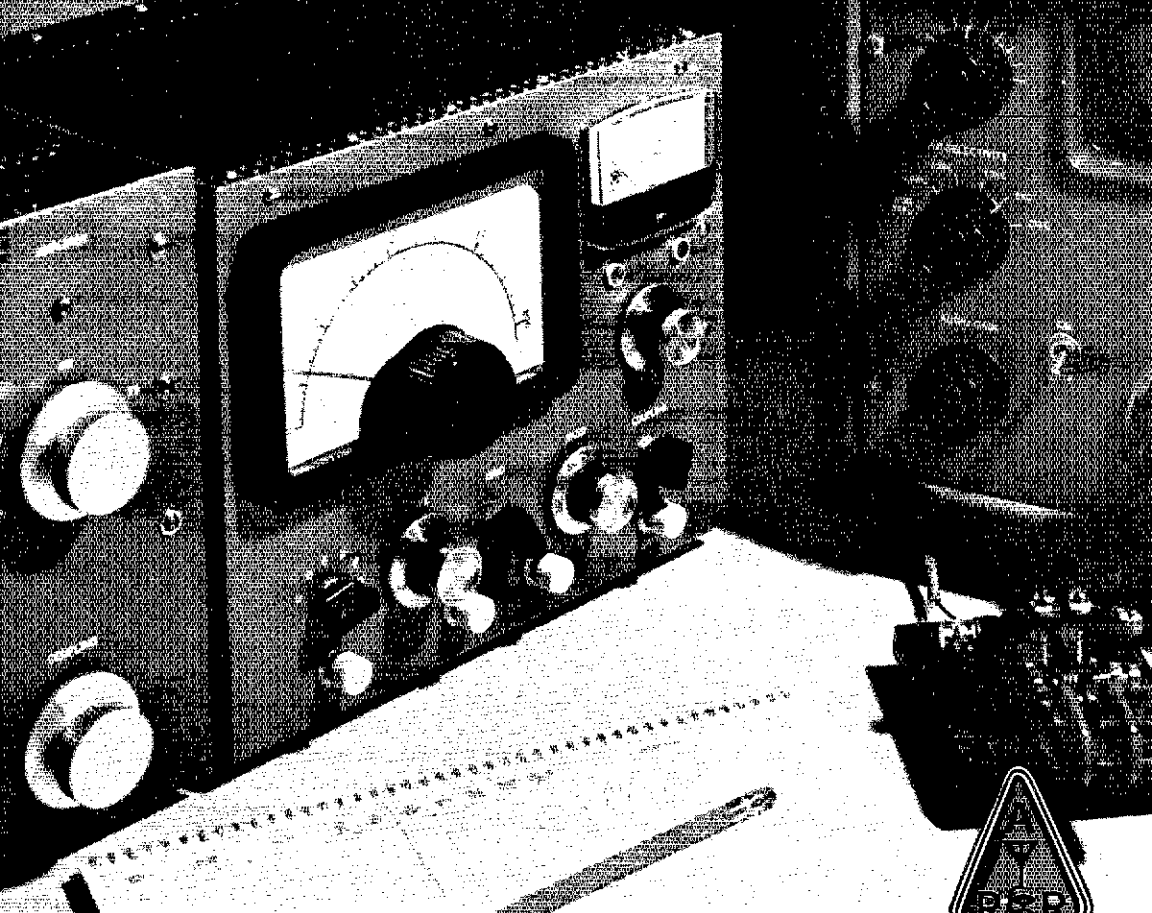


October 1971
75 Cents

QST

devoted

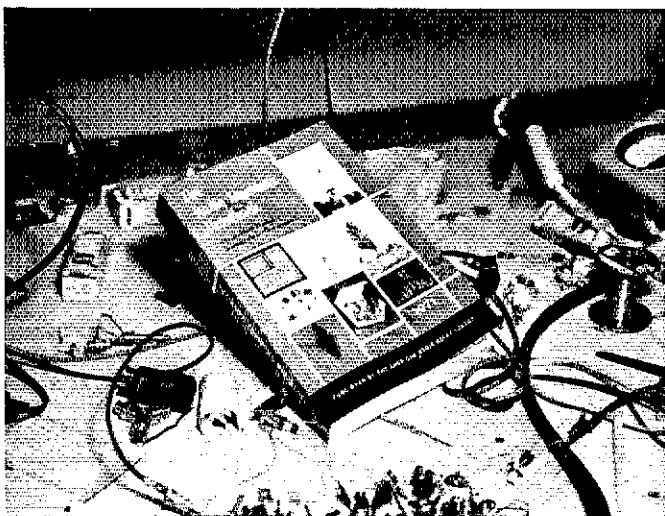
amateur radio



OFFICIAL JOURNAL OF THE ARRL



ON THE BENCH



That 2-meter transmitter isn't up to snuff. What to do about it? Better check....

THE RADIO AMATEUR'S HANDBOOK!

You will find the Handbook an invaluable aid in troubleshooting gear. That's why few Handbooks are found on the bookshelf. They are on the workbench where the action is.

It has all of those hard-to-locate formulas, operating characteristics of the more common semiconductors, copper wire table, tube base diagrams, color code charts, and a numbered drill size chart. This in