as

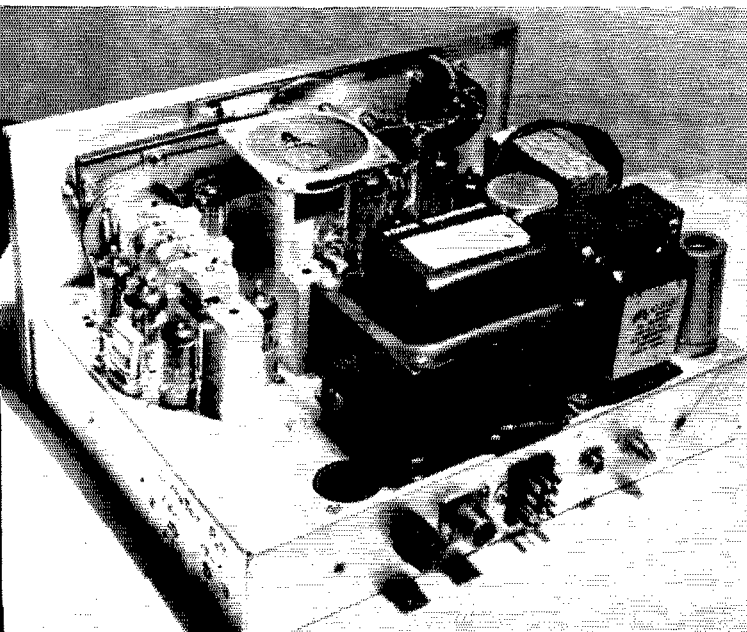
- L₂, low-potential ends adjacent.
- L₄, L₅—20 turns No. 24 enameled, close-wound on form similar to L₁.
- L₆—8 turns No. 24, enameled, close-wound on form similar to L₁.
- L₇—22 turns No. 24 enameled, close-wound on form similar to L₁, tapped at 5 turns from ground end.
- Y₁—Third overtone.

voltage is applied to the transmitter stages only when the relay is in the transmit position. The meter (Fig. 6) may be switched to read amplifier grid current, combined amplifier plate and screen current (in the modulator output circuit, Fig. 6), or to indicate relative power output.

The only difference in the 6-meter transmitter circuit, Fig. 5, is that the triode section of a 6A5A is used in an overtone oscillator circuit to produce 25-Mc. output from 8.33-Mc. crystals, and the pentode section of the same tube is used as the doubler to 50 Mc.

Modulator

Identical modulators are used in the two units. The simple circuit is shown in Fig. 6. A two-stage preamplifier using a single 12AT7 dual triode drives a pair of 6AQ5s in push-pull. Transformerless common-cathode input coupling furnishes the necessary phase inversion. Provision is included for push-to-talk operation of the change-over relay. The meter-switching circuit is also included in Fig. 6, with the various positions indicated in the caption. The meter may be switched to read modulator plate current in addition to the readings mentioned earlier.



Rear view of the 10-meter unit with the d.c. transistor supply removed to expose the octal socket into which the supply plugs. This view also shows some detail of the tunable first converter and crystal-controlled second converter in the receiver. Pillars elevate the 3-gang tuning capacitor to a height appropriate for the dial. Longer pillars are used to support the speaker at diametrically-opposite mounting holes. Corner bolts raise the power transformer to the limit imposed by the cabinet dimensions so as to improve air flow and minimize interference with components below chassis. Across the back apron of the chassis are the fuse for the d.c. supply, antenna connector, power connector, headphone jack, and modulator gain control.

I.F. AMP.

DET./A.G.C./1st AUDIO

I.F. AMP.

AUDIO OUTPUT

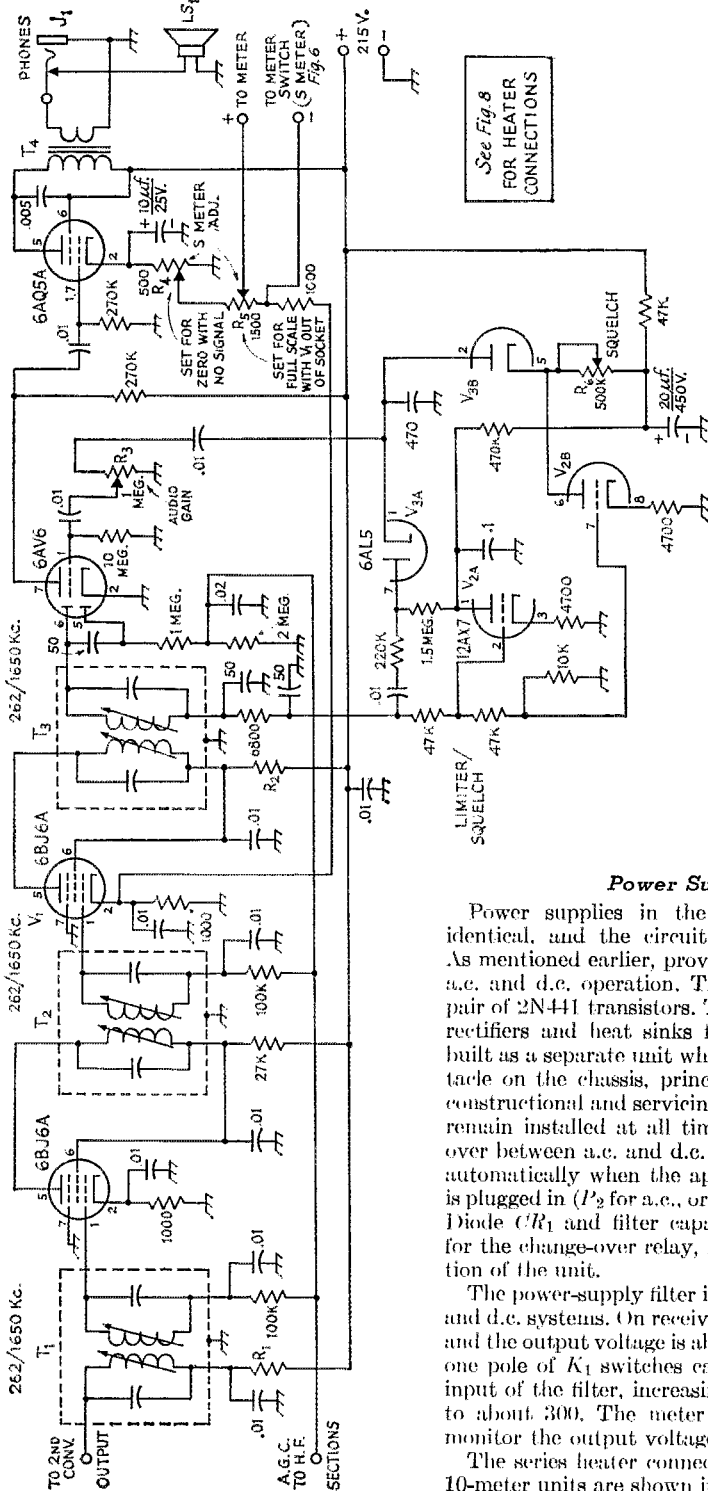


Fig. 3—Receiver i.f. and audio circuits. Polarity markings indicate electrolytic; other capacitors are disk ceramic (or paper for capacitances above 0.01 μ f.). Unless indicated, fixed resistors are 1/2-watt.
 J₁—Closed-circuit headphone jack.
 LS₁—2 1/2-inch 3.2-ohm speaker.
 R₁—6 meters—82,000 ohms; 10 meters—47,000 ohms.
 R₂—6 meters—18,000 ohms; 10 meters—27,000 ohms.
 R₃—Audio-taper control.
 R₄, R₅, R₆—Linear control.
 T₁, T₂, T₃—Miniature i.f. transformer—6 meters—1650 kc. (Lafayette 32 G 9013); 10 meters—262 kc. (Miller 12-H1 for T₁ and T₂; 12-H6 for T₃).
 T₄—Output transformer: 5000 ohms to 3.2 ohms [Knight 62 G 064, or similar].

Power Supply

Power supplies in the two units are also identical, and the circuit is shown in Fig. 7. As mentioned earlier, provision is made for both a.c. and d.c. operation. The d.c. section uses a pair of 2N411 transistors. This section, including rectifiers and heat sinks for the transistors, is built as a separate unit which plugs into a receptacle on the chassis, principally as a matter of constructional and servicing convenience. It may remain installed at all times, since the change-over between a.c. and d.c. operation takes place automatically when the appropriate input cable is plugged in (P₂ for a.c., or P₁ for d.c. operation). Diode CR₁ and filter capacitor C₁ provide d.c. for the change-over relay, K₁, during a.c. operation of the unit.

The power-supply filter is common to both a.c. and d.c. systems. On receive, choke input is used, and the output voltage is about 215. On transmit, one pole of K₁ switches capacitor C₂ across the input of the filter, increasing the output voltage to about 300. The meter may be switched to monitor the output voltage, as indicated.

The series heater connections for both 6- and 10-meter units are shown in Fig. 8.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ($\mu\text{f.}$); OTHERS ARE IN PICOFARADS (pf. OR $\mu\text{mf.}$); RESISTANCES ARE IN OHMS; $K = 1000$.

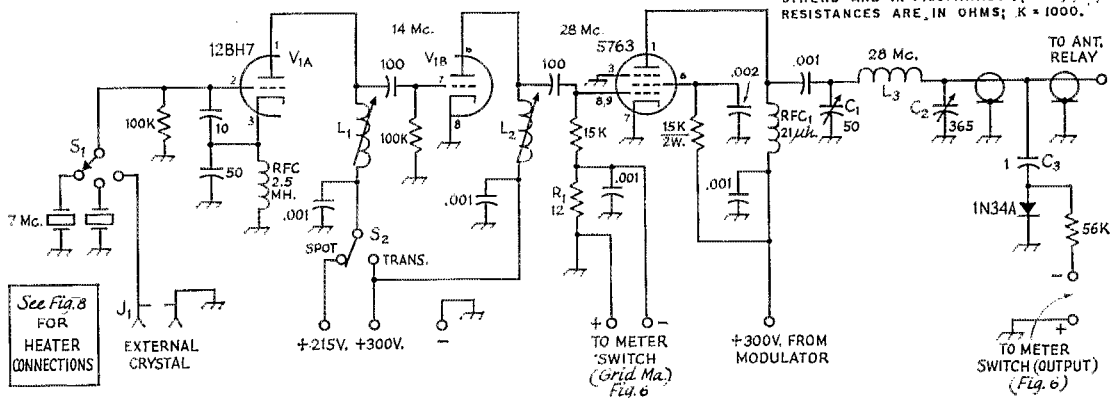


Fig. 4—Circuit of the 10-meter transmitter. Fixed capacitors of decimal value are disk ceramic; others are silver mica or NPO ceramic. Resistors are $\frac{1}{2}$ -watt unless indicated otherwise.

C₁—Air trimmer (Hammarlund MAPC-50-B, or similar).

C₂—Midget variable, broadcast-replacement type (Lafayette 32 G 1103).

C₃—See text.

J₁—Crystal socket.

L₁—20 turns No. 24 enameled, close-wound on $\frac{3}{8}$ -inch iron-slug form (CTC LS-5 form).

L₂—Same as L₁, but 12 turns.

L₃—10½ turns No. 18, $\frac{1}{2}$ -inch diam., 8 turns per inch (B & W 3002 Miniductor).

R₁—5-times meter shunt for 1-ma. meter.

RFC₁—Ohmite Z-28.

S₁—Ceramic rotary switch: 1 section, 1 pole, 3 positions (Centralab PA-2001, 3 positions used).

S₂—S.p.d.t. slide switch.

Construction

I often get perplexed when reading articles describing home-brew projects which have very worthwhile circuitry and performance, yet look as though no thought at all had been given to the outward appearance. One should approach all constructional projects with the attitude that anything worth doing at all is worth doing well. While performance may be the only thing that counts at the other end of the circuit, few amateurs get much satisfaction in having to hide the equipment when visitors show up. This thought was uppermost in our minds throughout our projects. The satisfaction far outweighs the slight additional time that a professional-looking job may require. Although advantage was taken of the drill press and chassis punches in the

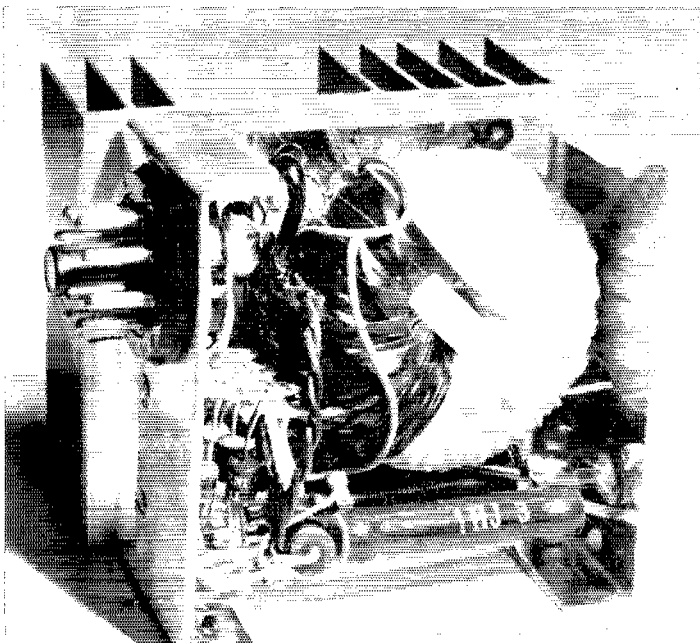
workshop of WCAU, these merely served to speed up the construction of the units. No operation is needed that requires more than the tools normally found in a ham workshop.

Reference to the photographs will supply most of the constructional details. The cabinets shown in the photos are California Chassis Co.² type LTC-470 "low-temperature" style, which includes an 11 × 8½ × 2-inch aluminum chassis. This type of cabinet, which is very compact for the chassis size involved, permits a large grouping of tubes to run adequately cool. These cabinets have a hammertone finish, but we preferred a custom job easily accomplished by painting, and then spraying with a protective coat of clear lacquer after the decals had been applied.

The chassis and panel layouts were made as similar as possible, in the two units. This similarity in design, both electrical and mechanical, is of considerable advantage in club projects, where many members may have to familiarize themselves with the operation and maintenance of the equipment. In general, the receiver occupies the front right-hand corner of the chassis (as viewed from the panel), the transmitter and modulator are assembled in the front left-hand corner, while the

² 5445 E. Century Blvd., Lynwood, Calif.

The plug-in d.c. supply. Components are assembled in a Minibox-type enclosure made from aluminum sheet. The box is backed up with a pair of heat sinks which carry the two transistors. The diode rectifiers are soldered between two terminal strips at the left.



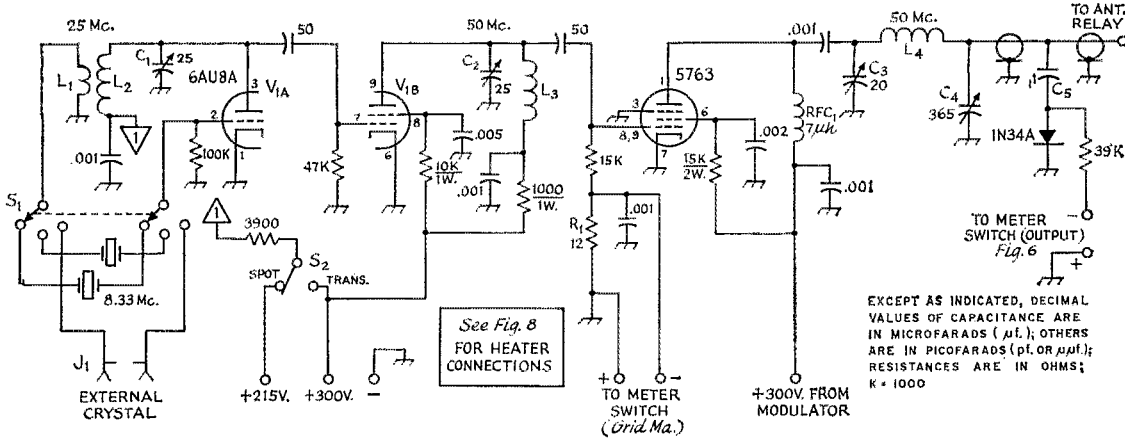


Fig. 5—Circuit of the 6-meter transmitter. Fixed capacitors of decimal value are disk ceramic; others are silver mica or NPO ceramic. Resistors are 1/2-watt unless indicated otherwise. Crystals are third-overtone type.

C₁, C₂—Air trimmer (Hammarlund MACP-25-B).

C₃—Air trimmer (Hammarlund MAC-20, or similar).

C₄—Miniature broadcast-replacement variable (Lafayette 32 G 1102).

C₅—See text.

J₁—Crystal socket.

L₁, L₂—14 turns No. 18, 1/2-inch diam., 16 turns per inch; cut wire at 4 turns for L₁ (B & W 3003 Mini-inductor).

L₃—6 turns No. 18, 1/2-inch diam., 16 turns per inch (B & W 3002 Mini-inductor).

L₄—6 turns No. 18, 1/2-inch diam., 8 turns per inch (B & W 3002 Mini-inductor).

R₁—5-times shunt for 1-ma. meter.

RFC₁—Ohmite Z-50.

S₁—Ceramic rotary switch: 1 section, 1 pole, 3 positions (Centralab PA-2001, 3 positions used).

S₂—S.p.d.t. slide switch.

power-supply components are lined up across the rear portion of the chassis.

Although almost any standard dial could be used for the receivers, both of the dials shown are homemade to lend a custom-built atmosphere. Neither is difficult to construct. The semicircular

dial used in the 6-meter unit is built around a Jackson Bros. planetary vernier (\$1.50 at Arrow Electronics) mounted on the shaft of the capacitor. The capacitor shaft also carries a clear Plexiglas pointer which rotates in front of a milk-white Plexiglas background. The frequency

MODULATOR

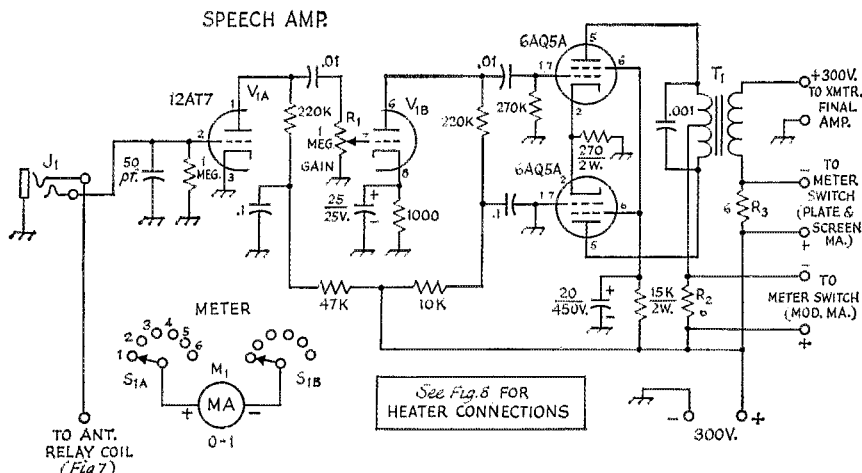


Fig. 6—Circuit of the modulators. Unless indicated, capacitances are in μf . Resistances are in ohms (K = 1000). Capacitors bearing polarity markings are electrolytic; others are ceramic or paper. Resistors are 1/2-watt if not indicated. Note: Insert a 4700-ohm stabilizing resistor between J₁ and the 50-pf. capacitor if needed.

J₁—3-circuit jack.

M₁—0-1 d.c. milliammeter; see text (Lafayette 99 G 2513 S meter).

R₁—Audio-taper control.

R₂, R₃—100-times meter shunt for 1-ma. meter.

S₁—Double-pole 6-position rotary switch, nonshorting (Mallory 3226J).

T₁—Modulation transformer: 10 watts; 10,000-ohm c.t.

primary, 5000-ohm secondary (Merit A-3008 or equiv.).

Meter switch positions and full-scale readings are:

1—Modulator plate current, 100 ma. (Fig. 6).

2—Final-amplifier grid current, 5 ma. (Fig. 4 or 5).

3—Final-amp. plate and screen current, 100 ma. (Fig. 6).

4—R.f. output (Fig. 4 or 5).

5—S meter (Fig. 3).

6—Voltmeter, 500 volts (Fig. 7).

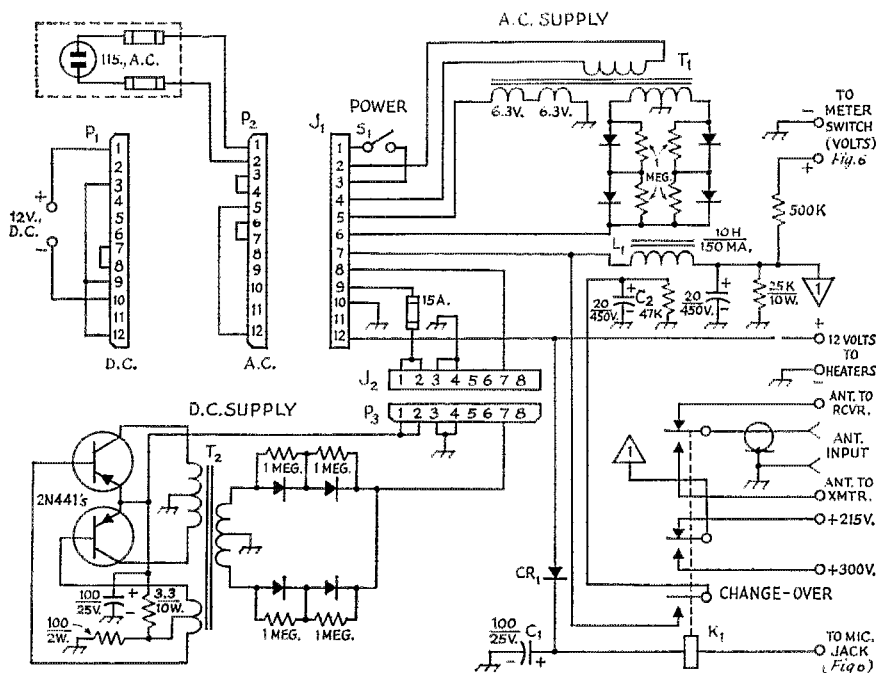


Fig. 7—Power-supply and change-over circuits. Capacitances are in μf , and capacitors are electrolytic. Resistances are in ohms ($\text{K} = 1000$), and resistors are $\frac{1}{2}$ -watt unless indicated otherwise. All diodes are 400 p.i.v. 300-ma. minimum (1N540, 1N2070, or similar). The fuses in the fused a.c. power plug are 3-amp. Components not listed below are labeled for text-reference purposes.

J₁—12-circuit chassis-mounting male connector (Cinch-Jones P-312-AB).

J₂—Octal tube socket.

K₁—Three-pole double-throw relay, 12-volt d.c. coil (Potter & Brumfield KA14D, 12 volts d.c.).

L₁—Filter choke (Merit C-3180 or similar).

P₁, P₂—12-circuit chassis-mounting female plug (Cinch-Jones S-312-CCT).

P₃—Chassis-mounting octal plug.

S₁—D.p.s.t. switch attached to receiver audio gain control, poles in parallel.

T₁—Power transformer: 540 volts, r.m.s., c.t., 265 ma.; 12.6 volts, 5.1 amp., c.t. (Merit P-2873). See Footnote 5.

T₂—Toroid transformer; see text.

markings are made with black decals. The background is translucent, and a very pleasing effect is obtained when a pilot lamp is mounted behind it.

The slide-rule dial used in the 10-meter unit was taken from a defunct car radio receiver. It has a $2\frac{3}{4}$ -inch dial-cord drum driven by a panel-bearing drive unit. The same cord drives the slide-rule indicator which is backed up by a dial lamp. After calibrating, and applying the decal markings, the scales of both dials were given a spray coating of clear plastic. The panel openings are covered with thin clear Plexiglas.

The illuminated meter used is not only inexpensive, but it is unusually well adapted to the purpose. It has an S-meter scale as well as linear scales of 0-5 and 0-10. The basic current range of the meter is 0-1 ma., which makes it convenient to apply multiplier shunts to suit the scales. A booklet accompanies the meter, which gives the shunt resistances necessary for various full-scale readings. Information on making shunts will also be found in the measurements chapter of the *ARRL Handbook*.

In the r.f. voltmeter circuit (Figs. 4 and 5), the pick-off coupling capacitor (C_3 , Fig. 4 and

C_5 , Fig. 5), was made by simply isolating a $1\frac{1}{2}$ -inch section of the outer conductor of the coax lead from the transmitter to the antenna relay, and connecting the 1N34 to this isolated section. The outer conductor either side of the break should be grounded, of course.

Almost any $\frac{3}{8}$ -inch iron-slug forms will be suitable for the 10-meter coils. Those used in the 6-meter unit are $\frac{1}{2}$ inch in diameter and are mounted in shield cans. They were obtained for 36 cents each.

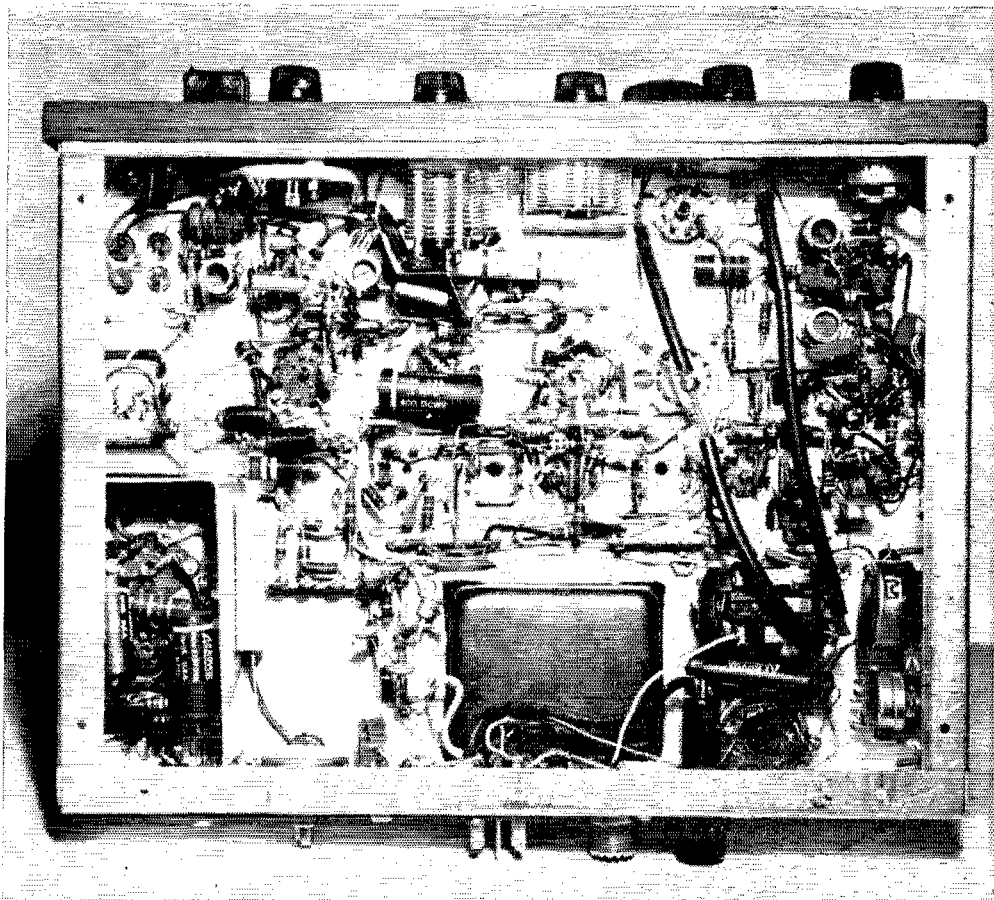
By referring to the diagrams, it will be found that there is a total of four 20- μf . 450-volt electrolytic capacitors in each unit. These are combined in the single four-section capacitor visible in the top-view photographs.

Toroid Transformer

The toroid transformer for the d.c. supply was constructed following the information given in an earlier issue by K2BQK,³ and this article should be referred to if a similar transformer is to be built. The core is an Arnold⁴ type 5387-D4,

³ Tetz, "Design and Construction of Transistor Power Converters," *QST*, April, 1960.

⁴ Arnold Engineering Co., Marengo, Ill.



Bottom view of the 10-meter unit. At top center are the components of the transmitter pi network, with crystal switch to the left and receiver audio gain control at the extreme right. A zigzag baffle shield separates the pi-network tuning capacitor and the slug-tuned exciter coils to the left. Components of the low-level stages of the modulator are in the shielded compartment in the lower left-hand corner. The receiver audio output transformer is immediately above. In the lower right-hand corner are the two S-meter adjusting controls (mounted on a bracket so that the shafts will not protrude), and the antenna relay connected to receiver-input (right) and transmitter-output (left) coax cables. The gap in the shielding of the latter cable is for the r.f. voltmeter pickup, as described in the text. The power transformer is at bottom center, with the rectifier diodes to its left. The 6-meter under-chassis arrangement is very similar.

having an outside diameter of $1\frac{3}{4}$ inches, an inside diameter of $1\frac{1}{4}$ inches, and depth of $\frac{1}{4}$ inch. The coils are bifilar-wound. Bifilar winding consists of winding both halves of each coil simultaneously by using a double strand of wire. The center tap of the coil is made by connecting the starting end of one strand to the finishing end of the other strand. The remaining two free ends are the outside terminals of the coil.

After a layer of Scotch electrical tape has been wound over the core, the collector coil should be wound first, with a total of 36 turns (18 turns of the double strand) of No. 14 Formvar-insulated wire, keeping the turns spread out as evenly as possible around the core circumference. Cover this winding with crepe-paper tape. Wind the high-voltage secondary next, in a similar manner, with 800 turns (400 turns of the double strand) of No. 26 Formvar wire. Cover this winding with crepe-paper tape, and proceed

to wind the base coil with 15 turns ($7\frac{1}{2}$ turns of the double strand) of No. 26 wire. Further details will be found in the article mentioned above. If you don't want to bother to wind your own transformer, Triad type TY-84 should make a suitable substitute.

The transistors are individually stud-mounted on Delco type 7276040 heat sinks. The box enclosing the toroid is about $3\frac{1}{2}$ inches square and $1\frac{1}{2}$ inches deep.

The power transformer specified for the a.c. supply is especially well suited to this application, since it has a 12.6-volt heater winding.⁵ This transformer is $3\frac{3}{4}$ inches high, $3\frac{3}{4}$ inches long, and $3\frac{1}{8}$ inches wide.

Wiring

Following usual procedure, the heater circuits were wired first. Grid- and plate-circuit com-

⁵ See page 166.

ponents were kept on opposite sides of tube sockets. Whenever possible, the disk ceramic cathode and screen bypass capacitors straddle the tube socket, separating the grid and plate pins. A small piece of copper was cut to fit across the 5763 socket in each rig to isolate the grid and plate pins. This shielding proved to be very effective when checks were made on stability to determine the need for neutralizing. All stages were rock stable without neutralization.

Transmitter Adjustment

In each case, preliminary adjustment of the various circuits to approximate frequency was made with the aid of a grid-dip oscillator. Then the transmitter was fired up. It is probably advisable to disconnect the screen resistor of the 5763 until the driver stages have been adjusted for maximum grid current. Then with the screen connected, the amplifier should be loaded to a plate current of 50 ma. (make an allowance of 6 or 7 ma. for screen current in the meter reading). Proper operating grid current under fully-loaded conditions is 3 ma., although we found it possible to obtain 5 ma. or more. Since there is no excitation control, the driver stages were stagger-tuned to reduce the grid current to 3 ma. and, at the same time, to obtain broad-band response. The best adjustment can be found by checking with crystals at the ends of the band, and one or two near the center.

Receiver Alignment

In lining up the receivers, the S-meter circuit should be adjusted first, as indicated in Fig. 3. R_6 , Fig. 3, should be set to open the squelch gate as indicated by noise output from the speaker. You may be able to line up the 1560-ke. i.f. in the 10-meter receiver on noise. Otherwise, couple loosely a signal generator, set to 1560 kc., to the input of T_1 . Any oscillator that is capable of covering the frequency may be used by setting to 1560 kc. on a broadcast receiver. If your g.d.o. goes down only to 1700 kc., the coil can be temporarily loaded with a capacitor. Then adjust T_1 for maximum S-meter deflection.

Adjust the high-frequency circuits to approximate frequency with the aid of a g.d.o. Insert a crystal near the center of the band in the transmitter, and set the spot switch to the spot position. Set the receiver tuning to approximately mid-dial, and adjust L_3 for maximum S-meter response. Then, adjust L_1 and L_2 for maximum deflection.

Couple the g.d.o., or other 2S-Mc. signal generator, to the input of the receiver, and adjust L_3 to center the 10-meter band on the dial. Adjust L_1 and L_2 for most uniform S-meter indication across the band. As a final adjustment, touch up T_1 and the 262-ke. transformers for maximum.

The 6-meter receiver is adjusted, generally, in a similar manner. The tunable i.f. can be adjusted by coupling a g.d.o. covering 7 to 9 Mc. into L_4 . Adjust L_7 and C_3 to center the 7-9-Mc. range on the dial, using the S meter

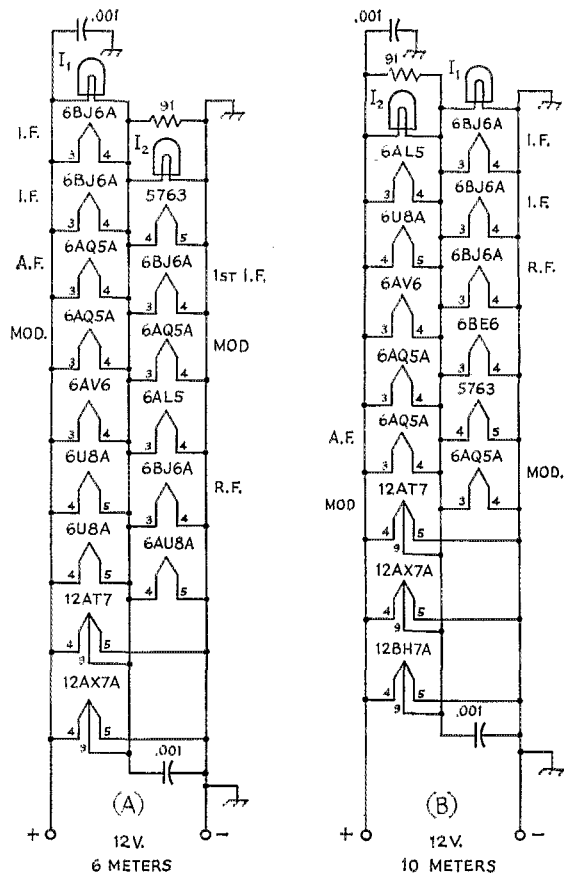


Fig. 8—Diagram showing series heater connections in the 6- and 10-meter units. I_1 is a No. 47 6-volt 150-ma. dial lamp; I_2 is the lamp furnished in the illuminated meter.

as an indicator. Then adjust L_4 and L_5C_2 for the most uniform response over the band. It may be of help to loosely couple an antenna to L_4 , and use incoming signals in the 7-9-Mc. range for final checking.

Now feed a signal generator at 50-52-Mc. into L_1 , and adjust L_1 , L_2 and L_6 for the most uniform response across the band. Touch up the 1650-ke. i.f. if necessary.

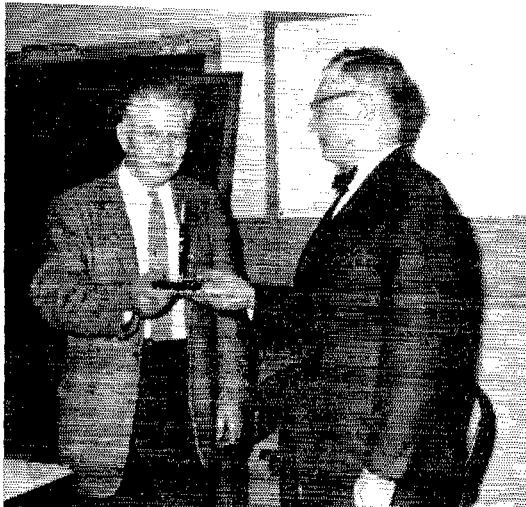
The dials can be calibrated by feeding the 100-ke. crystal calibrator of the station receiver into the antenna terminal of the receiver, marking the 100-ke. points, and estimating the intermediate points.

Very satisfactory results have been obtained with these units, especially when compared to the performance of comparable commercial rigs. A pair of stacked halos on 6 meters, and a coaxial vertical on 10 meters, mounted on the roof of a 65-foot building, provide solid coverage over a range of at least 40 miles in all directions. By keeping an eye peeled for bargains, the cost per unit was held down to approximately \$75. Even though some readers may not wish to duplicate either of these units completely, it is

(Continued on page 166)

What ARRL Means to Me

W1QJB (left) receives an engraved desk pen set, in recognition of winning honorable mention in the essay contest, from New England Division Vice Director Bigelow Green, W1EAE. The presentation was made at a meeting of the Bedford (Mass.) Radio Club. (Photo by W1SS.)



BY MILLARD P. CHRISTLE, W1QJB

Treble Cove Rd., North Billerica, Mass.

To me, the ARRL is a menagerie, a collection from the barnyard, the zoo, the open field.

The ARRL is a mother hen, clucking away at poachers (who want our frequencies) and exhorting her multiple offspring to lay bigger and better eggs (as she does).

The ARRL is an ostrich, but at times, an eagle, seeing far beyond and over the heads of her lowly charges.

The ARRL is a camel with many humps — one for c.w., one for a.m. and one each for s.s.b., RTTY, etc. When she walks, the humps all move in different directions, but she holds them all together somehow, firm in the belief that she is the only camel in the desert.

The ARRL is a bear, cuffing her cubs when necessary, but patiently trying to teach them good manners and helping them to survive in a competitive world.

The ARRL is a lion, ready to do battle with all comers (whether they are newly-emerging African countries, local ordinances, selfish political or commercial interests or what not) in defense of the amateur fraternity and WIAW.

The ARRL is a chameleon, patriotic and nationalistic but internationally minded, pro-phone but c.w.-oriented, promotes maximum band activity while advocating withdrawal of privileges, pushes AREC while praising CD, asks questions and supplies the answers, criticizes communism while copying their methods and pays lip service to home-brew gear while advertising commercial equipment.

The ARRL is a work-horse, always plugging for something and leaving a mess for the FCC to clean up.

The ARRL is an octopus with a hand in every activity and an eye on us all.

The ARRL is a bull and the world is a china shop.

The ARRL is a carrier pigeon with a message for us all.

The ARRL is a turtle dove which coos with love or a vampire which drinks our blood.

The ARRL is all these, and more, but almost never could be called a boar!

This is what the ARRL means to me.

QST

During its 50th anniversary year of 1964, the League conducted a Golden Anniversary Essay Contest on the subject which titles this article. Judges were unanimous in voting an honorable mention to W1QJB for his novel entry. Subsequent issues will carry other winning essays.

Happenings of the Month

License Fees Ruled Legal

Dannals New Hudson Director

Canada Adopts C.W. Segments On V.H.F.

SUPREME COURT DENIES REVIEW OF FEES

In 1964, when the Federal Communications Commission began imposing fees on amateurs and others for most applications for license, a group led by aviation interests filed suit in the U.S. Court of Appeals for the Seventh Circuit at Chicago seeking to prevent FCC from charging the fees. The League "intervened" (became a party to the case) on behalf of amateurs. In July the court issued a decision against petitioners, holding in effect that FCC had the right to charge the fees and had done a reasonable job in establishing fair fee schedules (see page 82, *QST* for September, 1964).

The petitioners (still including the League) later filed a writ of certiorari with the U.S. Supreme Court, asking the high court to review the decision of the appeals court. In mid-January, the Supreme Court announced its denial of the writ, for all practical purposes upholding the legality of the fees in principle and also in detail.

The sole remaining possibility for an overturn of fees lies in Congressional action. Representative Walter Rogers (D., Texas), Chairman of the communications subcommittee of the House Committee on Interstate and Foreign Commerce has a bill ready which would bar FCC from charging filing fees without specific Congressional authority. Hearings were held on a similar bill during the past session of Congress but the bill did not get to the floor.

DANNALS NEW HUDSON DIRECTOR

In November the Committee of Tellers made the incredible discovery that the Hudson Division election for director had ended in a tie between Harry J. Dannals, W2TUK and Howard W. Wolfe, W2AGW, at 2426 votes each. As a result, the Executive Committee ordered a second ballot sent to each person who was a full member of the Hudson Division on November 20. These ballots were due at Headquarters by noon of January 20.

The reballoting came very close to a million-to-one repeat: 2651 for Mr. Dannals, 2639 for Mr. Wolfe. The Tellers, First Vice President Groves and Directors Eaton and Compton, met at headquarters on January 22 with John Luft, a certified public accountant from the firm of Ernst and Ernst. A paper-counting machine, called a Tickometer, was used in verifying the count. In addition to the Tellers and the accountant, two members of the Hudson Division, Robert Stankus, W2VCZ and Newt Grievson,

W2DNG, were present as witnesses, having been named to do so in a petition submitted by supporters of Mr. Wolfe under the provisions of By-Law 15. The procedures used in counting the second ballots were essentially those shown in *QST* for January, pages 72 and 73.

Director Dannals has previously been vice director of the division from 1961 through 1964 and assistant director from 1958 to 1961. From 1955 to 1961 he also was Section Communications Manager for the New York City-Long Island section. Harry has also been president of the Nassau Radio Club and vice president of the Lake Success Radio Club. Currently, he's president of the Hudson Amateur Radio Council, and trustee of its stations K2US and K2YV, vice president of the Single Sideband Amateur Radio Association and director of the Suffolk County Radio Club. He was a co-chairman of the 1964 ARRL National Convention and holds the rank of Lieutenant Commander in the Naval Reserve. His ARRL station appointments include ORS, OPS, OO, and OES, and he is a member of the A-1 Operator Club, Navy MARS and AREC.

Director Dannals lives in the Dix Hills section of Huntington, Long Island, and is a senior engineer with the Sperry Gyroscope Company.

CANADA ADOPTS C.W. SEGMENTS ON V.H.F.

At the request of Canadian ARRL officials, the Department of Transport, early in January 1965, set aside the 50.0-50.1 and 144.0-144.1 Mc. bands for A-1 emission only. The step was taken to allow serious experimenters who are dealing with very low signal strengths (*i.e.*, auroral reflection, sporadic-E layer work, moon-bounce) to carry on without strong local interference. The rules will actually be changed at the next printing, expected with the issuance of new licenses. However, in anticipation of the launching of Oscar III, a repeating satellite with its receiver tuned to a 50 kc. bandpass centered on 144.1 Mc., the Department has made the 144 Mc. change effective immediately.

AMATEURS AND MEMBERS

FCC figures for December 31, 1964, show 256,155 amateur operator licenses in force, a decline of 82 from the June 30 figure of 256,237. There were 263,589 station licenses at year-end, a drop of 418 compared with the June total. There were only about 17,000 newcomers during the year (including Novices), which compares with a norm of some 30,000 in previous years.

Hamming

From Your

Fallout Shelter

APPARENTLY there are more amateurs operating from their fallout shelters than we thought. Our ARPSC lead under the above title (page 60, Jan. *QST*) brought several responses.

Ed Washburn, W2RG, says he has had a state-approved fallout shelter completely equipped for amateur operation since 1960 (see cuts). The gear, both transmitting and receiving, is all transistorized and operates from 12 volts of dry battery. Standard 110 v.a.c. gear is also installed for use when commercial power is on. Ed says that un-equipped and un-supplied, the shelter cost him exactly \$146.50 to build, took him six weeks, houses three. The shelter is completely equipped with emergency materials for several weeks, including radiation-measuring equipment which Ed also built. The rig operates on 80 and 40 meters and covers distances up to several hundred miles.

An amateur who wished his name withheld advises us that he has a fallout shelter, built at considerable labor and some expense by himself and his wife and with much kidding from the neighbors. His isn't equipped with ham gear yet, but this is being considered.

The next letter was from Ellen Ackerman,

WA4FJF, who states that we are missing the whole idea, that RACES will depend on community-housed facilities such as one which she describes in Bay County, Florida (we know of several others), and that there will and should be no dependence on communications by individual amateurs from their own homes.

W7PBV, SCM Nevada, advises that both he and W7ZT have amateur-equipped fallout shelters, and promises pictures.

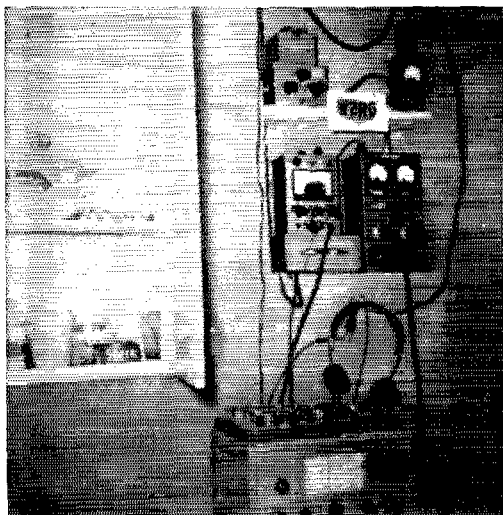
WA0BGW tells us he has been operating from his fall out shelter since 1961, and that it makes a very fine shack because it is nearly soundproof. All he needs is emergency power to be ready for any emergency.

VE7BOZ says that once such a shelter is completed, the matter of equipping it for amateur radio should be quite inexpensive. He promises to try it on his and let us know results.

We would have taken bets that there wasn't a single fallout shelter in all U.S.A. and Canada presently equipped for amateur radio or RACES operation — individually owned, that is. Glad we didn't.

— WIN/JM

QST



Inside and outside the W2RG fallout shelter. The outside shot shows the basement construction complete with shield. Inside we see the antenna tuner and absorption wavemeter on the top shelf, the transmitter on the right on the lower shelf and receiver and battery box on the left. At bottom is the AR-3 receiver for use when a.c. power is available.

● *Beginner and Novice*

Have You Got 'Em? — Harmonics, That Is?

Getting Rid of Your Spurious Signals

BY LEWIS G McCOY,* W1ICP

ONE thing the Novice has to learn, and learn quickly, is that harmonics can cause him plenty of troubles. We say "quickly" because as soon as a Novice goes on the air, he must be sure that he isn't causing interference to other services if he doesn't want an FCC citation. "Other services" refers to commercial stations operating on their assigned frequencies outside the amateur bands.

If a Novice having harmonic radiation is lucky, he may receive a notice from an ARRL Official Observer. Why "lucky?" Well, which would you rather receive — an FCC notice which becomes part of your official record or a friendly warning from another ham? Under the ARRL Official Observer program, between 20,000 and 25,000 notices were sent out in 1964, and approximately 7500 of these were to Novices for radiating spurious signals. The bulk of these were for second-harmonic radiation from 80 meters; that is, in the 7400-ke. region. It isn't difficult to get rid of spurious radiations, but before telling you how let's see what they are and how they come to be.

Spurious Radiations

The desired signal, the one we want to use for our communications, is called the "fundamental" signal. For example, let's assume we tune up and transmit on 3725 ke. The signal going out on 3725 ke. is our fundamental signal. If any other signal is radiated at the same time, such a signal (or signals) would be called a "spurious radiation."

Probably the most common of spurious radiations are harmonics. A harmonic is always an exact multiple of the fundamental frequency. For example, our 3725-ke. fundamental would have harmonics at 7450 ke., 11,175 ke., 14,900 ke., and so on, going higher and higher in frequency. Normally, the strength of the harmonics diminishes as you go higher in frequency.

In addition to harmonics we have parasitic oscillations. These are usually signals not harmonically related to the fundamental frequency. A parasitic can be quite strong in relation to the fundamental, even when its frequency is very high. In any event, even relatively weak spurious output can be radiated and cause interference to another service.

Nearly all transmitters, whether home-built or manufactured, will have some harmonic output. Parasitic problems are fairly common, too. Thus it is never safe to assume that you don't have

harmonics or parasites. It is, in fact, entirely normal for harmonics to be present in an amplifier stage, although in the average transmitter the second-harmonic will be somewhere between 20 and 30 decibels output below the fundamental. To make this a little clearer, let's say that you have 60 watts output. With attenuation of 20 db., the second harmonic would have a power output of 6/10 of 1 watt. While it might seem, at first thought, that 6/10 of a watt couldn't possibly be enough to cause interference, don't for one minute believe it. Many hams have worked hundreds of miles with no more power. Under ideal conditions your 6/10 of a watt could represent an extremely strong signal.

The 20- to 30-db. attenuation figure we mentioned didn't take one very important consideration into account. These figures will hold true only if the amplifier is correctly tuned and adjusted. The attenuation can be much less if the transmitter controls are not properly adjusted. Not only that, but many Novices fall into an even worse trap. They *think* that the rig is tuned up, for example, on 3725 ke., when actually they have tuned the amplifier to twice the frequency, or 7450 ke. In such a case the full output would be on 7450 ke.! Simply because your transmitter band switch is in the 80-meter position is no absolute guarantee that the output is on 80.

Again, the newcomer should never assume that because he has an "80-meter" antenna, the antenna won't radiate harmonics. (Many Novices make the incorrect assumption that an antenna cut for a given band will not radiate on any other frequency.) It is true that a half-wave dipole cut for a given band will *tend* to discriminate against certain harmonics but there is no positive guarantee that the discrimination will be great enough to prevent harmonic radiation.

Probably at this point the reader is getting ready to give up ham radio and take up stamp collecting! However, the situation is nowhere near as bad as it first appears. Getting rid of harmonics or preventing their radiation is quite simple, and only a few precautionary steps are required.

But before talking about the "how" there is one more point: Actually, we are concerned with two groups of harmonics. First, there are those that cause interference in that portion of the radio spectrum up to and including the 28-Mc. band. The second group falls at still higher frequencies and is the one that can be responsible for television interference. If you are operating

* Technical Assistant, QST.

on 80 or 40 meters the only harmonics you need worry about, usually, are those that fall in the spectrum below 30 Mc. When you go on 20, 15, or 10 meters, and the local television stations are in the v.h.f. range (Channels 2 through 13), any harmonic that falls in the local channel could cause TVI.

Many Novices who receive harmonic citations believe that a low-pass filter, the type commercially available for TVI, will clean up their low-frequency harmonics. This isn't so. Usually, a low-pass filter for TVI is designed to attenuate only harmonics above 30 Mc. It will *not* attenuate low-frequency harmonics such as the second-through eighth from an 80-meter fundamental. A low-pass filter to attenuate the lower-frequency harmonics must be designed specifically for that purpose.

How To Get Rid of Harmonics

Do you have harmonics? The only safe assumption is that you do. There are a couple of ways you can check but keep in mind that any check you make is for one given tuning condition of the transmitter or with one particular antenna system. Any day-to-day changes you make could change the harmonic condition.

First, trying to determine whether or not you have harmonic radiation by listening at the harmonic frequencies with the receiver in your own station is strictly no good. It is practically impossible to keep from overloading your receiver with your fundamental signal. When the receiver becomes overloaded, harmonics are generated *in* the receiver, making any readings unreliable. For the same reason, a receiving check by a neighbor ham only a few doors away is also unreliable. Your fundamental can easily overload any nearby receiver. However, if you have a

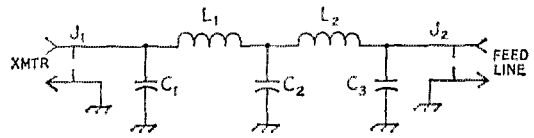


Fig. 1—Circuit diagram of the half-wave filter.

3.5-Mc. band. All capacitors are silver mica.

C_1, C_3 —820 pf., mica, 500 volts.

C_2 —1500 pf., mica, 500 volts.

L_1, L_2 —11 turns No. 20, 16 turns per inch, 1-inch diam.
(B & W Miniductor 3015, Illumitronic Air Dux 816T).

7-Mc. band.

C_1, C_3 —470 pf., mica, 500 volts.

C_2 —1000 pf., mica, 500 volts.

L_1, L_2 —8 turns No. 18, 8 turns per inch, 1-inch diam.
(B & W Miniductor 3014, Illumitronic Air Dux 808T).

21-Mc. band.

C_1, C_2 —100 pf., mica, 500 volts.

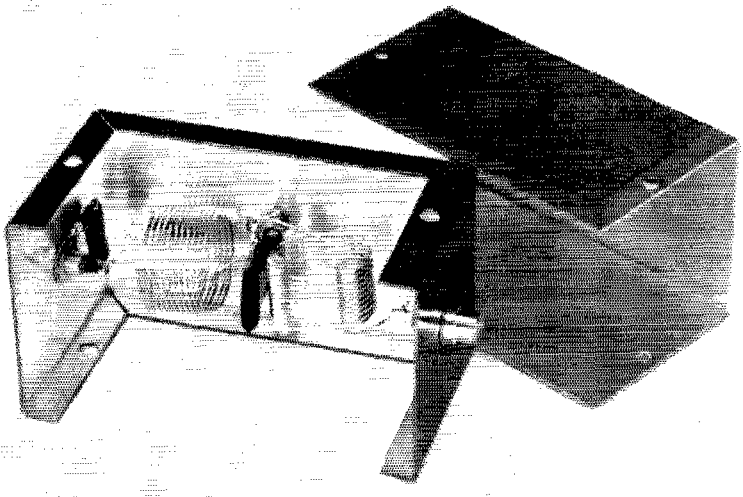
C_3 —200 pf., mica, 500 volts.

L_1, L_2 —7 turns No. 18, 4 turns per inch, 1/2-inch diam.
(B & W Miniductor 3001, Illumitronic Air Dux 404T).

ham friend a mile or so away you can have him listen at the harmonic frequency, and if he detects any harmonic you know you must take steps to eliminate it. Unfortunately, if he *doesn't* hear any harmonics it can't be taken for granted that your transmitter is clean. Your harmonic signal could be skipping over his location. Obviously, it is better to assume you do have harmonics and take steps to keep them from being radiated.

The method for reducing harmonic output consists of adding a selective circuit between the transmitter and the antenna. This circuit is usually installed close to the transmitter, in the feed line.

There are two types of selective circuits in



The coils, L_1 and L_2 , are mounted with their axes at right angles to each other to reduce unwanted coupling. Note that the coils are supported by their leads.

common use. One, a simple half-wave filter, requires no adjustment and is installed in the coax line feeding the antenna. The other, which does require adjustment, is a transmatch.

If you have a coax-fed antenna that is reasonably well matched, having an s.w.r. of, say, 3 to 1 or less, the quickest and simplest method of attenuating harmonics is with a half-wave filter. Fig. 1 is the circuit diagram of such a filter. The components specified in Fig. 1 will handle the Novice input of 75 watts if the s.w.r. is no higher than 3 to 1. Silver-mica capacitors as specified have a 500-volt rating, and since it is practically impossible to find units with higher voltage ratings in dealers' stocks, the filter is only adaptable to Novice power levels.

For an end-fed wire or an antenna with tuned feeders, the transmatch is the answer to harmonic suppression. Also, if you are a General Class license holder (or higher) and you plan to run more power than 75 watts, you'll need a transmatch. A recent article in *QST*¹ described the construction and use of a transmatch so we won't go into additional details here. Rather, a quick and easy-to-build half-wave filter will be described.

Basically, a half-wave filter is the electrical equivalent of a half wavelength of transmission line. Adding a half wavelength to your trans-

mission line doesn't change the impedance that transmitter "sees," so adding the half-wave filter doesn't change the load on the transmitter.

Being a resonant circuit, the half-wave filter will only pass a certain band of frequencies, such as an amateur band. For this reason, a separate filter is required for each band. However, the filters are cheap and easy to build, so the only problem is remembering to change filters when you change bands.

The filters shown are built in 2 $\frac{1}{4}$ × 2 $\frac{1}{4}$ × 4-inch Miniboxes. Phono jacks are used for the input and output connections and the coil ends are mounted directly on the jack terminals. One end of C_2 is connected to a solder lug which is mounted at the center of the box. The other end of the capacitor supports the center ends of the two coil sections. Note that the coils are mounted with their axes at right angles to each other. This is to reduce coupling between the sections. Although we have marked J_1 "Trans." and J_2 "Ant.," the filter can be put in the line in either direction.

To use the filter, simply connect it to the rig with a short length of coax and connect the antenna feed line to the other side. Don't forget to change filters when you change bands, otherwise you'll burn out the capacitors in the filter.

Don't wait until you get a notice from the FCC or an Official Observer; put in a filter immediately! You'll save yourself a lot of grief.

Q57

¹ McCoy, "A Completely Flexible Transmatch for One Watt to 1000," June, 1964.

Strays

OUTSTANDING NEW ENGLAND AMATEUR RADIO OPERATOR

The Federation of Eastern Massachusetts Amateur Radio Associations will present an award to the outstanding New England amateur radio operator. Only amateurs in the first call district are eligible and must meet any one of the following qualifications:

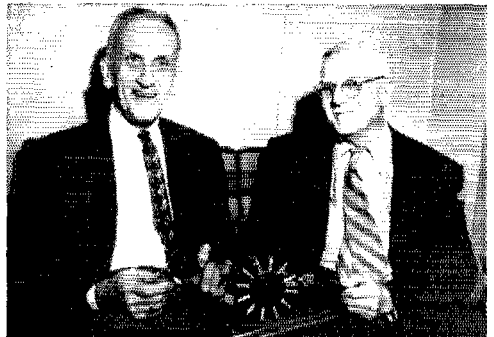
1. Performed a meritorious public service to his community through the medium of amateur radio or,
2. Made a major contribution to the science of amateur radio or,
3. Helped greatly to stimulate interest in amateur radio by others or,
4. Aided other radio amateurs to acquire a greater knowledge and skill in operating or building amateur radio equipment.

This honor will be announced at the New England Division ARRL Convention to be held on April 24-25, 1965, at the New Ocean House, Swampscott, Mass. The award is known as the John R. Mansfield Memorial Award and is given each year at this convention. The recipient will receive a cash gift of \$150 and a plaque commemorating the event.

Nominations, which should be complete and accurate, are urgently requested from the amateur fraternity. All nominations should be sent to The Federation of Eastern Mass., Amateur Radio Associations, c/o Mr. Eli Nannis, W1HKG, 37 Lowell St., Malden, Mass. The closing date is March 26, 1965.

Stolen Equipment

While visiting relatives in Wisconsin during the Christmas holidays, my Drake 2B (serial 6208), matching speaker and Q-multiplier were stolen by a discriminating thief . . . he ignored other valuables and took only the receiver and speaker! Any information on the above equipment should be sent to Gregg Hill, K5FXZ, 4106 Lively Lane, Dallas, Texas.



Over a century of ham radio is represented in this photograph of Tony, W9OD (left) and Herman, W9DA (right). Herman feels that there's been quite a change in ham radio over the years, but Tony says that nothing has really changed, it has just become more expensive!

A Switchable Four-Element 80-Meter Phased Array

BY DANA W. ATCHLEY, JR.,* W1HKK

THERE are very few amateurs who participate in the annual winter 75-80 meter DX chase who haven't wistfully entertained the idea of an 80-meter beam. Most of us who have had experience with rotary antennas on 20, 15, 10 — and in my own case, 40 meters — snarl when we finally locate a reasonable foreign signal on 80-meter s.s.b. only to have it blasted by VE3 phone and W c.w. QRM, and, in more cases than admissible, by buckshot from strong U. S. stations operating above 3.8 Mc. The author is no exception, and this article is a summary of his many man-hours (and dollars) consumed in the practice of 80-meter beamery.

First, a word on 80-meter propagation: Most of our domestic 80-meter phone contacts are within a radius of 1000 miles. As such, the optimum path is at a relatively high angle of radiation. The 80-meter DX, however, usually is a multi-hop signal arriving at a relatively low angle. More often than not, both the low-angle DX and high-angle domestic signals appear in the receiver simultaneously. The interference protection provided by "skip" on reception occurs

* Microwave Associates, Inc., Burlington, Massachusetts.

much more rarely on 80 than on the higher frequencies. Here in New England most of us are primarily concerned with European DX since that comes in at hours available to the average ham. The path becomes usable as early as 1500 EST and remains open, with some ups and downs, until at least an hour after daylight in Europe, or until 0300 EST. The path is almost always open during some part of this period, with day-to-day variations ranging approximately ± 20 db. The sunspot problems besetting the higher frequencies are less severe at 80 meters.

Most of the active experimenters on 80 s.s.b. have found the high dipole most effective for transmission. For reception, vertical dipoles sloping in the desired direction have provided a semblance of front-to-back on local signals while favoring the low-angle signals of the DX. Those of us who have tried horizontal collinear arrays, or long-wire antennas such as V beams or rhombics, either have been disillusioned due to misdirected techniques or to the more likely fact that in the average amateur environment they are relatively ineffective. My own experiments with many 80-meter horizontal phased arrays (up to

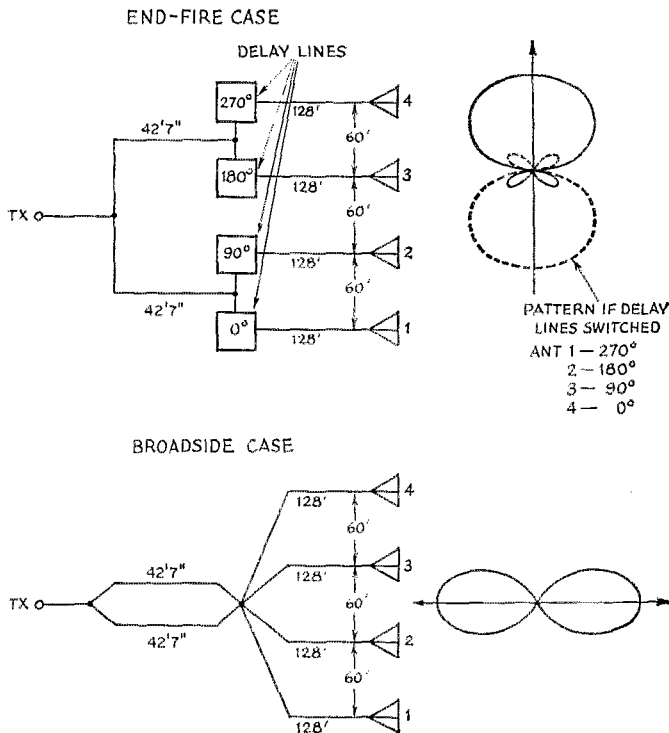


Fig. 1—Broadside and end-fire connections of the four $\frac{1}{4}$ -wave antennas, with resulting patterns.

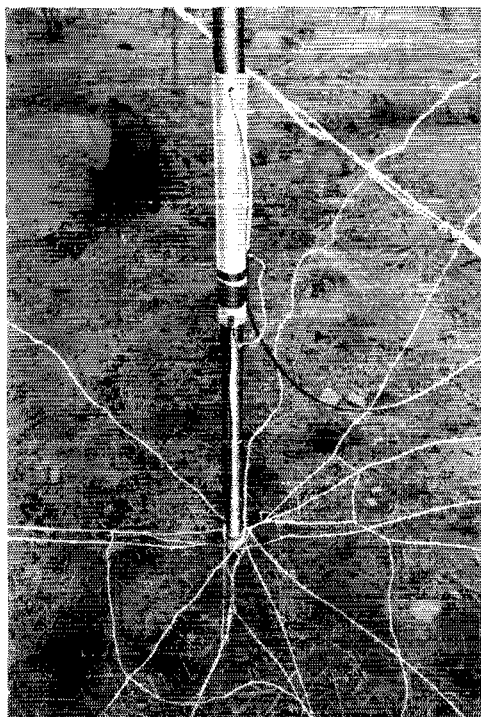


Fig. 2—The base insulator is phenolic tubing separating two mast sections, one of which is partially buried in the ground. Note radials connected to grounded section and radiating outward. These are not buried in this case since the lot on which the array is installed has no foot traffic.

5 elements collinear) as high as 90 feet, as well as a series of V beams, have always driven me back to the tried-and-true high dipole. I am sure that the above antenna types or the conventional 3-element horizontal Yagi will work most satisfactorily *if* and only *if* they are operated at a height of at least one-half wavelength. However, the writer has not had the resources to make such an experiment. The very thought of the cost of erecting a rotary 3-element 80-meter beam at 150 feet height is depressing.

Experiments With Phased Verticals

Undaunted, however, I started again this Fall to solve the problem. This year's efforts have been more successful. The story unfolds:

My aim was to erect a fixed beam that could be steered electrically by varying the phase relationship between the driven elements. First, I erected a 2-element beam consisting of two $\frac{1}{4}$ -wave vertical antennas spaced 60 feet, suitably supplied with ground radials. By driving either antenna and inserting a 90° lag to the other, an excellent reversible cardioid¹ pattern was obtained with the null at the rear of the driven dipole. A 43-foot section of RG-8/U served as the delay line. This array is relatively non-critical, and rejects signals from the rear at most angles of arrival. The 2-element array, although providing close to 15 db. front-to-back ratio on both transmission and reception, compared unfavorably on transmission with my 90-foot-high dipole. This could have been caused by lack of

care in tuning, and I intend to recheck this combination more carefully later this winter.

In the interests of achieving greater gain and a lower vertical angle, I then expanded the array into four elements with a capability of switchable end-fire operation to either the NE or SW direction and third position providing broadside operation with simultaneous operation NW and SE. The theoretical patterns² are shown in Fig. 1. The configuration consists of four $\frac{1}{4}$ -wave (53-foot) verticals, with ground radials, spaced 60 feet (90°) and driven at 0° , 90° , 180° , and 270° in one case; 270° , 180° , 90° , 0° in the second; and all in phase in the third. By this means, a beam with 4.9 db. theoretical gain over an isotropic antenna and, for low angle signals, a 30-db. front-to-back ratio, can be switched electrically either to the NE direction, or selectively to the SW. A third switch position provides two broadside lobes — one NW and the second SE — with 5.3 db. of theoretical gain.

Exclusive of the radials the beam occupies 180 feet of length. It is located in relatively swampy land amidst many second-growth trees. Its location and slim profile render the array almost completely unnoticeable to the neighbors — an important requirement in most suburban towns. It obviously does not lend itself to installation in many crowded areas of the U. S., but the 2-element version can be erected on the average lot.

Construction Notes

The $\frac{1}{4}$ -wave antennas are assembled from 5-foot sections of 2-inch o.d. aluminum tubing.

² Clay, "Linear Antenna Arrays." *CQ*, Nov., 1964.

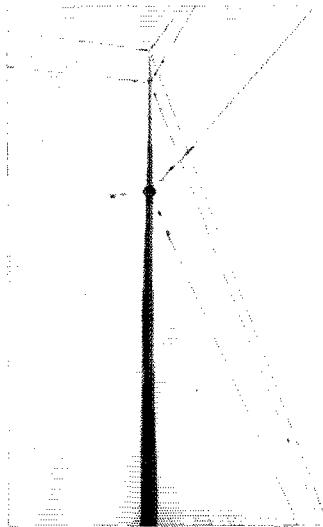


Fig. 3—The guy system used for the sectional aluminum mast.

¹ Terman, *Radio Engineers Handbook*, 1943, p. 804, Fig. 38. McGraw-Hill Book Company, Inc., New York.

each with a female end formed with an eight-inch sleeve constructed to mate with the end of the next section. These sections were available on the surplus market at 50¢ each, years back. For those not fortunate enough to find such a source of supply, I suggest investigation of the 50-foot telescoping steel mast available from Lafayette Radio at a cost of \$12.99. Their Part TL-63W as listed in the 1964 catalog consists of five 10-foot sections, ranging in o.d. from 2 1/4 inches at the bottom to 1 1/4 inches at the top. This mast is slightly short, but could be loaded up to resonate at 3.8 Mc. with a few turns of inductance at the base.

To construct such a beam the writer first laid out a straight line 180 feet long pointing in the direction of England (050 True). Next, at 60-foot intervals a section of the aluminum masting was driven 3 feet into the ground. This was done to preclude settling at a later date, to provide a firm footing for each element, and to keep the base insulator up above the winter snow. To provide the base insulators, an 18-inch sleeve of type 551 Panelyte paper-base phenolic tubing, 1/8-inch wall-thickness, 2-inch i.d., was used.³ A 5-foot section of the 2-inch o.d. aluminum masting was cut in half, and since the fibre tube sleeve was far from an interference fit, one-foot lengths of 3-inch fibreglass tape soaked in epoxy resin were used as U-shaped shims over the two open ends of tubing before they were inserted into the fibre sleeves to a distance of approximately 6 inches. To hold this portion of the tubing during the set-up period of the epoxy, a single sheet-metal screw was used at each end of the sleeve. These screws later provided electrical connections to the aluminum tubing for the coaxial-cable feed.

³ This type of tubing is available in many sizes from the Hub Stamping & Engraving Company, 381 E Street, South Boston 27, Massachusetts.

The outside of the fibre sleeve was also painted with epoxy as weather protection. The writer used a 50-50 combination mixed per instructions of Everfix Clear Epoxy Resin and Epoxy Resin Hardener.⁴ The writer allowed the epoxy to set up five days at room temperature, resulting in a glass-hard insulating surface. Since the insulator is at a low impedance at 80 meters and subjected only to compressional strain, it has proved adequate (so far) under varying weather conditions, including ice and rain. A photograph of the lower section of the mast is shown in Fig. 2.

Before erecting the dipoles, the guy wires should be cut to size, strain insulators inserted, and some method of affixing the guys to the mast determined. As the retouched photograph, Fig. 3, shows, the writer used two small strain insulators spaced approximately 10 inches at the mast point and broke the guys evenly with a third strain insulator.

Our erection crew consisted variously of from four to six people. We erected the top 30 feet in one piece and the rest in sections. The method will depend on the type of masting used. The insertion of the last section containing the base insulator should be done with care, since the fibre sleeve probably could be cracked if subjected to too great a bending moment. However, we had no trouble on this score. After the four antennas are erected, the guys should be tidied up for aesthetic reasons.

Electrical Details

The writer has found that in general the length of verticals tends to be somewhat shorter than

⁴ This eminently satisfactory resin is produced by the Fibreglass-Evercoat Company, Inc., Cincinnati 42, Ohio and it or its equivalent is available at any large marine hardware store such as James Bliss & Company, Inc., 112 Atlantic Avenue, Boston 10, Massachusetts. The same source also provides the fibreglass tape.

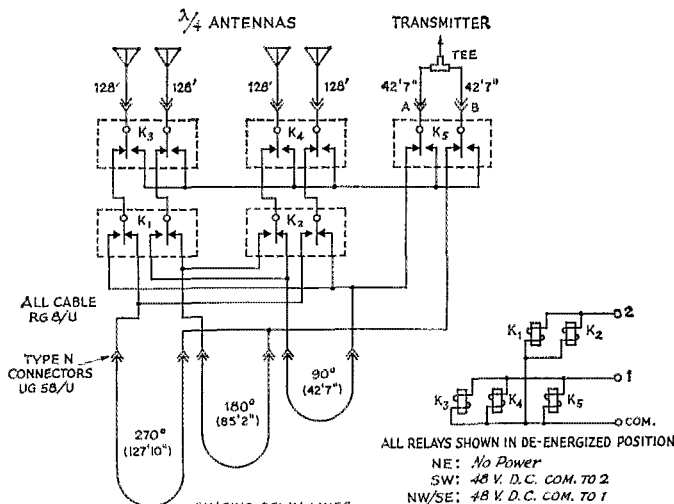


Fig. 4—Relay connections for switching antenna phasing to change directivity. The five relays are Guardian type A-300 with 115-volt a.c. coils, but operated on 48 volts d.c. All cable shields are connected together (not shown in this diagram). Antennas are from left to right: 4, 3, 2, 1.

the tables in the ARRL *Handbook* divided by two would indicate. Since the *Handbook* table indicated $61\frac{1}{2}$ feet, I first cut my verticals 59 feet. However, either because of loading by the guy wires, the proximity of ground, or the mutuals from the other antennas, I was forced to trim each by an additional $5\frac{1}{2}$ feet to raise the resonant frequency from the 3.3 Mc. measured to the 3.8 Mc. desired. All other things being equal, I recommend 54 feet (including approximately $2\frac{1}{2}$ feet below the insulator) for 3.8 Mc. You will find dimensions not overly critical at these frequencies.

For radials, copious unmeasured amounts of No. 16 galvanized fence wire were used. This can be procured in 2000-foot rolls for approximately \$5.00 per roll at most large lumber or hardware stores catering to farm needs. No attempt was made to bury the radials, since the land is occupied only by pheasants and other wildlife. At present there are at least 9 radials per dipole, but as time progresses I expect to add a few a week until I reach 20.

Feeding a multielement array with discrete, switchable phasing is more complicated than it seems, because of the asymmetry of the mutual impedances. Hopefully, antennas Nos. 1 and 4 and Nos. 2 and 3 should pair, but any mismatches can be transformed and transferred in part to the next antenna by combinations of the feed and phasing delay lines. As a start, the writer disconnected all feed lines and inserted a 50-ohm carbon resistor across three of the feed points, measuring the resistance and reactance at the remaining dipole with a Boonton RX meter.⁵ Since the dipoles had been resonated (by hacksaw) the feed points all measured approximately 40 ohms of pure resistance at 3.8 Mc., thus presenting only a slight mismatch to the 50-ohm RG-8/U feed. Surprisingly, there was no large variation from dipole to dipole.

Next, a variety of unsuccessful feed systems were tried. These were deemed unsuccessful because of the relatively uneven power split between the four dipoles, the variation being as much as 10 to 1. The final feed provides a power split of 3 to 1 in the worst case, with actual measured split in the NE direction 1.5-2.5-2-1. This type of feed, called "corporate feed"⁶ is used successfully in some of the vast new billboard-type phased arrays now in operation at microwaves for detection and tracking of space vehicles. As shown in Fig. 1, equal lengths of RG-8/U were brought back to a common junction box located near the physical center of the array. In my case each feed was 128 feet in length, electrically $\frac{3}{4}$ wavelength. The 250 feet of RG-8/U from the transmitter is split by means of a T connector at

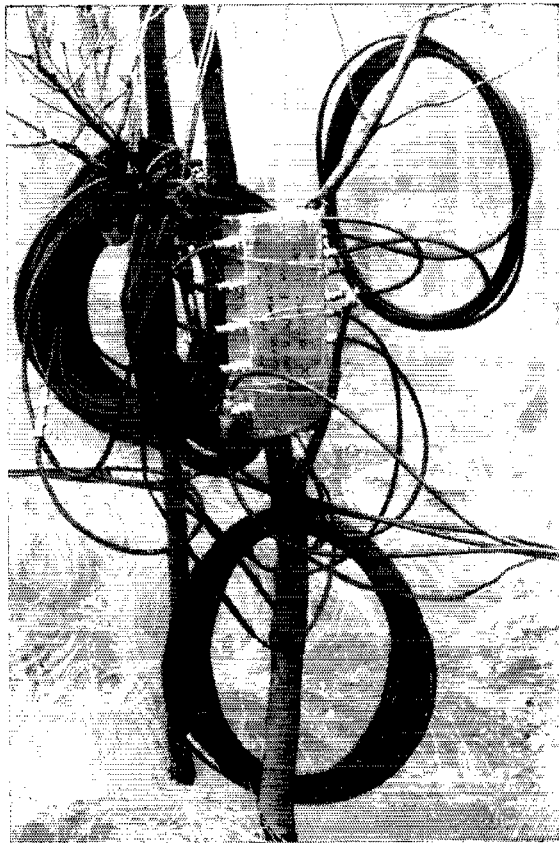


Fig. 5—The relay housing and coiled-up phasing lines.

a point 42-ft. 7-in. from the junction box and connected by two 42-ft. 7-in. $\frac{1}{4}$ -wave sections of RG-8/U to the box. Here by means of various relay sequences, the three coiled sections of RG-8/U which comprise the three delay lines are inserted selectively between the end of the two feeds from transmitter and the four antenna feeds. The delay lines for 3.8 Mc. are 42-ft. 7-in. (90°), 85-ft. 2-in. (180°) and 127-ft. 10-in. (270°) in length. A 1000-foot roll of RG-8/U costs approximately \$110. Because of the four-way power split, assuming an 800-watt average output, RG-58/U could have been used for the four antenna feeds and delay lines, resulting in some savings. It is recommended, however, that you stick to RG-8/U for the main feed to the transmitter and the two 42-ft 7-in. power-dividing sections.

The corporate feed was used in the two NE and SW end-fire positions. In the third switch position, where all four dipoles are fed in phase, the corporate feed, for reasons unknown, did not provide as much gain as was achieved by joining the two junction-box ends of the 42-ft. 7-in. RG-8/U and the four feeds to the antennas all together at a single point. In this case the two parallel 42-ft. 7-in. sections act as an impedance transformer.

The measured s.w.r. with the above feed com-

⁵ The usefulness of this procedure for the transmitting case is somewhat doubtful, since the actual termination that each antenna sees looking back to the transmitter is likely to be other than 50 ohms. However, it is valid in the receiving case if the receiver input impedance matches the feed system so that each antenna actually sees a 50-ohm load. — Editor.

⁶ Allen, "Array Antennas: New Applications for an Old Technique," *I.E.E.E. Spectrum*, Nov., 1964.

binations is better than 1.5 to 1 over the whole 3.5-4-Mc. band. However, in the end-fire position the finite lengths of the phasing delay lines are, of course, frequency sensitive and unfortunately the front-to-back ratio degrades to only 10 db. at approximately \pm 150 kc. from the 3.8-Mc. center frequency. The broadside case is less sensitive to frequency.

The junction-box relay sequences and interconnections are shown in Fig. 4. Although the five Guardian A-300 d.p.d.t. antenna relays are designed for 110 volts a.c., I operate them from 48 volts d.c. to preclude chatter. Further, they are only switched when the transmitter is off.

The feed lines and control cables are carried by means of a messenger cable 3 feet off the ground, paralleling the array. This messenger keeps the RG-8/U out of the mud and snow, and relieves the various connectors from any strain. The junction box and coils of RG-8/U were hung from a convenient tree as shown in Fig. 5.

How It Works

This array has been in use for one month. It gives front-to-back discrimination comparable to a reasonable 20-meter 3-element rotary. Those W4 c.w. stations just aren't there when you're listening to Europe. The low reception angle allows you to peer at the Europeans through the higher-angle VO and VE1 stations in the line of the beam. Modesty prevents me from commenting on what I can hear that the others can't. At transmission distances of over 1,000 miles my reports are invariably comparable to or better than those from my 90-foot-high dipole, fed with a balun and RG-17/U. This comparison antenna, certainly no "isotropic," is itself no slouch, having

accounted for an as-yet-unequaled 80-meter multiplier of 38 in the 1962 ARRL phone contest. Many Europeans, including HA's, OK's and OH's, have been contacted, along with one station in the Near East. In the short period of time this beam has been in use few contacts have been made in the broadside NW/SE condition; however, they include S9 reports from a VES and many YV's. In the SW position, ZL's have been heard but not contacted. They only come into New England between 0200 and 0500 EST, and the writer has not put much effort in this direction. It is interesting to note that when I hear Spanish-speaking stations on the SW position they are invariably Mexican or Central American, and on the SE position, Venezuelan or Caribbean stations. I get a great kick out of the ability to replace an S9 W4 c.w. station with 4X4DK on the same spot of the dial by simply flipping a switch.

In summary, this four-element 80-meter beam, erected in a relatively unfavorable location, has provided the ability, by a combination of forward gain, rear rejection and low angle reception, to hear foreign stations in any of the selected directions in a manner rarely achieved on such a low frequency. As a transmitting antenna it is comparable to or better than any other antenna ever used by the writer on 80 meters, providing in addition greatly reduced interference to other stations operating on the same frequency to the rear of the array.

In closing, the writer wishes to acknowledge the considerable stimulus and intellectual aid rendered by Henry Cross, W1OOP. In particular, his contributions to the relay sequencing were of great value. QST

Strays



Sergio Mikoyan, son of the present chairman of the Praesidium of the Supreme Soviet of the USSR, had a unique opportunity to see what ham radio in this country is like when he visited the home of W8PHZ and did some listening on 20 s.s.b. Mikoyan was in this country participating in the cultural exchange program between the USSR and the USA, and is very much interested in short-wave radio.

Each year, the high individual scorer in the ARRL International DX Competition receives the handsome W3INH trophy. W3EIS is shown holding the award for his superb HC1DC performance several years ago. During mid-December Don turned the trophy over to W3GRF, another PVRC club mate, for his 733-K performance in '64. Don't forget there are two remaining weekends in March to complete your performance.

DXMANSHIP — Phase I

“The DX Demoralizing Dazzler”

BY JOHN G. TROSTER,* W6ISQ

OK, Charlie, ok. I know you're still sore because 4KFC beat you in Sweepstakes.”

“Not only him, but also 9IOP and everybody else who was on. Even WILVQ beat me.”

“I say Charlie, you *did* poop out!”

“I don't think I like them Hamsmanship ploys ya told me about, 'cause I spent three hours just looking for a VES to zero beat.”

“Experience, Charlie, old man, merely experience. But that was last Sweepstakes. It's DX Contest time now. So how did you do in the first half?”

“I worked a VES. Called him an hour and he finally got mad and come back to me and said he didn't count, so quit QRMing him.”

“Maybe you could use a little help then, Charlie?”

“Yeah, but don't gimme no more of them Hamsmanship ploys like zero beatin' VES's.”

“OK, Charlie, ok. I think maybe . . . yes, I think I'll let you in on a novel little secret ploy used by our Hamsmen who are DXers . . . otherwise known as DXmen. We call this introductory course, “DXmanship — Phase I,” subtitled, “The DX Demoralizing Dazzler.” And Charlie, with this new little maneuver you'll be able to reek havoc . . . oooops . . . sorry . . . be able to make things a little more enjoyable for yourself in the DX contest.”

“Yeah, I need to be enjoyable for a change. So what do I do?”

“All right, Charlie. Let's suppose there's a pretty good pileup on Gus over at say, A99. So the first thing a good DXman wants to do is to demoralize the opposition . . . right? So what's the best way to foul things up?”

“Me get on the air.”

“Right . . . you call 'CQ DX' dead beat with Gus.”

“You're backin' me into another Wouff Hongin'”.

“Not at all, Charlie, my boy, because you really get an answer.”

“Me? I can't even get an answer with a Tuesday-night CQ on 40.”

“Yes, but who do you suppose comes back to you?”

“A VES?”

“YC7XZ . . . yessir . . . right out of the F_2 layer you answer this YC7. You thank him for his fine call. Give him a 579 report and ask him if he's in the contest.”

“What's he say to me?”

“Come on, Charlie . . . it's a make-believe YC7 — turn on your receiver!”

“Ohhhhh . . . thought I had a new country there for a minute. Would help my status a bit, ya know.”

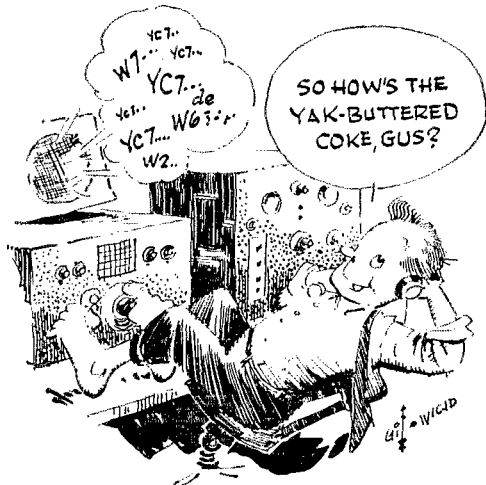
“So after a few minutes, you go back and say, 'thanks, Yorik, for the great report. Glad you want to work some of the other fellows. Just call 'CQ contest' on this frequency and see if you don't get some nice calls, 73 etc. etc.' Got it, Charlie?”

“Then what?”

“Well, about this time, some of the fellows who were cursing you for zero beating Gus are straining their audio to hear this YC7. And sure enough, a few of the superior operators are *positive* they hear him in there. And they start calling him blind . . . like their DXstatus depended on it.”

“Poor Gus. He'll never forgive me.”

“Quite okay. It'll give Gus a chance to have



a hot yak-buttered coke and a red cigarette. Now you have the opposition demoralized . . . right? They're all calling this YC7 blind, and QRMing each other, and swishing up and down and around. So now it's all yours . . . and in true DXmanship fashion, you sit back now and enjoy yourself.”

“You mean try for a VES?”

“You wait a minute, then go back on the air . . . ‘W6***’ (calls have been changed to protect the guilty) . . . ‘didn't you hear Yorik answer you?’ you say. ‘He gave you a 337 and said to QSY up 15 kc.’”

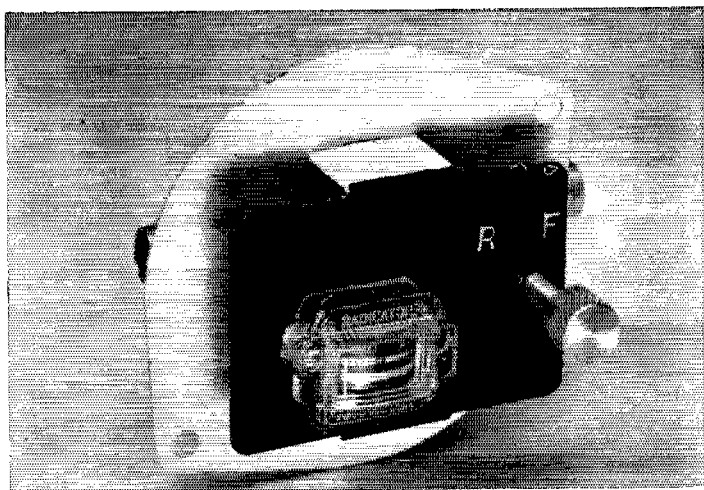
“Gee, W6*** usually has a good T9 note.”

“Listen up, will ya, Charlie. This is you making believe. Now . . . by this time, W6*** is so excited he can hardly paddle the keyer, but he comes out with a, ‘TU Yorik cu up 15’ . . . whhhhhooooeepppp. And off he beeps up 15 with half the band ditting and dahhing right behind.”

“So now Gus is in the clear and I call him to

(Continued on page 164)

*45 Laurel Ave., Atherton, Calif.



Front view of the Mini-Mono-Monimatch. The front panel, which serves as the mounting for the meter and sensitivity control, measures only $2\frac{1}{4}$ by $1\frac{1}{2}$ inches.

The Mini-Mono-Monimatch

Compact S.W.R. Indicator for Mobile Use

BY JAMES W. RUSH, JR.,* W4EWL

This novel Monimatch design cuts the size down to the point where the unit will easily fit into the instrument panel of any car. It is useful as a power-output indicator as well as for a continuous check on s.w.r.

IN the last few years, several single-band transceivers have appeared on the market. These monoband transceivers are ideal for mobile use because of their simplicity and ease of operation. However, serious antenna problems exist and, to keep a running indication of the transmitter-to-antenna match, a v.s.w.r. indicator is almost essential. To adjust the transmitter properly for modulation and output, a power-indicating device is also desirable. Both of these functions can be obtained using a Monimatch.¹ For mobile use, the Monimatch should be small, easily adjusted and clearly visible to the operator. This article describes a small reflectometer which appears to meet all of these requirements, and is very easy to build and adjust for almost any coax-line impedance and transmitter power level.

Circuit

The circuit of the Mini-Mono-Monimatch is shown in Fig. 1. If the antenna coax line is properly matched, a nonreactive condition exists along the line; namely, the r.f. currents and voltages are in phase. To determine the condition of match or mismatch, separate current and

voltage signals must be taken from the coax center conductor. To obtain a current signal, an r.f. current transformer, T_1 , is used. This consists of a small ferrite-bead core threaded by the coax center conductor. A secondary step-up winding converts the primary current to the proper signal level and phase. A voltage signal is obtained by capacitive coupling to the center conductor by means of C_1 or C_2 .

To indicate zero reflected power, the current signal must be equal in amplitude but opposite in phase to the voltage signal. This is done by comparing the two signals across a 100-ohm resistor and adjusting the capacitive coupling for minimum rectified output. The Monimatch must be terminated with the desired antenna-coax impedance. If the two signals are equal in phase and amplitude, they will add rather than subtract, and the rectified output is indicative of the power flow along the coax line in a forward direction. By these means the function of match and power-flow indication are obtained. Forward- and reverse-power flows are indicated, since the voltage signal is the same for both directions, but the current is reversed for forward and reflected powers.

To provide the proper level of current signal and to reduce the insertion loss, the small ferrite bead of T_1 is threaded by only one of five leads between the input and output coax connectors. This current split and a 6-turn secondary seem to be about the proper combination for the HW-12 transceiver. Less than 20 pf. of shunt capacitance was needed to match the current signal. For larger transmitters, more shunt wires should be used. The current and voltage signals are compared at the 100-ohm resistors, and rectified by the two diodes. Two separate circuits were used to provide both forward and reverse

*2123 Fieldcrest Drive, Owensboro, Kentucky.

¹ McCoy, "The Monimatch," *QST*, October, 1956. Brune, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959

indications without r.f. switching. The secondary windings of T_1 are wound in opposite directions to provide a sum and difference signal.

It was desirable to provide a single control for sensitivity and reverse because of the single hole in the dash plate. To do this, a 10K wire-wound miniature pot was opened, and the element open-circuited somewhere near the center. Sufficient wire was removed to provide an open-circuit position near the center of rotation. Maximum sensitivity is obtained when the pot is then rotated to either its maximum clockwise or counterclockwise positions. The direction of rotation for forward and reverse power flow is arbitrary and can be controlled by the phasing of the current secondaries.

Construction

The photos show the construction of the unit which, in this case, is designed to be mounted on the car's clock escutcheon to preserve the dashboard decor and provide good visibility. This escutcheon substitutes for the clock itself, and is for a 1964 F-85 Oldsmobile. The single control (for R_1) was located so as to coincide with the clock-stem opening in the dashboard. The miniature meter and R_1 are mounted on a small bracket which provides clearance from the front side of the escutcheon. R_1 is a 10K wire-wound control modified as described earlier.

The remainder of the components are assembled in a box made of sheet brass. The box shown in the photos is 1 inch square by $1\frac{1}{2}$ inches long. However, the capacitors shown are of foreign make and not generally available. The Johnson capacitors listed under Fig. 1 are larger physically, and will make it necessary to increase the box size to approximately $1\frac{1}{8}$ inches high, $1\frac{3}{4}$ inches long, and $1\frac{3}{8}$ inches deep. Each end of the box is fitted with a BNC coaxial-cable receptacle.

The ferrite bead (Ferroxcube 75-IT-060-3B) used in the construction of the transformer has an outside diameter of 0.245 inch, and inside diameter of 0.140 inch, and is 0.070 inch thick. Each of the two secondaries is wound with 6 turns of No. 24 Formex-covered wire. The secondaries are wound in opposite directions. The primary wire and the four shunting wires are approximately 1-inch lengths of No. 20 plastic-coated hookup wire. These wires are simply soldered between the two coax receptacles, one of the five being threaded through the hole in the bead.

Leads from the diodes to the sensitivity control emerge from the two feedthrough capacitors fitted into the bottom side of the box, and thence through clearance holes in the escutcheon to the control.

Adjustment

The only alignment required is to adjust the shunt capacitors for minimum reflected indication when the Monimatch is terminated with the desired impedance. The forward adjustment is made by temporarily reversing the Monimatch

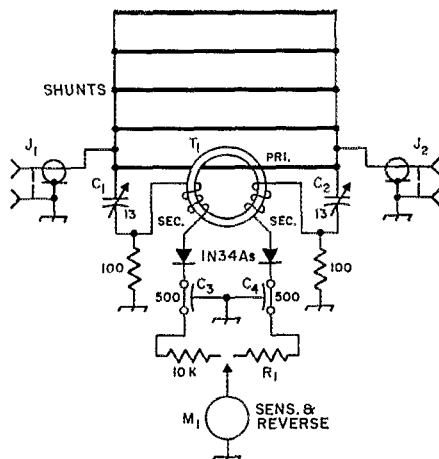


Fig. 1—Circuit of the miniature Monimatch. Capacitances are in pf., and resistances are in ohms. Resistors are $\frac{1}{2}$ -watt composition.

C_1, C_2 —Ultraminiature air trimmer (Johnson 189-6).
 C_3, C_4 —Feedthrough capacitor (Centralab MFT-500, or equivalent).

J_1, J_2 —BNC chassis-mounting coaxial receptacle (UG-290/U).

M_1 —Miniature a.m. receiver tuning indicator (Lafayette Cat. No. 99G5025).

R_1 —10,000-ohm wire-wound control, modified as described in the text.

T_1 —See text.

in the coax line and tuning the other capacitor for minimum indication and the other capacitor for minimum indication with R_1 turned to maximum sensitivity in the forward direction. There appears to be no critical frequency setting, since a good null is obtained across the 75-meter phone band.

Operation

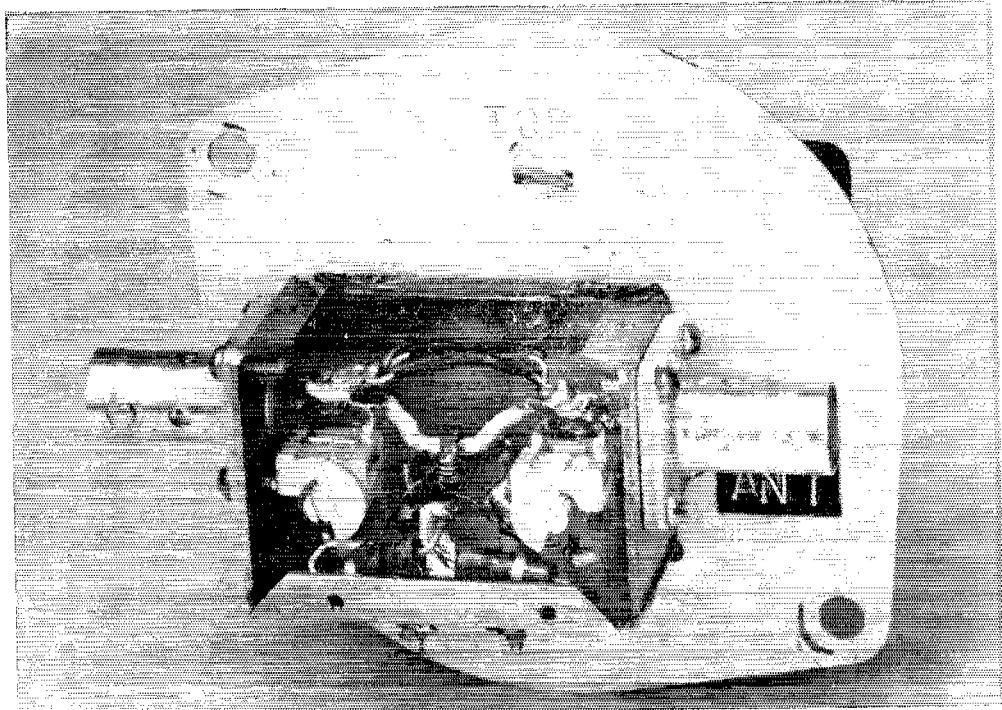
To obtain an estimate of antenna-coax v.s.w.r., the Monimatch was adjusted to give less than full-scale deflection with the HW-12 in its "tune" condition, and R_1 was set in its most sensitive forward position. The ratio of forward to reflected power can be estimated after noting the reflected-power indication when R_1 is set for maximum sensitivity in the reflected direction. The approximate v.s.w.r. is the sum of the two readings divided by their difference.² In the "tune" condition, the HW-12 puts out a small amount of e.w. power. In the forward direction, the Monimatch can be used to indicate s.s.b. modulation and relative power output.

Other Bands

There should be no reason why the same circuit could not be used on other bands. The maximum useful frequency would depend upon the ferrite and diodes used. The ferrite should be low-loss so that an accurately-phased current signal will be transformed. The upper useful frequency for the ferrite bead used is not known.

Although the Monimatch described here was designed for single-band usage, it has several

² Hall, "Accuracy of s.w.r. Measurements," *QST*, November, 1964.



Rear view of the miniature Monimatch. An L-shaped cover normally completes the enclosure of the components. The black wires at the top are the shunts. The white wire is the "primary" of the current transformer.

advantages over some existing Monimatches:

- 1) Extra small size.
- 2) Can be tuned for exact null for any chosen line impedance.
- 3) Can be designed for all power levels using the same basic circuit and components.
- 4) Single-knob for power-direction selection and sensitivity adjustment.
- 5) Relatively inexpensive, and can be designed to work with a variety of available indicating meters. The more sensitive the meter, the lower the insertion loss.

QST

Strays



During the seventh annual Rialto (California) Christmas Parade, hams of the Edison Amateur Radio Network helped to maintain the smooth flow of marchers, floats and equestrian units.