addition to all of those fine construction articles on transmitters, receivers, antennas, and accessories.

Pick up your copy today at your local radio store, or send a check or money order direct to League Headquarters.

\$4.50 in the U.S.A. and Possessions

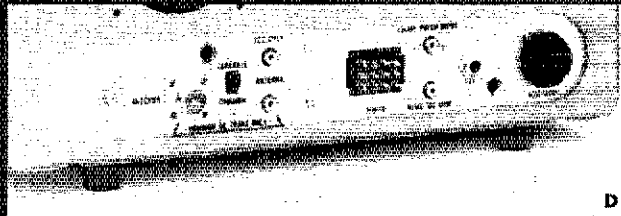
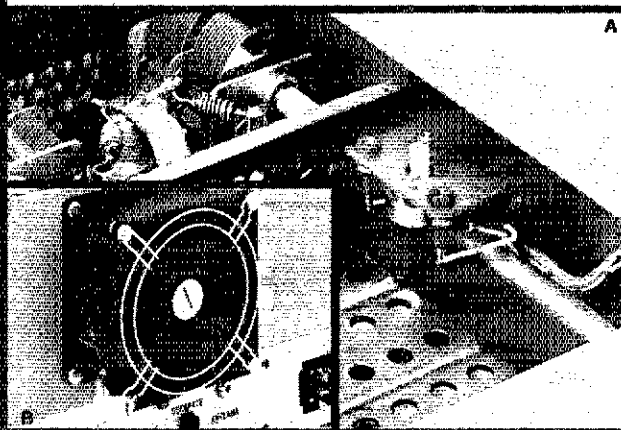
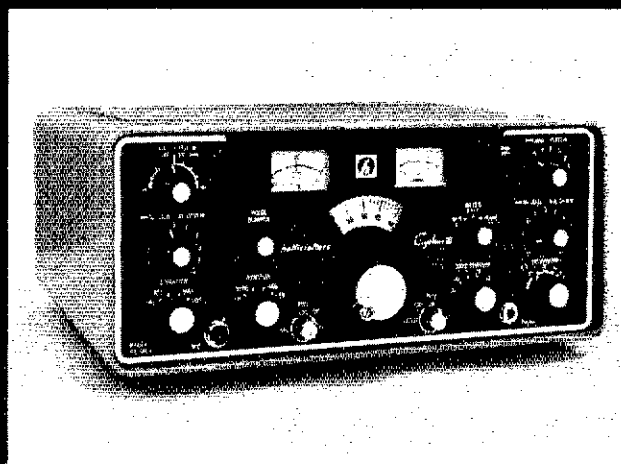
\$5.00 in Canada

\$6.00 Elsewhere

Clothbound Edition \$7.50 U.S.A. Possessions and Canada \$8.00 Elsewhere

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

HALLICRAFTERS' NEW SR-400A HAS INCREASED POWER TO 550 WATTS P.E.P. WITH IMPROVED RELIABILITY FOR CONTINUOUS DUTY OPERATION.