Southern California Edison Company employees served as communication expeditors along the two mile parade route. One of six mobile units used in the parade served as pace car. Others were positioned at key locations along the line of march. In addition, three men operated hand-held portable gear, and a temporary base station was set up in the Rialto Police Department Headquarters.

At the above left, Santa Claus, having momentarily lost his position, gets his bearings again from Bob Lyon, president of the Edison Amateur Radio Network. At the right, our president, Herbert Hoover, Jr., W6ZH, presents the Club's official ARRL Charter of Affiliation to Bob Lyon. Looking on is W. E. Montgomery, vice president of the club.

VE/W -- 1963-1964 Results

WE ARE happy to report that VE2BB and XYL are in fine condition once again and furnished us with the following report on both the '63 and '64 W/VE Contests sponsored by the Montreal Amateur Radio Club. VE2NI of the Montreal Amateur Radio club led the

1963 affair with 119,974 points while the '64 affair was spearheaded by the efforts of VE3DSU of Pickering, Ontario, with 110,532 points.

As soon as the information is available, dates for the 1965 test will be shown in the ARRL Activities Calendar.

1963

ATLANTIC DIVISION

Eastern Pennsylvania

W3GOQ	37,915
W3OCTJ	24,057
K3YQJ	12,375
K3VMG	8,745
K3JGJ	8,816
K3HNP	7,392
K3TEL	3,713
W3ADE	3,119
K3SVZ	1,485
K3MPG	1,188
K3VDH	1,188

Maryland-D.C.

W0GKY/3	54,450
W3AYS	42,966
W3MCG	33,000
K3AAG	4,950
K3NKB	2,079
K3URZ	99
K3UQN	50

DELTA DIVISION

Delaware

K3GKF	11,715
-------	--------

Southern New Jersey

W2EXB	69,498
W2SDB	11,880
W2ZWLN	6,732
W2QDY	6,336
W2ZFE	6,270
W2BEDH	4,208
W2EBW	2,772

WESTERN NEW YORK

WA2THY	15,048
W2RFP	6,548
W2RSU	6,495
W2ZSSJ	4,703
W2ZFR	1,386
W2ZPG	693
W2GLD	594
W2ZJW	594

WESTERN PENNSYLVANIA

K300U	38,610
W3KQD	18,315
W3ELZ	14,850
K3SLW	12,128
K3SDT	4,125
W3ULU	198

CENTRAL DIVISION

Illinois

W9QQG	67,815
W9LNQ	62,815
W9YYG	21,785
W9ACYI	15,314
W9APT	15,246
K9IRO	7,524
W9CJL	6,534
W9HVP	3,960
K9DYK	2,723
W9PEJ	2,640
W9AWP	328
W9SFM	122
W9FBC	347

Indiana

W99AQW	77,220
K9LLO	68,310
W9ATM	36,432
W9IOP	24,948
K9OIG	1,485
W9IRE	396

Wisconsin

WA9AIB	34,650
W9FMIQ	34,512
WA9IAT	8910

DAKOTA DIVISION

North Dakota

WA2BEX/9	29,700
WA9AAD	12,474

South Dakota

W0CUC	33,858
W0WUT	3,218
W0BMMW	2,940

Minnesota

K09WW	51,678
K0BPO	39,600

DELTA DIVISION

Arkansas

K5KDG	20,097
-------	--------

Louisiana

W5KC	31,185
WA5ALL	30,888
WA5ERC	17,160
W5RUF	16,237
W5JFB	17,03

Mississippi

W5AMZ	44,550
K1DNI	26,730
W5LLB/5	11,880
K8ELF/5	6683

Tennessee

K4LTA	40,095
K4CAT	39,600
WA4CGA	28,230
WA4FDR	27,984
WA4CGI	7,260
WA4CGB	2,100
WA4EJL	1,238
WA4GG	462

GREAT LAKES DIVISION

Kentucky

K4HSB	114,345
K4GOU	40,986
K4RZK	15,048
WN4PCO	495

Michigan

K8YBK	30,951
W8MSK	16,632
W8NPF	11,286
W8TRN	10,660
K8YCW	4,488
W8ENC	2,805
W8ECH	2,772
W8HCR	222
K8AJD	99

Ohio

K8BSH	71,808
W8CJN	66,825
W8RSH	58,360
K8YCM/8	56,430
K8QJH	29,403
K8CFH	16,500
W8GUN	15,444
K8GJL	14,652
K8VW	14,433
K8WOU	13,543
W8BZE	13,514
W8KMF	7,920
W8MXO	4,455
W8YGR	1,224
W8WU	3,218
W8EMD	1,733
W8AWT	1,350
W8DSS	792

OHIO

Ohio

K8BSH	71,808
W8CJN	66,825
W8RSH	58,360
K8YCM/8	56,430
K8QJH	29,403
K8CFH	16,500
W8GUN	15,444
K8GJL	14,652
K8VW	14,433
K8WOU	13,543
W8BZE	13,514
W8KMF	7,920
W8MXO	4,455
W8YGR	1,224
W8WU	3,218
W8EMD	1,733
W8AWT	1,350
W8DSS	792

HUDSON DIVISION

Eastern New York

WA2HLH	40,392
W2TER	16,500
K2SPP	12,540
W2PPD	7,673
W2POL	6,105

N. Y. C.-L. I.

WA2RUB	24,602
WA2TKL	20,196
WA2PJL	15,048
WA2WGN	13,860
W2BOM	10,395
WB2ARO	7,128
W2HAE	3,762
WB2DRM	3,163
WB2HMS	2,826
WA2TGL	2,376
WB2OHU	1,782
WA2URD	1,287
WA2VQV	297

Northern New Jersey

K2KFP	52,569
WA2ISM	25,740
W2KLS	24,948
W2DEP	21,088
WA2LGX	16,038

WA2WBH	10,982
K2ZSS	10,562
W2FDY	9,306
WA2OYG	8,610
W2NEP	4,988
WB2EZA	1,584

MIDWEST DIVISION

Iowa

K0VEJ	7,425
-------	-------

Kansas

K0BHM	35,640
K0KLV	23,562
K0JJE	22,176
W0QNI	3,142

Missouri

K0GSV	23,760
WA0EMS	21,277
W0ECG	20,394
W0QWS	19,602
K0JPL	10,165
K0ZBO	7,128
WA0ELM	287

Nebraska

K0SCM	2,475
K0PTL	1,634

NEW ENGLAND DIVISION

Connecticut

W1TTS	32,076
W1YW	10,098
K1WKK	3,119
WA2RIN/1	139

Maine

K1BGU	5,610
-------	-------

Eastern Massachusetts

K1WJD	10,296
K2A XA/1	10,065
K1ZES	7,722
W1EJJ	6,682
W1PLJ	1,884

Western Massachusetts

W1EZO	16,929
-------	--------

New Hampshire

K1RTB	36,960
W1SXX/1	35,561
W1PZ	24,582

Rhode Island

W1GOG	35,640
K1EWL	20,790

Vermont

K1OOV/1	19,404
---------	--------

NORTHWESTERN DIVISION

Montana

K7NHV	10,560
W7EWR	2,673

Oregon

K7ACP	306
-------	-----

PACIFIC DIVISION

Hawaii

KH6BG	297
-------	-----

Nevada

W7SHY	4,158
-------	-------

Santa Clara Valley

WA6HRS	14,550
WA6NYK	13,164
W6CLZ	6,138
W6BENI	50

San Francisco

WA6MSM	31,185
K6PBX	3,529

Sacramento Valley

W6BSVY	11,088
K6EDE	8,447
WA6ZBZ	1,337

San Joaquin Valley

K6RTK	24,440
-------	--------

WB6CHF	15,048
WA6SBG	10,247

ROANOKE DIVISION

North Carolina

K4ADT	22,275
W4VFN	12,128
WA4CXW	10,890
K4BYN	10,296

South Carolina

W4BWZ	42,570
WA4FMY	22,523

Virginia

W48NU	69,944
W4HTV	46,778
K4PQL	34,892
W3DON/4	26,334
W4P7W	15,444
K4GLA	14,850
W4HBO	1,386

West Virginia

WA8EUC	26,928
WA8DGE	23,760
W8DTE	13,860

ROCKY MOUNTAIN DIVISION

Colorado

WA0ADE	4,010
--------	-------

Utah

K7RAJ	21,830
W7POU	4,950

New Mexico

K5UYE	71,280
K5AYH	33,858
K5HTT	5,016

SOUTHEASTERN DIVISION

Alabama

K4HPR	67,320
W4ALDC	2,970
K4WOP	1,485

Eastern Florida

W41JV	40,260
K6SXX/4	35,222
W4ZOK	18,414
WA4JYB	5,643
WA4RQE	4,356
K4VRI	3,465

Western Florida

K4Vfy	27,908
-------	--------

Georgia

WA4CXH	51,975
W4HOS	14,207
K4BAL	6,237

SOUTHWESTERN DIVISION

Los Angeles

K6BLD	12,821
W6GLY	2,228
W6BKH	1,188

San Diego

WA6WTD	7,920
--------	-------

Arizona

K7TVS	12,705
-------	--------

Santa Barbara

W6AOL/6	9,356
W6BDPV	4,752
W6GEB	3,168

WEST GULF DIVISION

Northern Texas

K2ETU/5	73,560
W5OU	67,271
W5JD	24,848
K5LXZ/5	10,395

Oklahoma

W4SK1/5	14,256
K5OUC	6,432

Southern Texas

W5LJT	29,106
W5PTZ	27,324
W5ACNR	18,480

CANADA

Labrador-Newfoundland

VO2NA	22,280
VO1AW	6060
VO1DZ	5936

Maritimes

VE1ON	63,180
VE1GKJ/VE1	37,788
VE1NL/VE1	29,376
VE1BK	28,875
VE1ADW	10,636
VE1DB	10,197
VE1ALE	3172

Quebec

VE2NI	119,974
VE2ALH	14,880
VE2ATU	31,104
VE2BAK	17,860
VE2HN	17,550
VE2YA	12,408
VE2BOW	9612
VE2BY	6468
VE2BLP	4760
VE2BB	3082
VE2CP	1326

Ontario

VE3DU	111,466
VE3HZW	7,526
VE3BQG	70,688
VE3EMA	70,484
VE3DXD	69,498
VE3HJK	51,714
VE3AFT	49,236
VE3LZ	44,776
VE3AWT	35,844
VE3DRO	29,684
VE3ON	29,304
VE3IDDU	28,512
VE3HL	26,106
VE3PTQ	25,380
VE3IR	22,110
VE3BTR	18,145
VE3CER/3	14,620
VE3BPT	7998
VE3BYV	7770
VE3DVT	7200
VE3ETV	6834
VE3EVD	4988
VE3DXV	4725
VE3CFE	3564
VE3DFN	2892
VE3DFN	1887
VE3FFC	1190
VE3AO	Check log

Manitoba

VE4ZX	41,100
VE4TK	21,854
VE4GB	2030

Saskatchewan

VE5JL	28,206
VE5JU	17,184

Alberta

VE6AC	19,311
VE6ARV	16,200
VE6AGW	14,288
VE6UJ	12,600
VE6AKV	2754

British Columbia

VE7BJJ	24,980
VE7AC	15,000
VE7BCN	14,904
VE7ACN	8610
VE7AJK	5808
VE7TO	2646

N. W. T.

VE8DX	33,852
-------	--------

1964

ATLANTIC DIVISION

Eastern Pennsylvania

W3KDF	25,395
W3HNP	22,704
W3KRF	20,592
W3QOT	4240
W3LDO	4554
W3ZOL	4158
W3ZBK	2772
W3EON	Check log

Maryland-D. C.

W3AYS	68,310
W3AWZ	10,164
W3MSR	1188

Southern New Jersey

W2EXB	69,498
W2QDY	4950
W2ORS	1886
W2ZFWZ	1287

Western New York

WB2EDU	1815
WA2FRR	1386

Western Pennsylvania

W3YJL	76,032
W3GFY	29,402
W3KQD	1416

CENTRAL DIVISION

Illinois

W9LNO	80,635
W9TQL	67,320
K9ULY	31,185
W9ALJ	28,512
W9FRS	19,800
WA9AXX	18,744
W9HVP	15,593
W9AHJM	14,091
W9Y YG	9933
W9YDQ	8910
W9TCU	5544
WA9HYF	4752
WA9KYP	4703
WA9HCR	2277

Indiana

WA9ISM	24,552
W9HRD	15,137
WA9JFG	9306

Wisconsin

K9YBC	53,015
W9NLF	50,292
WA9BHQ	45,738
WA9AJB	43,246
WB8TE	34,848
W9QQQ	32,109
W9CHD	9801
W9DTE	7920
W9AEM	3715

DAKOTA DIVISION

North Dakota

WA0HYI	8316
K0OSW	5082
WA0ELO	2079

Minnesota

K0ZXE	58,608
W0RLI	54,252
WA0HMW	20,493
WA0CQA	5775
WA0GNO	1980

DELTA DIVISION

Arkansas

WA5CBL	24,552
W5DTR	3930
WA5IIS	1879

Louisiana

W5KC	58,410
------	--------

Mississippi

W5AMZ	29,778
K3KWE/5	21,830

Tennessee

K4LTA	42,240
WA4UM	36,729
W4YAU	12,771
W4ZVZ	5775
W4OGG	2970

GREAT LAKES DIVISION

Kentucky

WA4PGA	12,128
K4VDO	5775
WA4GHO	1980

Michigan

K5YEK	33,858
W8UMP	23,463
K8TDJ	14,850
W8TRN	9108
W890	9009
W8ADXW	5643
W8MPD	528
W8ASHB	396

Ohio

W8CTN	73,508
W8DWP	30,838
W8YGR	20,790
W8DXA	19,800
W1ZBL/1	8844
W8VDF	2970
W8AXM	694

HUDSON DIVISION

Eastern New York

K2YEW/2	7920
W2FSL	2970

N. Y. C.-L. I.

WB2GRF	50,490
WA2TKL	41,877
W2ZV	16,632

WB2QM	6336
WB2AEO	3069

Northern New Jersey

K2KFP	53,160
WB2EKG	30,888
WB2CRX	24,250
W2NEP	10,164
W2BFGZ	5910
WA2UDT	6930
W2TNT	1356
W2HLH	1930
W2NIX	792

MIDWEST DIVISION

Iowa

W0HXC	27,720
W0IFP	9207
K0AZJ	8316
K0VEJ	1950
WA0CZA	2640
W0DRE	693

Kansas

W0LEM	46,728
K0JJR	21,681
W0VFE	18,414
K0GZP	4620

Missouri

W0GNC	43,065
WA0EMS	39,204
K0ZBO	33,264
K0WTT	25,542
W0GAX	24,354
K0GCV	8985
K0DYM	6468
K0JPL/0	3218

Nebraska

WA0GVJ	4158
--------	------

NEW ENGLAND DIVISION

Connecticut

W1ECH	53,806
W1T8	40,085
W1ALPY	31,593

Maine

W1GKJ	22,316
W1UOT	9900
W1LDC	462

Eastern Massachusetts

K1HVV	41,550
W1AQE	23,100
K1VUT	15,576
K1WJD	8910
W1PLJ	2079
W1MRQ	1386

Western Massachusetts

K1DFC	23,760
K1LSW	15,444

Vermont

K1YRB/1	12,128
K1OOV/1	9240

New Hampshire

W1FZ	15,246
------	--------

Rhode Island

K1EWL	34,650
K1USD	14,850
K1BRJ	3287
W1YNE	1188

NORTHWESTERN DIVISION

Montana

W7EWR	15,939
-------	--------

Oregon

K7ZNE	21,150
W7JLU	16,368
K7LFG	11,088

Washington

W7GYF	3564
K7RSB	495

PACIFIC DIVISION

Santa Clara Valley

WB6CEP	29,568
W6CLZ	13,266
W6QRY	6237
WB6FHH	3212

San Francisco

WA6MSM	35,375
W6WLV	2805

Sacramento Valley

K6DQB	15,840
K6MIT	13,728

San Joaquin Valley

K6RTK	35,640
W6BVM	21,252
WA6VFN	13,860

ROANOKE DIVISION

North Carolina

W4UWS	47,075
W4VUW	9405

South Carolina

WA4IKU	42,903
--------	--------

Virginia

W4HTY	62,964
W4COL	39,501
WA2OKP/4	31,647
W4YDD	23,760
W4FZG	18,363
K4RDU	16,830
K4JCG	4155

West Virginia

WA8DGE	45,540
WB8KK	29,700
WA8EUC	13,365
K8RZC	10,989
K8WVW	528
K8BIT	132

ROCKY MOUNTAIN DIVISION

Colorado

K9GDF/0	1386
---------	------

Utah

WNPU	9207
------	------

SOUTHEASTERN DIVISION

Alabama

K2QIG/4	14,850
K5IQA/4	10,297
WA3SD	3580

Eastern Florida

W4PZV	32,356
W4JTA	23,166
W4NTE	20,196
W1PQ/4	15,443
W4ZOK	5544

Western Florida

K4VVF	64,152
-------	--------

Georgia

K4JSZ	28,760
W4EY	26,928
W4BOS	13,650
W4BHG	4389
WA4HBJ	3861

West Indies

KP4BBN	891
--------	-----

SOUTHWESTERN DIVISION

Los Angeles

K6JJC	29,700
W46YLV	22,275
W46VUW	16,711
W6RCV	18,117
W6OEO	15,477
W46KHK	12,771
W6CNO	11,583
W6JQB	330

Arizona

W7ZMD	35,640
K7AL	24,816
K7TVS	19,536
K7RZU	14,652

San Diego

WB6CFZ	26,136
W	

ARRL AWARDS HONOR ROLL FOR 1964



One of the strongest points of the League has always been the full participation in its activities of individual members wherever they are, on a voluntary basis for the love of the game and as their personal contribution to the welfare of amateur radio and their League. Occasionally, the most outstanding are singled out by the ARRL Board of Directors for special recognition. It serves to point up the excellent work done by the whole body of volunteers.

In 1964, The Hiram Percy Maxim Gold Medal was struck for the first time, and fourteen *QST* authors received awards.

THE HIRAM PERCY MAXIM GOLD MEDAL

AWARDED to John L. Reinartz, K6BJ, the Hiram Percy Maxim Gold Medal was adopted by the Board of Directors at its meeting in May, 1964, as an award for extraordinary contributions to the science of communications by a radio amateur. It is to be conferred only through action of the Board of Directors in exceptional instances. The same meeting also voted that the medal should be conferred on John L. Reinartz, K6BJ, in recognition of his outstanding achievements of pioneering the early development of amateur radio communications equipment and techniques, which contributed so heavily to the opening of practical short-wave communications.

The medal was presented to Mr. Reinartz in September by ARRL President Hoover, Director Engwicht and others just three weeks before K6BJ's death which followed a long illness. (Further information can be found in Dec. *QST*.)

THE ARRL MERIT AWARD

The ARRL Merit Award was created by the Board at its 1953 meeting to be presented annually to an amateur chosen for his outstanding technical contributions to the art of amateur radio communication.


In 1957, it was decided by the Board that the award need not be necessarily confined to technical contributions.

Past winners: 1953, Philip S. Rand, W1DBM; 1954, Oswald G. Villard, Jr., W6QYT; 1955, Ralph E. Thomas, W2UK and Paul M. Wilson, W4HHK; 1957, Fred Schnell, W4CF; 1958, Paul F. Godley, ex-2ZE; 1959, James J. Lamb, ex-W1AL; 1960, John T. Chambers, W6NLZ and Ralph E. Thomas, KH6UK; 1961, F. S. Harris, W1FZJ and the Rhododendron Swamp VHF Society, O. H. Brown, W6HBA and the Eimac Gang Radio Club; 1962, Project Oscar Association, W6EE; 1963 and 1964, no award made.

COVER PLAQUE AWARDS

The Cover Plaque Award was established at the 1961 Board Meeting. A plaque, bearing the actual plate from which the *QST* cover was printed, is presented to the *QST* author, not a member of the staff, whose article is picked by the directors in a mail vote as the best of the issue. The 1964 awards, by month, with the title of the article and name of the author or authors, follows:

- January: "A Junk Box Frequency Standard" by Roy R. Campbell, W4DFR
- February: "The Black Box" by Gilbert L. Countryman, W4JA
- March: "A Sideband Transceiver, VU2 Style" by B.A.N. Raju, VU2NR
- April: "A Low-Noise 2-Meter Converter" by Joel Balogh, K3CFA
- May: "An All-Transistor 50-Mc. Station" by Edward E. Ewald, Jr., K2HXE
- June: "An Electronic Storm Finder" by Thomas P. Leary, W0VTP
- July: "Speech Clipping for Single Sideband" by W. K. Squires, W2PUL and E. T. Clegg, W2LOY
- August: "A Transistor C.W. Station for 7 Mc." by Wes Hayward, WA6UVR
- September: "An I.F. Tracking Filter for Weak-Signal Reception" by Ralph W. Burhans, W8FKC
- October: "VR-Tube Regulation — Why and How" by Albert Weiss, W6UGA
- November: "Balanced Modulators for VHF and UHF Sideband" by J. V. O'Hern, W2WZR and T. L. Sly, K2QCX
- December: "No Tubes — Four Watts — Six Meters" by Henry H. Cross, W10OP

Our hearty congratulations and thanks on behalf of League members to all the authors whose voluntary efforts make *QST* what it is. 

Using the National Calling and Emergency Frequencies

History, Discussion and a Brand New Plan of Operation

BY GEORGE HART,* WINJM

Nearly all amateurs agree that we should have emergency frequencies, but so far we have never gotten together on details. This article is intended to outline the whole situation and present a new program which will require the cooperation of all amateurs.

EVERY so often we receive, at headquarters, a letter from an amateur letting us in on a "great idea" he has just had: Why don't we set up a series of calling frequencies on the amateur bands for emergency and general traffic calling, similar to those used in maritime communications services? "Six hundred meters" (500 kc.), for example, is strictly a calling and listening channel, with a mandatory listening period every hour and woe betide the station that violates the regulations concerning it. Why wouldn't something of this nature be a good thing on the amateur bands?

A Bit of History

The League first adopted this member-suggested concept in 1948, and has been pushing it ever since. Pushing it pretty hard, too. The National Emergency Net (NEN) was first announced in *QST* for Nov., 1948. This was the forerunner to our subsequent promotion of use of the present National Calling and Emergency Frequencies (NCEFs). Prior to the announcement, a picked group of amateur stations was solicited to perform the NEN function of monitoring certain frequencies for emergency calls and of assisting in keeping these and other frequencies being used for emergency operation free of casual interference. The way this was set up to work, an amateur in a disaster area who found himself with traffic for the "outside" had but to put his transmitter on one of the NEN frequencies and put out a general call to the National Emergency Net. Members of the NEN near the disaster area would have been alerted (by headquarters) to monitor the specified frequencies for such calls.

The original "six hundred meters" in the amateur bands was 3550 kc. Later 7100 kc. was designated for daytime use, and 3875 kc. was chosen as the phone NEN frequency. December, 1948, *QST*, contained the first listing of NEN frequencies. As time went on, additional frequencies were added in other bands, all the way down through two meters, and listed in box form in *QST*, complete with recommended procedure for their use.

* National Emergency Coordinator, ARRL

This box has appeared in *QST* over 150 times since then. Pointed editorial references and/or concerted programs aimed at use of the NCEFs have been included in *QST* 29 times, not counting incidental references naturally being contained in Simulated Emergency Test announcements and write-ups. Bulletins to ECs and other field officials concerned have included frequent and detailed reference to this voluntary program.

But we are getting ahead of ourselves. A bulletin in the fall of 1950 reviewed the progress of the National Emergency Net, gave a list of NEN stations, stated the qualifications (good signal, 25 w.p.m. and versatility), the duties, and outlined the aims. The next reference is in the Emergency and Traffic Bulletin of March, 1952, which commented that the setup wasn't working so good and reviewed the entire situation.

While these valiant attempts were being made to implement the NEN-NCEF program, FCC

RULES FOR ARRL NATIONAL CALLING AND EMERGENCY FREQUENCIES

1) Never use any full-time NCEF segment for any casual purpose. They are for public service calling and answering *only, always!*

2) Never transmit for *any* purpose (except to call for emergency help) on any full-time NCEF during the first five minutes of each hour.

3) *Monitor* full-time NCEFs (and emergency NCEFs during emergency) with a spare receiver whenever you are in your shack. Be prepared to answer any emergency calls heard thereon. A receiver operating squealch on one of the v.h.f. NCEFs is especially desirable.

4) Send cards (available from ARRL Hq.) to casual stations heard operating in any of the full-time NCEF segments, asking for their cooperation in this program.

5) When using the NCEFs for any traffic or emergency purpose, make your calls *brief*. As soon as contact is established, *QSY* to another frequency to complete your communication.

6) In an FCC-declared emergency (97.107, FCC regulations), apply above rules additionally to those frequency segments designated "emergency only."

7) For emergency calling, use QRRR on c.w. and RTTY, call "CQ Emergency" on phone. For traffic calling, use CQ followed by the specific area you have traffic for. Example: CQ NYC DE. . . .

THE ARRL NATIONAL CALLING AND EMERGENCY FREQUENCIES

Center Freq.	Segment	Use *
3550 kc.	3548.5-3551.5 kc.	Full-time calling and answering
3875 kc.	3872-3878 kc.	Full-time calling and answering
7100 kc.	7098.5-7101.5 kc.	Full-time calling and answering
7225 kc.	7222-7228 kc.	Emergency only calling and answering
14,050 kc.	14,048.5-14,051.5 kc.	Emergency only calling and answering
14,225 kc.	14,222-14,228 kc.	Emergency only calling and answering
21,050 kc.	21,048.5-21,051.5 kc.	Emergency only calling and answering
21,400 kc.	21,397-21,403 kc.	Emergency only calling and answering
28,100 kc.	28,098.5-28,101.5 kc.	Emergency only calling and answering
29,640 kc.	29,637-29,643 kc.	Full-time calling and answering
50,550 kc.	50,547-50,553 kc.	Full-time calling and answering
145,350 kc.	145,347-145,353 kc.	Full-time calling and answering

* Full-time frequencies will be monitored at all times, with a listening period by all amateurs the first five minutes of each hour. Emergency frequencies will operate the same way but only in a FCC-declared emergency.

trotted out its famous Docket 10237, a shocker to the amateur world if there ever was one, proposing an entire new section of the regulations which would, in effect, remove segments from each amateur band (500 kc. on the 220-Mc. band) and restrict them to calling and answering *only*, during normal times, and in emergencies to emergency operation only. It was, in effect, an attempt to create a "six hundred meters" on every amateur phone and c.w. band, on a mandatory basis. The League protested that the procedure set up was impractical and wasteful of frequencies, that amateurs were quite capable of and indeed in the process of implementing similar procedures on a *voluntary* basis — and the Commission subsequently withdrew the proposal.

The National Emergency Net was not abandoned, it just deteriorated and eventually ceased to exist as a cohesive group. But the campaign to popularize the use of the NCEFs continued. Frequencies on additional amateur bands were selected for this purpose. In 1953, ARRL Director W0IC proposed one minute of silence for monitoring NCEFs every hour on the hour; this proposal was publicized by the ARRL communications manager in *Operating News* in Feb., 1954, *QST*. In early 1956 the "Traffic Topics" column suggested designating specific monitoring stations for the NCEFs and asked for volunteers. Later the same year, "With the AREC" suggested use of NCEFs for summer mobiling. In '56 and '57, W7OE made desperate attempts to get stations lined up to monitor the NCEFs and by dint of continued plugging achieved some measure of success with the help of *QST* publicity. "Do You Keep Your Receiver on the NCEFs?" asked a topic heading in *Operating News*, Aug. '57 *QST*. W3CVE suggested each emergency net designate not less than one station to monitor the NCEFs during emergency. June '59 *QST* "With the AREC" again suggested doing summer mobiling on the NCEFs. In 1960, W6RIL came forward with a whole set of new proposals and the whole subject was thrown open for discussion; but there was no unanimity of opinion on the matter and

no definite conclusions were reached, although a lot of ideas were discussed.

In 1961, *Operating News* took up the cudgels for the NCEFs and for six months exhorted all amateurs to make use of them, setting down specific procedures and even sponsoring a con-



test; but there was little or no response. January, '62, *QST*'s "With the AREC" column contains a summary of thinking about the NCEFs, winding up with:

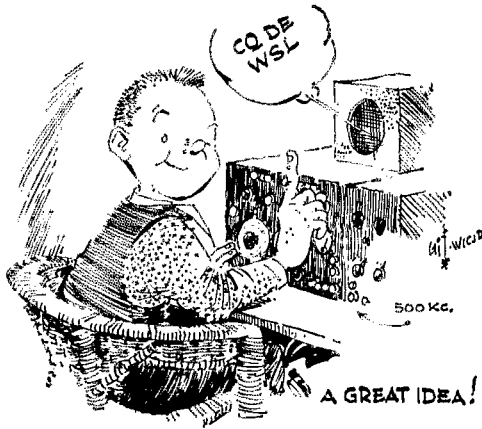
"Far from being insufficient, the list (of NCEFs) is more likely so extensive as to cause a dilution of its effectiveness. Instead of extending the list to accommodate special interest groups, maybe what we should do is to eliminate some of the NCEFs that are seldom or never used. Anyway, after all is said and nothing is done, it seems that there is little wrong with our present NCEFs that some avid support from the amateur fraternity wouldn't alleviate."

The same column, in Dec. '62 *QST*, summarizes the past history of the NCEFs and notes that "the appeal . . . for leadership and decision from headquarters (is usually) qualified by implied threats of non-observance if the decision doesn't favor their (*i.e.*, the appellers') ideas." Also mentioned here is the prospect of setting up definite rules for effective NCEF utilization. This is about the most recent reference to the NCEFs

editorially, although *QST* continues to carry the list of frequencies in nearly every issue.

The Present NCEF Set-Up

At the present time there are NCEFs on both the phone and c.w. bands on 80, 40, 20, 15 and 10 meters, and single frequencies on six and two. During a communications emergency, all ama-



teurs are supposed to monitor one or more of these frequencies for emergency calls. When such a call is heard, contact is made on the NCEF, then both stations move off to a mutually-agreed-upon "working" frequency to conduct their communication.

The NCEFs are not supposed to be used for casual QSOs during a period of emergency, nor for network operations of any kind *any* time, nor for handling traffic. They are *calling* and *listening* frequencies only. A station in a disaster area with emergency traffic who (heaven forbid!) has no regular outlet for it should choose the appropriate NCEF for the distance to be covered, for the type of equipment he has and for the type of operator he is. For example, a mobileer in strange country who meets with an accident or car trouble and needs help would be best advised to use one of the v.h.f. NCEFs if he is so equipped. If not, his best bet would probably be 75 phone or 80 c.w.

Everything depends on someone listening on these frequencies so that such calls are heard. This has been the rub — to get amateurs to monitor the NCEFs. In the past, amateurs have been urged to keep a spare receiver (most of us have an old one kicking around these days) with a wide passband operating in their shacks when they are at home, so that such calls can be heard even during "normal" times. A point has also been made that amateurs avoid operating on the NCEFs at *any* (non-emergency) time, but this is very hard to enforce because our bands are already overcrowded.

Problems

The above procedure seems simple enough, but there are many problems involved, some of which have already been hinted at above. To begin with, the selection of NCEFs was more or less

arbitrary and does not meet with the approval of many amateurs. Every special interest group wants to have an NCEF it can use for its very own — thus, there is pressure for separate NCEFs for a.m. and s.s.b. phone, for RTTY, for novices, for technicians. NCEFs should be selected so they can conveniently be covered by the currently-most-popular receivers and transmitters. (Some manufactured equipments, for example, don't cover the 29,640 kc. ten-meter NCEF.) Novices can't operate in the parts of the band where other NCEFs are located, therefore shouldn't we put one or more of them in one or more of the novice bands? And how about the techs? RTTY can operate on the c.w. bands, sure enough, but is it appropriate to have RTTY use 3550 kc., for example, along with c.w., for emergency calling purposes?

There are other considerations. Some of the NCEFs are in crowded portions of the bands, some in little-used portions. Why not have them all in the least-used portion, so any emergency call will be free of QRM? Or, why not have them all in the most-used portion, so any emergency calls are more likely to be heard by casual operators who, let's face it, are the only ones who will hear them anyway. Or, why not have them on the band edges, where everyone can find them and where QRM from adjacent signals will occur only on one side, which can be clipped off by a good receiver? Or, why not have the NCEFs at exact 100-kc. points? Or, let's have some regular activity on the NCEFs so they won't always be covered by casual QRM — for example, W1AW could use them for regular operating frequencies.

These are just a few ideas that have been submitted in past years. Some have considerable merit, but every one of them has definite disadvantages, and some of them contradict each other. Hardly any two amateurs agree on the subject. V.h.f. specialists want more NCEFs on the v.h.f. bands. DX operators are concerned about QRM to their operation on "the low end." Low-frequency (160-meter) enthusiasts are indignant that no NCEF has been assigned on that band. Band-edge NCEFs invite out-of-band operation, and operators with high power feel that the band-edges should be left for high-powered operation and not used for low-power emergency calling. Some feel that NCEFs should be on the low end of both phone and c.w. bands for better antenna-matching. Others say we should ask FCC to make observation mandatory.

Yes, the ideas have all been broached and examined and discussed. The only conclusion that has crystallized out of it all is that most amateurs are unconcerned and disinclined to cooperate, while the rest are rabidly enthusiastic but convinced that only their plan is workable. The result is that there is so little unanimity of opinion that any procedure promulgated has only about one chance in ten of being accepted.

And still, public-service-minded amateurs continue to feel that we *should* have some set procedure for emergency calling and answering in

the amateur bands and that it is up to headquarters to take the lead in this matter. The idea of establishing nationwide frequencies for this purpose simply will not die.

This article, then, represents a major attempt on the part of the League, after an exhaustive study of all angles, to formulate a set procedure and to implore the cooperation of all amateurs, whether they agree or not, to make our national calling frequencies work. Cooperation is required not just of public-service-interested amateurs (which *should* include all of us!), but casuals and others as well, to avoid use of certain of the NCEF's designated for 24-hour monitoring.

The Proposal

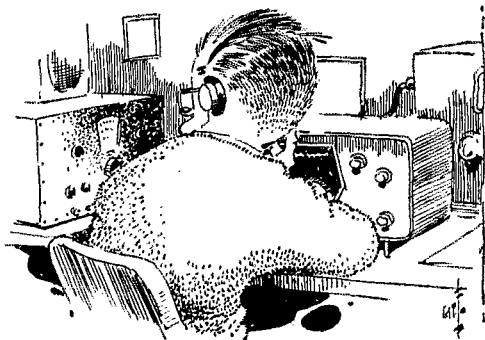
And so we come to the crux of the whole matter — the specific proposal, the sticking out of the neck. Two things are immediately apparent as requirements of any new proposal. First, that it has little chance of success unless it contains some innovations, some changes from former procedure. Second, that it must be called forcefully to the attention of *all* amateurs. We hope to accomplish the first by designating some of the present NCEF's as "full time" calling and listening frequencies, to be used *all the time* instead of just during periods of communications emergency. And the second by asking all interested amateurs, and ARRL official observers, to "jog" casual amateurs who accidentally wander into a NCEF channel. The boxes elsewhere on these pages will present the list of NCEF's, the guard-band for each, and the status of each as a full-time or emergency-only proposition. At this point we think it propitious that we explain some of the reasoning from which the frequencies and the rules for their use were evolved.

Although the NCEF's never did receive the amount of use and popularity which we have always thought they merited, some received more use than others. The "low-frequency" NCEF's (*i.e.*, 80 and 40 meters) were most used, the NCEF's in the so-called DX bands least used. Nevertheless, the Alaska-earthquake type of emergency proved the usefulness of the latter, so we have not dropped them, just put them on an emergency-only basis. The frequencies of 3550 and 3875 kc. are useful for nighttime operation (or will be as soon as Old Sol gets a new crop of freckles), while 7100 is better suited to daytime operation. We put 7255 kc. on an emergency-only basis because this one never did receive much use. The same applies to 28,100 kc., the ten-meter c.w. NCEF, while 29,640 gets full-time rating as a favorite hangout for ten-meter mobiles. The NCEF's on six and two meters are rated full time both because there is more room on those bands and because it is more convenient to monitor them using squelch receiver circuits.

Note that none of the NCEF's is changed. We concede that some of them have disadvantages, but all proposals to change them also have disadvantages. Why swap one set of disadvantages for another?

This is to request all nets now operating on the

..PUT YOUR OLD RECEIVERS
TO WORK MONITORING THE NCEF'S



NCEF's to move their center frequencies, at least outside the NCEF guard bands. In the future, ARRL will not register nets operating within 1½ kc. of c.w. NCEF's or within 3 kc. of phone NCEF's.

The five-minute listening period at the beginning of each hour emulates commercial practice, which has proved most successful for decades. The only difference is that with us it is *voluntary*. This means that it will work only if we *make* it work.

Note that the NCEF's may be used regularly for establishing contact for the purpose of handling traffic, except, of course, during the five minute listening period. Most traffic will be handled routinely on regular nets. The occasional inexperienced amateur with a message to handle, or a traffic man or ARPS-C-type "stuck" with one or messages may find it possible to clear on one of the NCEF's. This does not mean we should *depend* on the NCEF's for handling routine traffic. That's what nets are for. From time to time NTS operators will monitor 3550 or 3875 kc. and pick up any loose traffic to put into the system's proper channels.

One of the features of this program is the use of notification cards to stations heard operating on full-time NCEF's, or on emergency-time NCEF's during emergency periods. Although ARRL official observers will use these cards, they will also be available (in limited quantities) to any amateur who wishes to use them. The cards will put the notification in its proper perspective, not as something liable to FCC citation, but simply as a request for cooperation. We want any amateur who "violates" an NCEF to hear about it *plenty* from lots of people.

If we put this over, it will be a large feather in the cap of amateur radio's ability to regulate itself and at all times be ready to perform a public service. It will also be a resounding answer to those who are saying that only the CB can effectively run such a monitoring service. We know that we amateurs can perform any service CB'ers can perform, and twice as effectively, and a great number of other services besides. We can, that is, if we *will*.

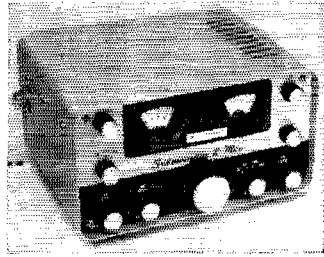
So let's do it!

QST

• Recent Equipment —

The Gonset Sidewinder

2-Meter Transceiver



THE transceiver-oriented ham from the h.f. bands will feel quite at home with the Gonset 2-meter Sidewinder. Only the readings in megacycles will be greatly different from what he has already learned to live with in sideband work on lower bands. But the v.h.f. man, steeped in band-tuning traditions of the 2-meter band, will likely find the Sidewinder transceiver approach about as foreign as anything can be — at least for a while.

The Sidewinder is "sideband" all the way. In technical concept or in the operating habits it induces, this is a clean break with v.h.f. practice. It will be interesting to see how it fares on the commercial market, on this account. Here we have the first true transceiver, in the h.f. sideband sense, that has become available to the 2-meter fraternity. One tuning system and one crystal-lattice filter work on both transmitting and receiving. The operator must become accustomed to transmitting on the receiving frequency, regardless of mode, with an equipment design tailored to the needs of the sideband operator.

Like most sideband transceivers, the Sidewinder works beautifully on c.w. (praises be!) but a.m. operation, while satisfactory, is defini-

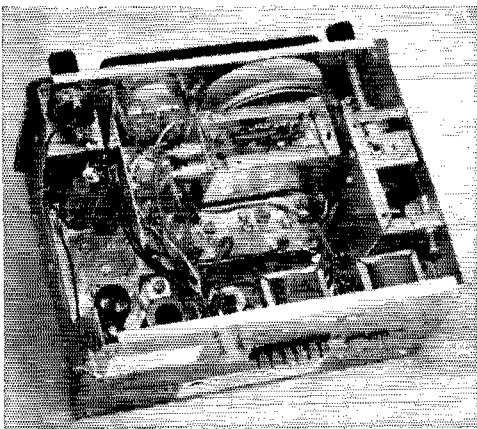
tely a secondary matter. Reception on a.m. is very good, and so is transmitter quality — if (and it is a large if) the operator will follow instructions and turn the output down to the appropriate level. From what we've heard of other Sidewinders on the air, there is a certain unwillingness on the part of users to accept this inevitable limitation on a.m. operation with sideband gear. The 3-ke. selectivity of the receiver will come as something of a shock to the 2-meter man accustomed to the bandwidth of a.m. transceivers of this same maker's earlier production. You don't drift and stay in *this* receiver's passband!

Another respect in which the Sidewinder is new to most v.h.f. men is its all-solid-state receiver and sideband generator circuitry. There are only three vacuum tubes in this outfit, all in the r.f. portion of the transmitter. All other circuits: receiver, audio stages and all sideband-generating stages, use transistors and diodes. A pleasant by-product of this is extremely low receiving drain. If you leave the transmitter heaters off (and there's a switch to permit this) you could receive for days on a car battery. Even on TRANSMIT the power drain at 12 volts is 8 amperes, maximum. This is for 20 watts input on c.w. or p.e.p. sideband, or 6 watts a.m.

How It Works

With the many overlapping functions of stages in a transceiver, explaining operation with the aid of a block diagram almost reaches the point of diminishing returns, but we'll have a go at it with Fig. 1. This is similar to the diagram in the Sidewinder instruction manual, but with minor changes for purposes of this discussion. First, don't let the diagram fool you — the Sidewinder is not really this simple. Only 22 circles appear in Fig. 1, but this little box has 3 tubes, 21 transistors and 8 diodes in the r.f. package, 9 diodes in the a.c. supply, and 6 in the d.c. supply — and many of these do double duty.

Functions are indicated in the diagrams; T denotes use on transmitting only, R is for receiving only, and TR for both. Here, briefly, is what happens along the way. At the top of Fig. 1 is a crystal oscillator, Q_{12} , with v.h.f. crystals at 64.75, 65.25, 65.75 or 66.25 Mc., depending on the position of the FREQUENCY SELECTOR switch on the front panel. A buffer, Q_{19} , follows, trans-



Top view of the Sidewinder interior. The transmitter r.f. tubes at the left are the only vacuum tubes in the outfit. The assembly at the far right, with cover plate removed, is the balanced modulator. Near the upper center, also with cover removed, is the v.f.o. assembly.

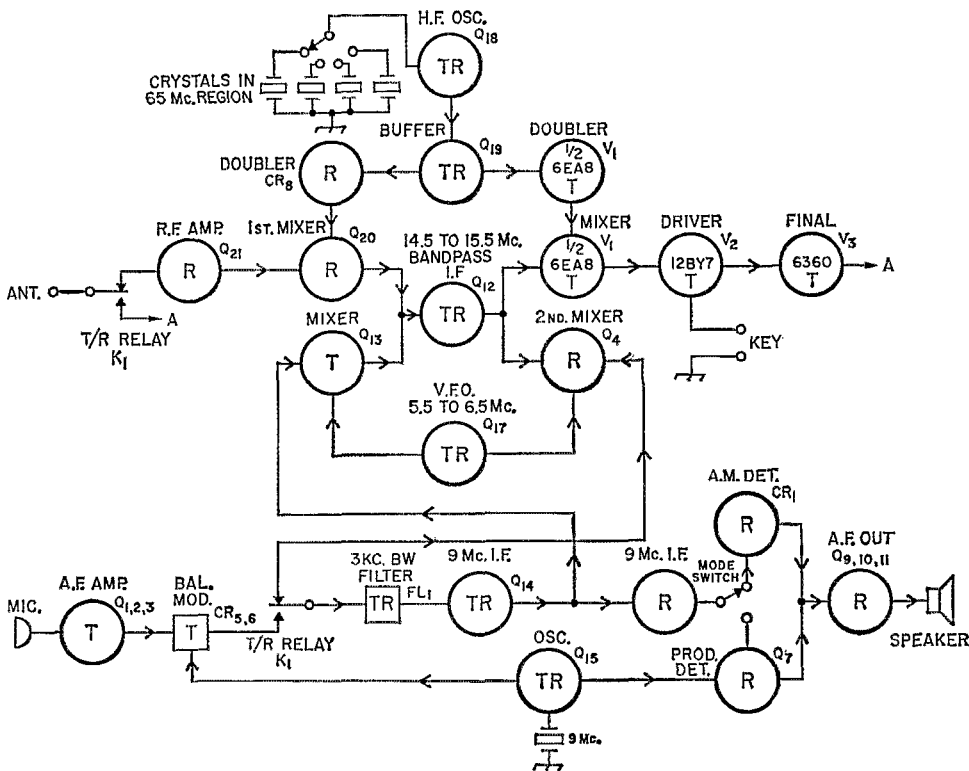


Fig. 1—Simplified block diagram of the Sidewinder 2-Meter Transceiver.

mitting or receiving. Next, we have doublers; a diode, CR_8 , in the receiver, and the triode portion of a 6EA8, V_1 , in the transmitter. Output frequency is 129.5, 130.5, 131.5 or 132.5 Mc., either way.

At the upper left we see a receiving r.f. amplifier, Q_{21} , and the first mixer, Q_{20} , where the above frequencies beat with incoming signals, converting them to an intermediate frequency in the 15-Mc. region, after which they are built up by the band-pass i.f. amplifier, Q_{12} . Each of the crystals with Q_{18} thus accounts for a 1-megacycle segment of the band, starting at 144, 145, 146 or 147 Mc., in the order given above, the i.f. being 14.5 to 15.5 Mc.

In receiving there follows a second mixer, Q_4 . In addition to the i.f. signal, this gets energy from a tunable oscillator, Q_{17} , working at 5.5 to 6.5 Mc., and driven by the main tuning dial. Result: output on 9 Mc., which is fed to the crystal-lattice filter, FL_1 , and then through Q_{14} and Q_5 and Q_6 , all 9-Mc. i.f. amplifiers. FL_1 and Q_{14} will be encountered again later when we follow the transmitting circuitry through the maze. Finally, the signal is fed to a diode a.m. detector, CR_1 , or a transistor product detector, Q_7 , to an audio driver, Q_9 , and push-pull audio amplifier, Q_{10-11} , to the phones or speaker.

Now let's back-track and follow the transmitting lineup. Generation of the basic carrier signal begins with the 9-Mc. crystal oscillator,

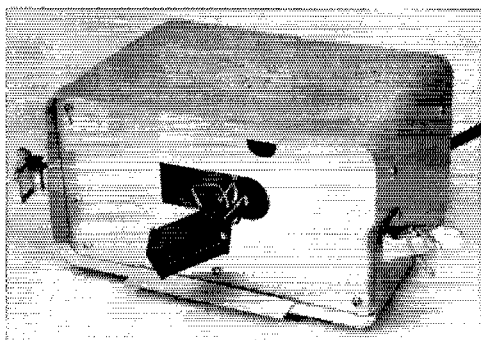
Q_{15} , at the bottom of Fig. 1. This also serves as a beat oscillator in receiving, its output being fed to the product detector or to the balanced modulator. We're concerned with the latter now. With the mode switch in the AM or USB positions the audio from the speech amplifier, Q_{1-2-3} , is combined with the 9-Mc. signal in the balanced modulator, CR_{5-6} . In the CW position, the audio is disconnected by the mode switch. In the USB position the balanced modulator cancels out the carrier, leaving audio sidebands. These pass on to the filter, where the high selectivity suppresses the unwanted lower sideband. The amplifier output of Q_{14} is then a 9-Mc. s.s.b. (upper sideband) or c.w. signal.

In the AM position of the mode switch the modulator is slightly unbalanced by a front-panel control, so that a carrier and a normal pair of sidebands are fed into the filter. The filter eliminates the lower sideband, and partially attenuates the carrier, leaving reduced carrier and upper sideband to be fed into Q_{14} . The original carrier level is adjusted manually, so that the signal is the equivalent of a 100-percent-modulated a.m. signal. It will sound just like one to the casual operator at the receiving end, but it will occupy a narrower band.

Now the process is about the reverse of that in receiving. The output of Q_{14} is whatever kind of signal we intend to radiate, but it is on 9 Mc., and at very low level. It is fed to another mixer, Q_{13} , along with the signal from our old friend the

5.5 to 6.5-Mc. dial-tuned v.f.o., Q_{17} . Result: output on 14.5 to 15.5 Mc., which then goes through the band-pass amplifier, Q_{12} , just as did the i.f. output from the receiving mixer. Now we get back almost to where we started. Remember, we had energy at 129.5 to 132.5 Mc. applied to the pentode section of V_1 , the first vacuum tube in the transmitting lineup, a mixer. Adding 14.5 to 15.5 to these frequencies, we get output at 144-plus, 145-plus, 146-plus or 147-plus, depending on the position of the sector switch and the setting of the v.f.o.

From here on we're on more familiar ground, with a 12BY7, V_2 , and a final amplifier 6360, V_3 , building up whatever type of signal we selected with the mode switch. This will have seemed like old stuff to the experienced sidebander, but this 2-meter job is going to catch a lot of newcomers to the s.s.b. mode, who may have paid very little attention in the past to the way in which a sideband signal is produced and processed in the



The Sidewinder power supply package clamps onto the back of the r.f. unit. Two supplies are available, one for a.c. and the other for 12-volt d.c. service.

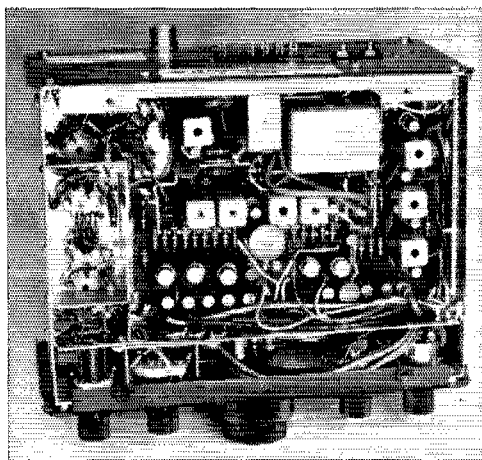
only the r.f. package, which is just about the front half. Snapping onto the back of this is a power supply, which can be for 115 volts a.c., or 12 volts d.c. Supplies are sold separately, which helps to hold the price down a little for the man who is interested in only one or the other. The power unit is shown separately in a later photograph.

Being almost entirely solid-state, the Sidewinder is a very compact and light unit, even with supply attached. The main r.f. and audio assembly is a printed circuit job, visible as the dark portion of the bottom view. The transmitter r.f. section is at the left side of this same picture.

Front-panel control for the main tuning, at the lower center, is a smooth-working two-speed vernier drive. Its scale is numbered .1 .2 .3 and so on, with each radial line between these numbers representing 25 kc. Tuning rate on the outer portion of the knob is fast enough to get you across the 1-megacycle range in good time, and the slow-speed inner knob handles s.s.b. signals very smoothly. You have never tuned in sideband any more easily.

Flanking the main dial are the receiver r.f. gain, left, and the sector switch, right; the latter for choosing the 1-megacycle range you want to listen to or transmit on. The r.f. gain control has a pull-out switch for turning on the transmitter heaters and dial lights. With these off (knob in) you receive with very low drain, and instantaneously when the audio gain control switch (left corner) is turned on.

Above left are the mode switch and carrier-balance controls. The latter is a 10-turn potentiometer, for very smooth vernier action. Lower right is the amplifier tuning control, and above it the antenna loading control for transmitting. Top right: microphone gain control, with pull-out switch for send-receive. The microphone jack, on the left side of the case, takes a push-to-talk microphone on a PL-68 plug. Just below it is the c.w. keying jack. Grid-block keying is applied to the 12BY7 driver, making the c.w. signal of the Sidewinder a far cry from the thumping of unfiltered cathode keying that we hear so much of in v.h.f. c.w. work.



Bottom of the Sidewinder, showing the printed-circuit assembly and most of the transistors. The final amplifier plate circuit is visible at the left.

crystal-filter type of transmitter. It sounds complicated, and in a way it is, merely because we do a lot of things along the way, but each step in itself is a basically simple process.

The end product is a sideband signal that can stand comparison with any you'd find on lower bands, because the quality and stability are developed and maintained in exactly the same way. This is a v.h.f. rig in which the phone signal, regardless of mode, is no more than 3 kc. wide, and the c.w. signal is a beautiful T9, and rock steady, despite its being v.f.o.-controlled. Sideband tunes in on 2 just as easily as it would on 75, and c.w. reception is a real joy as well.

Construction

If the Sidewinder package looks smaller in our first picture than other shots of the equipment you've seen, it's because we photographed

The Instruction Manual has an incomprehensible paragraph on loaded mobile antennas that must have slipped in from another book, but otherwise it is detailed and well done.

Performance

Transmitter input is about 20 watts c.w., and 20 watts p.e.p. on upper sideband (upper only). Input on a.m. is rated at 6 watts, maximum. Like all linear amplifier operation, this is a critical business, but it can be made to sound very fine indeed if adjusted with care.

Stability is adequate for dependable s.s.b. work, after 15-minute warmup, and drift, even from a cold start, is not observable on other than s.s.b. — *W1HDQ* QST

Conset Sidewinder 2-Meter Transceiver, Model 900A

Height: 5½ inches.

Width: 9½ inches.

Depth: 7¾ inches, without power supply, which is 6 inches deep.

Weight: 10 pounds, 10 ounces; power supply 13 pounds, 8 ounces.

Power Requirements: 115 volts a.c., 100 watts; 12.6 volts d.c., 8 amps. max. A.c. and d.c. supplies are separate units.

Price Class: \$100. A.c. power supply, \$68, d.c. power supply, \$80.

Manufacturer: Conset, Inc., 1515 S. Manchester Ave., Anaheim, California.

NEW BOOKS

Space Communications, by Stanley Leinwohl. Published by John F. Rider Publisher, Inc., Div. of Hayden Publishing Company, Inc., 350 Third Ave., New York 22, N. Y. 6 by 9 inches, 166 pages, including index, illustrated, paper cover. Price, \$3.95.

The book is a valuable treatment of the subject to the radio amateur interested in participating in such a program or solely interested in reading about the amazing discoveries in space communications during the past seven years. In understandable language even to the nontechnical reader, it describes as well what we are to expect in the immediate future in this rapidly advancing science.

Opening chapters cover the present state of world communications (ionosphere, seasonal and geographical variations, sunspots — of extreme importance in this field), principles of space communications (noise sources, frequency dependence on antenna systems, tracking). These are followed by chapters on passive space communications systems (transatlantic moon relay, moonbounce, Operation Smokepuff, amateur participation, Echo), active communications satellites (Project SCORE, Telstar, Telemetry, Relay I, Syncom), special purpose satellites (Pioneer, Ranger, orbiting observatories, Tirus, Nimbus), Flight of Mariner II (significant to the hobbyist in that the electronic equipment developed to monitor its signal will soon be available commercially). From there on, are chapters especially interesting to the radio amateur — amateur in space, followed by descriptions of the Oscar satellites. There is a brief history of the radio amateur from the days of Marconi to the present time. — *W1ZIM*

Semiconductor Network Analysis and Design, by Vasil Uzunoglu. Published by McGraw-Hill Book Company, 330 West 42nd St., New York, N. Y. 10036. 372 pages, 6¼ inches, cloth cover. McGraw-Hill Series in Solid-State Engineering. Price, \$12.50.

Here is an up-to-date reference text for the design engineer that covers all the advances in the semi-conductor field. Distributed parameters in semiconductors, pole-zero amplifier design methods, root-locus design of feedback amplifiers, negative resistance devices, active *h.c.* filters, and return ratio and difference in transistor networks are covered. Each circuit is explained as an active device and its associated passive networks. The mathematical analysis of each circuit is presented, and examples given for clear understanding. Other chapters cover transistor physics, small-signal parameters and equivalent circuits, matrix analysis of transistors, high-frequency behavior, stability considerations, broadbanding techniques, and logic and switching circuits. As one can see, this book is only for the

very advanced radio amateur who wishes to keep pace with transistor technology.

Transistor Specifications and Substitution Handbook, by the Editorial Staff of TechPress Publications, P.O. Box 32, Brownsburg, Indiana. 6 × 9 inches, paper cover. Price, \$1.95.

The sheer numbers of transistors available today, each with its associated set of specifications, has made the job of substitution rather a difficult one. No one could plow through the mountain of specs to find one that is like the transistor being replaced. Many books on transistor substitution have been printed, but the question arises as to what constitutes an acceptable substitute. This book has chosen each listed substitution so that the transistor will be at least equal to the original, and up to 30 per cent higher specifications. This job of sorting and matching all the transistor types was done on a computer. The transistor type is given with a notation if it is an obsolete type, the manufacturer, the transistor's ratings, base type, and the substitute types with a notation if the substitute is obsolete. The type is large enough to be easily read at a normal distance. In the rear of the book is a complete list of all the base diagrams referenced in the transistor listings. Several pages are devoted to explaining the transistor ratings, and how the ratings can be used to help in the selection of a substitute.

Radio Operating Questions & Answers, 13th edition, by Jules L. Hornung and Alexander A. McKenzie. Published by McGraw-Hill Book Company, 330 West 42nd St., New York, N. Y. 10036. 598 pages, including index, 5½ by 8¼ inches, cloth cover. Price, \$8.25.

The thirteenth edition of this well-known book is for those interested in the FCC commercial licenses. This book covers the examination requirements for all classes of radiotelephone and radio telegraph licenses, plus the restricted radiotelephone permit, the aircraft operators endorsement, and the ship radar endorsement. The text is broken into the same elements as the FCC exams, and is in a question and answer format. The changes from the twelfth edition include a complete rewriting of Element 1, new questions added to Element 2, and the new Broadcast Operation Element 9. The questions are grouped into sections according to topics, such as power supplies, theory, receivers, etc. This information is for self-testing and reference, and not to teach the complete subject of electronics. The appendix gives additional information to complete the book, such as world time signals, color codes, artificial respiration, and the current radio operating codes.

— *W1KLL*

• Technical Correspondence

MONIMATCH CONSTRUCTION

Technical Editor, *QST*:

Lew McCoy's article on directional power indicators (October *QST*) was very interesting and helpful; needing such a device I proceeded forthwith to build one. In so doing, some problems and solutions were found that may be of interest.

The whole reflectometer assembly that Lew describes is sensitive to changes in capacity to ground since this will change the voltage component that is sampled. Small changes in the position of the sampling loops with respect to the current-carrying conductor will change both the voltage and current component samples. Any such variation will change the value of the resistor required for proper operation of the device.

The situation can be improved by making several small changes in the construction of the reflectometer, including:

1) Bond the pickup inductors to the current-carrying conductor with epoxy cement to assure constancy of coupling.

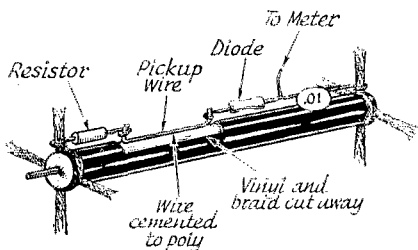


Fig. 1—How the pickup loop is mounted on the section of coaxial cable, in a "window" cut through the vinyl outer jacket and shield braid. Epoxy cement is used to hold the wire to the polystyrene inner insulation. Pigtailed at ends should be in final position on coax connectors before the resistor and capacitor leads are soldered. For bidirectional power indications a similar assembly is installed on the opposite side of the cable section.

2) Leave the coaxial cable shield in place as much as possible to maintain constant impedance through the device.

3) Shield the reflectometer assembly from the meter(s) to prevent r.f. leakage.

4) Use two microammeters with separate sensitivity controls for simultaneous readings of power in both directions. (Japanese meters in ranges down to 50 microamperes are available for under \$5.00).

A sketch of the coaxial construction is shown in Fig. 1. It is convenient to use a carbon-element potentiometer to approximate the value of the resistor (lead-length should be zero). After the approximate value is found, final adjustment should be made by substitution of fixed resistors. This adjustment should be made while transmitting r.f. power through the reflectometer into a nonreactive load. The adjustment should result in a minimum reading when the meter is indicating reflected power. — George Schleicher, W9NLT, 1555 Dartmouth Lane, Deerfield, Illinois 60015.

R.F. ATTENUATOR SWITCH

Technical Editor, *QST*:

I have been getting letters about the non-availability of parts for the r.f. attenuator I described in December, 1959, *QST*. Centralab discontinued the

P-121 index and wafers T, R, X and RR. These were the so-called "standard" switch parts, with a thin blade actuating the wafer rotor.

The "de luxe" version is still available. The index is the P-270, and the wafers are the TD and RD (shorting) and XD and RRD (nonshorting). Most parts jobbers can supply these. — Gene Hubbell, W9ERU, R.R. 4, Box 350, Rockford, Illinois.

COPPER vs. ALUMINUM

Technical Editor, *QST*:

Please refer to "Flagpole Without a Flag," p. 36, November, 1964, *QST*. A footnote states (in reference to buried radials) "Copper is better, and aluminum is better yet." Unhappily, this may frequently prove to be untrue.

Unless the ground resistance is over 5000 ohms per cm. squared, aluminum may corrode very rapidly. Some soils are extremely aggressive toward aluminum. It would be best to specify copper in all cases where longevity is a factor and in which no prior investigation is made. — William Nighman, W4ZSH, 3806 Overhill Road, Richmond, Va.

SKY TEMPERATURE

Technical Editor, *QST*:

In his article on "Sky Temperature Behind the Moon" (*QST*, October, 1964), C. R. Somerlock has raised a paper boogiemanager, at least as far as most hams are concerned. There is a great difference between the peak sky temperature in the direction of the moon and the actual antenna temperature (an indication of noise power received) which would be measured with an antenna pointed in that direction. This is because the antenna will undoubtedly have a large beam width which will take in large areas of sky around the desired direction. The antenna responds to the average sky brightness taken over its whole beam.

It might be reasonable to assume a 40-foot aperture diameter for the largest practicable ham antenna (excluding the "professional" hams in Puerto Rico, etc.). Such an antenna would have a beam width at two meters of about 20 degrees. Suppose the moon were sitting very near the galactic plane and suppose we can represent the Milky Way by a bright strip about 3 degrees wide with a brightness temperature of 3000 degrees K. The antenna temperature due to this strip is only about

$$3000^{\circ} \cdot \frac{3.20}{2 \cdot (10)^2} = 600^{\circ} \text{K.}$$

The reduction in antenna temperature comes about because the Milky Way doesn't fill the antenna beam. In point of fact, no antenna is 100 per cent efficient, and the actual contribution of the galaxy to the antenna temperature would be down by another 20 per cent to 50 per cent.

At two meters, the average sky temperature is about the same as the ground temperature (both about 3000 degrees K), and actual antenna temperatures in ham operations will seldom be as much as twice this value. At six meters, the brightness temperature of the galaxy is about 15 times higher and would be the dominating factor in determining the antenna temperature. — Alan T. Moffet, 550 Ladera St., Pasadena, Calif.

7360 Mixers in the 75A-4

Editor *QST*:

In his article on applying 7360 beam-deflection tubes to the mixer stages of 75A-4 receivers (*QST* for July 1964), W2QWS left the matter of switching filters in the second-mixer stage as a problem for the student. An examination of the circuit of the 75A-4 discloses that the solution should not be difficult, as indicated in Fig. 2. It appears that it should be necessary only to lift the ground connection on the line connecting the No. 1 input terminals of the three filters to switch section S_{2A} . Then the output circuit of the 7360 can be connected to the switch as shown.

If the capacitance to ground added to one side of the circuit by this connection is sufficient to cause serious unbalance, it can be compensated for by connecting a variable capacitor to ground from the other side as indicated by the dotted line.

— George W. Hippisley, Jr., K1WJD

RECTIFICATION

Technical Editor, *QST*:

In the *Handbook* chapter on BCI and TVI you point out that harmonics of the transmitter fundamental frequency can be generated at poor electrical contacts between joined pieces of metal, especially if they occur in the antenna itself. You understated the possible harmonic generation problem very much. Yesterday, as I was QSOing on 20 c.w. with a kilowatt, an ex-ham who cuts records and makes tapes for a living came over and told me I was putting signals over the whole f.m. band, washing out the white noise between, turning the Channel 2 and 8 pictures negative, and interfering with the TV audio. He taped some of the interference; it washed out the f.m. signal completely and produced a hum like I get in my receiver when I shut the b.f.o. off and listen to my signal without receiver muting. This occurred with his antenna switched off as well, leaving a few feet of Twin-Lead on the receivers. He is a block away.

My antenna is a quarter-wave ground plane vertical on 20, with four radials. The interference existed on 40 meters, but was reduced in amplitude. There the antenna is fed with the coax leads tied together at the transmatch, which is coupled by a coax link to the transmitter push-pull tank link. I went up on the roof and found one radial, No. 14 enameled wire, touching a sewer vent pipe. At the point of contact, the copper was shiny, surrounded by blackened enamel, and the aluminum paint on the pipe was charred.

Let that be a warning to anyone who is sloppy about antenna construction, including radial mounting. Now, I wonder what kind of interference was caused by my second harmonic, and the third, and the fourth, and . . . — George Tomaszewicz, K7GKB/K6SBJ, 11 Putnam Ave., Cambridge, Mass. 02139

DYNAMIC REGULATION IN C.W. POWER SUPPLIES

Technical Editor, *QST*:

The importance of good dynamic regulation in the plate supply of a linear amplifier used for s.s.b. has been emphasized. However, this factor has not been stressed for Class C c.w. amplifier power supplies.

The d.c. plate current swing in a typical c.w. final

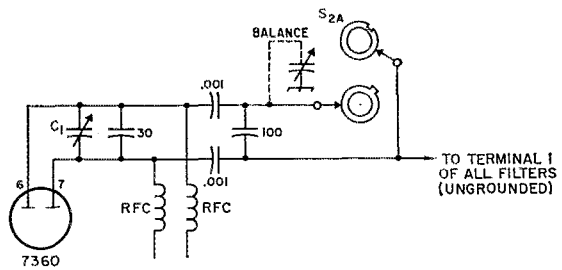


Fig. 2 — Filter switching in the 75A-4.

is greater than in a typical s.s.b. linear final operating under the same peak power and voltage conditions. Power supplies with choke-input filters often produce a severe transient decrease in output voltage when a load is applied; this is in addition to the static drop in voltage. The d.c. voltage can drop momentarily to less than 70 per cent of the full-load voltage. The power output from a final amplifier varies somewhat as the square of the plate voltage, so during the transient the power output could drop to less than 50 per cent of its normal output. When keying takes place, this transient occurs at the beginning of every dot and dash.

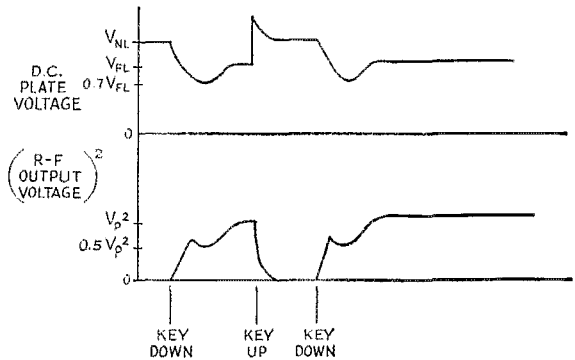


Fig. 3 — Transients appear in this dot-voltage waveform.

The duration of the power decrease depends on the power supply and load characteristics; typically it ranges from 30 to 60 milliseconds. At high keying speeds, the length of a dot may become 50 milliseconds or less, in which case a large portion of the keyed output power is less than the output power under continuous key-down conditions.

The best way to determine if this is happening is with a d.c.-coupled oscilloscope at the output of an envelope detector connected to the transmitter r.f. output. A dot voltage waveform such as shown in Fig. 3 indicates that the problem is there. The power-supply voltage could be coupled through a resistive divider to the d.c. oscilloscope to allow actual observation of the voltage transient.

This problem can be solved in several ways:

1) Redesign of the power supply to exclude the choke.

2) Increase of output filter capacitance.

3) Increase key-up load current.

— James H. Okubo, W1GTKO, 1018-B Minnie St., Santa Ana, Calif. 92701.

POWER-LINE NOISE

Technical Editor, *QST*:

Recently several long-distance telephone calls and letters have been received from hams who are experiencing interference from power lines, requesting information as to the steps I took to obtain prompt action from the local utility company, as reported by my letter on page 95 of *QST* for December 1963. To assist hams who may have the same problem, the following suggestions are offered:

1) Thoroughly investigate your problem. Determine whether the noise is related to wind, temperature or humidity. Using a transistor radio, check service entrances at nearby homes in addition to your own, and also at poles, especially those carrying transformers. If the noise is intermittent, see if there is any time pattern that might result from defective appliances, aquarium heaters, heating pads, and similar devices.

2) Write a letter to the president of your utility company. Do not telephone or call personally. You may need a copy of the letter for further action. State first that your station (give call letters) is licensed by the FCC. Mention any particular work that you do, such as furnishing emergency communications and handling messages from off-the-mainland service men. Then specifically list all poles and service entrances where you pick up the noise, along with the closest locations where the noise is *not* heard. That is important to help pinpoint the trouble. Be sure to include dates. Mention how much money you have invested in your equipment, and ask his cooperation in investigating and eliminating the interference. Ask that his engineer assigned telephone you for an appointment (give your phone

number), and personally visit you so he can hear for himself the exact type of interference and to what extent it interferes with your operation.

3) Any personal contacts or friends of the top man at the utility company may be of assistance, but only if they are personal friends of yours also.

In my case, action was prompt and effective. Defective lightning arresters are always suspect, especially if the noise is intermittent and over a period of weeks becomes increasingly more frequent. If the bypass capacitors on the 115-volt input to any of your gear have broken down, a bad lightning arrester is almost a certainty. Defective insulators, kite strings across power lines, and lines with insulation worn away also are common causes.

In the event that no action is taken after a week or so, address another letter to the president of the company, enclosing a copy of the first one. State that no action has been taken and remind him that it is the responsibility of the power company to eliminate any interfering noise and state that you hope it will be unnecessary for you to report this to the Federal Communications Commission.

If satisfaction is still not obtained, write to Engineer-in-Charge, Federal Communications Commission, at their office nearest you, enclosing copies of your letters to the utility company, and again briefly document your case. Send a copy of this letter to the president of the local utility company, without comment, and indicate on your letter to the FCC that a copy is going to the utility company.

All letters should be typed and addressed only to the president of the company. Employees may be uncooperative and have little interest in what they may consider a minor problem. — *G. L. Countryman, W4J A, 75 East Bay St., Charleston, S.C. 29401.*

NEW BOOKS

The Radio Amateur's Handbook, by A. Frederick Collins, revised by Robert Hertzberg, W2DJJ. Published by Thomas Y. Crowell Co., 201 Park Ave., South, New York, N. Y. 10003. 374 pages, including index, illustrated, cloth cover, 6 × 8½ inches. Price, \$4.95.

The eleventh edition of this book (not to be confused with the ARRL *Handbook*) has been revised by W2DJJ, well known for his own writings on radio subjects. Two new chapters on solid-state devices and mobile transmission increase the scope of the book and bring it up to date. The book's theory section is written in an easy-to-read manner, and provides a beginner's explanation of radio, rather than a reference text. The chapters on receiver and transmitter construction are primarily concerned with the construction of kits, but construction principles for the home builder are included for those who wish to start from scratch on projects. Trouble-shooting information for the finished kit is included to help the novice find any mistakes he may have made. The same information can be applied to the repair of any ham equipment, as the same principles apply to all gear. Test equipment that may be found in the ham-shack is also discussed. The new chapter on solid-state devices explains the operation of diodes and transistors, and shows the construction of a solid-state grid-dip meter kit. The section on operation rounds out the book by discussing safety precautions, operating techniques, and FCC rules. An extensive appendix lists radio formulas, a glossary of electronic terms, and the insurance requirements for radio equipment and antennas.

On the Early History of Radio Guidance, by Benjamin Franklin Miessner. Published by the San Francisco Press, 255 Twelfth St., San Francisco 3, California. 6 by 8½ inches, 86 pages, including index, paper cover. Price, \$2.75.

Mr. Benjamin Miessner is a noted inventor, and in this book he tells the story of some of his early discoveries. When he was a very young man he worked for Hammond, and in 1912 he was trying to develop a system of radio control for torpedoes. His research led him to many circuits that are the commonplace of today, including heterodyne receivers, frequency modulation, crystal detectors, and vacuum tube amplifiers. The characters in his story read like a Who's-Who of radio: Tesla, De Forest, Alexanderson, Lowenstein, Armstrong, and Lamb. The book is illustrated with schematics and pages from the author's notebooks in which he kept a running record of his research. In 1913 the author left Hammond's to attend Purdue University. He later continued his work in the radio field, and today holds some two hundred patents for his inventions; the inventions have made him a millionaire. Perhaps his most famous invention was the first system of a.c. power for radio receivers, eliminating the need for cumbersome, costly batteries. Later many inventors fought over who had invented what first. The patent fights were drawn out in the courts for many years. The cases were often difficult as many people had the same ideas at about the same time. Several of the cases that involved the author's early work for Hammond, the heterodyne principle and r.f. amplifiers, are reviewed in the second part of the book. This tale of early experimentation should be of interest to all who use radio.

— *W1KLLK*



Hints and Kinks

For the Experimenter



12-VOLT POWER IN A 6-VOLT CAR

Most mobile equipment available today is designed for 12-volt operation. Since I drive a Volkswagen, which has a 6-volt power system, I came up with the following idea that enables me to use a 12-volt-powered s.s.b. transceiver, shown in Fig. 1.

I mounted a 12-volt battery under the left rear seat of the car and enclosed it in a plastic battery box, such as is sold for marine applications. (See Fig. 2) A battery trickle charger is attached at night, and an overnight charge twice a week gives me about an hour or so of operating time each day on the way to and from work.

Since the battery is entirely independent from the car's electrical system, electrical interference is kept at a minimum.

— John B. Johnston, K3BNS

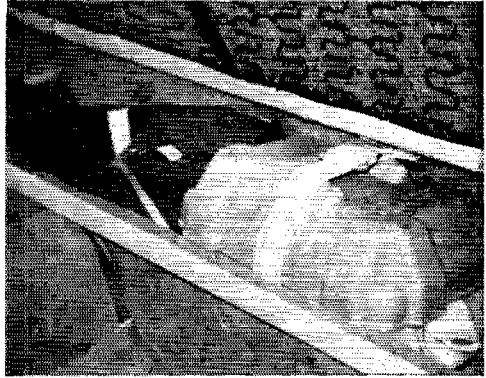


Fig. 2—The auxiliary 12-volt battery is mounted under the left rear seat in a plastic battery box.

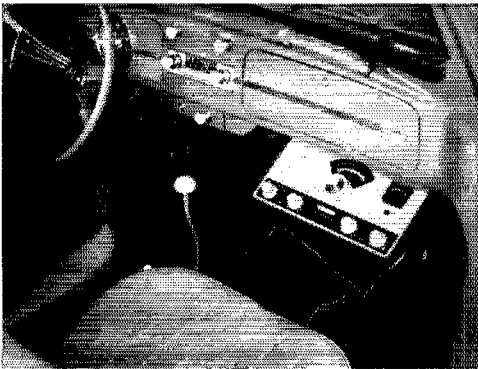


Fig. 1—The Heath HW-22 s.s.b. transceiver is powered by an HP-13 transistor power supply.

WINDOW FEEDTHROUGH

THE problem of bringing transmission lines into the shack can be a sticky one, especially if one does not wish to drill window frames or walls, or to replace the panes of glass with plastic sheets.

My method is to make a sandwich out of any one of the foam materials used by upholsterers, and to bring the antenna feeders into the shack between two sheets of foam which have been cut to sufficient width, about an inch or so wider than the window opening. The other dimension should be great enough to provide a closure base for the window and screen or storm window. I have found this method to provide excellent weather protection if the windows are closed firmly and held down with a wedge or tack against the window frame.

— A. W. Smith, K3ZMS

CABLE LACING CORD

DENTAL floss makes an ideal substitute for lacing cord and is available in most drug-stores in several sizes, the most useful being approximately $\frac{1}{16}$ inch in width. However, the smaller sizes are useful with miniature cable.

— Kenneth G. Kopp, WA4HAA

CONTROL ROTATION RIGHT?

I CAN never seem to remember how to connect up a potentiometer so that when the shaft is rotated clockwise, the gain or what-have-you would increase instead of decrease. I finally solved the problem. When the control is held with the terminals pointing up and the shaft pointing at you, the terminal to be grounded, in normal control applications, is the one on the right.

Having accomplished this scientific breakthrough, I went on to memorize: The right terminal is the right one to ground. Now, all of my controls turn the right way!

— R. F. Van Wickle, W6TKA

SIMPLE INTERFERENCE CURE

I HAD all sorts of radio interference in my mobile receiver. After trying the standard methods for curing the interference, I wrote the car manufacturer, the receiver manufacturer and even the ARRL for help. Nothing they suggested helped. Finally, after much experimentation, I found the answer. The car's ammeter leads were dressed near the receiver, and by simply moving them a few inches away I completely eliminated the interference. I suggest that all those who install ammeters in their cars try to keep the leads away from the mobile receiver, antenna lead, etc.

— Richard Shongut, W2QPR



Correspondence From Members-

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

CONTEST REACTIONS

☐ Your Editorial — "It Seems to Us" is first-class. As probably the originators of contests you show real courage and realism in raising the question of whether there are not now too many.

Would it not be possible to restrict not the time but the part of the spectrum used by the contest. For example, on a 20-meter phone contest restrict the frequencies permissible for the contest to — 14.150 to 14.275 Mc. This would give 50 kc. outside the American phone band and 75 kc. within the American phone band, while the non-contest operators would have 50 kc. outside the American phone band. — 14.100 to 14.150 Mc. and 75 kc. within the American phone band — 14.275 to 14.350 Mc.

The frequency band is then equally shared by contestants and non-participants in the contest, with part of each within the American phone band and part outside it.

Enforcement should not be too difficult. A few monitoring stations would soon deter contestants from "Out of Contest Band Operation" just as your OOs detect out of band operation today. — *G3BD*

☐ Someone has complained to the Board concerning this matter. Is it the people who run other contests? Your contest has more participation than any other which indicates that it is the best. If these people want to reduce contests let them reduce their own. If you drop a weekend, Lower Slobhovia will grab it and instead of a good contest we will have a mediocre one. Or, is it a delegation of traffic men or casual ragchewers that are inconvenienced? There is a solution to this. It is called co-existence and it works like this. If I want to ragchew at 0000 GMT on 3580 kc., there will be a traffic net there for sure. If a traffic man wants to pass a message on 14050 kc. during the ARRL DX Contest, he is in trouble. The obvious solution to both problems is to QSY to another band. Anything above 7050 or 3530 kc. should solve a ragchewer's problem during the contest.

The editorial expresses concern that the contests are monopolizing frequencies. By the same reasoning, one can say that there are too many nets and if we reduce the number of messages handled by 50%, we can release these frequencies to some other facet of our hobby.

The argument for the traffic man is that he is training himself for an emergency. This is true and he should be admired. However, the contest is another "school," so to speak, and provides training along a parallel path. The traffic man and the DX contest man are a different breed, but I believe both strive for perfection in his own way. The traffic man is more apt to have a "tape" fist and have a higher code speed. But for picking signals out of the noise level and maneuverability the DX man is tops.

Then there are the technical developments contributed to our hobby by the DX-contest man. A recent one is the construction of a full size 80-meter rotating beam. What other branch of our hobby

would have accomplished such a feat. Who knows what else will be next — perhaps noiseless receivers?

Last, and least important is my own selfish love of your contest. As a casual weekend DXer the height of the winter to me is the prospect of working such excellent operators as DL7AA, 9Q5AB, T12PZ, and the like on 5 different bands. I wasn't old enough to participate in 1927, but a two-week contest — that must have been real living! — *W3QQ*

☐ If the League were the only one who ran contests I might tolerate them. But as you remarked in your editorial, during the past dozen years or so everybody and his brother has been starting new contests — some worthy, some certainly of questionable usefulness. You only under-rate the situation when you remark that the impact on the amateur bands has been considerable. But in the same breath you state that you are open-minded to all suggestions and criticisms except one, that "contests serve no useful function." The only useful function I can see regarding contests is that it offers amateurs an opportunity to forego their companionship with their wives and household duties by sticking to the mike or key 48 hours every weekend throughout the year!

So here is my suggestion, which no one should object to. Continue your contests every weekend for the full 48-hour period, but keep free 14,020 kc. to 14,025 kc. and 7020 to 7025 kc. for these amateurs would like to continue their friendly contacts overseas. Is that asking too much? I don't think so. — *W20HF*

☐ In my way of thinking, nothing can improve operating proficiency better than a good snappy contest. The more the merrier, leave the contests "as is" and return the SS back to 2 weeks with its old time limit of 40 hours. — *K5OCX*

☐ I am very much in favor of a single c.w. and single voice weekend for future DX contests.

Some of the other contests could be eliminated which do not accomplish anything but clutter up the bands, especially during the time when important tlc must get through. — *W2QB*

☐ I suggest leaving the DX test as it is. Shortening this to one weekend eliminates much seasonal DX conditions. Also a one weekend contest would not give the low power station much of a chance at the DX. For single operator stations, have a maximum time limit allowed, i.e., of the 96-hour period allow single operator stations just 85 hours of operation. — *K1DIR*.

☐ Now that the 1964 SS is over, my views regarding the rule changes have not been altered, only affirmed. It was an endurance contest par excellence. If it was the thinking of the committee to discourage participation, the contest was a success!

Why are the Board members (how many contest

operators?) so imbued with the idea of improving the image of U.S. hams? Certainly we cause QRM, contests or not. How can a group of hams operate and not generate QRM? Isn't lack of activity on the ham bands good cause for the fixed services to point out the fact that the amateur bands should be cut? During the BERU, REF and the Russian contests much juicy DX pops up — and is unworkable. Do we sulk and scream that these contests be abolished since we cannot participate?

Your comment on the variety of new contests which have sprung up is confusing. Practically every non-League sponsored contest (except CQ DX) utilizes only small segments of any amateur band. Even the CD party finds most of the activity huddled in a 15- or 20-kc. portion of any band. Why should the League, which sponsors the most popular contests, be forced to "reevaluate" its position because of a minority?

Specifically, in regard to the DX contest, a 24-hour period is not long enough. Were you ever caught with two or three hours of early morning snow static — or 80 so full of QRN for one evening that it is impossible — or 10 doesn't open to Europe for the northern part of the country? When such a situation occurs you always feel the same conditions may not prevail the next day and perhaps you can recoup some of your losses. With a 24-hour period this would be impossible.

My sole comment is not to change the rules except for cutting the contests to one weekend each, phone and c.w. For the SS, 20 hours out of 33, and for the DX contest, 48 hours instead of 96. The casual entrant will never know the difference, the non-participant feels 24 minutes is too long and the hardcore contest man will never be satisfied.

I must reiterate my feeling — a contest should be a test of, and therefore indicate a means of improving, operating skill and equipment performance, not one in which the principal objective is to remain glued to the operating chair sans sustenance and physiological refreshment for a specified period of time. — *W3NOH*

¶ I never can get worked up over the ARRL DX test so will pass along the view of a confirmed tester: 1) Do away with the quota; 2) Shorten it to one weekend and maybe hold one in winter and one in summer, if they feel inclined toward two tests; 3) Allow single-band entries; 4) Forget this section awards business; 5) Allow single-xmtr, multi-op class; 6) Allow DX stn's to work DX. — *W1GSBO*

¶ In 1960 I won the contest for Germany. In the following years I was unable to join the contest because of the much-too-long period.

A man who had to do his work Monday morning cannot stand up 48 hours without sleep! That's the trouble.

So — if you change into two 24-hour weekends, instead of 48 hours I am sure everybody will be happy. — *DL9PF*

¶ Please *do not* change the present ARRL DX contest arrangements. With conditions so variable particularly during the up-swing of the cycle (approaching) two weekends are most necessary to manage a decent score from this part of the continent. VE2 land, for some reason, had to fall in the Auroal Zone, consequently stations 400 miles to the South and west of us enjoy an open band while we have to sit and listen. Let me say our openings are more limited.

As for those operators who are not interested in

contests are concerned I have never found any band during any contest so crowded that a decent QSO could not be managed if desired. — *VE2NV*.

¶ I'm a little inclined to question your argument that anyone participating in contests comes out more experienced and better qualified. Qualified for what? If I thought the SS was a sample of how ham operating should be done all the time I'd vote for turning all our hands over to the broadcast jammers.

Perhaps operating contests should be restructured into longer-term, less concentrated things. The Century Club is an example of an extremely long-term DX contest. I believe an eastern group is running a one-year CC test. A good idea. Would a DX contest that ran day and night for 4 months really cause extra QRM? Or to go in another direction and retain the weekend bit, how about dividing the present 96 hours of c.w. contest into 16 six hour bits on 16 weekends, Friday night one weekend, Sat. A.M. another, etc. Ditto for phone, of course.

And we could use some new rules, or new contests, which would make participants more experienced and better qualified to "meet the serious challenge of the future", not just to be best man in a meaningless scramble. — *W6ABT*

¶ Not too much more is accomplished running the DX Contest two weekends. If it should be cut back to just one, should condx be lousy they are lousy for all; should they be good they're good for all.

So, yes! Count me in favor 100% of reducing it to one. — *W2EQS*

¶ Many overseas amateurs do not consider our ARRL DX contest to be DX contest, for they are strictly limited to contacting only five out of the several hundred countries on the countries list. Of course, they have a chance to work new states, but they have no assurance of receiving automatic confirmations as we do when contacting them. How does the DXer feel about our contest while patiently waiting for an American band opening and simultaneously being unable to contact countries he needs because the other DX station will only work U.S. and Canadian amateurs. Actually, the ARRL International DX Competition is no more than a U.S.-Canadian QSO party. To call it an "International DX Competition" is certainly a misnomer.

It is possible to turn this event into a real DX contest by permitting creditable contacts between foreign stations, and extending to them the same DXCC confirmation privileges that we enjoy. If this were done, the contest would surely attract many more DX amateurs than currently participate. Of course, this would encourage even greater North American activity, and the net result would be a truly great event.

Perhaps it is felt that the general form of the contest should remain unchanged, i.e., essentially an American QSO party. If this is the general consensus, we still can greatly improve the contest while preserving this form. DX stations would be overjoyed to know that their contest QSOs are automatic WAS confirmations (providing of course that the American amateur has properly submitted his log to the League). We receive DXCC credit for contest QSOs, so why not give the DX station WAS credit? — *K7ADD*

¶ The reorientation of the 1964 SS contest is the first bright spot in the picture for many years. The new format lent at least some meaning to the exchange, and the 24-hours per mode schedule made it

possible for family men like me to participate — my first time in twenty-four years! This small change in format made contest operation profitable, interesting and feasible, instead of an insipid exercise in tedium. — *W4LUV*

¶ In general, I favor more contests because: 1) they offer a good respite from building gear and general operating; 2) contests provide a good workout and test of our equipment; 3) contests are an enjoyable activity — in a sense — the sport of ham radio.

Contests should be of shorter duration, particularly v.h.f. contests — because: 1) a long contest becomes a grind, instead of a pleasure; 2) long contests, extending through late Sunday, do not allow time for participants in remote locations to get home at a reasonable hour; 3) even home station contesters would probably enjoy calling it quits late Sunday afternoon so that they can relax, and get to bed early for Monday morning at the office. — *W1EXZ*

¶ I would hope that similar proportionate alterations might be made for contests of shorter duration. I would propose that eight-day contest periods be reduced to four days, that is two weekends instead of four. Further I would propose that the contest period be divided so that on the first weekend, for example c.w. would be on Saturday and phone on Sunday; the second weekend would be for phone on Saturday and c.w. on Sunday.

Such an arrangement gives each type of contestant two full 24-hour periods of operation and further is to their advantage that the division between two weekends helps to overcome any period of poor transmission conditions.

This arrangement also greatly reduces the interference with non-participating activities. An activity on Sunday, for example, would be interfered with only on one weekend instead of two. Furthermore, if such activity could be shifted from Sunday to Saturday, operation free of contest interference could be carried out on any contest weekend. At present, the whole week end is a contest weekend for either phone or c.w. and there is no way to bypass the contest interference. — *W4AU*

¶ I damn the League for selecting only weekends for contests. I am not against them, I want to participate and being a shift worker, I like many amateurs across the U.S. have only one weekend off every couple of months. The XYL has preference for that one, so I can not enter with intention of winning because of the limited available hours. My suggestion and solution: Have contests during week days. — *K3VYG*

¶ As a long time participant in the ARRL DX contests and a lucky winner on a couple of occasions, I will state very emphatically that no change be made in the current ARRL DX contest format. For me the 48-hour weekend arrangement is very necessary to provide me with the best possible chance to work all areas of the world. With the sunspot cycle dragging its heels it is very uncommon to find conditions exactly the same both days.

The concluding weekend a month away allows me the most welcome chance to compare our first weekends work to take stock as to what antenna changes need be made to improve our coverage. No other contest provides this feature!

As for monopolization, I do not think it fair to consider 4 days out of 365 for phone or c.w. contest work as being inconvenient. After all this type of

activity does offer an education in copying ability under very trying circumstances plus a wonderful education in operating ability from some of the world's finest operators.

Continued success with this activity and may it remain a part of ARRL for many years to come. — *W2VCZ*

¶ I note you are considering reducing the DX contest to one weekend. Please don't.

I like to work DX. The two contest weekends a year give me a chance to pick up a lot of contacts I'd have to wait months for otherwise. And, I like the contest method of operating.

I have entered the contest for score only once in the past ten years but I usually operate not in a knock-myself-out basis but just as time permits. And I enjoy it very much. — *W1CT*

¶ It seems to me that the key question in your editorial was: "Would changes work to the advantage of the hard-core contest man, the casual entrant or the non-participant?" My very strong feeling is that changes would work to the advantage of none of them. I feel safe in saying that the hard-core man likes it the way it is — or perhaps would like to run it twice a year. The casual participant, as well as the hot contest man, would suffer however, if the operating periods were reduced in any way. First of all, the little guy with 100 watts to a dipole just doesn't stand a chance at the rare or semi-rare countries until the second weekend. And then there is the unhappy fact that the DX contest is the only time that some of the rare DX stations get on 160, 80 and 40, and in some cases the only time they show up on any band. Two weekends a year is little enough time to get a shot at some of these rare birds. Conditions, vacations, equipment, failures or illness might keep 'em unattainable in February — but there's always March.

Now the non-participant. He is just as important as the participant. No more — but no less. His case ties in with your question as to whether the multiple weekends tend to monopolize useful frequencies. Everyone who fairly examines the bands during a DX contest knows that only the lower 25 kc of 80 and 40 meters are excessively crowded with contesters. On 20 meters and higher, the entire bands are used when conditions are good — but a great proportion of the occupants of these bands are interested in working DX anyway and seldom object to increased DX activity. This hardly adds up to a monopoly in the true sense. A change or reduction in the DX contest time would be scarcely noticeable to the non-participant who normally inhabits 80 or 40, and, I maintain that those who live on 20, 15 or 10 do not object too strenuously to the present arrangement. If I am wrong and they do object then let's get statistical about it. Since they are neither more nor less important than the participants, what's so unfair about a ratio of 4 weekends for the DX contest and 48 hours without it.

The thing that seriously bothers me is that we suddenly find ourselves having to justify a worthwhile activity. During the last phone CD party, I spent most of Sunday afternoon looking for other participants on 20 meters. I found 4 of them. But I also came across a rag-chewer who was complaining bitterly to his partner that "These CD guys are cluttering up the whole band with their contest today". This ragchewer had just been subjected to a 3 by 3 CQ CD call — he probably sat down and wrote his director about the terrific interference caused by contests! I'm not kidding — a good friend

of mine who is a sharp DX operator once complained to me about the c.w. CD parties using up the whole band. When I challenged him, he was honest and fair and admitted his statement was thoughtless. He further admitted that he knew they only occupied about 10 kc. of the band. But how many people do not stop and think? How many make irresponsible statements to their directors? How many are engaged in worthwhile activities and have an "inconvenience" forced on them by contest participants? — *W1JYH*

CORRECT ADDRESS PSE

Through the years I have been receiving QSL cards addressed to Hawaii, Oceania, Zone 31.

Oceania is meaningless to postal authorities, and Zone 31, downright wrong in the light of recent zoning changes.

These latter two notations are merely callbook and radio magazine notations made up for their own convenience and not for postal use. — *K1161J*

TROSTER, REALLY!

I just received my December *QST* and may I be frank with you? I'm bored with W6ISQ. Really! Enough is quite enough. — *W0HJL*

IT'S YOUR LEAGUE

As an affiliated club, the Tioga Amateur Radio Association (TARA), we shall continue to endorse the policies of the ARRL Board of Directors mandates, in such areas as radio operations, technical competency, amateur band surveillance, frequency band allocations, incentive licensing, to name a few. It is felt the elected directors of the ARRL are more than capable to determine the course of action for amateur radio in the long overall justification certifying the necessity for its existence.

A strong ARRL must be aggressive to be progressive. The individual directors must be chosen by its members with extreme prudence for qualities of unselfish devotion and dedication. The wishes of the majority must be endorsed and the minority must be heard.

The Board of Directors must establish, as in any progressive organization, a realistic long range political and technical planning program.

The Headquarters staff must be chosen for dedicated, knowledgeable, superior career oriented personnel, given directed organizational responsibilities.

The ARRL membership is a prerequisite for political strength at every government level, i.e., the local, the state, the federal government and the international to which we as amateurs are subjugated.

Failure by the licensed radio amateurs to demand (1) impartial long range amateur radio policies of all political phases, (2) superior ARRL governing bodies will result in eventual organizational deterioration.

As it now appears—SO GOES AMERICAN RADIO RELAY LEAGUE—SO GOES AMATEUR RADIO. . . . — *W12TDG*

LICK AGAIN

Congratulations to you and the Post Office on the commemorative stamp! A single sideband wave form rampant on a broken dial! This is an accurate picture of exactly what is wrong with amateur radio today. Too many phone lids. — *W2KJ*

MORE FOR YOUR MONEY

Now that we pay fees to FCC, I feel that we may be more demanding of the "public service" agency. FCC should step up monitoring of poor operation practices and other aids at the local level. Instances of radiated interference such as broadcast harmonics,

TV set radiation, TVI, and public utility line radiation, to name a few, should come under the surveillance of FCC field engineering. . . .

The amateur fees even at \$1 a head represent \$500,000 every few years, not to mention the other radio services. — *W3LUZ*

VHF C.W.

I feel that something should be done about the condition of v.h.f. c.w. I operate on six meters and I like c.w. very much, but trying to get a contact is quite a job. I believe that all amateurs bands should be balanced as far as c.w. and phone, but this is surely not the ones on v.h.f.

The blame for this is on the v.h.f. amateur for not having the needed interest, but also on the equipment manufacturer who in anything below 300 dollars refuses to install keying and a b.f.o. for some unknown reason.

With all the unused frequencies in the v.h.f. bands I think more could be only for c.w. which may get more activity. Maybe an ARRL sponsored v.h.f. c.w. contest would arouse more interest.

I am sure that there are others who feel as I do, that the condition of the v.h.f. bands is not what it should be and that c.w. enthusiasm must increase before these bands can reach their maximum popularity and usefulness.

I would like to hear from anyone who would like to start a 6 meter c.w. club in this area to promote interest and most of all to have fun pounding that key. — *WB2JVE*



Florida—The ninth annual Auctionfest of the Broward Amateur Radio Club will be held Saturday, March 6, 1965, at the Armory, SW 24th St., Rte. 84, and SW 45th Ave., Ft. Lauderdale, Fla., from 8 until 5.

New Jersey—The North Jersey DX Association is having their second annual DX roundup on Saturday, March 20th, at Schraffts Eastchester Restaurant. Tickets for the program (W9WNV will give a color slide talk on Cambodia) and the dinner (prime ribs of beef) are \$8.50. Mail checks (payable to the North Jersey DX Association) to Robert W. Stankus, W2VCZ, 30 Pitcairn Ave., Ho-Ho-Kus, New Jersey. Deadline for reservations is March 15, 1965.

New York—The SSBARA is in process of disbanding, but the tradition of the annual sideband hamfest during the IEEE show is being carried on this year by W2AVA. No Banquet this time, but on March 23, from noon to 9 P.M. at the Statler Hilton, there will be the usual extensive exhibits of new gear as well as technical sessions. Admission free. Bring your QSL marked with information on your hotel, IEEE booth number if any, and your club or net affiliation, for posting on a bulletin board to help locate your friends.

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.



Complete the Drive in Sixty-Five!