The incomparable new CYCLONE III features:

A. Increased SSB input and output power with Hallicrafters' engineered exclusive Power Amplifier tube balancing adjustment. It provides matching and peaking of tube gain for continuous, maximum power output.

B. Improved reliability through optional HA-60 heavy duty, high efficiency cooling fan (6.4 CFM rated) for Power Amplifier. Permits continuous duty operation in either SSB or CW modes at high power levels with greater reliability.

C. Easily accessible internal adjustment panels include AGC attack, Carrier balance, (3) VOX controls, S-Meter adjust and CW side tone volume for interface with various types of microphones, tube aging and general performance adjustments.

D. Rear panel input/output terminals and connectors for phone patch, accessories, power supply, antenna plus provision for common or separate receiving and transmit antennas, or linear amplifier operation.

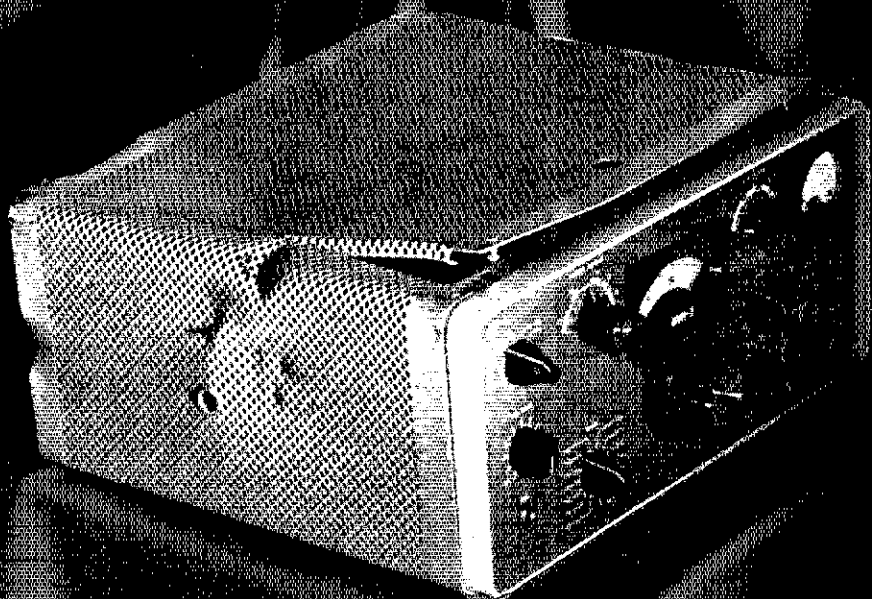
Of course, the new Hallicrafters SR-400A also has semi break-in CW, RTT, AALC, VOX, USB/LSB, < 1 KHz readout, noise blanker plus many more exclusive features.

Ask for it at your local Hallicrafters' distributor.



hallicrafters

600 Hicks Road
Rolling Meadows, Illinois 60008
A Subsidiary of Northrop Corporation.



Stout Heart

Neither rain, nor snow, nor polar ice, nor steaming jungle, nor sand-storm, nor salty sea, nor paradrop can stay the KWM-2 from its appointed task.

When the KWM-2 can survive all this, there's no telling how many trouble free years of enjoyment this stout-hearted transceiver can provide in your shack.



STAFF

JOHN HUNTOON, WIRW

Editor

E. LAIRD CAMPBELL, WICUT
Managing Editor

DOUG DE MAW, WICER
Technical Editor

GERALD L. HALL, K1PLP
DOUGLAS A. BLAKESLEE, W1KLL
ROBERT M. MYERS, W1FBY
Assistant Technical Editors

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

LEWIS G. MCCOY, WIICP
Beginner and Novice

RICHARD A. BITZER, WB2ZKW
Editorial Assistant

ROD NEWKIRK, W9BRD
WILLIAM SMITH, K4CER
LOUISE MOREAU, W6BBO
JOHN TROSTER, W6ISQ
Contributing Editors

MARK W. DANE, W1FXJ
Advertising Manager

EDGAR D. COLLINS
Advertising Assistant

I. A. MOSKEY, W1MY
Circulation Manager

JOHN H. NELSON, W6DRE
Assistant Circulation Manager

OFFICES

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

Subscription rate \$7.50 per year post-
paid, U.S. funds, in Canada and U.S.;
\$8 elsewhere, ARRL Membership,
including QST, available only to
individuals with a bona fide interest
in amateur radio; \$6.50 per year,
U.S. funds, in Canada and U.S.; \$7
elsewhere. Single copies, 75 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 1971 by the American Ra-
dio 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.