WELL, we're getting there, dollar by dollar, but we need to pick up a bit of speed if we are going to get our man to the top of the tower before 1965 runs out. Several divisions continue to move along toward their goal, and of course we have six divisions which have met their quota. Unfortunately, last month we made a serious typographical error and failed to list the Pacific Division among those who have gone over the top. No sooner had the February issue of *QST* been distributed than the wrath of Director Engwicht of the Pacific Division was felt at Hq. We are glad to set the record straight — the Pacific division has oversubscribed its quota by some 12% and so is firmly ensconced on the Building Fund Honor Roll.

Those six divisions now on the Honor roll are:

Canadian Division	New England Division
Dakota Division	Pacific Division
Hudson Division	Rocky Mt. Division

Here's how the other divisions stand.

Northwestern	93.1%	Delta	79.8%
Roanoke	89.2	West Gulf	77.2
Southwestern	86.3	Atlantic	66.0
Central	85.2	Southeastern	57.5
Midwest	82.5	Great Lakes	56.4

Remember, every dollar that you contribute to the Building Fund is matched by a dollar from a special fund established by a group of men who feel that much of their business success can be traced back to amateur radio.

Members Are Saying ...

Here's my contribution and I'm sorry it has had to be so late. Congratulations on your 50th anniversary and may we all see the 100th! — *W7THG*

Here is a small contribution toward the Building Fund. I just passed my General exam and am awaiting my license. I want you to know how grateful I am to the ARRL and how heartily I support your courageous stand on incentive licensing. — *WVØJII*

Here is something I've wanted to do for quite some time but never have gotten around to it. Have donated through several clubs, but our personal donation is the least I can do. — *W6ZRL*

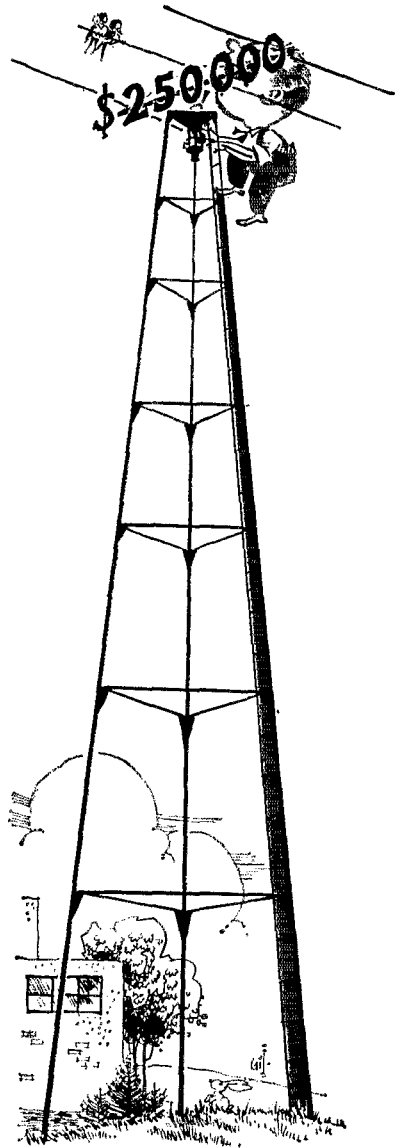
Enclosed is a small sum which can hardly express my thanks to our ARRL for its challenging contests, excellent awards program, and all the other invaluable services rendered through *QST*.

I decided to send in my Building Fund contribution after reading about it so long in *QST*! — *W191XL*

Please include the enclosed small contribution in the ARRL Building Fund. I much appreciate the efforts of the people who make the ARRL, especially the daily code practice from *W1AW*. Thanks. — *W48LJV*

This is my second contribution to your Building Fund. It will make one dollar for every year that I have been on this earth plus one for good measure. — *K3FVS*

The Six and Two Ham Club, Inc., of Downers Grove, Illinois, would like to make this donation to your Building Fund. This club is affiliated with



ARRL. We all are backing up the League 100%. Keep up the good work. — *W9RIU*

Enclosed is our check, which we wish to donate to the Building Fund in honor of *K9TUK*, now a Silent Key. This sum represents the remaining balance in the treasury of the DuPage Emergency Net, of which *K9TUK* was a charter member and really the spark plug of the net. The net is now discontinued and we felt that no better cause could be found than your Building Fund. On behalf of our good and true friend, we want you to accept this small sum in his memory. — *DuPage Emergency Net*

Please enclosed find a check. This I hope will help put our division over the top. Keep up the good work. — *K7BZE*



How's DX?

CONDUCTED BY ROD NEWKIRK, * W9BRD

Whereas:

FOUND — one strayed DX man. Remember the lamenting letter from "Garry, K2 —" in last September's column? The one mournfully abandoning all aspirations to DX glory? Well, jammed in the bottom of an old "How's" mailbox we discover this momentous report from west coast operative No. 009 on the Stanford University salient of the DX front:

Dear Jeeves,

Your search for Garry has ended! The soulful lament in September *QST* moved me to step forward and reveal Garry's whereabouts. He is now neatly ensconced in a very nice California hilltop QTH, complete with the same old 150 homebrew watts, lackadaisical trap antenna (one of mine) and a now somewhat better than so-so receiver.

DX? Garry's kicked the habit, though he does work an occasional odd JA, UAØ, VK, etc. (I guess you can never really kick it!) And he *did* finish off that DXCC from New York.

A few evenings ago I decided to check out his homebrew 9TO-style keyer and knocked off a 5A1 for him, pointing out how easy it was (first call). But Garry just chugged down the last of his brew, mumbled something about +*#&=%\$% QRM and handed me a fresh bottle (the only way to work DX).

But his complaints of long ago are still valid today. Even more so, perhaps, and I find myself becoming more and more sympathetic to his feelings on the subject. So we're both getting away from 14-Mc. QRM by moving to 144 Mc. CU TR, OM?

— Doug, K6TZX

p.s. I understand that the path to KP4 and OH is pretty good on 2 recently.

Yeah, fellows, you can never really kick it. The habit may wane and lie dormant till some red-hot midnight opening comes on 20, and there you go again! Wonder who that furtive figure could be, the one seen sneaking a long co-ax tap on W6AM's Tibetan rhombic.



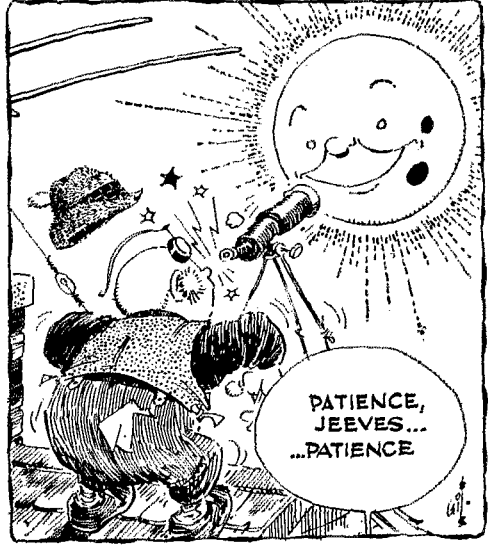
How's it going? Getting your share of sport in the 1965 ARRL DX Contest now at halfway intermission? This month finishes off the brawl in a blaze of operator-seasoning QRM. January "How's" comments urged participants in overseas-sponsored DX tests to express their interest by not failing to report results, good or bad, to sponsoring societies. Same goes for our own ARRL event, of course.

Carefully read or reread "DX Contest — Changes?" on page 9, December 1964 *QST*, and give the League the benefit of your opinion on the matter. You can kill two stones with one bird by submitting your views along with 1965 ARRL DX Contest log and summary data (per pp. 57-59, January 1965 *QST*) postmarked no later than April 24, this year. Good fishin' to you in those upcoming final weekends!

* 7862-B West Lawrence Ave., Chicago, Ill. 60656

What:

Newcomers to amateur radio a few years hence will have an awful time believing that 160 and 80 meters were jammed with juicy DX 'way back in 1965, and that long-path VKs and daytime Africans once broke through regularly to our east coast on 40. This sunset minimum, right now, is your golden opportunity to get lower-frequency QSLs in file that will be conversation pieces in years to come. And the concluding hours of the 1965 ARRL DX Contest will speed such a project considerably. Speaking of conversation, let's quote the "How's" gang's random commentary on the state of the DX art: "Twenty was a DX ball in late '64!" — *W4IUM*. . . "December was a 160-meter disappointment to me." — *W9PNE*. . . "Lower-frequency bands continue to stagger and stumble along." — *K6JVF*. . . "December 20th was a most unusual short-skip evening on 28 Mc. with Venezuela also coming through." — *W2COT*. . . "Bands have varied from worse to worst." — *W7DJU*. . . "New 80-meter Vee disrupted my 7-Mc. beam pattern so I must raise and lower it on pulleys." — *W4ZKS*. . . "Gangway for my new quad and upcoming 700-watter!" — *W3HNK*. . . "After a layoff of years I'm back chasing DX, strictly on 40." — *W4ZWR*. . . "Forty's been mostly poor to every place but South America." — *W4ZFUL*. . . "The low end of 40 has enough DX to keep me busy." — *W6IWS*. . . "We sixes are at a geographical disadvantage for every area except the far east, even fighting the east coast for Oceania lately." — *W6MEQ*. . . "Good 14-Mc. openings to southern Africa in the afternoons." — *W3CON*. . . "They finally quieted the power lines outside my shack." — *W6ITM*. . . "I tried for a different century club in school, 100 yards per game rushing." — *W4WJ*. . . "My poor quad took a beating in winter weather." — *W4GVT*. . . "Short-skip openings around Europe have kept 15 meters popular here." — *GM3MCH*. . . "Fifteen entered 1965 in not-so-good shape." — *K6VVF*. . . "How's DX? Down here it's great!" — *W4GTS*. . . "No TVI worries here because 21 Mc. goes out before supper, 14 Mc. shortly afterward." — *W3YGR*. . . "Twenty's fine at night if you go for South Americans." — *K3SLP*. . . "Bands certainly erratic here — no telling when Europe will break through on 20, and the Pacific hardly shows at all." — *W45ABG*. . . "Winter 14-Mc. conditions somewhat better than the summer slump." — *W4ACZM*. . . "My 1-400As do the job if they ignore my QRP 2E26 final." — *W6EAY*. . . "Twenty has a dismal ring." — *W2ADP*. . . "Back at DX after a ten-year layoff and not doing bad considering conditions." — *1E3BTQ*. . . "Fun working lots of W/Ks on 40, 20 and 15." — *K42TP*. . . "Things are relatively good on 14 Mc. for Europe, but 15 meters has been poor except for occasional openings to





Africa." — *W6BCWD*. . . . "Twenty has been fair here for Europe in the mornings, for Asia and Oceania later in the day." — *WA0DGH*. . . . "Fifteen and 20 seem to be improving here." — *WA4TLB*. . . . "Forty's generally poor, 20 okay except for Oceania, and I almost gave up on 15." — *K8TVO*. . . . "Even 80 seems to be improving." — *W4ARKB*. . . . "What a difference a hot receiver and antenna can make!" — *K0ARS*. . . . "Signals get weak on 14 Mc. but DX is there for the taking." — *W1YNE*. . . . "Things are beginning to look up." — *WA6TGH*. . . . "Picking up here, too." — *W6YKS*. . . . So, on the 1945 upbeat, let's scan the situation on good old 20 this month, as promised.

20 phone, as depicted by *Ws 6FB 8FQA 8IBX 8YGR 8ZCC*, *Ks 3SLP 3ZOL 4MYO 4TWJ 8TVO 8JPL*, *WAs 2KSD 2FKL 6MIWG 6TGH 8PBQ*, *WBs 2CAN 2FVD 2JFQ 6CUU 6CWD 6MTA 6TAM* and *L. Stewart*, is replete with the r.f. of *BVUSG 0 GMT*; *CEs 9AG* (14, 120 h.c.) 23-0, *QZ1/mm*, *CN8BG*, *COs 7EC 8HO* (115) 14, *CP8AB*, *CM4s AAQ AW* (138) 23, *GRs 4AD* (110) 0, *4AJ 6DA 6JB* (102) 19-20, *6BX* (123) 20, *7GF* (120) 19, *CT1s JH* (120) 20, *MS* 18*, *EA9EO* (253) 16, *E16AL**, *ELs 21* 3C (100) 7, *8D* (242) 21, *3C** 21, *8B* (104) 21, *EP2AU* (248) 13, *ET3US**, *FBZZ* (118) 20, *FG7s XL XP* (123) 13, *XT FM7WQ* (100) 13, *FY7YL* (260) 11, *GDS 3GMH* (254) 13, *6LA* (181) 16, *HGs 10W* 0, *IRS 5EJ 5NV 8FN* 13, *Hs 3JBR*, *KXAB**, *4XEC**, *8AAD**, *8WSR*, *HK0s AI* (260) 15, *QA* (254) 19, *HM1AX*, *HFs 1AA* (115) 14, *1CN* 16, *1JAI 1JAIN*, *HRs 3CG 6CGA*, *16*, *HZ3TA* (100) 9, *1T1AT* (252) 14, *JAs 1CN 1CWP 1MJ 8AAB* 0, *KA2s LD RG WM*, *KP6s CS* 20-21, *EBN* (280) 7, *EPN*, *KCs 4USB* (300) 0-6, *4USU*, *4USK 4USN 4USX 6BK*, *KGs 1BO* 20, *1BX 1PR* (342) 21, *4AN 4CH* (333) 2, *6AJB 61F 6U 6SB*, *KR6s AF* (255) 23, *FQ* 0, *KV4BZ*, *KX6s BU* (340) 20, *BY*, *LX1s 1P 1A*, *SM**, *MP4s BEK* (115) 11, *MAH* (110) 14, *PBJ* (115) 14-15, *OA4s OS* (335) 16, *P1*, *OFs IACW**, *8UP* 21, *OX3s JV* 11, *LP MN* (112) 15-20, *P1L**, *PJs 2AA* 20, *3A** 21, *3AV** 14, *SV9s WF* (240) 18, *WGG* 13, *WR* (100) 12, *TFs 2WHI 3NA 3SG*, *TFs 6HC 9AA*, *Ts 4MA**, 20, *6CAL*, *TU2AE* (101) 22, *UA2AO* 13, *UBKKA* (125) 16, *UG6AW* (254) 13, *UI8AG*, *UJ8KAA*, *UM8FZ*, *UR2KA* (275) 13, *VKs 9DK* (270) 11-12, *9NT* (240) 9, *9X1 9DS*, *VO1s AE BJ* (11) 7, *VPs 2DU**, *2KR 5AZ* (190) 12-13, *7NS 9AX**, *9DG* (115) 7, *9FK* (100) 12-13, *VO8s AM* (123) 18, *BJ* (120) 16, *VR2EK*, *VS9s AHE* (60) 17, *AWR MB* (130) 17, *MG* (105) 17-18, *VU2NR* (120) 14, *W8HZB* (71) 22, *XE3JG**, 17, *XT2HV* (125) 18, *XW8s AU* (105) 0-1, *AX* (262) 13, *YN1H* (100) 13, *Y0CT**, 16, *YS1s HUK*, *MS SRD* (105) 13, *YU6AA**, *ZB2AK*, *ZC4GT*, *ZD8 5R* (107) 21-22 who is ex-*Z87R* (same QTH), *8JC* (100) 0, *8JP* 0, *ZEs IAC* (129) 22, *1B1 2JE* 19-20, *4JO 19*, *ZP5OG* 0, *ZSs 2MI* (110) 20, *3B 3BP* (272) 18, *3E* (113) 20, *3A2s BF* 13-14, *CO CP* (250) 14-15, *4H8U* 15, *4W1G* 15, *434FQ* (131) 21, *5H3s AC* 20, *JJ JR* (268) 20, *5N2JVC*, *5T5s AB* (295) 11, *AD*, *5U7AG* (249) 22, *5X5IU* (347) 19-20, *5Z4AQ* (115) 16, *601AU* (330) 22, *6W8AG* (108) 20, *6Y5s MJ UC* 22, *7G1s H* (106) 22, *L* (118) 19, *7O7s GN GS* (135) 17, *PBD* (117) 18, *9G1DY* 21, *9J2s FK* 19, *MI* (115) 16, *VB* (115) 16-20, *9L1JR* 21, *9Q5s AK EA* 21, *HP RG* and *9U5ID* 15, the asterisks indicating straight-a.m. senders.

20 c.w. receives the concentrated attention of *Ws 1ECH* 1TS 1YNE 3HNK 4GTS 4YLD 4ZSH 5AI 5VA 6BAY 6YKS 7DJU 7VRO 8EQA 8IBX 8YGR 8ZCC 9IEM. *Ks 3SLP 3UXY 3VPN 3ZOL 4MYO 4TWJ 8PY 8TVO 8ARS 8GSV 8JPL*, *WAs 2KSD 2SRQ 2W1J 4CZM 4UM 4KXC 4TLB 5ABG 5EQA 5HJK 5HS 5JEY 6MIWG 6TGH 6VAT 6WSN 8KEX 9PMQ 8PBQ 8JCA*, *WBs 2AYU 2CAN 2CON 2FVD 2JFQ 6CUU 6CWD 6TAM 6MEQ*, *VE3BQT*, *KA2TP* and *H8R*, obviously because of *AP5s CP* (10) 13, *HQ* (12) 13, *8loof* *BY1PK*, *CEs 8CF 9AB 6AG* (5, 10) 15, *GM1AR* (28) 17, *COs 2CO 2JB 6AH 8HB* (5) 22, *CNs 2AQ 8BU 8CB*, *CPs 1EA/5* (10), *5AB 5EZ*, old favorite *GX2AJ* (78) 23, *GRs 4BB 6AI 6EI 6GO* (10) 22, *6GV 7CD 7IZ* (37) 20, *8AB*, *CTs 2AL* (75) 19-20, *3AE 17*, *3AM* (55) 18, *DMs 2AND 2AUO 2BCA 2RBM 3DZM 3SMD 4LA*, *DUs*

5H3HZ closes down this Mbeya ham shack after a two-year Tanganyika tour. Chas. may head for other DX pastures after a short stay in England. Ex-5H3HZ particularly regrets missing Nevada for *WAs* on 14- and 21-Mc. c.w. (Photo via K1IGO)

1OR (70) 23, *1PAR 7SV*, *EIs 8H 9J*, *ELs 2AC* (11) 21, *2AD* (7) 23, *2AM* (25) 1-2, *2AQ* 20, *8X* (39), *EP2s BQ RC RV* (20) 8, *ET3s RN USA* (35) 18, *FB8s XX* (22), *YY 8*, *WVW* (44) 12, *ZZ*, *FG7s XC XP XQ XX* (22), *FK8s AH BE BG*, *FO8BJ*, *FR7s ZD ZG* (96) 18, *ZI* (80) 17, *FU8AG* (40) 7, *FY7YJ* 21, *GB2SM* (4) 17, *GCs 2FMV 3ECC* (49) 12, *4LI* (50) 18, *GD3FXN* (10) 13, *HAs 1KSA IVA IVE 3GF* (16) 16, *3AMB* 13, *5AT 5DF 5KFR 6KVT 8CF* (29) 20, *8CI 8KUC*, *HC1s LE* (20) 22, *1OW*, *H18s SCTE* (90) 12, *WSR* (14) 22, *XAL*, *HK0AT* (120) 21, *HL9KA*, *HM1AB* (18) 7, *HP1s BR IE MN*, *HR8AM*, *IT1AGA* (35) 15, *JAs* by the dozen including *4BZN 5GZ* 0, *5HD 6C4*, *KAs 2CM 2DF* (43) 23-0, *2LD 8VB* 1, *KCs 4USB 4USG 4USK 4USN 4USX* 10, *6BO*, *KGs 1AQ 4AM* (40) 22, *KM6CE*, *KRs 6BQ 6FY 6JZ* (3) 22, *6OJ 6TN 8CF* (23) 22, *KS6BN* (18) 3, *KV4AA* (81) 20, *KW6s EF EI KX6s HQ DB 4*, *LA2QJ*, *P*, *LJZD* (85) 14, *LUs IZC* (46) 22, *6ZM* 22-0, *LX3BD* (11) 12, *LZs 1SP 2VB MP4s BBL BEK 8-9*, *BEU MAH* (60) 13, *TBl*, *OD5LX*, *OR4VN* (37), *OX3AY* (20) 21, *OY7AM* (93) 13, *PZ1s AG BH* (9) 23, *CU 23*, *CP* (80) 21, *SLs 3AJ* (54) 14, *6AL 6BU*, *SV0WPP* (26) 20-21, *TFs 2W1O* 16, *2W1V 2WY 3AP 3KG TL8SW* (1, 55), *TN8AF* (17) 19, *TT8AM* (2) 19, *UAs 1KED 2AC* (16) 14-15, *2AK* (5) 12, *2KAW 2KBD* 14, *9ES 9FJ 9WS 9XG* (25) 18, *8BF 8BZ 8EQ 8GF 8GM* 0, *8KA* 20, *8KCA 8KFG 8KFK 8KFS* (17) 5, *8KKB 8KZW 8LL 8L 8LN*, *UB5s ES FJ KEU KFV* (32) 15, *K1X* (6) 16, *KKA KST LU* 13, *WO ZO*, *UC2s BF* (70) 20, *HE KAA VW*, *UD6BZ* (50) 11, *UH8s AA AE* (55) 13, *BO* (8) 13, *UO8s CQ* (80) 11-12, *CY*, *UM8AP* (11) 11-12, *UN1BB*, *UO5PK*, *UP2s HW KCA KMU* (10) 14, *NR* (70), *OO* 14, *PT*, *UO2s GA HT KBC* (15) 16, *KAX KCT* (18) 15, *UT5s BF PI KHV NG YC* (31) 20, *UW's 1OL 3FZ 8FK 8IK 8IP 8IR 8IX 1-0*, *UY5MG*, *VKs 4TF 6-7* of *Willis*, *9BW* (80) 7, *9RB 9*, *8FR* (50) 10, *VPs 1TA* (16) 22, *2KA 2KT* (10) 15-16, *5BR* (39), *6BW* (6) 18, *7BG 7NQ 7NT 8CW 8GY 8HJ* (25) 23-0, *8HO* (35) 4, *9BO* (7) 23, *98P* (60) 0, *9BY 9DC* 22, *9EP 9FU*, *VOs 8AI* (42) 18-19, *8BV 8BY 9HB* (15) 19, *VR2s DK* (44) 13, *EG FK BR*, *Vs 6FE 9AJF* (21) 19, *9ASP* (20) 20, *9NB* (60) 17, *9SJJ* (17) 15, *VO2s GW LE* 16-17, *MD* (25) 13, *XO* (15) 10, plenty of *XEs*, *YA3TNC* (20) 13, *YN1SL*, *YS1CN*, *YOs* and *YVs* in number, *ZB2s AT AK* (10) 10, *ZC4s DX GB* (60) 14, *ZDs 5R 8BB* (21) 20, *8FP 8RH 9AD 9RB* (50) 19, *ZEs 1AJ 1BA 1BF 1BK* (56) 19, *4JE 4JS 8JO 8JW* (30) 20, *ZPs 1S OG*, *ZSs 3RW 7M*, *48TNE*, *4UI1TU*, *4WIH* (2) 18, *4X4FU*, *5As 1TW 3TX* (5), *5R8s AB AM* (10) 18, *5T5AD* (6) 20, *5X5IU 5W1AZ*, *5Z4s IV* (65) 18, *JE* 21, *6Os 1AU* (16), *6BW*, *6W8AJ*, *6Y5MJ* (15) 20, *7Z3AB* (4) 13, *7GHJ* (22) 22, *9GAs AQ* (57), *FK*, *9J2s BC* (12) 19, *MI* *VB* (16) 22, *WR* (9) 19, *9K2AN* (49) 14, *9M2R1*, *9Q5s AB* 20, *HD* (13), *QH* (21) 20 and *9X5AB* (10) 21. Sixty-one 14-Mc. c.w. reporters and all this DX makes poor Jeeves shudder to



CR7LU gives us a typical OM's-eye view of a contest gal, the back of her head. Lucia's consistent multiband Mozambique activity gives her status as one of the world's outstanding lady amateurs. (Photo via W1YYM)

think what our mailbag will look like when conditions are no longer "unfavorable." May have to take a trailer on the Bandwagon!

Lack of space precludes a view of other DX band occupancies this month, but in the April column we'll do the job with the help of (15 c.w.) Ws 31NKK 4GTS 8YGR, Ks 35LP 60VF 8TVO, Was 2WJ 4TLB 5IIS 6VAT, WB6CWD, WNs 6KKM 7ASM 9NHQ, GM3MCH, I1ER; (15 phone) Ws 3HNK 4GTS 8IBX 8YGR, Ks 35LP 60VF 8TVO, Was 2WJ 4TLB 5IIS 6VAT, 2YLD 6CWD 6FMJ 6FRP, L. Stewart, W. P. Kilroy; (40 c.w.) Ws 1ECH 3HNK 4ZSH 7DJU 8IBX, Ks 5JVF 8TVO, Was 2FUL 2KSD 2WJ 2WOR 4TLB 5IIS 6VAT, Wbs XCON 6CUU 6ITM 6IWS 6MEQ, WN4WHLX, KAZTE, DL4LA; (40 phone) WA2W9W, WB6FMJ, XE1NKN; (80 c.w.) Ws 1SWX 4ZSH 7DJU, K3VFN, Was 2KSD 2SRQ 4OYO; (75 phone) W3HNK, XE1NKN, W. P. Kilroy; (160 c.w.) Ws 1BB 9PNE, Ks 6JVF and 8BPH. What, no 10-meter reports? Perhaps by the time our next deadline rolls around the 28-Mc. gang will speak out.

Where:

Asia — End of an era, gang — no more Army Post Office numbers in U.S. overseas military addresses. Zip-code digits take on added importance in the shuffle. For example, PEARL secretary KA2CM writes, "The dropping of APO numbers creates a change in our organization's address. As of the first of this year it is PEARL (A1), APO, San Francisco, Calif., 96525. It is imperative, to prevent mail delays, to make sure that the zip-code number is clear and correct." KR6JZ tells WGDXC's *Bullern* that APO, San Francisco, Calif., 96248, is the new-style Okinawa military address. "I am QSL manager for KR6JZ, for QSOs dating from December 9, 1964," notifies WA8ECH. "I send out cards as soon as I get weekly logs from Pete. Self-addressed stamped envelopes rate direct replies." WB6CWD joins the growing list of Stateside QSL agents. "I now handle U. S. QSLs for JAIKFQ, S.a.s.e. is appreciated; all others go via bureau." DL5FL advises, "I was KR6GA in 1963-64. Anyone still in need of a QSL for this operation can reach me via my K4AMC address." "I'm now QRT from Bahrain," says ex-MP4BEQ-5A3CJ, resting up in Scotland. "I have plenty of blank QSLs for both calls and I'll be glad to reply to all cards received. Answers will go direct if International Reply Coupons are supplied, otherwise via bureau." Via W2CTN, ZC4CZ advises, "QSLs for ZC4s and 5B4s may go via RSGB or via CARS QSL Bureau, P.O. Box 216, Famagusta, Cyprus. Current licensees are ZC4s AK BG CZ GB GT GY HK JU KF KW MO PF PR RA TJ and TX." Despite spurious propagational evidence, there is no ZC4G. "I've been QSL manager for VU2SO since his beginner days," notes W8QNW. "We have a very smooth QSL operation." Ex-HL9TS (K2UVU) states in NEDXA's organ, "An s.a.s.e. with five-cent stamp to Korea may take one or two months to return via surface mail. An eight-cent airmail stamp can sometimes get reply in three or four days." Anyone still needing a deserved HL9TS QSL should apply to K2UVU, 117 Shaker Rd., Albany, N. Y.

Africa — KI1GO hears from G3APX (ex-5H3HZ) that 5H3s GH HD HG HL JJ JJ JR JL JZ KA and KC are Tanganyika licensees as of late 1964. "Please tell the boys they can reach me for QSL inquiries through G2MI's RSGB bureau." "I have TLSSW's logs through June 2, 1964," affirms WIBPM, requiring s.a.s.e. from W/Ks, one IRC from VE/VO/XEs, and two IRCs from other DX points for reply. Syd apparently resumed his C.A.R. activity in November, so Dick expects more logs from TLSSW at any time. "Special QSLs will be issued for our March 13, 1965, field day," declares EL2AI, secretary of the new 42-member EL-Twos society. Ex-FA3OA, now F3OA, states, "U. S. amateurs needing QSLs for 1961-'62 FA3OA QSOs can apply for them through W4YWX or to my F3OA address. We have all logs." W3HNK, QSL aide to ZE4JS, 5As 3TX and 5TR, chides applicants who fail to include s.a.s.e. True, those who would seek favors by mail should consider themselves responsible for transportation costs. W8QNW, QSL rep for 5R8AD, brings us up to date on that arrangement: "Chris departed from Antsirabe about fifteen months ago for Paris. He told me he would work in the far east, perhaps Cambodia, with a possible trip to central Africa. Haven't heard from him, though, and 5R8 stations inform me he's not in Madagascar. Letters addressed to his home in France are unanswered. It's possible ex-5R8AD has been occupied with the installation of electronic equipment at some remote spot and has not received my mail. If I hear from Chris I will continue to manage his QSLing." W8QNW has no logs yet for purported 5R8AD operation last June and July. According to W9JQE, W2CTN has no QSL connections with one T38AL.

Oceania — "I QSL 100 per cent on receipt, as over 500 stations will testify," assures KS6BL, formerly K7VAX/KS6. WA6LED/KG6 discloses, "The call of Barrigada (Guam) Amateur Radio Club has been

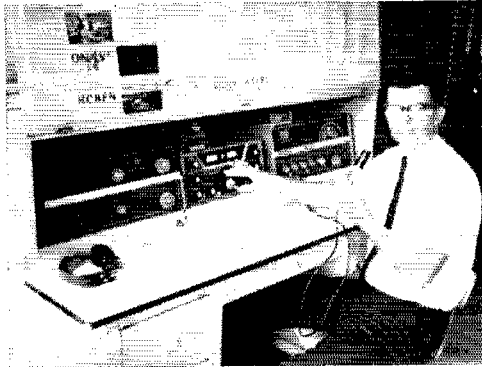
changed from KG6GX to KG6ALU. We will answer QSLs for either call sent to Box 116, NavRadSta (T), FPO, San Francisco, Calif., 96630."

Europe — "I receive cards through K6UTO or via the DL4/DL5 bureau," affirms DL4LA. "QSLing is 100 per cent using homebrew photo cards." Jim is WA0ISO back home but most of his Stateside DXing was done as K6SXX/4. "Fifteen-meter man GM3MCH says, 'QSL from here is 100-percent sure, no IRCs or stamps required.'" WA8GSJ observes, "Even though the Iron Curtain countries don't recognize International Reply Coupons, Russian and Czech hams appear to like them as an aid to obtaining operating awards and QSLs from other countries. One UB5 tells me, however, that incoming IRCs often fail to pass through their bureau." WIBPM doesn't rate the LZ gang among the world's fastest QSLers.

According to LA5HE via VERON's *DExpress*, current Jan Mayen LA5 2AJ 2QJ 3IJ 3P 4EJ 5AJ and 8FI, all 'p', can be QSLd via Norway's NRRL.

SOUTH AMERICA — "I am QSL manager for FY7YK." S notifies WB6KIG, recommending large-size s.a.s.e. with your application. "All c.w. QSOs with KC4USB from November, 1963, through November of '64 can be confirmed through W1UFW," reveals the latter. S.a.s.e., to be sure. K0JPL learns that W2CTN can confirm VP8HJ QSOs dating after December, 1964. The VP8 claims no QSL arrangement with SM5BLA.

HEREABOUTS — A doff of the "How's" hat to our "QSLers of the Month," nominated by correspondents for particularly pleasing punctuality in producing pasteboards: CO2HS, CP8AB, ET3USA, FG7XQ, FH8CD, FR7ZI, G3JQC, H1S 3AGS 8WSR, HK3RQ, HP1IE, JA7FS, Ks 6OZL/KP4 7LNU/3WS, KB6CS, KG4BQ, KH6SN, KR6s BF JZ OJ, KW6EI, LX3s AX BD,



KS6BL, formerly K7VAX/KS6, hunts DX on 14,340-kc. s.s.b. or 20 c.w. each Tuesday around 0200 GMT with a half-kw. HT-37/HT-41/TH-3/SX-117 combo or an auxiliary DX-40/S-108 outfit. Bill also serves Samoa neighbors through traffic schedules with western W/Ks.

MP4BEQ, OA4s FW CG, OE1GFW, ON5AX, PA8DV, SM2SU, TF2WU, TG9AD, TI2QKX, UW0JJ, VE8AU, VP8 1TA 2KR 2KT 2VI, VS9AWR, WA5IOZ/KH6, WP4CLL, XE1H, YN8 1MC 1SL 4JG, ZD8BB, ZE4JS, ZS7R, 5N2JWC, 5T5AD, 6O6BW, 7G1G, 9M4LP and 9Q5AB, as well as QSL agents Ws 2CTN 2YTH 3HNK 7ZMD 9WHM, Ks 3TVU 6EVR and DJ6SI. The applauders are Ws 4HZI 4NJF 8YGR 9EXE, Ks 1TZQ 3SLP 3VPN 60VF, Was 2SRQ 2TKL 4CZM 5ABG 6MWG 6VAT, Wbs 2AMO 2CAN and 6MEQ. Any swiftness we missed? *Help!* Perhaps you can assist the following italicized brethren in running down QSLs from holidays mentioned: *WIBPM, OY8KR; W8YGE, HB9AET/4W1, LA8 8FI/p 9MI/p; W9JQE, HR2HA '60, V6PWR '58, VR1A '63; K1TZO, FA8LJ '62, HH66D, TF2WLL, TT2PZ, UO5BM, UR2KAN, ZB1JF '62; K8MPY, 4X4FR '57; K3VFN, UB5LU; K8TVO, KT2AI '62, VP6FN, VP5RH, 6W8DD, 9G1FE; K0TRG, CO6XZ '61, HP1ED '63, JTICA '63, UL7FA '63, UP2KPT '63, VK9LA '63, VP8 1WS 2SL '61, 9M2GV '63; WA2TKL, CT2BO, EA6AY, VQ4ET, ZB2X, 3A2DE, 6W8AB all '62-'63; WA5IIS, CR6GS, ZP5ML, 6Y5UC; WA8AJI, PJ2MI, XW8AX; KAZTP, PY7AFN '58, VP5FP '60, VS9AC's Joe of '58. In sampling this service, remember that listed tardy QSLers should be reasonably rare and reasonably overdue. — Ks 1TZQ 3VPN 8HLR, WB2s CAN DXM and L. Stewart, RFD 2, Canisteo, N. Y., offer their labors as QSL aides for DX operators in true need of such assistance. "Anyone still deserving my QSL can get it through my home QTH," offers K6OZL/KP4, closing down in Puerto Rico with hopes of an Africa assignment*

... "I QSL 100 per cent," avers XE1TQ, specifying that incoming cards be sent only direct. . . . The new mainland manager for 6Y5AH QSLs is W1BPM. "I already have the cards from his former manager on hand. Alec will be sending logs every two weeks, depending on activity." W1BPM stipulates the same postal requirements outlined for his TL8SW QSL services in the preceding. . . . Now let's get down to cases, realizing that each of the following suggestions is necessarily neither accurate, "official" nor complete:

- GR4BC, Box 36, St. Vincent, Cape Verde Islands
 CR5AJ, Box 25, Bissau, Portuguese Guinea
 DL4LA (via K6UTO)
 DL5FL, J. Emery (K4AMC), Hq. Sq., 7030th CONWG, Box 764, APO, New York, N. Y., 09012 (or to K4AMC)
 F3OA, M. Lagrot, P.O. Box 95, Le Lavandou, Var., France
 ex-F3AOA (via W4YVX or to F3OA)
 FY7YK (via W6KIG)
 FY7YK (via W2MUM)
 HR1LM, Box 483, Tegucigalpa, Honduras
 JA1KFQ (via W6CWD)
 JT4KA, Purew, Bajnuldj, M.P.R.
 K4USB (see preceding text)
 K6AUSH, Navy 20, Box 35, FPO, San Francisco, Calif.
 K6ALU-K6G6X (see preceding text)
 K66IG (via W3KTY)
 KH6GMM/K6B6 (via KH6DQ)
 ex-K6G6A (to DL5FL)
 KR6JZ (via WA8PCH)
 LU5HBS 2CE 8ZE (via RCA)
 ex-MP4BEQ-5A3GJ, S. Gibbs, 11 Rowand Av., Giffnock, Renfrewshire, Scotland
 PY4BFX, P.O. Box 221, Juiz de Fora, M.G., Brazil
 TF2WIO, W. Dildone, ETNSN, Box 27, Navy 568, FPO, New York, N. Y.
 TZ2OKX, L. Boss (WA4QKX), c/o U. S. Embassy, San Jose, C. R.
 TL8SW (via W1BPM; see preceding text)
 TN8AF (via REF)
 TT8AM (via REF)
 TU2AU (to 601AU)
 VE8DR, E. Drake, P.O. Box 310, Yellowknife, N.W.T., Canada
 VP1FB, Engr. in Charge, Transmitter Site, Radio Belize, Belize, Br. Honduras
 VP2s DAA LS (to K1IMP)
 VP5BR (via VP5RH)
 VP8CW (via RSGB)
 VP8HJ (see preceding text)
 ex-VR2EJ (via NZART, attn. ZLIBBM)
 VR6CT (via W4TAJ)
 VS9ADF (via RSGB)
 YE1DDZ, C. Dela Barca 336, Mexico, D.F., Mexico
 XE1TQ, Dr. M. J. Graham, Independencia 188, Veracruz, Mexico
 XF1LM (to XE1LM)
 YV2AH, J. Vargas, Box 232, Merida, Venezuela
 YV4s FR ID, Box 18, Maracay, Venezuela
 ZD8BB, V. N. Sues, W7ZMD, 771 W. Pierson, Phoenix, Ariz.
 ZS8s E H (via SARL)
 ZS8G (via W2CTN)
 3A2CT (to G3KZI)
 4U1SU (to HB9SD)
 4W1H (to HB9ACD)
 5A5TR (via W3HNK)
 ex-5H3GC (to 9J2VB)
 5H3KC, Moshi, Tanganyika
 ex-5H3PYE (to 5Z4PYE)
 6O1AU, c/o U. S. Embassy, Mogadiscio, Somalia
 6W8AG, J. Andrivot, P.O. Box 5167, Dakar, Senegal
 6W8CB/mm (to FO8BK)
 6Y5AH (via W1BPM)
 9J2MI, P.O. Box 175, Lusaka, Zambia
 9L1JR, J. Richardson, Box 907, Freetown, Sierra Leone
- Your benefactors in contributing the preceding roundup are Ws 1VG 1WPO 2CTN 4GTS 4YLD 4ZSH 7UVR 8IBX 8YGR 9EXE 9GFF 9JQE, Ks 1IGO 1TZQ 3SLP 3VPN 5JVF 8TVO 9GZN 9JPL, Was 2OMR 2SRQ 4CZM 4DAA 5IIS 6VAT 8AJJ 8G8J 9CNS 9CNV, WB2CON, G3APX, XE1NIN, DARC's DX-MB (DLs 3RK 9PF), DX Club of Puerto Rico DXer (KP4RK), Florida DX Club DX Report (W4IKJ), International Short Wave League Mon-

itor (12 Gladwell Rd., London N. 8, England), Japan DX Radio Club Bulletin (JA1DM), Long Island DX Association DX Bulletin (W2FGD), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association DX Bulletin (K1SHN, W1BWP), Puerto Rico Amateur Radio Club Ground Wave (KP4DV), VERON's DXpress (PA8s FX LOU VDV WWP) and West Gulf DX Club DX Bulletin (W5IGJ). Have you fed the kitty lately?

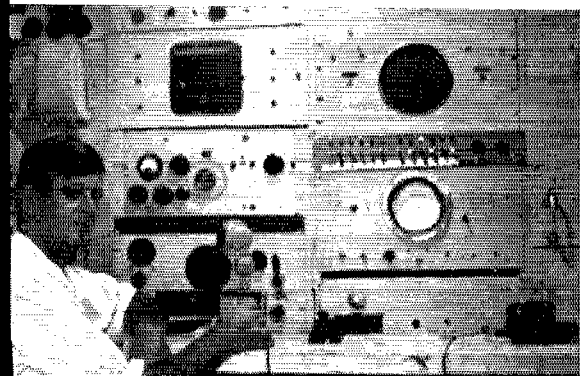
Whence:

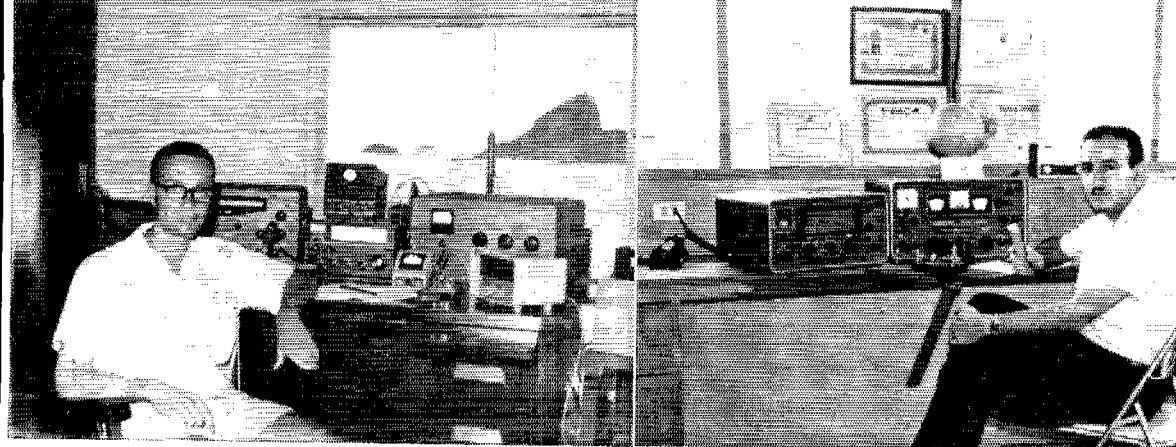
EUROPE — U. S. A. call area high scores in the 1961 Russian DX Contest were posted by Ws 2WZ 3JTC 4HKJ 5RRR 6LXC 7LNG 8SH and 9IOP. Other Yank entries in order of score were W3MR, WA6WTD, Ws 4FRO 9QWMI 3QLM, WA6WPG, W8YGR, K3CUI and W4EEO; no VEs appear. Other single-toppers around the globe in scoring order are Y09HC, UB5ZV, JA1VX, U05HM, UJ8AG, LZ1DZ, UH8AA, UA0VB, U18LB and UA4CI. Among multipierated stations UA3FA, LZ1KSY, 4U1TU, UA4KW, UM8KA, HA5KBB, UB5KAB, OK3KAG, UA1KGC and UA4KED scored in that sequence. W9IOP's QSO total of 195 almost doubled that of his nearest U. S. A. competitor, Marks, off the 8th and 9th of May on your shack calendar, dates for this year's U.S.S.R. DX stomp. . . . Final results of the VLEON (Holland) 1964 PACC DX Test, a c.w.-plus-phone affair, list only nine U. S. entrants in this scoring order: W1WY, WA1ANR, Ws 1CKA 3ADO, KA1EX, Ws 4HOS 4RLS 7DJU and K8NMG. PA8s LV PN and LOU finished 1-2-3 for the home team (45 Netherlanders filed logs). VEs 2IL and 3BWW won and placed for Canada, respectively. Other country leaders are CT1KH, DJ1VI, F8PK, G3EYN, G3W3AD, HB9QA, G6CF, LZ1RD, OH2BH, OK3CAG, OZ1LO, SM7BUE, SP8AP, TF2WIL, UA3UJ, UB5KBA, UC2AW, UD6KAR, UG6LD, UH8KA, UP2PT, UR2RCC, VK3TL, Y08JW and YU1BCD. Seven countries each produced as many or more entries than W/E-land. Let's do better in the 1965 PACC DX Contest scheduled to take place on the 24th-25th of next month. We'll supply necessary participation patter in April "How's". . . . DL7EN tells WIWPO that Ws 2JAE 3WJD, K1HVY, Ws 1WPO 9IOP and 4KXV came through with first-magnitude scores in that order for last year's WAEDC event. August 14th-15th (c.w.) and September 11th-12th (phone) are week ends designated by DARC for the 1965 WAE DX Contest. . . . WA-WOR finds IT1AGA especially interested in working New York's rarer counties on 20 or 40 c.w. . . . F2PY is widely worked on 80 through 10 meters with his hamspun 100-watt 6146s a.m. outfit, triple-con 15-tube inahler and TA-33-jr. launcher. . . . W1VG of ARRL hears that roving KP6AZ (W6PAY) hopes to try DXing from Andorra and/or the Balearics on his current eastward swing. . . . "G3SKH is very active on his favorite band, 80 c.w., and has worked all U. S. call areas except the seventh on 3.5 Mc.," reports W1WLZ. Cecil is a mathematics lecturer in Belfast. . . . G3M3ICH is a 21-Mc. c.w. addict who enjoys heading W/K/VEs, week ends on 21,050 kc. at 1400-1600 GMT. . . . "Arrived in Germany last July and finally received my application for hamming in November," writes DL4LA (ex-K6SXX/4). "No room for a decent antenna but I'm trying 20, 40 and 80, c.w. and sideband, with a long-wire lash-up." . . . W4DXC's Bulletin lists SV8s WFF WGG WKK WO WR WT available on Crete. SV8s WF and WQ on Rhodes.

ASIA — One of the most active Yanks in Japan now is A. KA2TP, recently W2BTQ/K1E, Turk writes, "New wire, 205 feet long and 100 high at the west end, works time on 7- and 14-Mc. c.w. while I clean and refinish my TA-33 Jr. We really have an active DX gang in FEARL. We're planning to put KA4US on the air some week end in the spring, and we'll have KA2USF on for DX and field day tests." KA2TP was commended for FEARL's 1965 presidency, so the KAs have another live-wire brassman. . . . JATPS makes all that 20-c.w. noise with a mere 20-watt 807, receiving with a BC-974. WA9CNS says Ko's secret is an on-the-nose 3-element quad. . . . WB2CON's friend K2HLZ took a 1-150 and 2B with him to Laos. . . . Marine radioop K2EYV/3 reminisces of his 1964 visit to India: "What really impressed me most about the VU2s is their over-all enthusiasm. Here in the States you meet an occasional ham who digs into every phase of ham radio but over there it's the rule. Attendance at their club meetings and on their h.f. and v.h.f. nets is good. Discussions are technical and spirited. VU2 amateur radio seems to me to be right along the lines of I.O.M." . . . Now courtesies of the clubs press: BY5MJ is occasionally peeking out on 7002 kc. at 1100 GMT. . . . K2JGG/JY's December Jordan jaunt gave 2600 juicy QSOs to DXers in some 100 countries. "I stayed at the Jerusalem Intercontinental

ZK1AA's busy routine as a local club leader, electronics instructor and commercial radio engineer restricts his DX activity. Stuart coaches a batch of budding ZK1s at Rarotonga. (Photo via W6OFF)

QST for





PY1MCC (left) and HK4EB are South American favorites well heard up our way. Rod runs a beamed kw. near Rio and prefers c.w. on 20 and 15 meters. Gus turns in top contest scores from Medellin, favoring the phone approach. (Photos via WABGSJ and W1YYM)

Hotel on the Mount of Olives where the temperature was a springlike 50 to 65 degrees. . . . Shipboard W4RXY/V89 works into the U. S. A. handily from the Aden area, 21,430-ke. sideband. . . . Z73AA says an outflux of foreign nationals may soon ravish Saudi Arabia. . . . NW8AZ intends to add a quad to his S-line for 1200-GMT 20-meter work. . . . ALP4BEK means to sign MIP4MAV in Muscat this month, particularly on 7012 kc. at 2000 GMT. . . . Ex-HL9TS (K2UVU) may get back to Korea later this year.

AFRICA — Ex-5H3HZ (G3APX) files some parting remarks about the current state of DX in Africa in a letter to KI1GO. "I was at Albeya for two years. Enjoyed the stay and the operating although conditions in 1964 were not good. In fact 14 Mc. seemed to be the only band regularly open. In 1963 fifteen meters was very good but not last year. I worked about 200 countries and all states but Nevada. Forty would have been better except for the shocking amount of QRM from Congo missionary stations. This usually doesn't clear up until midnight. I have no information on ex-VQ1AN. Ex-VQ1MH may now be in 9M8-land. 5H3s GC IP IW JP PBD and PYE have left Tanganyika, and 5H3HD was preparing to depart when I left for England. . . . CR7CO wants to arrange an exchange of Portuguese East Africa postage collectors' items for a TA-33 beam. Any philatelist in the crowd? . . . KI1QHP (L8AK) of ET3USA is told officially from Nairobi that "the Kenya Government does not allow the issue of amateur licenses to temporary visitors," so no 5Z4 QSOs by AL. ET3USA usually emits c.w. around 14,040 kc. . . . 6N2JWC is shutting down for a new assignment, according to W4H2I. . . . ZE1BK tells K0JPL of yearnings for Nebraska and South Dakota QSOs on 20 c.w., while 5R8AN hungers for Rhode Island. WA2OMR finds the latter on 14,015-ke. c.w. at 1800 GMT or so. . . . ZD8BB (W7FFF) works at the RCA tracking site on Ascension," informs W7ZMD. "He should be there until June with a Globe Scout, 2A and dipole." . . . W5SS8s B and H had their share of DXpeditionary troubles," says W4YGR. "Their beam was bent out of shape and conditions were poor. . . . EL2 stations plan to clobber 7010, 14,020, 14,290, 21,030 and 21,300 kc. on the 13th of this month with a field day from 1200 to 2100 GMT. This from EL2AI who gives advance notice of an operating certification being prepared on the basis of QSOs with each of Liberia's nine call areas. . . . W1VG tabs wandering KP4AZ (W6FAY) as a fresh 1fni aspirant. . . . Via club literature: 608 1AU (TU2AU) and 6BW may combine talents for more Africa DXursions. . . . TTRAM's s.s.b. sometimes shows on 14,252 kc. after 1900 GMT. . . . Following six months in England, ex-VQ1GDW (G3NUP) hopes for another DXotic assignment.

OCEANIA — "I'm doctor for the Navy facility here at Chichi Jima and enjoy operating KG6IG," writes K3HPS-K7ZOC. "A Navy radioman helps run the KWM-2 and dipole. We hope to get Conditional licenses for several others. To our knowledge there are only three other KG6I-stations at present, two on Iwo Jima and one on Marcus." John expects to have a linear final and triband beam going at KG6IG shortly. . . . K5JVF and WA6VAT found KH6CMM/KB6 hoping to do VRI and/or a few other rare Pacific stops after his January Canton caper. . . . The Goehes of yacht *Danne II* and 6W6CB/mm, now signing F08BK, are hitting out to continue their round-the-world voyage started from Dakar some four years ago. K0s GZN and GZO hear from Claude and Claudine. "We ordered a new s.s.b. transmitter and may ask for a Wallis Island call. We intend to leave Tahiti in May. Once at sea we will make many contacts on c.w. and voice." . . .

K2YFE, trying the game as a Fairbanks KL7, is casting covetous glances at Kure Isle, while K8BFH would sail his ketch to FO8 this autumn. . . . KS6BL (K7VAX/KS6) rounds out his first year in Samoa still hunting high and low on 20 phone and c.w. for Miss., Vt. and W. Va. "I plan to operate for two hours every Tuesday afternoon around 0200 GMT to accommodate KS6-seekers. I normally use the big station at Mapusaga High School next door to my home. In the evenings I try 20 c.w. with my own smaller gear. American Samoa now has about ten active amateur stations so KS6 QSOs aren't as rare as they once were." . . . WB6MEQ (ex-WA9ICQ) is impressed by the size of KH6SN's ham family, five calls. "VK/ZLS seem much rarer here on the west coast than at WA9ICQ. Will someone tell me why?" . . . WN3AOS tackled last month's Novice Round-up from the key at KM6CJ.

Noted by the clubs and groups newshawks: ZL4JF's new Kip puts the Campbells on 30-watt s.s.b.-14,235 or 14,315 kc. at 0900-1300 GMT. . . . Gunshy Willisite VK4TE fits between 7022, 14,063 and 14,118 kc. sometimes using a.m. on the latter. . . . A new linear courtesy W2GHK & Co. should permit Christmas islanders VK9s DR and XI to operate c.w. and s.s.b. simultaneously.

SOUTH AMERICA — PY1MCC's dad is old-timer SPY1HZ. Rod enjoys c.w. and leaves mike work up to the OM. He writes WA8GSJ that U.S. radio literature is exceptionally difficult to obtain in Brazil. For example, the cost of a 35-cent magazine down there is equal to fifty street-car rides, or seventeen movies, or four good meals in a high-class eatery. . . . KC4USK's Wes dropped into Yonkers for a recent visit with W2GRS, K2s AQM1BW and WA2HDA. . . . ZP9AY joined the 160-meter DX circus with a bang in January, scoring with W1BB on the 11th after a warm-up QSO with PY1NFC. VP3CZ is another South American available for our 1.8-Mc. WAC. . . . Further far-south tidbits via club journals: The 18-station-strong KC4 antarctic gang, aided by VP8s CW GJ and HK, regularly represent the white continent on 20 at 0800-1000 GMT. . . . PY4s ND and OL hope to follow their Trinidad trip with a Collins-and-vertical visit to PY7ID's Fernando de Noronha hideaway where the latter normally sticks to 15 meters.

HEREABOUTS — Long Island DX Association's first annual DXCC contest, a one-year DX marathon under way since clocks struck twelve last December 31st, gives additional impetus to multiplier-hunting in this month's closing week ends of the 1965 ARRL DX Test. Young squirts will never have a better chance to give the veteran Honor Roll mob a long-haul trouncing. . . . Ws 2BAK 28KE 3ASK and ex-CX4AP team up to produce the *Radio Amateurs' Notebook* over Voice of America transmitters on almost every short-wave broadcast band Sundays at 0730-0745 and 0845-0900 GMT, Mondays at 0330-0345, Ex-CX4AP emcees the Spanish version at 0410-0425 and 1245-1300 on Sundays. Reception reports sent to Amateur Radio, Box 922, Washington, D.C., 20004, are honored by distinctive QSLs. . . . K8YCI/4 says the "KWM-2" in our January H81X photo is almost a dead ringer for an NCX-5. . . . OT W2ADP is weakening, wondering if he should replace his hambrew 125-watt 811 exhaler and 7-tube. . . . peaked for 14 Mc." superhet with factory stuff. Lee's favorite antenna is a folded dipole hung between two rocking chairs in the attic. With the right type of furnishings you, too, might reach 255 confirmed. W6EAY describes the homebrew DX approach of his friend and recent Silent Key W6EA: "Howard worked his 130 countries with a simple 47-46-20 QST rig of long ago, later revamped with an 807 final, and he had only one crystal.

(Continued on page 152)

The World Above 50 Mc.

1215-1300 2300-2450 3300-3500 4650-5925 10,000-10,500 21,000-22,000 30,000-9

CONDUCTED BY SAM HARRIS,* W1FZJ

Communication and the V.H.F.

ONCE upon a time in the far distant past a v.h.f.er was an island by himself. There wasn't any OES. There wasn't any "World Above 50 Mc." His contemporary literature assured him that his world was limited by his horizon. He didn't know nor care what someone half way around the world was doing. He was an island and he stood alone. Nowadays things are different. 50-Mc. WAS is an accomplished fact. W0BFB has worked forty-three states on 144 Mc. Continents have been spanned and oceans bridged on all the v.h.f. and u.h.f. bands. If I want to ascertain how VK3ATN is doing on his new 30 foot parabolic reflector, I have only to call him at the appointed time on 40 meters. If I worry about the new paramp that DL9UG is building for the Swiss 1296-Mc. program, the answer is forthcoming on schedule with HB9RG on 80 meters. Is there any hope of KP4BPZ getting on 432 Mc. this Spring? 14.300 Mc. at 2100 GMT will net the answer. In fact communication with any country in the world is accomplished with the greatest of ease. Unfortunately, the local scene is not so readily probed. The question concerning the status of W4HHK's moonbounce program requires the aid of the United States mail. Information from W9GAB is available on a bi-monthly basis provided he is properly prodded. W6DNG's schedules remain a deep and dark mystery for all concerned. W4GJO is making a tremendous effort to activate the 420-Mc. band in his area but the information is only available the hard way, through the mailman. Now, we've gone down this road before and on our last trip we netted an absolute zero. I want to know why I can't talk to W9WOK on some reasonably repeatable basis. I want to know why W4FJ is hidden away on two meters and cannot be reached by way of any of the low-frequency bands. I want to know why I cannot get a message to Shelby Ennis short of the United States mails. I want to know why W6DNG can talk to Finland on two meters and can't be reached from Massachusetts on any other band. To put it bluntly, progress on the v.h.f.-bands is being considerably hampered by a deplorable lack of communication which is readily available on the lower-frequency bands. After all, what other useful purpose do the low-frequency bands serve but to provide communication for the expansion of the v.h.f. and u.h.f. worlds. Frequencies presently in use by the world-wide, sideband v.h.f.-information channels are 14.278, 7.214, and 3.820 Mc. Recommended operating procedure is to monitor during the first five minutes

*P.O. Box 334, Medfield, Mass.

of the even hour on the appropriate band for the time and distance. For instance, VK3ATN is on at 0800 GMT on 7095 listening on 7214. Or, HP9RG is on 3795 listening on 3820 at 0400 GMT on weekends only. Or, KP4BPZ monitors at 2100 GMT on the 14-Mc. band. W6YK monitors the 40-meter frequency on weekends at 0800 GMT. Now these are sideband frequencies which have been successfully used for the past several months in establishing communication on a world-wide basis. If you are not willing to go the sideband route and wish to operate c.w., some suggestions should be forthcoming as to what frequency on what band at what time you would be available. No one is going to set up an automatic information net without your help. How about it?

ARRL Delta Division Convention

The ARRL Delta Division Convention to be held in Memphis, Tennessee on March 26, 27 and 28, will have a lively v.h.f.-program chairmanned by W4HHK. Helen and I will be there with films and tapes and surely hope to see you there also. Details on preregistration can be obtained from Paul, W4HHK at 226 Peterson Lake Road, Collierville, Tennessee.

Midwest V.H.F. Meeting

W0CUC, K0CER and K0FJJ and K0SJZ are co-sponsoring a midwest v.h.f. meeting at Sioux Falls, South Dakota on April 10 and 11. If I miss seeing you at the Delta Division Convention, I will look forward to seeing you at this v.h.f. get-together. Details on preregistration are available by addressing Midwest V.H.F. Meeting, P.O. Box 400, Sioux Falls, South Dakota 57100.

144 Mc. and Up

Meteor showers and improved techniques of operating during the showers are slowly but surely bringing the serious two-meter boys closer to that coveted FIRST WAS on 144 Mc. Big news along that line this month is the fact that John Hinegardner, W0BFB of Mitchellville, Iowa, now leads the pack with 43 states worked on 144 Mc. On January 3, 1965 during the Quadrantids, John worked K7ICW at Las Vegas, Nevada to obtain this startling two-meter total. Congratulations, John! Keep up the fine job! Although not yet listed in the box, K0CER out South Dakota way is slowly working his way in that direction. Bill sez that he worked his first three m.s. contacts during the Geminids when he worked K4MHS and K4QIF in North Carolina, plus W4FJ in Virginia. "After trying since August to make a m.s. QSO, my hat is sure off to the guys who have the big totals, they've earned it." So sez Bill who now has a total of seven states worked in three call areas on 144. The Quadrantids shower peaked on January 3 for K0CER when he worked W4VHH and heard several bursts from K4LXC who was skedding W0EMS. He goes on to say that good tropo conditions occurred on

Sarasota's gift to 50 Mc., W4GJO. Grid is presently engaged in pushing 420-Mc. activity in all directions. Note homebrew 420-Mc. converter on top of monitorscope.



December 30th when he heard W0QDH in Kansas and W0IDY in Iowa, both stations over 300 miles away. Tropo conditions went wild on January 6th when Bill worked a number of stations in Kansas, Oklahoma and Indiana and heard W8KAY and W9MAL. K0CER is now running 500 watts and 16 elements on 144 Mc. and is open for meteor scatter skeds. Sez he is 300 miles closer to the east coast than Bob, W0ENC (who has thus far provided South Dakota contacts on 144 Mc.) but Bob has the same advantage toward the west. Another 0, this one from Missouri, writes that he, W0DQY has upped his two-meter total to 27 states in 8 call areas. Smitty sez that s.s.b. has it all over c.w. when it comes to scatter skeds. He'd like skeds with stations on two meters in Maine, Vermont, New Hampshire, Rhode Island, Maryland and Delaware. So you fellows in those states who are scatter conscious, get in touch with Smitty.

Some interesting comments from Hank, W8IFX, who recently brought his two-meter total up to 39 states in 8 call areas. "I think the guys miss a lot of bets by not trying m.s. skeds during non-shower periods. Ran m.s. sked with K4LXC for a couple of months every night and had several QSOs. Was real surprised to make it with K6TQP during December but it was such a squeaker that we decided to try again in January when Fred was going up on the mountain. We both got calls in the first few minutes of the January sked for full 30-second transmissions on several occasions." Out in Michigan, W8PT agrees that the Geminids shower was pretty good even though he didn't do anything. During random tuning on 144 Mc. during the Geminids, Bill heard both W0EYE and W1JSM keeping skeds with W9JFP and W9OH respectively. At times he could hear one station, at other times the other station and quite often he heard them QRMing each other. The showers have also been good to K7NII in Arizona who now totals 8 states and 4 call areas on 144 Mc. The first Nevada/Iowa QSO on 144 Mc. took place on January 3rd when Al, K7ICW, and W0BFB, John, made a go of it on scatter after an hour and thirty-four minutes of trying. This was Al's first m.s. contact after four years of trying and makes it 4 states worked for him. We keep receiving cards from John, W5UKQ telling us to move him up in the states worked box for 144 Mc. Within the past couple of weeks John has worked K5TQP for #21, K5DSM for #22, WA0FDY for #23 and W0ENC for #24. Now we're watching the mails to make sure we don't miss notification of #25. Keep going, John! The Geminids didn't add to K5TQP's score but the Quadrants did when he worked W8IFX for #21 and W0IFO/5 in Oklahoma for #22. Fred agrees with K7ICW in that the Geminids were very poor this time round. South Dakota and Alabama are the new states worked by K4QIF during the Geminids and makes it 27 for Howie. At Orlando, Florida, W4MNT sez everyone is asking "What happened to the Geminids?" Although George didn't have too much luck during the Geminids he did manage to nab W4FJ for #26 and in the Quadrants worked K30BU for #27. M.s. skeds with K0CER kept by Ted, W4FJ gave him #27 and a completed QSO with W4MNT in Florida. Ohio and Michigan were the last states worked by Joe, K30BU making his score 19 states in 7 call areas. New Jersey also is represented in the states working m.s. on 144 Mc. Bob Larkin, W7PUA/2, brought his total up to 23

220- and 420 Mc. STANDINGS

220 Mc.				420 Mc.			
W1AJR	12	4	480	W1AJR	12	4	410
W1AZK	9	3	412	W1BU	11	3	390
W1BC	14	5	600	W1HDQ	10	3	250
W1BDQ	12	5	450	K4LIX	9	3	230
K1JLN	11	4	615	W1MPT	8	3	170
W1OOP	12	4	400	W1OOP	11	3	390
				W1QWJ	10	3	230
				W1UHE	10	4	430
W2AOC	15	5	530	W2AOD	6	4	290
K2ANQ	9	3	240	W2BLV	12	5	360
W2BAH	13	7	167	K2CBA	8	4	220
K2CBA	13	7	660	W2DITZ	6	3	200
K2DIG	4	3	140	W2DQZ	10	4	196
W2DWJ	15	5	740	W2DZM	15	3	130
W2DZA	12	5	410	K2DZM	10	4	390
K2DZM	12	5	400	W2RGGZ	9	4	260
K2BSA	11	4	300	W2RUS	7	3	130
K2ITP	10	5	265	K2GGA	4	4	383
K2ITQ	11	5	265	W2HFE	8	4	280
K2JTW	6	3	244	K2KIB	4	4	100
K2K1B	12	4	300	W2LWY	3	2	100
W2LRJ	10	4	250	W2OTA	10	4	300
W2LWY	12	4	400	K2UUR	9	3	280
W2NTY	12	5	300	W2VCG	9	4	280
K2PPZ	11	4	400	W2YPM	6	3	300
K2QJQ	13	5	540	W2ZTV	5	3	140
K2SEU	12	5	450				
K2UUR	6	3	210				
W3AHQ	4	3	180	K3BLC	9	4	250
W3FE	11	5	350	K3BOF	6	3	250
K3IUV	9	3	310	W3FEY	8	4	296
W3JYL	8	4	295	K3IUV	8	3	310
W3JZI	4	3	250	W3RUC	5	2	410
W3KKN	10	4	255	W3RZD	5	4	300
W3LCC	10	5	300	W3MIV	5	3	240
W3LZD	15	5	425	W3UJG	4	2	350
W3RUE	10	5	480				
W3UJG	13	5	400	W4HHK	9	4	550
W3ZRF	5	4	112	W4TLV	8	2	500
				W4FRF	5	2	665
K4TFU	8	4	400	W4TLV	4	2	500
W4TLG	5	1	315	K4QIF	3	1	210
W4UYB	7	5	820				
W5AJG	3	2	1050	W5RCL	14	4	725
W5RCL	8	5	700	W5AJG	6	2	665
				W5HTZ	5	3	140
K6GTG	2	1	240	W5SWV	7	3	525
W6MIV	2	2	225	W5UKQ	3	2	500
W6NLZ	3	2	2540				
K7ICW	3	2	250	W6FZA	1	1	280
W7AGO	2	1	160	K6GTG	1	1	180
				W8TYY	9	5	580
K8AXU	11	5	1050	W7LHL	2	1	180
W8IJG	9	5	475				
W8LPD	6	4	480	W8PT	11	5	400
W8MRM	8	4	390	W8IFX	8	3	470
W8PT	10	5	660	K8AXU	5	3	660
W8SVL	6	4	540	W8HCC	3	2	355
				W8HRC	3	2	250
W9JCS	6	2	320	W8JLJ	6	3	275
W9JEP	9	4	460	W8MRM	3	2	390
W9OVL	6	3	475	W8RQI	6	3	270
W9UED	4	4	605	W8UST	3	2	25
W9Z1H	10	5	900				
K0DGU	5	3	425	K9AAJ	9	5	425
K0ITF	6	3	515	K9ITF	9	5	390
KH6UK	1	1	2540	W9AJG	8	4	325
VE3AB	7	3	450	W9GAB	9	4	608
VE3BPR	3	3	300	W9J0J	6	3	330
				W0IDY	7	3	430
				K0ITF	3	2	158

The figures after each call refer to states, call area and mileage of best DX.

states worked when he worked W0DQY during the Quadrantids. W4AWS reports a Quadrantids contact with W2AZL on January 3rd with Carl running only 30 watts. This brings Art's total up to 13 states in 5 call areas. Here in Massachusetts, W1JSM reports on the Geminids that he worked K4SJF in Georgia, W9OII in Wisconsin and W0DQY in Missouri, making his score 25 states. Don sez that east/west conditions were very poor during the shower.

From New Jersey WB2KEL writes of good conditions on 144 Mc. the night of December 22nd. John reports that Maryland and the New England states were coming through and that the weather condition was warm (68°). WN2MAJ, also in New Jersey, notices that on colder days and nights he is able to work out farther. Wayne would like skeds with stations in 1 and 4 lands on 144 Mc. Bob, WB2DDA is back on 144 Mc. running 50 watts to an 8-element beam. He has worked 8 states so far with 8 confirmed. Back again on 144 Mc. soon is K3QCQ who is working on an s.s.b. mixer and will also be available for c.w. skeds on 141 Mc. December 29th was a good night according to Lee, K3QAX who worked W1HDQ, W1JZD, K1AGB, W1MEH and W1AZK on 144 Mc. on c.w. In Florida W4AYV and W4AWS noted good conditions on December 28th and 29th. Art, W4AWS reports a number of Georgia and North Carolina stations coming into Florida. Nat, W4AYV sez he got back on two meters on Christmas day after a long absence and the opening of the 29th was quite welcome to him. He heard W1MEH and W2AZL and W2LVQ plus a number of 4's in Georgia and North Carolina. Shelby Ennis, W4WNH, sez he has a negative report on the Geminids. Didn't hear a single burst! However, on the morning of December 13th, Shelby found someone on 144.113 and got the call W0IDY. "Never did find out who he was after and did not make a contact with him either." Frequency at W4WNH is 144.099 Mc. for all skeds. In Oklahoma W5WAX sez there isn't much to report as activity has dropped quite a bit. Sam would like skeds on 144 Mc. He's running 150 watts, c.w. and a.m. WA6ROJ at Ukiah, California writes to tell us that there is always someone monitoring 145.35 Mc. in that area monitoring for mobiles passing through. Bob, K8PBA at Ypsilanti, Michigan also reports the opening of December 28. During the late hours on the 28th and early morning of the 29th Bob worked stations in Indiana, Mississippi, Tennessee and Kentucky. In Ohio K8TUT reports good ground-wave to Tennessee on December 27th, and K8YWF worked stations in Michigan and Illinois using a twoer. Larry, K0JWN tells us that WA0EEU is now running a new 80 watt p.e.p. s.s.b. rig on two meters; that WA0JSA has two stacked 6-element beams on two. He also reports a contact with K0A0B in Garnett, Kansas on December 21st with both ends of the contact using twoers. K0FPC sez that all his fun has been with 144 Mc. mobile work recently. Bob reports that K0JWN and K0FPC are using twoers with single ring halos; WN0JMC runs a Communicator IV to a whip (halo on the way); W0DBU has a Twoer and power supply and 19-inch whip.

W5SLL/p would like us to mention that 146.34 Mc. is the calling frequency to repeaters. Roy sez this is generally accepted across the country as another general frequency.

Jack, W8PT kept skeds during the Geminids on 220 Mc. with K7NII and W0EYE. Nothing was heard from K7NII but complete calls were received from W0EYE. However, no contact. The 28th of December did produce a new state for Jack on 220

2-METER STANDINGS

W1REZ	..32	8	1300	W5WAX	..11	5	735
W1AZK	..28	8	1205	W5VY	..10	3	1200
W1JSN	..25	7	1330	W5HEP	..9	3	1000
W1AJL	..25	7	1150	W5EJZ	..5	5	1375
W1KCS	..24	6	1150	W5YVO	..4	4	1330
W1MEH	..24	6	1000	W5CNH	..6	3	1200
W1MMN	..22	8	1200	W6WSQ	..15	5	1300
W1HDD	..22	6	1020	W6N LZ	..12	5	2540
W1IYZ	..20	7	1080	W6NLC	..9	5	1340
W1AFO	..19	6	920	W6HMS	..8	5	1010
K1CBO	..19	6	800	W6AJF	..6	3	800
K1AFR	..17	6	675	W6ZL	..5	3	1400
W2NLY	..37	8	1390	W6KAP	..5	3	1300
W2CXY	..37	8	1360	W6GTF	..4	2	800
W2SRI	..37	8	1320	W6MIU	..3	2	950
W2RIV	..36	8	1020	W7LHL	..10	4	1170
K2LNG	..32	8	1200	K7NII	..8	4	1220
K2GQI	..35	8	1365	W7CJM	..5	2	670
W2AZL	..29	8	1050	K7ICW	..4	3	1236
K2IFJ	..27	8	1060	W7JIP	..4	2	900
K3CEH	..25	8	1200	W7JU	..4	2	235
W2AMJ	..25	6	950	W8PT	..40	9	1260
W2ALR	..24	8	1100	W8KAY	..39	9	1210
W2RXG	..28	8	1200	W8IFX	..39	8	1225
W7PUA/2	..23	8	1150	W8SDJ	..37	8	1275
W2APZ	..23	7	1200	W8XU	..34	8	1375
W2SMX	..23	7	1090	W8SFG	..34	8	1040
W2LWT	..23	7	1050	W8NVE	..33	9	1155
K3HOD	..23	7	950	W9LOF	..32	8	1060
W2DWJ	..23	6	860	W8GGH	..32	8	1180
W2PAU	..23	6	753	W8BAJ	..32	8	960
W2E8X	..21	6	750	W8TLE	..32	8	910
K2KIB	..21	5	700	W8NOH	..31	8	1090
W2LW	..21	5	890	W8EHW	..31	8	860
W2WZR	..19	7	1040	W8SVI	..30	8	1080
W2RGV	..19	8	720	W8EHW	..30	8	860
WAZEMA	..19	6	1010	W8HPD	..28	9	850
WAZPE	..18	6	750	W8CRS	..28	8	680
W2BLG	..17	6	960	W8WRN	..28	8	680
W4ACY	..17	6	720	W8DX	..26	8	720
K2OEL	..16	6	1010	W8WEN	..25	8	800
WB2CCO	..16	6	780	W8WV	..25	8	940
K2JWT	..16	6	550	W8WMI	..25	8	900
W3RUE	..33	8	1100	W8GFN	..25	8	540
W3SGA	..31	8	1070	W8LVC	..22	7	680
W3GPK	..31	7	1180	W8RLN	..21	7	610
W3TDF	..30	8	1125	W8GTR	..17	7	550
W3KCA	..28	8	1110	W8NRM	..17	7	550
W3BYF	..28	8	1070	W9WOK	..42	9	1170
W3RSH	..22	8	1110	W9KLR	..41	9	1160
W3RST	..22	8	800	W9UIF	..41	9	1150
W8LNA	..21	7	720	K9AAJ	..36	9	1200
W8NKM	..20	7	730	W9AAG	..35	9	1050
W8LZD	..20	7	650	W9GAB	..34	9	1075
K30BU	..19	7	930	W9OD	..32	8	1030
W3AHT	..19	6	600	W9REM	..31	8	850
K30BU	..17	7	930	K9SGD	..30	8	1100
W8HHC	..16	6	550	W9ZIH	..30	8	830
K3CFA	..16	6	500	W9PPB	..28	8	820
K3HDW	..12	6	1015	W9LYC	..27	9	950
W4HJO	..39	8	1150	W9OJL	..27	9	960
W4BLE	..35	9	1290	W9LFA	..26	6	1000
W4WNE	..35	9	1350	W9ZHL	..25	8	700
W4LTV	..34	8	1160	W9BPV	..25	7	1030
W4ZNL	..34	8	954	W9CTV	..24	7	1000
W4MCK	..34	8	1149	K9AQJ	..24	7	900
W4AO	..30	8	1120	W9VDD	..23	7	900
K4LNO	..29	8	1255	W9LFE	..22	7	825
W4MNT	..27	8	1170	W9KPS	..22	7	690
W4KJ	..27	8	1050	W9ALU	..18	7	800
K4QIF	..27	8	1000	W0EFB	..43	9	1350
W4IVA	..26	8	1000	W0EPE	..32	9	1040
W4FQM	..25	8	1040	W0HID	..31	8	1030
W4HFR	..24	9	820	W0SMJ	..29	9	1075
W4TLV	..23	7	1000	W0QDH	..27	9	1300
W4JJC	..23	6	725	W0DQY	..27	8	1100
W4RMU	..21	7	1080	W0ENC	..25	6	1225
W4OLK	..20	6	720	W0RTU	..23	7	901
K4YVT	..20	6	720	W0MOX	..23	6	1150
W4LNG	..19	7	1080	W0IC	..22	7	1360
K4MHS	..20	5	800	W0DZH	..21	7	1170
K4VWH	..18	6	590	W0TGC	..21	7	870
W4MDA	..17	6	775	K0TTF	..21	6	940
W5RCL	..39	9	1280	W0NLI	..21	6	830
W5AJG	..35	9	1360	W0JAS	..19	7	1130
W5YJZ	..29	9	1275	W0AZT	..18	7	1100
W5JWL	..29	7	1150	K0AQJ	..16	6	1120
W5DFU	..29	9	1300	W0IFS	..16	6	1100
W5PZ	..28	8	1300	VEICL	..5	5	800
W5LPG	..25	7	1000	VE3DIR	..37	9	1300
W5HQA	..24	8	1150	VE3AIB	..29	8	1340
W5KID	..23	8	1200	VE3BPR	..24	7	950
K5TOP	..22	7	1250	VE3BQN	..23	7	1180
W5SWV	..20	5	960	VE3AQJ	..18	8	1300
W5ML	..16	6	700	VE3EJL	..17	8	1340
W5KTF	..15	5	1360	VE3HW	..17	7	1350
W5HGO	..14	4	835	VE6HO	..1	1	915
W5HSC	..12	5	1390	VETEJ	..2	1	365
W5HEZ	..12	5	1250	KH8UK	..2	2	2540
W5CVW	..11	5	1180				
W5NDE	..11	5	620				

The figures after each call refer to states, call area and mileage of best DX.

Mc. when he worked W0FY in Iowa for state #11. WA2JVO tells us that the Northern New Jersey Amateur Radio Association 230 Mc. net meets every Sunday morning at 1100 EST on 230.5 Mc. About a dozen stations call in each week and all interested are invited to sign in. W2SEU, W3EAX and K5TQP should all be on 220 Mc. in the near future.

Activity on 420 Mc. is constantly growing and it looks like New Jersey will be well represented on that band. K2RDX and WB2GKF are among the many now building equipment for 420 Mc. Steve, WB2GKF is presently building a 500-watt linear for his 432 Mc. s.s.b. transmitter (also in the works). WB2OSA tells us that he and K2GGA are now operating f.m. on 449.125 Mc., and they, plus WA2KIX, have regular weekly transmissions between themselves using A5 transmission. KQAX notes that he too is close to getting on the air with ATV. He's building his converter for 440 Mc. and has a Vidicon camera, monitor and TV transmitter. "Next, on the air!" sez Lec. At Norfolk, Virginia, W2UZN/4 sez his 432-Mc. converter is finished and aligned and the 13-element yagi is finished and fixed north toward the Hampton stations. 144 Mc.-2E26 exciter is being modified to be used as driver for the 432 tripler/amp. An ARC/RT-178 and an APQ-2/T9 transmitter have recently been acquired by WA8DXW. John wants to convert them for use on 440 Mc. ATV but is unable to find conversion information. Anyone know where to find it? Please get in touch with John Strough, WA8DXW, Route 4, Box 572, Marshall, Michigan 49068, if you have or know where to find the needed information. W8CVQ is working on an ARC-33 which he hopes to soon have working on 432 Mc. K5WXO tells us that work on the 432-emergency net is continuing with sixteen rigs purchased by Monroe County AREC Members. Frequency for the net is set tentatively for 433.0 Mc. Rigs are ex-taxi mobiles moved down from 450 Mc. Progress is being made in California too with WA6ROJ working on gear and antennas for 432 and 1296 Mc. A converter for 1296 Mc. is in the works now at WA2TOV, and W0PFP wants to know if anyone has any version data on a UPX6 for 1296 Mc.

K2RDX writes us concerning the Manhattan College Moonbounce project. "Everything completed except final amplifier, antenna and mount, and the parametric amplifier. Antenna at present is a five-foot dish. The feed is presently being modified for 1296 Mc. and plans being made to increase its size. Final amplifier held up at the moment, due to lack of funds to purchase 4CX600A. Hope to complete project before graduation in June, 1965."

3300 Mc. is the band for K7SJK in Portland, Oregon. Ron is presently running tests with polarizers on that band and working with him is Bill, K5LXF/7.

VE3BDX writes that he and VE3BYT now have gear on 432 Mc. and are "ready to go." VE4GI advises us that VE4JX and W0PHD now have converters on 220 Mc.; VE4JX has 3 states, 2 call areas and 425 miles on two meters; VE4MA reports activity in Vermont during the last opening. Bill also reports that two-meter interest has fallen off in his area although about 20 stations are converting for 147.33 f.m.

2300 Mc.

"Pulse activity on 2300 Mc. is growing slowly but surely. Reports of equipment constructed or under construction have been received from some 16 different states. Many fellows are using surplus APG-5 or APG-15 lighthouse tube cavities for their pulsed

oscillator and receiver local oscillator. These cavities, in an assembly together with a t.r. switch, were around in quantity on the surplus market years ago. The transmitter cavity tunes down to 2400 Mc. and can be used without any changes with the pulse modulator described in QST, March 1963, to give nearly 2 k.w. peak-power output. The high end of the 2300 Mc. band is preferred in order to use the surplus S-band radar equipment and to avoid possible interference with the space telemetry band between 2290 and 2300 Mc.

"Stations in eastern New England having pulse 2300 Mc. transmitters or receivers or both are W1DUB, W1OOP, W1QKA, W1QKJ, W1UHE, W1YWQ and K1JLX. At K1JIX, the best DX to date has been W1AJR in Rhode Island, a distance of 65 miles. Good signal levels were exchanged under average conditions, although the path is over hilly terrain and is not line of sight. Skeds with K2GRI in New York are being started in January. This is a 130-mile path over 3000-foot mountains. K1JIX would like to hear from stations in New Jersey or Long Island interested in 2300-Mc. schedules for this spring and summer." The foregoing information was sent to us by John, W2BVU/K1JIX as a progress report on 2300 Mc. For those of you interested in contacting John, his QTH is John Zimmer, Slough Rd., Harvard, Mass. 01451.

50 Mc.

A report on 50 Mc.-skip was received for the month of December from VE3BDX. Randy had several good days during the month, the first of which was the 8th, when he worked VE1AMJ and heard a number of other VE1s. The 19th brought forth stations in Illinois, Iowa, Missouri, Kansas and North Dakota; the 21st brought out these same states plus Wisconsin; and the 27th was the day for VE4s. We're delighted to receive a report from K1PSR at Amherst, New Hampshire who is wondering if anyone had any luck in getting a QSL card from VP9WB for contacts on 50 Mc. in May of '64. Nick noted a good opening on 50 Mc. on December 20th when stations in Michigan, Illinois, Ohio, Nebraska, Iowa and Minnesota were coming through into New Hampshire. However, no South or North Dakota! He'd like to set up some skeds with these two states, or even get some calls to listen for. WB2IPX worked stations in Minnesota, Arkansas and Louisiana on the 19th and 20th of December, but that was it, sez Les; while Charlie, WBHZY sez he hasn't noticed any skip during the month, although groundwave is okay. See what can happen! Bill Lakatos, K3QCQ, writes that on returning to 50 Mc. after a visit to the low bands, he found that the usual Sunday morning group on c.w. had disappeared or gone to s.s.b. He'd like to stir up activity on 50-Mc. c.w. once again and will sked any stations with the same interest. QTH is 208 Poplar St., Lebanon, Pennsylvania. Good luck, Bill. Hope you have lots of takers. In Alabama, W4YRM took advantage of the opening of the 20th to work stations in New York, Ohio and Pennsylvania; while WA4OMH in Kentucky was working Massachusetts, Maine and South Carolina at the same time. Virgil also mentioned hearing a few very weak skip stations on the 18th and 23rd. WA4ROC, also in Kentucky, caught an opening on the 24th when stations in Maine, New Hampshire, Pennsylvania, New York and VE1's were heard during a half hour opening. Other 4s who caught the December 20th opening were WA1CWG/4 (South Carolina), WA4NTJ (Tenn.), W4WQZ (Tenn.), and W4UIS

(Continued on page 160)

YL news and views

CONDUCTED BY JEAN PEACOR,* K1JYV

ZS Land YLs

WHETHER you are an avid DX enthusiast with 300 countries to your credit or the just once-in-a-while variety (10 countries going on 100), there's a decided thrill and feeling of accomplishment that goes hand and hand with every DX contact. When the DX station turns out to be a YL too, the pleasure is increased for YLs and OMs alike — an advantage YLs have in being substantially outnumbered.

If YLs in the continent of Africa have eluded you, the activities of the South African Women's Club could easily provide a turning point. This is the club's thirteenth year of activity during which time many incentives for all radio amateurs have been provided.

It sponsors a member's competitive program with the object of recruiting new members, obtaining suggestions for bettering the club and encouraging the writing of articles for use in their *YL Beam* publication. This is open to non-members as well. Points are awarded for the different items, among which the highest point count is given for teaching another ZS the code and being responsible for them obtaining their license. The high scoring member of S.A.W.R.C. for the year earns a trophy. A prize is also awarded any non-member who earns a minimum of 30 points for the year.

The club also sponsors two certificates as follows:

WORKED ALL YL — S.A. stations submit

* YL Editor, *QST*. Please send all news notes to K1JYV'S home address: 139 Cooley St., Springfield, Mass.



ZS6AVD, Maureen Von Rahden, XYL of ZS6LP an active c.w. enthusiast and also a zoologist with the Dept. of Mines.

proof of two-way communication (QSL cards) with 20 YLs in Southern Africa (embracing ZS, ZB, 9J2, 9Q5, CR7). DX stations must work 10 YLs. Only QSLs from 1st July, 1952 are valid. Non-members enclose 25c.

KEY-KEEN KLUB (K.K.K.) — For c.w. operators only and proof is required of 100 c.w. contacts to obtain the certificate with one "K" sticker. The second "K" is for 500 contacts; the third for 1000. Non-members enclose 50c. QSOs must be after midnight 31st December, 1956. A special application form may be applied for. Log books can be inspected by two hams in the applicant's area by arrangement with the Custodian.

Custodian for both certificates is Mrs. Margery Snyman, ZSIRM, P. O. Box 80, Strand, Cape



ZS1NQ, Gwen Smith, (left) a very active YL on 14-Mc. cw. She also teaches music at Stellenbosch Cape Province. ZS5OB, Edna Hervert, (center) and XYL of ZS5OA, is active on the phone bands. ZS6GH, Diana Green, (right) is one of the founders of the S.A.W.R.C. and XYL of ZS6J.



ZS6EQ, Roni Harper, XYL of ZS6DB is active on c.w. only on all bands from 80 through 6 meters. All ZS-land news and pictures were provided through the courtesy of Roni.

Province, South Africa.

The *YL Beam* reports that radio operators throughout the world have participated in the Johannesburg Festival by contacting Johannesburg amateur stations. A special award has been made available to all stations who have made contact with the required number of stations during the Festival period, July 1964 to October 31, 1964. Perhaps you qualify — DX stations (except Zone 38) must have contacted 10 Johannesburg stations; ZS stations 20. Short wave listeners can also qualify. Contacts must have been made during the Festival period. Details will be furnished upon request.

ZS land alone reportedly has about 150 YLs. Keep a-listenin' and good luck in adding many YL contacts from the African continent to your hamming accomplishments.

An Ambassador from Ohio

Radio amateurs in every district would welcome the enthusiasm and dedication shown by Eunice Bernon, K8ONA. Well known to many as the

founder and NCS of Ohio's Apricot Net which lasts almost four hours every Monday night on 51 Mc., she's also known as "one of the best YL operators in the business", to quote K8USW.

Eunice obtained her cherished amateur radio license six years ago; her OM Bernie, K8LMF, is an OT of 38 years. She founded the Apricot Net for the express purpose to encourage activity on the upper portion of the 50-Mc. band. The net is a family net with XYLS and harmonics invited to participate. Its success is very real to the 250 members now taking an active part many of whom are in Michigan, Pennsylvania and other states. Activity between 51 and 52 Mcs. is no longer unusual since many stations have followed the trend. Several operators on the net have received ARRL Public Service Awards, including K8ONA, her OM K8LMF, and associate NCS W8CTZ. They are also active in AREC, MARS, RACES and Red Cross Communications.



Eunice, K8ONA, shown during a visit at Brecksville V. A. Hospital, W8BAA. She maintains weekly schedules with this station.

In the past few months, Apricot Net members have provided countless amateur radio demonstrations before various boy scout troops, the Cleveland Society for the Blind and the Press Club of Cleveland. The Dec. issue of *QST* (page 58) illustrates their unusual Field Day activities at which time the public was invited to watch this demonstration in downtown Cleveland. All such activities better strengthen the link between amateur radio operators and the lay public which is Eunice's chief aim. Her dedication to this purpose is further shown through contacts she maintained for three months with Washington, D.C.'s Postmaster General, the Mayor of Cleveland and the local postmaster. This resulted in the Mayor of Cleveland proclaiming Dec. 14 through Dec. 20 "Amateur Radio Week" in Cleveland. Television, radio and the press covered the presentation of this written proclamation which Eunice proudly possesses. What a fine example of public relations this YL has provided us all.

Feedback

Apologies to Judy Rawcliffe, the YL who "Ran for the Money" (see Jan. column) whose correct call is WA2YRE.

YL Club and Net News

YLRL announces the first YL to hold the newly created position of Receiving Treasurer is Joyce Garlick, K1OLM, Box 243, Harvard, Mass. Dues of

(Continued on page 164)



ZS6BDB, Dot Faber, XYL of ZS6OF. When time allows, Dot prefers operating 14 Mc. phone.

CONDUCTED BY GEORGE HART,* WINJIM

JURISDICTION OF THE EMERGENCY COORDINATOR

IN 1963, when AREC and NTS were merged to form ARPSC, no sudden change in anything was intended. AREC and NTS both continued to operate, exactly as before. All that was really new was the blanket, the umbrella covering both operations, and we called this ARPSC. Gradually, as time went on, NTS had called to its attention more sharply its emergency responsibility, and AREC was reminded that communication is largely *record* communication and required a standard form and systematic procedure for handling and routing.

Some groups are adaptable to change and some aren't. Most AREC and NTS groups did just what we intended — went right on as they were before but, often without even realizing it, heeded the new concept of oneness between the two divisions. A few, however, readily adopted the new concept and appeared ready to modify their organization in name as well as in fact. These few stopped calling themselves the AREC and started calling themselves the ARPSC.

Surprisingly enough, this has met with some objection. In one eastern city, a group of local amateurs raise the matter of whether the EC is an official of the over-all ARPSC or just of the AREC, whether he has the right to call his organization the ARPSC at all, what jurisdiction he exercises over local NTS operations, and whether it is proper for him to assume the responsibilities of radio officer for RACES and allow RACES to operate under the aegis of ARPSC.

This is a mouthful of questions. There are no separate answers to them because the answers are all related to each other, and because the answers raise some more questions. Perhaps a discussion of principles of public service operation will answer them all, by implication if nothing else, and pose the additional questions.

You might think of ARPSC as a generic name for both (or either) AREC and NTS. Its use as a replacement for AREC is slightly inappropriate because ARPSC is not a replacement for AREC. The EC's traditional duties are more closely associated with the latter. On the other hand, if local emergency nets operate regularly, conduct regular liaison with NTS and perform regular public services (in addition to emergency preparedness and operation), they are just as much a function of NTS as they are of AREC. Each such local net is managed, ideally, by an assistant EC, designated by the EC who has appointed (by the SCM) jurisdiction over the area concerned. The problem at point is a heavily-populated

county, but it might also be a city, town, township, borough, or even an arbitrary area conforming to an SCM-SEC-devised pattern for the entire section.

The responsibility for representation of such local nets in NTS section nets belongs to the EC primarily; that is, it is more his responsibility to see that his local nets are represented in the section net than the section net manager's responsibility to find a representative in that area. It is expected, however, that all concerned will cooperate to get the job done without worrying too much about jurisdictional authority. Each ARPSC official, at whatever level, has a job to do, and a pretty specific one, but this does not mean any of us should feel unconcerned or uninvolved in the over-all picture. This is not an industrial or government bureaucracy, it's a volunteer organization and we're all in it together. We wouldn't want an EC, for example, to usurp the prerogatives of another ARPSC official, either AREC or NTS, but if that official is not doing his job, or if there is no such official to do it, then it is not only proper but highly desirable for any other official to take whatever steps he finds necessary to see that the job gets done.

So the EC *is*, in effect, the ARPSC official who has over-all authority over ARPSC activities within his area of jurisdiction as assigned by the SCM. This concept represents the beginning of what appears to be a deterioration of the lines of demarcation between AREC and NTS. This is more desirable than otherwise, because our traffic and emergency functions are basically the same.

Now, everybody working in NTS has to live somewhere. There will be amateurs living in a particular EC's jurisdiction who are not participating in local activities, but rather in a section or region or higher net or TCC function of NTS. Their activities when working at these higher levels are under the jurisdiction of the net manager concerned, not of the local EC. Of course it is desirable, if such activity is at section level, that such operator or station perform as a liaison from local to section level, and the EC may indeed recruit him for that purpose, in pursuit of which he *would* be under the EC's jurisdiction. It all depends on which hat he is wearing at any particular time, and confusion arises only when you consider the individual instead of the specific job he is doing. We amateurs are spread pretty thin in public service work. A great many of us are doing more than one job.

To continue this thought a moment, there are quite a few ECs who also serve as RACES radio

* National Emergency Coordinator

officers. Implementation of RACES *should* be an ARPSC responsibility, and if CD officials wish to recognize the authority of the ARRL emergency coordinator in such matters, this is all to our credit. All too few of them do so. But here again, it is a matter of wearing different hats. As EC, he has jurisdiction over the AREC members and their activities. As RO, he has control over CD equipment, facilities and operations. If CD officials find it desirable to make their facilities and equipment available for ARPSC operation when CD is not on alert, so much the better for all concerned. This gives ARPSC needed equipment and facilities at the same time it keeps RACES gear in operating condition. There can be nothing but mutual gain in such an arrangement, and the only thing that messes it up are personality clashes — about which we can do little or nothing.

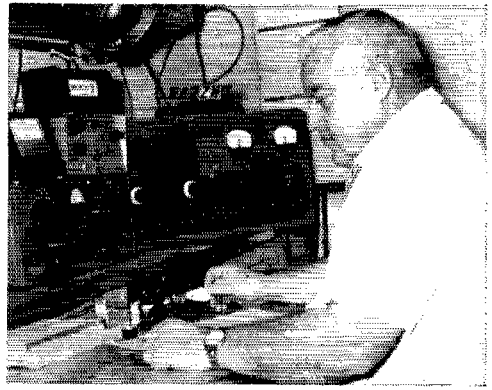
There is so much to say and so little time (and room) to say it. We leave you with a parting question. Are we ready, in ARPSC, to drop the AREC and NTS designations and consider ourselves the Emergency and Traffic Divisions of ARPSC, a closer-knit group of amateurs working together to the same end? — WINJAM.

Diary of the AREC

We have a few more reports of stations active during the Alaskan earthquake: K7s OQJ VJJ SCO QHO, W7s UML UZE. This should clean things up.

On the morning of Nov. 3, WA2ZKQ, heard OH5TW calling QRRR. Contact between OH5TW and K2MH was established but both signals were marginal, so W4VPD relayed the information that a certain drug was urgently needed by a hospital in Hungary. K2MH reported he was unable to locate the drug, so WA2ZKQ called a hospital in New Brunswick, N.J., and was informed where it could be obtained; the hospital also arranged to have the drug shipped to Hungary from the Switzerland office of the company that makes it, to save time. Our information does not state how Finland got into the act, but one presumes OH5TW was in contact with a Hungarian amateur who couldn't be heard in this country. Anyway, note that four countries were involved in this transaction.

While mobilizing on Nov. 4, W4KRT came across a fire in a residential section of Falls Church, Va. His CQ was answered by WA4SYY/4 who called the local fire department. W4ZMT also was on hand to help keep the frequency clear while emergency communication was in progress. — WA4SYY/4.



WA2ZKQ at his operating position on the morning of Nov. 3 when he assisted in securing a drug needed in Hungary (See Diary of the AREC for details).

On Nov. 16, W3OBD heard a call for assistance from an amateur (call unknown) in Angola who needed medicine for a patient in a deep coma. (Unable to obtain the drug at the U. S. Naval Academy (where he teaches Portuguese), W3OBD referred the matter to the Navy Bureau of Medicine, who referred it to the State Department, which arranged for shipment of the drug from Washington, D. C. — W3WTP.

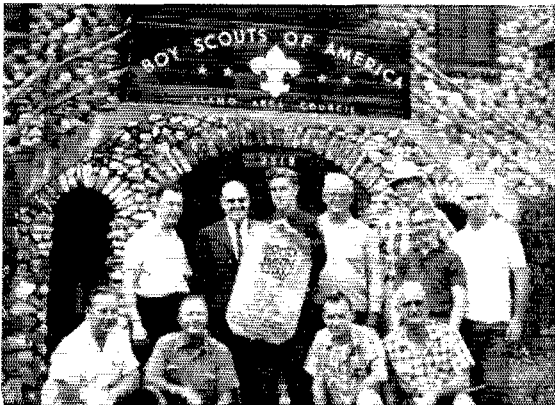
On Dec. 15, the Calgary, Alta. area was hit by a blizzard that, combined with 70 m.p.h. winds, caused an extensive power failure. VE6s AAX ALL UK aided the power company's repair crew by providing communication and spotting downed lines. — VE6FK, SEC Alberta.

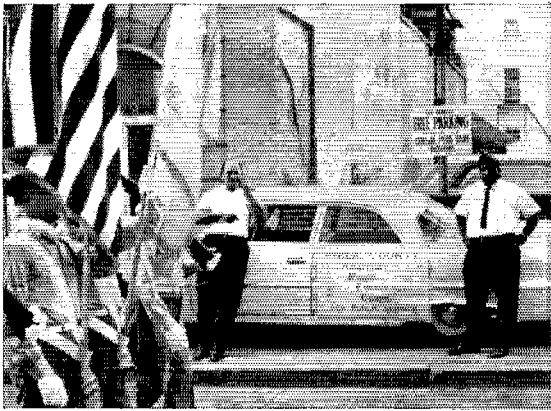
On Dec. 25, VE6US, Drumheller, Alta., operating on 40 c.w., was asked by VE7BST to notify the Burns Lake Hospital in Prince George, B. C., that an accident victim, bleeding profusely, was being rushed to the hospital by car, and that a doctor was required. Since there was no direct communication from the site of the accident, VE6US called the hospital and made the necessary arrangements. — VE6FK, SEC Alberta.

A three-year-old child in Ardmore, Okla., became sick and lapsed into a coma on Nov. 28. The previous day, the child's parents had left for a trip through eastern Oklahoma and western Arkansas. Since their exact location was unknown, local officials started a dragnet, relaying the information to all police and radio stations in the areas where the child's parents might be. W5DMIQ was contacted by the local CD director and asked if amateur radio could help in the search. K5TBP was contacted and went on 75 meters while W5DMIQ went on 40, both relaying the information about the couple to other amateurs who in turn relayed the information further. Police and radio stations were contacted just in case they had missed the previous bulletin sent by Ardmore police. It isn't known just how the couple was found, but they were flown back to Ardmore before the child died. Other stations known to have participated in the relay were K5DKO and W8BUL. — W5DMIQ.

AREC members in Los Alamos Co., N. Mex., were notified on Dec. 29 that two boys were missing in the hills. The boys were not equipped to stay out over night and several inches of snow was expected by morning. Mobile K5s EJW RIIR and Q1N, assisted by WN5KWK, were stationed at several points in the field. WA5JTF, K5WVR

The Bexar Co., Texas, AREC provided communication for the Boy Scout Good Turn Day on Nov. 14. Mobile units were used to supplement commercial communication, and to assist in collection of clothing. Amateurs participating were (kneeling l. to r.) W5s THU EJT VPQ, K5MOF, (standing, l. to r.) WA5JBY, two scout executives, WA5EJB, K5s HZR PKX.





K3ESL was one of many Philadelphia Co., Pa., AREC members who provided communication for the Amvet's Parade on Aug. 29.

and K5ELR operated club station W5PDO. K5HTT operated from CD headquarters while K5VQU and W5BEW monitored and relayed from their homes. W5ZMN joined the crew at W5PDO in the morning and K5MFD joined one of the field stations. The searchers had no luck in finding the boys by early morning and visibility was poor because of the heavy snow. Some 100 additional searchers were called and prepared to cover the area as soon as it was light. At 0830 MST, K5ELR, proceeding to the field station, came upon the two boys and immediately called W5PDO. The boys were well after spending a night in the cold and the search was called off as soon as all units could be contacted. — *K5HTT, EC Los Alamos Co., N. Mex.*

Two members of the Hat Amateur Radio Club provided communication for the speed trials in Medicine Hat, Alta. VE6MY operated from the starting line and VE6AMY did the timing at the finish of the 2-mile track. The operation was quite successful. — *VE6MY.*

With the large volume of emergency reports and the limited space available, we have a rather large stack of non-emergency reports waiting to be treated. In order that we may "catch-up", these reports are summarized here:

July 4: Members of the Milwaukee, Wis. AREC provided communication for a "Day in Old Milwaukee" parade and circus. The operation was an extensive one and carried out in fine form.

July 4: Calgary, Sask., AREC members provided communication for an air show held in Calgary.

July 11: Members of the Hoquiam, Wash., AREC conducted a rather large scale simulated emergency test in the form of a search for a "lost person."

July 14: Members of the Chemung Co., N. Y., AREC gave a demonstration of amateur radio and provided a message handling service for Boy Scouts at their summer camp. The same operation was repeated on July 28 with equally gratifying results.

July 25: The Corpus Christi Amateur Radio Club provided communication for the annual Walkathon held on Mustang and Padre Islands, Texas. Mobile units reported the progress of the participants over the 40-mile route.

Aug. 8-15: The Greenwood, Ind., AREC provided communication for the centennial parade and other events over the seven-day period. Some 13 amateurs took part.

Aug. 29: The Philadelphia Co. (Pa.) AREC provided seven amateurs to assist local officials during a parade.

The Michigan QMN Nets held their annual picnic in Sept. this year, and some of the boys got together for this shot. Kneeling (l. to r.) W8CHT (8RN Mgr.), W8s PBO AUD FX (SCM) KHY, K8QKY, W8EGI (RM). Standing (l. to r.) W8s QQO, IBB BEZ, K2SIL, W8QK, K8s NJW QLL, W8BKXO, W8SCW (past EAN Mgr.), W88PCP, W8s OCC ELW, K8KMQ.

Sept. 9: The Nanaimo (B.C.) District AREC staged a simulated emergency test which included participation by the local hospital and civil defense group.

Thirty four SEC reports were received for November representing 17,885 AREC members. This is four less than last year and represents a drop of a little less than 1,000 AREC members. Why don't some of those SECs who haven't reported in years shock us and send in a report? You don't have the forms? Drop us a card and we'll send 'em PDQ. Those sections reporting are: Del., N. Mex., Los A., Miss., E. Pa., Nebr., Sask., Wyo., E. Mass., Colo., Wash., N. C., B. C., Nec., Ind., Ala., Alta., Ohio, Okla., Va., Ark., N. Y. C.-L. I., S. Dak. N. N. J., Kans., Mich., Utah, R. I., E. Fal., Ariz., Mo., S. Tex., Ga., Iowa.

ARPSC Forum

So far we have not received any further questions for this heading, and of course it will not appear if there is no material received for it from the field. Let's answer the remaining questions submitted by WA2VKU:

Question: What operating goals have proved reasonable for some successful ARECs? *Answer:* Operating goals for AREC cannot be stated in finite terms. With proper leadership, support and enthusiasm there is little limit to the amount of service that can be prepared for and actually performed. If you want a definite operating goal, how about 100% participation by the registered AREC group?

Question: How should the ideal size of an AREC be determined? *Answer:* A good rule of thumb is 75% of the active amateurs in the area. The latter is usually about 50% of all licensed amateurs, but it varies from area to area.

Question: What should be the traffic-handling capacity and general level of efficiency in ARPSC nets? *Answer:* 100%, both capacity and efficiency. If you ever achieve it, let us know; you deserve a diamond-encrusted gold medal.

Question: How much spit-and-polish can be achieved in an AREC or RACES organization? *Answer:* More than most leaders think, if they go about it right. Even cantankerous members will go along with a high degree of discipline if it will result in efficiency in which they can take pride. Much depends on how it is administered and how big the doses are, but we know AREC groups whose "spit and polish" is every bit the equal of a military unit, and which have a larger membership percentage than most.

National Traffic System

In 1960 we examined, in these pages (Jan. '60 QST, p. 82 under "Traffic Topics") the requirements for "joining" NTS and a proposal that a new category of NTS net be created called "NTS Affiliate" nets. At some length, we explained the requirements for NTS participation, the fact that at region level and above NTS nets are created to serve a specific purpose and cannot be adopted. On occasions we have had net managers or organizers tell us that they are willing to do anything necessary to meet the requirements to be considered a part of the system. But when the only thing that can be done to accomplish this is to dissolve the net and have its members participate in appropriate NTS nets that already exist, what can one say?



The proposal to adopt certain independent nets as NTS "affiliates" would include those nets which are not set up to operate as a part of the system but which nevertheless conduct liaison with NTS nets either through common membership or deliberate assignment. Actually, we hope that all traffic nets are NTS affiliates in the sense that they will use the system's facilities at whatever level needed, just as NTS will use non-NTS facilities if this is necessary to get the traffic through. Indeed, we hope that all traffic nets will be affiliated with each other so that each can use the facilities of the other for prompt and efficient dispatch of traffic.

NTS is a tight organization whose nets operate according to a definite pattern, and we'd like to keep it this way. But this does not mean that the system's nets are "closed" to traffic men who are not "members." The only thing is, just as you have to observe the traffic laws of another state when driving therein, you have to observe NTS rules when operating in NTS nets.

Any consideration of adoption of quasi-official NTS status on the part of any net not now part of the system has to include two conditions: first, such nets may not be used to circumvent any regular NTS procedures or routings; second, the use of the term "affiliate" is taboo — this term has been used traditionally as applying to clubs and would cause no end of confusion, particularly because some nets have club-like organizations with officers, constitutions, etc.

Any suggestions? Do you favor the idea, or not? If so, what do we call them? How do they fit in? To what extent must they conform to ARRL operating procedures and standards? We had this subject out for an airing five years ago but received little response either way. Has there been any increase in enthusiasm since then? — WINJ.M.

December reports:

Net	Ses- sions	Traffic	Aver- age Rate	Represen- tation (%)
1RN	57	603	398	10.6
2RN	57	1125	811	19.7
3RN	62	826	428	13.3
4RN	62	1257	625	20.3
RN5	62	1808	571	29.1
RN6	62	1645	924	26.4
RN7	30	772	499	25.7
8RN	62	614	382	9.9
9RN	31	878	846	28.3
TEN	62	1115	642	17.9
EON	31	174	216	5.6
TWN	29	620	548	21.4
EAN	31	2413	1333	77.8
CAN	31	2331	1260	75.4
PAN	31	2770	1338	87.1
Sections ²	1368	12,820		
TCC Eastern ³	116	1319		
TCC Central ⁴	93	1720		
TCC Pacific ⁵	124	1936		
Totals	2058	36,746	PAN 17.9	CAN/PAN/2RN
Record	2045	44,109	1.421	23.5

¹ Representation based on one or less sessions per day.

² Section nets reporting (48): RIN, RISP (R.I.); OQN (Ont.-Que.); BUN (Utah); MIDD, MIDDS (Md.-D.C.-Del.); 16N (N.J.); MTN (Man.); SCN (Calif.); NTPN (Texas); GBN (Ont.); 1LN (Ill.); WSBN, WIN (Wis.); OSN (Ore.); OSSBN (Ohio); PTPN, EPA, PPN (Pa.); SCEN (S.C.); QFN (Fla.); OZK, QAN, Ark. SSB (Ark.); NYC-LI VHF, NLS, NYC-LI Phone (N.Y.C.-

I.L.); Mich. SSB; TN, TPN, ETPN Tenn. SSB (Tenn.), SGN (Maine); VSN (Va.); THEN, NCN(E), NCN(L); NCSSBN (N.C.); AENIL, AENAI, AENO, AENP (morn.), AENP (eve.), AENT, AENR (Ala.); MSN, MSPN (morn.), MSPN (eve.) (Minn.).

³ TCC functions not counted as net sessions.

Bad conditions and all, we still managed to break the sessions record. By the time you read this, the long skip should be almost gone and this will make life much easier on the nets. The propagation experts say that we are on the up-swing in the sun spot cycle so maybe we are over the hump for another ten or so years.

WA2GQZ will be changing jobs soon and will now be able to devote more time to 2RN. K3MVO complains that 3RN was really clobbered by bad condx (weren't we all?). The stations were there with the traffic, but just couldn't be heard. RN5's traffic total this month is the highest for a December since 1958; certificates went to W4s TUB SEZ, K4VFX, W4As HRG IBZ, W5s 1TR KRX JDF IQH GHP, W4As DQP AVO CBL FNB. K7JHA reports RN7 did better this December than they have in a long time and condx only wiped out one session. A 9RN certificate went to K9YNL. W9QLW tells us of two interesting happenings on 9RN. One night Ind. wasn't represented, and the next night there were 6 Ind. stations. One night when 7 Ill. stations QNled, do you know how much Ill. traffic they had? Yep, just one. TEN had an excellent month including much needed N. Dakota reps. This is the first month that each EAN NCS had a rate of better than 1.000. CAN had a pretty fair month, according to W9DYC, even with the skip and several nights of summer-like QRN. PAN had an exceptionally good month and WB6JUH has nothing but praise for the gang.

Transcontinental Corps: W3EML notes that plans are shaping up for a proper EAN/PAN daily sked. W5PPE has been appointed TCC Director for the Central Area. W7DZX reports that the going was rough this month, but things like that happen once in a while.

December report:

Area	Functions	% Sur- cessful	Traffic	Out-of-Net Traffic
Eastern	116	85.3	3593	1319
Central	93	69.9	2566	1720
Pacific	124	74.2	3872	1936
Summary	333	76.9	10,031	4975

TCC roster: Eastern Area (W3EML, Dir.) — W4s BGD EMG NJM, W2GVH, K2SIL, W4As BLV WLN, WB2HVB, W3s EML NEM, K3s FHR MVO, W4s DLA DVT, K4VDL, WA4PDS, W3s CHT ELW UPH, K3s KMQ TIG. Central Area (W5PPE, Dir.) — W4OGG, WA4AVM, W3s IQH PPE, WA5HNN, W3s CXY DYJ JOZ VAY, W4As AUM BWY, W6OHJ, K0s FPC GSY. Pacific Area (W7DZX, Dir.) — W6s EOT HC VQN, K6s DYX GHD, W4As BRG ROF, WB6JUH, W7s DJZX GAC WST.

Net reports:

Net	Sessions	Check-ins	Traffic
Northeast Area Barnyard	27	800	43
Mike Farad	59	746	2713
ALEPN	22	105	39
7290	44	1345	905
CNEN	27	665	10
ISSBN	30	1264	815
EASN	29	88	108
20 meter SSB	23	712	2202



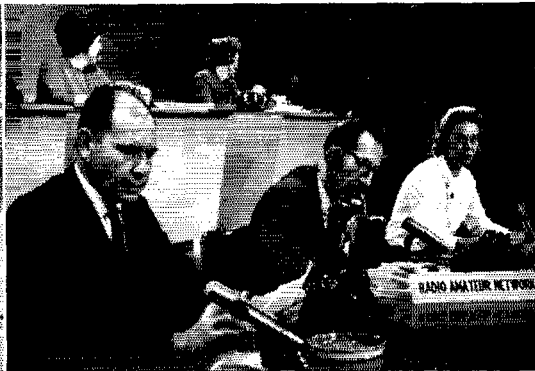
AMATEUR RADIO HELICOPTER OPERATION

Larry Hartwick, W4SCKJ, will be operating aeronautical mobile from a U.S. Navy SH-34J helicopter on route from Goose Isle, Michigan to Key West, Florida on March 1st and 2nd. The six-meter band will be utilized during this operation and a certificate verifying the contacts will be mailed to

each amateur successful in working the chopper. It is believed that these will be one of the first amateur radio operations conducted from a helicopter.

A 64-page cumulative index to *QST* is available for 25¢ postpaid, covering the years 1950-1964. Request your copy from ARRL Hq., 225 Main St., Newington, Conn.

Strays



The Anaheim ARA was asked to provide communications as a public service to report results of a hard-fought school board election. The Magnolia School District had become six square miles of turmoil when its eight elementary school principals resigned and some 200 of the teachers reported that conditions were becoming intolerable. A recall election was held, and 600 people turned out for a rally and to hear the results as they were radioed in by members of the Anaheim ARA from the nine precincts. A 6-meter station was set up at the Anaheim Bowl, scene of the rally, and mobile units were dispatched to the polling places. The recall election was successful, and the Anaheim ARA received much favorable publicity. The group at the left above, shown at the headquarters, are (l. to r.) W6RDB, WA6MFA, WA6VQC, WA6MEZ and K6RTR. Others participating included WB6CFC, WB6ITH, and WA6RGP. On the other side of the country more than 200 amateurs in North Carolina joined forces to speed election returns this past fall. Hams at county election boards transmitted returns back to a Raleigh computer site where they were tabulated and then broadcast over WRAL-TV. The amateurs had plenty of competition from the wire services, but had a very profitable exercise. The nets and various groups learned how to work together more cooperatively, and the h.f. skip conditions emphasized the need for more extensive v.h.f. organization. Thanks to SEC W4MFK for the info and photo.



Some time ago W1VG found QSLs in his file to make a Heel & Toe WAC. (See August 1959 QST, page 44.) The other day some of the fellows at League Headquarters were speculating on the possibility of a harder accomplishment along the same line—a Heel & Toe DXCC. After digging through several thousand cards the best W1VG could do was to put together enough for a DX half-century club. Has anyone the 100 QSLs? Pete offers a hand lettered award, the only one of its kind, to the first amateur who sends him his list. Any QSLs after World War II, any mode, any band, any report, no country to be used more than once. Don't send cards to be checked. A neatly prepared list is all that's required.

With the passing of Earl Williams, W2EG, inquiries about membership in the Old Old Timers Club (see story on page 53 of QST for December, 1964) should be addressed to the new secretary of OOTC, Mrs. Eunice R. Thompson, W1MPP, Christian Hill Road, Lovell, Maine.

The North American secretary of the Award Hunters Club, which was established in 1957 in Finland, is K2TGH. Basic requirement for the AHC certificate is possession of 25 awards, with sticker endorsement for 50, 100, etc. Contact K2TGH for the complete rules.

WA6NUN tips us off to a Government Printing Office Publication *Electrical Wiring* (Technical Manual No. 5-760, 50¢) which, among other things, lists the statistics on line voltage in many overseas countries. Things like 110 or 220 volts, 60 or 25 cycle, and so on.

WN5KHE (Ken Hackney) 509 Hancock, Natchitoches, La., would like to hear from other hams interested in on-the-air rapid transit chess games.

On May 16 and 17 4U1TU will be on the air continuously in special celebration of the 100th anniversary of the International Telecommunications Union. Special QSLs, guest operators from all over the world, etc. In a later issue we'll give you the latest info on frequencies and operating schedules. If you can be in Geneva on those dates and would like to be one of the operators, write to 4U1TU, c/o ITU Headquarters, Geneva, Switzerland.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr.

ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide

CODE PROFICIENCY CERTIFICATE ISSUANCES, JULY '64 THROUGH DECEMBER '64. The number of *different* code-certified amateurs was boosted close to two thousand more initial-certificate issuances this last year with over half this number additionally receiving code proficiency stickers by submitting papers showing progress of several words per minute over the initial grade.

By far the larger number of certifications, as usual, were in the 10-15 and 20 w.p.m. speed ranges. *Very special* credit is due those who go on to achieve the full 30-35-w.p.m. rating. It gives us the greatest pleasure to present at this time a report listing those who were certified in this final six months of '64 at these speeds in the top bracket:

ARRL Certified at 35-w.p.m.

W1DIE/6	WB2AEL*	WA2PJJ*	W4MHW	W7PAY*
K1LNC*	WB2EUH*	W2PZF	K3OAH*	W8AJZ*
K1QZV*	WB2EZG*	WA2UFI*	W5PSB*	K8JPA*
W1SGU*	WA2HIU*	W3ATQ*	W6JUS*	W8KPO*
K1ZHS*	WB2HJF	K3PBY*	W6OZ	W8RSW*
K1ZND*	WB2ILY*	W4FDV*	W7LQH	WA0FMD*

William J. Garrett, Flint, Michigan; Ralph S. Taylor, Ft. Devens, Mass.

ARRL Certified at 30-w.p.m.

WN1BGL	WB2GPE*	WA4KQQ*	W7GYF*	K8SSV*
W1EV*	WB2GUE*	K4SXD*	K7HLE*	K9DCV*
K1FVS*	K2JZG/W1KTU	K4THA*	K7JRE*	W9DNY
W1SGU	WB2OTT*	K4UQI*	W5RSD*	WA9EKJ*
W1WLZ*	W3LOS*	WB6BTQ*	K7SGX*	WN9LNS*
K1YLX*	K3QFG*	W86WS*	K7VZH	W9UZS
K1YKT	K4BS8/1	W6SAW	K8DIU*	W0DEP
K1ZHS*	WA1CU	W6YKS*	W8KPO*	W0FXW
VE2AUB/W5*	VE2ZK	VE3AED*		

Thurston A. Johnson, Huntington, West Virginia *

* Endorsement Sticker.

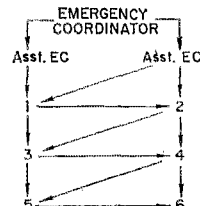
V.h.f. Nets on Increase; WA2ICP Reports Example of Emergency Coverage. Charles Stein, WB2ICP, Net Manager (Schenectady) reports that in his area there are now some 80 units in well organized AREC nets working between 146 and 147 Mc. These operations include the calls of around fifty amateurs. (Some 30 have *both* mobile and fixed operation assignments). In the Schenectady area there are also two hill-top repeater stations. These are remotely controlled in full accordance with FCC requirements. They give the mobiles in the area coverage such as only hill-top provisions insure. As to service aspects! This net was in emergency operation during the recent ice storm paralysis of the area from a Friday until Tuesday. Battery-operated units were placed in local hospitals by the AREC as their sole communication for the three days. Emergency operations were activated likewise at the local Red Cross chapter

house where an antenna had been previously installed ready for such an emergency. W2EFU and K2IOW (EC) and WB2ICP all are to be commended on this progress.

ARRL cordially invites net registration for all v.h.f. nets that are active in operation, that have provisions for traffic or emergency operations and which operate *regularly*. We hope all operating v.h.f. nets will designate *at least one* member operator and an alternate to hook up with h.f. section nets for state and national message connections. Ask for our CD-85 net registration form. All AREC groups are urged to work in directed net formation. *All v.h.f. nets are requested to become familiar with the forms and procedures for handling formal traffic and to dedicate their work, with ECs and ROs to useful ends.*

Cross-check AREC Alerting System. In January QST on this page we detailed W3ELI's Alerting System. Amateur Radio Emergency Corps groups can profit from frequent tests and review of their alerting plans. This month we want to pass along information reaching us from West Hartford AREC members. After several dry runs they found that a cross-check system had advantages for their use. Their normal alerting is carried out by telephone contacts, if possible. If there is no telephone working, AREC group members, all watchful for indication of emergency or disaster contingencies (list agreed), are required to go on the air (on AREC frequency) *immediately*.

We're pleased this month to describe this cross-check system. The diagram shown (West Hart-



ford's) describes a superior double-check telephone system of Emergency Alerting. The Emergency Coordinator (K1SJK) has two Assistant ECs, K1QNF, and W1BGD, designated to head up this alerting-for-emergencies. Each operation in the

whole group has only two persons to contact by telephone. You will note from the arrowpoints that each group member only has to make two outgoing telephone calls. (1) Once the EC has communicated the concise message about the nature and duration of the alert to one of his AECs, the system is set in motion. AEC-1 alerts AEC-2. The member we show as number one (1) passes the word to (2) and (3). "Two communicates with (3) and (4) etc. The telephone-load is kept small on each individual yet there is a check-

system with a second person confirming that the word is duly authenticated. This minimizes the possibility of any unauthorized alerting. Besides this double insurance that every *AREC* member gets a notification and no one is missed, there is additional security against false alerts.

About Gentlemen's Agreements; a.m./s.s.b. and Good General Operating Principles

The following is an excerpt from a letter received from M. A. Metz, W7BJG: "At the time I became an amateur in '31, as well as today, there were unwritten understandings called Gentlemen's Agreements. These were observed to keep phone operations separate from c.w. in the bands. With the advent of s.s.b. after WW II such an understanding was carried over to help maintain helpful separation between a.m. and s.s.b. within the phone sectors of our bands. We

have on occasion attempted to advise s.s.b. stations heard below 14250 kc. about this situation and have been 'told off'. But many stations like myself operate both a.m. and s.s.b. and observe the Gentlemen's Agreement . . . May all amateurs more closely observe the agreement principle. Such a program will preserve the integrity and the spirit of Amateur Radio . . ." ARRL in recognition of this principle ran a page-width chart of s.s.b. — a.m. utilization or "Planned Use of 14 Mc." This appeared in Nov. '61 *QST*, page 96.

W7BJG feels that more emphasis and space should be devoted to publicizing these frequency arrangements, so newer amateurs who may not be familiar with the principles may extend their full cooperation . . . and all voice operators (both modes) can benefit. Without republishing that operating chart, we can follow the basis

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for December Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	544	4669	3797	792	9802
K6BFB	193	3923	3577	306	7869
W1PFX	178	1673	1567	62	3480
W0LGG	70	1475	1420	43	3008
K00NK	129	1068	1004	74	2275
W00HJ	26	1066	1053	13	2158
W42GPT	109	949	863	75	2049
W7BA	21	952	853	91	1919
WA2RUE	184	869	732	71	1856
W7DZX	8	932	887	11	1838
W86JUH	42	827	876	69	1814
K7JHA	227	744	718	5	1694
W36AL	18	763	706	15	1502
W48CP	27	739	681	35	1502
W3IVS	17	738	698	40	1493
K2FXP	64	709	637	75	1485
K9GNY	11	688	663	6	1398
W3VR	84	666	613	29	1392
W6WPF	5	651	608	17	1306
W8RSY	33	636	467	160	1296
W6GYH	182	545	528	4	1259
WA4BMC	825	219	136	59	1239
W6BBO	59	595	526	41	1221
W9IDA/5	12	563	534	3	1112
W8UFB	30	538	449	94	1102
WB2HWB	121	327	110	20	1078
W86HJW	2	536	535	1	1074
WA2UZK	317	409	310	35	1071
W6VNG	5	453	379	6	1043
W6JNK	26	485	37	385	993
W6EOT	2	489	463	20	974
K6BOD	2	353	470	3	946
K2UBG	152	413	136	231	932
W9MM	7	450	429	20	906
K9KZB	27	432	403	30	892
W46WPK	10	440	399	42	891
K6HVV	9	431	418	13	871
K1BOB	13	429	414	5	861
W2EW	51	387	252	130	850
WA2VYS	22	423	362	33	840
K3MVO	20	432	370	17	839
W7BR	6	399	397	1	803
W9ZW	1	534	26	217	778
WA2TQT	118	329	100	229	776
K2YNL	11	381	342	35	769
K6MDD	—	384	300	84	768
W2OP	166	325	263	10	764
K4YFA	121	314	253	61	745
W1BGD	4	355	35	46	740
K5TFY	24	357	350	5	736
K9IVG	12	384	334	5	735
K8HLR	34	351	325	10	720
W6YKS	25	354	293	41	713
WA5CBL	40	335	303	24	702
V8TBDJ	4	357	340	—	701
K81DJ	58	312	282	27	679
K0PFC	37	285	341	9	672
K6DYX	4	334	323	4	665
W10PK	25	324	251	51	651
W9CXY	15	315	285	30	645
K2KQC	15	305	261	69	640
W5DTH	87	296	202	37	622
W48CNV	12	311	18	280	621
W9DYG	91	285	224	16	616
W4URK	6	318	242	46	612
W4FUB	6	295	293	6	611
K3MYS	40	289	268	12	609
WA5LNN	80	260	245	5	590
W1TXL	81	264	216	25	586
K8LNE	17	273	275	2	567
W2GVH	19	264	274	9	566
WA6TAW	7	275	247	28	557

Call	Orig.	Recd.	Rel.	Del.	Total
WA4JYB	96	232	153	64	545
K1LFW	4	270	136	121	541
W46RRG	112	215	194	17	538
K8VBO	11	263	256	7	537
K1WKK	55	245	220	10	530
WA2UWA	10	260	250	10	530
K5FLD	13	246	235	23	517
WA5JTF	15	237	198	36	516
W48CXK	—	258	255	3	516
W48CXY	20	248	243	4	515
W48CEN	9	256	249	—	514
W8JYJ	—	251	251	—	502
WA9BWW	23	243	210	24	500

Late Reports:

WA2GPT (Nov.)	57	483	306	76	1012
WA2TQT (Nov.)	123	402	300	202	927
W6WPF (Nov.)	5	455	44	14	915
WA2RUE (Nov.)	99	389	316	36	840
W6WPE (Sept.)	4	416	402	14	836
W6WPF (Aug.)	1	345	322	22	690
W7DZX (Nov.)	10	247	303	6	666
W6WPF (Oct.)	3	329	311	18	663
W6HVB (Nov.)	35	237	198	22	635
W2EW (Nov.)	135	222	101	119	577
K1WKK (Nov.)	6	251	248	1	506

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W61AB	1504	3636	3054	582	8776
W6YDK	2601	1008	946	62	4617
K6WAH	317	1023	990	33	2363
KR6GF	1077	51	12	39	1179
KR6MB	888	116	58	43	596
KR6DL	379	—	—	—	—

Late Report:

W4LEV (Nov.)	97	782	744	38	1661
--------------	----	-----	-----	----	------

BPL for 100 or more originations-plus-deliveries

W7NPK 368	WA4RLG 128	WA8ARI 108
W48PC 216	W82LUK 127	W4AKY 107
W9NZZ 194	K1VEJ 126	W48AJL 106
K4AIC 189	W4LHK 125	W4UOO 105
WA4BSC 186	W2URP 120	W4RMJ 105
W82MLN 185	K8QKV 119	K9MAR 104
W6LRU 169	WA4NEV 115	V8QX 104
W60KAK 163	K3PFS 115	W48GCE 103
W8DAB 158	K3HNP 116	W48EMJ 102
W6BHG 149	W3ZRC 113	WA4LCH 101
WA8BXN 148	W7OCN 113	WA0FLL 101
WA8TFX 148	WA6DPT 111	Late Reports:
W1ZS8 146	W1ZLX 111	W6JNK (Oct.) 237
W1AOG 145	W4RHA 110	WA2QJN (Nov.) 183
W9BA 140	K9GJH 110	K2BA (Aug.) 131
WA2IYO 137	W5JDF 109	K4OOJ (Oct.) 124
WA4DYL 129	W48GRE 109	K4FLR (Nov.) 113
	W4NML 108	

More-Than-One-Operator

W6BKZ/6 480	KR6MD 124	W0CTV 102
KR6NH 187	W0GWX 123	

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: WA4XB.

The BPL is open to all amateurs in the United States, Canada, and U.S. Possessions who report to their SCM a message total of 500 or a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

presented earlier (for information) by a short tabulation. Also we remind readers that the observance of general patterns that place most s.s.b. stations in one sector, and a.m. stations in another, works out to make for best results for all and with minimum interference.

14,250 — 14,350 kcs. . . . W — s.s.b. and work with DX at the high end.

14,200-250 kcs. . . . a.m. transmissions from W's. Below 14,200 . . . W's listening for a.m. DX and other voice emission.

Additionally we want to repeat several operating injunctions. Without any pretense that the following are new let us say that these principles if observed can help make our communications more effective.

1. *Listen* always before transmitting, and in the course of making contacts to minimize conflict in channel use.
2. *Switch* to the band best adapted for your local or DX purpose.
3. *Avoid* use of DX frequencies for short distance contacts.
4. *Tune-Up* with dummy antennas, not on-the-air-signals.
5. *Be brief.* This will make contact with you a pleasure whether c.w. or voice is used. Avoid monologuing or speech making.
6. *Show Courtesy.* Operate so as to minimize QRM; move frequency as feasible to avoid trouble rather than to cause it knowingly; assist brief traffic net operations by making the individual sked another time or using another frequency.
7. *Observe gentlemen's agreement precepts,* the mutual understanding that voluntarily limits c.w. and phone to their sectors, and as earlier set down between a.m. and s.s.b. operations. Let's all try to live up to the established standards of decency in our operating.

Courtesy and Lack of it in our Operating.

The Ontario DX Association suggests that there has been a sad deterioration of operating decency on the part of some who operate for DX in the 14.1-14.2 Mc. band normally used by Canadian and overseas stations. This invites consideration of the general subject of *courtesy* in our operating!

Operating practices such as out of band work must be condemned as even illegal. Also amateurs generally are quick to condemn the discourtesy of "crashing a QSO" in the selfish eagerness to make a DX contact. The cure for this sort of thing of course, is simply *not* to grant or engage in a contact when made the subject of such unnecessarily forceful overtures. To refuse to QSO when justified as when improperly broken in on is considered a proper cure for such operators with no social consciousness or restraint.

"There has been a tendency for stations to appear on phone and on frequencies out of their

assigned phone bands to ask the DX station to come up into the U. S. phone sector. Such stations do not sign calls, but if one goes to the band he finds them shortly working the DX, if the operator was naive enough to comply. . . ." This of course is completely illegal and subject to government monitoring and citation!

It is deliberate or malicious interference (and completely actionable by the licensing authority) where there is deliberate jamming. According to VE3EWY this is accomplished by calling a.c.w. CQ DX right on top of the channel in use by the s.s.b. stations and not listening for replays. In one case, the sending of an article directly from a magazine was transmitted right on the frequency of the DX station.

Now a word about some of the legal but unethical work commonly brought to our attention: It seems almost a habit with some W/K VE operators to break in using c.w. on contact already under way in the phone bands. The degree of discourtesy depends on how this is done. The purpose most often seems to be to ask the DX operator to listen on voice for the operator choosing to break in.

If an operator is engaged purely in casual rag chewing, if the break comes as operators turn the circuit over to each other and there is courteous waiting out the pleasure of the operators completing a contact for their response, then the worst that can be said of this sort of operation is that it abrogates the Gentlemen's Agreement that c.w. is used only in voice bands under emergency conditions. Should the operator show interest and desire to engage in this new work and time permit, that is up to him, and the new QSO may be welcomed. But there are many other circumstances in which the DX operator may *not* have the time or the slightest desire or reason for a contact. He may be engaged in special-project overseas operations. Besides following a pattern, keeping schedules, frequencies and modes for contacts to give as *many as possible* amateurs DX contacts during a visit to foreign lands, there are stations closely engaged in morale building operations. Those involved in telephone relaying from DX points are not in a position to cooperate. Is there any good reason that such services one operator gives his time to complete should be jammed by another to effectuate more selfish purposes? All too often operators have written of the deliberate jamming that we have referred to. Even in the current effort to handle emergency communications in support of the flood problems in the Pacific Northwest we hear complaints of the unwillingness of certain amateurs to yield the desire to rag chew on a frequency to the needs of those engaged in special netting or schedules in our public service tradition.

Let us *each* in our operations realize the bad taste this sort of thing leaves, the many positive dividends that result from proper operating courtesy, and the added efficiency in operating when orderly work and traditional cooperation between operators is the order of the day.

— F.E.H.

C.D. ARTICLE CONTEST

A new Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 800-1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1965 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map. Our first winner, Tava Franklin, K9RNQ, has chosen QSLing as his subject, and the article appears below.

QSLing

By Tava Franklin, K9RNQ

THE other evening one of the fellows was complaining about his poor return on QSL cards. When I indicated that my return was over 90%, he sounded skeptical but asked for the magic formula. My high return of QSLs from stateside, as well as from DX stations using 80 through 2 meters, has no magic formula, but there are a few things I have learned about QSLing from being a small-time QSL manager and through many personal experiences.

If you are one of the hams who recognizes QSLing as a by-product of our hobby, and participate therein with little success, possibly the following contains a helpful suggestion or two for you.

Let us reverse the order of business and look at what the other fellow expects from you. Most DX stations need your QSL card as much as they need a hole in the head. So, after you have successfully fought the pile-ups and received that beautiful 599 signal report, don't louse up the chances for that card by goofing off. Should he have a QSL manager in the U.S., try the following to enhance your chances of getting that treasured QSL.

1. S.a.s.e. means self addressed stamped envelope. If you want a direct reply from a QSL manager, s.a.s.e. is required, and is a common courtesy to him. Most QSL managers spend much of their own money on a QSL venture, so the stamped envelope you send is a great help in relieving the postage costs. A note, such as I once received, stating: "No time for s.a.s.e. jazz, maybe you can spare postage for a QSL for me," received prompt attention . . . to the round file.

2. If you do not keep your log in GMT, then by all means convert your local time to GMT when filling out the QSL data. Also, watch that date! Sometime in the evening, here in the U.S., the date changes. A little extra care in recording the time and date is an asset to the QSLer.

3. If your QSL is a 2-sided card with the data on one side and the call on the other, then include your call next to your signature on the data side. This places the data, the time, and the call in the same area, which expedites location of your contact in the log copy. The need for flip-flopping the card to read the time and date, then over to the other side for the call, is eliminated. What a great help and a tremendous time saver!!

4. Be accurate and neat in filling out the contact data. A carefully prepared card is a joy to handle. Typing or upper-case printing reduces the possibility of errors. Scribbled cards are usually put aside for later deciphering. If a card is worth sending, spend the extra minute and do the job well. These are the primary steps to insure expeditious QSL handling. Two other points to remember:

1. Most DX stations submit copies of their log entries to the QSL manager. This is the only data he has concerning your QSO. In all fairness, to everyone, the information received must be assumed to be correct. Should your contact result in a report of 599 but the card has your report as 589-c do not feel bad. The QSL manager does not have any way of verifying your 599 on the air report. He only has the log extract and that must go on the card.

2. How about letting that QSL manager know he is doing a good job? A short note similar to "Thanks Jack, for your efforts in sending me XW9AA's QSL card, sincerely, Bill, W1AA", goes a long way in raising spirits. Hand write the note using an extra sheet of paper. The note belongs to the QSLer, while the card itself is usually sent along to the DX station operator.

Most of these same points can be followed in direct QSLing, with the exception of the s.a.s.e. My experience with DX stations has been that the pile-up of calling stations does not permit much more than an exchange of signal reports and names. In lieu of a longer chat, a letter is sent along with the card telling a little about myself, the station and some of the interesting things about my locale. The letter, QSL card and a couple of IRCs make up the package, which is usually sent via air mail. No mention of mode of reply is made. The decision of return by air mail, surface mail or through bureau channels is left to the DX station. He knows his QSL conditions better than you do.

Should the opportunity present itself for a second contact with the DX station a nice rag chew might possibly result.

Some fellows have special appeal cards printed, which are enclosed with the QSL. It would be interesting to know what percentage return is experienced using this method. A printed appeal card brings to my mind visions of a form letter that receives only a partial reading, at most, before being discarded. On the other hand an interesting letter gets read and re-read.

The unusual, colorful or pictorial QSL card is often credited with high QSL returns. Personally, the oversized or oddly-shaped card is initially eye-catching but brings problems of storing and mailing. Stick to the regulation size card even though you have a striking design. Some of the QSLs received have included snapshot prints with the QSL and these have been so pleasing that the old man has begun to include a print of himself and the shack with all DX QSLs. Should this result in a drop-off of QSL returns, the practice will stop immediately!

That's it, fellows and gals. There is no secret formula for successful QSLing. Just show an honest, sincere interest in a fellow ham plus a little extra effort on your part to make his QSLing job a little easier. If you adopt the rules as suggested, I hope each QSL you send out brings a prompt return. [SET]

CODE PROFICIENCY PROGRAM

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are in GMT)

- Mar. 5: CP Qualifying Run — W6OWP
Mar. 13-14: DX Competition (phone)
Mar. 18: CP Qualifying Run — W1AW
Mar. 27-28: DX Competition (c.w.)
Apr. 1: CP Qualifying Run — W6OWP
Apr. 10-12: CD Party (c.w.)
Apr. 16: CP Qualifying Run — W1AW
Apr. 24-26: CD Party (phone)
June 12-13: V.H.F. QSO Party
June 26-27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

- Mar. 6-7: YL-OM Contest c.w., YLRL (p. 30, last month).
Mar. 15: W1EIA High Speed Code Test, Conn. Wireless Assn. (p. 158, this issue).
Mar. 20-25: BARTG Spring RTTY Contest, BARTG (p. 43, this issue).
Apr. 24-25: PACC. VERON (next issue).
Apr. 24-26: Missouri QSO Party, Northwest St. Louis ARC (next issue).
Apr. 3-4: Florida QSO Party, Florida Skip (p. 142, this issue).
Apr. 3-4: H-22 Contest, USKA (next issue).
May 16-17: Special operation from AUIITU. Details in a later issue.

BRIEFS

The January *CD Bulletin* inadvertently showed WA4PFQ's phone score under the S. C. c.w. listing — sorry, Terry

W1AW SCHEDULES

Operating Hours

Daily: 2330 to 0530 GMT.

While the reconstruction program is in progress, there is no provision made for visiting of the station. Visitors to the ARRL headquarters building, located on the same premises, are of course welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EST Mon. through Fri.

Operating Frequencies

C.W.: 1805 3555 7080 14,100 50.7 145.6

Voice: 1820 3945 7255 14,280 50.7 145.6

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

C.W.: Mon. through Sat., 0100; Tues. through Sun. 0500.
Voice: Mon. through Sat., 0200; Tues. through Sun., 0430.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

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 Mar. 18 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 Mar. 5 at 0500 Greenwich Mean Time on 3590 and 7129 kc. CAUTION! Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. Example: In converting, 0230 GMT Mar. 18 becomes 2130 EST Mar. 17.

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

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0230—0320; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0230—0320, 10, 13 and 15 w.p.m. daily from 0030—0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0230—0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending in step with W1AW and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230-0320 GMT practice on those dates:

Date Subject of Practice Text Jan. *QST*.

- Mar. 1: *It Seems to Us*, p. 9
Mar. 11: *The Teletype Machine*, p. 14
Mar. 17: *The Mar-Bar*, p. 22
Mar. 23: *The Whys of Transmission Lines*, p. 25
Mar. 26: *Hurricane Hilda*, p. 30

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

- Mar. 29: *Inductive Coupling*, p. 27
Mar. 31: *The Transformer*, p. 28

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 card conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

W1AW NOTE

To the full bulletin and code practice schedules on our 20-, 40- and 80-meter frequencies. W1AW now adds transmissions on 160, 6 and 2, as detailed above. Additional equipment for the station has been under long-term construction and is to be installed as fast as it becomes available. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services. The use of additional operating bands will be reinstated as rapidly as new equipment under construction and procurement becomes available and is installed.



DX CENTURY CLUB AWARDS



Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through December 31, 1964.

W6UO 312/337	W3KT 311/335	W8KH 309/329	W0NTA 307/327	W5ADZ 304/326
CX2CO 312/333	W4AA 310/334	W6GPB 309/330	W2OKM 307/325	W4MR 304/324
W8JIN 312/337	PY2CK 310/333	W5KC 309/332	W2LAX 307/324	W2GUM 304/326
W4DQH 312/336	W3LMA 310/332	W4AIT 309/332	W8HGW 306/331	W7AG 304/328
W9RBI 312/337	W2DEC 310/332	W6EBG 309/334	W2FXN 306/320	G3YF 304/326
W2GUV 312/335	W8DMD 310/332	W7GBW 309/333	K4LNM 306/320	W2HMJ 304/324
W2AGW 312/336	W9YFV 310/334	W4TM 308/330	W9AMU 306/323	K2OEA 304/320
W8BRA 312/335	W1MCE 310/333	W0AIW 308/331	574AO 306/324	DJ2BW 304/321
W3GHD 312/336	W4OCW 310/327	W4ML 308/328	W4PYD 306/323	W3GAU 304/327
W1GKK 312/337	W6AM 310/335	K2DCA 308/325	K6ENX 306/323	W7WVE 304/321
W8UAS 312/333	W6Y 310/330	V67ZM 308/332	W6CVY 306/324	W0PGL 304/319
W4GD 312/333	W1JYH 310/333	LUGDJK 308/332	W3RNO 306/328	HB9MO 304/321
W1FH 311/337	W2SUC 310/327	W8ABY 308/328	W1HZ 306/324	W2NUT 304/320
G4CP 311/335	W0QVZ 310/331	W0ELA 308/331	W0SYK 306/324	W0QGI 304/320
G3AAM 311/335	W2ZX 310/329	W0BFB 308/326	W5UX 306/321	W1HX 304/324
W8POO 311/328	W1CLX 310/333	W2ZGB 308/324	W1WZ 305/322	W2HTI 304/319
W2POC 311/330	W9LNM 310/333	W5AFX 308/333	W4LY 305/325	W9ROK 304/328
4X4DK 311/329	K3UPG 310/334	K2BZT 308/328	W3CR 305/322	DL6EM 304/319
W2LPE 311/332	W2BOK 310/327	W0ODR 308/325	W4XGB 305/326	W5ASG 303/327
G2PL 311/334	W8KML 310/331	OE1ER 307/329	W1MY 305/322	W2SAW 303/320
W2JT 311/330	CE3AG 310/334	W3JTC 307/330	W4OPM 305/322	PA0FX 303/323
W8EWS 311/335	DL3LL 310/326	W2UVE 307/325	K6EVR 305/322	I1AMU 303/322
W9NDA 311/335	W9HIZ 310/330	W5CKY 307/326	W3WGH 305/320	G3FXB 303/321
W9KIA 311/335	G8KMM 310/327	C8KS 307/325	W8PUD 305/322	K4RID 303/317
W8MFW 311/329	W1BIH 309/333	W2WZ 307/330	W8IRN 305/323	W8NGO 303/320
W2BXA 311/335	W3JNN 309/333	W2ENW 307/331	K2LWR 305/318	K4AIM 303/317
W7PHO 311/329	D1JBE 309/327	W2TVR 307/325	W4PLL 305/320	W6WVQ 303/320
W8BF 311/332	W5MMK 309/330	W8DAW 307/331	W2FTZ 305/314	W4OM 303/325
HB9J 311/335	W8JBI 309/328	W2AYJ 307/326	W2FY 305/318	WA2ZS 303/319
W2LV 311/330	W0DU 309/331		K2EQ 304/325	W2YTH 303/321

Radiotelephone

CX2CO 312/333	PY2CK 310/333	W8KML 310/331	W9JFF 308/325	W0AIW 304/325
W9RBI 312/335	W3RIS 310/335	W1FH 309/330	W3JNN 307/328	W4OCW 303/316
W8CZ 311/334	4X4DK 310/328	W5ERR 309/331	PY4TK 307/324	TI2HP 303/325
W7PHO 311/329	W4DQH 310/332	W6Y 309/329	W2BXA 307/329	W8HGW 302/324
W8BF 311/332	W2ZX 310/329	W2JT 309/325	W6AM 305/329	I1AMU 302/321
		W8POQ 308/325		

New Members

From December 1, through December 31, 1964, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

VF8JL 203	J8BB 112	HA8UD 104	W6PLS 101	Y08RL 101	WA6SBS 100
K25TD 173	OZ2EGL 112	HK8NQ 103	W6RAMH 101	WA2THY 100	K9PQK 100
DJ9GD 159	W2GRW 108	W2TOD 102	W7VZC 101	K3HTK 100	K9VQK 100
DJ8LF 116	W6MVF 108	DL9BT 102	JATMN 101	WA4FTW 100	LA2C 100
K4MOJ 112	DL9NL 107			WA6QNN 100	Y07DO 100

Radiotelephone

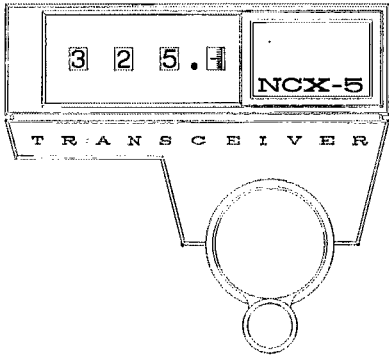
K25TD 127	DJ7ZG 106	ON4AM 105	VE3CUS 104	K4REC 101	K4FTZ 100
	PY7AKW 106		K3CNN 101		ZL1AJD 100

Endorsements

W2CR 314	W4DLG 256	W46HX 211	W4OEL 172	SM1CXE 162	CR7FN 130
W7HKT 310	G8JM 256	W8IQS 211	WA2FQG 170	K4CBB 151	W3FLY 129
W2RGV 302	W8FLL 252	YV5AK 211	W4FEO 170	WA2BH 150	K3ICA 125
W7CMO 301	W5KTV 250	W6LDA 202	K8EHD 170	W9QQN 150	K7CVL 125
W9KXK 301	W7TQL 250	WA6QGW 202	LA3UF 166	VE3UC 148	K4NVL 122
W2EQS 300	K6HJQ 242	WA6PTM 201	K5QVH 162	WA4DZU 146	SM4CMG 122
K6LGF 300	W6ABA 241	W0P2MK 200	W42RFB 160	W9GXH 144	W4LUD 121
K2SHZ 296	W4HKJ 240	SP8HT 200	K6CNN 160	K1AQI 143	WA2YVI 120
W1BGA 290	W0JZ 240	K4UPD 191	W8RCM 160	SM7AUO 143	WA1AMU 120
W3AFM 281	W9WU 240	WA5CBL 190	W0TDR 160	VE8DX 141	K4YYL 120
W2ML 273	VE8RG 236	K6POC 190	KP4BJD 160	W3URE 140	W6RGG 120
W6ATGY 273	OH2YV 231	SM5MC 183	PY2BGL 160	W6FB 140	WA6SLU 120
W3INH 270	K1IGO 221	K8RDE 181	W4LYQ 157	W9WQG 140	K6QYD 120
K4HYL 270	K6HPH 220	K1PL 180	K9TJU 154	K9TJV 140	K9DRT 114
W8KUT 270	VE3AGC 220	W2ECS 180	DL1XZ 154	W0PAH 140	W7NPU 112
W0AUB 270	W2ZTV 215	K2PFC 180	W8NPF 153	W8SH 132	SM6ARH 112
K3DCP 260	Z8ZU 214	W5IPH 180	LA1H 152	CE5EF 132	W1CNP 110
K8WOT 260	K4BVD 213			W82XD 130	W2VIR 111

Radiotelephone

W9NDA 321	K4HYL 265	SM5RY 210	OA4KY 190	W6LDA 161	WA2FQG 130
ON4AM 320	W2PTM 259	W2ZTV 203	W3BSC 181	K8WOT 153	W9WU 130
W2TP 300	W8ZJY 243	K6GNX 200	W5PH 179	K6HZZ 150	KR6OF 130
DL6EN 300	F0DJ 240	VE3IO 200	WA8TGY 171	W8AJI 150	WA5EPL 122
W4OM 291	W5AYD 234	G4JW 196	SM5MG 169	TI6AI 143	K6JZN 121
W8RGY 290	W7CMO 231	W4KJ 192	K1AMO 168	W0QUY 142	K5AIF 121
K2BZT 273	W2ODO 230	W4NL 191	W8CUT 187	WA4YQ 141	WA6KNE 120
W1HX 270	OA4PD 215			9Q8AB 141	VE3EUE 114



IF you haven't yet seen the digital frequency display used in the NCX-5 transceiver, you'll be quite surprised and pleased at the unusual ease of operation it offers. The operating frequency is read directly in kilocycles and hundreds of cycles by means of four counter dials. The first three, reading from left to right, are added to the bandswitch frequency in megacycles. Thus, if the bandswitch is in the 14.0 Mc. position, and the counters read 327, the frequency of operation is 14,321 Kc. The VFO is accurate to one KC throughout its entire range of 500 KC, so that it is practical to incorporate a fourth counter dial which provides ten 100 cps increments for even greater reseta-

bility. Naturally, the finite accuracy of the 100 cps read-out is quite high near a 100 Kc. calibration point — and the prime advantage of the additional calibration is to allow reset to a *precise* frequency within better than 100 cps. The 100 cps calibrations are approximately $\frac{1}{16}$ " apart, so that they may be readily interpolated to around 30 cps.

THERE are a number of distinct advantages to the digital frequency display in the NCX-5. The most obvious, of course, is the complete absence of parallax. No matter what the viewing angle, the accuracy of read-out is unaffected. In addition, it is not necessary to count forwards or backwards from a numbered calibration point as in other highly accurate dials — since read-out is instantaneous and the counter does all the math for you. A digital display is quite easy to see — perhaps the most important point when the operator has less than perfect vision. The numbers in the NCX-5 digital dial are $\frac{1}{4}$ " high — and may be comfortably read, with normal vision, from a distance of ten feet (only important if you have *very* long arms).

THE NCX-5 digital dial incorporates some unusual mechanical features — the most noticeable is the absence of the "clickety-clack" noise often associated with counter mechanisms. A special geneva mechanism rotates the counter wheels to provide a smooth transition from one number to the next, and results in an extremely silent counter movement. There is a band reversal in the NCX-5 on 80 and 10 meters because of the mixing system used, which with conventional dials requires a separate set of dial calibrations going the other way. The NCX-5, instead, has *two* sets of counter wheels — one for 80 and 10, one for 40, 20, and 15 meters. The set of counter wheels not in use is masked, and moves into place behind the window when the bandswitch is changed.

TAKE a careful look at the entire NCX-5 digital counter mechanism the next time you're at the local ham emporium. It's quite easy to see as soon as you lift the lid. Notice the construction of the one-piece counter and VFO mechanism, mounted on a massive aluminum extrusion for rigidity and mechanical stability. Check the use of split gears and the way they result in an unusually smooth dial. Also, you might appreciate the novel dial-set adjustment. In particular, see if you can figure out how the stop mechanism works to provide a positive end-of-rotation at the band edges. As a clue, the two gears that do the trick are the third set directly in line behind the tuning knob (yes, *we* know how they work, but you might get a kick out of working it out yourself). Answer in next month's page.

Now, all this is not really a device to get you to a National dealer and so close to an NCX-5 that you can't resist the urge to trade, but as long as you *are* right there. . .

MIKE FERBER, WIGKX



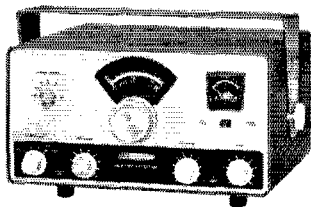
National Radio Company, Inc.

HEATHKIT® Amateur Radio Gear...

"SINGLE-BANDER" SSB TRANSCEIVERS

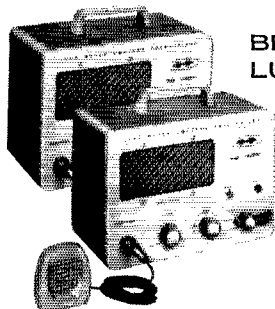
HW-12
Choose 80,
40, or 20
meters

\$119.95



200 watts on the band of your choice with built-in PTT and VOX. Versatile! See line listing below for power supplies. Go mobile or fixed!

Kit HW-12 (80-meter), Kit HW-32 (20-meter), Kit HW-22 (40-meter), 16 lbs.....each \$119.95



BENTON HARBOR LUNCH BOXES...

HW-29A
6 & 2 Meter
Transceivers

\$44.95

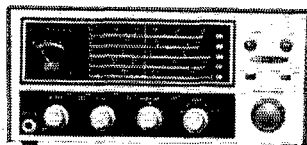
Take along one of these handy 5-watt rigs on your next outing. Complete for 117 v. AC operation. Use Heathkit GP-11 power supply for mobile.

Kit HW-29A (6 meter) & HW-30 (2 meter)...each \$44.95

"COMBO" FOR THE NOVICE

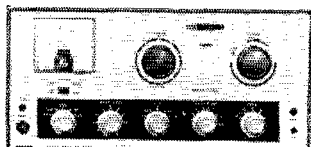
HR-10
Receiver

\$79.95



Heathkit
DX-60A
AM/CW Transmitter

\$79.95



Here's inexpensive amateur radio... yet the finest quality! HR-10 provides amateur band coverage 80-10 meters with xtal filter, calibrator, BFO, and AVC. DX-60A provides 90 watts AM or CW with low harmonic output from xtal control or external VFO.

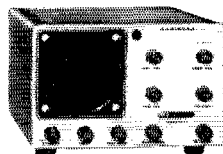
Kit HR-10, 20 lbs.....\$79.95

Kit DX-60A, 25 lbs.....\$79.95

HEATHKIT "MONITORS" ADD PROFESSIONAL QUALITY TO THE AMATEUR STATION

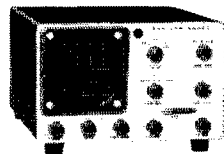
HO-13
"Ham-Scan"
Spectrum Monitor

\$79.00



HO-10
Signal Monitor

\$59.95



"Ham-Scan" shows a panoramic display of radio signals 50 kc/s on each side of receiver tuning. Shows band conditions instantly!

Kit HO-13, 12 lbs.....\$79.00

HO-10 shows actual quality of transmitted and received signals. Displays envelope, AF and RF trapezoid patterns.

Kit HO-10, 12 lbs.....\$59.95

TUNNEL DIPPER

HM-10A

\$34.95



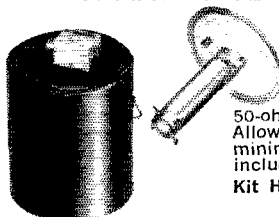
Outperforms the usual grid-dip meter through solid-state circuitry.

Kit HM-10A, 3 lbs.....\$34.95

HEATHKIT "CANTENNA" TRANSMITTER DUMMY LOAD

HN-31

\$9.95



50-ohm impedance. Oil cooled. Allows power measurements with minimum radiated signal. (Oil not included).

Kit HN-31, 3 lbs.....\$9.95

For Complete Descriptions See Your 1965 Heathkit Catalog

Kit HP-13 DC Power Supply (converts 12 v. DC to power for single-banders), 7 lbs.....\$59.95

Kit GP-11 Vibrator Power Supply (6 or 12 v. DC to 250 v. DC @ 100 ma.), 6 lbs.....\$16.88

Kit HP-23 AC Power Supply (converts 120 v. AC to power for single-banders), 19 lbs.....\$39.95

Kit HS-24 Mobile Speaker, 3 lbs.....\$7.00

Kit PM-2 RF Power Meter, 2 lbs.....\$12.95

Kit CO-1 Code Practice Oscillator, 2 lbs.....\$7.95

Kit HD-11 "Q" Multiplier, 3 lbs.....\$14.95

Kit HG-10 VFO, 80-2 meters, provides 5 volts RMS, 12 lbs.....\$34.95

Kit HD-20 100 kc Crystal Calibrator, 1 lb.....\$14.95

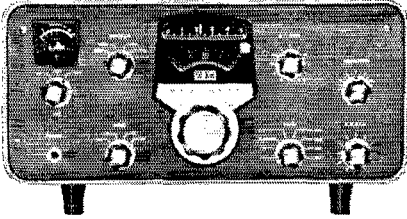
Kit HM-11 Reflected Power Meter, 3 lbs.....\$15.95

World's Largest Selection!

YOU CAN SAVE UP TO 50%

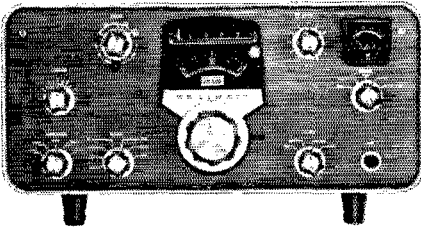
HEATHKIT DELUXE SB SERIES...

SB-300 SSB RECEIVER... \$265.00



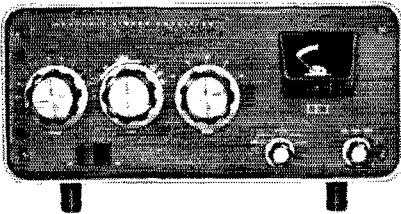
- A new standard of amateur performance & value • 80-10 meters with provision for VHF converters • Crystal-controlled front-end for same rate tuning on all bands • 1 kc dial calibrations—100 kc per dial revolution • Bandspread equal to 10 feet per megacycle • Provision for transceive operation with matching SB-400 transmitter • Drift less than 100 cps per hour after warmup • 8 ohm audio output matches HS-24 speaker • Compact—weighs only 22 lbs.

SB-400 DELUXE SSB TRANSMITTER... \$325.00



- Built-in power supply • Complete transceive capability with SB-300 receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation (upper or lower sideband) • VOX operated CW uses CW sidetone • 1 kc dial calibration—100 kc per dial revolution • 500 kc coverage per bandswitch position • 33 lbs. weight.

SB-200 KW LINEAR AMPLIFIER... \$200.00



- 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation • Weight 42 lbs.

6 & 2 METER PLUG-IN CONVERTERS EXTEND OPERATION OF SB-300



6 meter model extends coverage from 48-54 mc (50-52 mc crystal supplied). 2 meter model extends coverage from 142-150 mc (144-146 mc crystal supplied). Designed to plug-in to SB-300, but work with any receiver having proper voltages and 10 meter coverage. 2 lbs. **SBA-300-3** (6 meter), **SBA-300-4** (2 meter), 2 lbs.....\$19.95 each

FREE 1965 HEATHKIT CATALOG

HEATHKIT 1965



See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications... Send for Free copy!

HEATH COMPANY, Benton Harbor, Michigan 49023
In Canada: Daystrom, Ltd., Cooksville, Ontario Dept. 9-3

Enclosed is \$ _____, plus shipping.

Please send model (s) _____

Please send FREE 1965 Heathkit Catalog.

Name _____

(Please Print)

Address _____

City _____ State _____ Zip _____

Prices & specifications subject to change without notice. AM-153

Giant MOVING SALE!

Trade or No-Trade/Cash or Terms

SAVE BIG MONEY on

NEW HALLICRAFTERS Equipment

ACT NOW!

STERMAN
ELECTRONIC
SUPPLY



TERRY STERMAN
W9DIA
Proprietor

"We're moving soon to a bigger and better location, here in Milwaukee. At our present location we're bursting at the seams with Brand New Factory-Sealed Equipment. It would cost us too much to move our giant stocks—so . . . we're having this Giant Moving Sale, and passing the savings on to you. Until we move, we'll be trading wilder than ever. If you've been thinking about trading up to some New Equipment, now is the time to get our quote. You'll never get a better deal! Use handy coupon below! There is no obligation."

TRADE-IN Coupon

To: STERMAN ELECTRONIC SUPPLY
4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am interested in the following new items:

I have the following to trade:

Rush me your SPECIAL MOVING SALE TRADE-IN DEAL by return mail. I understand I am under no obligation.

Name _____

Address _____

City _____

State _____ Zip Code _____

Send latest Reconditioned Equipment Bulletin

We stock the entire Hallicrafters Line

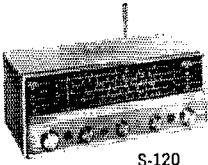
STERMAN ELECTRONIC SUPPLY

4828 West Fond du Lac Ave.
MILWAUKEE, WISCONSIN 53216
Telephone (414) 442-4200

NOTE: Our firm was formerly known as
AMATEUR ELECTRONIC SUPPLY
We've changed the name . . . *THAT'S ALL!*

VISIT our Branch Stores, located at:
6450 Milwaukee Avenue | 19 Azalea Pk. Shopping Ctr.
CHICAGO, ILLINOIS | ORLANDO, FLORIDA
Phone (312) 763-1030 | Phone (305) 277-8231

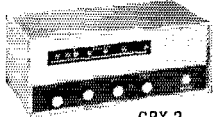
LOOK at your low Monthly Payment AFTER JUST \$5⁰⁰ DOWN



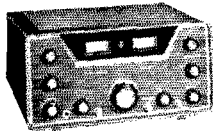
S-120



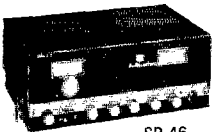
SX-62B



CRX-2



SX-117



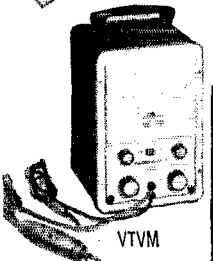
SR-46



CB-10



CB-11



VTVM

HALLICRAFTERS

S-120 AC/DC	(2.34)	\$ 69.95
S-118 5 tubes	(3.42)	99.95
S-108 7 tubes	(5.23)	149.95
SX-110 7 tubes	(5.95)	169.95
SX-122 9 tubes	(10.47)	295.00
HA-7 Calib		19.95
SX-62B 14 tubes	(18.77)	525.00
H-3 Headphones		4.95

Special Receivers:

CRX-1 30-50 mc	(3.42)	\$ 99.95
CRX-2 151-174 mc	(3.78)	109.95
CRX-3 Aircraft	(3.42)	94.95
CRX-4 30-50 mc	(2.34)	69.95
CRX-5 151-174 mc	(2.34)	69.95

Ham Band Equipment:

SX-140 Rec.	(4.87)	\$139.95
SX-140K Kit	(3.97)	114.95
HT-40 Xmtr.	(3.78)	109.95
HT-40K Kit	(3.06)	89.95
SX-117 Rec.	(13.53)	379.95
HA-10 Tuner		24.95
HT-44 Xmtr.	(14.08)	395.00
CA-44 Cable		4.95
HT-45 Linear	(13.00)	365.00
P-45 AC Sup.	(7.94)	225.00
SR-150 Xcvr.	(23.29)	650.00
SR-160 Xcvr.	(12.44)	349.50
HA-16 VOX		37.95
MR-150 Rack		39.95
MR-160 Rack		14.95
P-150AC Sup.	(3.41)	99.50
P-150DC Sup.	(3.41)	99.50
HA-1 Keyer	(2.70)	79.95
HA-5 VFO	(2.70)	79.95
HA-8 Mod. Ind.		24.95
R-47 Speaker		12.95
R-48A Speaker		19.95
R-49 Speaker		14.95
SR-42 2m Xcvr.	(6.67)	189.95
SR-46 6m Xcvr.	(6.67)	189.95
MR-40 Rack		11.50
HA-32 Rotor	(7.94)	225.00

Citizen's Band:

CB-7 6 channel	(3.42)	\$ 99.95
CB-9 "Deluxe" CB-7	(4.51)	129.95
CB-10 Transistor	(5.23)	149.95
P-10 AC Supply		29.95
CB-3A 8 channel	(5.59)	159.95

Hand-Held CB Units:

CB-6 100 mw ea.	(1.98)	\$ 59.95
CB-8 1 Watt, 2 ch	(3.42)	99.25
CB-11 100 mw—pr.	(2.70)	79.95

Test Equipment:

VTVM	29.95	\$ 59.95
Condenser Tester	29.95	49.95
RF Generator	29.95	64.95
Resistor Decade	14.95	24.95
Capacitor Decade	14.95	24.95
Battery Eliminator	49.95	79.95
Oscilloscope	84.95	164.95

HAM NET

	\$ 69.95
	99.95
	149.95
	169.95
	295.00
	19.95
	525.00
	4.95

"If you are considering purchasing, **WITHOUT TRADE**—either Cash or Financed—any **NEW Equipment, Antennas, Towers, or Station Accessories, etc.**—You will want to get our **Special NO-TRADE MOVING SALE DEAL.** You know that the Manufacturers would frown upon our advertising a Discount . . . So, tell us what you are interested in on the Coupon below, and we'll call you Long Distance (at our expense), to let you know how we can save you **BIG MONEY.** You are under no obligation! Sorry, we cannot accept Collect Calls—we'll call you."



RAY
K9KHW
Mgr. Mail
Order Dept.

NO-TRADE Coupon

To: **STERMAN ELECTRONIC SUPPLY**

4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am seriously considering purchasing the following new equipment without trade-in:

I understand you will phone me long distance (at your expense) and tell me how I can save money during your **MOVING SALE:**

My home phone # is: _____ My phone # at work is: _____

Best time to call: _____ Best time to call: _____

My area code is _____

Name _____

Address _____

City _____

State _____ Zip _____

Send latest Reconditioned Equipment Bulletin

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—PAM: W3CFA, RM: W3EEB, DEPN meets Sat. on 3905 kc. at 1830 local time; D8MIN meets Tue. on 50.4 Mc. at 2100 local time. Appointment: W3CFA as PAM. Renewals: W3HKS or ORS, W3FJF as OO, W3LEC has moved to Pennsylvania. Ex-KN3YRT is now W43BQT. Ex-W4GCU is now W3BKQ. Ex-K4EUS is now W3BDP. At its Annual Dec. Dinner the Kent ARC chose K3OPF as the outstanding amateur of the year. K3NHL has a new tower and 40/20 beam up at his new QTH. Now that the holidays are behind us there should be increased activity on the nets. Traffic: K3YZF 139, W3EEB 55, K3YHR 16, K3CUU 15.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI, RMs: W3EML, K3-3VO, K3YVG, PAMs: W3SAO, W3SGI. New section appointments: K3MHD as ORS and K3MSG as OES. The E. Pa. C.W. Net has QNI of 375 with QTC of 515. PTTN had QNI of 289 with QTC of 163. K3VKG and OM, K3VRP, are active on 75 and 10 meters. New Gear Dept.: W3CUL added an SR-160 in the kitchen for a monitor. K3MVO and W3ZRQ added a 24-hour clock. K3HTZ received DXCC and K3YVG the A-1 Operator certificate, along with a new harmonic. New General Class licensees are K3WEU, K3VZM and K3ZXO. A rebuilt rig and improved v.f.o. increased power for W3JXN. Two-meter gear was added to K3RZE. Northumberland County EC W3LXN acquired a 7½-k.w. generator. K3NLW is on leave from Naval Station, Treasure Island, Calif. The International Resistor ARC cleaned out the junk box and donated all surplus to the Overbrook School for the Blind. K3PBU finally got his HG-10 v.f.o. to cooperate with the HT-40. New club officers:

The Poor Richard Radio Assn.: K3SFP, pres.; K3YQJ, vice-pres., The Philmont Mobile RC: K3EIJ, pres.; W3YHV, vice-pres.; K3CEE, secy.; W3GOW, treas. The successful tutoring of K3AOH resulted in the addition of WN3BYN, W4AFN and K3FRU to the ham bands. During "Ham Radio Week," declared by Mayor Tate of Philadelphia, W3CDY and W3ADV were interviewed by radio station WPEN. The new EC for Lehigh County, W4BYH, gave the Coplay Rotary Club a talk and demonstration on emergency communications. During the recent Philadelphia AREC meeting while W3ELI was speaking on fire emergencies, a 6-alarm fire broke out and broke the meeting up. On the scene in jig time were W3ELI, K3KTY, W3ERP, W3SAO, K3DXC, K3GOJ, K3YPL and K3DLS. A brief rundown shows there are 94 section appointments; 87 stations sent a total of 538 monthly reports totaling a grand sum of 102,172 pieces of traffic handled. A drop of 5000 in traffic is shown from the 1963 totals. Traffic: W3CUL 9802, W3-EML 1502, W3IVS 1493, W3VR 1392, K3MVO 839, K3MYS 609, W3ZRQ 234, K3YQJ 195, K3PIE 168, K3HNP 163, W3QDW 159, K3WEU 137, W3JXN 109, K3RU4 109, K3-KTH 106, K3YVG 101, W3RV 85, W3ELI 74, W3VAP 64, K3MNT 61, K3PWW 58, W3AXA 48, W3LXN 46, K3RZE 44, W3CBH 39, K3HFH 20, W3OY 18, K3HKW 17, K3-MHD 13, W3BUR 10, W3BFE 9, W3ID 8, K3LPT 6, K3TEJ 4, K3HTZ 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE, RMs: W3QCW, K3JYZ, W3JCG, W3ZNV, PAMs: W3RKK, W3JZY. Nets:

MDD	Daily	0000Z	3643 kc.	Tfc. 334
MDDSD	Daily	0130Z	28100 kc.	
MEPN	M.W.F	2300Z	3820 kc.	Tfc. 39
MEPN	S.S	1800Z	3820 kc.	

Christmas Doings: W3CDQ and W3GCO found that Christmas activities cut into their operating time. W3-IVC got on the air while home on Christmas leave. K3-UFV used his Christmas vacation to clear up technical problems in his shack. K3URZ found a new Vibroplex among his Christmas gifts. New Gear: K3TJU has a new T-150A and a 10-meter ground plane. K3YEK has a 432-Mc. beam in operation. K3VCG has a 6-meter walkie-talkie working. K3OSX replaced his DX-40 with a DX-100 and has fine results. W4AJR has an automatic t.r. switch working and has a new driver's license which will lead to 2-meter mobile. Operating: K3LFD handled traffic on 80-meter c.w. and 6-meter

• 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.

phone. K3UXY shared time between DX and net operation. W3QCW reports that propagation conditions on MDD were as bad as predicted with 40 per cent of the sessions affected. K3LLR is sticking to traffic on the lower bands because of poor v.h.f. conditions at his station. K3TJE reports "too much school work" but managed to be No. 3 in traffic and boost his DX total to 83 countries. WN3BNL operates aeronautical mobile. *Special Interest:* K3VHS is an engineer at WHMC. K3QDD says the Montgomery Blair H.S. ARC is offering a program of ARRL training aids for students. Traffic: (Dec.) W3PQ 188, K3UQU 162, K3TJE 117, K3BURZ 110, W3-QCW 101, K3UXY 99, K3QDD 95, K3LFD 77, K3VHS 66, W3ZNV 64, K3JYZ 61, K3UFV 61, W3ATQ 31, K3-OSX 30, K3GZK 25, W3IVC 16, K3NCM 12, W3BWT 4, W3JZY 4, K3VCG 4, W3GCO 2, WN3AJR 1, K3LLR 1, (Nov.) W3PQ 91, W3GCO 13, W3MCG 8.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY, PAM: W2ZP, RM: WA2BLV, W2ZVW, Beverly, has been appointed Asst. SCM. Southern Counties Area elected WB2HFV, pres.; WB2FIS, vice-pres.; WB2MRA, secy.; W2PUR, treas. WB2MMD, Monroeville, is recovering from a recent operation—his traffic total more than doubled for Dec. WB2-GUK, Atlantic City, is very active handling traffic with his new K.W. N.J. Phone & Tlc. Net totals for Dec.; 31 sessions, QNI 520, traffic 398. K2CPR, Pennsauken, has received his 231st award. W2BEI, Audubon, reports a DXCC total of 130. W2BZJ, Pennington, is getting accustomed to new equipment, including s.s.b. W2BAY, Haddonfield, is heard Sun. on 1805 and also QCWA on 3810 kc. WA2VWF, Wenonah, has started an AREC net Fri. nights on RTTY. The SJRA had a big turnout at its Christmas Party. WB2MNF reports the forming of the Haddonfield Memorial High School ARC. SJRA's newly-elected officers are W2ORA, pres.; W2FZF, vice-pres.; W2FYS, rec. secy.; WA2ABF, secy.; K2ZBG, treas. The Burlington County Radio Club's officers are W2-ZVW, pres.; WA2MGV, vice-pres.; W2PKF, treas.; K2BG, secy. WB2AVA is vice-pres. of the Haddon Twp. High School RC. The Cherry Hill High School RC elected WB2GPH, pres.; W2EQI, vice-pres.; WB2-NPY, sec.; WB2MPH, sgt.-at-arms. Atlantic Division Director W3VA has appointed W2ZL, W2ZVW and K2BG as assistant directors of the Atlantic Division. Traffic: W2ZVW 182, W2RG 150, WA2KIP 14, W2SMD 117, WA2VAT 84, WB2GUK 80, W2ZI 47, K2RXP 45, K2SHE 33, K2CPR 16, W2BEI 4, W2BZJ 3, WA2KAP 3.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—PAM: W2PVI, RMs: W2RUF, W2EZB and W2FEB. NYS C.W. 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 3510.5 kc. at 1930 Wed.. TCPN 2d call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 and 2345 GMT. NYSN on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. The NYSPTEN maintained a continuous vigil in December for 39 hours. The occasion was a severe ice storm involving over 4000 square miles and disaster conditions prevailed, phones and power were out and many hams and groups deserve a lot of credit for their assistance. NYSPTEN elected WA2TUI, mgr.; WA2JWL, 1st asst. mgr., K2AIK, 2nd asst. mgr. and WA2RLV was re-elected secy.—treas. W2ANE, former mgr., becomes chairman of the policy committee. BPLs were earned by W2OJE, K2KQC, W2GVT and W2RUF. ECs were appointed as follows: K2AYQ, Glens Falls area; WA2NDC, Lewis County; WA2QVR, Franklin County. These fellows are in charge of AREC-APRSC in these areas and they deserve your support. Appointment—
 (Continued on page 106)

OPTIMUM SPACED FOR MAXIMUM GAIN!

hy-gain 2 Meter BEAMS

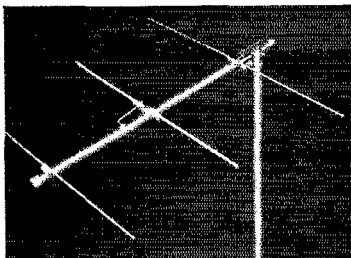
Model 28—An 8-element performance giant. Longest element, 3'6"; boom length, 14'; turning radius, 7'6". \$16.50 Net

• Exclusive Hy-Gain Beta Match

Hy-Gain 2 meter beams feature a special VHF Beta Match configuration which permits maximum gain and F/B ratio with a nominal 50 ohm feedpoint impedance without detuning any of the parasitic elements. An optimum transfer of energy thus results without sacrifice in gain or pattern control.

• Coaxial Balun

To assure a perfect balance of currents to the driven element, Hy-Gain 2 meter beams are supplied with a coaxial balun. All models take maximum power input of 1 KW and are fed with 52 ohm coax.



Model 23—
A superb performing, compact 3-element antenna. Longest element, 3'6"; boom length, 3'; turning radius, 4'. \$6.95 Net

Model 215—The Epitome in Beam Performance—15 elements longest element, 3'6"; boom length, 28'; turning radius, 14'. \$33.50 Net

Across Town—Oscar III—Moonbounce...whatever you want to work, Hy-Gain has the exact antenna you need. Send for fully illustrated 16-page Catalog No. 204...it's FREE.

HY-GAIN ELECTRONICS CORPORATION

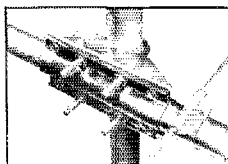
8406 N.E. Highway 6 - Lincoln, Nebraska

• Scientifically Staggered Optimum Spaced Elements

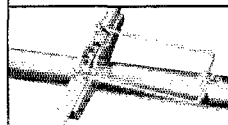
All Hy-Gain 2 meter beams feature a new concept in beam construction...one that results in actual delivered performance equalling maximum theoretical gain. Strategically staggered optimum spaced elements along the boom are referenced solely to increased field strength intensity and pattern control thus delivering tremendous increases in directional gain not attainable with close-spaced beams or optimum-spaced beams using linearity as the sole reference.

• Mechanical Reliability

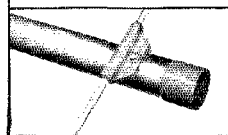
Hy-Gain 2 meter beams feature booms constructed of heavy wall, aluminum tubing. The mast brackets are machine formed of heavy gauge steel. Elements are of 1/4" rod for maximum efficiency in the 2 meter frequency range. Element to boom fittings are injection molded of high impact styron...an exclusive Hy-Gain innovation. No structural details have been overlooked...Hy-Gain 2 meter beams are built to deliver the ultimate in performance and mechanical reliability. Maximum wind survival of all models is 100 mph.



Machine formed heavy gauge boom to mast bracket



Rugged driven element to boom bracket



Parasitic element to boom bracket

ment: WB2NNA as ORS. Endorsements: WA2THY as OBS. K2DNN as EC (Chemung County, WA2IYB/WA2TFV as OPS. The ARATS elected W2RPO, pres.; W2PVL, vice-pres. and treas. and K2RTQ was reelected secy. for a 5th term. The GRAMS elected K2IAQ, pres.; WA2CTI, vice-pres.; W2GIB, secy.; and W2TON, treas. Silent Keys: WA2BRN, who was active in v.h.f.; W2AFY, very well known to those on 75-meter s.s.b. and very active in RAWNY through the years; K2PMD, one of the organizers of GRAM and active in the Bavaria area. The FMT for Class 1 OOs is not a contest but our section consistently is near the top in accuracy. Most OOs use BC-221 and receiver. W2PZI is near perfect with this equipment. Other top men are W2RN, W2ZDL, K2LGI, W2BTP, WB2NZA, K2KTK, WB2FPG and WA2AHP. K2MQN was elected pres. of the Lackawanna ARA and mgr. of the Erie County Phone, T&E Net. WB2NZA became a RACES member. WA2THY received WAS, WAC and DXCC. W2QB, licensed since 1914, has retired and now has plenty of time for 20-meter e.w. Send your appointment certificate to the SCM if endorsement is required. Traffic: (Dec.) W2OE 764, K2-KQC 640, W2GVH 566, W2FEB 189, WB2GAL 176, W2-MTA 152, W2HYM 137, K2JBX 134, K2RTQ 91, K2OFV 66, W2FCG 59, K2AYG 57, K2RYH 45, WB2JQS 44, K2LXC 44, W2RQF 34, K2IMI 32, K2MQN 18, W2PNW 13, K2DNN 17, W2PVI 13, WA2GLA 9, WA2PPQ 8, W2FPG 7, WB2NZA 7, K2HOH 6, K2BWK 4, WA2-TNY 2.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3-NEM. SEC: K3OTS, PAM; W3TOC, RMs; W3KUN, W3MFB, W3UHN, K3OOU. Traffic nets: WPA, 3585 kc, 0000GMT Mon, through Sun, KSSN, 3585 kc, 2330 GMT Mon, through Fri. Interested in the AREC? If so, contact the section SEC, SCM or any EC for details. W3-NEM has been appointed Asst. SCM for the WPA section. K3USC, with a two-element Quad, is working DX on 20. W3RFX has moved to California. WN3BKF passed the General Class exam. W3BWU completed his first two-way contact with Ohio via RTTY. K3PYS made that BPL again. W3RUL uses a new HG-10 v.f.o. K3RQV has a new TA-33, 7-44 and tower in operation. K3YDD and XYL K3YBR are doing well with a four-element Quad on a 70-ft. tower. K3QTY is happy with a new SB-400. Santa was good to W3LOD, delivered a new "mike" for his s.s.b. transmitter. New hams up Eric way are WA2BZG and WA3BTF. WN3CDL is getting out on 2 meters. The Univ. of Pittsburgh Amateur Radio Assn. has received its former call, W3YI, to replace K3RIA. Talk about antennas—K3CFA, erstwhile OBS, has a 2-meter 24-element Collinear up 55 feet. W3FSF is temporarily in California on business. W3-LAMI is now a member of the 100,000-mile flight club, WA3BNO, at McKeesport, plans 2- and 6-meter activity. K3FFJ, OO with 26 parts per million, accomplished his best measurement ever during a recent ARRL Frequency Measuring Test. The section can use more Official Observers. K3IDJ erected a new homebrew Cubical Quad. K3ZMH (EC) requests participation in the AREC Allegheny County Net (ALN) each Sun, at 1300 GMT on 7152 kc. A new Novice in McKeesport is WN3CFF. Call Book winners during the past Pennsylvania QSO Party under the auspices of the Nittany ARC are W3-ERD and K3IINP. K3QIO attends Penn. Technical Radio school in Pittsburgh. W3GJY built the Twin City TU and plans RTTY activities. Traffic: (Dec.) W3KUN 387, K3PYS 238, K3TEZ 143, W3LOS 124, W3SMV 77, W3GJY 60, K3SOH 56, W3NEM 53, W3MFB 29, K3ZMH 23, W3IYI 20, W3OEO 20, W3UHN 18, K3NZB 12, K3-SMB 12, W3LOD 10, W3YA 8, W3TOC 6, K3EDO 4, W3KWO 2. (Nov.) W3NEM 224, W3JHG 31, K3NZB 26. (Oct.) K3NZB 58.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George Neshed, W9LQG. SEC: W9RYU. RM: WA9DXA, PAM; W9VWJ, Cook County EC: W9-HPG. Section Net: ILN, 3515 kc, Mon, through Sat, at 1900 CST. The new officers of the Rockford Amateur Radio Assn. are K9AHH, W9VZ, K9SAN, WA9BLE, W9BRY, K9VJJ, W9BQC, WA9DXE and K9CKX. WA9DXE, the new RM of the Illinois section, has asked that all those interested in traffic be sure and check in nightly on ILN, which has now been reactivated. Operators in all parts of the state are needed. W9URI is working on his Ph.D at the University of Michigan. K9-KZB and K9AXS are net manager and secretary of the North American Two-Meter Net. K9EIV is now on s.s.b. with a Hallicrafters HT-37. W9PVD has completed the building of the Health HW-32 and reports FB contacts. The traffic count for the 9th Regional Net was 878, with Illinois having a 100 per cent check-in. The Worth Township Amateur Radio Club supplied food for needy families' Christmas dinners. WA9KYT has a new keyer and a

multiband antenna to bring his DX score up. W9SXL reports that the Bloomington gang has added two old-timers to Silent Keys, W9CEO and W9JRX. Our sympathy to their families and friends. WA9CCQ has a TA-33 jr. for bringing in new DX. 815 messages were passed by the Interstate Sideband Net and NCSs. WA9DXE, WA9-APT, K9YNL and W9MAK of the ILN report a traffic count of 64. K9CON, WA9JLH, K9CNX, K9RZN and WA9JPT were reelected new officers of the South Eastern Illinois Ham Society. WA9NFS has received his General Class license. New officers of the Joliet Amateur Radio Society are W9OKM, W9REA, W9YJG and K9YAJ. K9-MWH has a new SR-200. W9HOD is using a newly-acquired NCX-3. W9YYG has installed a two-element 7-Mc. beam. WN9MKT is working mobile with a Clegg 22er. WA9AWP is building a 146.94-Mc. repeater. W9ESG is State C.D. Radio Officer and not W9EGB, as reported in the Dec. issue of QST. W9FVU was elected chairman of the Chicago Area Club Council. Other officers include K9PGN, W9MYF and K9PDT. W9RHP has a new SR-46 with a nice signal on 50 Mc. W9JUV/K9OSO, W9NPC, K9RAS, K9VVL and W9WYB participated in the League's recent Frequency Measuring Test. K9BTE reports that the traffic count of the North Central Phone Net was 1176. New father-and-sons amateurs are WN9-MFK, WN9MFI and WN9MFJ. WA9BYF is a new OO appointee and W9LQF has been appointed as Asst. SCM. K9TQH is now W9IDY. BPL certificate recipients for December traffic: WA9CCP, K9KZB and WA9CNY. Traffic: WA9CCP 1502, K9KZB 892, WA9CNY 621, W9-MAK 178, W9AXR 171, WA9DXA 160, WA9GUM 112, W9DOQ 98, K9HSK 84, K9CYZ 83, WA9APT 78, W9JXV 74, WA9AJF 50, WA9NFS 24, W9GFF 17, W9PRN 10, W9UAR 10, W9IDY 8, W9LNQ 8, K9MDN 7, K9UIY 7, W9HPG 6. K9EIV/9 2, K9RAS 2, K9DEV 1, W9QQG 1.

INDIANA—SCM: Ernest L. Nichols, W9YXX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. RMs: W9TT, W9DGA, PAMs: K9CRS, K9GLL, K9IVG. Net skeds in GMT: IFN, 1330 daily and 2300 M-F on 3910 kc.; ISN, 0000 daily and 2130 M-Sat, on 3910 kc.; QIN, daily at 0000 and RFN at 1200 Sun, on 3656 kc. New appointments: WA9AUM as OO Class IV, K9FFY as OPS and WA9AKU as OES. BPL winners: W9AMI, K9IVG, WA9BIV and W9NZZ. QIN honor roll: W9TT, K9VHY, K9HYV, WA9AVT, K9VWJ and WA9BIV. The Tri-State ARS participated in a YMCA Santa Clothes Drive. W9TT is equipping a trailer for mobile operation. Indianapolis RC officers: K9JSE, pres.; K9VIE, vice-pres.; WA9CCX, secy.; K9EJU, treas. Tipton Co. AREC is starting a c.w. practice net on Mon. nights on 3710 kc. WA9KWH is a new General in Portland. W9SWM got married. WA9BGI has installed a 52.525-Mc. f.m. base station. South Bend RC officers: WA9CJR, pres.; W9-WCE, vice-pres.; WA9EDO, secy.; K9UTZ, treas. Welcome home to W9JZO from California. W9CC expects to return from Florida in April. *Amateur Radio exists because of the service it renders.* Dec. net traffic: ISN 860, IFN 519, QIN 134, RFN 38, Hoosier V.H.F. 23, BRN 878 with Indiana represented 98.7%. Traffic: (Dec.) W9MM 906, K9IVG 735, WA9BIV 500, W9QLW 347, W9NZZ 343, WA9AVT 184, WA9AUM 170, W9VAY 167, W9TT 164, WA9FDQ 145, K9LEJ 106, K9HYV 93, W9OG 70, W9RTH 70, W9YXX 69, K9HYV 68, K9EFY 64, W9BUQ 62, WA9-EED 54, K9RWQ 44, WA9CJR 39, W9DGA 35, W9FZW 34, W9SNQ 25, W9DZC 24, WA9CYQ 23, W9ZYK 22, K9-QVT 21, K9HMC 19, K9WET 19, W9FWH 18, K9UXX 18, W9BBN 17, WA9BRD 17, WA9MNG 17, K9LAU 16, WA9BI 15, K9JLK 15, W9CC 13, K9VWJ 13, W9ENU 12, K9JQY 12, W9EJW 10, WA9FGT 10, K9GRT 10, WA9-FEV 8, K9YK 8, K9UEO 7, W9DOK 6, K9RTL 6, K9-PAR 6, W9ZZY 6, K9FHQ 5, K9GEO 5, K9VZQ 5, K9-JSK 4, W9WUH 4, W9NLFV 3, WA9ASZ 2, W9JSY 2, WA9GKF 1. (Nov.) W9ZYK 102, WA9CJR 80, W9VAY 63, WA9IZR 58, W9HRB 6.

WISCONSIN—SCM, Kenneth A. Ebner, K9GSC—SEC: K9ZPP. RM: W9IQW. PAMs: W9NRP, K9IMR, K9HJS, WA9EJT. Nets: WIN, on 3535 kc, daily at 0045; W9BN, on 3985 kc, daily at 2315Z; BEN on 3985 kc, Mon, through Sat, at 1300Z and 1800Z (new time); SWRN, Mon, through Sat, on 50.4 Mc, at 0300Z. New appointments: K9EJS as PAM for noon sessions of BEN. Renewed appointments: K9DBR as OES, WA9AQT as OBS. K9AQB has received his General Class license. WN9LWJ has 35 states worked. K9ZPP is on RTTY on 80 & 2. WA9AKE is building a new transmitter. W9QQQ is on s.s.b. with new Heath equipment. New officers of the Outagamie Radio Club are WA9FTT, pres.; W9VTM, vice-pres.; WA9FMQ, secy.; W9UVZ, treas.; W9IEI, act. mgr. W9DYG is back in business with traffic and visits from traffic men at the new QTH. BPL certificates for Dec, traffic went to W9CXY, W9DVG and K9IMR. W9BCL has a new Swan 350 rig. WA9AZK received an HO-10 monitor for Christmas and W9KXK got a new Collins rig from Santa. FMT results: W9RKP 37.1, W9-

(Continued on page 108)

INTERNATIONAL FREQUENCY METERS

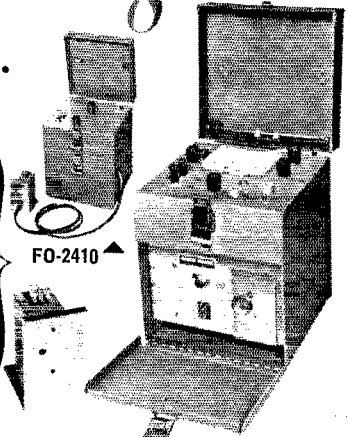
 *designed for servicing!*

Equip your lab or service bench with the finest . . .
Discover new operating convenience.

FM-5000 FREQUENCY METER 25 MC to 470 MC

The FM-5000 is a beat frequency measuring device incorporating a transistor counter circuit, low RF output for receiver checking, transmitter keying circuit, audio oscillator, self contained batteries, plug-in oscillators with heating circuits covering frequencies from 100 kc to 60 mc. Stability: $\pm .00025\%$ $+85^\circ$ to $+95^\circ\text{F}$, $\pm .0005\%$ $+50^\circ$ to $+100^\circ\text{F}$, $\pm .001\%$ $+32^\circ$ to $+120^\circ\text{F}$. A separate oscillator (FO-2410) housing 24 crystals and a heater circuit is available. Dimensions: FM-5000, $10" \times 8" \times 7\frac{1}{2}"$.

FM-5000 with batteries, accessories and complete instruction manual, less oscillators, and crystals. Shipping weight: 18 lbs. Cat. No. 620-103 \$375.00
 Plug-in oscillators with crystal \$16.00 to \$50.00

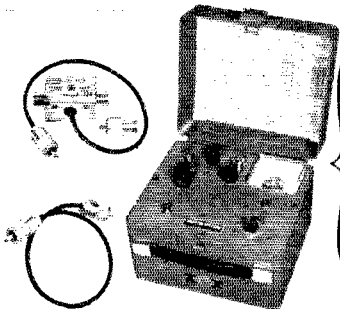


FO-2410

C-12B FREQUENCY METER For Citizens Band Servicing

This extremely portable secondary frequency standard is a self contained unit for servicing radio transmitters and receivers used in the 27 mc Citizens Band. The meter is capable of holding 24 crystals and comes with 23 crystals installed. The 23 crystals cover Channel 1 through 23. The frequency stability of the C-12B is $\pm .0025\%$ 32° to 125°F , $.0015\%$ 50° to 100°F . Other features include a transistorized frequency counter circuit, AM percentage modulation checker and power output meter.

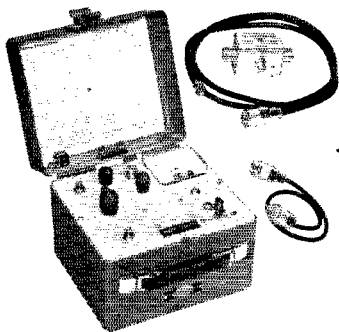
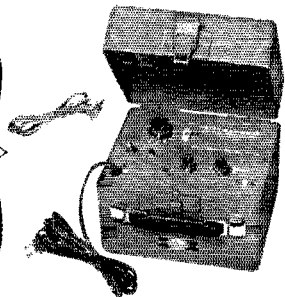
C-12B complete with PK (pick-off) box, dummy load and connecting cable, crystals and batteries. Shipping weight: 9 lbs. Cat. No. 620-101 \$300.00



C-12 CRYSTAL CONTROLLED ALIGNMENT OSCILLATOR

The International C-12 alignment oscillator provides a standard for alignment of IF and RF circuits 200 kc to 60 mc. It makes the 12 most used frequencies instantly available through 12 crystal positions 200 kc to 15,000 kc. Special oscillators are available for use at the higher frequencies to 60 mc. Maximum output .6 volt. Power requirements: 115 vac.

C-12 complete, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-100 . . \$69.50



C-12M FREQUENCY METER For Marine Band Servicing

The International C-12M is a portable secondary standard for servicing radio transmitters and receivers used in the 2 mc to 15 mc range. The meter has sockets for 24 crystals. The frequency stability is $\pm .0025\%$ 32° to 125°F , $\pm .0015\%$ 50° to 100°F . The C-12M has a built-in transistorized frequency counter circuit, AM percentage modulation checker and modulation carrier and relative percentage field strength.

C-12M complete with PK (pick-off) box and connecting cable, batteries, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-104 \$235.00
 Crystals for C-12M (specify frequency) \$5.00 ea.

KEEPING YOU ON FREQUENCY IS OUR BUSINESS...