QST is available to the blind and
physically handicapped on magnetic
tape from the Library of Congress,
Division for the Blind and Handi-
capped, Washington, DC 20542.

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



OUR COVER
Nicknamed The
"9er, this cw-
only exciter/
transmitter
package offers
features not
often found in
rigs these days.
Turn to page
15 for more
details.

QST

OCTOBER 1971

VOLUME LV NUMBER 10

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

—CONTENTS—

TECHNICAL —

A Transverter for 1.8, 21, or 28 MHz <i>Douglas A. Blakeslee, W1KLL, and Gus Wilson, W1NPG</i>	11
A CW Man's Kilowatt (Part I) <i>Robert M. Myers, W1FBY</i>	15
Gimmicks and Gadgets: A Relay Driver for Use with Solid-State Keyers	22
Fabrication of Printed-Circuit Boards <i>E.R.V. Anderson, K6AWG</i>	24
Voltage Multipliers <i>Jack Althouse, K6NY</i>	29
Two New ICs for the Receiver Builder <i>Doug DeMaw, W1CER</i>	37
High-Frequency Atmospheric Noise (Part I) <i>Marvin R. Clinch, K2BYM, and Calvin R. Graf, W5LFM</i>	42
The W7YGN Contest Keyer <i>John D. Allyn, W7YGN</i>	45
Technical Correspondence	54
Recent Equipment: Simpson Model A FM Transceiver	58
Millen Solid-State Dipper	61

BEGINNER AND NOVICE —

The Apartment Dweller's Dilemma . . <i>Lewis G. McCoy, WIICP</i>	34
--	----

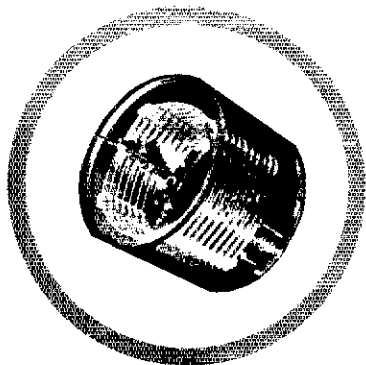
OPERATING —

2nd A.R.R.L. 160-Meter Contest Announcement	68
June VHF QSO Party Results <i>At Noone, W1KQM</i>	69
38th A.R.R.L. November Sweepstakes Announcement	74
AREC and RACES	80

GENERAL —

How to Make a Jewish Movie . . . <i>Mebville Shavelson, W6VLH</i>	62
Fine Business Claude <i>Joel Rose, W8GOF</i>	67
Radio Robert	76
Some QST Abbreviations used in Text and Drawings	78

ARPS	80	Index of Advertisers	158
ARRL Museum	41	"It Seems to Us, . . ."	9
ARRL QSL Bureau	92	League Lines	10
Coming Conventions	89	Operating Events	108
Correspondence	90	Operating News	104
Feedback	55	Silent Keys	92
Hamfest Calendar	89	Station Activities	109
Happenings of the Month	86	World Above 50 Mc.	93
Hints & Kinks	56	W1AW Schedule	105
How's DX?	99	YL News & Views	96
IARU News	85	25 and 50 Years Ago in QST	23



U.S. & FOREIGN PATENTS PENDING

MODEL DGA-4075

A complete system package for primary use in the 40 and 75 meter bands at power levels up to 4KW-PEP with secondary operation in other bands at reduced power levels.

MODEL DGA-4075 - \$59.50

Complete packaged Multi-Band Antenna Systems employing the famous Bassett Sealed Resonators and a special Balun. Air has been evacuated from both and replaced with pure helium at one atmosphere.