Write today for our FREE 1964 CATALOG



18 NORTH LEE OKLAHOMA CITY, OKLAHOMA

(Continued from page 106)

DKE 43.0 and W9KCR 451.2 p.p.m. error. K9WVM has a new TA-36 beam and a HAM-M rotor. Net reports: W5BN, 543 offered, 449 cleared, 1249 QNT; W1N, 103 offered, 88 cleared, 132 QNT; BEN, 328 offered, 280 cleared, 542 QNT (153 A.M., 357 Noon); SWRN, 40 cleared, 429 QNT. Traffic: W9CXY 645, W9DYG 616, W9AOW 415, K9HMR 328, W9SAA 196, W9AKE 149, K9HJS 149, W9-NRP 117, K9W9M 95, W9IQW 86, W9HWQ 54, W9CQO 36, K9DBR 32, W9CBE 29, W9GOC 27, W9BVTI 26, W9ERT 22, K9GSC 15, W9Y1T 17, W91RZ 17, W9OTL 11, K9ZPP 10, W9YQH 6, W9EDZ 4, W9FXA 4, W9LWJ 4, W9ONI 4.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Aldrich, WOOPX—Asst. SCM; Herman R. Kopschke, Jr., WOTCK. SEC: WA0BZG. RMs: WA0EFP, K0JEL, PAMs: K0FLT, K0VBJ, MSSB PAM: W0HEN, V.H.F. PAM: WA0-CQG. The Minneapolis ARC held its Annual Christmas Banquet Dec. 12. Recently-elected officers are WA0-14N, pres., W0SFU, vice-pres.; K00XR, secy.; W0-HPV, treas. The December meeting of the Winona ARC was held at the home of W0ZSA. Officers elected were W0ZSA, pres.; K0JCG, vice-pres.; W9HWQ, secy./treas.; K0H0I, act. mgr. Appointments issued: WA0-EDN as EC. Appointment renewed: K0UXQ as ORS. A warm welcome is extended to the newly-affiliated Albert Lea ARA. Ex-NCS K0SBB spent a hurried 30 days at the home of QTH at Rochester, showing slides and pictures of the Orient. K0EWM visited with former RARC members W0FJJ and W0IQW, who send their greetings to old Minnesota friends. The Pionet 6-meter group meets at 1900 CST Sat. This is a formal net and welcomes additional stations. OO/PAM/OPS W0HEN scored an average of 16.2 parts/m on six different measurements in a recent PAM. OO W0WAS reports 3 violations. OO W0TIV cited 22 hams for out-of-band, broad signals, r.a.c.-c.w. and excessive harmonic radiation. EC WA0-FUR operates on 2 meters while the ailing TR3 is being repaired. OBS WA0ETR reports much interest in his 75-, 40- and especially 15-meter transmissions. Christmas greetings to WOOPX from ex-RM K0AKM, stationed at Pearl Harbor, arrived on Dec. 7. Congrats to W0YC who made the BPL in November and to W0RA who made it in December. Traffic: (Dec.) W0RA, 277. W0GRW 104, K0TXU 88, W0LAW 82, W0HEN 72, K0VPI 71, W0ATO 49, W0QBI 45, K0FLT 44, K0LJU 44, K0ZRD 41, WA0EDN 39, WA0EQZ 39, WA0ACT 36, WA0CQG 35, W0MXC 31, W0TCK 30, WA0DOT 27, WA0GVF 24, K0FJF 24, W0UMX 14, WA0HMW 0 23, WA0IEF 22, WA0BZG 19, K0ICG 17, K0MIA 15, WA0CAE 13, K0ZKK 13, WA0AAM 12, W0IJJ 12, K0RGE 11, W0KJZ 11, WA0QA 10, W0OJPR 9, K0LWK 8, K0SXP 7, WA0DPT 6, WA0JDG 6, W0GCR 5, K0JKU 5, W0LIG 4, W0SZJ 1. (Nov.) W0RA 82, W0GRW 44, WA0FCJ 42, WA0DGW 17, K0IKU 13, W0-FUR 8, WOOPX 8.

NORTH DAKOTA—SCM, Harold A. Wengel, W0-HYA—SEC: W0CAQ. PAM: K0TYY. K0CND is active in Bismarck with a Valiant and an RME-4350. K0-EOF has a new HT-37 and an NC-303. K0RLF is taking on the responsibility of married life. K0VYF 0 is active on phone. K0MIB's beam came down and WA0-ELQ's reflector came off in the big blizzard. K0QYD got his 120 sticker for DXCC. WA0DAR has a new SBE-33. W0CZR is active on 20-meter c.w. after several months' absence. The N.D. Fone Net reports 14 sessions with 146 checking in and handling 18 formal and 2 informal pieces of traffic with two relays. Traffic: (Dec.) K0-ITP 229. (Nov.) K0ITP 71.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—Asst. SCM; Jene H. Melton, WA0DEM. SEC: W0SCT. RM: K0GSY. K0GSY and W0ZWL made the BPL in December. W0SMV reports 252 countries confirmed of 267 worth. He has a kit to add an element to his TA-32 beam. K0LKH is a student at South Dakota Tech. K1CAU/0 is operating a Galaxy III to inverted Vee. He reports signing into ten nets. Newly-elected directors of the Sioux Falls ARC are K0ESC and K0EJK. K20PT is working at the Pathfinder Atomic Plant, Sioux Falls. The Midwest V.H.F. meeting will be held in Sioux Falls April 10-11. Write to P.O. Box 400, Sioux Falls, S. Dak. 57100 for information. Newly-licensed in Sioux Falls: WA0KXL. Traffic: K0GSY 1398, W0ZWL 778, WA0-ROY 345, W0SCT 193, K0VYY 117, K0BMM 66, W0-RWX 60, K0ZBJ 55, K0AIE 53, WA0FPR 52, K1-CAU/0 37, WA0BVJ 37, W0DVB 37, K0TXW 37, W0-DIY 32, W0H0T 27, W0CQN 22, K0YJZ 22, K0CXL 20, W0DJO 13, K0FQH 6, W0IGG 5, W0RRN 3, K0-TGX 3, WA0CKH 2, K0LKH 2, K0JGM 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NMs: WA5AVO, K5TFS, W5NCT, WA5IEQ. Am pleased to announce the appointment of W5NCT as Benton County EC. If you are a resident of Benton County, please offer him your support. EC reports for Dec. were received from WA5GPO, K5ALU and WA5ACG only. Any Arkansas ham is invited to contribute to this column. My address is on page 6. W5YM got the WAC certificate. Congratulations. ARC'UA, WA5IS reports working CR6 and CR7 on 15-meter c.w. and 44/26 toward DXCC. Dec. net reports:

New	Freq.	Time	Days	Sess.	QTC	QNI	Are.
OZK	3790	0100Z	Daily	31	330	306	10.6
QAN	3695	0400Z	Daily	24	94	107	3.9
RN	3815	0001Z	Mon.	31	158	309	5.1
APN	3885	1200Z	Monday-Sat.	27	32	837	1.2

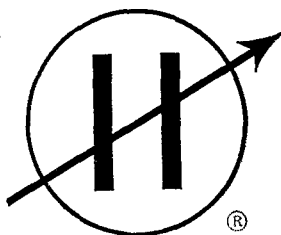
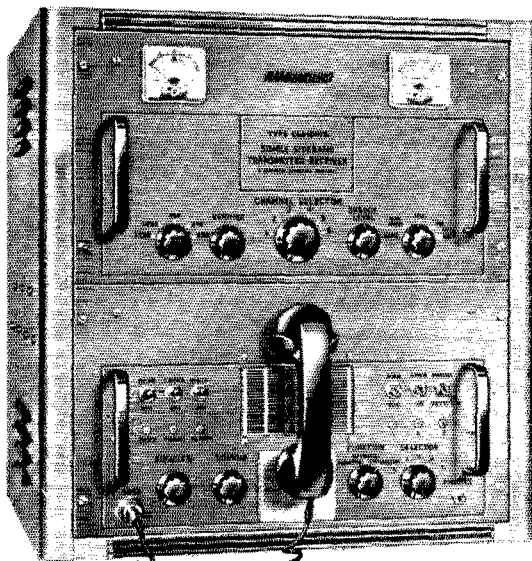
The following were top QN'ers on OZK during 1964 out of a possible 367 sessions: WA5AVO 255, W5DTR 249, K5TYW 173, WA5HNN 165, W5NPM 165, W5JWL 149, WA5CBL 142, K5ABE 140, WA5BBS 137, W5FUD 103, K5TCK 102. Totals for OZK in 1964: Traffic 1935, QNI 3145, time 10,325 minutes, and rate 0.188. Those figures represent almost a 100% improvement over 1963. W9-IDA/5, WA5CBL, W5DTR and WA5HNN made the BPL in Dec. Traffic: W9IDA/5 1112, WA5CBL 702, W5-DTR 622, WA5HNN 590, WA5AVO 479, K7RWI/5 275, K5TYW 113, W5NCT 104, WA5GUL 46, K5TCK 34, W5YM 23, WA5CSJ 16, WA5BBS 8, K5ALU 2, K5AKS 1, WA5IS 1.

LOUISIANA—SCM, J. Allen Swanson Jr., W5PM—SEC: W5BUK. RM: W5CEW. PAM: W5TAV. V.H.F. PAM: WA5KHE. We regret to report the passing of W5ZS in Shreveport. The East Jefferson High School Radio Club needs equipment for a club station. Contact WA5IDB if you can help. Plan to attend the Delta Convention, Memphis, Mar. 27 and visit your Louisiana Hospitality Room. The Baton Rouge Radio Club is planning a bang-up hamfest May 8 and 9. Bossier High School ARC now has the call W5NZY and is busy on 6 meters and 75-meter s.s.b. W5ZBC is the proud owner of a HO-10 scope. W5UKQ now has No. 21 on 2 meters with his QSO with K5TQP. K5MJO works all the Delta s.s.b. nets. WA5ITW has put up a new 80-meter antenna. W5-FMO now has a 328-1 to push his final. W5KRX, one of our anchor men on RN5 and CAN, reports a nice traffic total. K5OKR is truly a traffic hound working 40 and 80 together with 75-meter phone. W5IQH has had a hard time keeping up with his skeds because of his many patients! WA5HRD keeps 80-meter c.w. hot with LAN and RN5 activities. W5EA, recently retired, now makes smoke on all bands. WA5FRU has a new TR-3 and a new baby girl. WA5CHZ punches holes in the ether with his trusty DX-100. W5QIX is sporting a new Viking 500. K5ELM has moved to Monroe. WA5AM, with a new beam, is banging away on 20 while W5SWS is gathering parts for a new super final. W5MXQ is another hot net figure in the state. WA5BLO is most active in LAN. K5-PGS has completely recovered from surgery. Plans for a 1a. phone net are moving along with plenty of interest. WA5EID is a new ORS. W5BV has the final working again. W5CEW joins the regulars on 75 daily together with W5BMM, W5BUK and WA5JWE. K5FYI is busy with C.D. and Delta 75. K5WOD reports the Springhill Net guards 28.8 Mc. during daylight hours. The South-west La. Amateur Radio Club has twenty-seven 2-meter rigs going for a local net, according to W5CFZ. W5PXV reports most of his activity is traffic-handling on LAN, as does WA5FNB. LAN Net Mgr. By the time you read this yours truly will have recovered from major surgery. Traffic: W5CEZ 351, W5KRX 214, WA5FNB 180, W5IQH 116, WA5ITW 91, K5OKR 76, WA5HRD 70, W5QIX 33, W5PM 25, WA5EID 24, W5EA 23, W5PXV 23, W5ZBC 10, K5MJO 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EAM—SEC/ RM: W5JDF. News of my reappointment as SCM for another term came while I was in the hospital recuperating from an accident. Glad to report I'm fine again and looking forward to your cooperation. W5JDF reports that "Miss CW" had its most successful year. K5RUO is doing a fine job as OO. W5JDF made the BPL again. WA4ATC/5 is doing a fine job from Pittsboro. WA5IMU is doing a good traffic job in Jackson. K5RUO is very successful with 20-meter CWDX and WA5GHF is handling more and more traffic each month. Thanks for the report from W5CLS. W5WZ has a good signal from Columbus with his HW-12. K5BWW is very faithful from Cleveland. We need current lists of club officers and station activity reports. Some appointments are open. Let's

(Continued on page 110)

ATTENTION: GOVERNMENT, AIRLINES, POLICE, FORESTERS, INDUSTRIES AND OTHERS OPERATING IN THE 2 TO 30 MCS HIGH FREQUENCY BANDS



LEFT: CSB100TR.
RIGHT: CSB125C



YES

SINGLE SIDEBAND SETS BY HAMMARLUND ARE EIGHT TIMES MORE EFFECTIVE.

Says who? Says Hammarlund who makes these remarkable long-range transmitter/receivers (see above). Each will deliver a signal eight times more effective than an AM set drawing the same power. (In regular AM equipment the carrier wave absorbs most of the power and carries no message. So Hammarlund SSB sets transmit the message signal along one narrow sideband with no carrier wave.)

IT WORKS

And how it works. Hammarlund's SSB sets free themselves of conventional AM interference because they use only half the frequency space. They cut distortion because they depend less on rigid relations between phase and amplitude. Talk is more private because Hammarlund SSB sets can't usually be picked up by home-style shortwave receivers.

IDEAL FOR GOVERNMENT AND INDUSTRIAL OFFICES

When normal telephone lines aren't available or wanted, Hammarlund SSB takes over. The CSB100TR works on mountaintops, in spots remote from its antenna, in installations where several dispatchers are working separately and can use the CU-10A Telephone Remote Control units providing up to 20 control points. The CSB125C, less expensive, works when dispatcher, antenna and set are in one location.

This means Hammarlund SSB sets work beautifully in out-of-the-way locations for government, maritime, forestry, airline, police and offshore oil installations.

FITS THE NEED

One antenna serves all six channels. Use handset, speaker or remote line. Phone or code. All simple controls on front panel. Just connect antenna, ground and plug in.

GO AHEAD AND WRITE

Mail this coupon for details on the 8-times more effective Hammarlund SSB sets.

HAMMARLUND MANUFACTURING COMPANY
A GIANNINI SCIENTIFIC COMPANY,
73-88 Hammarlund Dr., Mars Hill, North Carolina, 28754
Cable Address: ARLAB, New York, N.Y.
YES—We want to know about Hammarlund SSB.

NAME _____

WITH _____

AT _____

HAMMARLUND

SUPERPRO ENGINEERING IN EVERY SET

From 1910 to Tomorrow: Hammarlund Builds Commercial Communications Equipment
Variable Air Capacitors, Amateur Radio Equipment and the Outercom 2-Way Radio.

BE SURE TO SEE US AT OUR BOOTH AT THE SINGLE SIDEBAND SHOW, STATLER HILTON HOTEL, NEW YORK CITY, MARCH 23

(Continued from page 108)

all cooperate to make Mississippi go forward this year
Traffic, W5JDF 310, WA5GEF 225, W5WZ 79, WA5IMU
61, WA4ATC/3 29, K6R1X 18, W5C1S 8, W5EMM 7.

TENNESSEE—SCM, William A. Scott, W4UVP—
SEC: W4RRV, RM: W4MXF. PAMs: K4WWQ, WA4-
AIS, W4RIJ.

Net	Freq.	Time	Days	Sess.	QTC	QVI
TN	3635 kc.	1900C	M-Sat.	27	131	172
TSSB	3980	1830C	M-Sat.	26	107	691
ETPN	3980	0640E	M-F	23	56	384
TPN	3980	0645C	M-Sat.	31	283	931
		0800C	Sun.			

W4MXF reports the post office thanks us for use of the zip code on net correspondence. The Nov. FMT gave OOs W4YAU and W4ZBQ excellent reports. W44NUJ reports damage to the 8-meter beam when trying to stretch it upward the last foot. The Mid-South ARC reports a visit to the local FAA facility whose radar would rival Cape Kennedy. Clubs wanting programs should explore this source through the ham who works there. W4DPO is recovering from surgery. W4IBZ has a new keyer. K45SD is trying for new counties. K4PUZ heads for an 18-month stay in Turkey with a stop to see K4-AMC in DL-Land. Traffic (Dec.) W4OGG 381, W4MXF 271, W4FX 265, W4PQP 229, W4IBZ 168, K4XSD 148, W4RALJ 122, K4EWI 57, W4YAU 51, W4UVP 50, W4WBK 50, W4AKOG 43, W4TYV 34, W44UM 30, K4PUZ 30, W44NUJ 27, W4TJZ 26, W44NYL 21, W4VTS 20, W4PFP 19, W44HQ 17, W44AWG 12, W4VJW 12, W44BXH 10, W4LLJ 10, K4NRZ 10, W44RPP 10, W44VOM 8, W44-
EWW 7, W44GLS 7, W44VWQ 6, W44VAB 6, W44ROD 5, K4UMW 5, W44SI 4, W44PSV 4, W44REJ 4, K4ZZQ 4, W44EJL 3, W4VNU 3, W44CXK 2, W44SXZ 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4-
QIO—SEC: K4URX. PAMs: W4BEJ, W4ARDE, K4-
YZU, V.H.F. PAM: W44UM, RM: W44LCH. New ap-
pointments: W4ARDE as PAM MKPN; W44AUR and
W4ARDE as OPS; K4OZG as ORS; W4AGHQ as OES.
Officers of the Mammoth Cave Amateur Radio Club of
1965: Roger Miles, pres.; Ellis Rice, vice-pres.; K4-
UMN, secy.-treas.; K4MIQ, act. mgr. The ARTS in
Louisville elected K4GVA, pres.; W44IBG, vice-pres.;
W4BTA, secy.-treas.; K4QIO, asst. secy.-treas. Net re-
ports for Dec.:

Net	Freq.	Days	Time	Sess.	QVI	QTC
EMKPN	3980	M-F	0630	23	338	97
MKPN	3960	Daily	0830	30	553	167
KTN	3960	Daily	1830	51	405	143
KYN	5600	Daily	0900 & 1900	61	584	529

In Nov. KYN held 60 sessions, with 491 QNI and 397
QTC. K4NHV has not missed a session on the EMKPN
for three years. W4J1I is cleaning out his shack to wel-
come home his son. W86HOJ, W441CH, W44DYL and
W44BSC made the BPL. W44ELB is selling his equip-
ment and getting ready for the trek to college. Purdue,
in Sept. Ky. was represented 88.2% on 9RN in Dec. More
Ky. representatives are needed on 9RN. W441CH re-
cently spent some time visiting friends in other states.
W44DH has his s.s.b. linear almost ready for 6 meters.
Traffic: (Dec.) W44LCH 443, W44AGH 401, W44BSC
293, W44BAZ 277, K44ZMI 269, W44DYL 242, K4YZU 168,
W44MEX 143, K4QIO 78, W4KJP 53, W4RTA 52, K4-
PNG 52, K4OZG 51, W4ZXV 36, W4CDA 35, W44ELK
35, W44GMA 24, K4TQZ 17, W44OLK 16, W44SZB 16,
W44GHO 14, W44KFO 14, K4LOA 11, W44VEC 8,
W44YH 7, K4VDO 6, W44HLW 5, W44YYI 5, W44DH
4, W44PLN 3, W44UMN 2, K4ZIQ 1. (Nov.) W44AGH
216, W44UMN 8.

MICHIGAN—SCM, Ralph P. Thetren, W8FX—SEC:
K8GOU, RM: W8EGI, K8QLL, W8ELW, K8KMQ.
PAM: W8CQU, K8LOA, K8JED, V.H.F. PAM: W8PT.
Appointments: W8CVQ and W8FZ as OES; W8AID,
W8DNZ, W8FWQ, W8FX, K8NJW, K8PYW, K8QKY,
W8QOQ, W8SCW, W8SJE, K8WQV, W8WXO and W8-
ZHB as ORS. New officers—Catalpa ARS: W8AMZ, pres.
W8VVD, vice-pres.; K8ONV, rec. secy.; K8UOQ, corr.
secy.; W8CMV, treas. Am. Rad. Trans. Society, Grand
Rapids Jr. College; W8ACTC, pres.; W8AHDG, vice-
pres.; Pippie, secy.-treas. Kent County Emerg. RC:
W8HIN, pres.; W8A8T, vice-pres.; W8ACTC, secy.-
treas. Pictured Rocks RC: W8PVL, pres.; K8NBF,
vice-pres.; W8FSV, secy.-treas. Mark your calendar
now for next Western Mich. U.V.E.P. Conference, Nov.
6 at 2 P.M. Monroe County AREC now is on 433 Mc. The
new AOPS Net on 50,125 Mc. Sun. at 1500Z, covers
Mich.-Ohio-Penna. W8EJR has a new Drake TR-3.
W8ABLU, W8ASORO and W8ALTx make General, Silent

Keys: W81PR, W8PXR, W8WMI, W8HIE, BPLers: K8-
LLR, K8TDJ, K8LME, W8ECCN, W8YJY, K8QKY,
W8ACXP, W8A8RI, W8ARJ, W8YAN has a new base-
ment, new shack? W8AJWD has all HB gear. W8EGI
finds the attic antenna works. W8UIC still uses an
8X-25! W8AGRI likes the new SB-300. W8HYR has a
new Galaxy III. W8ACDR listens to slow QMN. C'mon,
civ. m. The Eye Bank Net has transferred over 600 eyes!
K88JQ joined the Peace Corps. The U.P. Hamfest this
year will be held at Escanaba July 31 and Aug. 1. The
K8PNAs and the W8Hks went to Florida, and K8JCB is
in Alaska. The W8ZLs are down in Texas and Mexico,
where Inez had an accident on a saddle tour and is hos-
pitalized for 12 weeks, W8NBJ is rebuilding—the old
Tahquamenon boat! The K8LXJs moved to Florida.
Congrats to W8ACDR on an editorial in the V.H.F.
Assn. Bulletin, entitled "The Amateur Image." The
Michigan Six-Meter Club station call is W8ADR. Traffic:
(Dec.) K8HLL 720, K8TJF 679, K8LNE 567, W8ACXF
516, W8ECCN 514, W8YJY 502, W8EJW 351, K8KMQ 302,
K8QKY 249, K8GOU 204, W8ACPH 136, K8TIG 132,
W8ARI 117, W8ARJ 117, W8AKXO 116, W8EJR 110,
W8EU 101, W8BEZ 99, W8BQK 84, K8QLL 67, W8FX
65, K8BYX 62, K8VCB 59, K8MFO 57, W8DSE 53, K8-
IUTZ 47, W8WYL 43, W8TBP 39, W8ADZP 36, K8JED 34,
W8HKT 28, K8KQV 28, K8RHU/8 26, W8AUD 25, W8-
DNZ 24, W8FWQ 23, W8RTN 22, W8YAN 19, W8ACTE
17, W8HGE 15, W8AJWD 11, W8ZEB 6, W8EG 5,
W8ASANO 4, W8UCU 4, K8VDA 4, W8AGRI 3, W8WNX 3,
W8AAM 2, W8HYR 2, W8AGBN 1, K8GJD 1. (Nov.)
W8ACXF 39, W8UIC 12, W8ALKC 10.

OHIO—SCM, Wilson E. Weelk, W8AL—Asst. SCM:
J. C. Erickson, W8DAE, SEC: W8HNP, RMs: W8BXZ,
W8DAE, K8LGB, PAMs: W8VZ, K8BAP, K8UBK, W8-
WUO reports that W8LKO joined the Silent Keys. West
Park Radiops 1965 officers are W8IMT, pres.; K8GUK,
vice-pres.; W8SDV, secy.; W8DMI, treas. Warren
ARA's Q-Match tells us Santa brought W8CJI a new
HA-350, W8KAK a new mike and W8QCT has a new
HT-44. Seneca RC heard W8BUL speak on Practical
Trouble Shooting. Mt. Vernon Arc's 1965 officers are K8-
LFA, pres.; W8AKNS, vice-pres.; W8KNP, secy.;
W8FYU, treas. Massillon ARC's MARC News informs
us that K8HTM and K8LYR are home after serving a
litch in the Navy. Parma RC's R.R.C. Bulletin informs
us that K8BVM joined the Silent Keys and that the club
held a Christmas Party. Received the Canton ARC's
Deadline, which says that HRIBB told of the life of a
ham in Honduras. K8VYZ underwent major surgery in
Cleveland, W8NKNT joined the Silent Keys, W8NCK
received his General Class license and the club's 1965 offi-
cers are W8OJW, pres.; K8AGB, vice-pres.; K8RMY,
secy.-treas.; K8KTM, K8YLK, W8FSM, W8NAL, K8-
OBW and W8TUY, trustees, K8OGN has a new beam on
2 meters. The Six-Meter Nomads ARC announces that
its 1965 officers are W8JBS, pres.; K8AJB, senior vice-
pres.; K8RWR, junior vice-pres.; K8YQL, treas.; W8-
GEO, secy.; K8VIE is in the hospital and the club held
a Christmas Party. The Ohio S.S.B. Net held 57 sessions
during December, handling 2454 messages. In 1964 the
net handled 11,278 messages. Columbus ARA's Carascope
tells us the club's 1965 officers are K8GKO, pres.; W8-
INO, vice-pres.; W8FSX, secy.; K8QDN, treas.; W8-
ZCQ and K8DJM trustees, W8THY is home from the
hospital, W8CZK has moved to Detroit and the V.H.F.
group elected K8TPY chairman; W8BGF, vice-chair-
man; and K8OQS, secy.-treas.; W8EVR has a new
Drake 2A, Springfield ARC's Q-5er states that the club
held an auction. Toledo's Ham Shack Gossip tells us
that W8CJF received his General Class license. Oregon
City RC held a potluck Christmas Party, W8BSW was
elected to the Toledo RC Hall of Fame, Genoa RC's 1965
officers are W8JVM, pres.; W8HHP, vice-pres.; K8LRJ,
secy.; W8GTS, treas. and W8GMA joined the Silent
Keys, W8TPH, W8DAE, K8VGO, W8BXN, W8ACXY
and W8FTX made the BPL in December. The Babcock
& Wilcox RC saw a movie about the Nike Zeus Missile.
K8STB reports that K8BDV joined the Silent Keys. K8-
JMN has a baby boy, W8BAP has a new BW-5100 and an
HQ-170, W8AKNM has a new Johnson 682, W8ALMI has
a new Uficc 650, K8ZCE has a new Interceptor Zeus,
K8LMI has a new HT-32, W8NOP has a new HX-50,
Sioto Valley ARC's 1965 officers are K8CGS, pres.; K8-
OUQ, vice-pres.; W8LIV, secy.-treas. Appointments
made in December were K8SSY as ORS, W8BUL as EC
and W8HME as OES, K8KYE joined the Silent Keys.
Traffic: (Dec.) W8UPH 1102, K8VBO 517, W8ACXY 515,
W8DAE 482, K8VRH 452, W8GVT 301, W8BZX 298,
W8FTX 275, K8DHF 220, K8UBK 219, K8YDR 213,
W8RYP 186, W8RKN 163, W8MGA 157, W8BDB 144,
K8LGA 138, K8RAB 134, K8BYR 105, W8NAL 72, K8-
DUI 71, W8CQU 68, W8FEP 59, W8GPT 56, W8CXM
42, W8PKD 42, W8HYR 42, W8DDG 41, W8CKY 36,
W8AJD 32, K8LGB 31, W8VDA 27, W8RIF 26, W8-
LZE 26, K8BNL 25, K8YWF 23, K8BAM 21, K8ZCZ 21.

(Continued on page 112)

MOBILE SERVICE is the most demanding form of voice communications you use. Power and size limitations are extreme, putting an unusual premium on efficiency. The environment is tough, putting an accent on reliability. In the final analysis you will benefit fully from your mobile equipment only by paying strict attention to every detail of installation and operation.

Mobile service performance starts with the microphone—the first active element in the system—and there's no better way to start than with the new E-V Model 600E dynamic microphone. It is a little more costly than many microphones you can buy that "just work", and rightly so. For the E-V 600E is a lifetime investment in top-notch performance.

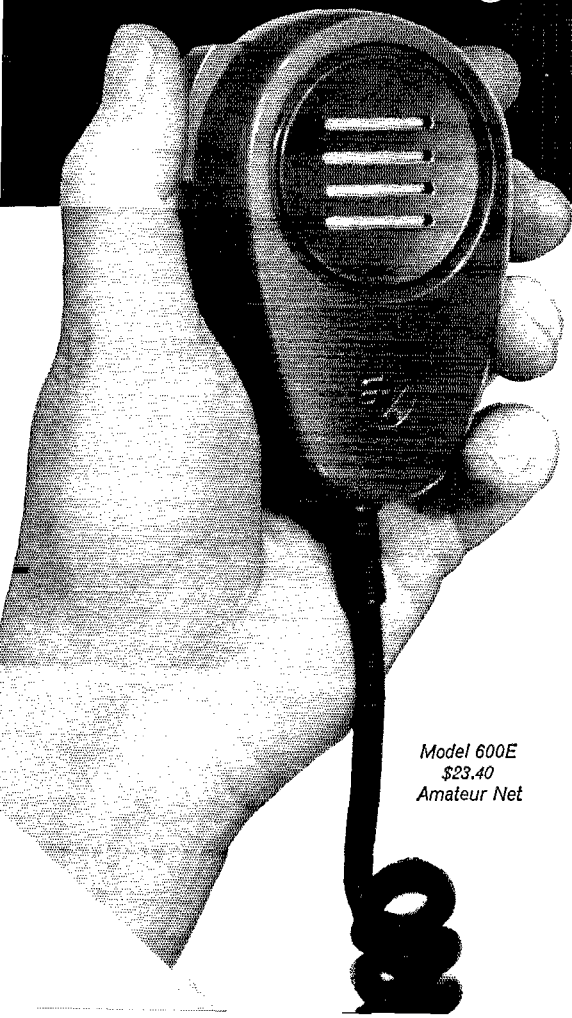
Look closely. The dynamic element of the 600E is the direct descendant of a long line of military microphones built to perform faithfully under battle conditions. This element was chosen for high intelligibility and its ability to withstand any environmental conditions. The proved ruggedness of the E-V Acoustalloy® diaphragm easily with-

stands ear-shattering sound pressures with no change in characteristics. But there is more to the 600E than ruggedness. Its sound quality has no equal. Here's why.

The frequency response of the 600E is ideally suited to SSB and critical AM transmission. You get highest intelligibility with any ALC circuit or frequency-shaping network in common use. That's been proved with on-the-air tests with every commercial SSB mobile transmitter and transceiver on the market today. Further, the high output level of the 600E will fully modulate even the "Scotch" input circuits sometimes found in mobile rigs. The 600E is available in 150-ohm or Hi-Z models.

Now pick up the 600E. It is shaped for comfort, with an easy-acting switch that gives you positive control, even when you are wearing heavy gloves. The case is molded of Cyclocac®, a space-age plastic that absorbs a fantastic amount of abuse. The 600E never feels hot or cold to the touch, regardless of the climate. The shielded coiled cord has passed flexing tests that far ex-

There Is Nothing Tougher Than Mobile Service... Except Our New Model 600E!



Model 600E
\$23.40
Amateur Net

ceed normal life, while the switch has test-cycled on and off over a half-million times without a sign of failure. Even so, both cord and switch are designed for easy field service, if necessary.

The E-V 600E is built to outlast every other piece of mobile equipment you may use, while outperforming every other microphone on the market. It will probably be transferred from rig to rig as the one most useful communications tool you own. Actually, the 600E, like all E-V microphones, is guaranteed forever against defects in workmanship or materials. It must perform as stated, or your money back.

The one best way to find out what the E-V 600E can contribute to your mobile installation is to try it. We guarantee you have nothing to lose. Ask your Electro-Voice distributor to help you put the new E-V 600E dynamic microphone to work in your rig, today!

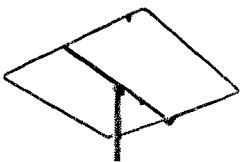
ELECTRO-VOICE, INC.

Dept. 352Q, Buchanan, Michigan

Electro-Voice®
SETTING NEW STANDARDS IN SOUND

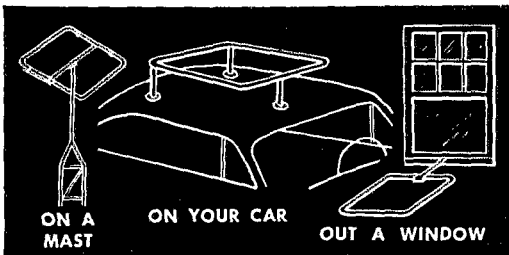
SQUALO

ANOTHER
CUSHCRAFT
FIRST!



SQUALO is a full half wave, horizontally polarized, omni-directional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. The square shape allows full electrical length in compact dimensions. Direct 52 ohm Reddi Match feed provides ease of tuning and broad band coverage.

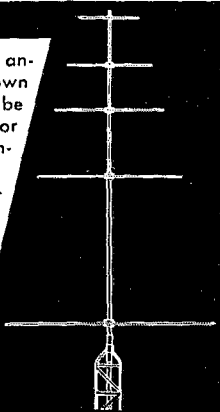
The 6 meter Squalos are completely universal for mounting anywhere. They are packaged with rubber suction cups for car top mounting and a horizontal center support for mast or tower mounting. The 10-15-20 and 40 meter Squalos are designed for mast or tower mounting. Squalo is ideal for net control, monitoring, or general coverage.



MODEL NUMBER	DESCRIPTION	NET PRICE
ASQ-2	2 Meter 10" square	\$ 8.45
ASQ-6	6 Meter 30" square	12.50
ASQ-10	10 Meter 50" square	19.50
CSQ-11	11 Meter 50" square	19.50
ASQ-15	15 Meter 65" square	23.50
ASQ-20	20 Meter 100" square	29.50
ASQ-40	40 Meter 192" square	66.50

SQUALO TREE

Design a complete multi band antenna system to meet your own requirements. Squalos can be mounted one above the other or above existing beams on a single mast. The Squalo tree is a horizontally polarized, omni-directional system in any combination of the 6 through 40 meter amateur bands. The Squalo tree takes a minimum amount of space, and does not require extra radials, ground wires, or rotators common to most multi band systems.



BUY FROM YOUR DISTRIBUTOR
OR WRITE FOR FREE CATALOG

Cushcraft

621 HAYWARD ST.

MANCHESTER N. H.

(Continued from page 110)

K8BAP 15, K8MIMZ 15, WA8GEG 10, W8DIH 9, W8FEEQ 9, WA8AWH 6, W8ILC 5, K8PJH 4, WA8EPX 2, WN8-ORX 2, K8PBE 2, W8WEG 2. (Nov.) WA8HVR 65, WA8-CFJ 24.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC; W2KGC, RMs; W2PHX and WA2VYS, PAM; W2JIG, 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. Appointment: WB2CPV as ORS. Endorsements: W2HZZ as EC and OBS, WA2BAI and WA2ZPD as OES. December traffic established a new record in ENY with four BPLs, W2-URP, K2TXP, WA2VYS and WA2UZK, plus a total of 25 traffic reports. Congratulations to you all. Loss of power and telephone service for nearly five days in the Capital District because of a sleet storm found many AREC and RACES nets in full operation serving hospitals, fire houses, Red Cross and evacuation centers. Emergency-powered base stations and mobiles activated immediately with high praises for the amateurs involved. New Rochelle reported that 115 attended its December dinner during which WB2FXB received the Kollman Memorial Award for meritorious service and K2SJM received an honorary membership in the club. Both WB2CPU and WB2CPV received their Extra Class tickets. WB2HZY has 29 states and is manager of the New Rochelle High School ARC. Our new OO, K2LSX, is installing RTTY gear. WA2LJM reports he would like to see more ENY activity during future CD Parties for competition. How about it, appointees? The ESS Net published a large two-page bulletin with net history written by K2QJL. The net's membership increased substantially during 1964. Our congratulations. Traffic: (Dec.) K2TXP 1485, WA2I'ZK 1071, WA2VYS 840, WB2-CPU 320, W2URP 290, K2SJM 141, W2THE 127, WA2-WGS 86, WA2VYT 67, WA2LJM 63, WB2FXB 49, W2-ANV 46, WA2JWL 39, WB2CPV 29, WB2FVD 24, WA2-HGB 22, WB2FYP 17, K2UTV 8, WB2HZY 7, WA2ZPD 5, K2DEM 4, W2EFU 3, WB2HYA 3. (Nov.) WA2LJM 15, WA2OOO 14.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC; K2OVN, Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP-RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSM	W2EW-PAM
NYCLIPN	3932 kc.	1600 Daily	WB2HWB-PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE-RM

NYC-LI AREC Nets: See Dec. 1964 column for schedules. The Massachusetts AREC/RACES unit lost another of its stalwart members as K2ULS was added to the honored roll of Silent Keys. BPL certificates were awarded to WA2GPT, WA2RUE, WB2HWB, K2URB, W2EW, WA2TQT, WA2UWA, WB2ECH, WB2MLN and WB2LUK. WA2GPT, who is also NOREH, reports that Navy MARS had a record month in Dec. '64. WA2CHK put a Poly-Comm 2 on the air while on leave from the Navy. New appointments: WB2HWB as PAM-75; WA2-QJU as OBS; and WB2JHK as OES. New officers of the Amateur V.H.F. Institute of N.Y. are K2GZ, pres.; W2EW, vice-pres.; W2HVL, rec. secy.; WA2OGA, corr. secy.; W2AUF, treas. WB2EUH got a CE-20A from that jolly ole fella and is now handling traffic the s.s.h. way. WB2LUK put his new keyer together, but the switching transistors would rather fight than switch and so far they are winning! WA2JEN got his old call, W2AWK, back and then an eccentric old breeze blew the 70-ft. tower down upsetting the four-element quad in the process. WA2QJU is No. 36 in a graduating class of 1450! WB2IQG will participate in world-wide OSCAR Net. WB2OTT reports that Bayside HSARC has started an Amateur Radiogram Service. That is about four high schools doing so, so far! WB2QFT is secy. of the Bayside HSARC. New officers of the Rockaway ARC are WA2TAQ, pres.; WB2EJD, 1st vice-pres.; W2BJM, 2nd vice-pres.; WA2OOL, secy.; WA2-SYB, treas.; W2VZQ, sgt.-at-arms. WB2HYK is romping through the bands with a new Heath Marauder. WN2QFT passed the General Class exam and is patiently waiting for the FCC-type computer to erupt. WB2NSQ has returned after a brief sojourn in W4-type Florida. WA2PGC was elected pres. of James Monroe HSRC. Queens 10-Meter AREC is maintaining close liaison with Nassu 10-Meter AREC. While putting up a long wire on the 13th floor of the apartment building, WA2YTM and WB2AWX saw an accident occur on the Belt Pkwy. and were instrumental in dispatching emergency forces. W2BOT is running a 6W-6100 and a 75A-4 on 20 and a Poly-Comm 2 with a five-element

AMECO*Leader in Compact, Quality Ham Gear*

Improve your receiving Capability with the NEW ALL BAND NUVISTOR PREAMPLIFIER



- 6 thru 160 meters
- With built-in power supply

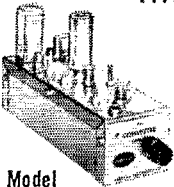
Two nuvistors in cascode give noise figures of 1.5 to 3.4 db, depending upon the band. The weak signal performance of ALL receivers as well as image and spurious rejection are greatly improved. The PCL's overall gain is in excess of 20 db.

Panel contains bandswitch, tuning capacitor, an "on-off" power switch and a switch that transfers the antenna directly to the receiver or through the Preamplifier.

The addition of the preamplifier to the ham station will enable the ham operator to hear signals that he was not able to hear before. The improved noise figure will allow reception of signals that were previously lost in the noise.

Model PCL-P (shown above) with built-in power supply—wired and tested \$32.95
 Model PCL is identical in all respects to model PCL-P except that it does not contain a power supply. (Power can be taken from receiver or from the Ameco PS-1 Supply) wired and tested \$24.95

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model
CN

CN-220K in kit form. (specify IF.) \$34.95

Has 3 Nuvistors (2 RF stages & mixer) and 616 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95

NEW 2 & 6 METER TRANSMITTER

With built in modulator & solid state power supply



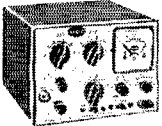
Compact size — 11½" wide, 9½" deep, 6" high.

The new Model TX-62 is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter on the market like it.

SPECIFICATIONS AND FEATURES:
 Power input to final: 75W. CW, 75W. peak on phone. Tube lineup: 6GK6 —osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final, 12AX7 and 6GK6 modulator. Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.

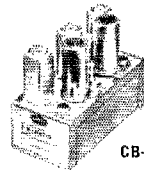
Model TX-62 wired and tested \$149.95

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" x 7" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 Kit \$89.95 — Wired Model TX-86W. \$119.95. Model PS-3 Wired \$44.95. Model W612A Mobile Supply wired \$54.95.



CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. \$19.95
 CB 6W — wired & tested \$27.50
 CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix, 616 osc. \$23.95
 CB-2W — wired and tested, ... \$33.95
 Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. PS-1K — Kit ... \$10.50
 PS-1W — Wired \$11.50

EASY TO UNDERSTAND AMECO BOOKS



Amateur Radio Theory Course \$3.95
 Amateur License Guide50
 Radio Operators' Lic.75
 Guide, EL 1-275
 EL 3 1.75 EL 4 1.25
 Amateur Log Book50
 Radio Electronics Made Simple 1.95

CODE PRACTICE MATERIAL



Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear.

Dept. QST-3

Ameco equipment at all leading ham distributors.

AMECO EQUIPMENT CORP.

178 HERRICKS RD., MINEOLA, L. I., N. Y.

Affiliated with American Electronics Co. and Ameco Publishing Corp.



THE LEAGUE IS YOU!

Working together, the members of ARRL have for fifty years provided the base of support from which our great public-service hobby has grown and maintained the precious privileges that many amateurs now take for granted.

Through membership in the League and affiliated clubs, many people pool their knowledge, their skills, their energy, and a small part of their material resources to help one another. The result is top-notch training programs and publications, top-efficiency traffic nets, community communications programs—and an amateur radio service which is useful to our country and deserving of its privileges.

Newcomers gain from the experience of the old timers, and old timers gain from the enthusiasm of the beginners. The more we work together in the League, the greater will be our collective achievements—and our security.

Each and every radio amateur is vital to the League, and the League is vital to each and every radio amateur. Join now with over 100,000 League members so that we can all share more fully in these mutual benefits. League membership is only \$5 in the U.S., \$5.25 in Canada, and \$6.00 elsewhere.

If you are already a member, help strengthen your League by spreading this word to others!

**THE AMERICAN RADIO
RELAY LEAGUE, INC.**
Newington, Conn. 06111

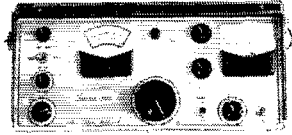
YAKI on 2. WA2JIS now is on RTTY. New officers of NYC-QRP Chapter #1 are WA2CFG, pres.; WA2JKX, vice-pres.; WB2CSS, secy. WB2AYW, treas. W2KTG, W2BID, WB2MEP and WB2FCB are new members of Nassau 10 Meter AREC. New officers of the Mid-Island RC are W2SEO, pres.; WA2LJS, vice-pres.; and W2OUQ, secy.-treas. WA2JKX added an SBA 300-4 converter to the SX-115 for 2 meters. WA2FUL reports the new Bent dipole is doing FB on 40-meter DX. I have a Crunched Zepp that's doing great on 75! WB2-LGR is on with a new SR-160 and keyer. The N.Y. Ionosphere Buster RC membership drive is on, says WB2COW. W2IHE, who is celebrating his 30th year with that call, has an older son, K2ABW, in the Army in Munich with the call DL5GU/AEIGUA. Younger son, K2PHT, is in his 4th year of HE at CCNY. K2RDP and his XYL, K1QNV, are attending U. of Cal, and are looking for old friends on 20-meter s.s.b. from the club station, W6BB. The Amateur Teenage Net meets on 14.300 Mc. daily at 1100R. Traffic: (Dec.) WA2GPT 3049, WA2RUE 1856, WB2HVB 1078, K2UBG 932, W2EW 850, WA2TQT 776, WA2UWA 530, WB2EUB 373, WB2-MLN 296, WB2MHT 268, WA2LJS 241, WB2LUK 205, W2GKZ 200, WA2QJU 158, WB2DBW 141, WB2IQG 121, WB2OTT 115, WB2AEK 103, W2DBQ 99, WA2OOL 78, WB2HYK 75, WB2FTT 65, WB2EGV 59, W4TRU/2 53, WN2QFT 38, WB2NSQ 37, WB2LGR 24, W2EC 16, W2APG 12, W2IAG 11, W2EF 7, WA2PJL 6, WB2-HST 4, WA2YLL 4, WA2DTY 3, WA2WAO 2, WB2-AWX 1, W2BOT 1, WA2RNP 1. (Nov.) WA2GPT 1012, WA2TQT 927, WA2RUE 840, WB2HVB 635, W2EW 577, WA2QJU 410.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM, L. J. Amoroso, W2LQP. SEC: J. W. Banke, K2ZFL.

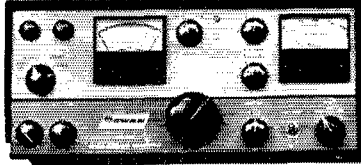
NJN	3695 kc.	7:00 P.M.	Daily	WA2BLV-RM
NJ Phone	3900 kc.	6:00 P.M.	Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZI-PAM
NJ 6&2	51150 kc.	11:00 P.M.	M-W-Sat.	K2VNL-PAM
NJNN*	3725 kc.	7:30 P.M.	MTWTh	WB2KXG-RM

*Novice & Slow Speed. All times local. AREC net skeds and information available from K2ZFL. The Northern New Jersey ARA conducts a net on 220.5 Mc. every Sun. at 11 A.M. local time. K2UKQ visited California and W2ZI visited Hawaii last fall. Recent speakers at the UCARA were W2PIX, W2KAK and W2IHA. New members of the South Amboy ARA include WN2PJU, WN2PEH and WN2PEW. WA2TMT has a new SB-33 transceiver. WB2MXZ received his Technician Class license. W2WHB is C.D. Radio Officer for Newark as well as ARRL EC. New appointments: WB2MXZ as OES. New officers of the Central N.J. V.H.F. Society are WB2DDJ, pres.; WA2UDT, vice-pres.; WB2LDE, secy.; K2GLL, treas.; K2JRP, sgt. at arms. WA2ZKT, FC Somerset County, has joined MARS. WA2PWI has been elected to several posts in CFC/FIC chapters. WB2PLK puts 10 wats into a TA-38 Jr. K2AGJ made the FOC Club. WB2KLD has joined A.F. MARS. WB2HBC is communications officer for Piscataway RACES. WB2DDA is active on 2 meters again. WB2-JDW runs a Ranger and an HQ-110A. Dennis wants to put up an 80-meter antenna so he can become active in ARPSC. W2ABL has a new QTH. WA2UOO continues to plug away running the 16N Net on 1880 kc. every Tue. at 7:30 P.M. WN2NLH has received his General Class license. John has 41 states worked. WA2HGL has worked enough counties for USA-CA, but now must wait for the QSLs. The MARS station at Fort Monmouth, K2USA, has been reactivated. A club composed of military and civilian personnel is being formed. K2GBF is assigned to Antarctica and is looking for a NNJ sked. Fifteen-year-old WN2QKZ is a new Novice in Glen Rock. WB2GKF is working on TV, 432-Mc. s.s.b. and 1220-Mc. gear. K2RDX is working on 432- and 1296-Mc. gear. Project Moonbounce continues at Manhattan College. We would like to see a Moonbounce/Satellite project here in Northern New Jersey. Attention, Novices! Join the New Jersey Novice Net if you are on 80 meters. Join the N.J. 2 on 146,700 kc. at 10 p.m. Tue. and Sat. (phone). By the time you read this we should also have a Novice activity on 15 meters. Your SCM would like to thank you all for the nice comments on the "Schedules of Operating Activities." A postcard or radiogram will bring a copy to those of you who do not have one. Don't forget to get ready for the PRE-SET in May! Traffic: (Dec.) K2VNL 769, WA2YD 345, WB2AEJ 324, WB2DEP 282, WA2GQZ 189, WA2UOO 189, WB2YVO 178, WB2HLH 132, WB2ICH 79, W2LQP 63, WB2GFY 52, WA2WAJ 46, WB2KSG 44, W2PEV 29, W2CVW 28, WA2TWS 22, W2DRV 21, WA2-SRK 17, WA2ZKT 14, WA2PWI 13, K2HFL 9, K2AGJ 8, WA2WHZ 8, W2NIY 1. (Nov.) WB2HLH 77, W2-CVW 36, K2EQP 6, W2DRV 1. (Oct.) W2DRV 1. (Sept.) WA2KVQ 19. (Aug.) K2RXQ 131.

IT'S THE SAME LITTLE OLD BOX

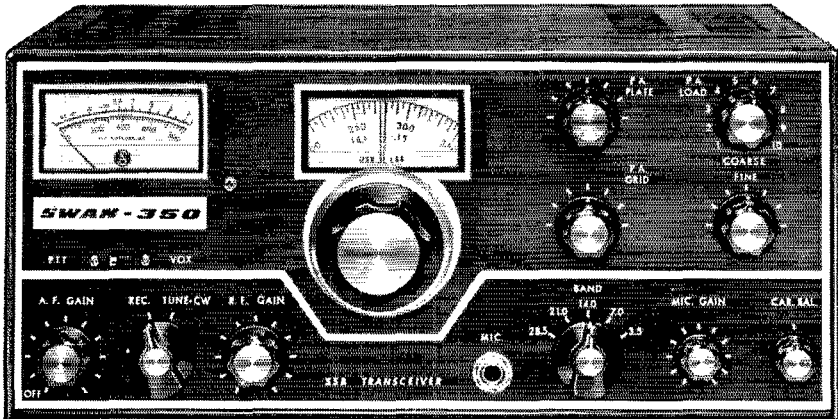


1962 SWAN SINGLE BANDER —
1 BAND — 180 WATTS — \$275



1963 SWAN 240 — 3 BANDS — 240 WATTS — \$320

but we've put a **LOT MORE** in it!



NOW THE **SWAN-350** TRANSCEIVER
5 BANDS — 400 WATTS AND ONLY **\$395**

- 3.5 - 4.0 mc, 7.0 - 7.5 mc, 13.85 - 14.35 mc, 21.0 - 21.5 mc, 28.5 - 29.0 mc (10 meter full coverage kit available.)
- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.
- 400 watts SSB input
320 watts CW input
125 watts AM input
- Sideband suppression: 40 db
Carrier suppression: 50 db
Third order distortion: 30 db
- Lower sideband on 80M and 40M.
Upper sideband on 20M, 15M, and 10M.
(Opposite sideband kit available.)

WITH THE SAME RELIABILITY AND PERFORMANCE
WE'VE PUT IN ALL OUR LITTLE BOXES

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C.....\$ 85
- 12 Volt DC Power supply. Model 412.....\$130
- Plug-in VOX. Model VX-1.....\$ 35

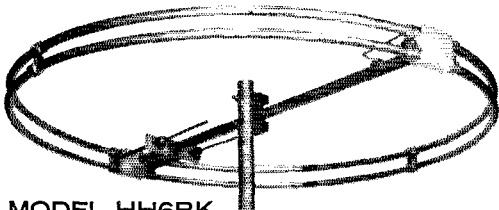
SEE THE NEW SWAN 350
AT YOUR DEALER'S NOW!



ELECTRONICS CORP.
Oceanside, California

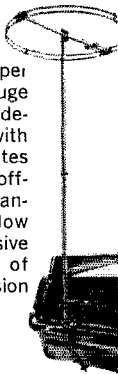
Built better to perform best

Hy-gain
MOBILE HALOS
for 6 and 2 Meters



MODEL HH6BK
6 Meter Center Mount Double-Ring Halo with Mast and Bumper Mount

A superior quality mobile antenna package at a sensational price! Includes rugged double-ring 6-meter halo, heavy wall aluminum telescoping mast and sturdy bumper mount with stainless steel strap. Heavy gauge seamless aluminum halo center mounts...delivers perfect omni-directional performance with unparalleled impedance control...eliminates pattern distortion commonly prevalent with off-center mounts and provides maximum mechanical reliability. Built-in tuning rods allow precision adjustment to frequency. Exclusive Beta Match insures maximum transfer of energy. Telescoping mast includes provision for installing Hy-Gain 2-meter halo for duoband operation. Packaged complete with everything needed for quick installation on any vehicle. Model HH6BK...\$16.50 Net



6-meter halo only, Model HH6BA...\$10.95 Net



MODEL HH2BA
2 Meter Center Mount Halo

The most efficient 2-meter mobile halo available...delivers perfect omni-directional performance and unequalled impedance control. Features exclusive Beta Match for optimum transfer of energy. Heavy gauge seamless aluminum construction with injection molded styron insulators and heavy gauge machine-formed mounting hardware insures maximum mechanical reliability. Comes ready for mounting on any mobile mast. Model HH2BA...\$5.95 Net

Stack 'em for greater range

Two Model HH2BA halos stacked on Hy-Gain's Model HMBA mast provide a 2-element, all driven array that efficiently compresses the radiation pattern and concentrates the energy at the horizon for optimum omni-directional gain. An ideal installation for attaining greater range. Model HHS2BA Stacking Kit only...\$4.95 Net

For detailed information on Hy-Gain's complete line of Base Station and Mobile Antennas and Accessories for VHF, write for Catalog No. 204.

HY-GAIN ELECTRONICS CORPORATION
8407 N.E. Highway 6—Lincoln, Nebraska

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WONTB—Asst. SCM: Ronald M. Schweppe, KOEXN, SEC: KOVBM, RMs: WOLGG and WOTIU, PAMs: KOBBL and WOLSF. Big news: The Talcocon has been reactivated under the leadership of WOTIU, Check 3560 kc. at 1830 CST Mon. through Sat. Remember, Charlie cannot do it alone, so let us give him our support. WODUA reports the death of his father and much other illness as well. Our sympathy to you, Robert. Our Iowa section has suffered a tremendous loss in the death of KOVKT. Ralph was active in amateur radio long before the time it was known as such, dating back to 1907 or 1908 which was the time Jack Binns of the SS Republic was learning the code. Our sympathy to Mrs. Deck and the family. It seems to this SCM that good sense has prevailed and most of the ill feeling generated by certain proposals of ARRL have subsided and more harmonious relations are evident. Net reports: 160-Meter Net—QNI 1208, QTC 20, Sessions 31, 75 Meter Net—QNI 1412, QTC 250, Sessions 27, Hamilton County Net—QNI 284, QTC 4, Sessions 31, Traffic: WOLGG 3008, WONTB 69, KOQKD 61, WOULS 54, WAOLJF 18, WOGPL 13, KOTDO 13, KOKAQ 11, WOYDV 10, WOFMZ 9, WAODYV 6, KOKAFI 5, WOBKR 5, WOPL 5, WODRE 4, WOJPI 4, WOMMZ 4, WQOVZ 4.

KANSAS—SCM, C. Leland Cheney, W0ALA—SEC: KOBXF, RM: W0SAF, PAMs: KOEFL, W0BOR, V.H.F. PAMs: KOVHP, W0HAJ, Nets reporting for Dec.:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave.
KPN	3920	1245Z	M-W-F	12	37	206	17.2
KPN	3920	1400Z	Sun.				
KSBN	3920	0400Z	Daily				

NCSS: W0ORB, KOEFL, KOUER, KOJII

The Kansas section is now without a c.w. traffic net as will probably be noted in the lack of tabulation above. The QKS C.W. Traffic Net ceased operation Dec. 1, 1964, and we are making every effort to re-establish this much-needed operation. Operators who are interested in working traffic should contact either W0ALA, W0BOR or KOEFL. Since your SCM was hospitalized most of the month of January, the current reports of necessity are short. Traffic: W0OHJ 2158, KOJIL 256, KOBXF 35, KOJIG 26, W0ALA 20, WA0CCW 19, KOEFL 19, W0FRQ 19, KOJMF 16, KOLPE 15, W0BMW 12, W0FDJ 6, W0WFD 6, WA0DZI 4, W0ZUX 2.

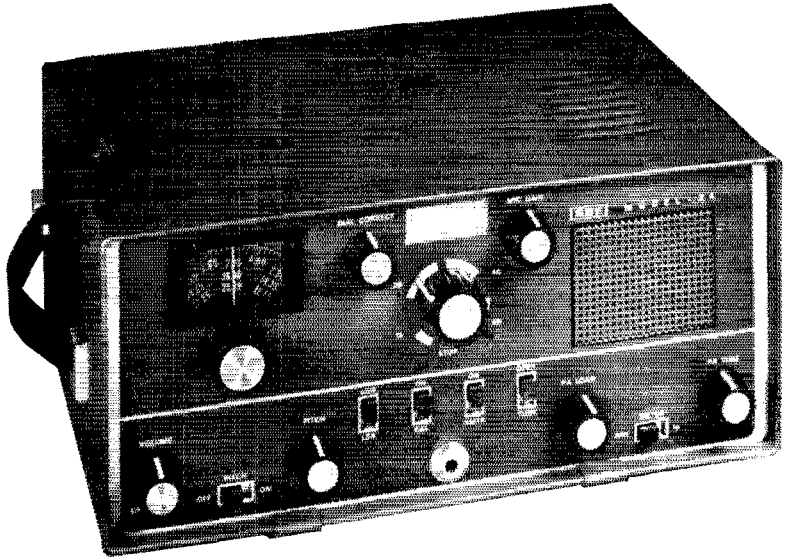
MISSOURI—SCM, Alfred E. Schwancke, W0TPK—SEC: W0BUL. This column, being written in January will appear in March when my second year as SCM ends. My thanks to all of you who have helped me through a rough year. Your reports and public service activities add much to the image of amateur radio in the state. New appointments: W0UCK as ORS, W0AMO as OES, W0QIHV as OBS, W0ZLN as ORS (WA0CCW, trustee). Appointments renewed: KOFPK as OES, W0ECE as ORS, KOEQY was elected manager of HBN. Officers of the HARC (Kansas City) are W0LVV, pres.; KOUEJ, vice-pres.; WA0ABO, secy.; W0MCL, treas.; KOCEV, sgt.-at-arms; KOAEU, membership; KOORB, publicity; W0OTQ, programs; W0FGQ, tech. chmn.; W0TFQ, editor. New officers of the St. Louis ARC (KOLIR) are W0DSW, pres.; KOTOV, vice-pres.; KOKJX, secy.; KOHUO, treas. Officers of the Harrisonville ARK are WAODYK, pres.; KOJWN, secy.-treas. W0OKCX is a new Novice in Crocker. KOLGZ has WA0JBK as his second call at home in Dixon. WA0DJG passed the 1st-class commercial phone license. EC W0OGC reports 24 members in the St. Joseph AREC Net on 50-55 Mc. W0GQR reports 24 of 31 hams in District 1 signed in the AREC. The Mo. QSO Party will be held in April. W0BUL reports 9 of 16 ECs in the section reported in the first session of the EC Net. W0CTV, WA0FMK, WA0PLL, KOFPK, W0GWX, and KOONK made the BPL. Net reports for Dec.:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mar.
MEN	3885	2345Z	M-W-F	13	273	92	W0BUL
MION	3580	0100Z	Tu.-Sun.	27	155	178	W0OUD
MINN	3580	1900Z	M-Sat.	26	82	45	W0OUD
SMN	3580	2200Z	Sun.	4	15	12	W0OUD
MoSSB	3963	2400Z	M-Sat.	24	566	122	W0MMI
PHD	50.4	1245Z	Wed.	5	71	13	WA0FLL

Traffic: KOONK 2275, KOFPK 672, WA0EMX 165, W0OUD 159, WA0FLL 131, KOTGU 129, W0GWX 123, W0HVJ 116, W0CTV 102, KOAEM 79, KOEQY 71, W0EFE 62, KOTCB 58, WA0FKD 41, WA0DJG 39, WA0DGT 30, W0BUL 21, W0ZBR 20, W0KIK 16,

COMPLETE, SELF-CONTAINED, 4-BAND (80-40-20-15) SSB TRANSCEIVER,

NEW SBE SB 34



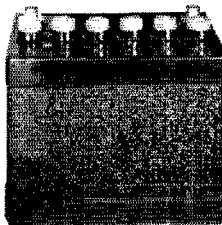
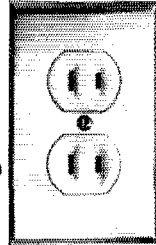
12V DC / 117V AC POWER SUPPLY BUILT-IN!



Small ...
Compact ...
Easily carried

You can plug your
SB-34 into the 117
volt AC outlet . . .

(just use the AC patch cable provided)



OR

connect it directly
to the 12
v. car battery.

(using the DC patch
cable furnished)

SB-34 draws only 500 milliamperes from
vehicle battery when on receiver standby.

Suggested price

\$395

including built-in
power supply.

Please send data sheet on SB-34 transceiver

Name _____

Number _____ Street _____

City _____ State _____ Zip _____

317 Roebling Road, So. San Francisco, Calif.

- Expanded frequency coverage • Delta receiver tuning •
- Solid-state dial corrector • Panel switch selects USB or LSB •
- Solid-state switching---no relays • Collins mechanical filter •

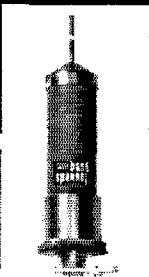
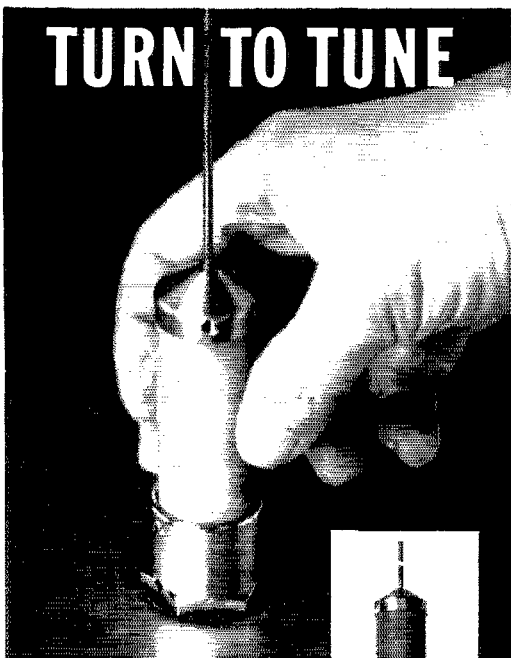
Power input: 135 watts P.E.P. input (slightly lower on 15).
Freq. range: 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc. 21.2-21.45 mc
23 transistors, 18 diodes, 1-zener, 1-varactor, 2-6GB5's PA,
1-12DQ7 driver. **Speaker built in.** Pre-wired receptacles on rear
accept VOX and Calibrator—both units optionally available.
Size: 5"H, 11¼"W, 10"D. 20 lbs. (approx.)

Export sales:



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

TURN TO TUNE



**W-600 SERIES.. HIGH QUALITY
COMMERCIAL-GRADE**

MOBILE ANTENNAS

Model W-600-12 for rugged commercial/industrial use, covers 145-174 mc.* Whip length averages 1/2-wave but antenna is base loaded to 3/8-wave for additional gain. Exact resonance, lowest VSWR (less than 1.5 into 50 ohms) obtainable anywhere in band by turning sealed inductor, micrometer fashion, then locking with set screw. Electro-static-sleeve tuning is used—no sliding contacts to wear or corrode. Assembly is weatherproof, durable. Metal parts are brass, heavily plated. Top whip is stainless steel. Inductor outer jacket is high-impact-strength plastic. Car top mounting provides best ground plane but antenna also performs satisfactorily on cowl, rear deck or fender.

* (Whip length is set per chart supplied to allow micro-tuning within desired band segment.)

3-GROUPS OF ANTENNAS AVAILABLE

(1/4-wave resonant w/42" whips)
25-54 mcs. (includes models for 27 mc C-B and 6 and 10 amateur bands.)

(3/8-wave resonant w/1/2-wave whips)
144-148 mc 145-174 mc 450-470 mc.



317 ROEBLING RD.
SO. SAN FRANCISCO,
CALIFORNIA

WRITE FOR COMPLETE DATA—PRICES

WOOGC 14, WOTPK 13, WOZLN 13, WOGQR 7, WOBYL 6, WOAIM 5, WAOCWV 4, WNQILQ 2, KQJPL 2, KOLGZ 1.

NEBRASKA—SCM, Frank Allen, WOGGP—SEC: KOJKN. Appointments: KOFRU, WAODOU, WOFQB and WOVEA as ORSs. Renewal: WONYU. Net reports for the month:

Nehr. Morn				
Phone	3982.5 1330Z	QNI 550	QTC 71	
West Nehr. Net	3850 1400Z	QNI 671	QTC 142	Wx 325
Nehr. Emer.				
Phone	3982.5 1830Z	QNI 1225	QTC 126	
Nehr. Storm Net	3982.5 2330Z	QNI 587	QTC 63	
	0030Z	680	116	
AREC Phone Net	3982.5 1430Z	QNI 118	QTC 8	
	Sun.			
Nehr. CW Net	3525 0100Z	QNI 210	QTC 83	
Nehr. AREC	0400Z	142		
CW Net	3782.5 0000Z	QNI 39	QTC 1	

New officers of the Pine Ridge Amateur Club at Chadron are K06AL, pres.; K00DF, vice-pres.; WA0JKN, secy. The Tri-City Radio Amateur Club of Scottsbluff recently presented W0SWG, a blind ham at Minatare, with an HW-12. Look for him around 3850 kc. New TR-3s include K0RRL and WA0AES. K0MZV, formerly of Nebraska now in the Aleutians, is working 20 meters with K1LFB1. Anyone with information about the following publications please contact your SCM: *Cornhusker Catwisker*, Nehr. *Hams*, *Radio Forum*, *Star* or the *Radioist*. The Seward County Blue Valley ARC at its Christmas party pre-ented certificates to W0GG, W0BOQ and W0DDP, each over 40 years a licensee. Traffic: K0RRL 301, WA0DOU 285, W0LOD 179, WA0GHZ 142, W0NYU 137, W0FOM/7 83, K0HNW 87, W0VEA 64, W0FIG 58, W0FXH 54, W0ZOU 51, W0VRE 48, W0YFR 46, W0NFK 37, WA0B10 36, W0GGP 36, K0HNT 36, K0JFN 35, W0BFN 30, WA0BIE 30, W1CJP/0 27, WA0EEI 27, K0FRU 25, K0GDW 24, W0ZDF 23, WA0HB 22, WA0BOK 21, W0MTI 15, W0NOW 15, W0RJA 15, WA0CFZ 13, K0FJT 13, W0EGQ 11, W0FQB 10, WA7AZI 9, WA0DFS 9, W0BKW 8, WA0ETE 8, W0FTQ 8, K0QVN 8, W0DDT 6, WA0IXF 5, K0JRH 5, W0HYD 4, WA0RQA 4, K0UWK 4, WA0AKG 3, W0CIW 2, K0ECH 2, WA0ERN 2, WA0FJN 2, W0HOP 2, WA0JAV/0 2, K0VTD 2, W0WKP 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred Tamm, K1GGG—CN meets on 3840 kc. at 2345 GMT daily and CPN meets on 3880 kc. at 2255 GMT M-Sat. December was a big traffic month. Congrats to KILFW who made her first BPL this month, and the hard way too. W1BGD also made his fourth BPL in a row, and K1WKK added another to his collection for Nov. and Dec. The AREC program in Connecticut is on the down swing and with the increased emphasis on public service, I would like to get the ball rolling. Anyone interested in becoming an EC should request an application from the SCM or ARRL. There is no reason why every amateur shouldn't be a member of AREC. Here again, applications can be obtained from the SCM or ARRL, and if you don't know who your EC is, send the application to W1EKJ, or the SCM and the application will be forwarded to the EC. Have you fulfilled your public service obligation this month? Traffic reports: (Dec.) W1BGD 740, K1LFW 541, K1WKK 520, W1ZFM 269, W1EFW 244, K1OQG/1 190, K1EIC 168, K1EIR 135, K1GGG 89, W1CTI 84, W1BDI 78, W1QV 34, K1FRF 23, W1BNB/1 8. (Nov.) K1WKK 506.

EASTERN MASSACHUSETTS—SCM, Frank J. Baker, Jr., W1ALP—W1A0G, our SEC, received reports from W1STX, K1s DZG, ICJ and PNB. W1s WAJ, VAH, BB, BGW and K1WJD took part in the Nov. FMT. The Fall River ARC, W1ACT, elected W1YHZ, pres.; W1ZQA, vice-pres.; WA1BXU, secy.; K1AUP, treas. The QRA elected W1VDV, pres.; W1MXC, vice-pres.; K1ZQL, treas.; K1LJT, secy., also net mgr. W1YD is on several bands. K1USA is active again. K1PNB says his group is working on a new emergency transceiver. K1BUF and W1ZQM have rigs set up in a new QTH, Cape Cod & Islands ARA elected K1GAZ, pres.; K1LIE, vice-pres.; W1EYK, secy.-treas. W1s BMW, DVS, OQT, KINGJ, directors. W1HGT has been in S.C. with the National Guard but now is in Brookline. WA4WBG/1, Boxford, W1BYN, No. Reading, are on 10. K1HDW has a new 78-ft. tower. W1HIL went to Swiss-Land. The Wellesley ARS held a meeting. W1AQV put out a nice bulletin for the West Medford CCRC. K1NBJ, Needham FN held 4 sessions, 17 QNIs, 6 traffic. K1OCD is very

Clegg



22'er TWO METER TRANSCEIVER

Signal reports on the 22'er are consistently excellent, thanks to the many fine Clegg design features that result from years of experience in pioneering VHF equipment. Hams, CD groups, MARS, CAP and other vital services are signing up enthusiastically for membership in the 22'er club because they know that they can depend on superior Clegg performance at the right price.

NOW AVAILABLE
AMATEUR NET \$239.50
 Clegg Mic \$10.50 additional

Features

RECEIVER

1. Unique new triple conversion design
2. Selectivity 10 KC at 6 db
3. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up
4. Full 143.8 MC to 148.2 MC coverage with tuning dial calibrated 144 to 148 MC
5. Adjustable Squelch
6. Excellent AGC performance
7. NUVISTOR RF stage and low noise first mixer provide .35 μ V sensitivity (6 db S + N to N)
8. 2 watts audio output available with self contained high efficiency speaker for operation in high ambient noise associated with mobile operation
9. Effective Automatic NOISE LIMITER

TRANSMITTER

1. Broadband exciter stages to simplify rapid QSY
2. High efficiency straight through final amplifier with crystal controlled 20 WATT input
3. High level plate and screen modulation for typical Clegg "HIGH TALK POWER" performance
4. PUSH TO TALK with provisions to switch external LINEAR and VFO
5. TRANSMITTER frequency SPOTTING SWITCH
6. Self contained universal solid state power supply for 115 volts AC and 12 volts DC
7. Tube line-up

6CW4	RF Amplifier	12AX7	AF Amplifier
6KE8	Tripler/1st Mixer	6AQ5	Rec. Audio/Modulator
6EJ7	2nd Mixer	6AQ5	Modulator
6BA6	10.7 MC IF Amplifier	6AE8	VLO. Buffer
6BE6	3rd Mixer	6KE8	OSC/Tripler
6BA6	456 KC Amplifier	12BY7	72 MC Amplifier
6AL5	Diode Detector/Noise Limiter	12BY7	Doubler
		2E26	Power Amplifier

Other S-S Products: SS-1R HF receiver, SS-1S Noise Silencer, SS-1V Bandscanner; Venus, Thor VI, and 99'er Transceivers; Interceptor B VHF Receiver; Allbander HF Converter; Zeus Transmitter; Apollo Linear Amplifier

Squires - Sanders, Inc.

MARTINSVILLE ROAD / LIBERTY CORNER • MILLINGTON, N.J. 07946

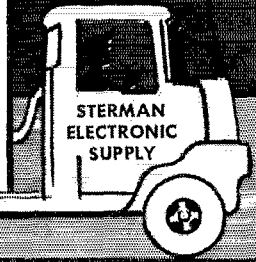
Giant MOVING SALE!

Trade or No-Trade/Cash or Terms

SAVE BIG MONEY on

NEW CLEGG EQUIPMENT

ACT NOW!



TERRY STERMAN
W9DIA
Proprietor

"We're moving soon to a bigger and better location, here in Milwaukee. At our present location we're bursting at the seams with Brand New Factory-Sealed Equipment. It would cost us too much to move our giant stocks—so . . . we're having this Giant Moving Sale, and passing the savings on to you. Until we move, we'll be trading wilder than ever. If you've been thinking about trading up to some New Equipment, now is the time to get our quote. You'll never get a better deal! Use handy coupon below! There is no obligation."

TRADE-IN Coupon

To: **STERMAN ELECTRONIC SUPPLY**
4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am interested in the following new items:

I have the following to trade:

Rush me your SPECIAL MOVING SALE TRADE-IN DEAL by return mail. I understand I am under no obligation.

Name _____

Address _____

City _____

State _____ Zip Code _____

Send latest Reconditioned Equipment Bulletin

We stock the entire **CLEGG Line**

STERMAN ELECTRONIC SUPPLY

4828 West Fond du Lac Ave.
MILWAUKEE, WISCONSIN 53216
Telephone (414) 442-4200

**NOTE: Our firm was formerly known as
AMATEUR ELECTRONIC SUPPLY**
We've changed the name... **THAT'S ALL!**

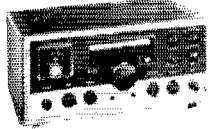
VISIT our Branch Stores, located at:
6450 Milwaukee Avenue | 19 Azalea Pk. Shopping Ctr.
CHICAGO, ILLINOIS | **ORLANDO, FLORIDA**
Phone (312) 763-1030 | Phone (305) 277-8231

LOOK at your low Monthly Payment AFTER JUST \$5⁰⁰ DOWN

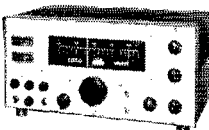


RAY
K9KHW
Mgr. Mail
Order Dept.

"If you are considering purchasing, **WITHOUT TRADE**—either Cash or Financed—any **NEW Equipment, Antennas, Towers, or Station Accessories, etc.**—You will want to get our **Special NO-TRADE MOVING SALE DEAL**. You know that the Manufacturers would frown upon our advertising a Discount . . . So, tell us what you are interested in on the Coupon below, and we'll call you Long Distance (at our expense), to let you know how we can save you **BIG MONEY**. You are under no obligation! Sorry, we cannot accept Collect Calls—we'll call you."



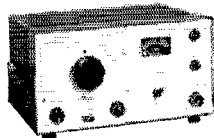
SS-IR



VENUS



NEW SS
BOOSTER
FOR
VENUS



THOR

SQUIRES-SANDERS

SS-IR Receiver	(32.13)	\$895.00
SS-IRS Speaker	(1.08)	35.00
SS-IS Silencer	(4.69)	135.00
SS-IV Scanner		To be announced
SS-IT Xmtr.		To be announced

HAM NET

CLEGG

Zeus Xmtr.	(26.72)	\$745.00
Interceptor B Rec.	(17.69)	495.00
Allbander Tuner	(4.51)	129.95
22'er 2m Xcvr.	(8.46)	239.50
99'er 6m Xcvr.	(6.31)	179.95
Thor 6 RF Unit	(9.20)	260.00
Thor 6 AC Sup.	(4.87)	139.95
Thor 6 DC Sup.	(5.95)	159.95
Venus 6m SSB	(17.69)	495.00
Venus AC Sup.	(3.79)	110.00
Apollo 6 Lin.	(8.75)	247.50
SS Booster	(3.34)	97.50
372 Filter		14.95

The above monthly payments are shown for \$5.00 down—regular price—no trade—for 36 months.

Of course if you purchase during our **GIANT MOVING SALE**—Trade or No-trade . . . your monthly payments will be less.

NEW!!

for 2
Meters



NEW SQUIRES-SANDERS 22'ER

Now superior CLEGG performance at the right price. Check these features:

- Full 20 watt input • Nuvistorized Triple Conversion receiver • Solid state AC/DC supply • Full frequency coverage for MARS-CD-CAP.

NO-TRADE Coupon

To: **STERMAN ELECTRONIC SUPPLY**

4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am seriously considering purchasing the following new equipment without trade-in:

I understand you will phone me long distance (at your expense) and tell me how I can save money during your MOVING SALE:

My home phone # is: _____

My phone # at work is: _____

Best time to call: _____

Best time to call: _____

My area code is _____

Name _____

Address _____

City _____

State _____

Zip

Code _____

Send latest Reconditioned Equipment Bulletin

14th Annual Dayton Hamvention

of the Dayton Amateur Radio Association

Saturday, April 10, 1965
Wampler's Ballarena
Dayton, Ohio

- TECHNICAL SESSIONS
- EXHIBITS
- AWARDS
- FORUMS • VHF • DX • SSB • RTTY •
ANTENNAS • ARMY MARS
- HIDDEN TRANSMITTER HUNT
- WOMEN'S ACTIVITIES
- HOMEBREW CONTEST

FCC EXAM: 0900 Saturday, April 10.
General Class only. Make exam application
in advance to 8th District Engineer in Detroit.
FCC will issue exam papers.

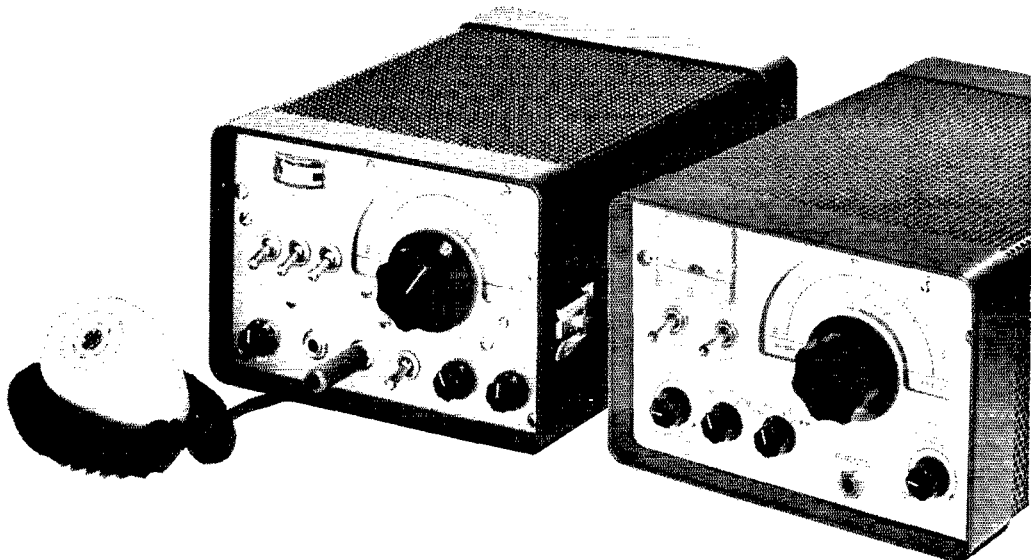
For information, map, accommodations, writes:
Dayton Hamvention, Department H, Box 44,
Dayton, Ohio 45401

busy at work. W1AAU is working DX on 20. W1JLI will have a 1-kw. c.w. rig. W1NFB is working DX on 3.5 Mc. WILES is visiting in California. WA1BOQ is on 80, 40 and 20. W1NIGGI is on 80-40-Mc. c.w. WA1DEK is ex-W1FGT on 80 c.w. K1PLP is on RTTY. WN1DDO is home from the hospital and on the air. K1RQS now is in Billerica. The New England Emergency Phone Net and our Eastern Mass. C.W. Net held meetings in Boston. WINS has moved to W. Palm Beach, Fla. WILES made the BPL. K1VGM is on 20-meter s.s.b. W1AYG is working WIBW on 2-meter s.s.b. W1ACB is busy selling cars. The Dim Lights still are on the air. K1CCL is doing a lot of traveling on his job. W1MRQ spent some time in the hospital but is better now. W1AKN has a new vertical antenna and worked his son, K8MZD. W1ALB is home after quite a trip. WN1DBD gets on the air at two other stations. The new Suburban Amateur RC's officers are WA1BIK, pres.; WA1BMY, vice-pres.; K1SBT, secy.; K1QVW, treas.; K1SLQ, act. mgr. and the club meets the 2nd and 4th Wed. at the president's QTH. The T-9 Club met at W1TJP's QTH. W1IPZ is on 15 and 20. W1ZSS is sending code on 145.8. See the BPLs this month: W1s PEX, OFK, ZSS, AOG, K1VPJ, W1ZLX. WA1CRK is on 160. K1ESG said he heard Arizona on 10. K1ZHS has WAC and WAS. W1FJJ is out of the Army. K1VOK still is working odd hours. WIATX is back on the air on 160. W1JDP is on some. W1JYH works his son at W4OUR in Memphis, Tenn. K1QFC is in the Navy. W1AUQ has an SX-100 receiver. W1BB spoke at the Middlesex ARC on "My 50 years of Happy Hamming." K1LFA is EC for Watertown. Appointments endorsed: W1EAE and K1BUF as ORSs. W1EAE as RM for 80 c.w., K1PNB and W1DOP as ECs. W1KBN, K1VGM as OBSs, and W1ZSS, W1DOF as OPSs. W1HGT as OES. K1CIMS has a Telrex 1147 beam for 6. K1FJM is attending Worcester Polytech. K1PNB sent out a nice Novice Net bulletin. Where are all the other new Novices? EM12MN held 23 sessions, 222 QNTs, traffic 416. W1UOH is working down at Otis AF Base. Traffic: (Dec.) W1PEP 3480, W1OPK 651, W1ZSS 422, WA1CRK 352, W1EMG 287, K1ESG 252, K1VPJ 241, W1AOG 215, W1ZLX 204, W1DOM 179, K1GKA 127, K1LCQ 125, WA1DAG 98, K1PNB 97, WA1CLR 46, K1ZHS 38, W1NCR 84, K1PZE 32, W1CTR 31, W1FJJ 24, W4YAC/1 24, K1FJM 20, K1VOK 20, W1BJE 18, WIATX 17, WA1CEV 17, W1JDP 13, K1CIMS 12, W1JYH 9, K1ZSA 6, W1AUQ 2, WA1BIK 2, WA1BOQ 2, K1DZG 1, K1OWK 1. (Nov.) K1WJD 52, K1WHM 50, K1BGK 6.

MAINE—Acting SCM, Herbert A. Davis. K1DYG—SEC: K1DYG. PAMs: K1BXI, K1ZVN, RM: K1NAN, V.H.F. PAM: K1QIG. Traffic nets: Sea Gull Net, 3940 kc. 1700 to 1800 and 2000 to 2100 local time Mon. to Sat. Pine Tree Net, c.w. daily at 1900 on 3596 kc. AREC Net, Sun. on 3940 kc. at 0900. Two-Meter Phone and Traffic Net, 145.08 Mc. Thurs. 1930 to 2030. C.D. Nets, Wed. on 3530 kc. at 1900 and 1100 Sun. on 3993 kc. Any stations looking for new certificates or endorsement on those they have, please get in touch with K1DYG. A new net called the Maine Novice Net was started the first of the year on 3720 kc. Mon. and Wed. at 1630 local time and Sat. at 0830. This will help stations to get used to procedure and traffic on c.w. Because of conditions most of the nets have a bad time getting any business done, but things will change soon. Many thanks to all the stations who have helped to keep things going with the nets, traffic and all the rest. There seems to be a lack of good net control stations on most of the nets. Any station having the time and a good setup is asked to contact the net manager. Traffic: K1TAK 163, K1TVT 96, K1SZC 63, WA1ADK 61, K1DYG 34, K1MDM 26, K1LHE 18.

NEW HAMPSHIRE—SCM, Robert C. Mitchell. W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. The Granite State Phone Net meets on 3842 kc. (alt. 3845) Mon. through Fri. at 2330Z and Sun. at 1430Z. VTNNJ meets on 3520 kc. Mon. through Fri. at 2359Z. GSPN certificates were awarded to K1APQ and K1PCY. W3OLE is now W1BYG, Milford. K1PAM now is K9RFU. Welcome to new hams WN1DGM, WA1DAG and WA1DHL. W1JB has been endorsed as OPS. The GSPN has check-ins and 38 traffic. The Nashua Mike and Key Club's new officers are K1NBN, pres.; K1VLX, vice-pres.; K1SIU, treas.; W1NCFE, secy.; W1RCC, act. mgr. New appointments: W1QKA and K1WKP as OESs. Results of the New Hampshire QSO Party: C.W.—1st W1SWX, 2nd W1DYE, 3rd K1BGL. Phone—1st K1NBN, 2nd W1RCC, 3rd W1UJM. W1PYM was home from W6-Land and we had a chat with him at Christmas. The Contoocook Valley Radio Club has a new Ranger and is on the air as K1BKE. W1GQK is a new AREC member. K1PSR is waiting for a QSL from VP9WB,

DESIGNED FOR THE AMATEUR WHO IS ACTIVE ON SIX



**COMPLETE, SELF-CONTAINED STATION FOR FIXED,
PORTABLE, OR MOBILE OPERATION.**

LI'L LULU TRANSMITTER FOR 6

Special gang-tuned circuits in Li'l Lulu let you QSY instantly — there's no buffer tuning and final dipping needed when the frequency is changed. And the rig is really TVI proof! By keeping the VFO grid circuit in the 25mc range, TVI is eliminated.

- 117 vac, 12 vdc integral power supply. Class A high level modulation. Carbon dynamic or crystal mic input. Push-to-talk, or use panel switch • Built-in cw keying filter • VFO spotting switch • VFO control • 12 DQ7 final.

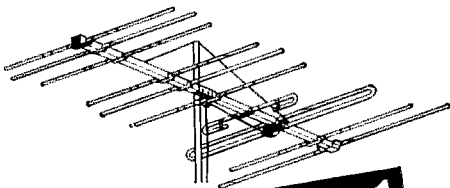
LI'L LULU RECEIVER FOR 6

Specially developed to complement the famous Li'l Lulu one-knob-controlled transmitter for 6 meters, the new Li'l Lulu receiver is unmatched for performance.

- AM, CW, SSB • Product detector for SSB • BFO crystal controlled • Delayed AGC operates on AM, CW, SSB • Integral front-end filter • Tunes 50-54 mc, and 10 mc for WWV and converter input • Critical components are temperature compensated • 10 mc crystal filter ahead of 3 IF amplifiers • Built-in CW monitor • ANL operates in all modes • S meter controlled by non-delayed AVC • Front panel control for companion transmitter — 80 to 1 drive reduction for precise tuning • Matches the Li'l Lulu transmitter.

WHIPPANY LABORATORIES, INC.
1275 BLOOMFIELD AVENUE, WEST CALDWELL, N. J.

FINCO 6 & 2 Meter Combination Beam Antennas



2 ANTENNAS in 1

MODEL A-62 · 300 OHM

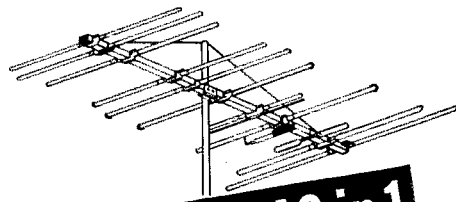
On 2 Meters:

- 18 Elements
- 1- Folded Dipole Plus Special Phasing Stub
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- Full 4 Elements
- 1- Folded Dipole
- 1- Reflector
- 2- Directors

Amateur Net. \$33.00
Stacking Kit \$2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:

- Equivalent to 18 Elements
- 1-Gamma-Matched Dipole
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- 4 Elements
- 1-Gamma-Matched Dipole
- 1- Reflector
- 2- Directors

Amateur Net. \$34.50
Stacking Kit. \$18.00

MODEL AB-62 GMC

On 2 Meters:

Equivalent to 30 Elements

On 6 Meters:

Equivalent to 6 Elements

Amateur Net. \$52.50

Also:

- 5 New 6 Meter Beams
- 3 New 2 Meter Beams
- 1 New 1 1/4 Meter Beams

Gold Corodized for Protection Against Corrosion

See Your Finco Distributor
or write Dept. QS for Catalog 20-226

The FINNEY Company - Bedford, Ohio

who he worked on 6 meters. WA1DGV is the XYL of WIYHF. Congratulations, Hank, WINXP works for the FAA in Nashua. KIISJ is on 75-meter s.s.b. mobile with a new NCN-5. W1ALE, K1DWK and K1BGI are active in the 6-meter nets. Traffic: W1ALE 153, K1BGI 34, WIYMJJ 28, K1HK 23, W1SWX 6, W1AJJ 2, K1AEG 1.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: WIYNE, PAM: WITXL, RM: W1BTV, V.H.F. PAM: KITPK. New appointments: K1FHS, W1FEQ and W1BTV as FCS. Endorsements: K1GRC as EC, R1SPN report: 31 sessions, 735 QNT, 304 traffic. R1N report: 23 sessions, 129 QNT, 175 traffic. The Providence Radio Club, W1OP, elected W1BIL, pres.; K1DWH, vice-pres.; W1HK, secy.; W1KKE, treas.; W1EYH, W1UUP, W1ALE, K1YFJ, K1JPK and K1BKM, board of directors. The NCR Club of Newport elected W1JFF, pres.; W1WLG, vice-pres.; K1VQO, rec. secy.; WITXL, corr. secy.; Roy Smith, treas. WITXL presented the club with a 6-meter converter to be used at W1SYE. The W1AQ Club of Rumford elected K1AGA, pres.; K1CBO, vice-pres.; K1LII, secy.; K1CZB, treas. The club issued W1I certificate No. 55 to W8RSW, No. 56 to K1OQG, No. 57 to W9VEN and No. 58 to WA5GVF/1. Committee chairmen appointed were, Code and Theory, W1YUT, Films K1PEL, Technical K1LXQ, Speakers K1AAV, Electrical W1WAC and Net Mgr. K1LII. W1FNH was reinstated. All three clubs will start code and theory classes soon, so contact them for further information. K1EWL has a new Eico 730 modulator and W1WKQ is operating a new 6-meter converter. K1VQO is Asst. EC for Middletown. Traffic: WITXL 586, W1BTV 349, KITPK 230, WIYNE 245, K1USD 166, W1YKQ 135, K1YYI 71, K1VYC 41, K1VYE/40, K1VYN 39, K1EWL 22, K1BRJ 15, K1SXY 12.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA, RM: W1WPFZ. The Green Mt. Net meets on 3855 kc. daily at 2230Z; the Vt. Fone Net on 3855 kc. Sun. at 1400Z; the VTNH Net on 3520 kc. Mon. through Fri. at 2330 (note new time effective since Dec. 2 because of band conditions), the Vt. C.D. RACES Net on 3993 kc. (a.m.) Sun. at 1500Z. Welcome to new Novices W1IDFY Burlington, W1IDGE Randolph, W1IDHK Ludlow, and congrats to WA1DHS in Lyndonville (Conditional). K1BQB has made her third consecutive RPL and in December made her highest total, 861. Congrats, Millic, K1AJL, K1LEC, W4KSV and K2YAZ, students at UVM, are active on 2 meters. The Trading Post Net is active again on Sun. at 3 p.m. on 3855 kc. W1VAC has been in the hospital and we miss the net manager of the Green Mt. Net. The net report for the Vt. Fone Net showed 116 stations checked in for Dec. in Nov. the Green Mt. Net had 208 check-ins. Traffic: K1BQB 861, K1LLJ 27, K1RMG 19, K1MPN 18, K1VNY 15.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR, C.W. RM: K1IJV, 75-Meter PAM: K1RYT. Our section is saddened by the passing of one of our old-timers, W1AWW. Our most sincere sympathy to his family, K1PKZ, manager of the Hampden County 10 Meter Traffic Net, reports that the following stations reported in during the month: K1PKZ, K1UFQ, K1ZFJ, K1ZLB, W1NRQ, K1FQL, K1FUR, K1NJ, K1RNH, K1RNG, W1JWV and K1YNY. W1NBXQ and W1BXP passed the General Class exam in Boston. RM K1IJV reports that W1MN handled 118 messages during the month and that newcomer K1WZY was extremely active on the net. W1DQX is running home-brew s.s.b. on 75. W1VC also is W4GS. W1GTO worked 17 countries on 80 during December. W1UUK now has 215/228. W1JGW has "phone only" DXCC. W1FKN used a bow and arrow to get his antenna up into a high tree. K1UVP and W1FVT are active on 6 meters. W1QCC was the speaker at the Berkshire County ARA. The new Valley Amateur Radio Club in Springfield gets out a fine bulletin and is running a very active program. Co-editors of its bulletin are K1NGL and K1TGT, both of whom are studying electrical engineering at the University of Massachusetts. W1NY, on the occasion of his golden anniversary in amateur radio, was awarded honorary life membership in the club. The meeting place of this new club is at the Association of the Blind, 910 Liberty St., Springfield, the 3rd Fri. of each month at 7:30 p.m. W1DX, of ARRL Hq., was the speaker at the Hampden County Radio Assn. Traffic: K1IJV 118, W1BVR 112, K1LBB 58, W1ZPB 43, W1QXK 26, W1UYY 22, W1MING 20, W1DVV 15, K1YMS 13.

HOW MUCH TRAINING IS NEEDED TO OPERATE RADIO COMMUNICATIONS EQUIPMENT OVER 100 MILE TO 1000 MILE DISTANCES?

It only takes 15 minutes to learn how to use the RF Communications Compact SSB Transceiver!!

These are the steps...

1. TURN ON POWER
2. SELECT CHANNEL
3. ADJUST AUDIO VOLUME
4. PUSH THE BUTTON AND TALK



Designed for extra simplified operation, the RF Communications COMPACT series SSB Transceiver is a high quality commercial unit using modern circuit design and the best grade of components and construction. The COMPACT is used in over 50 countries of the world by Police Departments, Oil Companies, Government Agencies, Military Organizations, etc.

With 100 watts power output (p.e.p.) the COMPACT provides highly dependable SSB communications over long distances.

The COMPACT is available in 1, 2, 3 or 4 channel versions. The frequency range is 1.6 to 16 Mc, either upperside band, lower sideband or selectable sideband.

The COMPACT weighs only 35 pounds complete in one cabinet including power supply. The COMPACT can be used in mobile applications with the RF-1210 mobile power kit.

The modern circuit has many advanced features including AGC, ALC, Collins mechanical filter, military grade crystals in high stability ovens and solid state power supply. All high voltage circuits are protected and the transceiver can be used under conditions of high temperatures and humidity.

A complete line of antenna couplers, linear power amplifiers, and other accessories are available. RF COMMUNICATIONS is a leader in SSB communications.

PRICES ON THE COMPACT START AT \$695.

Please contact us for further details.



R F COMMUNICATIONS, INC.

1680 UNIVERSITY AVENUE • ROCHESTER, NEW YORK 14610

.....BARRY ELECTRONICS.....

AN/SRA-18 Antenna Tuning Group for Manual/Auto Tuning of Antenna to 50 Ohm Line (3 to 30 Mcs.) Call or write for details. (Orig. cost \$6,000.00).

2.0 Mfd @ 18 KV DC Capacitor. Sale \$27.50.

6 Hy. @ 1.5 Amp. DC Choke. 28.2 ohms. 13.5 KV working. (20 KV Test). Compact. Oil-filled \$24.50.

2.0 Mfd. @ 7500 VDC Capacitor. \$13.50.

Halicrafters RA-63E Battery Charger. Input: 115 VAC. Output. 12 VDC @ 17.5 Amps. \$45.00.

Superior Powerstat Model 30M116U. 0 to 140 VAC @ 7.5 Amps. Motor-driven. With Motor. Brand new. \$50.00.

Superior Powerstat Model 30 MC136-3. Consists of three 136-U each rated for 20 Amps. 0-120 VAC. Single or Triple Phase. Motor-driven. With motor. \$150.00. Brand-new.

CV-253 ALR Electronic Freq. Converter. Tunes from 38 to 1,000 Mcs. in APR Receivers. \$150.00.

Silicon Rectifiers: 600 PIV @ 1 Amp. @ 36¢; 880 PIV @ 750 Ma. @ 56¢; 400 PIV @ 750 Ma. @ 30¢. In lots of 50 — Deduct 10% (may be mixed)

In stock W2AU Super 2 Element Quad for 10-15-20 Meters. \$44.95.

Eimac SK-400 Air System Socket (less hardware) \$6.95 each (reg. \$17.50).

Vantron-300 Watt PEP GG Linear Amplifier. Brand-new. Original carton. With built-in 115 VAC P. S. 10 thru 80 meters. Only \$69.00.

General Radio Type 760-A Sound Analyzer. Good/used condition \$290.00. Set of batteries. \$16.50 extra.

Cole Decade Resistance Box. 5 ranges. From .1 to 11,111 Ohms. Similar to General Radio type 1432-N. These units are brand new in original Gvt.-sealed packing. \$49.50.

Andrew Gas-Filled Coax Cable with 2 pressure gauges. One continuous 86 ft. roll only. Specify #CG2286/U. 86 ft. for \$75.00.

Bendix PN-8A Hi-Power 2 Meter Long-Lines R.F. Amplifier. Excellent condition. Complete with P.P. 3C24's. With Grid and plate meters. Operates from 100 to 156 Mcs. (no conversion). Standard 19" Relay Rack Panel. Only \$16.00 F.O.B. Site, Georgia.

TUBES . . . TUBES . . . TUBES . . . THE BIGGEST AND FINEST NAME BRANDS. LARGEST STOCK IN USA! For example — 3E29 @ \$8.50; 4-65A @ \$9.50; 4X150A @ \$12.00; 4X150D @ \$7.00; 5D21 @ \$6.50; 6C21 @ \$25.00; 6J4 @ \$2.50; 100TH @ \$11.50; 250TL @ \$18.00; 450TL @ \$33.00; 572B @ \$12.50; 575A @ \$14.50; 803 @ \$7.50; 805 @ \$8.50; 806 @ \$9.00; 807 @ \$2.20; 808 @ \$1.50; 811A @ \$3.85; 814 @ \$6.95; 815 @ \$4.50; 866A @ \$1.70; 872A @ \$4.95; 902A @ \$4.95; 3-1000Z @ \$112.00; 4C X1000A @ \$135.00; 1616 @ \$1.00; 1624 @ \$1.70 and 1625 @ 60¢. Thousands of other types in stock. Write for quote.

COME IN AND BROWSE

Thousands of items that we cannot list in an ad. MON. TO FRI. 9 to 6. SATURDAYS 10 to 2 P.M. (free parking on Street Sat.) Mon. to Fri. parking lot 501 Broadway.

NORTHWESTERN DIVISION

IDAHO—SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. Pocatello was besieged with its 3rd flood in four years Christmas Eve and Christmas day. Pocatello amateur radio operators were alerted by the Salvation Army and hams set up a 2-meter station in the Canteen and a base station also was set up at the Red Cross Headquarters. Those furnishing mobiles were W7GCO and W7YXM. Those furnishing fixed stations were W7UA, W7GGV/K7CXP and K7QKV. Also operating were K7LVC and K7NEY. Passing traffic during December was extremely rough as all existing nets were all but wiped out with long-skip conditions. Practically all holiday and flood, health and welfare traffic was passed on a "catch as catch can" basis. Traffic: K7HLR 193, W7GGV 42.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. Net reports: OSN, K7IWD net mgr., sessions 21, attendance 83 high 7, traffic 65 high 11, average 3.09. BRAT awards to W7ZFH, K7IWD, K7IFG, NSN, K7UXF mgr., attendance 183, traffic 50. K7DVK has been busy rebuilding and peaking up the antenna, stringing up the 80-meter dipole and building a Heath Twoer. He says his XYL passed the Novice Class exam and will operate on 2 and 80 meters. WAHP is using an SBE-34 mobile. K7MYV has an 832 linear in the trunk of the car and is driving it with a Twoer and puts out a snappy signal on 2 meters. OOs W7K7G, W7DIS and K7IWD did excellent jobs during 1964. Reports are coming in on the activities of Oregon amateurs during the December floods and will be reported on later. K7PHP, Asst. EC and recorder for the Multnomah County, Portland Area AREC, reports: Asst. ECs 16, AREC members—Full 89, Supporting 32, Mobile Units 39. My records for 1964 show the following: An SEC, an RM, 15 ECs, 11 ORSs, 9 OPSs, 3 OBSSs, 5 OESSs, 5 OOs. Our records also show that 7 ORSs, 2 OPSs and 7 others made reports on traffic handled during 1964 and the total was 9562 messages. This has been a good year for Oregon activities. Traffic: K7IWD 345, W7ZB 179, W7ZFH 77, K7KBK 70, W7DEM 62, K7ZMR 13, W7JHA 8.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMJ. RM: W7AIB. PAM: W7LFA. New officers of the Mt. Baker Radio Club are W7VRO, pres.; W7VET, vice-pres.; K7UNI, secy.-treas.; K7GOR and W7TIZ, trustees. Meetings are held the 2nd Tue. of each month. A new ham club has been formed called the Vancouver V.H.F. Radio Club, with K7DPT, pres., and K7QZG, secy.-treas. The club station call is W7BJG. Anyone interested in this club should contact K7AEJ/K7GHZ. During the December flood in Southwestern Washington the town of Klickitat was completely isolated for several days. During that time W7AJV, with the assistance of K7EGX from The Dalles across the river in Oregon, established an emergency net and handled the communications with the assistance of others in the nearby areas. The new director for the NTN is W7BR and the manager is K7UMM, W7NBR, the Spokane Radio Operators station, now is located in the National Red Cross Bldg. Club officers are W7BFI, pres.; K7VVQ, vice-pres.; W7OBI, secy.; K7QNN, treas. The station is equipped with an SR-180 transceiver, a 10-meter a.m. station and a 2-meter f.m. station. The Northwest Weather Net meets on 3890 kc. at 0630 PST daily except Sun. WN7DWG, a new Novice, is the jr. operator of K7JHA and operating with 32 watts. Effective Mar. 31, 1965, I will resign as SCM of Washington and Asst. SCM W7HMJ, will be Acting SCM until such time as nominations and an election for the new SCM has taken place. Because of my newly-elected office as Director for the Northwestern Division, it is felt that I will need all my spare time to better represent my fellow amateurs in the division. My sincere thanks for the many, many courtesies and support given me in the past. May you have many hours of enjoyment and good contacts in a very fine hobby. Young of W7HMJ becomes acting SCM. Be sure to send your reports to him after Apr. 1, 1965. His address is 2217 Fifth St., S.E., Puyallup. W7BTB is checking into the Inland Empire Net on 1995 kc. at 0300Z Wed. and Fri. K7IAE was in Alabama for a two-week vacation. W7UVR still is awaiting gear. The Noon Time Net had 31 sessions, 1417 check-ins and 1695 messages for December. A new appointee is K7URU as ORS. The following renewed their EC appointments: W7CTS, K7EYM, W7ITP, K7KJB, K7LZA, W7SAP, W7UJA, W7YFO and W7ZCE. New officers of the Lower Columbia Amateur Radio Assn. are K7EEC, pres.; K7KSD, vice-pres.; W7DER, secy.-treas. K7MGA joined Navy MARS. Traffic: (Dec.) W7BA 1919, W7DZC 1833, K7JHA 1694, W7IBR 803, W7NPK 406, K7CTCY 295,

BARRY ELECTRONICS DEPT. O-3
512 BROADWAY, NEW YORK, N. Y. 10012
WALKER 5-7000 (AREA CODE 212)

- Enclosed is money order or check and my order. Prices FOB, NYC. Shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overage will be refunded. Fragile tubes shipped via Railway Express. **Minimum order \$5.00.**
- Send for greensheet catalogue No. 15
- Send information

Name.....Title
Company.....
Address.....
City.....State.....

SIX BANDS IN TWO MINUTES!

This is the performance that K4KXR of Gotham can demonstrate, using his Gotham V-80 antenna with 35 foot feed-line connected to the coil at the antenna's base, and his HT-40 transmitter. Neither the antenna nor the coil is touched. Without worrying about the standing wave ratio on various bands, Bob merely switches his rig to the desired band (80-40-20-15-10-6 meters), plugs in the crystal, tunes grid drive, plate tuning and plate loading, and he is on the air. No TVI at any time even with TV receiver in the same room. Contacts vary from local ragchews to DX thousands of miles away.

GOTHAM VERTICALS DELIVER THE CONTACTS

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #139

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/42, a W.A.C. of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success—i.e., DL4s, Z53, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

FREE CATALOG

AN ANTENNA THAT SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED.

WHY

THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA FOR YOU

- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive: aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

DO YOU KNOW

1. YOU WILL HAVE NO DIFFICULTY INSTALLING YOUR GOTHAM VERTICAL ANTENNA IN JUST A FEW MOMENTS, REGARDLESS OF YOUR PARTICULAR PROBLEM, SO ORDER WITH CONFIDENCE EVEN IF YOU HAVE RESTRICTED SPACE OR A DIFFICULT SITUATION.
2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PLI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED. IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. GST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money order for:

V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS..... \$14.95

THE V40 IS ALSO MADE FOR CITY-ZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS. DESIGNATE CB-11 ANTENNA. PRICE SAME AS THE V40

V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95

V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS, SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

HOW TO ORDER: Send check or money order directly to Gotham, immediately shipped by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

City.....Zone.....State.....

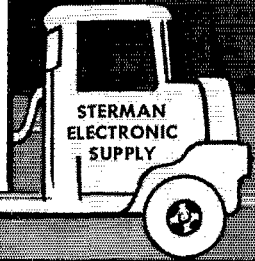
73
GOTHAM

Giant MOVING SALE!

Trade or No-Trade/Cash or Terms

**SAVE BIG MONEY on
NEW GONSET EQUIPMENT**

ACT NOW!



TERRY STERMAN
W9DIA
Proprietor

"We're moving soon to a bigger and better location, here in Milwaukee. At our present location we're bursting at the seams with Brand New Factory-Sealed Equipment. It would cost us too much to move our giant stocks—so . . . we're having this Giant Moving Sale, and passing the savings on to you. Until we move, we'll be trading wilder than ever. If you've been thinking about trading up to some New Equipment, now is the time to get our quote. You'll never get a better deal! Use handy coupon below! There is no obligation."

TRADE-IN Coupon

To: **STERMAN ELECTRONIC SUPPLY**
4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am interested in the following new items:

I have the following to trade:

Rush me your SPECIAL MOVING SALE TRADE-IN DEAL by return mail. I understand I am under no obligation.

Name _____

Address _____

City _____

State _____ Zip Code _____

Send latest Reconditioned Equipment Bulletin

We stock the entire GONSET Line

STERMAN ELECTRONIC SUPPLY

4828 West Fond du Lac Ave.
MILWAUKEE, WISCONSIN 53216
Telephone (414) 442-4200

**NOTE: Our firm was formerly known as
AMATEUR ELECTRONIC SUPPLY**
We've changed the name . . . **THAT'S ALL!**

VISIT our Branch Stores, located at:
6450 Milwaukee Avenue | 19 Azalea Pk. Shopping Ctr.
CHICAGO, ILLINOIS | ORLANDO, FLORIDA
Phone (312) 763-1030 | Phone (305) 277-8231

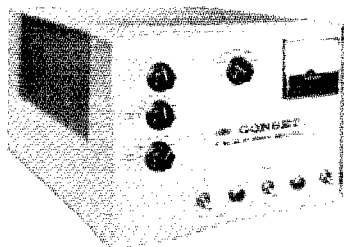
LOOK at your low Monthly Payment AFTER JUST \$5⁰⁰ DOWN

GONSET

9000A	2m Sidewinder (SSB, AM, CW) Xcvr...	(14.26)	\$399.50
901A	AC Power Supply for 900A.....	(2.25)	73.50
902A	DC Power Supply for 900A.....	(2.70)	79.50
903A	500 Watt 2m Linear.....	(10.65)	299.00
910A	6m Sidewinder (SSB, AM, CW) Xcvr...	(14.26)	399.50
911A	AC Power Supply for 910A.....	(2.52)	73.50
912A	DC Power Supply for 910A.....	(2.70)	79.50
913A	500 Watt 6m Linear.....	(10.65)	299.50
3341	2m Communicator IV 12VDC + 117VAC	(14.62)	409.95
3342	6m Communicator IV 12VDC + 117VAC	(14.62)	409.95
3409	Civil Defense Kit for Comm. IV.....	(2.16)	64.95
3363	Canvas Carrying Bag.....		12.95
GA-138	108-138mc Xcvr Aircraft.....	(17.51)	489.95
3362	Civil Air Patrol Kit.....	(1.62)	49.95
3357	2, 6, + 1/4 meter VFO.....	(3.06)	89.95
3340	GSB-201 10-80m Linear.....	(12.27)	345.00
3221	G-50 6m Xcvr, 117VAC.....	(13.00)	367.30
3300CD	G-50 (CD Version).....	(13.90)	389.95
3448	5DB RF Attenuator.....		10.79
3449	10DB RF Attenuator.....		10.79
3450	15DB RF Attenuator.....		10.79
3365	Mobile Mtg. Brackets.....		4.26
3350	Ceramic Microphone.....		13.60
621-018	Telescoping Antenna.....		3.30

The above monthly payments are shown for \$5.00⁰⁰ down—regular price—no trade—for 36 months.

Of course if you purchase during our **GIANT MOVING SALE—Trade or No-trade . . . your monthly payments will be less.**



One of 1965's hottest products
**NEW GONSET
500 WATT
LINEARS**
for 2 and 6 meters
\$299.00

"If you are considering purchasing, **WITHOUT TRADE**—either Cash or Financed—any **NEW Equipment, Antennas, Towers, or Station Accessories, etc.**—You will want to get our **Special NO-TRADE MOVING SALE DEAL.** You know that the Manufacturers would frown upon our advertising a Discount . . . So, tell us what you are interested in on the Coupon below, and we'll call you Long Distance (at our expense), to let you know how we can save you **BIG MONEY.** You are under no obligation! Sorry, we cannot accept Collect Calls—we'll call you."



RAY
K9KHW
Mgr. Mail
Order Dept.

NO-TRADE Coupon

To: **STERMAN ELECTRONIC SUPPLY**
4828 West Fond du Lac Ave.,
MILWAUKEE, WISCONSIN 53216

I am seriously considering purchasing the following new equipment without trade-in:

I understand you will phone me long distance (at your expense) and tell me how I can save money during your MOVING SALE:

My home phone # is: _____ My phone # at work is: _____

Best time to call: _____ Best time to call: _____

My area code is: _____

Name: _____

Address: _____

City: _____

State: _____ Zip Code: _____

Send latest Reconditioned Equipment Bulletin

THE TURNER

SINGLE SIDEBAND 454X

*Not just streamlined
...HAMLINED!*

Here's the mike that was specially designed for hams, by hams. It has all the features a ham wants and then some! Both models in the series . . . 454X (crystal) and 454C (ceramic) . . . feature real "ham pleasers" like press-to-talk or VOX operation; durable satin black case; and a three conductor (one shielded), 11 inch retracted, five foot extended, neoprene jacketed coiled cord. Send coupon today for details on these completely ham-lined microphones.

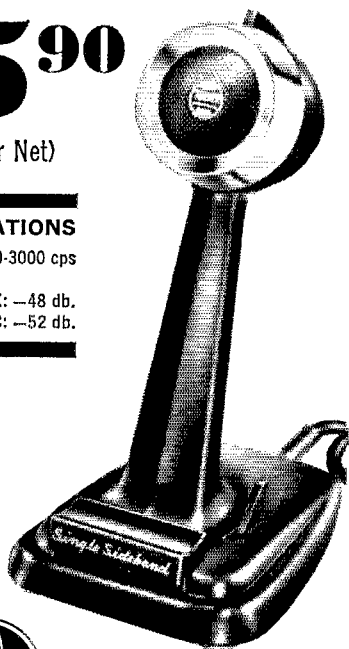
\$15⁹⁰

(Amateur Net)

SPECIFICATIONS

Response: 300-3000 cps
Output level:

454X: -48 db.
454C: -52 db.



THE TURNER MICROPHONE COMPANY
917 17th Street N.E.
Cedar Rapids, Iowa

In Canada: Tri-Tel Associates, Ltd.,
81 Sheppard Ave. West,
Willowdale, Ontario

Export: Ad Auriema, Inc., 85 Broad Street, New
York 4, N.Y.

Please send latest literature on the Turner 454X and the complete line of Turner microphones.

Name _____
Address _____
City _____
State _____

K7CTP 225, W7HMA 133, K7LAE 121, W7BTB 100, W7AIB 83, W7APS 52, W7AAC 33, W7AJV 18, W7EVW 8, K7JRE 3, K7MGA 8, K7CHH 4, K7JYE 2, WN7-BWG 1 (Nov.) W7DZX 666.
EAST BAY—SCM, Richard Wilson, K6LRN—WB6-

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WB6-HJW turned his Christmas vacation into 9 days of traffic-handling during the flood emergencies in the Northwest part of Calif. Ernie was NCS during the day for the Red Cross Net, clearing traffic in and out of the stricken areas. Others known to have participated were WA6MIE, K6TFT, W6ZF, K6GK, WA6PTU, WA6QZA, W6VNI, WA6PRV, WB6BSD, WB6JGS, WB6MTP and W6LGV. WA6NFF is doing a real good job with the new net started on 2 meters. It meets Tue. and Thurs. on 145.5 Mc. at 1930 PST, but will be expanded as Ray finds some alternate net control stations. The net covers the East Bay section with QNI from as far away as Camino and Santa Rosa. K6GK joins others commenting about rotten band conditions on 40 and 80. After 6 years of editing the Lark's paper K6EKD has resigned in favor of WA6-KLL with K6UGX publishing. WA6KLL made WAS and has an 250/100-watt transmitter working on 80 meters. K6JZR is back on NCN after a short absence. WB6ETY and WB6LH are QRL school. WA6MXI and W6NDR renewed as OBS. WA6FBS and W6LPW are new ORSs and WA6ECP has renewed. W6CFE has been endorsed as OO and WA6FFF as EC. K6TFT has been appointed EC for the Napa County area. WA6KJZ and WA6MJP have been cancelled as OBSs. New officers of the M.D.A.R.C. for 1965 are WA6FBS, pres.; WA6ANE, vice-pres.; WA6MIE, secy.; K6IMV, treas.; WA6-DKG, EC, WA6NFF and W6LGV, board members. WA6ECP is pres. of the Radio club at Univ. of Santa Clara. W6NDR is working on a transistor v.f.o. with direct output on 6 and 2 meters and single transistor frequency multiplier with crystal at 8 Mc. producing 130 Mc. for use in converter with 14-18 Mc. output. New officers of the Silverado ARS are WB6AIB, pres.; K6VNX, vice-pres.; WA6OGB, secy.; K6RZR, treas. WB6PMN, sgt. at arms; W6ZF, board member. WN6KGX is sporting a new Poly-con. WB6CKT was portable at Rattlesnake Peak. WN6MJW has an HQ-170 and WA6YEU has a 40-ft. crank-up tower. WA6HSQ hosted the Jackson twins, WA6QMY and QMX, on a tour of S.F.'s Chinatown. New officers of the Hayward RC for 1965 are WB6LH, pres.; K6YBS, vice-pres.; WA6JCS, secy.; WA6VPG, treas.; WB6FVW, sgt. at arms. WA6NXC and WB6LK are new Generals. WB6-CUA worked a CR9. W4UAF/6 donated a Panadaptor to the HRC. Don't forget NCN at 6300Z daily on 2.635 Mc. Traffic: WB6HJW 1074, K6TFT 306, WA6WNG 231, WA6MIE 213, K6GK 132, WA6NFF 04, WA6FBS 25, W6ZF 18, W6TYM 14, K6LRN 13, WA6KLL 10, WA6PTU 8, WB6ETY 7, K6JZR 6, WB6LH 3.

HAWAII—SCM, Lee B. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL, Acting PAM: KH6ATS, RM: KH6EWD. I have just returned from a business trip throughout the entire Far East and the South Pacific. I met many amateurs, including one JA and spoke with several officers of the FEARL while at Tachikawa A.B., Japan. I was sorry to have missed KA2LL, editor of the *PEARL Newsletter*. In Taiwan I visited BV1USG/A18AF, the only presently active amateur radio station authorized to operate in Taipei. I met S/Sgt. L.R. "Smitty" Smith, ex-K7VGV, NCOIC, A/1 W.H. "Bill" Grofe, ex-WA4DXF, 2nd operator and their "top drawer" maintenance man, A/1 "Nick" Nichols. All hams in the Pacific Division, which includes the Marianas, Philippines and the Far East, are encouraged to submit their activity reports to me. My address appears on page 8 of each QST. If these reports are mailed by the last day of the month your news will be included in the following month's report. KH6EPW and his XYL left for the mainland on their 20th anniversary to spend the holidays with their family. Our SEC, KH6CCL, made a short business trip to the Pacific Northwest. KH6CRV has returned to KJ6-Land on business. PAM KH6ATS reports the 50th State Net has been low on activity because of poor band conditions. RM KH6EWD would like c.w. traffic men to contact him. Traffic: KH6ATS 12.

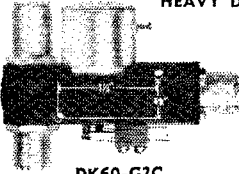
NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU, WA7BAY and his XYL are parents of their first harmonic, a boy. W7AI is running a BC-610 into a new beam. W7OIQ reports good signals with his quad. WA7RY has a new linear. The NARA held an old-fashioned get-together for its Christmas program. K7ICW reports a new record for himself, 5 states and 3 call areas 1236 miles on 2 meters. W6-RAY/7 is our new EC for Jackass Flats. The Western

DOW-KEY

has a **COAXIAL RELAY**
for most every switching
application . . .

DK60 SERIES

HEAVY DUTY SPDT COAXIAL RELAYS



DK60-G2C

Heavy duty SPDT 50 ohm impedance, 1 kw rating. Life expectancy 1,000,000 operations. VSWR less than 1.15:1 from 0 to 500 mc. DK60-G and DK60-G2C feature patented automatic receiver protecting connector for positive isolation of r.f. from receiver greater than 100 db isolation between receiver and transmitter lines from 0 to 500 mc.

DK60-G2C has DPDT external contacts for switching auxiliary circuits. Size: 2 3/4" x 3 3/4" x 1 1/4". Wt. 9 oz.

With UHF Coaxial Connectors, AC or DC from \$12.45 ea.

DK71 SERIES



DK71

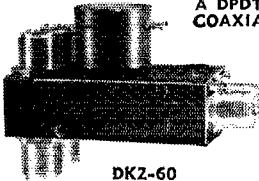
1P6T COAXIAL RELAY FOR SWITCHING OF r.f. SOURCES

Weatherproof. Common connector may be switched directly to any one or combination of six positions. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. Life expectancy greater than 1,000,000 operations. 50 ohm impedance.

Size 5 1/2" dia. 2 3/4" deep. Wt. 3 lbs. With UHF Coaxial Connectors . . . \$49.50 ea.

DK2-60 SERIES

A DPDT SWITCH for SWITCHING 2 COAXIAL LINES SIMULTANEOUSLY



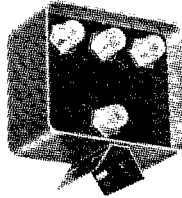
DK2-60

Frequency range 0 to 500 mc. Power rating to 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 2 3/4" x 3 3/4" x 1 3/4". Wt. 12 oz.

With UHF COAXIAL CONNECTORS from \$19.00 ea.

DK72 SERIES

1P3T COAXIAL RELAY FOR REMOTE SWITCHING OF r.f. SOURCES



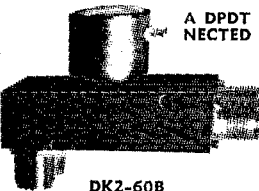
DK72

Weatherproof. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 4" x 3 3/4" x 2 5/8". Wt. 1 lb., 8 oz.

WITH UHF CONNECTORS . . . \$22.95 ea.

DK2-60B SERIES

A DPDT SWITCH INTERNALLY CONNECTED IN DE-ENERGIZED POSITION



DK2-60B

Ideal for switching in and out a power amplifier between an exciter and antenna. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations, 50 ohm impedance.

Connectors UHF. Size: 2 3/4" x 3 3/4" x 1 3/4". Wt. 12 oz. Available in all standard AC, DC voltages from \$19.00 ea.



DK77-TNC

DK77 SERIES

MINIATURE, LOW COST 50 ohm SPDT COAXIAL RELAYS

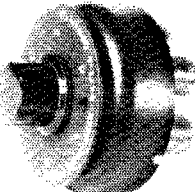
Wt. less than 3.5 oz. from \$7.90 ea.

DK 77 relays available with phono, TNC and BNC coaxial connectors—with high performance characteristics. Freq. range 0 to 1000 mc. Power rating 250 w. VSWR less than 1.1:1 @ 500 mc. Isolation greater than 30 db @ 500 mc. Insertion loss less than .03 db @ 500 mc. Life expectancy over 1,000,000 operations. Models with 10 in. mfgs. type have SPDT auxiliary switches rated at 5 amp @ 110 VAC resistive.

Comply with MIL-5541. AN-C-170 and MIL-S-5002.

AND NOW
DOW-KEY'S

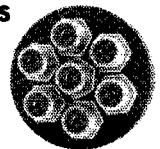
DK78 SERIES



New Manual Coaxial Switches

New manual DK78 series coaxial switches with excellent r.f. characteristics (not wafer switches). r.f. rating, 1 kw. 50 ohm impedance. VSWR less than 1.05:1 at 150 mc. Isolation greater than 50 db @ 500 mc. and greater than 80 db @ 30 mc. With dial plate and knob. Wt. 10 oz. Size: 3" dia. x 1 1/2" deep.

Available: 1P2T, SP3T, 1P6T and crossover switch from \$12.75 ea.



DK78-6

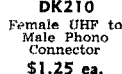
DK60, DK2-60, DK2-60B, DK71, DK72 available in standard AC, DC voltages. Also available with types BNC, TNC, N & C Connectors. DK77 all st. DC voltages. DK78 with BNC, TNC, N & C connectors.



DK201
Panel Mount
Male Connector
\$1.25 ea.



DK202
Double Female
Connector
.85 ea.



DK210
Female UHF to
Male Phono
Connector
\$1.25 ea.



DK211
Male UHF to
Male Phono
Connector
\$1.25 ea.

AVAILABLE TOO: DK61, DK63 and DK67 Series of Relays for Military and special application. Write for complete brochure of Dow-Key Products.

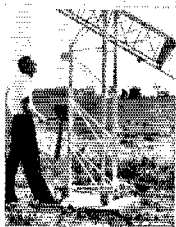
Dow-Key products available at your distributor or write:
Manufactured by DOW-KEY COMPANY, Thief River Falls, Minnesota

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 (55)
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.

F. O. Box 2000

Peoria, Illinois

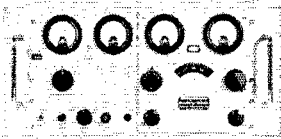
"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers, and installers of complete communication tower systems."

States Noontime Emergency S.S.B. Net is now operating on 7225 kc. K7YXX is on RTTY with a 15. K7QYR and K7YHR each have new towers and beams. W7WRS is running an NCX-5 into a linear. K7KJA is mobile with an NCX-5. K7NVE has a new Galaxy 5. K7TNY still is chasing DX on 15 and 20 around 1200 GMT. WA7BEU, W7BJY, W7PBV, K7PYF, K7-RKH and K7ZOK are all on 2-meter RTTY. W7SHY has moved to New Mexico. W4CJD/7 reports low activity on 8360 kc. C.W. Net; unless more check in the net will fold for lack of interest. W7TTF is chasing DX on 20 and 40 c.w. Traffic: (Dec.) W4CJD/7 158, WA7BAV 37, W7BFL 12, W7JU 11, W7PBV 11. (Nov.) W7FBL 5.

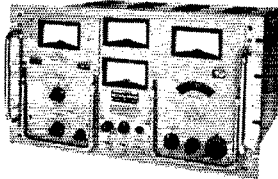
SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF. The need for communications in the northern part of the section during the floods late in December found communications in better shape than the last time in 1955. W6YKS made BPL for the third time. Nominations were held at the Marin Amateur Radio Club in January with K6OJO and WA6ASW nominated for president. W6MTJ made WAC-RTTY in 1964 and his first two contacts in 1965 were KG4 and FG7. WA6QXV had to evacuate during the December floods when it was feared a dam upstream would burst. He moved back when the danger had passed. W6GQA scored in a fine 1.3 parts per million in the November FMT. WA6ROJ has moved to Ukiah from Petaluma and is working on 432- and 1296-Mc. gear. John is constructing a 6-ft. dish for 1296 Mc. WB6AIS is a new EC appointee in Western Marin. Doc has a new call but can tell of working at the University of California laboratory when Dr. Lawrence was developing his cyclotron a few decades ago. WA6FYJ is operating an f.m. rig on 2 meters. W6FVK has changed jobs and probably will move his QTH. WA6-WPO got on the Huntley-Brinkley Report on TV showing his operating during the flood emergency. W6YKS has left for Fort Polk in Louisiana and will not be back until summer and the section misses his heavy message work on the nets. A newspaper is being mailed monthly to club officers and appointees in the San Francisco section. The Marin Club found one of the articles in the club paper reprinted in a national magazine. Traffic: W6YKS 713, WA6WPO 29, W6KVQ 25, WA6QXV 9, WA6AUD 7.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WA6EDQ reports that the Central California Sideband Association has 19 members. Anyone interested in joining, contact WA6FDQ in Exeter. W6WSI and W6PLX are helping Novices to get their tickets. WB6ADN is building his hamshack in the house and doing a nice job hiding it from the XYL. K6PSN was a recent visitor in Exeter with WA6EDQ. WA6RLW is in the bowling tournament and going strong. W5HWW now is located in Fresno. KLYND is on RTTY in Merced. W6FWW and W6ALL have a TR-33 and are on s.s.b. in Jamestown. W6JXY has a Galaxy III and is mobile on 40-meter s.s.b. with good results. W6KB was a recent visitor here in Fresno with W6QFR. WB6GIT has new SB-300 receiver. W6WSI has a new quad antenna up so he can chase DX. WA6TQL is using a Swan 175 in his car. WA6KIV is moving to the State of Washington. WB6HYA and WA6VPN report that because of bad conditions on 80-meter c.w. traffic-handling is at its lowest. W6ZKH is on f.m. on 2 meters. W6LLR also is on 2-meter f.m. New calls heard on 2 meters in Visalia are WA6ZWW and WB6-NQO. The Tulare County Net for 1964 reports 48 sessions, 340 check-ins, 43 messages, 6 QST, 20 net business contacts. W6ADB reports nothing new. WB6HYA built up an electronic antenna relay for c.w. break-in. Traffic: (Dec.) W6ADB 216, WA6VPN 123, WB6HYA 65, W6ARE 18. (Nov.) WA6VPN 103, WB6FYH 9.

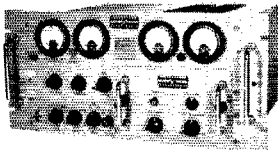
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6-HYU. ECs: WA6MNO, W6LSW, K6QIF, W6JDN, WA6TQV, W6JTO. OESs: K6HHD, W6AF, WA6YKR, W6LWL. OESs: W6GDO, WA6YKR, W6PIV, K6HEZ. OCs: W6GDO, W6ZJW, WA6LCT, K6ER, W6LWL, K6HEZ, W6FTH, WA6NRH. OESs: WA6YKR, W6MIW, W6WGO. OPSs: K6ORT, K6YZU. K6IKV reports that the Sacramento County Emergency Net (SCEN-V.H.F.) 100% AREC drills in message traffic-handling procedures and holds emergency drills monthly. Inter-area liaison with the El Dorado and Yolo Counties is established. The SCEN meets Tue. at 8 P.M. on 146.28 Mc. with WB6BWB as net mgr. Sacto ARC's 1965 officers are Ed Black, presy; W6VJR, vice-pres.; WA6-YZD, treas.; W6BKAW, secy.; W6BMYR, Sgt.-at-arms. WA6YZO is providing information to all interested members on converting and tuning-up procedures for the Link mobile sets. The new location for code and theory classes is Zackit, 1020 14th St. K6QWL,



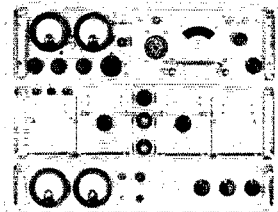
- **TMR-2A:** 215 to 265 mc Tuning Range; VFO or XTAL controlled. FM or PM. FM demodulators—Wideband, Narrowband, Phase lock. Phase Demodulators—Short loop. Pre-D: Plug-in record and playback modules.



- **TMR-5A:** 55 to 2400 mc; Tuning Units VFO or XTAL controlled. AM/FM, PM. FM Demodulators—Wideband, Narrowband, Phase lock. Phase Demodulators—Short loop.



- **TMR-6:** 50 to 1000 mc: Fixed Frequency XTAL controlled RF Tuning Units. AM, FM or PM. FM Demodulators—Wideband, Narrowband, Phase lock. Phase Demodulators—Long loop. Pre-D: Plug-in record modules.



- **TR-101:** 100 to 2400 mc; Tuning Units VFO, XTAL controlled and Automatic Phase Control. AM, FM or PM. Dual Data Channels. FM Demodulators—Wideband, Intermediate, Narrowband. Phase Demodulators—Long loop, Short loop.



- **TR-711:** 100 to 2300 mc; Tuning Units VFO, XTAL controlled and Automatic Phase Control. AM, FM or PM. FM Demodulators—Wideband, Intermediate band, Narrowband. Phase Demodulators—Long loop, Short loop. Plug-in display unit or Pre-D record and playback modules, or oscilloscope.
- These receivers are compatible with TDC and DC series Diversity Combiners and the PRU-1 and PD-101 Predetection Record/Playback units. Plug-in IF bandwidth determining modules and plug-in demodulators are used in these receivers. Other options are described in individual receiver data sheets.

DEI TELEMETRY RECEIVERS...

Technically Superior
Reliable by design
Modular for flexibility
Available now

Telemetry receivers are very important at DEI. Development and planning never stop. We consider new requirements, new components and the constant need to advance telemetry system performance. It is a rare telemetry receiving function that cannot be met by a DEI catalog receiver/module combination.

DEI receivers that have been in use for many years are updated by module changes to achieve new system characteristics. System modifications are introduced with minimum interruption when the DEI modular approach is used.

For your telemetry applications, consult DEI, the company where receivers and receiving systems are constantly being improved.

Write or call DEI for your copy of detailed specification sheets.



DEI
RESEARCH
DEVELOPMENT
MANUFACTURING

Defense Electronics, Inc.

Rockville, Maryland

ROCKVILLE, MD. (301) 762-5700, TWX: 302-427-4660; SHERMAN OAKS, CALIF. (213) 872-2670, TWX: 213-783-2742; COCOA, FLA. (305) 632-5400, TWX: 305-632-5442; WILLOW GROVE, PA. (215) 659-6651; INT'L, ROCKVILLE, MD.; CABLE: DEIUSA

DEI has growth opportunities for qualified Circuit Design Engineers

You CAN ALSO WORK DX!

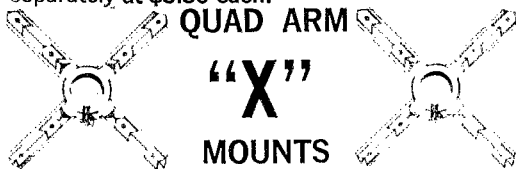
when you install a



FIBERGLASS QUAD ARMS

First time ever offered at this unbelievable price. More than 2 years in R. & D. These full length mandrel processed reinforced Fiberglass arms are practically indestructible in application. Cross arms are reinforced at base and wire intercept points. Give your Quad a professional look with high reliability.

13 ft. Long. These Quad Arms can be purchased separately at \$5.50 each.



These rigid die cast mounts are poured from a special aluminum alloy bullion with low deterioration and fatigue factor. 2 in. hub diameter. Special "V" angle will handle any diameter quad arm from 1 in. to 1 3/8 in. O.D. Comes complete with all necessary hardware.

Separately, \$5.95 each

BOOM TO MAST "T" MOUNT

Die cast to true fit a 2 in. O.D. boom to a 1 1/2 in. O.D. steel mast such as popular T. V. mast. Complete with hardware.



Separately, \$4.95 each

COMPLETE KIT PRICE

CONTENTS

- 8 Fiberglass Arms
- 2 Quad Arm "X" Mounts
- 1 Boom to Mast "T" Mount
- 1 Instruction Manual

\$59.95

FOB Miami, Florida

Designs by W8FYR — W4WSM

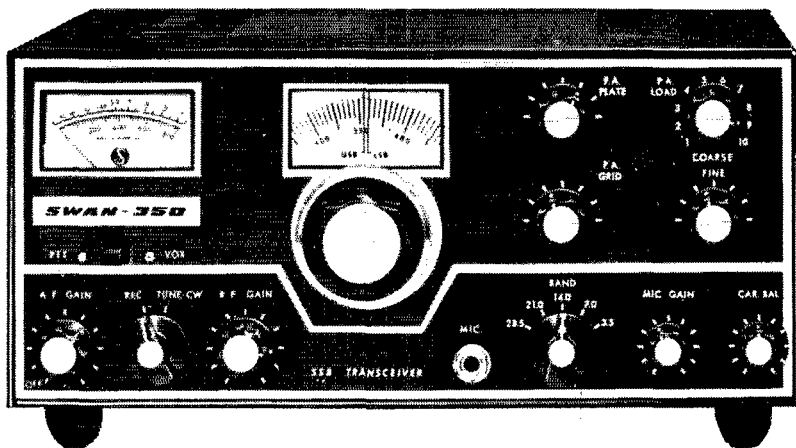
UNITED STATES FIBERGLASS CO.

5101 N.W. 36 Avenue Miami, Florida

North Hills Radio Club, has resolved during 1965 to build "something" using current tubes, semi-conductors and recent component parts. W6VEH has his 2-meter transmitter on the air and is working on his RTTY converter. K6LS claims his RTTY converter is entirely free of parasites. K6VT is building an RTTY converter. WN6LAE is awaiting the little piece of paper from FCC changing his call to "WB". K6QWL decided to have a "Tag Day" rather than publish the names of delinquent members. The *Heterodyne* (El Dorado County Amateur Radio Club) says K6SJM is on regularly with his 8BE-23. (RAMS. SV2MRC (Sacto Valley 2-Meter Repeater Club) is on the air on a "lost" basis, input frequency 145.6, output 147.21, running approximately 1-watt input. MARS's new officers are W6WGO, pres.; K6EWE, vice-pres.; George, secy.; W6QYJ, treas.; WA6ECJ, exec. comm. W6M1W, MARS dir.; W6ASL, training officer, Paul Magnusson, Field Engineer for Tektronix, spoke on "The Oscilloscope and Its Uses" at a recent club meeting. YOLO AREC (WA6MMO), alerted during the Christmas floods and assisted by Sacto AREC, responded by dispatching 7 mobiles headed by K6QLF with K6GDS standing by with a small group on 2 and 75 meters. OARS is organizing AREC and RACES within its ranks. Newly-elected officers of OARS are W6DHL, pres.; W6BGOO, vice-pres.; W6DVO, treas.; W6AF, secy. New officers of the Golden Empire Amateur Radio Society, which meets in the Applied Sciences Bldg., Ohio State College, are WA6YVQ, pres.; W6B1PY, vice-pres.; W6SYX, secy.-treas. W6DNUW has been operating net control from Paradise for the Amer. Red Cross Emergency Net on 3875 kc. and assisted during the Eureka-Fortuna Flood. RACES stood by on calling frequency 145.58 Mc. transmitting on 147.08 f.m. using W6KUI, K6KGH and K6KGA. K6R1Q's new 100-watt home-brew rig is PB with 5894s in the final on 145.35 Mc. W6NHL handled traffic for W6ZRW when land lines and roads failed to Paskanta. W6CKV has a new 75-meter Heath s.s.b. transceiver completed. W6BDLV lost his antenna during the winds and snow. W6KAI and W6SYX are using 160 meter with competition from WA6AMT on 7360 type phasing rig. K6B1U boasts a new TR-3. New appointees, W6JDN as EC for Dunsmit ARC, WA6TQV as EC Yolo County Civil Defense ARC. Traffic: K6BYB 248, W6HYU 64, W6JUN 35.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin. W6ZRJ—Asst. SCM, Edward T. Turner. W6NVO, SEC: WA6HVN, RM; W6QMO, V.L.F. PAM; WA6RXD. The new officers of the Santa Cruz County Radio Club are WA6OCP, pres.; WA6UDE, vice-pres.; W6ONX, secy.; WA6FNC, treas.; W6K1S, WA6WNH, ex-WN6GTI and K6BDK, board members. The group meets the 1st Fri. of each month. WA6RXD, our new V.L.F. PAM, reports the Santa Clara Valley Section Two-Meter Net held 25 sessions, handled 34 traffic and had 81 check-ins during December. This net meets at 8 p.m. on 146.7 Mc. W6RSY handled a large amount of bulk traffic through touch RTTY interference. W6JXK is active on the AREC Net on 6 meters. K61DYX's RTTY OBS schedule is Tue., Wed. and Fri. at 0430Z on 3625 and 3650 kc. W6YBY works NCN. W6AGR, ex-W9AKV, is a new ORS from Illinois and now works NCN. RN6 and PAN. W6PLS is active on QCWA, HMA and CHC/FHC. W6ZRJ traveled to Oregon during the Christmas holidays and managed to work W6HC while mobile e.w. from the Siskiyus Pass in a snow storm. WA6HVN is active on MTN/sideband. W6ASH works the OSCAR Net and handles OO schedule. W6AUC works the Sketo Net and is an OO. WA6TKE is active on the Sketo and Mission Trail Nets. W6HC has had some difficulty on TCC schedule east but now has a new antenna up which has increased his signal on both 40 and 80 meters. New officers of the SARO are K6GDO, pres.; W6YHM, vice-pres.; W61JY, secy.; W6ZF, treas.; W6NZG, comm. mgr. W6YHM now has the P.S. keyer operating on RTTY. W6OH is renewed as OPS. W6MAIG is active on ALARS. W6ISQ is busy helping the King City Explorer Scout Post. K6MTX stood by for possible operating during the Northern California Floods. K6-PJW now has a Swan 350. W61BW sends in several newspaper clippings of work by Palo Alto amateurs in the Northern California floods. The Santa Clara County Amateur Radio Assn. and West Valley Radio Club held a combined ARCS Convention Christmas Party in December. Guests included W6ISQ, K6LEH, W6MVL and W6HC. W6HC presented W6ISQ with a QST cover plaque for his work in the magazine. It is with deep regret that we mark the passing of Robert F. Mead, K6GZ, on Dec. 19. Bob had been an active ORS for over ten years and worked both e.w. and RTTY circuits. He was active in OSCAR traffic operations and an active MARS traffic handler. Bob made the BPL every month with his work bringing MARS traffic into the NTS. Your SCM, W6ZRJ, and RM, W6QMO, attended the funeral in San Mateo to represent the League, the section and NCN. I'm sure I

Power --- Versatility --- Expensive features
 --- All at a price that defies comparison



the new **SWAN-350** TRANSCEIVER

At only \$395, the Swan 350 transceiver offers features to gladden the heart of the most discriminating. Five bands, 400 watts of power and equally at home as a mobile, portable or home station.

For complete specifications call or write your nearest Henry Radio Store

and—DESIGNED TO SOLVE YOUR FINANCING PROBLEMS . . . HENRY RADIO'S EASY TERMS

**6% FINANCE CHARGE • 10% DOWN OR TRADE-IN DOWN
 • NO FINANCE CHARGE IF PAID IN 90 DAYS • GOOD
 RECONDITIONED APPARATUS.** Nearly all makes and models.
 Big savings! 15 day trial — 90 day warranty. 90 day full
 trade back on new apparatus. Write for bulletin.

CALL DIRECT . . . USE AREA CODE

Henry Radio Stores

Butler 1, Missouri	816 679-3127
11240 W. Olympic, Los Angeles, Calif.	213 477-6701
931 N. Euclid, Anaheim, Calif.	714 772-9200
431 E. Green St., Pasadena, Calif.	213 684-0861
6116 N. 27th Ave., Phoenix, Ariz.	602 AM 4-3895

"World's Largest Distributors of Short Wave Receivers"

LEAVE QRM BEHIND,

GO TO

ANTARCTICA!

The National Bureau of Standards, Department of Commerce, is calling for resumes from competent, self-reliant physicists and electronic engineers to work in the High Latitude Conjugate Point and the Ionospheric Sounder 1965-66 Program.

OPERATIONAL AREA: Byrd Station, and South Pole Station, Antarctica.

SCOPE: Special training at Boulder, Colorado—July through October, followed by 12 months at the operational stations, with data collection and analyses the main scientific effort.

RESEARCH MEDIA: Vertical Incidence Soundings, Riometry, VLF, Micropulsations, and Air-glow Studies.

CONTACT: Personnel Office, National Bureau of Standards, Boulder, Colorado 80301

an equal opportunity employer

SSB-AM-CW

75% of Your Pwr is wasted

MODERNIZE... EFFICIENTIZE

Your Receiving and Transmitting Equipment with Nationally Known Products...

What have you been wanting to get—but hesitating because of the cost?

... Transceiver, Tower, Beam? ... Write us... We may be able to help you.

OVERSEAS DOMESTIC
ORGANS & ELECTRONICS Box 117
Lockport, Ill.

express the feeling of all who knew Bob in saying that his loss will be felt by all. Traffic: (Doc.) WGRS 1296, W6JXK 993, K6DYX 665, W6YBV 323, W6AJT 147, W6AGR 136, W6PLS 135, W6DEF 90, W6QMO 72, W6ZRJ 44, W6HVN 28, W6ASH 36, W6AUC 30, W6RFF 19, W6ATKE 17, W6HC 12, W6YHM 8, W6OIT 5, W6ISQ 4, W6MNG 4, K6MTX 2. (Oct.) W6JXK 497.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dould, W4RNU—Asst. SCM; Robert B. Corns, W4FDV, SEC; W4MFK, RM; W44FJA, PAM; W4AJT, V.H.F. PAM; W4HJZ, Nets: NCN (E) 2330Z/3573 kc., SSBN 2330Z/3938 kc., CCEN 2330Z/3907 kc., THEN 0000Z/3865 kc., NCN (L) 0300Z/3573 kc. If you have been hesitant about checking into a high-speed c.w. net for fear of getting confused by all the net jargon, hark! The late sessions of NCN is a slow-speed net primarily for training purposes, so drop down there and join the fellows and learn how to become a trafficker. W4LEV has started a traffic net on 7215 kc. at 1300Z and 1800Z Mon. through Fri. and reports more than 4000 pieces of traffic handled during the first month of operation. The new officers of the Piedmont Amateur Radio Club are K4CDZ, pres.; W4BNU, vice-pres.; W4AITF, treas.; K4YYJ, secy.; K4IRY, librarian. Two-meter stations now on s.s.b. include W4HJZ, K4GPL, K4BE and W4WVDH. W4COJ is active on phone. K4GNX reports that his first grandchild was born on Christmas Eve. Net traffic: NCN (E) 256, SSBN 181, NCN (L) 158, THEN 62, Traffic: (Doc.) W4PDS 477, W4LWZ 419, W4EVN 294, W4IRE 169, W44LWE 123, W4BNU 113, K4CDZ 99, W4BDU 93, K4CWZ 64, W44ANH 54, W44PYJ 45, W4FDV 41, W44FJA 32, W44ICU 29, W4MUP 25, K4EO 24, W4COJ 18, K4GNX 16, K4QWQ 16, K4LEX 14, W4AJT 4, K4QDO 3. (Nov.) W4LEV 1681.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC; K4HJK, RM; K4LND, PAM; (a.m.) K4OCU, PAM; (s.s.b.) K4LNJ, Nets: C.W. 3795 kc. at 0000Z and 0300Z, A.m., 3820 kc. at 0000Z daily, and 3930 kc. at 1330Z and 2030Z Sun. S.s.b., 3915 kc. at 0000Z. New club officers: Charleston, W4TIS, W44HZN and W4FFH; Rock Hill, W4NDH, W4GOY; North Augusta: W4UUY, W4KVF, Ex-W2HCO is now K4UA in Clinton. The Spartanburg Club is helping 18 Boy Scouts with their radio merit badge. W44QK reports a new SB-10 for s.s.b. also a new OPS appointment. W4YOH is now active on 80-meter RTTY as well as SCN. W4TLC says 2 meters was open to Alabama on Dec. 27, W4JFY, in Aiken with a new 6-meter rig, is working Atlanta regularly. If you are not on 6 and 2 you're missing some good contacts! If you are interested in pioneering a 6- or 2-meter section net, please contact me. OO W4NTO reports over 1100 OO notices sent in 1964. Fritz again was in the top ten for the country in the November Frequency Measuring Test. Net traffic: A.M. Net 22, S.S.B. 267, Traffic: W4PPQ 109, W4WQM 95, K4LNJ 74, K4OCU 56, W4PED 40, W4NTO 12, W4YOH 12, W44JHD 8, W44LPV 6.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC; H. J. Hopkins, W4SHJ, PAM; W4DKP, RMs; W4ZM, W44EUL, W4SHJ, W4QDY, Net Mgrs; W4OKN, W3VZO/4, K4DOR, W4ZM, W44EUL, W44UXL, W4YZC is running about 950 watts to p.p. 813s and trying to get a 60 ft. tower up. SEC W4SHJ was well received on his trip to Area 4. W4BZE, W4PTR and W4JUJ enjoyed the Va. QSO Party. The PVRC had a nice Annual Christmas dinner, W1QV, W3FMC, W5KZA and K8UZA were speakers. The W4YLARCS also enjoyed its Yule party. W4ZAU says he has to struggle along without kever and QSK and misses them. K4AET is rebuilding the antenna systems with an aim to checking into V5BN. W44FCS is having trouble with rigs and antennas. K4GRZ is a new ORS. W44EUL is sporting a new TO kever brought by Santa. W4MXU reports that all the Virginia nets are doing great, which is a tribute to the managers and NCS, W4MK has recovered from the ole flue bug. W4DVT is awaiting a new Heath Linear. K4SCL built an antenna tuner with a coverage of 3.5 to 4 Mc. W4DLA now is relocated in Syracuse, N.Y. with his old call, W2SEL. The Lynchburg Radio Club elected W44BR, pres.; W4VTT, vice-pres.; W4KNC, secy.; K4ITH, treas.; K4PWA, ham tamer, WN4UYA wishes to thank W44JA for helping him get on the air; he also says that he and W44VFQ are interested in getting a ham club going at Fort Hunt High school. The Tidewater Radio Club and The Virginia Century Club held a joint dinner Jan. 20 to install new officers. As reported by Tom Cruse, pres.: the Ft. Velvoir Amateur Radio Club station handled some 280 messages to and from all parts of the world during Christmas. Traffic: (Dec.) W4DVT 386, W4NLC 273, W44EUL 265, W4RHA 233, K4LJK 162, K4PQL 140, K4FSS 117, K4SCL 112, K4GRZ 111, W4SHJ

Here is what a Ham thinks about the new 6 meter base station antenna . . .

"I do a lot of 6 meter work since I act as net control for the Michigan, Ohio, Pennsylvania SSB Net and in addition, stations from other midwestern and eastern states check in. My 10 element commercial beam with a 24' boom has met with several accidents due to high winds."

"Recently, I purchased and installed your new Coveya-6 beam antenna. To make a comparison with my previous 10 element beam I went on the air without revealing the change. You'll be glad to know that the results surpassed the performance of 10 element beam and besides, I obtained these additional advantages:

- 1. Better front to back ratio for receiving — at least 25 DB.*
- 2. An improved forward pattern.*
- 3. Much wider coverage of forward pattern on transmit, thus eliminating moving the antenna often.*
- 4. Very low VSWR — 1.1 to 1 across entire band.*
- 5. Completely weatherproofed assembly making weatherproofing spray unnecessary."*

"My greatest satisfaction was the ability of the Coveya-6 to reach out and get the long distance ground wave stations. All comparison checks in the log book were very favorable to the Coveya-6."

Elmer D. Sauers, WA8AUZ, Akron, Ohio

**this is just one of numerous
favorable comments we received about our COVEYA-"6"
see it at your distributors or write for literature**

"The Home of Originals" NEW-TRONICS CORPORATION

3455 Vega Avenue

Cleveland, Ohio 44113

ARROW ELECTRONICS INC

ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL-1, Wired, \$21.95
MODEL PCLP with built-in power-supply, wired, \$32.95

2 Nuvistors in cascade give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required—120 V. at 7 ma. and 6.3 V. at .27 A. —can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

AMECO 2 & 6 METER CW/PHONE XMTR WITH POWER SUPPLY



Model TX-62 complete 75 W. phone & CW transmitter has built-in power supply and modulator. Tunes easily by adjusting final plate and loading caps.

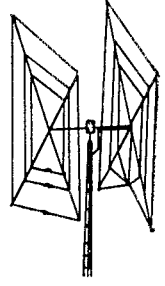
50-51 Mc. & 144-148 Mc. Xtal (8 Mc) controlled or can take VFO. Meter reads final grid or cathode current or RF out. Built-in, solid state power supply, fused. Mike Key jack & xtal socket on front panel. Size: 11 1/2"x9 1/2"x6" high, shipping weight approx. 20 lbs. TX-62, wired and tested

\$149.95

W2AU SUPER 2 ELEMENT QUAD FOR OUTSTANDING PERFORMANCE ON 10-15-20 METERS

pre-tuned • rated 2KW
PEP • low Q • low
angle radiation • high
gain • broad band •
low wind load • sim-
plified assembly •
rugged construction •
single line or 3 line
feed • ship. wt. 40 lbs.

\$44.95



ARROW ELECTRONICS INC

900 Rte. 110, Farmingdale, N.Y., 516 - MYrtle 4-6822
65 Cortlandt St., N.Y. 7, N.Y. 212 — Digby 9-4730
525 Jericho Tpke., Mineola, N.Y. 516 — Pioneer 6-8688
225 Main St., Norwalk, Conn. 203 — Victor 7-5889

LET W3KT FORWARD YOUR DX QSLs

QSLs forwarded promptly to foreign QSL Bureaus, QSL Managers, or, if necessary, direct to DX station.

THREE CENTS EACH OR 36 PER DOLLAR
FIRST CLASS MAIL • NO MEMBERSHIP FEE
SAVE TIME! SAVE MONEY!

W3KT QSL SERVICE

Box 204 Chalfont, Pennsylvania 18914

111. W4ZM 107, W5VZO/4 105. W4MXU 99, K5ITV 81
W4OKN 81. K4CG 65, W4KYR 50. W4ZAU 45, W4PTR
33, W4JND 28, W4TE 28. W4BZE 23, W4JGA 22, W4JRY
20, W4AJXO 20, K4NOV 20, W4VCT 20, K4MXF 19, W4-
NVX 17, K4BAV 14, W4UJU 11, W4LKL 8, W2UZN/4 6,
K4LMB 6, W4AIK 6, K4AET 4, W4KFC 4, W4KN 2, W4-
WBC 2, W4YZC 2. (Nov.) W44PCS 40.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—
SEC: W8SSA, PAM: K8CHW, RM: W8LMP, S.S.B. Net
Mgr.: W8EEO. Nets operate on 3570, 3890, 3903 and 3905
kc. New officers of the Opequot Radio Society of Mar-
tinsburg are K8QVG, pres.; K8SDI, vice-pres.; W8A-
CTS, secy.-treas.; K8WALX, act. mgr. K8TPF and W8-
FIC report high activity on WVPON, with 27 sessions,
225 stations and 316 messages. K8MYU plans an increase
in activity, having completed his college work. The WVN
C.W. Net had 20 sessions, 89 stations and 34 messages.
The WVN Phone Net handled 81 messages in 20 sessions
with 321 stations reporting. W8FIC, W8GRE and
W8DGE made the BPL. W8HZA reports Randolph and
Upshur Counties have submitted RACES plans. Two-
meter activity continues high, with 9 p.m. Sat. night on
144.450 and 145.230 Mc. for state-wide contacts. The
Black Diamond ARC held a successful Mid-Winter Dinner
Meeting at Princeton in January. W8FCZ, Ohio
County EC, using retired f.m. gear, has a good emer-
gency net in operation. Circle your calendar now for the
Seventh Annual West Virginia State ARRL Convention,
July 3 and 4 at Jackson's Mill. Traffic: W8FIC 352,
W8GRE 208, K8TPF 170, K8WVW 135, W8DGE 115,
K8HJD 41, W8HZA 33, W8LMP 32, W8KLUW 29, K8-
CHW 15, W8CKX 15, W8AIE 6, K8ZDY 6, K8MYU 5,
K8VBH 4, W8ALJ 3, K8ZPN 2, W8AYP 1, W8ACYZ
1, W8ADAU 1, K8WMIQ 1, K8ZDY 1, K8ZWM 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, K0TTB
—SEC: W0SIN, PM: K0FDH, CWM: W0HXB. I wish
to thank all the Colorado hams who helped in reelecting
me to serve as your SCM. I feel honored to know that I
had all your support. I also want to thank our Colorado
SEC, W0SIN, for the fine job he has done in the past
and for accepting reappointment as SEC. W0OIL, of
Lamar, has been appointed Radio Office for his county.
Did you ever think of the thankless job the OO has?
Most of the time he does not know if he has helped
someone or not but once in a while he will get a card
thanking him, and then there is always someone who
wants to know if he is in a contest. The OO is a guy just
like you and me. The only thing, he takes the time and
has the equipment to check signals for us. You can figure
yourself lucky in one way when an OO lets you know
about your signal. It's much better than having the FCC
tell you. Plans are being made for the Hamboree at
Southfork, Colo., June 4, 5, 6. Convention plans and dates
will be out soon. Net traffic: High Noon Net 350, Colum-
bine Net 200. Traffic: K0ZSQ 388, W0EYX 237, K0-
DCW 182, K0TUH 162, W0TVI 94, W0SIN 71, W0SWK
60, W0CBI 34, K0LCZ 12, K0TTB 10.

NEW MEXICO—SCM, Nowell Frank Greene, K5IQI,
—Asst. SCM: Kenneth D. Mills, W5WZK, SEC: K5QIN.
The Breakfast Club meets week-days at 0700 MST on
3838 kc. NAEPN meets Sun. at 0730 on the same fre-
quency. The wife of W8UBW presented him with a new
daughter, just in time for '64 taxes. K5ONE, who has
been prominent on W5GB, will start teaching in Alamo-
gordo. W5DER, formerly of Oklahoma, is now repre-
senting Portales. We have had little activity there since
Jake joined the Silent Keys. Los Alamos classes gradu-
ated 5 Novices. The atomic city c.d. group was clated at
their efficiency and progress in the rescue of two lost
boys. Four hams in Alamogordo are struggling with
RTTY. They are W5AFLG, W5OVM, W5UJF and W5-
UNK. W5ADUH has made BPL. Congratulations, Den-
nis. Traffic: W5DUH 516, W5UBW 134, W5FFL 67,
W5LUX 51, W5DMG 25, W5ROH 15, K5HTT 14, K5-
HTS 8.

UTAH—SCM, Marvin C. Zitting, W7MWR/W70AD -
SEC: W7WKF, W70CX, the BUN net manager, advises
that BUN has handled 4612 messages since it was organ-
ized and handled 883 in 1964. Congratulations to W70CX
on making the BPL in December. W7LQE missed BPL
by only seven points! K7ERR advises that the Beautiful
AREC Net meets on 146 Mc. each Tue. at 1900 MST. W7-
BAJ was taken out of the DX business when the wind
brought down his vertical and his beam. K7SDF has
been busy sending out OO notices. W7AYN is on with
a DX-20. K7JIZ won a 2-meter transmitter hunt in the
middle of a blizzard. K7EZR has been elected net mgr.
of the West Coast Noon Time Emergency Net. K7ZRT
reports lots of early morning JA DX on 40 meters. W7Y-
BFW is a new ham in Provo. Traffic: W7LQE 345, W7-
OCX 309, W7VTJ 107, K7SDF 41, K7EZR 22, W7MWR
12, W7BAJ 4, K7ERR 4.

Low cost transistorized commercial SSB transceiver

Designed for both mobile and base station operation, the SSB-100 transceiver gives you dependable long range communications with low battery drain. It is ideally suited for use where conventional power sources are not available.

Transistorized construction reduces battery drain to less than 100 ma. during reception. Instant heating power amplifiers operate at the 100 watt P.E.P. level to provide immediate communications. Four crystal controlled

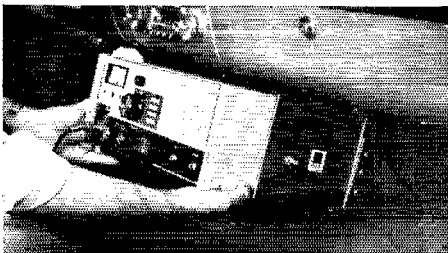
channels can be selected throughout the 2-18 mc. range.

The unit is built to withstand severe environmental conditions encountered in military, construction and agricultural usage.

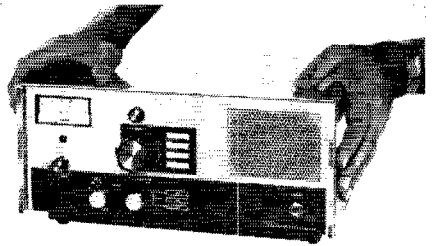


In addition to commercial applications, the SSB-100 has been approved for matching fund Civil Defense purchases, and may be used by non-amateur operators in RACES networks.

Prices start at \$795.00; full line of accessories available.



Designed for both base station and mobile use, the SSB-100 can be removed from an office and quickly slipped into a foldaway mounting for mobile operation.



SSB-100R Four-channel crystal controlled receiver uses clarifier control to eliminate crystal ovens and further minimize battery drain.

Write for descriptive brochure and specifications.



STONER ELECTRONICS CO., INC.

POST OFFICE BOX 7388 • ALTA LOMA, CALIFORNIA, U. S. A.

HERE IT IS FROM ENGLAND!

As Beulah Electronics, Ltd.

Promised in Our Previous Advertisements . . .

THE REVOLUTIONARY
**WESGROVE VIDEO
TAPE RECORDER**

Using Only 1/4" Recording Tape

TRANSISTORIZED KIT FORM \$450.00

WIRED BY SPECIAL ORDER ONLY \$650.00

"BEUKIT" TRANSISTORIZED
TV CAMERA KIT

Complete with Vidicon (less lens) \$226.75

• All Prices Above F.O.B. Bayonne, N.J. •



For full information
write to:

P.A.F. ENTERPRISES

32 East 22nd Street, Bayonne, N.J. 07002



Distributors for Beulah Electronics, England.
Complete line of Video Cameras and Lenses.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE, RM: K7LAY, PAMs and OBS: W7TZK and K7SLM, Nets: Pony Express, Sun, at 0830; YO, Mon., Wed., Fri, at 1830 on 3610; Jackalone, Mon, through Sat, at 1230 on 3920. The 70-80-mile-per-hour winds in December raised havoc with antennas in the Casper area and it seems there was nearly as much antenna repair as operating during the month. K7WNJ acquired a new transceiver over the Christmas holidays. New officers of the Casper Amateur Radio Club are W7CQL, pres.; K7IAY, vice-pres.; W7N7ALY, secy.; W7NXX, Treas.; K7LBW, act. chairman. New appointments: W7GOJ as OO, W7YWE as OPS. During December the Casper Club's club house was broken into but, guess they were looking for money as the equipment wasn't taken or damaged. Traffic: K7LAY 166, K7SLM 40, K7VTM 33, K7QGV 17, W7BHH 15, W7YWW 9, K7HBB 6, K7TTH 4, K7OWT 4, W7TZK 4, W7YWE 3, K7HHW 2, K7OAF 2, K7SAR 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML, RM: WA4EXA. PAMs: K4NSU and K4WHW. The following are new net managers: K4WHW-AENH, K4NUW-AENP evening session, K4BSK-AENT and K4NSU relected NM AENM. New officers of the Limestone Club: K4VLL, pres.; WA4GNK, vice-pres.; K4OXL, secy.-treas. W4NML made the BPL, K4BSK urges all teenage hams to check into AENT. WA4JFF won the Corcoran Award in YLAP and took 4th district phone and c.w. AENK will start a code class the last of Feb. Dec. net reports (times GMT):

Net	Freq.	Time	Days	Sess.	T/c.	QNI
AENM	3085	0030	Daily	31	3.9	48
AENO	50.55	0115	T/T/Sat.	13	2.4	19.4
AENP	3055	1230	Mon.-Sat.	25	1.7	14
AENR	3055	2400	Daily	34	1.3	15.8
AENR	50.55	0115	Wed./Fri.	10	.4	2.52
AENT	3970	2230	Daily	35	1.17	5.4

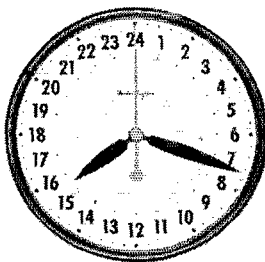
If you are not sending me a Form 1, please start doing so. Does your county have an EC? If not, contact me or W4NML. K4WHW now is mobile with an HW-12. WA4HGN has an SB-200. W4TYS now is on s.s.b. Traffic: (Dec.) W4NML 187, K4BSK 102, WA4JWS 97, W4YNG 65, K4WHW 33, WA4HFE 30, K4KJD 25, WA4JFJ 21, K4WWP 20, WA4GLX 19, WA4EXB 16, K4NUW 13, K4GXS 10, WA4MGI 7, K4NSU 7, K4ANB 5, WA4HGN 5, W4YRM 5, K4BTO 3, WA4EBS 3, K4FZQ 2, K4WOP 2, W4DGH 1. (Nov.) W4YRM 2.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD—KZ5EV will be rotating back to the U.S. soon. KZ5IM already is back in the U.S. KZ5JT is back from vacation. KZ5JK now is new MARS Director. KZ5TG finally has gone s.s.b. KZ5EO also is on with s.s.b. KZ5LC is in the U.S. on vacation. KZ5HJ is working on an SB-10 for his Valiant. KZ5KR is at the FAA school in Oklahoma City. KZ5AW and KZ5EH are the latest DX addicts in the teenage set. KZ5MQ now is reported in the U.S. Navy. KZ5AA will be on RTTY as soon as the rack wiring can be finished to the converter. KZ5 Amateur Radio Week, commemorating the 50th anniversary of the opening of the Panama Canal was a huge success. Over 7000 special Commemorative QSL cards and more than 700 certificates for 5 or more KZ5 contacts were sent out. Special mention is made of the efforts of KZ5UR and KZ5WI as well as many other KZ5s, in organizing and double-checking the logs, etc. New officers of the CZARA are KZ5WC, pres.; KZ5PW, vice-pres.; KZ5WI, Treas.; KZ5TT, secy.; KZ5VG, chairman of the act. comm. KZ5VR made the yearly collection for the '66 auto license plates, KZ5CU is handling the chores for the KZ5-25 certificate again.

EASTERN FLORIDA—Acting SCM, Albert L. Hamel, K4SJK—SEC: W4YF, Asst. SEC: K4KRG, RM: C.W.; W4LUV, RM RTTY: W4RWL, PAM S.S.B.: W4OGX PAM 40: W4SDR, PAM 30: W4TUB, PAM V.H.F.: WA4BMC, WA4BMC is coming up with the appointment of Asst. V.H.F. PAMs for v.h.f. populated areas so as to provide better contact for purposes of promoting organized v.h.f. activity. The Brevard Engineering College is now in the process of organizing an active amateur radio club complete with station, according to WA4UXZ. W4FP sent in a nice traffic report for W4BOW, which was operated from Seartown Shopping Center during a demonstration staged by the Lakeland Amateur Radio Society. The Dade Emergency Net has announced that it now meets only in case of emergency. This seems to me a very effective way for a net to silently fade away and if it doesn't how will the large accumulation of rust be removed when an emergency does occur? Come on, fellers, let's get the lead out. That was all the news from the

NEW!

**24 HOUR
CLOCK**



Dependable, Accurate, Made in U.S.A.

Wonderful addition to any "Ham" Shack—provides accurate time reading without confusion. Dependable, self-starting U.L. Approved electric movement. 13 1/2" black case, 12" white dial, black hands and numerals with red sweep second hand. Operates on 115 volts AC, 60 cycles.

ORDER TODAY Only \$14.95

Enclose check or money order—we prepay shipping and insurance charges!

COMMUNICATIONS EQPT. CO.

518 State St., La Crosse, Wis., 54601

Please send me _____ 24-Hour Clock(s) for which

I have enclosed \$ _____

by: Check; Money Order.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____



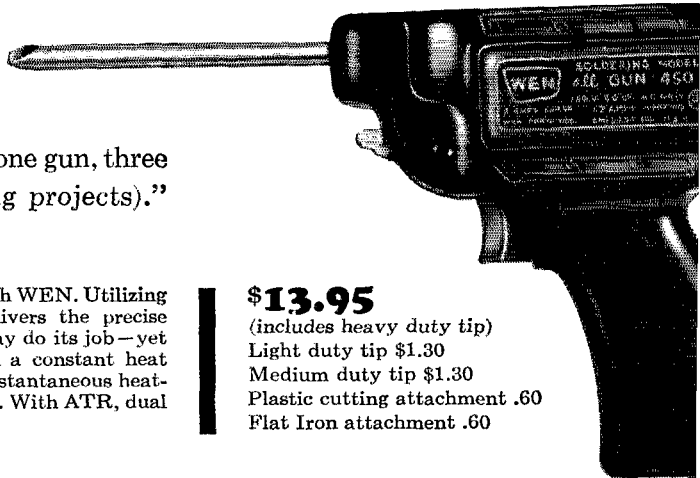
“My Father says all soldering guns are not the same...”

“How many have detachable tips (fine, medium, heavy duty) that deliver heat power ranging from 25 to 450 watts?”

“How many are versatile enough to do delicate printed circuitry work, T.V. and radio repair, *and* heavy duty chores (like repairing radiators and downspouts)?”

“How many have ATR*?”

“None—except the new WEN 450 (one gun, three tips, a thousand and one soldering projects).”



*Automatic Thermal Regulation, exclusive with WEN. Utilizing a high temperature magnet wire, ATR delivers the precise amount of heat power to each tip so that it may do its job—yet requires 50% less wattage input to maintain a constant heat level after initial surge. No wasted current, instantaneous heating and cooling and maximum thermal control. With ATR, dual heat is truly obsolete.

\$13.95

(includes heavy duty tip)

Light duty tip \$1.30

Medium duty tip \$1.30

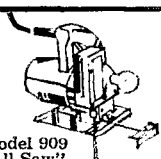
Plastic cutting attachment .60

Flat Iron attachment .60

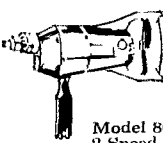


PRODUCTS, INC.

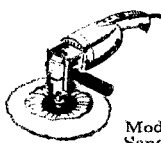
5810 Northwest Highway
Chicago, Illinois 60631



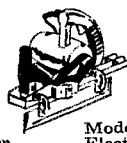
Model 909
“All Saw”



Model 808
2-Speed Drill



Model 940
Sander/Polisher



Model 930
Electric Plane



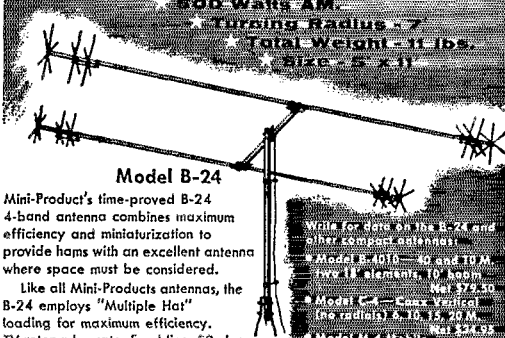
Model 910
Belt Sander

7 Solder Guns
and kits

Want High Efficiency and Small Size?

6 10 15 20 METERS MINIATURIZED-4-BANDS

★ 500 Watts Am.
★ Turning Radius - 7'
★ Total Weight - 11 lbs.
★ Size - 5' x 11'



Model B-24

Mini-Product's time-proved B-24 4-band antenna combines maximum efficiency and miniaturization to provide hams with an excellent antenna where space must be considered.

Like all Mini-Products antennas, the B-24 employs "Multiple Hat" loading for maximum efficiency. TV rotor adequate; Feed line, 50 ohm coax; SWR 1.5:1.

Amateur Net

\$59.95

Mini-Products, Inc.

1001 WEST 130 STREET, ERIE, PENNSYLVANIA

Write for data on the B-24 and other compact antennas!

- ★ Model B-1011 - 6 and 10 M. two 41' elements, 10 inch. Net \$72.50
- ★ Model C - Coax Vertical (no radials) 6, 10, 15, 20 M. Net \$24.95
- ★ Model M - Mobile 6, 10, 15, 20 M. Net \$16.95

Express packing

membership so here is a suggestion from the SCM. With the increased use of v.f.o. control on traffic nets there also is increased driftitis present. Even NCSs have drifted as much as two kc. during net time. How do I know this? I use crystal control. Suggest that the NCS periodically QRT traffic and take one minute to check his own frequency and get others on also. Traffic: (Dec.) WA4BMC 1239, W4URX 612, W4TUB 611, WA4JYB 545, K4QAY 343, K4BY 226, WA4BAW 304, WA4NEV 279, K4YSN 262, WA4LHK 214, K4KDN 209, WA4BGW 206, K4SJJ 203, K4ADD 196, K4COO 186, W4AKB 174, WA4RLG 164, W4LUV 163, W4FP 151, WA4NBE 137, W4TR8 135, WA4FP/4 128, WA4OAO 122, W4NLX 104, W4FLW 94, WA4RXG 94, WA4CTQ 76, W4DFU 69, W4LEI 68, W4BOW 67, WA4LBM 63, K4BNE 56, K4OYSL/4 55, W4TJM 52, WA4COR 51, WA4GHI 51, W4JYT 51, W4OCX 50, K4EBE 39, WA4LRW 38, W4FE 37, K4DAX 32, W4AYD 29, K4ILB 27, K4OAP 27, W4SMK 25, WA4DEV 19, W4BAT 18, WA4TZC 12, K4MTP 9, W4BKC 5, K4MZR 4, K4ODS 5, (Nov.) WA4OAO 38, W4JYT 32, K4ENW 26, W4TJM 13, K4EBE 8, WA4RLI 2, (Oct.) K4DAX 31.

FLORIDA QSO PARTY

April 3-4, 1965

Florida Skip, the all-Florida amateur radio publication announces the Florida QSO Party, April 3rd and 4th, 1965. Participation is open to all Florida amateurs are urged to work as many out of state stations as possible, as well as those within the state.

Times: 0000-0500, 1400-2000 (3rd) and 0000-0400, all times GMT, no time limit.

Frequencies: 1815 3530 7030 14,030 21,030 28,030 145.2; 3930 7230 14,230 21,330 28,830 and 50,230. Phone and c.w. count as separate contests.

Exchange: Serial number, RST, county for Florida stations, all others state, province or country.

Scoring: Florida stations count 1 point per QSO times the number of states, provinces and countries. Other stations in Florida may be worked but only for contact points. Outside stations count one point per QSO times the number of Florida counties worked. Bonus points will be given for working Florida counties as follows: first 20, 50 points; second 20 counties, 200 points; third 20 counties, 500 points; all 67 counties 1500 points.

Power: No restrictions.

Awards: Certificates will be awarded to the highest scoring station in each state, province and foreign country (with 5 or more contacts) and each entry from Florida county.

Logs: All logs must be postmarked no later than April 30, 1965 and mailed to *Florida Skip*, Contest Chairman, P. O. Box 501, Miami Springs, Florida 33166.

EDDYSTONE



GEARED SLOW MOTION DRIVE For Amateur Radio & Communications RECEIVERS & TRANSMITTERS

A high grade assembly, flywheel loaded, manufactured to fine tolerances, provides a smooth positive drive with a reduction ratio of 110:1. The vernier with its 100 divisions rotates 5 times for one pointer traverse, giving 500 divisions with positive reset readings. A cam adjustment on the vernier assures correct zero setting. A spring loaded jockey arm maintains tension of the pointer drive. Overall dimensions 9 3/4" x 5 3/4".

Manufactured by
Stratton & Co., Ltd. (Eddystone) PRICE \$21.50 NET
Birmingham, England Postpaid

Distributed by

BRITISH RADIO ELECTRONICS, LTD.

1742 Wisconsin Ave., N.W.
WASHINGTON 7, D. C.

GEORGIA—SCM, Howard L. Schonher, W4RZL - Activity within the clubs of the section seems to have reached an all-time high during the holiday season. Many of them held annual elections and with installation of new officers plans for the 1966 season are being formed. Interesting and informative bulletins were received from the Atlanta Radio Club, the Georgia Single Sideband Association, the Lanierland Amateur Radio Club, the Savannah Radio Club and SOWEGA (Albany). To the editors of these and others my congratulations on a job well done. Nets within the section continue to do a fine job with v.h.f. activity increasing at a rapid pace. Let's all attempt to participate in at least one net and work toward the v.h.f. participation so urgently needed to complete v.h.f. coverage of the section. W4AQL, Georgia Tech. Radio Club, is active again on 80/6. Our Director, W4HYW, says he is going to reinvigorate the station. W4CJN received a Public Service award for operation during Hurricane Cleo. W4VVF is reestablishing old contacts and making new ones after 23 years' absence. The Columbus Amateur Radio Club again will sponsor the Georgia QSO party in May. Details later. Traffic: (Dec.) K4MCT 390, W4FOE 154, WA4QHQ 98, WA4MPD 86, WA4CJN 51, K4DKJ 50, W4RZL 43, WA4JSU 35, WA4JXL 30, W4NSO 29, W4PBK 29, WA4LLI 23, K4BAI 22, W4SAZ 12, WA4GAY 11, K4BVT 7, K4FRM 6, WA4PSA/4 4, WA4VVT 4, WA4PSA 1, (Nov.) K4FLR 172, W4PBK 33.

for the SWL, Newcomer, or Extra-Class Amateur

- Two-Week Trial • 90-Day Guarantee
- Trades Accepted • Plenty of Free Parking



Whether you are a shortwave listener, a potential ham, a UHF enthusiast, or possess one of those rare two-letter calls, Trigger Electronics is where you will get the cleanest, most dependable, like-new equipment at sensational savings for such gear. And it performs as brilliantly as it looks!

SEND FOR FREE PRICE LIST

Whether you want to buy a key, a code practice set, or a top-quality receiver or transmitter, Trigger has the gear and is ready to get you started out right. Send stamped self-addressed envelope for free price list.

75S1.....	\$299	NC190.....	\$149
75S3.....	459	NC270.....	159
32S1.....	399	NC300.....	179
32S3.....	549	NC303.....	269
30L1.....	379	HR060.....	269
KWM2.....	795	G76.....	179
S SPEAKER.....	19	G76 DC SUPPLY.....	69
32V3.....	229	GSB100.....	239
SWAN 120.....	149	GONSET 2B 2MTR.....	129
DRAKE 1A.....	139	GONSET 3 6MTR.....	149
TR3.....	439	G66B.....	67
KV3.....	67	3 WAY SUPPLY.....	19
AC3.....	67	RME VHF 126.....	169
DC3.....	99	RME DB23.....	29
SK62A.....	249	KE93 6AC.....	99
SK99.....	79	CLEGG INTCPR.....	299
SX110.....	97	CLEGG ZEUS.....	429
SX111.....	159	99ER.....	114
SK140.....	69	THOR 6DC.....	99
S38E.....	39	POLYCOM PC6.....	239
S108.....	79	POLYCOM 62B.....	279
S118.....	69	HX11.....	39
S120.....	47	DX35.....	39
FPM200.....	975	DX60.....	77
HT32.....	289	GR91.....	37
HT57.....	279	RX1.....	179
HT40.....	49	HW32.....	119
HA2 6AC.....	269	HP13.....	57
JOHNSON 500.....	395	HP23.....	39
INVADER 200.....	349	MT1 XMTR.....	39
VALIANT.....	199	MP1 DC SUPPLY.....	24
SSB ADAPTER.....	199	VF1 VFO.....	19
RANGER.....	129	HG10 VFO.....	34
6N2 XMTR.....	99	H010 SCOPE.....	57
6N2 VFO.....	39	H10A GDO.....	29
6N2 CONV 14MC.....	59	GLOBE HG303.....	49
122 VFO.....	29	CENT. B SLICER.....	39
JOHNSON TR.....	22	KNIGHT T150.....	87
HQ100C.....	109	KNIGHT T80.....	27
HQ100A.....	129	KNIGHT T60.....	34
HQ110C.....	127	KNIGHT VTVM.....	34
HQ145X.....	179	LINCOLN 6ER.....	39
HQ10.....	179	EICO 720.....	49
HQ10.....	179	EICO 723.....	29
NCK3.....	249	RC221D 6AC.....	79
NCKA.....	69	HICKOK 820.....	69
NC88.....	69	TRIPLETT 3414.....	69
NC183D.....	169.		

NEW
DRAKE & SWAN
equipment
We also
stock the
complete
line of
hand--new
DRAKE & SWAN
equipment.
Used, clean
gear
accepted in
trade. Write
TRIGGER for
INSURPASSED
trade-in
allowance.

WE BUY USED HAM
GEAR FOR CASH

TRIGGER Attn: W9/VJ (ABC1234)
7361 North Avenue
River Forest, Illinois
(suburban Chicago)

Amount Enclosed

RUSH THE FOLLOWING:

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

ORDER BLANK TO: (1) send for free price list, (2) trade ur present gear, (3) order equipment, (4) sell ur gear for cash.



(A small deposit will hold the unit of your choice on Lay-Away)

STORE HOURS
Weekdays 1:00-8:00 P.M.
Saturdays 9:00-3:00 P.M.
Or by Appointment After Hours

TELEPHONES
From Outside Chicago..... PR 1-8616
Chicago Area Only..... TU 9-6429
Business phones with QTH Extensions



7361 NORTH AVENUE • RIVER FOREST, ILLINOIS

Electronics



The
**ORIGINAL
"HALO"**
ANTENNA

Since 1956 one of the best performing 6-meter mobile antennas

- ▶ Horizontally polarized
- ▶ Minimizes flutter and noise
- ▶ Adjusts to your frequency in 6 meter band
- ▶ Feeds with 50-ohm cable
- ▶ Fits standard mounts
- ▶ Ruggedly constructed
- ▶ Weighs under 2 lbs.

Model S-1 antenna, 5' adjustable mast and bumper hitch..... \$16.95
Model S-2 antenna only..... 11.95
New Matching Transformer,
Model MT-1 4.95

AT YOUR DISTRIBUTOR

HI-PAR PRODUCTS CO. • Fitchburg, Mass

CQ de W2KUW

We will pay for every good
833A • 304TL • 4-400 \$10.00

Sent to us before June 30, 1965

Other large transmitting tubes & equipment also needed.
ARC-GRC-PRC-MN-TS-UR. 51J-V-X-Y-388-390, 17L.

TED DAMES CO. • 308 Hickory St., Arlington, N.J.

**RADIO
TELEGRAPH OPERATORS**

Excellent opportunity for qualified
Radio Telegraph Operators for
permanent assignments to various coast-
al stations in the United States: Mini-
mum requirements:—2d Class FCC Tele-
graph license, touch typist, good "fist"
essential • • • • • Liberal benefits •

Good Starting Salary

Send Full Particulars to:
Mr. J. Cappellini

ITT World Communications Inc.
Mackay Marine Division

An ITT Subsidiary

67 Broad Street, New York 4, N. Y.
• An Equal Opportunity Employer •

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NAMZ, RM: W4BVE, Tallahassee: K4MZT has been assigned to Japan, as manager of the Misawa naval radio station, K4PVU is studying at Cambridge, England, W4MLE is well pleased with his SB-300, George also is making good progress on a new communications procedures manual, to be published by ARRL. Marianna: The F.S.B. puts on a beautiful animated Christmas display each year; W4DED is responsible for much of it. Blountstown: W4CDE has been appointed EC, Panama City: Civil defense now has its own call, WA4VXL, WA4NRP has obtained a 500-watt 6-meter f.m. rig for c.d. use, Defuniak Springs: K4VWE and WA4PXR have started a fund drive to put W4ECM, a blind ham, back on the air with an HW-12, Contributors should be sent to WA4PXR, Fort Walton/Eglin AFB: Some good publicity for amateur radio was obtained through two newspaper articles about the issuing of the ham commemorative stamp, EARS President K1CTG was pictured buying the first stamp to go on sale, K4UBR checks in to QFN from Germany, Pensacola: W4YIT is now active with an HW-12, K4SOI was appointed OBS, Traffic: (Dec.) K4VPY 749, W4BVE 262, K4VWE 58, WA4ABP 33, WA4EOQ 26, WA4NRJ 13, WA4NVG 11, WA4NRP 10, W4SOI 4, (Nov.) K4BDF 45, (Oct.) K4BDF 240, K4QOJ 129.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NLY, PAM: W7CAF, RM: K7TNW, K7OYE has a new TR-3, K7RUR participated in a recent Frequency Measuring Test, K7GRP has a new KWM-2, W7AYY sends in a fine QES report, K7NHL didn't quite make the BPL W9PAN/7 is going 6-meter mobile with a Heath Sixer, K7GPZ has a new TE6-DX beam. There are OO appointments available, both for lower bands and v.h.f. K7RUW installed a National NCX-3 in his Rambler, W7IZ has a heavy power line noise at his QTH, so can only hear the S9-plus sigs! KNYTTP is on the air with a Knight T-50, K7RUR was endorsed as OO and OPS; his OPS dates back to 1939 and his OO back to 1960, K7NHL, K7UXB and K7UTF are affiliated with TWN and PAN. A new call in Tucson is KN7YUP. The Arizona C.W. net (ACN) meets on 3575 kc. at 0200 GMT Mon., Wed. and Fri. It is with regret that we note the passing of W7PRD, of Douglas, K7JEQ received his CP-25 and applied for CHC membership, K7HGW is converting a BC-733 to a 2-meter transceiver, Your SCM had a nice QSO with W7FFF, now ZL8BB, There are a few counties in Arizona without ECs, Your SEC would like to hear from anyone interested in an EC appointment, Okinawa traffic keeps W7CAF busy, KN7ZIY is on the air with a Knight T-60 and an S-38, Traffic: K7NHL 440, K7UTF 184, W7CAF 78, K7UXB 47, W7FKK 31, K7RUR 8.

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: John A. Vaidean, WB6JGA/W4FOR, SEC: K6YCX RMs: WB6HG, W6QAE, WB6BBO, PAM: W6ORS, December was a pretty fair month for traffic but our annual totals are down from last year's—11,707/64 vs 13,392/63. This very, very respectable score was aided by the BPL Club of Southern Calif. which really went to work this year. Those taking the BPL in December were K6WAH, W6WPF, W6GYH, WB6BBO, W6JGA, K6-1WY, K6AIDD, WA6TAW, W6BHG, WB6KGG. The following appointments have been endorsed: W6QAE as RM/ORS; WB6BBO as RM/ORS; W6USY as ORS; K6-CDW as ORS; W6FNE as ORS; W6JQB as OO; W6-NKR as OBS, Welcome to WA6YKP as OO, K6FA as ORS, WB6KGG as OFS, WB6NMO as OO, WB6JGA/W4-FOR as ORS/OO/EC. These new appointees come well recommended and will be an asset to the section and the amateurs that they serve, Ft. McArthur is back with K6-WAH and the totals show those boys like traffic, WA6-TAW is testing diversity experiments on 2 meters, WA6-TWS is down for a long-overdue overhaul, W6JGA made like an electronics expert and put #2 32V2 on the air. This was after W6BHG used it while his was in the shop, K6YCX is making good headway on 2-meter cavities and 432-Mc. signal generator, W6CK is back up on the hill out of the noise, WB6GXI reports that Santa was on 6 meters again this year, K6EA is redoing the shack while in port and will be going to sea again soon, W6MLZ coordinated radio contacts for kids at the Childrens Hospital to talk with their parents at Christmas, WA6CXB talked Santa out of a new Pawnee for Christmas, K6SIX was driven from his shack in the garage because of cold wx, WA6YSA is out of town at college, W6FB is sporting a new Swan 350, W6ORS is getting the XYL active with aircraft monitoring, WB6HLO put Santa on the K6MYK and WA6TDD 2-meter repeaters, W6IBD blew up his 7-Mc. beam, Of all the bulletins that I receive the Southern Calif Net bulletin for December was the most striking with the new stamp and all, Support your National Traffic System by checking into SCN (Southern Calif Net) on 3600 kc. at 0300Z daily. The AREC still is developing under the able leadership of K6YCX. Are

THE BEST HAM BUYS ARE AT HARVEY



W2AU SUPER 2 ELEMENT QUAD FROM UNADILLA

A quad for outstanding results, the W2AU uses 8 selected Korean bamboo spreaders for extreme strength and durability. The 14 gauge copper stranded wire used is extremely wind resistant and will carry a full KW or 2000 watts PEP. Spreaders are fastened to cast aluminum spiders by means of stainless steel strap compression clamps. The F/B ratio of the W2AU quad is exceedingly high. Dimensions: 17' wide, 17' high; turning radius approx. 9'11". Weight 40 lbs.

W2AU SUPER 2 ELEMENT QUAD \$44.95



VERSATILE B & W "VACATIONER" PORTABLE ANTENNA

Designed as a highly efficient transmitting and receiving antenna for the travelling amateur. Can be installed and disassembled in minutes. Power rating — SSB, 300 watts input PEP; CW, 180 watts input; Frequency — 20, 15, 10, 6 and 2 meter amateur bands. Maximum extension, 57 inches; minimum, 18½ inches. Weight, 2 lbs. complete with coils and counter-poise.

"VACATIONER" PORTABLE ANTENNA, COMPLETE \$19.95

NEW NCX-5 ALL-BAND TRANSCEIVER FROM NATIONAL

The new NCX-5 transceiver represents the finest money can buy at half the cost of closest comparable equipment. Designed as a total amateur station for the 80, 40, 20, 15 and 10 meter bands without compromise for either mobile or fixed station operation. Incorporates a linear solid state VFO with essentially no warmup drift. Dial calibration by means of a digital counter read-out accurate to one kilocycle on each band with additional calibration to 100 cycles. Mobile mount included. One-year warranty. Dimensions: 6¾" x 13¾" x 11½". Weight: 26 lbs.

NATIONAL NCX-5 ALL-BAND TRANSCEIVER \$685.00

NEW NCL-2000 LINEAR AMPLIFIER FROM NATIONAL

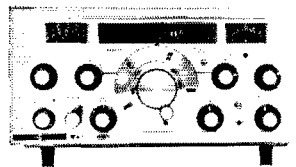
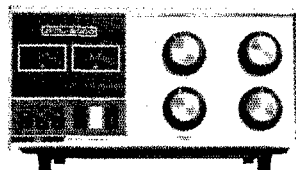
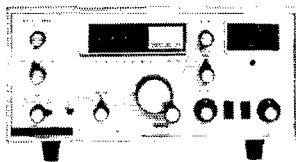
National's new 2000 watt linear amplifier is desk-top dynamite. Every component in the NCL-2000 is rated for operation at a "DC" Kilowatt. Adding the NCL-2000 to your desk-top station permits you to run at the maximum power allowed by law. The two 8122 ceramic tetrode output tubes were designed specifically for SSB, and provide 800 watts of plate dissipation to assure conservative operation. Not only does the NCL-2000 deliver the power but it does it cleanly. One-year warranty. Dimensions: 7¾" x 16½" x 12¾". Weight: 62 lbs.

NATIONAL NCL-2000 LINEAR AMPLIFIER \$685.00

NEW HRO-500 SOLID STATE RECEIVER FROM NATIONAL

The new HRO-500 receiver by National is the result of 30 years of "improvement of the breed." By all criteria the HRO-500 is extraordinary. In design, it is totally solid state with frequency determined by a phase-locked crystal synthesizer feeding a VFO-controlled tunable IF. Transistors make it extra reliable and compact. The HRO-500 may be operated anywhere — even from flashlight cells. Its frequency coverage encompasses the entire VLF through HF spectrum. It employs a turntable 6-pole filter to meet any selectivity requirement. If your specifications demand the finest amateur receiver obtainable, the National HRO-500 solid state should be your one choice. Dimensions: 7¾" x 16½" x 12¾". Weight: 32 lbs.

NATIONAL HRO-500 SOLID STATE RECEIVER \$1295.00



Send check or money order including shipping charges. We return any excess.

It takes a ham to talk to a ham. Make it your business to get equipped at Harvey . . . midtown New York's ham center. Harvey serves the world right here at the crossroads of the world. In addition you receive many exclusive extras at Harvey's. This includes opening sealed cartons for complete equipment check-out at your request — at no extra charge. The man from Harvey also guarantees everything you get — including his advice. And with liberal trade-in allowances you can be sure you are getting the best values for your ham dollar. So come to Harvey where the finest ham equipment and the best service go hand in hand. It pays to check us first.



HARVEY RADIO CO., INC.

OUR



YEAR

103 WEST 43rd STREET / NEW YORK, N.Y. 10036 / (212) JUdson 2-1500

good
mobiles
STILL
going



HUSTLER

by **NEW-TRONICS**
the home of originals!

HUSTLER is the mobile antenna that has won the widest praise from everyone that has used it. For really reaching out, and for exceptional results on every band, the HUSTLER has no equal. For unbiased opinion of performance, ask any HUSTLER user... there are thousands of them.

See the HUSTLER at your dealer or write us for literature.

NEW-TRONICS CORPORATION
"the home of originals"
3455 Vega Ave., Cleveland, Ohio 44113

you a member? A lot of hams in Alaska weren't either. Make a note of my new address for March reports: 16205 South Broadway, Gardena, Calif 90247. Traffic: (Dec.) K6WAH 2365, W6WPF 1306, W6CYH 1259, WB8BBO 1221, W6AWTK 891, K6LWV 871, K6MDD 763, WA8TAW 557, W6QAE 386, W6ATWS 383, W6BJGA 359, WB6KKG 275, W6BHG 174, W6FD 164, WA6VUV 153, WB6FPQ 129, K6GIL 89, WB6BBH 84, K6USY 62, WB6AJT 53, K6YCX 42, W6CK 35, WB6GXI 21, K6EA 19, W6AILZ 19, K4LDM 18, K6HV 17, W6LVQ 15, WA6KVA 9, WA6CXB 8, W6PCP 7, WA6AJT 4. (Nov.) W6WPF 915, WB6JGA 105, WA6TAW 99, W6FD 85, W6NKR 19, K6HV 17, WB6KKG 15. (Oct.) W6WPF 663, WB6JGA 139. (Sept.) W6WPF 836, WB6JGA 242. (Aug.) W6WPF 690, WB6JGA 167.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Starting in March all stations in Orange County should send their monthly reports to their new SCM. If you live in that area and don't know who he is check with any member of the Orange County Club, Newport Club, Anaheim Club, Fullerton or DX Club. They will know. My thanks to the hams and clubs in that area for their cooperation, support and help the past 12 years. We in San Diego wish the new Orange section every success. New officers of the North Shores Club are WB6GMM, pres.; WA6QBN, vice-pres.; WB6AIRK, secy.; W6SK, treas, WB6HPJ, who is blind, received the club award as the inspiration ham for the club in 1964. W6WCI is a Silent Key in Orange County. Twenty-one stations sent in traffic reports in December and 10 made BPL K6ROR, in Garden Grove, is now on BPTV. Director W6QJW, Vice-Director W6ECP and SCM W6LRU attended the North Shores Annual Dinner Meeting in January. W6LRU showed slides of the high Sierra to the Orange County Club in February. A c.w. station in Imperial County is needed to check in to the Southern California Traffic Net (SCN) at 7 p.m. on 3600 kc. to clear traffic for that area. Any takers? Traffic: W6IAB 8776, K6BPI 7869, W6YDK 4617, WB6JUH 1814, W6VWQ 1043, W6EOT 974, K6ROR 946, WA6BRG 538, W6BKZ/6 480, W6ADFT 289, W6LRU 247, K6IME 136, WB6GMM 57, WA6ROF 48, WB6KNN 47, W6WRJ 47, WA6UUC 31, WA6ZWR 30, K6LKD 17, W6ECP 14, WA6RUS 12.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—WB6DPV, in Santa Maria, has a new rig on 75 meters running 450 watts. WA6KVS sends along a nice report on the v.h.f. activity in the Ventura County area. Jim is active on 144, 220 and 1200 Mc. He reports that f.m. activity on the v.h.f. bands is increasing rapidly. Sulphur mountain is being investigated as a possible location for an f.m. repeater. W6MJU, WA6APO, WA6MLI and K6GHI are recent stations heard from the Camarillo area on 2 meters. Dave reports that the Pt. Mugu club station, K6CST, is interested in contacts above 2000 Mc. The club lost its 150-ft. tower in the December high winds but little damage was sustained. W6YK is completing his 2-meter antenna array of 64 elements for Oscar/Moonbounce work. Bill runs power and will be available for EME skeds. New officers of the Santa Barbara ARC are WA6THG, pres.; WA6NQS, vice-pres.; K6EDQ, treas.; WB6IFK, secy. Your SCM visited several hams in the Boston area and was a house guest of K1VQG. Traffic: WB6DPV 17, WA6KVS 8.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—The Arlington ARC's Annual Christmas Party, held Dec. 12 at the Admiral Inn, was enjoyed by 80 or more hams and their families. Director Best, W5QKF, and Vice-Director Bryan, W5UYQ, gave short talks on amateur radio. After the dinner we were invited to the home of K5ZFFZ and K5ZGA, Alice and Joe Janicka, where we enjoyed more eye-ball QSOs and refreshments. The Kilocycle Club of Ft. Worth held its Christmas Party Dec. 17 with 45 in attendance. K5ABG and WA5CTD are on s.s.b. with new rigs. W5AVA has a new Johns-on 2000. W5UYQ visited the KC Club of Ft. Worth in November and gave an interesting talk on the operation of the Oklahoma City radio clubs. Now is the time for you to start making plans to attend the West Gulf Division Convention to be held in Oklahoma City July 9-10-11. K5FLD made BPL the hard way. W5CYB is running a half-gallon with a new Courier amplifier. W5DYW has a new Galaxie for his camper. W4DWR/F7CL/QC5WF, formerly at the Amarillo AFB, now stationed in France, keeps a daily sked with his XYL, WA4REL. With the closing of the Amarillo AFB several hams are being transferred. WA5EMP and WA5EKN are going to Groesbeek. WA5DHF and WA5DAV went back to Wichita Falls. K5RXO, president of the Permian Basin ARC, was killed in an airplane crash near Odessa, Dec. 20. Traffic: K5FLD 517, W5CYB 392, W5EYU 143, K2EUL/5 137, K2UOR 56, W5EGZ 52, WA5EVS 51, K5DOC 47, K5BKII 23, W5LR 9, W5BNG 8, K2GKK/5 6, W5VEZ 2.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX, SEC: K5DLP. New officers of the Bartlesville Amateur Radio Club are K5OVI, pres.; Bud Thompson, vice-pres. W5YLIH continues as



LEO SAYS: BUY DIRECT AND SAVE BIG ON THESE WRL HAM EXCLUSIVES

Leo I. Meyerson
W0GFQ

NEW

WVG MARK II ALL BAND VERTICAL ANTENNA

Low cost — self-supporting 10-80 meter antenna. Tunes 3.5 — 30 Mc with manual tap adjustment. Feed with 52 ohm coax. Quick installation. Amazing efficiency for DX or local contacts. Used as portable antenna also.