Highly efficient system packages including all hardware, insulation, coax cable, and copperweld elements assembled at the factory. Complete installation instructions included.

Multi-frequency models available for all amateur bands and for commercial use, point to point, ground to air, military and government.

MODEL DGA-204075

A complete system package for primary use in the 20, 40, and 75 meter bands at power levels up to 4KW-PEP with secondary operation in other bands at reduced power levels.

MODEL DGA-204075 - \$79.50

CONTACT YOUR DISTRIBUTOR OR WRITE FOR DATA

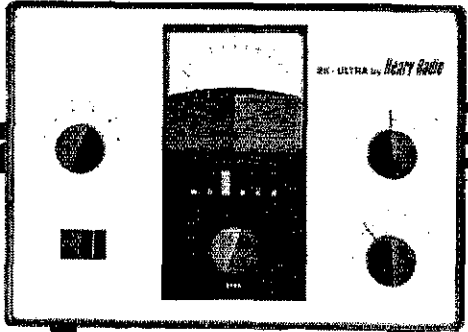


Savoy Electronics, Inc.

P.O. Box 7127 - Fort Lauderdale, Florida - 33304

Tel: 305-566-8416 or 305-947-1191

The Henry Family of Fine Amplifiers Grows and Grows



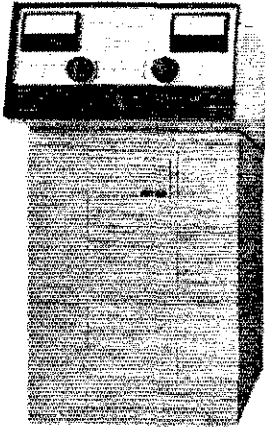
2K-ULTRA

There has never been an amateur linear amplifier like the new 2K ULTRA. Small and lightweight, yet rugged and reliable... all that the name implies. The ULTRA is destined to establish the standard for comparison for the 70's as the earlier Henry 2K series did in the 60's. It offers all of the fine quality, engineering and construction of its big brother, the 2K-4, condensed into a miniature powerhouse of radio frequency energy.

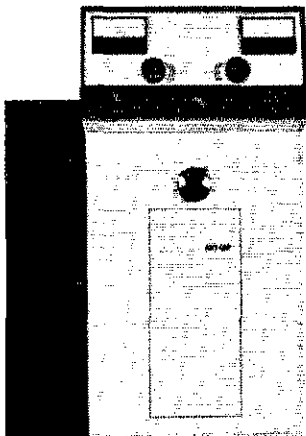
SPECIFICATIONS: Maximum legal amateur input in all modes: 2KW PEP SSB, 1 KW CW-FSK Continuous duty performance Frequency range: 3.5 to 30* MHz. Tube Complement: Two Eimac 8873 tubes, conductively cooled grounded grid triodes Power requirements: 115/230 VAC, 50/60Hz. Drive power required: SSB-CW; 50 to 100 watts. ALC Circuit: prevents overdrive from today's high power exciters and boosts average talk power. Output impedance: 52 ohms unbalanced with SWR not to exceed 2 to 1. Input impedance: 52 ohms. Harmonic and other spurious emissions: Second Harmonic: -50db. Third Order Distortion: -35 db at full power output. Noise level: -40 db or better below one tone carrier at 1 KW. The price: \$845.00

*Amateur Bands

2K-4



True to its heritage, the 2K-4 is destined for a future of even greater achievements than its predecessor 2K's. Its rugged construction guarantees a long life of reliable performance. The 2K-4's heavy-duty components allows it to loaf along even at full legal power. You can spend more for an amateur linear, but you can't buy better. The 2K-4, the big signal amplifier... floor console or desk model: \$795.00



3K-A

MILITARY/COMMERCIAL LINEAR AMPLIFIER

Henry Radio is proud to introduce the new, high quality 3K-A linear amplifier for commercial and military users.