\$15.95

Postpaid
Continental USA

MECHANICAL SPECS:

Overall ht. — 18". Tubing diameter — 1 1/4" to 7/16". Max. ungued wind survival — 50 mph. — Mtg. bracket for 1 3/8" mast. Wt. 5 lbs.

ELECTRICAL SPECS:

Maximum power: 1000 watts AM or CW — 2 KW PEP. Omnidirectional. Vertical polarized.



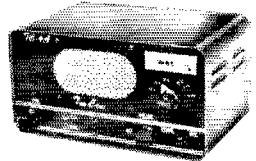
TECH-CEIVER 6A

Low cost, compact, 6 meter transceiver

Stable superhet receiver. 5 watt transmitter, featuring PTT, using std. (Ft 243) 8 Mc range xtals, non-critical coils, plate modulation, power and modulation indicators, 10 tube performance. Step-by-step manual included. Wt. 9 lbs. 115 VAC Power supply (kit) — 15.95.

- 5 Watt input
- Sensitivity — better than 1 UV

only
\$39.95
kit



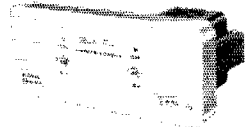
- Selective — 20KC @ 6DB points
- 49-54 Mc coverage

PSA-63 POWER SUPPLY

Universal Power Supply: Powers most AM rigs up to 100 watts, SSB units up to 200 watts, PEP. Silicon rectifiers provide both 300 VDC & 600 VDC @ 300 Ma., ICA S (210 watts total), plus 6 VAC @ 10A or 12 VAC @ 5A, plus 95 VAC @ 10 Ma. Size 11 1/4" x 4 3/4" x 6". Wt. 15 lbs. Kit — 24.95, Wired — 39.95. Opt'l cabinet — 4.95.

- Use with 30-200 watt XMTRS—XCVRs
- Dual voltage B+ Fil. power-bias
- Customized units available—Extra

only
\$24.95
kit



DUO-DOUBLET 84



NEW 80-40 meter dipole using proven parallel dipole principle to resonate on both bands. Requires only one 52 ohm feed line (coax not supplied). Kit includes wire, insulators, center connector & full instructions. Complete formula supplied & quick graph chart for easy adjustment. May be used on 15 meters also. SWR: Better than 2:1 at resonance — 80/40. Max. length — 123 ft.; 140 ft. for lowest CW range. Easy to install. Wt. 4 1/2 lbs. Shipped Parcel Post.

80-40 Meter Dipole
One Feed line

\$7.95

NEW

WRL'S 12R GENERATOR

\$149.95



Shielded ignition. 1250 Watts, 115 VAC, 60 cy., 77 lbs. (FOB Milwaukee, Wisconsin)

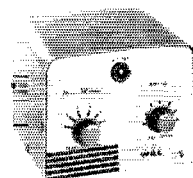
SS-3 "Q" MULTIPLIER

- Notch and peak
- Self Powered
- One simple receiver connection

Int'l 115 VAC P.S. Plugs into Collins 75S-1, KWM-2 & others. Use with receivers having 455KC-IF: AC or DC powered. Adj. selectivity: 300 cy. to 10 KC. Sharp rejection (50DB) null for heterodynes. 6 1/4" x 4 1/4" x 4 3/4".

\$15.95
kit

ANTENNA TUNER MM-100



\$10.95
kit

Specifically designed to match end-fed long wire which is 1/2 wave, or multiples thereof, to 50 ohm transmitters. Panel lamp indicator. For inputs up to 150 watts SSB, 100 watts CW, 75 watts AM. 4 x 5 x 4 steel case. Reduces TVI.



\$4.98

\$6.37



WRL NUVISTOR PREAMP PRINTED CIRCUITS

PA50-2 Stage preamplifier for 6 meters. Use 2 RCA 6CW4 nuvistors. Highest grade glass epoxy board. Assembled and pre-aligned for 50 ohm input-output. Requires 60-120 VDC @ 10 MA. & 6.3 VAC. Size 2 3/4" x 2 1/4". Wired \$6.37
PA-144 Same as above except only 1 6CW4 nuvistor & for 2 meters. Wired \$4.98 (less 6CW4 tubes).

WRL

WORLD RADIO LABORATORIES, INC.
3415 West Broadway
Council Bluffs, Iowa 51504

Rush me FREE!

WRL 1965 Catalog

Reconditioned Specials!

Please rush me item _____
Enclosed is Cash Charge COD (25% cash w/order)

*If new customer, send credit info with your charge order

Name _____

Address _____

City _____ State _____ Zip _____

Clip & Mail

N. Y. MIDTOWN HEADQUARTERS

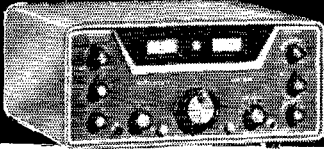
for world famous **hallicrafters**

SR • 150 Amateur Band Fixed/Mobile Transceiver . . . provides, with unvarying dependability, a range of operating features never available at this price . . .

P-150 AC Power Supply
\$99.50

P-150 DC Power Supply
\$109.50

\$650.00



Enjoy the ultimate in proven engineering reliability. HALLICRAFTERS' (maximum flexibility) SR-150 is the most advanced, most outstanding example of HALLICRAFTERS' ability to build the world's best value in professional quality sound equipment.

ALL HALLICRAFTERS in stock for immediate delivery. Complete audio demo dept. Depend on us.

EVERYONE eventually goes to

1 Door East of Lexington Ave.

GRAND CENTRAL
Radio Inc.

Hrs.: 8:30 to 6 Sat. Incl

124 East 44th Street, N.Y.C. • MU 2-3869

100 KC CRYSTAL BARGAIN!

U.S. Navy Surplus. Hermetically sealed standard octal base. Check or money order. No COD's or export orders please. Add 25c for postage and handling.

295

ELECTRONICRAFT, INC.

Box 13, Binghamton, N. Y. 13902

COMING SOON!

NEW AMECO 6 and 2 METER VFO

Heterodyne VFO with solid state oscillators. Highest stability—negligible warm-up time. MODEL VFO-62—\$59.95. Write for details.

AMECO EQUIPMENT CORP.

178 1/4 Herricks Road, Mineola, N.Y. 11501

*STRAIN AXIAL ANTENNA CONNECTOR

FOR OPEN WIRE FEED-LOADING COILS AND ALL ANTENNA PROBLEMS

(Solid Porcelain Low Loss)

Handles 1 KW DC inp. & 2000 watts P.E.P. (Actually will handle 5 kw). Epoxy cement supplied for coax seal.

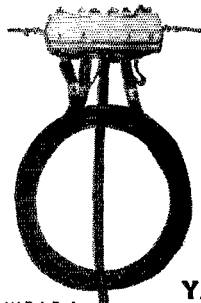
FREE! Balun Instructions with every purchase of a Strain Axial Connector for 80 and 40 meters. Size: 5" x 1 3/4" Wt: 12 oz

See Your Supplier or Write \$3.00 Ppd

YATTER

Sam, W2ENM

LABORATORIES Bradley Beach, N.J.



(*) Pat. Pndg.

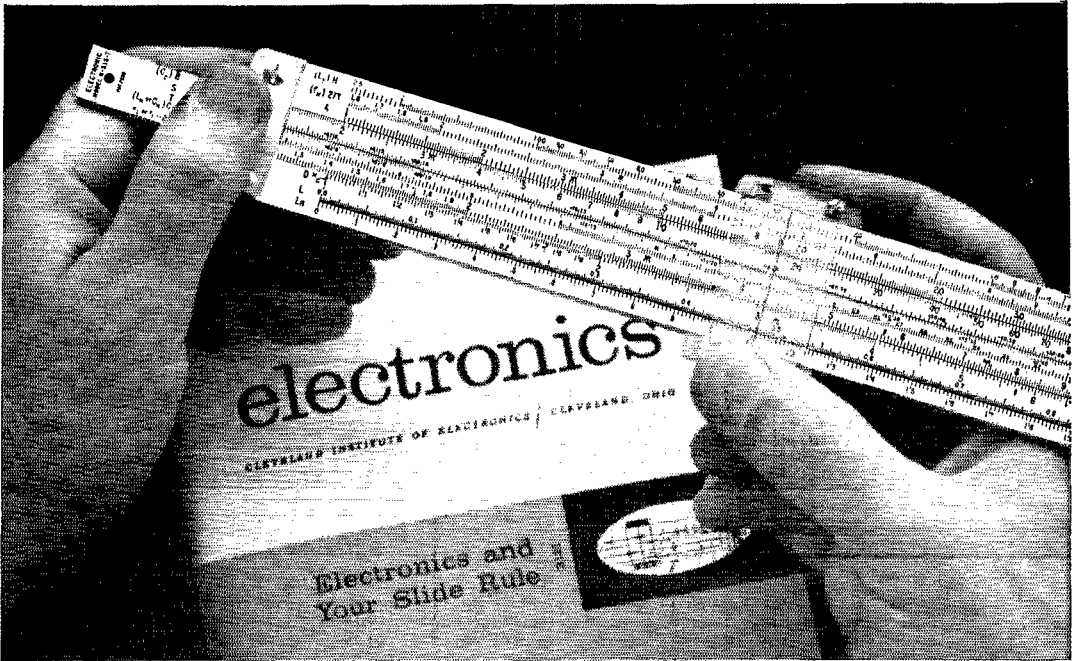
secy.-treas. K3PVC is the proud owner of a new SR-150 transceiver. K5OVJ has a Galaxy III. K5RIP decorated his telescoping mast and beam with Christmas lights which created much comment. W5MFX is a proud new member of the A-1 Operator Club. W6BGVX is a new ham in Lawton. W5FFW is now on the road to recovery after a recent illness. W5OZA has been doing a lot of experimenting with all types of antennas. This might explain his booming signal out of Inola. Griff also is building a superhet 2-meter receiver using several 6CW4 n-vistors. K5IYS is a new ham in Inola. W5FAA is getting more years of QST bound and will have 1935 through 1964 complete in the club library. The ACARC bought 2000 "Amateur Radio Stamps." W5EHC has been waiting for warm weather and an outburst of ambition to put up beams for 50 MHz and 134 MHz, and he will tickle the beams with an Ameco TX-62 and will twirl them with a CDR-44 on top of a 40-ft. tower. Because of the QRM on the lower frequencies the fellows are moving up to the v.h.f. bands. Traffic: K5TEY 736, W5BNG 196, W5-BTQ 66, W4SK1/5 52, K5KTW 45, K5CBA 42, K5CAY 33, K5DLP 29, W5AIDX 23, K5MTC 14, W5EQP 12, K5-OCX 10, W5UYQ 7, W5EHC 4, W5OZA 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5RDP, PAM; W5ZPD, RM; K5ANS. New appointees are K5RDP as SEC and K5ANS as RM. Texas A. & M. Univ. station W5AC is going stronger with a new Invader 2000. W5JHW has a new General Class license. Congratulations and CU on the bands. K5-ANS will present a paper at a meeting of the American Physical Society in February at the U. of Oklahoma. TEX. the Texas traffic net, needs more participation. Come on in and have fun on 3770 kc. at 1900 and 2200 CST daily. You are needed to help represent all areas in So. Texas. Some members of STEN now are running preliminary tests on 6 and 2 meters hoping to add these bands to the existing eight sections of the South Texas Emergency Net. Participation in STEN phone and c.w. sections is running at a high percentage. The West Gulf Emergency Net, on 3945 kc. at 0800 CST Sun., averages over 60 check-ins per session. W5BUBV is now NCS for WGEN. Jim is back on the air after a recent accident and confinement in the hospital. Santa brought W5HPU membership and QST. W5ABQ is recovering from a heart attack and hopes to be back at work soon. I'm still trying to find out how long the emergency generator at W5-AIR will run a full tank. Haven't found time to stay at home long enough to run the tank dry. SEC K5RDP has 10-kw. emergency power. His tank runs dry fast, he says. We anticipate a number of new appointments for Southern Texas in very near future. Traffic: K5HZR 105, W5-AIR 83, K5ANS 36, W5ABQ 13.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harroid, VE6TG—SEC: VE6FK, PAM; VE6PV, ECs; VE6s SA, SS, AFJ, AJY, HB, ALL, RM; VE6AEN, ORS; VE6BR, OPSs; VE6s CA, PV, HM, SB, BA, OOs; VE6s HM, NX, TW, OBs; VE6s HM, AKV, OESs; VE6s DB, AKV, AJY, MC. To you fellows who have not sent in a report for the last three months: I am going to cancel your appointments as I have lost faith in you. Conditions for APN are not good and different times are being tried to find an opening. VE6HM tried and tried for the last Frequency Measuring Test from WIAW but could not hear it. Better luck next time, Charlie. The ARLA is getting ready for this year's International Hamfest and needs your help so, fellows, give your support. We have three lively AREC groups under VE6SA, VE6SS and VE6ALL but have no reports from the rest of you. VE6SS has been doing a fine job pinchhitting for VE6PV, VE6HM and VE6AKV are reported as having a hard time with Official Bulletins with band conditions as they are. Keep trying, fellows, it will change sometime. Traffic: VE6HM 122, VE6FK 16, VE6SS 16, VE6TG 7, VE6SU 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—December has left us with some memories such as the worst snow storms for the coast, worst band condition on 80 and 75, yet some outstanding DX on 80 with low power and the sad passing of Lois, VE7AUF, VE7AHT/G3TEA, writes from England that the local ragchew band is 160 but he does look for VE7s on 20 and finds none. He has a new s.s.b. transmitter, VE7BCC and his XYL, VE7BDH, left Kamloops for Yellow Knife, N.W.T., in January. VE7AAJ has set the concrete for his poles, now the snow must go. VE7AKE is leaving for Swindle Island. VE7U and VE7FB are retired members of the West Coast Sig Regt. (M). VE7TD made life happy for a Vancouver family by contacting their son who is stationed at Easter Island. VE7BKE, the old VE7AIG, is back home at Courtenay. VE7AKD's home is the home of a fire engine during the snow fall as an emergency measure. This being the end of one year and the beginning of another it is time to say thanks to all for helping in this column and other chores in this department. Sure hope for your help during the New Year. Traffic: VE7BDJ 701, VE7OQ 42, VE7BHH 32, VE7AMW 10.



Tune In On This New Electronics Slide Rule With Self-Training Course

Once you've seen CIE's Electronics Slide Rule* you'll know why hams across the country call it the most useful, practical tool they've come across in years. It's perfect for adjusting your rig . . . for designing test circuits . . . for figuring coil windings, db's, operating frequencies, resistor sizes and power ratings, proper inductor and capacitor sizes . . . for accurately matching antenna to final.

You'll be amazed how fast and easy it is to learn to use this terrific NEW slide rule. It comes complete with a fully illustrated AUTO-PROGRAMMED Instruction Course. You will receive four lessons and be entitled to the services of CIE's expert instructors for answering

any questions. In no time at all, you'll be using special scales to solve complex problems dealing with reactance, resonance, AC and DC circuitry, etc. And, as an added bonus, you can use this rule for conventional computation, too.

The CIE Electronics Slide Rule is no toy, no gadget. It is an all-metal, 10" precision measuring instrument that's made to our rigid specifications by one of the country's leading slide rule manufacturers. Slide Rule, Self-Training Course and handsome top-grain leather carrying case . . . all yours for just \$14.95. Cleveland Institute of Electronics, 1776 E. 17th St., Department QT-104, Cleveland, Ohio 44114.

SATISFACTION Warranty

The Electronics Slide Rule with Self-Training Course is available only from Cleveland Institute of Electronics, and is covered by CIE's exclusive "Satisfaction Warranty." Order it now . . . use it for ten full days. Then, if you're not completely satisfied, you may return the Slide Rule with Self-Training Course and CIE will refund full payment.

*U.S. Patent Number 3,120,342.

SEND COUPON TODAY

to: Cleveland Institute of Electronics

1776 East 17th St., Dept. QT-104, Cleveland, Ohio 44114

Please send me your Electronics Slide Rule with Self-Training Course and top-grain leather carrying case. I am enclosing \$14.95. (If not fully satisfied after 10-day trial, CIE will refund payment.)

Please send descriptive brochure only.

Name _____

(Please Print)

Address _____ County _____

City _____ State _____ Zip _____

A leader in electronics training . . . since 1934



CUBEX FIBERGLAS QUAD KIT

Based on the famous CUBEX MK III mechanical design. Kit includes 8 — 13 ft. Fiberglass Arms, 2 Cubex Quad End Spiders and 1 Cubex Boom-Mast Coupler.

WE INVITE CRITICAL COMPARISON!
The CUBEX MK III and MK III-FG now available in multi-element models. Also single, dual and tri-band models. Write for FREE BROCHURE.

COMPLETE
KIT ONLY
\$59⁹⁵
F.O.B.

CUBEX COMPANY
P.O. Box 732, Altadena, California

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready. No QRM. Beats having someone send to you.



ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the Instructograph System. Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS
4700 S. Crenshaw Blvd., Los Angeles 43, Calif.

FREE GIANT NEW 1965 CATALOG

B-A
SINCE 1927

TUBES, PARTS ETC. AT LOWEST PRICES

100'S OF BARGAINS NOT IN ANY OTHER CATALOG

EVERYTHING IN HI-FI AND STEREO

SAVE UP TO 50% ON CHOICE KITS

TOP VALUES IN POWER & HAND TOOLS

100's OF BIG PAGES CRAMMED WITH SAVINGS

BURSTEIN-APPLEBEE CO.

Dept. 69, 1012 McGee St., Kansas City 6, Mo.

Rush me FREE 1965 B-A Catalog

Name

Address

City..... State.....

SEND FOR IT TODAY

FREE

MANITOBA—SCM, William H. Horner, VE4HW—The Manitoba Traffic Net (MTN) had 30 sessions with QNT 122 and QTC 126. VE4JT's December traffic count of 325 should be a Manitoba record. Other good handlings were VE4QX with 114, VE4DL 88 and VE4EF 38. A Tenth Region Net certificate has been issued to VE4JT. The MTN meets at 0100Z daily on 3635 kc. VE4IQ was moved from Brochet to Saskatoon with DOT. VE4CZ has his new Heath SB-300 and SB-400 operating. VE4RE has a four-element 6-meter beam up 60 feet at Minnetonas and is building a linear for 6 and an HB s.s.b. receiver. Murray also is receiving RTTY on a Model 15. VE4QX was awarded a BPL certificate in December. Related congrats to VE6APP (ex-VE4LP) and bride. The Eye Bank Net is looking for Manitoba representation and deserves our strong support. New gear at VE4UM includes an SB-200 linear and an HB electronic keyer. VE4SA has a home-brew linear now backing up the HLX-20. VE4HV has a new Quad ready to go up when the weather breaks. VE4TP is thinking of adding a new Swiss Quad to his present setup. With VE4NS and VE4FB in charge WARA again is sponsoring code and theory classes for unsighted persons. The SCM still is looking for interested operators to take OO and ORS appointments. Traffic: VE4JT 325, VE4QX 114, VE4DL 88, VE4EF 38, VE4UM 19, VE4NF 18, VE4HW 14, VE4JY 14, VE4IW 8, VE4JA 8, VE4QD 8, VE4QJ 8, VE4XA 7, VE4EG 6, VE4LQ 4, VE4EX 3, VE4AN 2, VE4EP 2, VE4TE 2, VE4EV 1, VE4EZ 1, VE4ON 1.

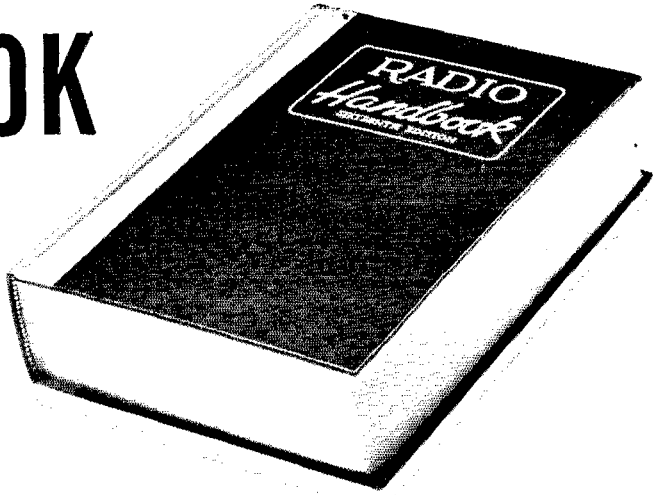
MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM; A.E.W. Street, VE1EK. Deepest sympathy is extended to the relatives and friends of VE1AM, who has joined the ranks of Silent Keys. New appointments include VE1HE as ORS. Congratulations to the members of the Halifax Club, VE1FO, on their Field Day score! VE1AHK will be operating as HP9FC/MM aboard the R/V *Vema* in the South Pacific for the next few months. He will welcome VE1 contacts. VE1AGH and VE1LZ have been maintaining schedules with VE0MM and CEOAG. Congratulations to VE1AX, VOIDS, VO1EX, VO1FG, VO1FQ and their XYLs on the new arrivals. *The Bluenose II* is operating near Costa Rica under the call VE0MY. Santa Claus helpers included: (St. John's, Nfld. Parade) VO1S BU, BR, CZ, DU, FU, FZ, HC and HI; (Cape Breton, Little Flower and Bainscroft Orphanages) VE1S AAK, AJQ, D, SQ, TX, WT and ZO; and, of course, VE1VN and the annual over-the-air visits! OH5SG had a QSO with VO1HN then visited him in person. VO1BZ and VO1FB have new rigs on s.s.b. Have you renewed your license? Don't postpone it any longer. Traffic: VE1AX 446, VE1TE 38, VE1ABS 4.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The West Side ARC elected VE3CWN, pres.; VE3CUX, vice-pres.; VE3GAE, secy.; VE3FGW, treas. VE3FEZ is now in Waterloo. The Kitchener ARC held its Dinner recently. VE3CJ Canadian Division Director was guest speaker. Field Day plans are already under way for 1965 by certain clubs. Niagara Peninsula ARC's officers are VE3CBQ, pres.; VE3BTI, vice-pres.; VE3FOI, secy.; VE3CWQ, treas. VE3BPB is now VE3NM. Two new hams in St. Kitts are VE3FXJ and VE3FXD. VE3CIII and VE3CBG are now Advanced ops. Easter Island was on the map as VE3DGX was operating under the call CEOAG. The Belleville group held a fine auction recently with VE3DHH in charge. From the Quinte bulletin we hear that VE3CJA is president of the Kingston ARC for '65. VE3BJR is on s.s.b. The Ontario DX Assn. publishes a very excellent and informative paper, VE3EWW is skipper. Clubs can exchange, write or send theirs to Ont. BX Assn., Box 212E, Toronto 4, Ont. 4N4 PQ, of Tel-Aviv, Israel, is back in Ottawa under his old call, VE3ECN. Two more of our Ontario hams are also back in this area. Vi and Gord Austin, formerly VE3GH and VE3DEX, have returned from Jamaica. The Windsor ARC elected VE3BJK, pres.; VE3FBP, vice-pres.; VE3DJN, secy.; treas., A Silent Key in January was VE3DLC, of the Soo. VE3FYR is now on 2. VE3DEA is in the hospital. VE3BQP, in Toronto, is on 144 Mc. VE3FGU is on 28 Mc. and VE3ABG is on 100 meters. My apologies to the Toronto 2-meter gang for neglecting to report that they were responsible for the local 2-meter communications during the Governor General Trophy Air Rally back in Oct. EC VE3DRP was in charge. Traffic: VE3CYR 188, VE3NG 177, VE3AWE 120, VE3DPO 89, VE3BZB 79, VE3I 77, VE3FG 61, VE3TT 54, VE3RII 53, VE3EAM 52, VE3DWN 47, VE3EHL 46, VE3BTV 38, VE3EBC 31, VE3BZT 29, VE3DU 28, VE3CIL 20, VE3AUU 19, VE3ETM 19, VE3BLZ 17, VE3EGG 12, VE3CFI 11, VE3DVE 10, VE3YD 8, VE3AKQ 5, VE3OT 4, VE3AOF 3.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM; Michel St. Hilaire, VE2BEZ. Some 250 enjoyed a chicken dinner, numerous prizes and fine professional entertainment at the excellent Christmas Party sponsored by the MARC. VE2VV also put on a novel one-man show. VE2ARK is a newcomer at Grand'Mere, active on 144.1 Mc. Another new ham, VE2AUS, likes traffic-han-

RADIO HANDBOOK

- the most comprehensive how-to-build-it source
- a problem solver for builders and designers of practical radio equipment



In the latest "Radio Handbook," you get comprehensive data on every subject listed below, plus original new design and construction articles. The 16th Edition is thoroughly revised, and brought abreast of the latest in technical progress.

Broadest coverage in the field . . . complete information on building and operating a tremendous variety of high-performance equipment items. All data clearly indexed. 805 pages, all text, with hard covers.

\$9.50 Book #166
(foreign \$10.50)

at your distributor

CONTENTS INCLUDE: AC & DC Circuits • VT Principles • Transistors & Semiconductors • VT Amps • High Fidelity • RFVT Amps • Oscilloscopes • Special VT Circuits • Radio Receiver Fundamentals • Energy Generation • R-F Feedback • Amplitude Modulation • FM & Radio Teletype Transmission • Sideband Transmission • Transmitter Design • TV & BC Interference • Transmitter Keying • Radiation, Propagation & Transmission Lines • Antennas • HF Antenna Arrays • VHF & UHF Antennas • Rotary Beams • Mobile Eqt. Design & Install. • Receivers & Transceivers • Low Power Transmitters & Exciters • HF Power Amps • Speech & AM Eqt. • Power Supplies • Workshop Practice • Electronic Test Equipment • Radio Mathematics & Calculations

NEW AMPLIFIER DESIGNS

- Complete Grounded Grid Amplifier
- 3-1000Z Linear Amplifier
- 4CX1000A Amplifier
- 813 Grounded Grid Amplifier
- 7094 Amplifier
- Tri-Band Linear Amplifier
- KW-2 Amplifier (economy g-g circuit)
- 4-400A General Purpose Amplifier
- Kilowatt All-Purpose Amplifier
- Transformerless 25-Watt Music Amplifier (Hi-Fi)

NEW TRANSMITTER DESIGNS

- 50 Mc. Transistorized Xmitter
- 200-watt Deluxe Tabletop Xmitter
- VHF Strip Line Amplifiers
- "9T0" Electronic Keyer

LATEST IN RECEIVERS AND TRANSCEIVERS

- Bandpass Filter Receiver
- 10-15 Meter Transceiver
- 2-6 Meter "Siamese" Converters
- Deluxe Mobile Transceiver
- DX Communications Receiver

All above units are modern in design, and free of TVI-producing problems.

ORDER FROM YOUR FAVORITE ELECTRONIC PARTS DISTRIBUTOR.



If he cannot supply, send us his name and your remittance, and we will supply.

EDITORS and ENGINEERS, Ltd.

New Augusta, Indiana

Dealers: Electronic distributors, order from us. Bookstores, libraries, newsdealers, order from Baker & Taylor Co., Hillside, N.J. or Momence, Ill. Export (except Canada), order from H. M. Snyder Co., 440 Park Ave. South, New York 10016.

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, W6QK1. 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. \$2.85

At your radio dealer now!

Add 15¢ per order to the publisher:

RADIO PUBLICATIONS, Inc., Wilton, Conn.

TV CAMERA

We have the lowest prices and complete stock of all components for making your own Ham TV or closed circuit TV camera plus exclusive VANGUARD printed circuits and incredibly low prices on PL-9 lens with focusing mounts. Complete ready-to-operate cameras also available at the lowest prices you'll ever find. For more information, price list, and photos, send 10c coin or stamps.

VANGUARD ELECTRONIC LABS
190-48-99th Ave.

Dept. 5-3
Hollis, N. Y. 11423

VHF • UHF

CONVERTERS & PREAMPS

50 thru 432 Mc.

Write for Literature

PARKS ELECTRONICS

RFD 2

Beaverton, Ore.

10-15-20M QUADS

* Pre-Cut	* Pre-Tuned	* Triband
Two Element	Bamboo	Fiberglass
Three Element	\$59.95	\$99.95
	\$85.95	\$149.95

New

- * ROTATE WITH TV ROTOR
- * HIGH F/B RATIO
- * VERY LOW SWR
- * LOW Q BROADLY TUNED
- * HIGH GAIN
- * EASY TO MATCH
- * LOW WIND RESISTANCE
- * ONE FEED LINE FROM XMTR FOR ALL 3 BANDS NO SWITCHING

WRITE DEPT. A
406 Bon Air Dr.
Temple Terrace, Florida
Phone 988-4213

Skylane PRODUCTS

152

ding. If everyone followed in VE2EC's footsteps, life would be simple for your SCMI. He has an almost unbroken report record. Sorry to hear that VE2AFZ was involved in a nasty car accident but glad to report that Fred is recovering. It was a pleasure running into VE2-AVC who now signs VE3EFJ, and is active on 20-meter phone. There are rumors that VE2BRT finally licked his chair. VE2WA, VE2AXU and VE2FY are very prominent in handling CE0EG (Easter Island) traffic with VE2CBC running into reception difficulties. VE2DR specializes on SMS and now has 250 worked, mostly confirmed. VE2BEZ reports: VE2TO, VE2IM et VE2-HB expérimentent sur 432 Mc Félicitations a VE2AAH pour le bon boulot a la tête de RAQI. VE2BAA maintenant actif sur 80 m. VE2BMR semble vouloir retourner au c.w. avec son nouveau keyer. Félicitations a VE2BBZ, autre nouveau dans notre cercle; Jean est aveugle. VE2DS a obtenu son nouveau Marauder. Vous pensiez donc que le 11 m. est mort? Surveillez VE2s BUY, BUB, BSO, AIR, PE, ACY, JY, AYN et ALH. très actifs a Quebec 26.975 Mc. Traffic: VE2DR 222. VE2OI 102. VE2BRD 58. VE2ALH 45. VE2BEZ 45. VE2AGQ 30. VE2EC 30. VE2AUU 28. VE2TA 23. VE2-BG 20. VE2BCB 10. VE2ABT 9.

SASKATCHEWAN—SCM. Mel W. Mills, VE5QC—HAMFEST '65 HAMFEST '65 HAMFEST '65. Again "Western Canada's Largest and Friendliest Hamfest"! Yes, again Saskatoon will be host to what is becoming a must for vacationing hams and their families in Western Canada. Once again the emphasis will be on including the whole family at all times. Headquarters will be the famous Bessborough Hotel on the bank of the mighty South Saskatchewan River! The dates are July 2, 3 and 4, 1965. Pionera Week, so bring the whole family for the biggest double shock in the West! For complete information write Hamfest Manager, Box 801, Saskatoon, Sask. Don't forget to keep your gear inaccessible to unauthorized persons, this is your responsibility! The AREC held many exercises during the past season and is becoming a very efficient organization, which is a definite asset to the Saskatchewan section. Are you a member? VE5VD, Regina EC, wishes to thank VE5DP, VE5HP, VE5JV, VE5SC, VE5TP and VE5ZO for their help during the December exercise. Once again don't forget to include HAMFEST '65 in your holiday plans. Write now for reservations. Traffic: VE5HP 203, VE5LA1 146, VE5BO 17, VE5HQ 9, VE5QC 8, VE5IG 6, VE5AT 2, VE5CB 2, VE5EO 2, VE5VD 2, VE5IL 1, VE5KZ 1, VE5PU 1, VE5TP 1.

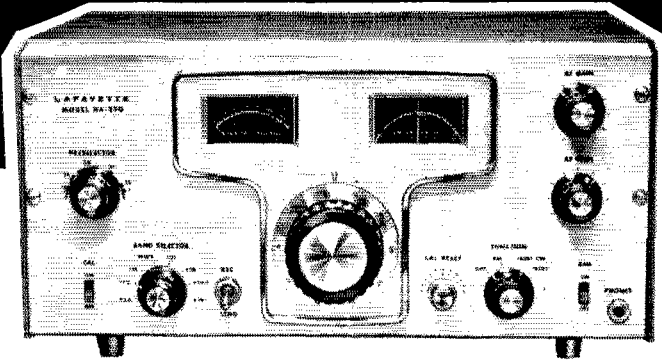
How's DX

(Continued from page 81)

W6EA was often heard doubling down to 20's low end with that lone rock and thoroughly enjoying it. He kept that rig in good order. It really worked, and W6EA was rarely off the air trouble-hunting like many of the new crop of DX men with their complex commercial jobs. . . . W4YLD (ex-W9IKX), back from Europe, exclaims, "The courtesy and fine treatment I received from CT and EA amateurs was unbelievable. In some of the cities I visited a copy of QST is a valued possession indeed. In one place the most recent one on hand was a 1958 issue. . . . VP5BR of Turks will be on Navy assignment there till July, according to K0JPL. . . . WA2KSD's pop, an airlines pilot and WA2KLV, enjoys visiting Brian's XE friends down Mexico City way. . . . ARRL's W1ECH shipped a WAC diploma to WN5ITA, now WA5ITA, for 15-meter DX success in late 1963 and early '64. KITZQ says he confirmed all continents as KN1TZQ twice in '62 and is just getting around to applying for the wallpaper. By the way, WAC is an award administered through ARRL but sponsored by the International Amateur Radio Union. . . . C.w. hound XE1TQ sticks close to 14,000 kc, and likes to work Europeans daily at 1330-1500 CMT. . . . W4NJF forwards announcement by the Virginia Century Club of Norfolk that W2GHK is declared winner of that organization's 1964 DX-man-of-the-year salute. Past victors are W4s BPD and ECI. W9WNV gave Stu competition in the vote this year, and W2CTN received enthusiastic honorable mention. . . . DXCPR DX'er extract: KP4AOO's reassignment by the Coast Guard costs us one of Puerto Rico's most active DXers. . . . KP4s have been intermittently plagued by wideband noise signals skipping in on the upper half of 20. . . . The 20-c.w. CT1 who regularly calls CQ about fifty times, listens for ten seconds, calls CQ fifty times, listens for ten seconds, ad nauseam, rates a superheated sandpaper-lined Wouff Hong.

**SWITCH
TO SAFETY**

NEW! LAFAYETTE



10-80 METER DUAL CONVERSION AMATEUR RECEIVER Model HA-350

Uses Mechanical Filter For Exceptional Selectivity—
Offers 2KC Bandwidth!

189⁵⁰

99-2524WX

Lafayette's newest! A dual conversion superheterodyne communications receiver covering the 10 through 80 meter amateur bands and offering a high order of electrical and mechanical stability for superior AM, CW and SSB operation. Check some of the exceptional features!

- Sensitivity 1 μ V or Better
- 7 Band-Switching Positions—3.5, 7, 14, 21, 28, 28.5 and 29.1 MC, plus WWV on 15 MC
- Covers 600 KC for Each Band
- 12 Tubes
- Crystal-controlled 1st Oscillator
- Transmitter-type for 2nd Osc.
- Preselector Tuning
- Crystal-controlled BFO (Dual frequencies)

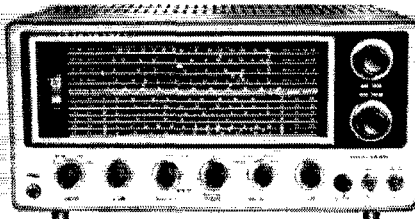
- All Heterodyning crystals supplied
- Selectable Sidebands
- Geared Tuning Mechanism
- 100 KC Calibrator Circuit (crystal optional extra)
- Separate Diode AM Detector and CW/SSB product Detector.
- Coax Antenna Input
- 8 and 500 ohm Outputs
- Imported

NEW! LAFAYETTE Professional-Quality 8-TUBE AMATEUR RECEIVER Model HA-230

Model HA-230

89⁵⁰

Wired
99-2522WX



Model KT-340

74⁵⁰

Semi-kit version
99-2521WX

4 BANDS:

550-1500KC 4.8-14.5MC
1.6-4.8MC 10.5-30MC

Features "ALWAYS ON" FILAMENT VOLTAGE ON MIXER AND OSCILLATOR STAGES FOR FREQUENCY STABILITY . . . LONGER TUBE LIFE . . . FASTER WARMUP!

- 8 Tube Superhet Circuit
- 1 RF + 2 IF Stages For High Gain
- Illuminated 10½" Slide Rule Dial
- Built-in Q Multiplier For Crowded Phone Operation
- Calibrated Electrical Bandsread on 80 thru 10 Meters
- Effective Automatic Noise Limiter
- Stable Oscillator And BFO For Clean AM, CW and SSB Reception
- AVC-MVC Selector On Front Panel
- Built-in Edgewise S-Meter
- Imported

FREE!

Lafayette 516—Pg. 1965 Catalog No. 650. Write:

Lafayette Radio Electronics Corp., Dept. VC-5, P.O. Box 10, Syosset, L. I., N. Y. 11791

SPECIAL SALE!

THE popularity of our new VHF receivers and the expansion of our production facilities are causing an over-crowded condition to exist in our stock room. We want to rapidly reduce our present stock and offer the following units for sale at greatly reduced prices. Each unit is guaranteed and comes complete with all cables and installation instructions.

These prices good until April 15, 1965.

Model CVA2 (160M) is \$18.95	sale price . . . \$10.39
Model CVA4 (80M) is \$18.95	sale price . . . \$10.46
Model CVA5 (WVV) is \$18.95	sale price . . . \$10.32
Model CVA7 (40M-CHU) \$18.95	sale price . . . \$10.43

Order by check or money order enclosing 25¢ for postage and handling. Attach this advertisement to your order.

SCIENTIFIC ASSOCIATES CORP.

BOX 1027

MANCHESTER, CONNECTICUT

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 \$17.95 to the 24K Gold Plated Base "Presentation" at \$33.95.

thumb pieces. Five models to choose from, priced at \$17.95 to the 24K Gold Plated Base "Presentation" at \$33.95.

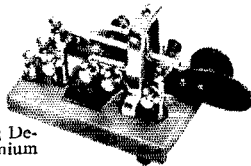
VIBRO-KEYER

Works perfectly with any Electronic Transmitting Unit. Weighs 2 3/4 lbs., with a base 3 1/2" by 4 1/2". Has Vibroplex's finely polished parts, red knob and finger, and thumb pieces. Standard model \$17.95; DeLuxe model includes Chromium Plated Base at only \$22.45.

Order today at your dealers or direct

THE VIBROPLEX CO., INC.

833 Broadway New York 3, N. Y.



FREE Folder

"The DX Demoralizing Dazzler"

(Continued from page 55)

see how he likes his yakked-up coke . . . right?"

"Right . . . and after you say 73 to Gus you whoooooohhh up 15 kc, and call your YC7 buddy and say, 'my, how strange these powerful stations with the big aerials can't hear you at all, Yorik. Too bad because they all need YC7 for a new country. I'll tell all these powerful stations to give you a long call.' OK fellows, QRS and give Yorik a long call."

"Wonder if they have a International Wouff Hong at 4U1ITU?"

"And so the band comes apart, and you can hear those variacs screeching and the signals snapping from 86 to 9."

"How does a Wouff Hong sound in action?"

"And when it quiets down a bit, you come on again and say something like, 'Alas poor Yorik, I worked him well' . . . haw . . . lu . . . hee."

"What does that mean?"

"Harrumph . . . ahhh, never mind Charlie . . . just say, 'alas poor Yorik came back to W2*** and gave him 228 and says he is so sorry no one can hear him, so he is going to QRT. Says he wants to write Bob White to claim new country status.' I tell you, Charlie, that'll put the opposition on their knees sorting resistors."

"Say, you think I could work the YC7 just once more before the contest is over?"

"Sure, that would be perfect. DXmanship mystique! You demoralized the opposition once already: so you are in an excellent and advantageous position to administer the coup de humiliation."

"Oh, that's good. Sure hope he can copy me ok next time."

"Sure he can *always* copy you . . . why?"

"Cause he forgot to tell me who was his QSL manager."

QST

YL News

(Continued from page 87)

\$2.50 are due on March 1st and should be mailed to the above address. Membership is open to all licensed YLs.

The Bay Area YL Amateur Radio Club (Baylars) elected the following officers for 1965 at their December meeting: Pres., Vera Wall, WA6PKP; V. Pres., Dorothy Dimitre, WA6LIZ; Secy., Dorothy Leif, WA6GOK; Treas., Esther Given, W6BDE; Board Members, K6SZT, WB6ADM, WB6BSA, K6USC. "Come alive in '65 on 14.265 Mc. — patiently wait for '68." Who said it? Marte Wessel, KOEPE, Chairman for the next YLRL convention which will be in Colorado in 1968. Marte invites all YLs, a.m. or s.s.b., to join in the YL Tangle Net which now meets on 14.265 Mc. at 1800 GMT each Thursday. Note the change in frequency.

QST

►►► THE DXERS CHOICE • 10-15-20 METER W2AU 2EL QUAD ◀◀◀

PRE-TUNED • SINGLE OR 3 LINE FEED • HIGH GAIN • LOW SWR • EXCELLENT F/B RATIO
Compare features of W2AU Quad with any other quad at any price. Quad consists of: 8—Heavy duty selected Korean bamboo spreaders (not fishing poles) • 2—Rugged, reinforced cast aluminum spiders (36000 lb. stress) • 1—8' heavy duty tempered aluminum boom, 2" diam. • 16—Husky stainless steel compression clamps • 310'—#14 stranded copper wire—will handle full KW plus • 1—Heavy dural boom-to-mast mount with stainless steel bolts

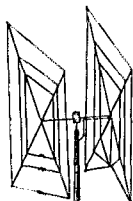
All other components of same high quality. See Aug. Sept. Oct. Nov. QST for other details

Complete Quad. Introductory Price F.O.B. Unadilla, N.Y.

If not available at your favorite dealer, order direct.

\$44.95

UNADILLA RADIATION PRODUCTS, UNADILLA, N.Y.

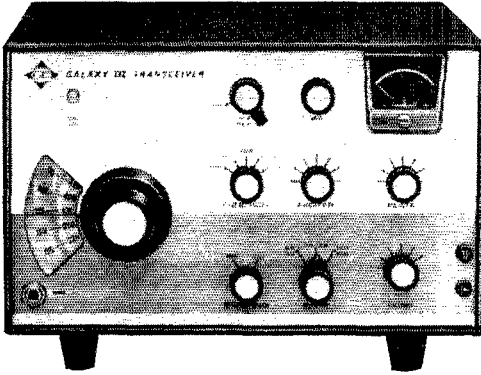


BRYAN EDWARDS, JR.

W5KFT

"The Kid from Texas"

RECOMMENDS



GALAXY III \$349.95
80-40-20 METERS (Illustrated)

GALAXY V \$469.95
80-20-15-10 METERS

IMPORTANT FEATURES OF THE GALAXY III AND GALAXY V . . .

- ✓ 300 Watts SSB/CW Input conservatively rated.
- ✓ "Hottest Receiver" because of advanced design.
- ✓ Best Filter Available: 2.1 kc bandwidth with exceptional 1.8: 1 shape factor. The only 6-crystal filter used in amateur equipment.
- ✓ Most Compact 300-Watt Transceivers: 6" high, 10 1/4" wide, 11 1/4" deep; weight —only 13 lbs.



★ LUBBOCK, TEXAS
THE HOME OF
THE KID FROM TEXAS
WHO GIVES TEXAS-SIZE TRADES
P.D.Q. DELIVERY

AND A
TIME PAYMENT
PLAN.

ORDER TODAY!

PERSONAL INDIVIDUAL SERVICE GUARANTEED

WE WANT YOUR BUSINESS!

Edwards Electronics

TELEPHONE PO rter 2-8759
1320 19TH ST. / LUBBOCK, TEXAS 79401

Edwards Electronics Okay, Kid From Texas
1320 19th Street I'm interested!
Lubbock, Texas 79401

Enter order for equipment listed on attached sheet.
 Send Galaxy III and V literature.
 Send quotations for trade in allowances on equipment listed on attached sheet.

Name _____ Call _____
Address _____
City _____ State _____

LIKE THE PYRAMIDS . . .

VESTO

STEEL TOWERS LAST!



You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5 1/2 ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower — and saves you money, too!

HURRICANE PROOF! VESTO TOWERS HAVE NEVER FAILED!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- ATTRACTIVE — NO GUY WIRES!

Width of Base Equal to 1/5 Height

SMALL DOWN PMT.—EASY TERMS

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers

22' \$ 174
23' \$219
33' \$262
39' \$ 312
44' \$359
50' \$416
55' \$ 472
61' \$539
77' \$850
100' \$1312

Towers are shipped to your home knocked down. FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now!

Send check or money order . . . or write for free information.

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

VESTO CO., Inc.
20th and Clay
North Kansas City, Mo.

NEW!

THE IMPROVED NIKEY

Now with ball bearing pivots. The only key especially designed for use with all types of Electronic Keys. Independent Dot-and-Dash Levers make your fat sound a Truly Automatic Standard Model \$17.95, Deluxe Model \$19.95. Check or Money Order.

THE PRODUCTIVE TOOL & MFG. CO., INC.
9 Market Street
Stamford, Conn.

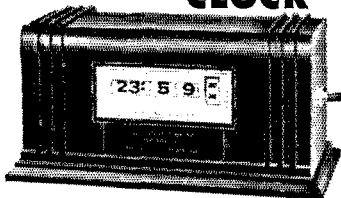
CALL-IDENT TYMETER®

10-MINUTE STATION CALL REMINDER

#124

22.50

Plus applicable taxes



24 HOUR CLOCK

10-minute repeating timer buzzes warning to sign your call letters. Walnut or ebony plastic case. H4", W7 3/4", D4". Wt. 3 lbs. 110V, 60 cy. 1 year guarantee.

At Your Dealer, or WRITE TO

TYMETER ELECTRONICS

PENWOOD NUMECHRON CO.

7249 FRANKSTOWN AVE., PITTSBURGH 8, PA.

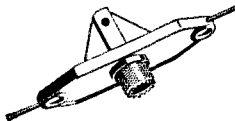
Silent Keys

It is with deep regret that we record the passing of these Amateurs:

- W1AWW, T. F. Cushing, Springfield, Mass.
 W1KKZ, Arthur E. Parker, Auburn, Maine
 ex W1UB, Herman D. Taylor, Hartford, Conn.
 W1ZTO, Frank Chalfant, Holliston, Mass.
 W2AFY, David Stein, Kenmore, New York
 W2AKI, George E. Matthias, Runnemede, New Jersey
 K2BF, William N. Baker, Bound Brook, New Jersey
 W2DI, Ernest Cyriax, Katonah, New York
 K2IHO, Wallace I. Youngs, Grand Island, New York
 W2LSD, Nils P. Michaelsen, Mt. Vernon, New York
 W2PIG, Edith G. Clifford, Plainfield, New Jersey
 ex W2PR, George J. Sandberg, Los Angeles, Calif.
 W2RRQ, Max Barrack, Bronx, New York
 K2ULS, Clarence W. L-Hommedieu, Massapequa, New York
 KN3FQZ, James R. Laury, Washington, D. C.
 W4ATX, John C. Craig, Ellberton, Georgia
 W4BZ, Broughton W. Benning, Atlanta, Georgia
 W4DDU, Ben R. Singleton, Savannah, Georgia
 W4EET, Horace V. Schwarzkopf, Memphis, Tenn.
 K4IFK, James F. McConnell, Fort Lauderdale, Florida
 W4MIV, James V. Settle, Sr., Atlanta, Georgia
 W4APPM, Percival H. Fox, Delray Beach, Florida
 W4PUM, Nathan M. Moore, Decatur, Georgia
 W4WLM, Marvin A. Norred, Birmingham, Alabama
 W5AYF, John H. Douglas, Tulsa, Oklahoma
 W5GZW, Gilbert Brain, Oklahoma City, Oklahoma
 W5QID, George Machin, Biloxi, Mississippi
 K5RXO, David Haebler, Odessa, Texas
 W5SL, Arthur C. Knott, Kingston, Oklahoma
 W5ZS, William E. Antony, Shreveport, Louisiana
 ex W6EXQ, Ralph R. Heiges, Monterey Park, California
 K6GRL, Robert A. McGuire, Hollywood, California
 K6CZ, Robert F. Mead, Belmont, California
 W6GJHR, Francis G. Caswell, San Jose, California
 W6HTN, Reuben E. Riesland, Del Mar, California
 W6HYR, Irwin Martin, Fresno, California
 W6IKG, George Scott, Sherman Oaks, California
 W6KVY, Theodore J. Chessman, Canoga Park, California
 W6MNN, Carl V. Teschan, Yucaipa, California
 WA6OAO, Donald G. Benn, Santa Clara, California
 K6TZZ, Phillip K. Seilheimer, Whittier, California
 W6VLD, Louis M. Spencer, Newport Beach, California
 WA6ZQF, Walter R. Smith, San Bernardino, California
 KL7AUG, Robert Paulsen, Ketchikan, Alaska
 ex W7EEX, Ruth Harrington, Sedro Woolley, Washington
 W7KX, James E. Parrott, Seattle, Washington
 K7RJP, William S. Dement, Pendleton, Oregon
 K8BDV, Kenneth F. Koons, Waverly, Ohio
 K8BVM, Joseph P. Madden, Parma, Ohio
 W8IPR, Richard E. Knapp, Birmingham, Michigan
 W8KYE, John Chufar, Canton, Ohio

(Continued on page 158)

HYE-QUE ANTENNA-FEEDLINE CONNECTOR



New 3-in-1 molded plastic-and-metal fitting provides: coax feeder connection, heavy copper leads to elements, antenna center support. Hye-Que 1 connector fits standard PL259. Reinforced, weather protected, ultra-efficient. At your ham store, or \$2.95 ppd. Companion insulators, 2 for 99¢ ppd. Includes complete instructions.

BUDWIG MFG. CO. P.O. Box 97, Ramona, Calif. 92065

RECONDITIONED EQUIPMENT

★ 10 Day Free Trial (Lose only Shipping Charges) ★ 30 Day Guarantee ★ Full Credit Within 6 Months on Higher Priced

New Equipment ★ Pay as Little as 10% Down and Take up to 3 Years to Pay the Balance Order Direct from this Ad!

AMERICAN GELOSO Receiver \$99	ELMAC (cont'd) PSR-6 DC Sup \$ 9 PSR-12 DC Sup 9 M-1070 AC/DC 39	HALLICRAFTERS S-107 Rec \$ 57 SX-110 Rec 89 SX-111 Rec 149 SX-117 Rec 275 S-120 Rec 44 SX-140 Rec 69 CRX-1 Rec 69 R-46 Speaker 9 R-46A Speaker 9 R-46B Speaker 9 R-48 Speaker 12 HT-18 VFO 39 HT-32A Xmtr 349 HT-32B Xmtr 449 HT-33A Linear 349 HT-37 Xmtr 299 HT-40 Xmtr 49 HT-41 Linear 249 MR-150 Rack 19 P-26 Supply 49 P-150AC Sup 75 P-150DC Sup 75 SR-150 Xcvr 395 SR-160 Xcvr 325 FPM-200/AC 995 HA-1 Keyer 39 HA-2 Xvterter 125 HA-5 VFO 54 HA-6 Xvterter 125 HA-10 Tuner 19	HEATHKIT (cont'd) MP-1 DC Sup \$29 UT-1 AC Sup 19	LOUDENBOOMER Mk IIA w/Sup \$275	R.M.E. (cont'd) 4302 Speaker \$ 10 4350 Rec 109 4301 SB Adapt 49					
B & W \$100 Xmtr \$125 \$100S Xmtr 149 \$100B Xmtr 175 \$15B-B Gen 109 L-1000A Lin 175	GLOBE Scout 680 \$ 35 Scout 680A 39 Scout Deluxe 69 Hi-Bander 62 89 Chief 90 29 Chief 90A 34 Chief Deluxe 39 Champ 300 125 Champ 300A 149 Champ 350 175 King 500C 325 DSB-100 Xmtr 49 3B-175 Xmtr 59 PSA-62A AC 19 HG-303 Xmtr 49 TC-6 Techcvt 29 Galaxie 300 225 755 VFO 34 755A VFO 39 V-10 VFO 39 PH-1 Attenuator 5 UM-1 Mod 29 DB-68 Presel 19 Mobiline 6 Xcvt 75	HUNTER 2000A Lin \$375	JOHNSON Adventurer \$ 29 Challenger 69 Navigator 79 Viking I 69 Viking II 89 122 VFO 25 Ranger I 115 Ranger II 225 Valiant I 175 500 (4-400A) 425 Invader 200 375 Invader 2000 649 Courier Linear 139 Thunderbolt 299 275W M'box 39 275W w/SWR 69 6N2 Conv 39 6N2 Xmtr 99 6N2 VFO 29 Mobile VFO 19	MOSLEY CM-1 Rec \$99	NATIONAL SW-54 Rec \$ 25 NC-57 Rec 49 NC-60 Rec 44 NC-98 Rec 75 NC-105 Rec 99 NC-109 Rec 85 NC-125 Rec 75 NC-173 Rec 75 NC-183 Rec 119 NC-183D Rec 149 NC-188 Rec 69 NC-190 Rec 139 NC-190 Rec 169 NC-303 Rec 269 VFO-62 39 2m Converter 29 6m Converter 29 Conv. Cabinet 19 HRO-50T-1 125 HRO-60 Rec 225 NCX-3 Xcvt 269 NCXA Supply 75 NCXD Supply 75					
CENTRAL ELECT. 10A Exciter \$ 59 10B Exciter 75 20A (table) 119 QT-1 Anti-trip 9 BC-45B VFO 24 BC-45B/10m 39 100V Xmtr 395 300V Xmtr 575 600L Linear 219 QC-1 Comp 29	CLEGG 22'er Xcvt \$175 99'er Xcvt 99 Thor 6 (RF only) 175 Thor AC/Mod 89 Interceptor Rec 325 Zeus Xmtr 425	COLLINS 210B-3 Xmtr \$ 99 75A-1 Rec 149 75A-2 Rec 199 75A-3 Rec 269 75A-4 (#4277) 439 75A-4 (#5399) 475 75A-4/blanker (\$5772) \$499 75A-4 Spkr 15 75S-1 Rec 325 75S-3C Rec 575 32V-2 Xmtr 175 32V-3 Xmtr 225 32S-1 Xmtr 449 30L-1 Linear 390 30S-1 Linear 875 62S-1 Conv 645 KWS-1 (#1437) 795 3C-101 325 399B-1 DX 29 EWM-2 Xcvt 775 MP-1 Mob Sup 119 516E-1 Sup 75 PM-2 Supply 95 351D-1 Mt 25 312B-5 PTO 249	CONSET Comm I 2M \$109 Comm II 6M 109 Comm II 2M 119 Comm IIB 6M 129 Comm III 2M 165 Comm III 6M 145 Comm IV 2M 249 Comm IV 6M 225 Comm IV 220 199 GC-105 (2M) 175 2M Lin (II) 89 6M Lin (III) 89 G-50 Xcvt 239 GR-212 Rec 59 G-63 Rec 99 G-66 Rec 59 G-66B Rec 69 3-way Supply 24 Thin-Pak 19 G-76 Xcvt 175 G-76 Calib 9 G-76 AC Sup 6 G-76 DC Sup 59 G-77 Xmtr 89 G-77A Xmtr 109 GSB-100 Xmtr 225 GSB-101 Lin 175 Super 12 34 6m 12v Conv 29	HAMMARLUND HQ-100 Rec \$ 99 HQ-100C Rec 109 HQ-110 Rec 119 HQ-129X Rec 89 HQ-140X Rec 114 HQ-145C Rec 149 HQ-150 Rec 139 HQ-170 Rec 199 HQ-170C Rec 209 HQ-170AC Rec 279 HQ-180C Rec 275 HQ-180A Rec 319 SP-600 Rec 325 SP-600 IX-1 249 SP-600 IX-14 275 SP-600 IX-17 325 HK-1B Keyer 29 HC-10 Conv 59	LAFAYETTE HE-30 Rec \$49 HE-35 Xcvt 45 HE-45 Xcvt 75 HE-45B Xcvt 85 KT-320 Rec 39 HE-48 Speaker 5	P&H 600A SSB Conv \$29 600A AC Sup 29 LA-500M Lin 99 PS-1000 AC Sup 75 PS-1000B DC 75 6-150 SB Conv 149	POLYTRONICS 62B Xcvt \$249	R.M.E. DB-23 Presel \$29 4300 Rec 89	SWAN SW-120 Xcvt \$149 SW-140 Xcvt 149 SW-175 Xcvt 149 SW-12 DC Sup 75 SW-240 Xcvt 249 SW-117AC Sup 75 SW-117B AC 59 SW-12A DC 75 TCU Control 65 SW-400 Xcvt 275 SW-420 "VFO" 80 SW-406 "VFO" 50 512 DC Sup 95	SQUIRES - SANDERS SS1R Rec \$625 SS1RS/Spk Noise Slencer/Spkr \$75
R. L. DRAKE 1A Receiver \$119 2A Receiver 169 2AC Calib 12 2AQ Combo 25 2B Receiver 209 2BQ Combo 29 2BS Speaker 9	HALLICRAFTERS S-38B Rec \$ 24 S-38C Rec 29 S-38D Rec 34 S-38E Rec 39 S-40 Rec 44 S-40B Rec 49 S-53 Rec 44 S-53A Rec 49 SX-62 Rec 149 SX-62A Rec 225 SX-71 Rec 89 SX-73 Rec 295 S-85 Rec 65 SX-99 Rec 75 SX-100 Rec 145 SX-101 Rec 139 SX-101 Mk III 169 SX-101 IIIA 195 SX-101A Rec 219	HEATHKIT HR-20 Rec \$ 99 MP-1 Xmtr 49 MR-1 Rec 59 RX-1 Rec 149 XC-2 Conv 29 XC-6 Conv 29 QP-1 Q-Mult 4 DX-20 Xmtr 24 DX-35 Xmtr 34 DX-40 Xmtr 39 DX-100 Xmtr 89 DX-100B Xmtr 139 TX-1 Xmtr 169 HA-10 Linear 175 HX-20 Xmtr 149 HX-30 Xmtr 169 HA-20 Linear 79 HW-12 Xcvt 125 HW-22 Xcvt 125 HW-32 Xcvt 125 VF-1 VFO 15 HG-10 VFO 29 HW-10 Xcvt 169 HW-20 Xcvt 175 VHP-1 Seneca 159 HP-10 DC Sup 29 HP-13 DC Sup 39 HP-20 AC Sup 29	UTICA 650/VFO Xmtr \$125	T.M.C. GPR-90 Rec \$249 GPR-90 Spkr 19 GPR-90 Calib 12						

ACT NOW!

TO:

STERMAN ELECTRONIC SUPPLY

4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216
Ph. (414) 442-4200

Ship Me:

State Second & Third Choice (If Any)

I enclose \$ _____, and will pay balance (if any):

C.O.D. 1 Year 2 Years 3 Years

NAME _____

CALL (if any) _____

ADDRESS _____

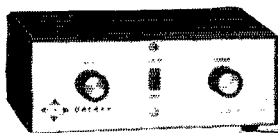
CITY _____

STATE _____

Send Latest Reconditioned Equipment Bulletin

VISIT! our branch stores in ORLANDO, Fla. and Chicago, Ill.

NEW DELUXE CW MONITOR



**LISTEN TO
AND IMPROVE
YOUR CW**
A MUST FOR
EVERY CW
OPERATOR

Only
\$29.95

Use with any ham transmitter or transceiver. Simply connects to transmitter and receiver. Use as a code practice oscillator.

A long-needed item in the Ham fraternity. The CW Monitor allows the beginner and experienced CW operator to monitor his CW transmission. Helps improve his "fist" and rhythm in sending the code. May also be used as a deluxe code practice oscillator. Expertly engineered—featuring a stable transistorized oscillator and diode keying circuitry. Requires 9-volt battery—(less battery).

AMATEUR NET \$29.95

NEW HAM/CB COMPRESSION AMPLIFIER AVAILABLE—\$24.95

GALAXY ELECTRONICS
10 South 34th Street
Council Bluffs, Iowa

SEND FURTHER INFORMATION ON

CW MONITOR HAM/CB COMPRESSION AMPLIFIER

NAME _____

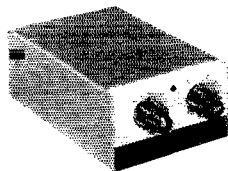
ADDRESS _____

CITY _____ STATE _____

CW OPS:

QRQ with less effort
try the "Ultimatic" Keyer

- DUAL LEVER OPERATION
- PERFECT DOTS, DASHES, SPACES • MEMORY PREVENTS LOST DOTS • CALIBRATED SPEED CONTROL • MONITOR
- TRANSISTORIZED.



MODEL 200, for blocked-grid keying \$ 98.75
MODEL 200R, SPDT reed keying relay 110.75
"NIKEY", dual lever 17.95

WRITE FOR BULLETIN 200.1

ALKAN
products

P.O. BOX 5494 LAKE ST. STATION
MINNEAPOLIS, MINN. 55408

BE SMART—BUY AND SAVE ON THE PLAN THAT FITS YOUR POCKETBOOK

Plan 1—Best terms—no finance charges—no trades!

Plan 2—Best Cash Price—No Trades!

"Don't Delay—Write Today!"

Drake-Hallicrafters-Hammarlund-Johnson

National-SBE-Swan, etc.

WILLARD S. WILSON, INC.

405 Delaware Ave., Wilmington, Delaware 19801
Est. 1920 Willard-W3DQ Tel. 302-654-5344

Silent Keys

(Continued from page 156)

- K8SDB, Edward Hennezan, Cincinnati, Ohio
W8ONS, J. S. V. Allen, Bethany, West Virginia
W8WNU, George E. Boyd, Sr., Saginaw, Michigan
W8YMT, Stanley M. Stein, Cleveland, Ohio
K9AAB, Raoul du Chatellier, Palos Heights, Illinois
W9CEO, A. Edgar French, Downs, Illinois
W9JRX, George J. McIntosh, Normal, Illinois
W9RRX, Robert Adair, Tinley Park, Illinois
W9ADT, Lloyd Brooks, Kansas City, Kansas
K9VKT, Ralph M. Deck, New London, Iowa
KP4AIG, Hubert B. McGill, San Juan, Puerto Rico
VE3DLC, F. S. Bradley, Sault Sainte Marie, Ontario, Canada
ex VE4GT, Arthur Asmussen, Edmonton, Alberta, Canada
VE5FP, Heneage J. M. Goodman, Swift Current, Sask., Canada
VE5NA, William F. Powell, Swift Current, Sask., Canada
VE7AUF, Lois A. Gillespie, Nanaimo, B. C., Canada
VE7ES, Ron M. Sharp, Vancouver, B. C., Canada
VK3ZA, Lance T. Frith, Melbourne, Australia
VP7TC, Diego Serrao, Trinidad, West Indies

HIGH SPEED CODE TEST, MARCH 15

The Thirteenth Semi-Annual High Speed Code Test of the Connecticut Wireless Assn. is scheduled for March 15, 1965. The test is transmitted by club station W1E1A simultaneously on 3637 and 7120 kc., and synchronously by a number of other volunteer stations in the midwest and far west to give nationwide coverage. The exact identity of the latter have not as yet been fully settled, but look for transmissions on 3640, 3650, 3660, 3690 and 7095 kc.

Call-up for the test will commence at 0115 GMT, consisting of announcement, identification, and a plea for a clear channel. At 0130 GMT very important instructions will begin, which all operators intending to participate in the test should copy. The first speed run, 40 w.p.m., will begin at 0150 GMT and will last for exactly five minutes. Subsequent speeds will be 45 w.p.m. at 0200, 50 w.p.m. at 0210, 55 w.p.m. at 0220 and 60 w.p.m. at 0230, all GMT. Text will be plain English with common punctuation and numerals in stride, with no intent either to deceive or make it easy. One minute of consecutively-solid copy out of any five-minute transmission is required to qualify for a certificate.

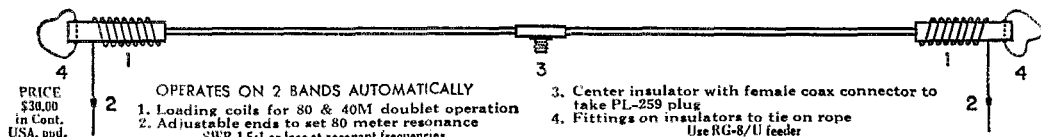
There are other rules for which we do not have space here. Copy the instructions at 0130 GMT, March 15. (Note that this is the evening of March 14 if you are still using local time.)

This is *not* a part of the ARRL code proficiency program. All correspondence should go to W1NJM at his home address.

LRL-70 ANTENNA

70' LONG, 80 & 40 M

Power rating 2 Kw. P.E.P. or over



PRICE
\$30.00
in Cont.
USA, ppd.

LATTIN RADIO LABORATORIES

Box 44

Owensboro, Kentucky



BREAKTHROUGH

IEEE CONVENTION & SHOW!

March 22-26, 1965

ELECTRICAL-ELECTRONICS

◆ Exhibit hours (4 days): Monday & Thursday, 9:45 a.m.-9 p.m.; Tuesday & Wednesday, 9:45 a.m.-6 p.m.

◆ Technical sessions (5 days) 10 a.m.-5 p.m. (Hilton, Tuesday to 10 p.m.)

◆ 80 subject-organized technical sessions presenting 400 vital "break-through" papers.

◆ Over 1000 Exhibits using 140,000 running feet of display units in N.Y. Coliseum & N.Y. Hilton.

◆ Gala IEEE Banquet on Wednesday, March 24, 1965 at 6:45 p.m. in Grand Ballroom, N.Y. Hilton.

◆ Registration: \$2.00 IEEE Members, \$5.00 Non-members. High School students admitted Thursday afternoon only, \$2.00 if accompanied by an adult (not over 3 per adult).



NEW YORK COLISEUM and the NEW YORK HILTON

Buses every few minutes



HAMS! TURN CB RADIO INTO YOUR OWN BIG-MONEY MAKING BUSINESS!

There are over 1,500,000 CB rigs—and 30,000 more go on the air every month. Each must maintain a frequency tolerance of 0.005%; frequency adjustments can be made only by holders of commercial tickets—and with proper equipment . . . like the Lampkin Frequency Meter.

With your ham background, it should take but a few weeks to study for your 2nd class ticket. When you have it . . . and your Lampkin 105-B . . . you're ready to check CB rigs for cash. And this is only the beginning—for there are 2,800,000 other mobile-service radios requiring regular frequency measurements. In your area you can find hundreds of them—Business Radio . . . Aviation Radio . . . Marine Radio . . . Mobile Telephone . . . Police Radio—and you can contract to maintain them for a fat fee!

LAMPKIN 105-B FREQUENCY METER



0.1 to 175 MC and up. Inexpensive accessory PPM Meter available for 0.0001% accuracy on split-channels.

TO LEARN HOW MAIL COUPON TODAY!

LAMPKIN LABORATORIES, INC.
MFG Division, Bradenton, Fla.

[At no obligation to me, please send me free booklet "HOW to MAKE MONEY in MOBILE-RADIO MAINTENANCE"—and data on Lampkin meters.

NAME _____
ADDRESS _____
CITY _____ STATE _____

LAMPKIN LABORATORIES, INC. BRADENTON FLORIDA

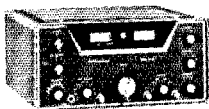


"Your Friendly Supplier"



OFFERS

**THE hallcrafters
SX-117 RECEIVER**



Exceptionally versatile and compact Triple-conversion, super-heterodyne communication-type receiver. Selectivity .5, 2.5, or 5. Sensitivity less than 1 μ V on AM, less than 1/2 μ V on SSB/CW. T-Notch filter, I.F. type noise limiter, 100 kc xtal Calibrator.

IN STOCK: Net \$379.95

HA-10 Low freq. tuner adapts SX-117 for 85 kc-3 mc. Net \$24.95

ALSO IN STOCK: HT-44 Compact Transmitter. SSB, AM, or CW 80-10 meters. Net \$395.00

P-150 AC Supply for HT-44. Net \$99.50

"Used Equipment March Special"

HALLCRAFTERS SX-101A \$249.95

HALLCRAFTERS HT-37 \$349.95

WRITE FOR LATEST COMPLETE LIST

Evans RADIO

P.O. BOX 312 FONE CONCORD, N. H.
603-225-3358

LEARN CODE

the right way—with
Code Sound Language!



"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.

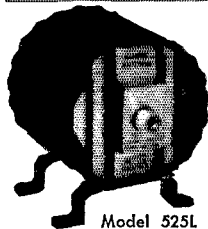
Both tapes on one order, only \$13.50.

SOUND HISTORY RECORDING Box 16015, Washington, D. C. 20023

GENTEC DUMMY ANTENNAS

And now, a new model 525L

Model	525	525L
Impedance (ohms)	50	50
Power—Steady State	125	125
Power—ICAS	250	250
VSWR—Less than	1.1/1.0	1.05/1.0
(DC to over 250 MC)		
Price	\$11.95	\$19.95



Model 525L 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 IVI, QRM and associated problems. Transmitters readily peaked for top DX operation.

Terms: C.O.D. plus postage or ppd in U.S.A. when check included with order.

Write for Free Literature

GENTEC INCORPORATED, P.O. Box 233, Raritan, New Jersey

World Above

(Continued from page 85)

(Virginia). Amazing the difference in what was heard from these various southern states. Ken, WA1CWG/4 in South Carolina, seems to have heard most states with Missouri, Iowa, Kansas, Illinois, Indiana, Ohio, Connecticut, Massachusetts and Maine coming through to his QTH. At Knoxville, Tennessee, WA4NUJ was hearing Maine and Canada while W4WQZ at Kingsport, Tennessee reports hearing Indiana, Illinois, Missouri and Massachusetts plus VE1LF (who stood out like a sore thumb.). In Virginia, W4UIS was hearing Arkansas, Tennessee, South Carolina, Maine, Vermont and New Hampshire plus VE1s on the 20th, while W2UZN/4, also in Virginia missed this session but did catch openings (poor ones) on several other days during the month. All of the 4s reporting mentioned openings on other days during December but all agreed that the one of the 20th outshone the others. Only report from 7-land (via K7ICW) is from K7ZOK who reports an opening to Houston on December 24th. K8TUT in Ohio and W8MBH in Michigan both report on the 20th, with most contacts being to the east and northeast of them.

Out in Cicero, Illinois, WA9FIH reports openings on more days during December than anyone else heard from. Jim noted skip stations coming through on December 14, 17, 18, 19, 20 and 21, with the 20th again being the best opening. On that day he heard Florida, Georgia, Alabama, Maine, New Hampshire and New York plus VE2 and VE3. At Chicago, W9RSV sez the afternoon opening (of the 20th) was very good to 4-land but the evening opening to 1 and 2-lands was unstable and it was difficult to hold a decent QSO. From Indiana, WA9NDN reports that Massachusetts was "an easy grab" during December but in addition he worked stations in New Hampshire, Maine and Texas. WA9JNG and K9WST also worked into Texas and Charl (K9WST) also worked WA4GMT in Florida. These two boys held a 50-minute QSO. Iowa comes through via W0DRE and W0PPF this month with 50 Mc. news. John, W0DRE seems to have found an opening on the 19th which outshone the one of the following day. On the 19th he worked stations in New York, Ohio, Pennsylvania and Massachusetts while on the 20th only North and South Carolina were worked. Somehow or another Jim, W0PPF seems to have missed the 20th but reports working K3KEO on scatter on the 13th and skip stations in Colorado, Texas and Louisiana worked during other openings of the month. "On January 3rd, scatter signals were so many and so strong that they were causing bad QRM", sez Jim. Stations were heard and worked in Texas, New York, Illinois and Ohio via scatter. Here's another direct quote from Jim. He wants some information and here's how it goes. "Would like ideas to allow 1 pair of wires to remotely select one of two transmitter frequencies, with two receiver audios on same line, and with some signalling circuit to show which receiver broke squelch for remote control of 6-meter f.m. base station. Anyone have good idea?" He said it, we didn't!

One of the Smith boys, Bill, K0CER in South Dakota writes that the only really good day during December was the 19th. (Good for skip, that is.) However, seems to us that he did about everything on that one day so what more could he ask. Bill heard or worked seventeen states on the 19th from Maine to Florida to Texas. (Guess he outdid WA9FIH on "most heard".) W9HWQ in Wisconsin reports openings on the 15th, 18th and 19th of December.

QST

Thinking
Hams know
a TIGER
when they see
one...the Mosley
TIG-ARRAY

Yes, here is the real Tiger - - the Mosley Tig-Array - - a new member of the quality Mosley family - - 750 watts input AM and CW, 2000 watts P.E.P. on SSB (input to the final amplifier).

Here is the antenna for you - - strong, rugged, impressive! The new Tig-Array features three band performance on 10, 15, 20, and all-metal enclosed traps made famous by the TA-33 & TA-33 Jr. antennas.

NET PRICE \$82.91

Write for specifications and performance data
4610 N. LINDBERGH BLVD. - BRIDGETON, MO. 63044

Mosley Electronics, Inc.

HUNTER

DIRECTIONAL WATTMETER

MODEL 20-A

■ DIRECTIONAL, IN LINE WATTMETER, TWO UNIT DESIGN ■ CONTROL-INDICATOR UNIT AND COUPLER ■ 200 AND 2000 WATT SCALES FOR FORWARD AND REFLECTED POWER MEASUREMENT ■ 2 TO 30 MEGACYCLES ■ VERY GOOD ACCURACY ■ LARGE EASY TO READ METER ■ MODERN DESIGN IN



MATCHING GRAY COLORS ■ SIZE: 4"H X 7"W X 4"D APPROX. ■ READY TO OPERATE, EASY TO CONNECT ■ USES STANDARD SO-239 CONNECTORS ■ NOW AVAILABLE AT A PRICE EVERYONE CAN AFFORD ■ SEND CHECK OR MONEY ORDER ■ WRITE FOR MORE INFORMATION ■

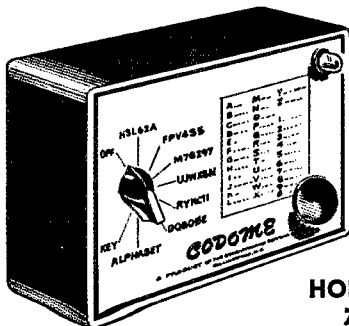
\$79.50 Post paid.

Hunter Manufacturing Company, Inc.

IOWA CITY, IOWA 52243

**LEARN
CODE**
*with the new
CODOME*

(pat. pending)

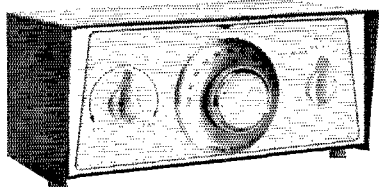


- A self-teaching course.
- A fast, practical way to learn how to receive code.
- Built in key and oscillator to practice sending code.
- A self-teaching course on electricity and radio.

Only \$17⁹⁵

HOLLAND ELECTRONICS, INC.
772 East 53rd St., Brooklyn, N.Y.

NOW AVAILABLE IN NORTH AMERICA!



The World Famous CODAR PR-30
Preselector, only \$19.95

Made in Great Britain. Thousands already in use throughout the DX world. Substantially improves the performance of most superhet receivers. Ideal for the amateur or short wave listener who wants that little bit extra when listening to weak DX. Uses EF183 frame grid RF amplifier and will provide up to 20 db gain on all bands from 10-160 meters together with substantial image-rejection and improved signal/noise ratio. Features include famous Jackson ball-bearing vernier tuning, gain control, provision for balanced or unbalanced antennas. External power supply requires only 6.3V .3A and 180/250V 10 Ma. easily obtained from receiver. Smart styling in gray cabinet with silver black panel. Complete, ready for use with all cables, plugs and instructions.

Price in United States . . . \$17.95
plus 75¢ postage in U.S. funds.

U.S. Amateurs order direct, enclosing cheque or m.o. for \$18.70. Import duty of 12½% plus 33¢ handling charge will be collected by your postman when he makes delivery to you.

CODAR RADIO OF CANADA
Dept. A1, Tweed, Ontario, Canada

TRANSTENNA 102A

A PRESELECTION SECOND TO NONE AND A T-R SWITCH BEYOND COMPARISON

Pat. Pndg. U.S.A. & Canada

MODEL 102A

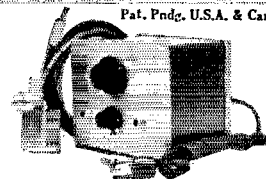
\$69.45 (Add \$7 for Sidetone)
15 DAY TRIAL

Return For Full Refund If
You Burn It Out Or Are
Not FULLY PLEASED

- Std. coax coupler (xmt to feedline)
- No TV or Suck out
- 30 DB Min. Gain (10-50 mtrs)
- No Effect on Transmission
- Monitored switching
- Full Legal Input
- Burnout Proof
- CW Sidetone (optional)

Write or Free Literature

33 Myrtle Avenue, Cedar Grove, N. J.
Tel. CEnter 9-6412



IMPROVEMENTS

Muting circuit breaks between dots and dashes. Through operating positions for unity gain on all frequencies.

102B \$59.00 (excludes revr muting)

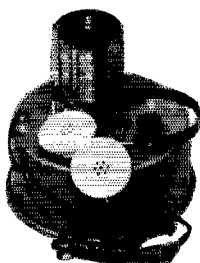
FICHTER ELECTRONICS

CODE

THE WAY YOU LIKE IT.

For many years TELEPLEX METH-OD has been used exclusively by schools training professional operators. It is now available to any one wishing to learn Code or advance his present ability. You will be amazed to see just how easy and simple it is to thoroughly master the Code. This professional type equipment has too many exclusive features to be explained here. Write today for full details and short history of telegraphy. It is free. It can save you months of frustration and dismal failure.

TELEPLEX CO. 739 Kazmir Court Modesto, Calif.



RTTY Reception For Beginners

(Continued from page 81)

through the circuit. It seems that, thanks to the way the magnetic circuit is arranged, the fields of the two magnets were bucking. Reversing the connections to one magnet cured this, and operation became normal on 60 ma.

After about two days of satisfactory operation with the converter the machine suddenly started to print only gibberish. It would work with a local loop, but the optimum setting of the range selector was no longer in the middle of the scale, where it had been originally, but was off to one side. One of the local RTTY enthusiasts, WIDDP, came through with a suggestion that saved the day—soak the clutch on the main drive from the motor with oil and keep it saturated. It was also advised that if the machine had not been used for a while it was a good idea to fill all the oil cups. After this treatment our machine was back to normal operation. Perhaps the lesson here is to contact the experts when in trouble!

Receiver drift can be a problem with the f.s.k. converter, and it may be found that shortly after a signal is properly tuned in, everything goes out of adjustment unless the tuning is continuously monitored. A drift of about 150 cycles is about all the converter will stand. The only answer to this is to improve the receiver stability, if possible, or to keep one hand on the tuning knob.

Both converters rely on receiver selectivity for protection from QRM, so the bandwidth should be no greater than is necessary for passing the f.s.k. signal. Without such selectivity the printing will be reliable only when the desired signal overrides everything else. Although this doesn't happen all the time, it happens often enough to give you the kick of seeing how the machine can print—and to stimulate your interest in going on to more "sophisticated" circuits! QST

W/VE Test

(Continued from page 68)

<i>Maritimes</i>		VE3AQN	9603
VE1DR	18,876	VE3FHQ	5472
VE1EK	12,390	VE3FDP	4860
<i>Quebec</i>		VE3FES	4702
VE2WA	68,904	VE3FUP	4556
VE2ATU	59,130	VE3ETX	3888
VE2IZ	45,600	VE3BWD	3360
VE2ASL	43,320	VE3BWM	1156
VE2ROW	37,856	VE3BAC	966
VE2ATD	26,680	VE3NH	624
VE2BV	20,610	<i>Manitoba</i>	
VE2AWR	20,444	VE4ZX	48,495
VE2ABT	7676	VE40X	35,505
VE2BLQ	6464	VE4KZ	9360
VE2BUW	5628	VE4UM	3526
VE2ATT	5544	VE4JT	1560
VE2CP	2100	<i>Saskatchewan</i>	
<i>Ontario</i>		VE5UF	79,732
VE3DUS	110,532	VE5T	41,250
VE3AVV	85,200	VE5VP	38,485
VE3BJK	69,680	VE5JU	15,560
VE3EMA	65,664	<i>Alberta</i>	
VE3FCU	65,268	VE6MC	68,556
VE3BOG	57,420	VE6GX	23,247
VE3FIE	47,112	VE6ABV	18,990
VE3OCB	45,450	VE6TK	6798
VE3DDU	42,912	<i>British Columbia</i>	
VE3XXD	42,224	VE7BDP	52,326
VE3DH	29,886	VE7GN	43,089
VE3FLN	29,376	VE7AGX	26,508
VE3MI	25,413	VE7ASI	9975
VE3CKW	16,590	VE7ZO	5860
VE3DJE	14,820	VE7M	7134
VE3BWR	14,680	VE7BLO	6696
VE3BUR	13,209	VE7BCJ	30
VE3EMG	10,404		

SOUTHWEST'S MOST COMPLETE HAM STOCK

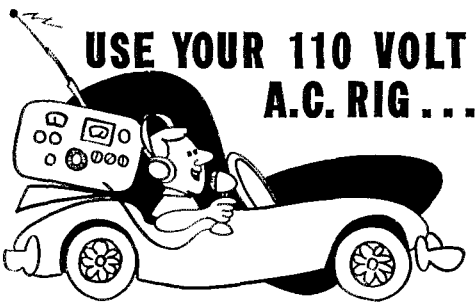
SAVE
15%

ADDITIONAL DISCOUNT ON
ALL USED AM EQUIPMENT
DURING
MARCH-APRIL

Write for complete list

Radio, Inc.

1000 S. MAIN • LUTHER 7-9124
TULSA 19, OKLAHOMA



IN YOUR CAR!!!

WITH A
TERADO POWER INVERTER!

Plenty of A.C. Power for your A.C. Transmitter and Receiver is available from your car, boat or plane battery. Just add a Terado inverter to change the 12 volt direct current to 110 volt, 60 cycle alternating current, stable within 1/2 cycle, in spite of changing input or load. Also operates tape recorders, signal generators, grid dippers, tube testers, etc. Models from 15 to 600 watts, both vibrator and transistor types.



See your electronic parts jobber, or write:

terado CORPORATION

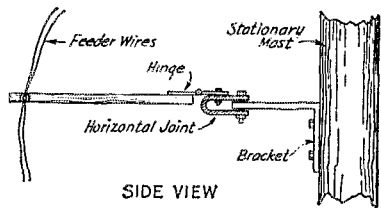
1061 Raymond Avenue, St. Paul, Minn. 55108
In Canada, Atlas Radio Corp., Ltd., Toronto, Ont.



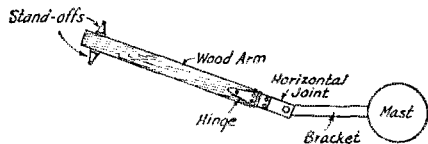
25 Years Ago
this month

March 1940

... By Goodman, W1JPE (now W1DX) was at it again in the ARRL Lab pumping out equipment and copy. This month, By came up with "A Practical 112-Mc. Converter," which used Loktal tubes instead of the conventional acorn tubes. J. L. Hill, W9ZWW, had an article "A 'Modified' Dickert Noise Limiter," which presented improvements in a circuit particularly adapted for mobile applications. Pioneering work in the field of radio-controlled model airplanes appeared in March 1940, *QST*. Bill Good, W8IFD, reported the details of a radio-controlled model airplane that had made over one hundred successful flights. Other technical articles included, "The Ionosphere and Radio Transmission," "One Meter for Multi-Stage Transmitters," by D. L. Warner, W9IBC, and a high-voltage power supply full of safety features for use with home-made television receivers, "A Design for Living — With Television," by Philip Rosenblatt, W2AKF. ... A 12th ARRL DX Contest warning was posted this month, reminding U. S. operators that disqualification would occur if contacts were made with countries on the European continent (because of a self-imposed amateur black-out on Europeans as a precaution necessary in view of the war). ... An interesting and useful (even today) Hint & Kink by Harold Ulmer, W6EPM showed a way to prevent tangling of open-wire feeders with rotatable antennas.



SIDE VIEW



TOP VIEW

Arrangement used by W6EPM to prevent tangling of open-wire feeders when used with a rotatable antenna.

... There were only eight names listed in the "Silent Keys" column twenty five years ago. Compare this with 70 names in this 1965 issue. **QST**

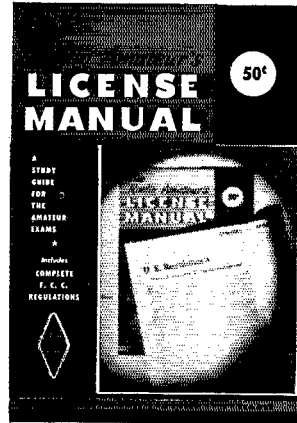
CHEMIST

- Ph. D. from Swiss University, is looking for a job in the United States. Age 41 years, experienced. Citizen of Switzerland and U.S. 11 years in the United States.

Dr. Walter A. Tschannen, WA2PID
Untere Bahnhofstrasse 23
8340 Hinwil/ZH, Switzerland

UP TO DATE . . .

THE 53rd edition of the Radio Amateur's LICENSE MANUAL is complete, up to date and revised to include latest information on amateur licensing. Contains information on questions included in FCC amateur exams, all the dope on frequency privileges for the various classes of amateur licenses, the full text of RACES regs, details of the U.S.-Canada Reciprocal Operating Agreement, code-practice schedules, and the current FCC examination schedule. A useful manual for all, newcomer and oldtimer alike. Always up to date.



Order YOUR copy today

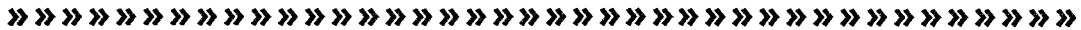
PRICE **50¢** POSTPAID


ALL the dope between two covers . . . complete and easy to understand.

- NOVICE • CONDITIONAL
- TECHNICIAN • GENERAL
- EXTRA-CLASS

The AMERICAN RADIO RELAY LEAGUE, Inc.

NEWINGTON, CONN. 06111





Telrex "BALUN" FED INVERTED "V" ANTENNA KITS

SIMPLE-TO-INSTALL, HI-PERFORMANCE ANTENNA SYSTEMS:

1 KW P.E.P. Mono-Band Kit... 1KMB1V/81K... \$19.95*


2 KW P.E.P. Mono-Band Kit... 2KMB1V/81K... \$22.95*

*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 Pat. 2,576,929

Write for TELREX PL 65

TELREX LABORATORIES
ASBURY PARK, NEW JERSEY



Before you buy or trade, wire, write, call or drop in to see WARD, W2FEU

Be Sure to Write for Our Latest Used List

ADIRONDACK RADIO SUPPLY

185-191 W. Main St., Amsterdam, N. Y.

Phone: VICTOR 2-8350

Ward J. Hinkle, Owner

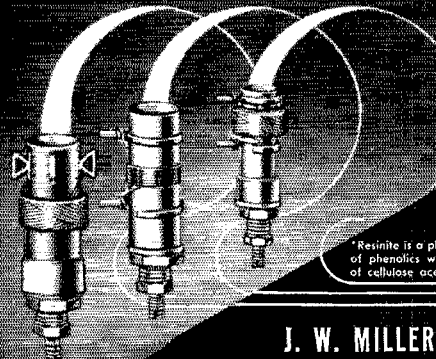
URGENT, NEED IMMEDIATELY

Very high prices paid. Freight prepaid. AN/GRC; PRC; APR; APN; ARC; ALT; URM; UPM; TS- We also buy all military and commercial test, radar, and communication equipment.

Call collect. It costs you nothing to hear our high offer.

SPACE ELECTRONICS 4178 Park Ave., Bronx, N.Y.

(212) CY 9-0300



***RESINITE ADJUSTABLE R. F. COILS**

— 20A00ORBI (form only): 1/4" dia. x 13/16" long. Coils wound on this form have an inductance range of .079 uh to 1.25 mh.


— 21A00ORBI (form only): 3/8" dia. x 1 1/8" long. Coils wound on this form have an inductance range of 0.68 uh to 12.5 mh.

— 22A00ORBI (form only): 1/2" dia. x 1 7/8" long. Coils wound on this form have an inductance range of 5.70 uh to 125.0 mh.

*Resinite is a phenolic impregnated tubing which combines the mechanical and dielectric advantages of phenolics with the high dielectric strength, moisture resistance, and non-corrosive properties of cellulose acetate. Resinite can be certified to MIL-P-798 Type P8C.

J. W. MILLER COMPANY 5917 South Main St., Los Angeles 3, Calif.

(AVAILABLE THROUGH YOUR LOCAL DISTRIBUTOR)



CONVERTER SALE

New series 300 with 3 VHF-UHF transistors, crystal-controlled oscillator, tuned R.F. stage and low noise mixer. One microvolt sensitivity. More than 30 high quality parts carefully assembled and tested. Measures only $3\frac{1}{2}'' \times 2\frac{1}{2}'' \times 2\frac{1}{2}''$. Operates at 12 volts DC 4-5 ma. Available in the following models:

	Model	Input mc.	Output mc.	Price
2M	300-D	144-148	50-54	\$12.95 ppd.
	300-E	144-145	.6-1.6	\$12.95 ppd.
	300-F	144-146	28-30	\$12.95 ppd.
	300-Q	144-148	14-18	\$12.95 ppd.
6M	300-B	50-51	.6-1.6	\$10.95 ppd.
	300-C	50-54	14-18	\$10.95 ppd.
	300-J	50-52	28-30	\$10.95 ppd.
20M	300-G	14.0-14.35	1.0-1.35	\$10.95 ppd.
CB	300-A	26.965-27.255	1.0-1.29	\$10.95 ppd.
WWV	300-H	5.0	1.0	\$11.95 ppd.
Int'l.	300-I	9.0-10.0	.6-1.6	\$11.95 ppd.
CHU	300-K	7.3	1.0	\$11.95 ppd.
CHU	300-L	3.35	1.0	\$11.95 ppd.
Marine	300-M	2.3	.6-1.6	\$11.95 ppd.
Aircraft	300-N4	121-122	.6-1.6	\$13.95 ppd.
	300-N5	122-123	.6-1.6	\$13.95 ppd.
Fire, Police etc.	300-P	155-156	.6-1.6	\$13.95 ppd.
CUSTOM MADE	300-X	Choice of 1 input freq. and 1 output freq. between .6 mc. and 160 mc.		\$14.95 ppd.

All above converters are supplied with Motorola type connectors. For two SO-239 connectors instead, add 75¢.

For prompt shipment of stock models include postal money order or cashier's check. Personal checks must clear before shipment. For C.O.D.'s include 20% deposit. New York City residents add 4% sales tax.

VANGUARD ELECTRONIC LABS

Dept. S-3

190-48-99th Ave.

Hollis 23, N. Y.

New from Philco: an up-to-date handbook for **SSB** Communications

Comprehensive treatment of SSB Systems for the Radio Amateur. Sections of SSB Modulation, Transmitter Theory, Receiver Theory, and much more. Price, only \$4.50

Send orders with remittance to:
PHILCO TECHREP DIVISION DEPT LQ
P. O. BOX 10, FORT WASH., PA. 19034

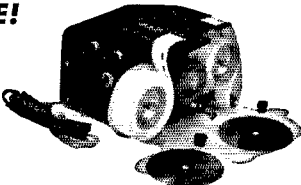
LEARN CODE!

SPEED UP Your
RECEIVING
with G-C

Automatic Sender

Type S

\$32.00 Postpaid in
U. S. A.



Housed in Aluminum Case. Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycles A.C.

Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50¢ per roll.

GARDINER & COMPANY

STRATFORD

NEW JERSEY

Single-Band Combos

(Continued from page 40)

hoped that at least some of the ideas involved will be an incentive toward the building of equipment for short-range work that will go a long way toward reducing QRM on the lower-frequency bands, leaving them free for longer-haul work.

The photographs, which we have relied upon heavily to tell the story, are the product of Irv Gubin, a technician at WCAU, who plies his amateur standings in the field of photography, rather than radio. QST

Merit products are not currently listed by the major catalog houses, but are handled through numerous local distributors. If you cannot locate one of these distributors, it is suggested that you contact the manufacturer (Merit Coil & Transformer Co., 2027 Sherman St., Box 2048, Hollywood, Florida, 33020) who may supply the transformer direct, or refer you to the nearest distributor. Suitable equivalents are Thordarson-Meisner 26R117, 26R149 and 26R148. However, these, as well as the Merit transformer, are replacements for specific TV receivers and may require ordering direct from the manufacturer, or through a distributor. It is also possible that these transformers, or close equivalents, may be carried by local TV repair shops. As a last resort, it may be possible to shuffle the components around a bit on the chassis to make room for an additional 6.3 volt, 3-amp. (min.) filament transformer, to be connected in series with the 6.3-volt winding of the power transformer to provide the necessary 12 volts.

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

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

WA2WLN WA8LRM
WB2AEK WA9AJF
K3AOH K0FNY
K4HAK WA0IAK
K4LTA K0VHP
WN4SWY VE7AZ
W5ETF CE0AG
W5KZQ IT1TAI
WB6HJW OA5AD
K6LKM SV0WEE



SWITCH TO SAFETY!



Can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Big trades, easy terms. Used bargains
VAN SICKLE RADIO SUPPLY CO.
Gene Van Sickle, W9KJF, Owner
4131 N. Keystone Ave.
On the northeast side of
Indianapolis 5, Indiana

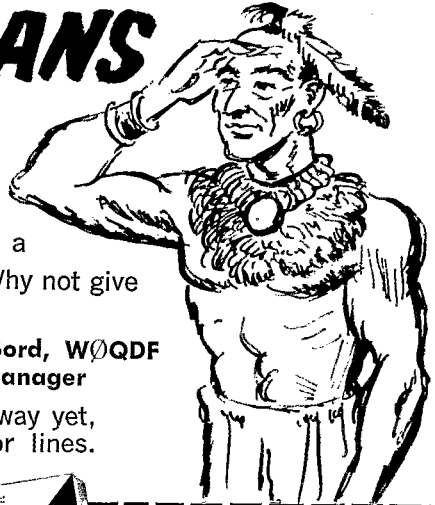
LAST ^{OF} THE MOHICANS

The amateur radio parts business isn't in quite as bad shape as the Mohicans were, but darned near!

There are very few distributors left who handle a line of radio parts catering to the ham. We do! Why not give us a try!

73, Bill DuBord, W0QDF
Sales Manager

P. S. We aren't giving ham equipment away yet, but still trading high on all major lines.



**CLIP COUPON AND MAIL
TODAY FOR FREE CATALOG**

Catalogs mailed in continental U.S. only.

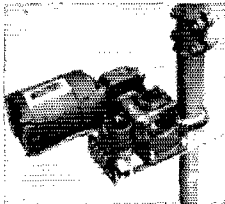
WALTER ASHE RADIO CO.

Land Line 314 Chestnut 1-1125 Dept. Q-3-5
1125 Pine Street St. Louis, Missouri 63101



MAIL TODAY TO:
WALTER ASHE RADIO CO.
1125 Pine St. Dept. Q-3-5
St. Louis 1, Missouri
Please rush me your new 1965 ham radio catalog.

NAME
ADDRESS
CITY ZONE STATE



TELREX ROTATOR-INDICATOR SYSTEM MODEL TS250-RIS
Most Feeds Thru Rotator
For Safe, Easier, Installation

- 1300 IN./LBS ROTATION TORQUE
- SELF LOCKING BY STURDY WORM GEARS
- SELSYN AZIMUTH INDICATION
- ACCOMMODATES 2" O.D. MASTING
- MALLEABLE CAST MASTING CLAMP SUPPLIED
- OUTPUT SPEED APPROX. 1 RPM
- WILL FIT INTO OR ONTO A 6" SIDED TOWER

A Really Sturdy
**ROTATOR-INDICATOR
SYSTEM**—
Not a Modified
TV Rotator!
Designed To
Out-Perform, Outlast!

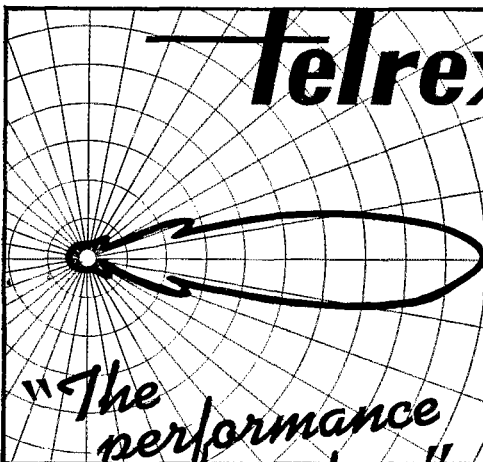
\$2500 F.O.B.

ALSO:

- TS325-RIS \$325.00
- TS435-RIS \$435.00
- TS535-RIS \$535.00
- TS585-RIS \$585.00



Write for FREE PL65 Describing Rotators and Antennas **TELREX LABS.** ASBURY PARK, N.J.



"The performance with a line"

**MATERIAL DIFFERENCE
—IN USE IN 135 LANDS!**

"BEAMED-POWER" ANTENNAS and ANTENNA SYSTEMS

VISIT US AT
BOOTH 1316
IEEE SHOW!

The Choice of the Discriminating
Communication Engineer . . . the
Man who Never Settles for Any-
thing Less than THE-VERY-BEST!

You too—can enjoy world renowned TELREX performance and value! Send for PL65 condensed data and pricing catalog, describing the lowest priced antennas on the market, in relation to materials and performance! Expanded data sheets—including your favorite band, are also available.

ANTENNAS SINCE 1921 **telrex** LABORATORIES COMMUNICATION SYSTEMS
ASBURY PARK 40, NEW JERSEY, U.S.A.

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested that 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 issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

HAMVENTION Notice! The Dayton Amateur Radio Association invites you to the 14th Annual Dayton Hamvention Saturday, April 10, 1965. Wampler's Ballarena, Dayton, Ohio. Banquet Speaker, Bill Leonard of CBS. Technical Sessions: DX, SSB, Antennas, RTTY, and Army MARS; Hidden Transmitter Hunt, Exhibits, women's activities. F.C.C. Exam, general class only. Make examination application in advance to Engineer in Charge at your local F.C.C. office. F.C.C. will issue examination papers. Friday evening, April 9, Exhibits: Saturday Registration 07:00-17:00; Exhibits 07:30-18:00; Forums 09:00-17:00; Banquet 19:00. For information, write Dayton Hamvention, Dept. A, Box 44, Dayton, Ohio, 45401.

MIDLAND (Texas) Amateur Radio Club Annual St. Patrick's Day Swapfest, March 21st. Inquiries invited, 510 Midland Savings Building, Midland, Texas 79704.

AUCTIONFEST, Ft. Lauderdale, Fla., Saturday, Mar. 6, Armory, SW 4th Ave. at SW 44th St (Rte. 84), Opens 8 A.M. Schmidt, W4NYF, Chm., Broward Amateur Radio Club.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: military or industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NORMandy 8-8262.

WANTED: All types of aircraft on ground ratios, 17L 618F or S 388, 390, GRC, PRC, 511, RVX, Collins linear amplifier, Type 204; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For best cash offer contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

SELL swap or buy ancient radio set and parts, magazines, Lavery, 118 N. Wycombe, Lansdowne, Penna.

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 For personal collection: Benwood Bakelite Rotary Gap; antique gear dating back to 1915 or earlier. Spot cash! W0ZAB, 4 Williamsburg, St. Louis 41, Mo.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

CASH For Callbooks. For private collection. U.S. Government Callbooks before 1927. Radio Amateur Callbook Magazine 1942 wanted. W8EF, 801 Lake Shore Road, Grosse Pointe 36, Mich.

COLLINS 32S-1 xmtx, \$300.00. J. F. Young, W5HXW, 1234 Glen Cove, Richardson, Texas. Tel. 14-235-6927.

304TL tubes wanted. Also other xmtx and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

QSLs??? SWLSS?? WPE?? Largest variety samples 25¢. DeLuxe 35¢ (refunded). Sakkers, W8DEJ, P.O. Box 218, Holland, Michigan (Gospel QSL samples 25¢).

QSLs, Modern designs. Call stamped in gold. Free samples. American Roll Leaf Mfg. Co., 1629 Northern Blvd., Roslyn, N.Y.

C. FRITZ QSL's. Sorry, fellows, due to pedestrian (mc) auto accident, I am on my back for 3 months. All damage to legs—first reports are encouraging. See you later!

QSLs, Twenty exclusive designs in 3 colors. Rush \$3.00 for 100 of \$5.00 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSLs, Samples 20¢. QSL Press, Box 281, Oak Park, Illinois, 60433.

QSLs "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSLs-SMS, Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

QSLs "Frier" Harvard St. Schenectady, N.Y. 12304. Large "Clip and Design" Catalog with samples, 25¢.

DELUXE QSLs, Petty, W2HAZ, Petty Printing Co., Inc., 1702 5th, Trenton, N.J. 08638. Samples, 10¢.

QSL Stamp and Call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs. See our new "Eye-Binder" cards, Extra high visibility. Samples 25¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

QSLs, SWLs XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, eye-enticing, sedate, fatabolous, DX-attracting, prototypical, snazy, unparagoned cards (Wow!). Rogers, KOAAB, 961 Arcade St., St. Paul 6, Minn.

QSLs-SWLs 3-colors, 100 \$2.00. Samples dime. Bob Garra, 414 Mahoning St., Leighton, Penn.

QSLs, 100 for \$3.00, 28 new drawings. Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSLs, Samples 10¢. Wildcat Press (W6CMN, Bill), 6707 Beck Ave., North Hollywood, Calif. 91606.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio

QSLs Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLs until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL, SWLs, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs: Economy, 2 color, 125 for \$3.75. Samples Free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLs, Samples Free. Blantons, Box 7064, Akron, Ohio 44306.

ZIP Code Rubber Stamp, Call, name, address, with ink pad, \$1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLs, Samples 25¢. Rubber stamps; name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLs 300 for \$4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ineside, Ill. 60041.

QSLs 3-color glossy, 100, \$4.50. Rubers Vari-Typing Service. Free samples Thomas St. Riegel Ridge, Milford, N.J.

QSLs Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Id decals. K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLs \$2.50 per 100. Free samples and catalog. Gartin, Box 51Q, Jutland, N.J.

1/2" Call QSLs \$2.40/100, \$2.90 (2 sizes). Samples. Garipey, 2624 Kromer, Ft. Wayne, Ind.

3-D QSL Cards have that prestige look, with glittering colors and metallics in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable), 3-D QSL Co., Monson 2, Mass.

QSLs-100 3-color glossy \$3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7573, Kansas City, Mo. 64114.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CUSTOMIZED QSLs with your autographed photo. Dime brings sample. Pic-U-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER Stamps, 3-line, \$1.00. Andrew Travis, 2002 West 8th, Austin, Texas, 78703.

RUBBER STAMPS \$1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

PICTURE of your self, home equipment, etc. on QSL cards made from your photograph. 25¢—\$7.50 or 1000 \$14.99 ppd. Samples free. Write to Picnic Cards, 129 Copeland Ave., La Crosse, Wis. 54603.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 Laverne Ave., Chicago, Illinois, 60639.

PICTURE QSL Cards of your shack, etc. Made from your photograph, 100, \$14.50. Also unusual non-picture designs. Samples 20¢. Raun's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLs New cartoons. Top quality, fast service. Samples 20¢. Ed's Press, 3232 LeMoine, Chicago, Ill. 60651.

QSLs. Free samples. Attractive designs. Quick service. W7IIZ Press, Box 183, Springfield, Oregon.

ATTRACTIVE QSLs: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSLs. Free samples. WA6QAY Press, 3363 Wicopee Place, San Diego, Calif. 92117.

QSLs. Finest. Filmmatters, Box 304, Martins Ferry, Ohio.

SELECTED QSL samples 10¢. Tom, W6OHE, P.O. Box 2411, San Bernardino, Calif.

PLASTIC Holder frames and displays 20 QSL cards, 3 for \$1.00 or 10 for \$3.00. Prepaid. Teapaco, Box 198, Gallatin, Tenn.

QSLs, Sharp, dime. Filmcrafters, Box 1304, Martins Ferry, Ohio.

QSLs, SWLs, 3 & 4 colors 100, \$2.00. Samples dime. Garra, W3UOL, Leighton, Penna.

QSLs Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE, W2JME Edgewater, Fla. 32032.

QSLs, Free samples, WA6QAP Press, 3363 Wicopee Place, San Diego, Calif. 92117.

QSLs; Y.R.L. Specials, engraved badges, reasonable. Samples 10¢. W2DJH Press, Warrensburg, N.Y.

QSLs Large selection, including photos, rainbows, glossy stocks, cuts, etc. Fast service. Samples dime. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

QSLs, Samples, dime. Printer, Corwith, Iowa.

GOLDEN Call QSL (only QSL) crafted by Samco for 1965. Sample 10¢. QSL, Box 203, Wynantskill, N.Y. 12198.

QUALITY QSLs. New designs monthly. Samples 10¢, 25¢, 50¢. Savorly, 172 Roosevelt, Weymouth, Mass.

QSL-SWLs. Photo and art. special cards. Samples 10¢. K. Kidd, Rd. 1, Box 254, Telford, Penna.

CANADIANS! Spanish \$200, excellent condition. Wanted: 110 volt AC generator, min. 500 watts. VE3CCB, 1593 Dale St., London, Ont., Canada.

CANADIANS! KWM-1 AC supply, \$400; DX-100, \$175; Cheyenne, Comanche, DC supply, \$350; Beam Telrex 20-15-10 as is, \$60. VE2IU, 675 Fontainebleau, Duvernay Mt 1, 40, P.Q., Canada.

FOR Sale: Model 19 RTTY composite set (see Jan. 1965 QST, p. 15); TA33SR, AR22 and 40 ft. tower, NCXD transistor power supply for NCX-3 or 5, TMC CFA RTTY receiving converter, also other gear. Full details on request from: VO1EC, Kennedy, Box 863, St. John's, Nfld., Canada.

TUBES: Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

WANTED: For personal collection: QST, May 1916. W1CUT, 18 Mohawk Dr., Unionville, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc. 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL5-2615.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12, Call 212-WALKER-5-7000.

COLLINS Amateur equipment bought, sold and serviced. Paul A. Reveal, W2DC, 129 Midland Ave., Glen Ridge, N.J.

WANTED: Tubes, all types, write or phone W2QNV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. Garfield Area code 201-471-2020.

CASH For Your Gear. We buy, sell and trade. Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

We buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., P.O. Box 516, 199 Front, Hemstead, N.Y.

KWM-2 with 516 F ac, supply, \$900; 30L-1, \$400. Factory checked and aligned, cables and manuals. Condition excellent. Ted Brix, 5373 N. Van Ness Blvd., Fresno 5, Calif.

ELECTRONIC Tubes Top Brands Sold at substantial savings! (Minimum Order \$15.00). Authorized GE, Amperex, Dumont & Eimac Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only-Commercial Quantities). Metropolitan Supply Corp., 445 Park Avenue South, New York, N.Y. 10016, 212-MU 6-2834

FOR Sale: Back issues QST and CQ, Large S.A.E. for list. Will swap. W2TAM, 140 Summit Ave., West Trenton, N.J. 08628.

CRYSTAL Bargains. Free List. Nat Stinnette, W4AYV, Umattilla, Fla. 32784.

RTTY Gear for sale. Write for list, 88 or 44 mhz Toroids, Five for \$1.75 ppd, Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

MECHANICAL Filter wanted, 800 cycles for 75A-4. W2DFP 100V Central Electronics. The transmitter with everything. Excvt condx, \$399, K2JZW, Nussbacher, 212-332-5870, 2750 Homcrest Ave., Brooklyn 35, N.Y.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash Budget, Graham Radio, Dept. A, Reading, Mass. 01867, Tel: 944-4000.

WILL Buy pre-1925 QSTs, etc., etc. State condition and price. W6ISO, 45 Laurel Ave., Atherton, Calif. 94025.

MINT LaFayette HE45-B, \$79, K1IHK.

FREE! Giant Bargain Catalog on transistors, diodes, rectifiers, components, Poly-Paks, P.O. Box 942Q, Lynnfield, Mass.

FOR Sale: 75A-4 rcvr, Ser. No. 4908, with matching speaker, in perf. condx. Johnson Ranger with PIT and matching Astatic mike; Hy-Gain Tribander beam; new Signal Sentry. Best offer takes any or all. Charlie Nash, K0YXZ, Atwood, Kansas, Phone MAIn 6-3155.

INEXPENSIVE Sideband Pacemaker, \$195, 100-Amp, alternator, \$75. Free delivery Maine. Nelson Bigelow, Box 535, Camden, Me.

CENTRAL ELECTRONICS 200-V, like new, \$495; new Drake 7-B with calibrator, \$245.00. Elvin Miller, 3845 Kipling Ave., So., Minneapolis, Minn.

GALAXY V, \$400; Galaxy III, \$299.00; ac power supply, \$65.00; remote VFO, \$30. All new, in unopened factory cartons. Bookstore, 5824 N.W. 58th St., Oklahoma City, Okla. 73122.

TETRONIX Model 575 transistor curve-tracer, General Radio 605-B lab. sig. acn., Ballantine 314 VTVM, RCA lab. sig. gen. LG-22; RCA UHF lab sig. gen. LG22, L&N Wheatstone bridge mod. 4735 and 4232B, Dekatron DT 10A decade trans, Weston DC lab meters and others. Send for list and specs. D. Mills, 10 Cottonwood Dr., Huntington, N.Y. Tel: 516-HA7-8791.

INTERESTING Offers! Ham's trading paper, 12 issues, \$1.00. Sample free. "Equipment Exchange Bulletin", Sycamore, Ill.

HOOBT Reception, 1.5-30 megacycle SK-20 Presetector kit, \$18.98. Boost modulation, AAA-1 Clipper-Filter kit, \$10.99. Reduce noise, NC-7 noisefilter, IF wired, \$4.49. Postpaid! Literature free, Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

CLEANING House! Like-new Lampkin freq. meter 105B ser., No. 5145, \$165.00; Triplett GM tube-checker model 3423, \$75.00; Simpson 260 adapters, models 650 and 656, \$30. Cipher V tape recorder, \$40. Eddystone slow motion dial, \$14. Bob Welch, K2BXN, Box 427, Branchville, N.J.

GETTING The new NCX-5. Would like to sell my mint condx NCX-3 for \$265. WA2LIM, tel: 212-461-1779.

SELL: 75S-3B w/500 cycle mech. filter, 32S-3, 516F-2, all as new condx, less than 6 months old, works. \$1200. Will deliver within 500 miles or 1 day shipping in continental U.S. G. School, W0IVY, P.O. Box 32, Silver Bay, Minn. Phone (218) 226-4133.

WANTED: C.E. MM-2, receiving adaptors; HRO-60 E. AA, AB, coils, accessories; Japanese Collins, RCA mechanical filters; FT-241 Channels 326-30; old electronics catalogs; LP-5, LM-10 manuals. WB2FIL, RD-1, Box 315, Old Bridge, N.J.

SELL TR-3 and D.C. supply. W9BIU, Fred-Gwyer, Box 236, La Grange, Ill.

FOR Sale cheap, QSTs or CQs, any quantity. Send your list for quotation. Cash for Callbooks before 1942. Want early radio gear and publications. Erv Rasmussen, Box 612, Redwood City, Calif.

SALE: HT-32 xmtr. Exclnt condx, almost new. Must sell. Make offer to Goldenson, Sunny Ridge Road, Harrison, N.Y.

KEYER-Monitor keys your transmitter safely, for months on two, internal flashlight cells. Monitor keys with crisp speaker-tone. Sealed relay contacts for long life. Keys beyond 100 WPM. Attractive cabinet has front key-jack, tone/off control, and rear keying terminals. \$18.95. PP USA. Electro-Signal Lab, 782 Broad St., Weymouth, Mass. 02189.

FOR Sale: Plate transformers 3600-0-3600 VAC @ 1000 ma, CCS, with 120/240 VAC primary, one year unconditional guarantee. \$35. 4-1000A filament transformers 3 secondaries 5.0 VAC @ 2 amps, 20KV ins. \$25. Peter W. Dahl Co., 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel: 922-7618

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. PL-12 and socket, \$95; CDR TR-44, \$50; SR-160, \$290; Hy-Gain TH-4, \$85. Used less than 5 hours. HW-12 with HP-23 and HP-13, \$195. F.o.b. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

MUST Sell QST in binders complete from 1951 through 1964 and several from 1946 through 1951. Ideal for club or individual library. Best offer. Prefer New England sale. Ray Higgs, K1FLG, Buena Vista St., Unionville, Conn.

WANTED: FR-2409 bandpass filter. State price. Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

KWS-1, \$700. 75A-4, \$350. TH-4 Beam, \$60, plus other items. Take all \$1000.00. You pick up. K9GWC, 19 Elm St., Glenview, Ill.

HEARING Aids: If you are hard of hearing now you can get that QSL without ORMING the household. Free information. Write J. M. Enterprises, Box 815, Longwood, Fla.

24 HOUR kit for 12-hour Tymeter (or any clock); GMT-local kit. Either kit, \$1.00, both, \$1.75. Bob May, Box 270, Jonesboro, Tenn.

RANGER II, factory-wired, PTT, in exclnt condx; \$235.00. K1IGO.

FOR sale: RME Model DB-22A RF amplifier/Presetector, used but in gud condx, \$15.00; oscilloscope, OS-11F/FGC-5, like new, \$10.00; Silver Mod. 906 Signal Generator, 9-170 Mc, gud condx, \$20.00; 2 ea. type 5894 VHF/UHF tubes, new, similar to AX9903, \$30.00; 2 ea. 4-1000A tubes, new one \$80, used 50 hours, \$25.00; 1 ea. APR-1 tuning head, TN-3, 300/1000 Mcs, TN-1 30-90 mcs., both units, \$10.00. Stan Rozala, W3GFT, 6519 76th St., Cabin John 14, Maryland.

HALLICRAFTERS 6 meter transverter HA-6 and PL-26 power supply, also cavity resonator, \$135.00. New condx. Will ship. George Snow, Jr., Box 105, Callery, Penna. 16024.

GALAXY III Transceiver with power supply, new condition. F.o.b. Lincoln, Nebraska. \$300. Dean Hofer, W0LXP, 1040 So. 18th St., Lincoln, Neb.

FOR Sale: 75S-1, \$275; KWM-2 (unused), \$875.00; 32S-1, \$393.00; 75A-1, \$145.00; Central 200-V, \$449; 75A-2, \$190.00; 516-F, 75A-3, \$235.00; told 12 V DC supp. for KWM-2) \$125.00. Cecil White, W5LVF, 1133 Canterbury Ct., Dallas Texas.

COMPLETE 6-meter station HE-45B, halo, machine transformer, Mayerick filter, best price over \$75.00. Charles Lutz, K2OJR, 2 Dutch Lane, Spring Valley, N.Y.

TELETYPE Model 15 sync. w/tube, p.s., worked Germany, Africa, etc. \$100. Facsimile transceiver, \$150; 75A-4, \$423; electronic switch for VFO or Astart w/p.s. \$10; HT-33, \$300; (sell or trade); Yashica U-Matic 8 mm zoom, \$65. Bolex H16 3 lenses, \$115 F.2 SLR Kineflex F-X, \$50. All perfect. K2DCY, Perera, 410 Riverside Dr., N.Y.C. 10025.

POTENT 400w GG class B linear, 2-811As. Self-cont. p/s with Variac in 32V-3 cabinet. Fully metered, 80-10 mtrs. perfect. \$85.00. K8EHD, 712 E. Sandusky St., Findlay, Ohio.

DX-60, \$75.00; Knight K-100, \$85.00. Both in excellent condx. K9TVC.

SELL: Surplus AN/SRR-13A 2 to 32 Mcs. receiver, built-in 115 VAC, crystal calibrator, 29 tubes, crystal lattice filters, 6A-5, 6X5, manual, \$400. WA4QPA, 8249 Simons Dr., Norfolk, Va. 23505.

EXCELLENT Condition: HQ-170, DX 100B and SB-10. HQ-170 has recently been aligned and the Heath gear was wired and aligned by an electrical engineer. The DX-100B has grid block keying, 6:1 gear drive on VFO, spotting switch and Heath approved ceramic switches to change from AM to CW to SSB without changing any external coax connections. All for \$395.00. No trades. Will ship prepaid in U.S. G. Krumacher, K4T5U, 3345 Pasley Ave., Roanoke, Va.

COLLINS 312BI (SWR, spkr) \$65.00; KWM-1 PTO, \$20; cabinet racks 26-77, \$6.00-\$15.00; 6 mtr. RX: Ameco Navigator receiver, ARC 5 IF, p/s, switch and spkr, custom assembled on 7 x 19 panel, \$70 4 KV, HD supply, with 5 KVA Variac, 48 mfd. paper, \$110 (pick-up); HDVL coils, etc. Pkg cheap; 120 mgd 3 kv, 2 for \$70; xfrm welder, complete, \$18; Hohner folding orkan \$50 (trade?), J. Gillson, 109 Mullin Road, Wilmington, Del. 19809.

SX-101A, like new with R-47 spkr, \$220; Collins 32V-2, \$160; TA-33 Jr. with mast and 100 ft. RG-8/U, \$60; Heath HM-11 reflected pwr. meter, \$10; Dow-key DK6-GZC, \$8; Hornet V-75 vertical with 50 ft. RG-8/U, \$8; entire station \$420.00. Also, Heath HG-10 VFO w/p.s. \$30; Linolium top steel desk, \$20. Steve Ames, K3MZZ, 6909 Brook Mill Rd., Baltimore, Md. 21215.

MODEL S-108 Hallcrafters receiver and manual, like new condx, \$75.00; old Navy transceiver (2 807s in final), mike and power converter; make offer; cash, tape recorder, tower or beam. H. E. Holmgers, 1129 Goodrich, St. Paul 55105 Minn.

SALE: Telrex 3-element 20-meter beam, best offer; Telrex 1100 rotator with selenium indicator, best offer; PE-103-A dynamotor 6/12 volt, \$15. All in exclnt condx. K3CMN, 3905 S. 13th St., Arlington, Va. 22204.

DRIFTFLESS VFO, \$2.50! Precision tuned circuit with smooth vernier dial, ceramic coil form, straight-line frequency capacitor, in aluminum case. Instructions. Many available! Slow tuning rate, \$1.00 extra. Please include postage. Arnold Olean, K1WHT, Route 111, Monroe, Conn.

SELL Six meter transceiver HE-45A with HE-61A VFO, \$80. W1VLC, George Stronach, 13 Evans Drive, Simsbury, Conn.

TRADE: 75A-3 receiver for Ranger or Valiant transmitter. K2JFU, Box 384, Milford, N.J. 08848.

SELL: SX-71 receiver, \$100; DX-100B and SB-10, both for \$200. All in A-1 condition. Homer Holloway, K8YOD, Buckingham, W. Va.

FOR Sale: Collins 75A3 in gnd condx with 3,1 and 6 Kc filters and manual, \$300. W8FOT, John R. Borley, 3097 Dresden Rd., Zaniesville, Ohio.

SELLING Heathkit Marauder, recently realigned, new 6146B finals, \$350; HQ-170A, \$200; Shure 444 mike, \$20. Harvey Horn, WB2NMN, Quaker Ridge Rd., Brookville, L.I., N.Y., Tel: 516-MA6-0819.

FOR Sale: SX-111, just reconditioned, \$190; pair 813s, never used, \$25.00; 810, \$15.00; Triaxial gamma match for Hy-Gain 152 TG beam, \$10; 8 inch Dynascope reflector, electric clock drive, telescope like new, \$400. WA8DXX, 619 N. Sugar St., Celina, Ohio.

WANTED: Drake DC-3 power supply. WA2FAS, 221 Clark St., Hillside, N.J. 07205.

SELL: Gonset Comm. IV, 6-meter communicator, "new", \$300. Want: 2-meter rig. Milt Long, WA8LDR, Box 255, Wooster, Ohio.

DRAKE TR-3 with mobile supply and Webster Bandspanner ant., complete with base and springs. All new, never used, in original cartons. Will ship First \$550.00 plus all. K. H. Wiley, 411 S. Valerio St., Santa Barbara, Calif.

FOR Sale: Going mobile. Perfect condx: Apache xmt, \$150; NC-300 with base, \$150.00; Hickok tube tester, \$95. 5 in. 5 mc scope, \$35.00; sweep generator, \$25. WA6YCP, Mengel, 819 Ticonderoga, Sunnyvale, Calif. Phone 739-0426.

WANTED: Technical material GSR SSB adapter. W8ODI, 1453 Bryn Mawr Dr., Dayton, Ohio 45406.

SELL: Hallcrafters SR-150, all-band SSB/CW transceiver with P-150 AC supply, Mint condx, \$450, complete. Joseph DiJberti, 4 Ehler Ct., Ridgefield Park, N.J. Tel: 488-5063.

BALTIMORE Area: National NC-300 with xtal calibrator and spkr; Heathkit DX-100 with time-sequence keying, Dow-Key relay, \$300. K3RMX, Steve Silberman, 8402 Topping Rd., Pikesville 8, Md.

"HOSS TRADER" Ed Moory can sell cheaper for cash because he operates in a small town with low overhead. New equipment: SB-33, \$259.00; 75A-3, \$495.00; Swan 400, \$319.00; New TA-33 beam and antenna, \$149.00; 75A-4, \$195.00; HT-37, \$289.00; SB-33 transceiver, \$125.00; 2-B, \$239.00. Demonstrator equipment, factory warranty; Swan 350, \$329.00; Drake R-4, \$299.00; SB-39, \$319.00; TR-3, \$429.00; Galaxy III, \$299.00; Hy-Gain TH-6 DX beam, \$99.00; KWM-2, \$839.00. Used equipment: 200-3, \$439.00; 100-3, \$389.00; 75A-4, \$195.00; HT-37, \$289.00; SB-33 transceiver, \$229.00; GSB-100, \$199.00; 20-A, \$59.00. Factory reconditioned KWS-1 and 75A-4 serial #5200, \$1095; HQ-170-C, \$189.00; 2-B, \$189.00; NCX-5, \$439.00. Terms. cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

SELL: Hammarlund HQ-180C with speaker, \$249.00; NC-183 RX, \$112.00; Eimac 4-65A, \$3.00 each, 5 in. speaker, round, \$1.25 each. Josef Schilling, 1409 S.W. 66th, Oklahoma City, Okla. 73159.

SELL: Factory-wired Vikings II, plus Model 122 VFO, manuals, \$110. Will deliver 100 miles radius. K9PZG, Rte 2, Box 263A, Janesville, Wis.

HT-37 in exclnt condx, for sale, \$290. Pick-up deal only, sry! Ecker, W2EKK, Box 644, RR 2, Martinsville, N.J. Tel: 201-EL-6-5802.

JOHNSON Viking Valiant, in exclnt condx, \$195.00. Bill Arnold, AN5-4610, Smithtown, N.Y.

HALLCRAFTERS SX-117 receiver with R48A speaker, in new condx, \$249.50. DB23 Preselector, \$19.50. W5ALA, 4531 Fairway, Dallas, Texas 75219.

COLLINS KWM-1 with 110 and 12-volt supplies, mobile rack and speaker console containing wattmeter, \$500. G. Gowans, 8833 Thames St., Springfield, Va.

HALLCRAFTERS SX-88 receiver, less than 250 hours use. Professionally realigned, \$375.00 or your best offer. Grad school expenses. Donald Krueck, 430 Hobart Ave., Haledon, N.J.

FOR Sale: 2 & 6 meter gear, transmitters Lettine 6 meter antennas 4-el. Telrex: Seneca 2 and 6 meter, Workshop 4 el.; transm & rcvr mod. 35 auto, rotor CDR rcvr Hammarlund 110, 24 ft. tower and 40 ft. 1/4" pipe; Drake filter, SWR Bridge; power supplies 1 100 mill 350V, 1 300 mill 350V; assorted fittings and adaptors; converter 2 meter; Heath VFO 6 meter operation, grid dip meter, 25 watt generator 110 V, new, assorted mikes, ant. trans. switch, 5 years back issues QST, 1956-1961, George H. Haines, W3JQZ, 2572 Salem Dr., Cornwallville Heights, Penna.

BOSTON Area: Ham residence for sale, late Spring 1965; motorized Tri-Ex 71 ft. tower, Telrex beams, underground coax in place; 7 rooms, Garrison Colonial style, 1 acre, details: W1UIM, W1SCS, Wayland, Mass. Tel: 617-358-4846.

MOSLEY 10-40 meter vertical, \$10. Astatic mike 200-S, \$8. K8VYY.

HQ-170, exclnt condx, \$200. Gregory A. Martin, WA9BIK, 402 S. Second St., Mt. Horeb, Wis.

SELL: Instructograph Code Machine with 10 tapes, electric, no oscillator, \$30. Ship collect. W4BLX.

WANTED: Hallcrafters receiver SX-9, W4EMV.

SELL: HQ-110V with matching speaker, Mint condx. Manual, \$135.00; Ranger II, professionally wired, also mint, manual; \$225.00; NC-60 special 4 band receiver, \$30.00; DB-23 Pre-selector, \$23.00, Johnson L/P filter 52 ohm, \$10. Express collect. Ted Cook, WA2JEM, Edgemere Road, Montauk, N.Y.

CALL CQ, roll calls, contests, meteor and moonbounce schedules, etc., automatically with your tape recorder. Transistorized unit, \$60. Triband quartz spiders, Boom and instructions, \$10. Gonset noise-chopper, \$4. W2MHL, Valt Zinetronak, 147 Farview Ave., Paramus, N.J. Tel: CO1far-1-949.

SELL: Fico 720, 730-cover, both A-1, First \$100 buys. U pay shipping. K9WKK, Box 235, Windfall, Indiana.

JOHNSON KW with desk, pair 4-400As, Johnson Pacemaker exciter, Johnson power divider and Johnson audio amplifier for 1000 watts AM and 2000 watts SSB on all bands, \$900. Can be heard most evenings on the lower end of 40 meters. Lewis West, W0A10, 3514 West St. Louis, Wichita, Kans.

SELL Or trade (local): QST's 1944 to 1960, \$48. Build your tower with this heavy-duty acetylene welding and cutting outfit with do-it-yourself book, \$45; Johnson 275 Matchbox, \$32; Saturn 6 halo, \$6; Triband quartz spiders, Boom and instructions, \$10. Gonset noise-chopper, \$4. W2MHL, Valt Zinetronak, 147 Farview Ave., Paramus, N.J. Tel: CO1far-1-949.

FOR Sale: Many miscellaneous issues of QST and CQ since 1945. List on request. K5YYI, 901 North Evans, El Reno, Oklahoma.

LAFAYETTE Pre-con, original carton, new last October. First \$40 takes it. WA4TEH, 3 Kimes, Havelock, N.C.

75A4 ser #3009, 3,1, 1,5 fltrs, absolutely perfect. Apache xmt used v little, wired by engineer. Need cash immediately. M. Desens, 3148 Holmes Ave., Mpls, Minn.

GOING To college: for sale: Hallcrafters SX-111, HT-37 and R-47 spkr, \$425. WA6VDI, 838 Manzanita, Laguna Beach, Calif.

FOR Sale: Johnson Invader like new, \$425.00; Drake 2B and 2BQ and 2AC, all in like new condx, \$225.00. Take both for \$600 including D-104 microphone, antenna relay and key. WA2UAO, Stevens Bar, 62-60 99 St., Rego Park 74, N.Y. 11334. Phone BR5-6831 after 7:00.

FOR Sale: Drake TR3 SN 10656A and AC-3 supply, new in sealed factory carton, \$535; Collins KWM-1, SN-571 and 516FT AC supply, perf. condx, \$325.00; 75A4 spkr, \$10; Lakeshore Phenomaster SSB xmt, new, less tubes and sweep, \$30; QTI new, \$10; Want: KWS-1, 30L1 or 30S-1, Ed Flynn, W9IHD, 3118 N. Francisco Ave., Chicago, Ill. 60618.

FOR Sale: Heath VFO Model HG-10, Heath balun, Fico signal generator, Mod. 324, W2VP, Rt. 1, Milton, N.Y. 12547. No Time to ham. HT-32A, D-104 mike w/nt stand; NC-103, make offer. Singly or package deal. W7PMC, Victor, Rocking Chair Ranch, Phillipsburg, Montana.

SWAN 400 transceiver, 406-VFO 117B AC supply, flawless condx, cartons and manuals; \$465. Gonset 20M Bantam Beam, \$25. D-104/G stand, \$20. K6MIV, Davis, EL61214, 675 Sierra Meadow, Sierra Madre, Calif.

HX50 Transmitter \$360; GPR 9 rcvr plus GSB-1 SSB adapter, \$395; RC-611 handle-talkies pr. plus two spare cables, \$60; James C-1050 vibrator supply, \$15.00; 500 watt multimatch modulation xmt, \$20; ART-13, \$30; Eico 377 FW audio generator, \$25; Eico 360 FW sweep generator, \$25.00; Johnson Matchbox, \$35.00; Bvaust Ltd. Giant antenna, \$25. All in exclnt condx. Might trade. Ship F.o.b., Les Basham, Cave Junction, Oregon 97523.

HALLCRAFTERS R45/ARR-7 rcvr, general coverage 0.55 Mc to 42.50 Mc, Vernier BFO for SSB, with HB p/s, \$65.00. Without p/s, \$55. Dick Kelly K5SOD, 1604 N. Faulkner, Pampa, Texas 79065.

DRAKE TR-3/AC supply, brand new! In original cartons, \$255. Dave Morrison, K2YHK/1, Box A-222, North Truro, Mass.

100V Central Electronics, perf. physical and electrical wkr condx. First certified check for \$325.00. Firm, in trades! F.o.b. Mobile, Alabama. Dean Wagner, WA4DQT, 1304 Azalea Rd., Mobile, Alabama 36609.

SELL: Eico 720 xmttr exclnt condx, WBFWT, Les, 2146 E. 24th St., B'klyn, N.Y. Tel: NI 8-7742.

SELL: Johnson Invader 2000. In exlnt condx, \$625.00, Lt-Col. Byron Hargrove, W7BSO, (ret), Box 1784, Prescott, Arizona.

WANTED: Johnson 6N2, VFO and converter. For sale: WRLT TC-6A SW plate-modulated 6-meter xcvr w/p.s. and VFO, \$60. Heathkit Tower, \$40. Exclnt condx. Operating. Any demonstration. WAZTAB, 212 E17-8466. Local deal preferred. 261-01 69th Floral Park, L.I., N.Y.

WANTED: Commercial or military, airborne or ground, equipment and test-sets. Collins, Bendix, others. We pay freight. Ritco, Box 156, Annandale, Va.

SB-400. Sell new, operational, mint condx, \$325. Fred Pichino, WRKML, 19199 Blake, Detroit 3, Michigan.

COLLINS KWM-2, latest model, used by little, never mobile; \$795.00. Matching 516F2, \$75.00. Both for \$845.00. Sal Giordano, WAZREO, 2274 National Dr., Brooklyn 34, N.Y.

HW-12-22 32 owners inexpensive Triband conversion. Complete plans, \$4.00 postpaid. Plans, Box 17, West Bend, Wis.

SALE: Matching SX-140 revr. HT-40 xmttr, new, \$130.00; SX-99 revr in gud condx; \$60.00. KF5PE, Hattiesburg, Miss. Tel: 584-7403.

SELL: Complete mobile, Gonset G-66 receiver, 10 thru 80; AM/CW/SSB, Gonset G-77 transmitter 10 thru 80, A.C.W. Amortized p/s and modulator, Triband ant. Shure mike. Burglar alarm, \$225. Collins 75S-1 receiver, 32S-1 transmitter, 516F2 p/s. Electro-Voice mike, used less than 10 hours; \$850. Bert Green, W2LPC, 51 Elmira St., Hicksville, N.Y.

FOR Sale: Gonset G-50 50-watt 6-meter transceiver, Astatic D-104 mike, Astatic G stand. Complete; \$225. Sam Bein, WA2DJB, 3715 Jules Lane, Wantagh, N.Y.

FOR Sale: SX-101, Mark III, \$225.00; DX-100, \$115.00. Cash and carry deal only. Winderman, 30 Ridgeway, White Plains, N.Y. Tel: 914-WH-8-0672.

SWAP Some 4CX1000As for some 3-400Zs. W2HBC, Rd #1, Munnsville, N.Y.

SELL: SX-101 MK IIIA, with Ameco 6M conv. \$200. K2JOX, 205 Hamburg Ave., Egg Harbor, N.J.

FOR Sale: Lafayette Starlight transmitter; Hy-Gain 14 AVS vertical. Best offer, WB2FYD, 7211-72 Court, Brooklyn, N.Y. Tel: 212-TR-9-3183.

HAM Radio Counselor, over 19, for Boys' Camp in Berkshires. Either write Camp Winadu, 2112 Broadway, New York City or call TRafalgar, 3-5970.

DX-100 grid block keying, exlnt condx, \$115.00. Knight T-50 with Novice crystal, \$25.00. McKay, WA2VRK, Tel: PE-6-4536 days, NYC.

SACRIFICE! Must sell! Perfect condition! Globe 755 VFO, \$35.00, new Vibro-Key, \$15.00; HT-40, \$60; 4 months old SX-140, \$75.00; New R-47 skr, \$9.00; homebrew, but in perfect condx, with professional black and grey cabinets; exact replica of Hallcrafters TO keyer, \$40. TR switch, \$18. \$225 takes all! WN4V1K, Bob, 920 Oakmont Dr., Asheboro, N.C.

HEATH Warrrior linear. In exlnt condx. Almost new tubes. Will ship collect, \$150.00. Steinhauer, RD #1, Dallas, Penna. W3LHZ.

SURFLIN Electronics technical manuals. Stamp for list. S. Convalto, 4905 Roanne Dr., Washington, D.C. 20021.

SENECA, \$150.00 and Johnson 6N2 converter, factory aligned, \$35.00. Need: Lampkin Labs 105B, W2PKZ, Desvermine, 30 Byron Lane, Larchmont, N.Y.

COLLINS Deluxe KW-1 transmitter, 1000 watts phone or car. Cost \$1,350. Best offer over \$1,400. Three new oil-filled capacitors, 4,000 volts 4 mfd., \$10 each. Choke 16 henry 0.45 amps, 5,000 volts test \$10. All prices F.o.b. George F. Norton, W4EEE, Athens, Ga.

WANTED: Vibroplex "Presentation" bug (late model) in like-new condx. W4SHL.

COMPLETE 220 station. Gonset IV, mint condx, c-w, jack, xtals, mikes, stacked 11 cl. Hy-Gain beams, pair 5.1. Telrex. Asking \$250. Make offer for all or any part. K2ZJR, 125 E. Oakland Ave., Pleasantville, N.J.

SELL: Morrow 5-band mobile receiver 5BRF/FTR, manual, 12 volts, \$55. W1MJJ, 58 Felch Rd., Natrick, Mass.

FOR Sale: Telrex 317B, \$75; Weston S64 VOM, \$10; Eico 221 VTVM, \$15; Eico 450 scope, needs work, \$10; Heathkit AM1, \$7.00; Precision E200 sig. generator, \$15.00; Selys, pr., 110 v. \$15.00; homebrew scope, \$10.00; homebrew SWR bridge, \$7.00; (trade?) Swift adding machine, 9 figs., \$25.00; Bolex C8 camera, perf., w/case worth \$35.00; Necca 35 mm. Letz f.3.5, \$35.00. Need: Telrex 536 beam, 312B4 console tower, Swift Collins FLA S. K. Kit, fil for 2.1 Kc unit. W2LEC, 60 Willow Ct., Shrewsbury, N.J.

WARRIOR Kilowatt linear amplifier HA-10, \$150, Sry, can't ship. E. M. White, WA2JDW/4, 1500 Ninth St. North, St. Petersburg, Fla.

WANTED: I-177 (A-B-C) tube-checker. State price, condx, etc. W3QII, 5899 Barnes Ave., Bethel Park, Penna.

HEATHKIT Cheyenne for sale: \$75.00. Also SX-99, \$75.00 and BC-1004 w/p.s., \$60.00. Lou Jones, K3MTN, 30 Orchard St., Truicksville, Penna.

SELL Hammarlund SP-6001X rack, \$395; SAREF 2-meter xmttr, w/p.s. \$30; walkie-talkie BC-611, \$70 pr. p/s 800V DC, \$35; coax ratiometer KW-4M, \$20; Zenith transoscantec model 1000-D, \$180; tape recorder Norelco Continental 101 w/remote mike and AC supp., \$80. All in like-new condx. G. Bunge, Box 4099, Tucson, Ariz. Tel: 623-1278.

COLLINS S/Line, 75S-1, 32S-1, 516F-2. There are substitutes but if you've ever owned Collins, no satisfaction. Costs a little more but worth lots more. For casts, \$795, W0BNF, Box 105, Kearney, Neb. 68847.

SALE: HW12, new, \$150. Will wire any kit reasonably, radio, hi fi, etc. (20 years' New experience, retired). Will repair any of your gear. Lan Richter, 131 Florence Dr., Harrisburg, Penna.

SSB 10-80 mtr station, two years young. Looks new, works perfectly. Everything guaranteed! Leaving hobby temporarily. Professionally constructed. Heath HX-20, \$180; HR-20, \$110; HP-10, \$25; AK-7 spkr, \$4 and Knight Bridge, \$10. Also matching homebrew 4CX250B GG 500 PEP in 10-40 mtr, linear, \$190; DX-60-G2C, \$10; mobile mike, \$5; Shure 440SL/VOX mike, \$15; "Goodie Box" w/extra 4CX250B and 4X150A jugs/sockets/chimneys, dummy load, meters, 1500 VCT/500 mil plate xtrfr, ARCS-T-18, fan, etc., \$250. Complete: \$600. Worth \$1200. Certified check, shipped express prepaid. Selling Quad, \$80, tower #30 and rotator, \$20 in B. Complete: \$100, worth \$305). KP4BLP, Wire Division, ANTISO, Ft. Buchanan, Puerto Rico 00934.

GSB-100, \$300 prd; G-63, \$150 prd. Both for \$400. F.o.b. Doylstown, Ohio. R. Sheppard, 153 Huffman, W8CGG.

FOR Sale: Eico 720 transmitter, 722 VFO, 730 modulator, \$130. WB2IOG, Phil Harris, 236 West Neck Rd., Huntington, N.Y.

HALLCRAFTERS SR-160, used only 3 months, in perf. condx, \$250; Swan SW-120, gud condx, w/factory approved modifications and slip-in mobile mount, \$125.00. Will ship F.o.b. Jim Leonard, W4FPS, 657 N.E. 151 St., North Miami Beach, Fla. FOR Sale: 1 Gonset Comm. 6M, IV, A-1 complete with mike, cables, manual, \$150; 1 V-M 730 Mono tape recorder, new, condx. List \$150, first \$65; (trade) 1 Colt .357 Magnum, A-1 condx and holster, \$80; 1 .45 cal. autom., holster and belt, \$100. Certified check, \$45.00. Cal Heller, K9KCM, 5712 N. Spaulding Ave., Chicago 60645, Ill.

RECORDER-Webcor "Microcorder", battery-operated portable tape recorder, 3 3/4 and 1 7/8 ips speeds, battery condition and recording level meter, uses 3/4 in reels with remote mike switch, telephone pick-up coil, accessory cords, 110V AC and 12V cigarette lighter power supplies and carrying case, \$60. K9KTL, 3514 N. Riley, Indianapolis, Ind. 46218.

FOR Sale: SuperPro BC-779 receiver, modified for 15-10, with Heath Q-multiplier, both \$60. Homebrew 813 transmitter, National tank circuit with HT-18 VFO, both for \$60; Heathkit DX-35, in exlnt condx, \$30. Walt Deemer, 8 Garden Place, Brooklyn 1, N.Y.

BLACK Widow Deluxe for ten meters. Transmitter 6146 final, receiver dual conversion. The ultimate in compactness, 9" x 5" h. and 6" d. in exlnt condx. Photo upon request, \$150. William H. Bossert, W2FWX, 72-10 41 Ave., Woodside, L.I., N.Y. 11377. Tel: TW-9-3320.

HEATHKIT Shawnee, needs revr align job: \$95; Lettine 242, gud condx, \$35. Will trade for PMRS, Harvey Lawrence, Box 481, Bradford, N.Y.

FOR Sale: 300 watt modulator, new, 811As, \$40; Meissner band-switching VFO, 80-10, \$20; 813 final 80-10, \$45; dvr. supp., new 866s with 4000 CT 500 Ma or more transformer, \$120; 6 ft. rack. Takes 19" panels, \$25. All tubes new. Prices suggestive. Need Johnson Matchbox, other junk, etc. Might trade. Might pay cash. Certainly will deal. What ya got? All inquiries answered. Write or call Jim, WA8GLM, 644-3502, 1631 Swigart Rd., Barborton, Ohio.

FOR Sale: B&W xmttr, like new condx, 100 watts output all bands, \$135.00; Heath HW-32, in exlnt condx transceiver, transistor power, mike, xtal calibrator, Hustler 20-meter antenna, \$200. Fred Dukes, 834 Butler St., Bolivar, Tenn.

DX-35, v/clean, \$35.00. E. F. Eggert, K2IVJ, 300 Parsippany Rd., Parsippany, N.J.

SELL: SX-101 Mk III, in exlnt condx, \$199. D-104 mike, \$14; VF-1, \$10. K9VLM, 3826 Wesley, Berwyn, Ill.

FOR Sale: 6 Meter Shawnee, 6 months old. Perfect condition. Checked out and aligned by Heathkit Laboratories. With this kit, all-weather speaker, Hy-Gain Halo for car, 6 element Hy-Gain beam for house station, both 117 and 12 volt plug-ins. Complete station: \$250. Also Heathkit Kit Twoer, new, works perfectly. 10-element Hy-Gain beam with twoer, \$50. Write Kenneth McMillin, WA9DZH, 412 E. Graham St., Kentland, Ind.

COLLINS KWM-2, \$750, 516F-2, \$75. High serial, like new, original cartons. Will ship. WA2AVW, Tel: 212-LU-70970.

JOHNSON Invader 200, 1 year old, \$350 cash postpaid. WA5-HTS, Box 611, Claremore, Okla.

APACHE: Like new, must sell. \$165.00. K2EGI, 5 Stratford Pl., Babylon, L.I., N.Y.

MUST Have Heath Twoer. Will trade for CRTs, transmitting tubes, transformers, etc. Write full details. K7YDL, La Haie, 139 Crestview Dr., Hillsboro, Oregon.

GO SSB: Exclnt: Apache SB-10, \$225; 75A-1, \$180; all for \$390. Ron Samson, W0DCB, 3301 Mt. Vernon Rd., Cedar Rapids, Iowa.

SELL: Globe King 400C, \$125.00; Hallcrafters HT-18 VFO, \$20.00. Both are in v/c condx. WA0DYA, C. Gumeson, 857 So. Race St., Denver, Colo. 80209.

TR-3, \$455.00; AC-3, \$66.00; DC-3, \$108.00. All factory sealed, never broken. Warranty, naturally! Sell separately. K4LGR, Box 10021, Greensboro, N.C.

ALL Hams! Build your own compact pre-fabricated shack six by eight feet. Plans and instructions \$2.00. Roy Kashner, 95 Olympic, Las Vegas, Nevada.

SELL: Valiant with Matchbox, \$225. HQ-180, \$250, all in perf. condx. Norman Hinkle, 4758 Cleveland Rd., Srracuse, N.Y. 13215.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, \$7.00 postpaid. Julius W. Wenzelare, W4VOF, 1517 Rose St., Key West, Fla.

BOEHEME Wheatstone Tape Reader for CW tapes. Like new. RTTY terminal unit, fully transistorized. Write for free list describing these and other TTY bargains. Jack Hardman, K2MVR, 33 Laurel Place, Upper Montclair, N.J. 07043.

SELL: Heathkit HW32-20M SSB transceiver, like new, with xtal calibrator, \$105; HP-10 AC power supply \$35; HP13 mobile DC supply, \$45. Will ship. Russ Davis, 1204 N. Alamo St., Anaheim, Calif.

FREE! Blue Book List. Leo offers hundreds of bargains on re-conditioned gear. Viking II, \$97.70; Eico 720, \$44.95; SR-160, \$27.15; Ampco T-86, \$69.50; Aie-68, \$101.15; HT-37, \$23.15; DX-40, \$40.50; Cheyenne, \$49.18; CE-10B, \$69.00; SX-101, \$160.65; HR-20, \$89.10. Many, many more. Also Free 1965 Catalog! Leo, WQGFQ, WRL, Box 919, Council Bluffs, Iowa.

SPECIALS! Galaxy III w/warranty, CliffDweller antenna (new), both: \$350; Galaxy 300, TH-3 Jr. beam, both \$385 (new). Your HT-32 and \$795 gets Invader 2000 (used); trade your DX-100 on used Valiant, \$175 difference, or Viking II and \$395 gets used Viking 300. Trade in DX-60 on Apache, only \$125 difference, five to go. Get Courier Linear, \$150 Challenger free. Vikings I and \$325 gets Invader 200 (used). Your 2B and \$300 gets SX-115 (new). Your S-38 and \$80 gets HQ-100. Write for used list. Tenny Freck, W4WL, Bill Beck, K4QCK, Freck Radio & Supply, 38 Blittmore Ave., Asheville, N.C.

SELL: IBM electric typewriter, elite type, \$75; Cleveland Inst. of Electronics course, \$35; Bell 550 "Dyna-Quik" mutual-conductance tube-tester, \$35; Beck & Howell "Filmosound" 16 mm sound movie projector, "as is" (Needs no projection lens, motor doesn't run), \$35 or trade; Eico 360 sweep signal generator, \$30; Pilot FM tuner, \$15; VM 3-speed automatic recorder-changer, \$10. Turner xtal mike \$4. V. R. Hein, 418 Gregory, Rockford, Ill. 61108.

COLLECTORS attention. General Radio 358 wavemeter in case, \$10; General Radio 377B low frequency oscillator, serial 98, with tubes, \$30. General Radio 413 beat frequency oscillator, serial 135 with tubes \$30. All in apparent working order with meters, knobs, etc. Gene Hubbell, W9ERU, Box 350, RR #4, Rockford, Ill.

SACRIFICE: Johnson Invader, manual, factory carton. Hammarlund, HQ-180 receiver, clock, manual, factory carton. R48 speaker, Johnson TR switch, HK1B keyer, B&W coax switch, Electro Voice mike, electric clock, ten RCA electronic lessons and kit parts. All purchased new. Cost \$1281. Asking \$640. Henry Miller, W4VGJ, Hudson, Fla.

PRINTED Circuit boards. Hams, experimenters. Catalog, 10¢. P/M Electronics, Box 6288, Seattle, Washington 98188.

SELL OR trade. 35mm cameras, Nikon F with F2 lens, case, sunshade. Canon IVS2 with F1.9 35, 50, 85 MM lenses, case, sunshade, viewfinder filters, etc. Want transceiver, H&W or other linear or cash offer. Jennis, W2HKC, 513 Stony Brook Drive, Somerville, N.J.

HAMMARLUND HQ-129X, Heath OF-1, speaker in case, perfect electrically, professionally aligned, physical condition like new. First \$110 takes all. Prefer cash and carry deal. Ron KZIV 80-14 250 St., Bellerose, Queens, N.Y. Phone: 212-F17-3161.

WANTED Aircraft receiver 108 to 135 Mcs. Also Elmac AF-68A xmitter. All replies answered. John Winward, 12711 Medford Road, Philadelphia, Penna. 19154.

RECEIVER HQ-120, complete, \$65; NC-183, no cabinet, \$75; WO88 scope, \$45. Heath sweep generator, \$28. Communicator 1, 2 meters, \$105. John Kakstys, 18 Hillcrest Ter., Linden, N.J.

EXPERIENCE Not necessary. Please send me ur old ham licenses, plates for collection. Proud to display ur plate. Mike, W4QED, Box 14, Milan, Tenn.

DRAKE 1A with calibrator for sale, one owner, original carton. Extra condx. Just returned from factory for alignment. \$150. W4BXG, P.O. Box 334, Alcoa, Tenn.

HEATH HR-10 amateur band receiver 80-10 meters AM SSB. Professionally wired, in A-1 condx. \$75. A. L. Short, 24 Smith St., Glen Head, N.Y.

SALE: Apache TX1, \$130; SB-10 adapter, \$65. Won't sell SB-10 separately. Both in like-new condx. Lew Wallace, W2LNA, Wendy Drive, Collins, N.Y.

COLLINS 75S-2 for sale. Highest bid above \$300 takes it. You pay shipping. In mint condx. D. M. Walls, 1220 Elmwood, Richardson, Texas.

SELL: Heath Cheyenne, Comanche, HP-10, Kepco twin 0-600 VDC at 200 Ma. regulated supply, 20 meter whip and mount, \$150, or make an offer. J. B. Damerell, 2 Robbins Lane, Saugerties, N.Y.

ANCIENT Nmtg tubes. I'm selling out my collection. WE 270As, \$4. VT1s, \$2.50, others. Make ideal lamps. Send for list, include postage on tubes listed. Samkotsky, 201 Eastern Parkway, Brooklyn 38, N.Y.

FOR SALE: Apache and SB-10, \$250 or best offer. Will sell Apache separately but not SB-10. WA2TPT, RFD 1, Box 345, Vernon, N.Y.

FOR SALE: Drake 2B, spkr, HT-37; excellent. K4CLE, Rte. 3, Charlotte, Tenn.

FOR SALE: Gonset Mobile Twins G166B, G77A w/p.s., \$219, like new. Barbara Gernand, Monticello, Iowa.

DRAKE 2B, with 2BQ and 2-AC, Excellent. \$195. L. H. Anderson, 31 Axate Rd., East Brunswick, N.J.

SELL: Viking Challenger transmitter. In perfect condx. 1 year old, \$95. Howard Lester, 245 Runsey Road, Yonkers, N.Y.

COLLINS 75S-1 receiver and 516F-2 AC supply, in mint condx. \$375. K1KRO, 203-529 9281, Wethersfield, Conn.

RC779 Super-Pro osc. Converted, manual, gud condx, \$60. W2HU9, 385 Blvd. Kenilworth, N.J. Tel: BR 6-2549.

SELL: Very nice SX-100 Mk II and new R-48A spkr, both \$145 plus VDC, WASERC, 154 Ronald Blvd., Lafayette, La.

RTTY Equipment: cleaning house, 28-KSR, \$290; 28ASR, \$550; 14,15,19 kleinschmidt gear. Parts for all above. John Altstatter, W6QAC, 841 Levin Rd., Mountain View, Calif.

HALLICRAFTERS SX-99, OF-1 O-multiplier, and xtal calibrator, all with manuals and original cartons, exlcnt condx, \$95; new Mosley V-4-6 40-10 meter trap vertical, plus Blitz Rug and SWB RC-58U, \$17. AM going W4EJ Sidney J. Lindheim, WB2HBH, 250 Lafayette Ave., Passaic, N.J.

WANTED: Franchises of Distributors for Electronic Items and Components. Write: Electronic Surplus Sales, 324 Arch St., Camden, N.J. 08102.

WANTED: 60 ft. crank tower wind load 10 sq. ft. W2UGM, 66 Columbus, Closter, N.J.

ACUMULATED spare gear: Central Electronics 20A, Deluxe 458 VFO, OT-1, \$175; Heath DX-40, \$43; VF-1, \$17; AC-1, \$7; Johnson Signal Sentry, \$10; Advance 115W coax relay, \$6; CDR AR-22, rebuilt, 57 ft. cable, \$25; surplus BC-455-B, \$6 7-9, 1-22/ARC-5, new, \$8. No panel scratches or modifications. All with manuals. Ship, your cost. Shay, W7GXC, 414 Fountain Circle, Murray J, Utah.

FACTORY-Wired Eico 720. Homebrew VFO. \$75; SX-28, 100 Kc calibrator, \$70, 8-el, 2 mtr. Hy-Par, \$8. Looking for a Triband transceiver, WA2TCE, Martorelli, 737 Asbury St., New Milford, N.J. Tel: 262-5078.

WANTED: RTTY Bulletin back issues. Please send list, price, to WA6NAT, 9802 Forni, Placerville, Calif. 95667.

SELL: Collins 32V2, \$115. Sry, no shipping. Has weak output tube, otherwise OK. Eugene Ballard, W9SFU, Rte. 1, Brownsburg, Ind.

FOR SALE: Cheyenne, Comanche with AC; DC pwr supplies, mike, brackets, everything \$170. DX-40, \$40; HR-10, \$60. RME VHF 152, 10, 6 and 2 converter \$25. HG-10 VFO, \$25. Can discuss. WA9JFW, Chris Allen, 426 Bellevue, Alton, Ill.

IMMACULATE Drake 2B, 2BQ mutl-spkr, and 2 AC xtal calibrator, all for \$235. WA2ROX, Barry Hoffman, 34-16 69 Lane, Maspeth, N.Y. 11378, Tel: 212-DE-5-8493.

CRYSTALS Airmailed: FT-243 custom finished .01% 3500 to 8600 Kilocycles \$1.90. Five crystals \$1.70. Ten net crystals same frequency \$1.35. 1700-20,000 (overtones above 10,000) \$2.50. Add 50¢ each .005%. Add 75¢ above 20,000. HC-6/u, December, OST, X-VFO, 26 accurate crystals \$29.90. Write regarding 3700-340 Kilocycle oscillator—liters and other kits, crystals. Add 10¢ crystal airmail, 5¢ surface. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

FOR SALE: SX-117, excellent condx with extra xtals, \$275; PS-150-120 p/s, new unused, \$75; Dow-Key DK-60-G2C, coax relay, unused, \$10; Johnson Signal Sentry, \$10. Lower offers will be considered. Art Champagne, WA1BFK, 24 Northview Dr., South Windsor, Conn.

75A-4, excellent, \$375.00; KWM-1, latest production manufactured, \$300; HT-32, like new, \$300; HT-41 linear, used 5 hours, \$250; HT-45, perfect with extra new tube and factory power supply, \$375; Drake 1-A, just factory tuned, \$135; mobile DC supply for TR-3, used 5 hours, \$85, W8WGA, 3451 Ridge Ave., Dayton 14, Ohio. Phone 277-0409.

HW12, 22, 32 owners. convert your rig to Tribander for \$20. Retains neat appearance, week-ends work. Runs 170 watts c.w. Covers twice the spectrum on each band. Plans neatly laid out, 65 steps, 15 diagrams. Send \$3.00 for plans. Robert Christie, 88-15 168th, Jamaica, 32, N.Y.

CIRCUITS from Handbook, OST, CQ, etc. constructed. All work guaranteed. Reasonable. Write for free list. WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

HAMMARLUND HQ-145X, w/xtal calibrator, 24-hr. clock, 5 months old, \$185; new Knight FT-50A, \$85. WN3BGC, 247 Colbrook, Limon, Colo. 80521.

INTERN needs cash. Must sell KWM-2, \$725; 516F-2 AC supply, \$75; Heathkit Warror kilowatt linear amplifier with connecting cables and antenna relay, \$150. All cash and carry. H. R. Wexler, M.D., K2EQE, 2100 Eastchester Rd., Bronx 61, N.Y. or telephone TA-2-2055.

COMPLETE Station, in mint condx! Year-old HQ-170C, \$225; Eico 720, \$50; Eico-730 factory-wired with cover, \$45; Knight VFO, \$20; Dow-Key relay, \$18. Package deal: \$325.00. Marc Heller, WB2DKR, River Road, Scarborough-on-Hudson, N.Y.

FOR SALE: Collins 75S-3, \$500; 32S-3 with 516F-2 p/s, \$625. Equipment is in mt condx and shipped to you in original cartons. \$1000A final in 6 ft. rack, complete with power supply, ready to go on for \$450. Believe me, this final is no junk and is conservatively rated at 1 Kw DC input (2 Kw PEP). Write for picture. Have new Swan SW-240 with matching speaker, p/s, never been opened, for \$350. James N. Long, W4RZC, P.O. Box 6742, Birmingham, Ala. 35210. Tel: 505-592-9998.

HEATH HR-30, 6 meter SSB, AM transmitter, factory aligned, \$175.00; HA-20 linear, \$85, both: \$245, New Condy, original cartons, manuals. Mort Ryan, WA8CNQ, 3379 Harry Lee Lane, Cincinnati, Ohio 45239.

FOR SALE: AF-67, Gonset Super Six, power supply, antenna, relays and hookup cables. Best reasonable offer. Hubert Miller, P.O. Box 26, Dudley, Georgia.

ATTENTION HT-37 owners: install perfect push-to-talk in HT-37 with Kentronics P.T.T. kit, \$4.95 plus. Solder just once. Won't affect VOX. Ken Hoffman, 34-16 69 Lane, Maspeth 78, L.I., N.Y.

75S-1 with Waters rejection tuning, \$325.00; Gonset GSB100, \$250. W4AVY, 7310 South 4th Ave., Birmingham, Ala.

SELL: HW-32, HP-23 AC supply, HP-13 DC supply, \$175. RC-221 with original calibration book, \$45.00. Lynn Faulkner, WRNTV, Grafton, West Virginia.

MODEL 28 Teletype printer in excellent condition for sale: \$550.00. Will be willing to pay shipping to N.Y. F. L. Sherwood, Scheissheimerstr. 189, Munich 13, Germany.

HO-110 C, \$150, HT-40, \$90; BC-453, \$12. William Blaine, 4132 Haverhill, Atlanta.

WANTED: Loose coupler, 1918-1924 version. Set of honeycomb coils and coupler. Send price and description to W2CBG, C. M. Radford, 20 Dover Lane, Yonkers, N.Y.

SR-150; AC and DC supplies; mobile rack. Never used, \$650. K2VFW, 47-25 215th St., Bayside, L.I., N.Y. Tel: BA-9-2313.

SELL: SB-33 mobile mount, supply, mike and Band Spanner ant. \$315; HT-37; \$275; LA-400, \$95; Heath PS-1 p/s, \$40. Bill O'Byrne, 209-33 35th Ave. 1 Bayside, L.I., N.Y. Tel: HA-8-0710.

Collins 32S-1, 75S-1, 516F-2 with speaker. Immaculate, without a scratch. Quarantined in perfect condition. Shipped in original cartons. \$830.00. W5BZV, 2098B Falcon Place, Kirtland AFB, N.M. Phone: 505-256-7153.

FOR Sale: Clegg 90'er. New condx. Will not ship, sry! Highest offer over \$75. K1QNF, 41 No. Quaker Lane, West Hartford, Conn. Phone 232-4934.

CHICAGO Milwaukee hams! Junk box bargain: IF cans 50 and 500 Kc, mech filter, 400 ft vacuum cap; 150w homebrew xmtr 10-80 AM-CW VFO; parts, panel meters, sockets, capacitors, resistors, more; surplus; 2 BC-455-Bs, DM-21-B dynamotor, T19/ARC-5, AM-1415/UNS-1 amplifier. Can't ship, sry. Lot: \$75. Higgins, 2062A Langley, Great Lakes, Ill. 60087. Call (312) 244-4559.

JOHNSON 6N2 transmitter, \$100; 2M Gonset Communicator 1H, \$125.00. No reasonable offer refused for quick sale. K3FOY, 1308 Deerfield Dr., Monroeville, Penna.

WANTED: Military dial box bearing nomenclature C974-FRR-33. Mfrd. by Collins Radio for R-391/URR revr. Please advise condx and asking price in ur first letter. Also want unmodified Motorola FM xmtr-rcvrs in the FMTR and FMTRU-80 and 140D series or later. Both 6 and 2 M units needed. Write stating the numbers appearing on the inner under-chassis of both xmtr and revr (e.g. PA-9033-B (L), and asking price. K2IEG, 2 St. Marks Pl., Huntington, N.Y.

KWS-1, No. 1295; top condition, recently overhauled. All modifications. \$650.00 or best offer. Heath 6er, \$35.00. Hy-Gain H-Tower, \$75.00. K2MGE, 12 Elm St., Lynbrook, N.Y. 1.Y. 9-2356.

HEATH HR-20 receiver HX-20 transmitter HP-20 AC p/s, 80 to 10 meters, 90 watts SSB or CW. Professionally wired, no modifications, 100 scratches, used about 5 hours. Kits cost \$371.00. Will sacrifice at \$290.00. K3IBQ, 1239 Wheatshaf Lane, Abington, Penna.

FOR Sale: Johnson 250-watt Matchbox, with S.W.R. indicator, contact Jeff Glauber, W0EPE, Rayburn Trailer Ct., Mason City, Iowa.

WANTED Collins mechanical filters for personal use. 6.0, 2.1, 3.1 and .5 kc. bandwidth with 455 kc. center frequency. New or used. Other hand widths acceptable. Send description and price. Phil Schaad, WA9JYU, 3138 South Home, Berwyn, Ill.

COLLINS VFOs, new, unopened cartons for 75A-4, \$49; KWM-1, \$39; KWM-1, \$29.00; 75A2-3, \$39; 32V-2-3, \$19; R-390A, \$14; \$39; DX-Adaptor KWM-1, new, \$19; Novice adaptor KWM-1, new, \$14; KWM-2, int. \$75.00; P1-9; RTTY converter radio frequency band model 1946 and 1601C-TR, \$175 each. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa, SS \$5.50. Richard E. Mann, 7205 Center Dr., Des Moines 12, Iowa.

TOWER 72 ft. high, 3 legs, self-supporting, no guys. Outstanding value for the serious-minded ham. \$375. K3JTK, Robert J. Nawrocki, Mt. Bethel, Penna. Tel: 717-897-6430.

QSTs for sale. Complete from August 1952 to December 1964. \$25.00. WZZGB, 178 Colonial Road, Summit, N.J.

WILL Sell: KWM-2 with AC Collins supply: \$875. Perfect, no scratches, etc. Used v. little. Late model, A. M. Wilson, WINPG, No. 37 Round Hill Rd., Wethersfield, Conn. 529-0394. KWM-2 and 516F-2 power supply, like new condx, \$850. W3-WNC, 1-215-EL-6-0831.

WANTED: Back issues of Transactions of any professional group of IEE, E, Nagle, 40 Whittier Parkway, Severna Park, Md. 21146.

FOR Sale: DX-100, SB-10, exclnt condx: \$200. SX-100, recently aligned, \$150, manuals included, pair 250TLs, new, make offer. K1YGS.

FOR Sale: 75A-4, like new, No. 3193 3.1 Kc filter, matching sprk, vernier dial, only \$400. W8CCK.

ESTATE OF W8IG: Valiant I, F.W., \$219.00; SX-99 w/matching spir, \$99.00; Globe Scout 660-A trans, 80 thru 6 \$44; all are in exclnt condx. Also good ART-13, \$45.00; BC610E w/614 speech amp, ant. JB-70 junction box, \$325.00; BC-603 FM 20-2.9 Mc revr, as new, \$34; SCR-522 complete, never modified, \$25.00; Collins 75A-4 d kc mech. filter, \$310.00; Hy-Gain vert. ant. 80-10 \$8. All offers considered. W8LRQ, 15801 Edgecliff, Cleveland, Ohio 44111.

SACRIFICING Excellent 4-1000A linear brand new tube, 3500 volt power supply, 3 ft. wheeled cabinet, \$395; Ham-M rotor and indicator, \$65.00; Collins A6F-1 0V power supply, \$65.00; Hallcrafters 100, \$62.00; 100W Mes. Base reflex speaker, like new \$150. WAGME, 6803 Amestoy Ave., Van Nuys, Calif.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 IF), Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

IMPORTED TV and Radio tubes at 70% below list prices; write for free list: Bobco Electronics Co. P.O. Box 4133, Lynchburg, Va. 24502.

115 VAC output alternators; single phase requiring DC field voltage; 2500W 6 VDC field, \$30; 1500W 12 VDC field, \$30; 1500W 6 VDC field, \$25.00. F.o.b. Irving ARC, 2307 Cartwright, Irving, Texas. Write for info.

BARGAIN List, clearing out transformers, chokes, diodes, resistors, capacitors. HQ-110, S-100 speaker, mint. factory cartons, manual, \$120; 75A-1 matching speaker, xtal cal., manual, \$160; 32V-2, mike, coax relay, spare final, manual, \$140; Thordarson 3000y 20 Ma xtmtr, matching choke, both \$35.00; HR-10 receiver kit, \$45. W0LWZ, 1030 So. Dudley, Denver, Colorado 80226.

SELL Measurements Corporation Model 84 signal generator 300-1000 megacycles. Late model with instruction manuals, cables and balun. \$50. Bantoon sweep generator \$100. Dumont 208B oscilloscope, \$40. Carl Swanson, W9SCN, 1331 Center St., Des-Plaines, Ill.

BUY New radio amateur equipment at the advertised list price. No trades, pay no interest or service charge for one year! Nothing down with approved credit. Crabtree's Electronics, 2608 Ross Ave., Dallas, Texas. Tel: 214-818-5361.

DRAKE TB, 28G, xtal. calibrator, exclnt condx, original boxes, \$95. G5B 900 condx, \$200. R. Barnard, K0GMB, 7701 Mission Road, Prairie Village, Kansas 66208.

GLOBE KING 500B xmtr, 500 watts of AM and CW. Must sell, you make offer. Dave Steffens, 656 Cascade Road, Cincinnati, Ohio. 45240. Phone 625-8333.

PL-172 Wanted. Please state price and condition. G. Cutsgoore, W2VJN, RD 1, Princeton, N.J.

POLYCOM 62B, in exclnt condx. Complete. \$250. K2UMH, 13 Circle Drive, RD #1, Voorheesville, N.Y.

WANTED: Globe Champ 300A in first class shape. Al Rowder, 370 Fairhill, Holland, Michigan.

SWAN 400, AC and DC supplies plus mobile remote frequency control unit. Used few hours. Never mobile. Absolutely perfect; \$425.00. Will demonstrate, W2RQA, Huntington, L.I., N.Y. Phone: 516-HA-3-7739.

SALE: HT32A and HT33A. Both for \$550. In A-1 condition and will demonstrate, W2FWY, Phone 609-494-2518.

KWS-1 Collins kW, Serial No. 1030. Exclnt condx. Will deliver within 300 miles. \$650. L. M. Harris, W5RKE/4, Box 67, Lynn Haven, Florida. Phone 265-5479.

HEATHKIT MR1 Receiver, MT1 transmitter equipped with HP-10 DC supply and HP-20 AC supply and cables to go fixed or mobile; \$185. K7K1D, L. R. Anderson, Rt. 1, Box 436, Corvallis, Oregon.

APACHE. In gud condx, \$155. Jones MicroMatch and indicator, \$22.00. K2QIL.

FOR Sale: B&W 5100 and 51SB transmitter; Hallicrafters SX 101A receiver. Both exclnt condx and operating as W2BVH. Best offer. Bernard Annenberg, Trustee, 400 Pennsylvania Ave., Brooklyn, N.Y. 11201.

SELL R390-A/URR, in exclnt condx. Includes competnet modifications to IF sub-chassis for product detector, hams AVC, RF gain control ala 75A-4, BNC antenna termination, "spinner" kilocycle knob, recent alignment and check to original specifications. Includes manual and complete schematics, spare hard-to-get tubes. Excellent SSB, RTTY, and CW. Best offer over \$1000. 100 B. K1JZM, Fred Davidson, 617 Elm St., RFD Marlboro, Mass. 01752.

NCX-3, NCX-A 110V supply, new condition, original boxes and papers, etc.; Johnson low-pass filter; Astatic 335-H mike; all for \$349. Sacrifice. Lt. R. Fremont-Smith, 115 Eighth Ave., Brooklyn, N.Y. 11215.

WANTED: Contact Electronics 100V or 200V. Will buy or trade with brand new Tandberg tape-recorder. I will pay shipping charges. Please contact LA7IB, Capt. Per Stensland, Box 793 Trondheim, Norway.

SWAP Or sell: Two, 6 meter xmtrs, complete with P/S, mike, VFO, and ant. relay, 1-25W, 1-60W-LM freq. meter with p/s. Want: general coverage receiver, W2GQK, Sterner, 322 Perrine Ave. (PT), New Brunswick, N.J. Tel: AC-201-846-2290.

SELL: Globe 90A, \$30; Eico 730, \$40, both for \$65. Charles Berner, WA2HRZ, 1361 E. 17th St., Brooklyn, N.Y. Tel: DE 48349.

FOR Sale: HQ-145, \$150; SX-100, \$160.00; R-100A, \$70. All like-new condx. F.o.b. Morton, Ill. R. E. Pickering, 505 N. Main St.

FOR Sale: Swan 240, \$285; Adcom AC supply, \$75; Adcom 250 mobile supply, \$75; KWM-1 mobile supply, \$185; KWM-1 mobile mount, \$25.00; AN/APR-4 revr tunable 40 to 1000 megacycles. \$225.00. Lucas, W5VGE/8, 8102 Delaware St., Oscoda, Michigan, Tel: 7398561.

G66B, 3-way PS, manuals, \$70; NC300 speaker, \$7. Supro 2 pickup electric Spanish/Hawaiian guitar (trade?) \$40. K2IKZ/5, Thurber, Box 593, James Connally AFB, Texas.

SALE: Ranger II, new, from Henry Radio 12-23-63. Used very little, like new condx. First m.o. for \$200 takes it. Will ship prepaid insured, original box, manual. Bob Randall, W0RNR, Box 672, Ashland, Kans.

WAREHOUSE Clearance sale: Thunderbolt, \$295; Courier, \$179.95; 1000-B, \$149.00; Johnson Valiant, \$145.00; 32V-1, \$135.00; DX-100, \$89.00; Viking II, \$79.00; Globe 500C, \$139.00; SX-101 MKII, \$179.00; NC-183, \$145.00; HRO-60, 5 coils, \$165.00; 75A-1, \$135.00; 75A-2, \$145.00; 2A, \$179.00; 6900, \$195.00; Invader, \$295.00; HT-32, \$295.00; HT-37, \$295.00; new HT-37, \$395.00; 75S-1, \$295; HQ-170C, \$195.00; New NC-270, \$179.00. All units reconditioned and guaranteed. Howard Radio, Box 1269, Abilene, Texas 79604.

U.H.F. and Microwave Receivers, transmitters and antennas for sale. Free literature, EPCOA, 94 Lolly Lane, Centereach, N.Y.

HALLICRAFTERS SX-117. Used only a few hours. In brand-new condx. You make offer. L. J. Slavin, P.O. Box 2858, Kalamazoo, Mich.

WANTED: "Radio" Magazine 1935-1940, by complete years. State price and condition. All letters answered. Harry Hyder, K7HON, 2523 N. 57th St., Scottsdale, Arizona 85257.

HQ-170, like new, matching speaker, phones, Price: \$200; Valiant f/w like new, Matchbox, SWR meter, lo-pass filter, key and mic, \$205.00; C-E 20A, 348 VFO, \$120; Millen c.w. and fone xmtr with 3" scope, \$85.00; 1 Kw final, dual 813's with power packs and modulators, \$105.00. No shipping, sry! V. Olson, 1430 Foster Ave., Chicago 40, Ill. Pl: R 8-2782.

DIGITAL Circuits: transistorized flip-flop mounted on a printed circuit board with plug-in connector. Designed for use in counters, shift registers, and other circuits requiring either a set-reset or trigger flip-flop. Flip-flop and connector, \$3.87. Send for free literature. Komtron, Dept. 2, Box 275, Little Falls, N.J. 07424.

FOR Sale: DX-100 wired for SSB with ant. relay, D-104 mike with stand, all in good condx: \$125.00. E. J. Breaux, 6351 Diamond Ave., Port Arthur, Texas.

PACKAGE Deal: SW-240 Swan AC and DC p/s; Hustler ant. for 3 bands, mike, bumper mount; \$350.00. Save \$225.00. Exclnt condx. Ted Goodison, RD 3, Vestal, N.Y.

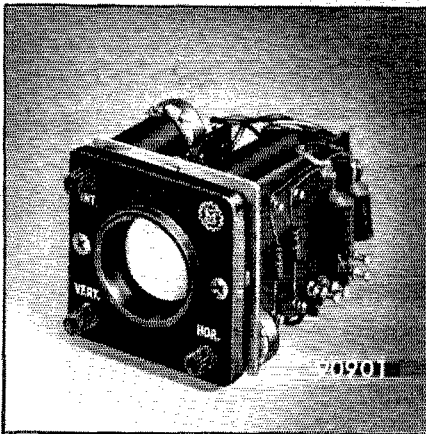
AFRICA Mission needs ham equipment. Bishop Arnold Cotch, S.D.S. requests donations of amateur radio equipment. New or used. Mobile or stationary. Parts and antennas. For use by Catholic Missionaries in Diocese of Nachingwea, Tanzania, East Africa. Anyone willing to help should write to Rev. Alfred Schmit, S.D.S. Salvatorian Center, New Holstein, Wisconsin 53061.

WANTED: HEATH Q meter; Heath IP-10 or IP-22 isolation transformer; Heath GR-41 FM receiver. Millen 90672 antenna bridge. R. Arrowsmith, 1204 North Evergreen St., Arlington, Va. 22205.

Designed for



Application



The No. 90901 One Inch Instrumentation Oscilloscope

Miniaturized, packaged panel mounting cathode ray oscilloscope designed for use in instrumentation in place of the conventional "pointer type" moving coil meters uses the 1" ICPI tube. Panel bezel matches in size and type the standard 2" square meters. Magnitude, phase displacement, wave shape, etc. are constantly visible on scope screen.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS



Index of Advertisers

Arlondack Radio Supply.....	165
Alkan Products.....	158
Ameco Equipment Corp.....	113, 148
American Radio Relay League, Inc. QST.....	114
Handbook.....	7
License Manual.....	165
World Map Supplies.....	175
Arrow Electronics, Inc.....	138
Ashe Radio Co., Walter.....	167
Barry Electronics.....	126
British Radio Electronics, Ltd. (Eddystone).....	142
Budwig Manufacturing Co.....	156
Burstein-Applebee Co.....	150
Cleveland Institute of Electronics.....	149
Codar Radio of Canada.....	162
Collins Radio Co.....	2
Communications Equipment Co.....	140
Cubex Co.....	150
Cush Craft.....	112
Dames Co., Theodore E.....	144
Dayton Hamvention.....	122
Defense Electronics, Inc.....	133
Dow-Key Co., Inc., The.....	131
Editors & Engineers, Ltd.....	151
Edwards Electronics.....	155
Eitel-McCullough, Inc.....	4
Electro-Voice, Inc.....	111
Electroncraft, Inc.....	148
Evans Radio.....	160
Fichter Electronics.....	162
Finney Co., The.....	124
Fort Orange Radio Distributing Co., Inc.....	163
Galaxy Electronics.....	158
Gardiner & Co.....	166
Gentee, Inc.....	160
Gotham.....	127
Grand Central Radio, Inc.....	138
Hallcrafters Co., The.....	Cov. II, 1
Hammarlund Manufacturing Co., Inc.....	109
Harrison Radio.....	176
Harvey Radio Co., Inc.....	145
Heath Co., The.....	100, 101
Henry Radio Stores.....	135
Hi-Far Products Co.....	144
Holland Electronics, Inc.....	161
Hunter Manufacturing Co., Inc.....	161
Hy-Gain Electronics Corp.....	105, 116
Institute of Electrical & Electronics Engineers Instructograph Co., Inc.....	159
International Crystal Manufacturing Co., Inc.....	150
ITT World Communications, Inc.....	107
Johnson Co., E. F.....	144
Lafayette Radio.....	5
Lampkin Labs, Inc.....	153
Lattin Radio Labs.....	159
Miller Manufacturing Co., Inc., James.....	158
Miller Co., J. W.....	174
Mini-Products, Inc.....	165
Mor-Gain.....	142
Mosley Electronics, Inc.....	163
National Bureau of Standards.....	161
National Radio Co., Inc.....	136
New-Tronics Corp.....	99, Cov III
Organs & Electronics.....	137, 146
P. A. F. Enterprises.....	136
Parks Electronics Lab.....	140
Pennwood Numechron Co.....	152
Phileo Techrep Div.....	156
Post-Check.....	166
Productive Tool & Manufacturing Co., Inc., The.....	163
Radio, Inc.....	156
Radio Publications, Inc.....	164
RCA Electronic Components & Devices.....	152
RF Communications Associates, Inc.....	Cov. IV
Rohn Manufacturing Co.....	125
Scientific Associates Corp.....	132
Slideband Engineers, Inc.....	154
Skylane Products.....	152
Sound History Recording.....	160
Space Electronics.....	165
Squires-Sanders, Inc.....	119
Sterman Electronic Supply.....	102, 103, 120,
Stoner Electronics Co., Inc.....	121, 128, 129, 157
Swan Electronics Corp.....	139
Telex Co.....	162
Telrex Labs.....	165, 167, 167
Terado Corp.....	164
Trigger Electronics.....	143
Tschanne, WA2PID, Dr. Walter A.....	164
Turner Co., The.....	130
Unadilla Radiation Products.....	154
United States Fiberglass Co.....	134
Van Sickle Radio Supply Co.....	166
Vanguard Electronic Labs.....	152, 166
Vesto Co., Inc.....	156
VIEP Associates.....	163
Vibroplex Co., Inc., The.....	154
W3KT QSL Service.....	138
Webster Manufacturing Co.....	118
Wen Products Co.....	141
Whippany Labs., Inc.....	123
Wiggins, W6CHZ, Wally.....	163
Wilson, Inc., Willard S.....	158
World Radio Labs.....	147
Yatter Labs.....	148

Strictly Modern

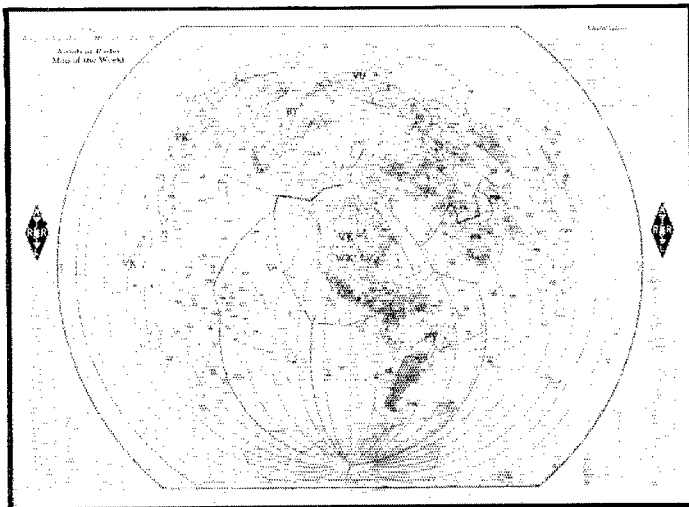
Latest amateur data by League Hq. Brilliantly executed by expert map-makers Rand McNally. Order this showpiece for your shack now!

No active amateur can afford to be without one of these popular and useful adjuncts to good operating. Here is why the ARRL World Map is such a favorite:

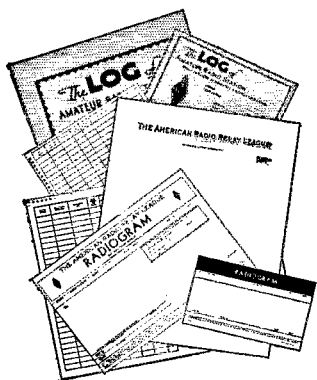
As soon as you hear a DX station you can see exactly where he is—the country prefixes are not just listed in the marginal index; they're printed on the countries, themselves. You can tell his direction from you, and his distance. There's no question about which continent he's in—boundaries of the six continents are plainly marked.

The time zones are plainly marked, too. Call areas of thirteen countries are shown. Principal cities are designated. There's a scale of miles, another of kilometers. Printed on heavy map paper measuring 40" wide x 30" high, in 8 colors that really stand out, this new ARRL World Map is easily read from your operating position.

40" x 30" 8-Color Map, \$2.00, postpaid anywhere in the world



FOR THE ACTIVE AMATEUR



Record keeping can often be tedious. But not with the *ARRL Log Book*. Fully ruled with legible headings it helps make compliance with FCC rules a pleasure. Per book **50¢**

Mobile and portable operational needs are met by the pocket-size log book, the *Minilog*. Designed for utmost convenience and ease **30¢**

First impressions are important. Whether you handle ten or a hundred messages you want to present the addressee with a neat looking radiogram . . . and you can do this by using the *official radiogram form*. 70 blanks per pad. **35¢**

If you like to correspond with fellow hams you will find the *ARRL membership stationery* ideal. Adds that final touch to your letter. Per 100 sheets. **\$1.50**

and they are available postpaid from . . .

The American Radio Relay League

NEWINGTON, CONN. 06111

The ham who deals with Harrison is served by men who are experienced hams themselves. We'll give your SB-34 (or any other purchase) an on-the-air checkout if you like, and steer you right on tune-up and operation. You'll get full servicing facilities to back up the manufacturer's guarantee. In short, you'll get the full satisfaction that has made Harrison "Ham Headquarters, U.S.A."®



SB-34 IN STOCK RIGHT NOW!

Come in and take it home with you! Harrison has the brilliant new SB-34 in stock, plus every other item in the SBE line. Or, phone or write, and we'll ship to you in any part of the world . . . safely, swiftly, and immediately!

YOURS FOR ONLY \$395 OR \$18 A MONTH*

MATCHING LINEAR AMPLIFIER

The compact new SB2-LA is designed as a companion unit to the SB-34; will also boost output of any SSB transceiver to a full KW! Operates at 1 KW p.e.p. input in 80-40-20 meters, 750 watts on 15 meters.

YOURS FOR ONLY \$249.50 OR \$11 A MONTH*

*Typical monthly payments, after average trade-in allowance or down payment.

That's why
it will
pay you
to get
your

NEW

SBE SB-34

from



HARRISON

"HAM HEADQUARTERS, U.S.A."®
225 Greenwich St., New York, N. Y. 10007
(212) BA 7-7922

Long Islanders! Visit our new Jamaica Store on
Hillside Avenue at 139th Street—RE 9-4101

Come to the 1965

SINGLE SIDE BAND SHOW

Tuesday March 23rd, Noon to 9 P.M.

During IEEE Week

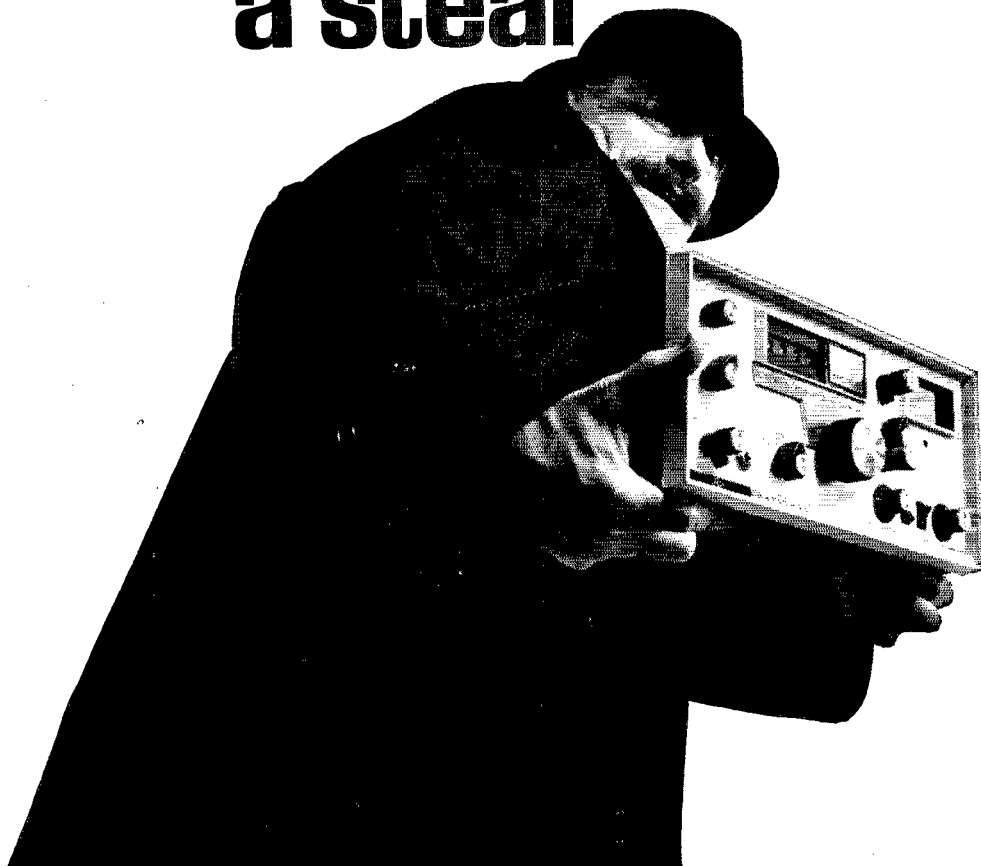
Statler-Hilton Hotel — Skytop Room

401 Seventh Ave., N.Y.C.

- See the latest SSB gear!
- Win prizes!
- Talk to experts!

ADMISSION FREE

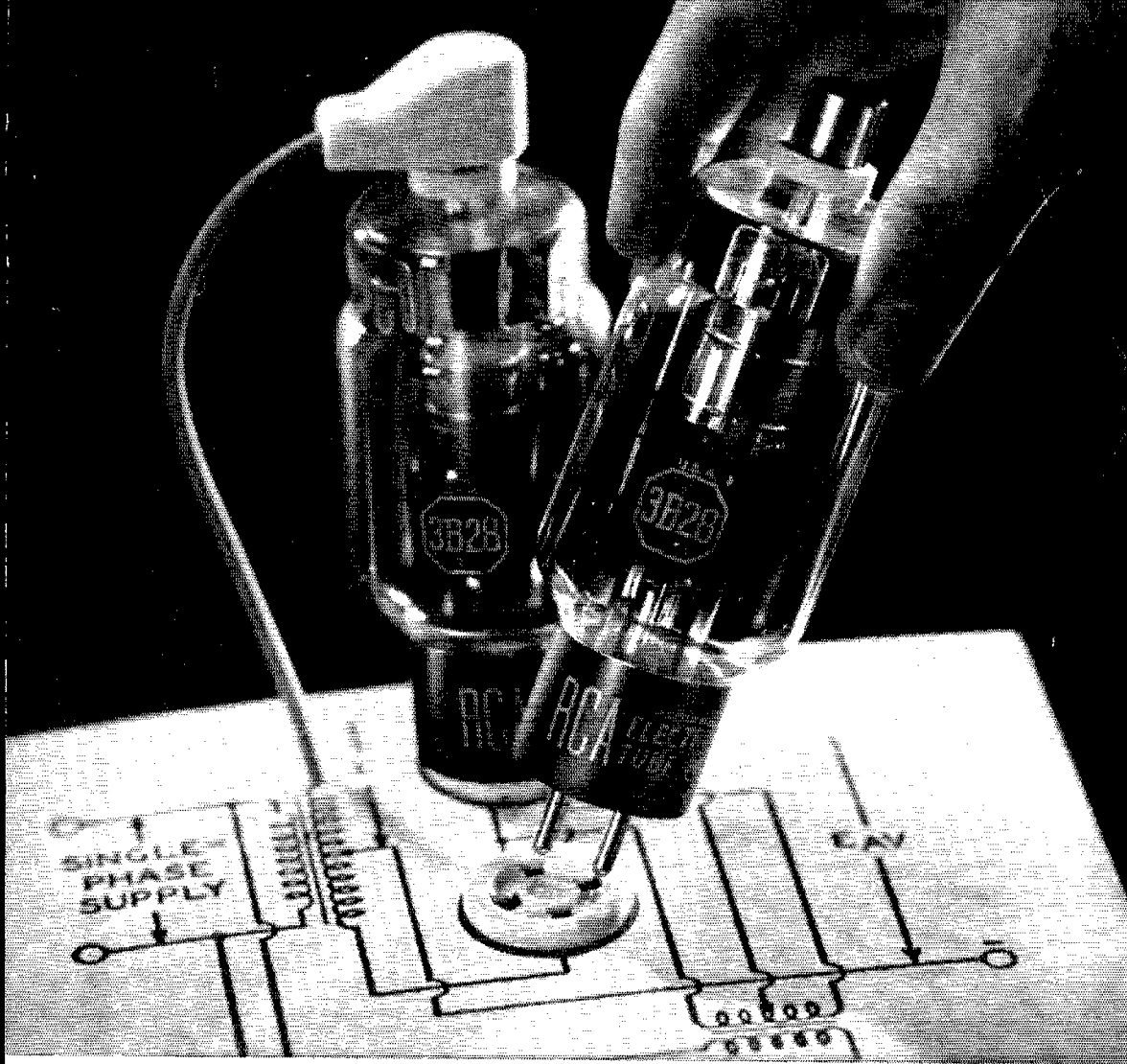
a steal



Feel like a little larceny? Go ahead. Take advantage of us. At only \$685.00, National's NCX-5 transceiver is a steal. Here's a total station transceiver for the 80 through 10 meter bands which gives you more features and performance than any other transceiver at any price. Judge the NCX-5 by any criterion: **Dial Calibration** using a digital counter with accuracy to one Kc and read-out to 100 cps—ten times better than any other amateur equipment available. **Stability** from a cold start with a linear solid-state VFO which eliminates tube-type warm-up drift due to electrode structure change with temperature. Each VFO individually temperature compensated and double-regulated against input voltage variation. Long-term stability from a cold start superior to most tube-type VFO's after warm-up. **Selectivity** with an 8-pole crystal lattice filter substantially superior to any filter of any type ever used in commercial amateur gear. 6-60 db shape factor of 1.7:1 and 2.7 Kc bandwidth assures superb sideband suppression and adjacent-channel receive selectivity with pleasing, natural voice quality. **Sensitivity** of $0.5 \mu\text{v}$ for 10 db S/N, using **two RF** stages on all bands. **Split-frequency operation** with built-in **Transceive Vernier** for ± 5 Kc independent receiver tuning. Also accessory VX-501 VFO console to provide completely independent control of receiver and transmitter frequencies as well as transceive operation controlled by either NCX-5 or VX-501. Console also provides choice of five crystal-controlled frequencies for net or novice use. **Complete AM and CW facilities** including separate high-quality AM detector and break-in CW with adjustable release time. **Quality and workmanship** you expect from National—one-year guarantee against component failure and the neatest wiring you've seen since the last sun-spot cycle . . . right-angle component dress, with even the resistor color-codes all lined up in the same direction. **And everything else** you want in a transceiver . . . precision styling that complements the NCX-5's performance . . . 200 watts PEP punch on SSB or CW . . . 10 db of ALC for maximum talk-power without flat-topping or splatter . . . front panel choice of VOX, push-to-talk, or manual operation . . . SSB/CW/AM AGC and D'Arsonval S-meter/PA meter . . . mobile mount included . . . even optional deluxe oiled walnut cabinets separately available for the NCX-5, NCX-A AC supply/speaker console, and VX-501 VFO console for custom home installations.

NATIONAL RADIO COMPANY, INC. 

37 Washington Street, Melrose, Massachusetts, 02176 World Wide Export Sales: Auriema International Group, 85 Broad Street, New York City, N. Y.; Canada Tri-Tel Associates, 81 Sheppard Ave. W., Willowdale, Ontario



Goodbye "ARC-BACK"

Use RCA Xenon Rectifier Tubes

Do your rectifier tubes arc back, blow fuses during QSO's? Does noisy rectifier "hash" get into your receiver? Do you have trouble "firing up" when the shack is cold? If any of these problems are real to you, install RCA Xenon rectifier tubes—and forget them.

These remarkable high-voltage, half-wave rectifiers deliver maximum DC power at temperatures far below those where many power rectifier tubes won't even start. *Yet RCA Xenon rectifier tubes maintain full peak inverse voltage rating at operating temperatures far above those where ordinary rectifier tubes break down.* High overload capability of mercury-vapor types is maintained. DC output is as quiet as vacuum types—no rf filtering or shielding is needed. Tubes can be operated horizontally or vertically. Preconditioning is unnecessary.

Two RCA-3B25's handle up to 1400 watts of DC power. Two RCA-3B28's handle up to 1600 watts.

FACTS ABOUT RCA-3B25 and -3B28							
RCA Type	Filament Ratings		Tube Voltage Drop	Operating Conditions, Single-Phase Full-Wave (2 tubes)			
	Volts	Amp.		Peak Inverse Volts	Max. AC Plate-to-Plate Supply Volts	Approx. DC Output Volts to Filter	Max. DC Output Amp.
3B25	2.5	5	10	4,500	3,000	1,400	1
3B28	2.5	5	10	10,000	7,000	3,200	0.5
				5,000	3,400	1,600	1

AVAILABLE THROUGH YOUR RCA INDUSTRIAL TUBE DISTRIBUTOR



The Most Trusted Name
in Electronics