The 3K-A employs two rugged Eimac 3-500Z grounded grid triodes for superior linearity and provides a conservative three kilowatts PEP input on SSB with efficiencies in the range of 60%. This results in PEP output in excess of 2000 watts. In addition, the 3K-A provides a heavy duty power supply capable of furnishing 2000 watts of continuous duty input for either RTTY or CW with 1200 watts output. Price: \$995.00

the 4K-A

The 4K-A is specifically designed for the most demanding commercial and military operation for SSB-CW-FSK or AM. Using the magnificent new Eimac 8877 grounded-grid triode and vacuum tune and load condensers, the 4K-A represents the last word in rugged, reliable, linear high power RF amplification. One hundred watts drive for 4000 watts PEP input. Available in December. Price: T.B.A.

Henry Radio

11240 W. Olympic Blvd., Los Angeles, Calif. 90064 213/477-6701
931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
Butler, Missouri 64730 816/679-3127

AVAILABLE AT SELECT DEALERS THROUGHOUT THE UNITED STATES

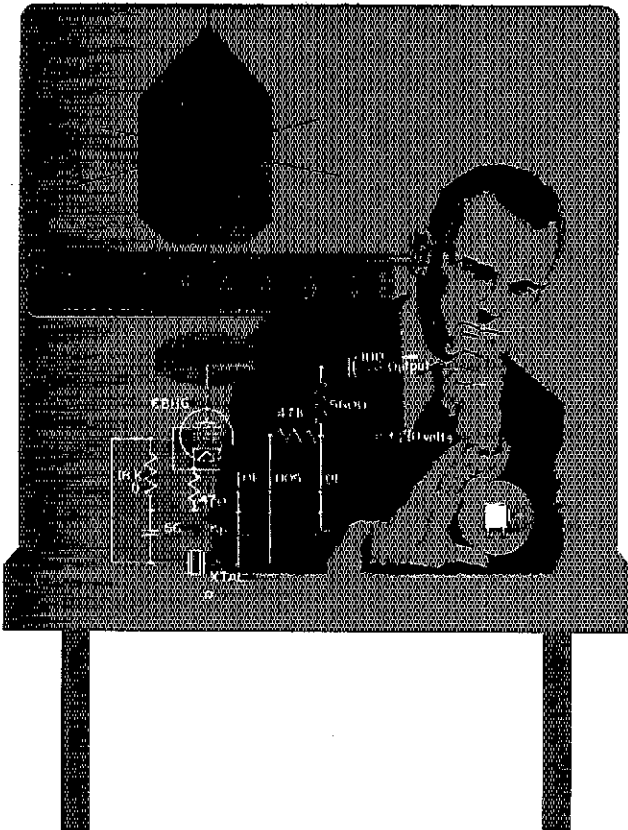
Section Communications Managers of the ARRL

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

ATLANTIC DIVISION			
Delaware	3NYYG	John L. Penrod	RFD 1 Townsend 19734
Eastern Pennsylvania	W3HK	George S. Van Dyke, Jr.	4607 Convent Lane Philadelphia 19114
Maryland, D.C.	W3EA	Earl R. Medaris	1101 L. Indiantown, Md. 21034
Southern New Jersey	W2YFZ	Charles E. Travers	State Police Drive Trenton 08678
Western New York	W2K1K	Richard M. Pitzeruse	407 Woodland Rd Syracuse 14219
Western Pennsylvania	W3NEM	Robert E. Gawryla	1463 N. Allen St State College 16801
CENTRAL DIVISION			
Illinois	W9ERN	Edmond A. Metzger	1520 South 4th St Springfield 62703
Indiana	W9BUQ	William C. Johnson	2838 Hldside Ave. Indianapolis 46218
Wisconsin	W9NRP	S. M. Tokorny	R. 4, Box 179 Ft Atkinson 53538
DAKOTA DIVISION			
Minnesota	69MVI	John H. Halstead	1315 North Cleveland Ave St. Paul 55108
North Dakota	W9JHN	Harold L. Sheels	21 Euclid Ave Grand Forks 58201
South Dakota	W8QCPX	Ed Gray	2402 Hoefler Ave Rapid City 57701
DELA DIVISION			
Arkansas	W85VWH	Jimmie N. Lowrey	2818 N. Albert Pike Fort Smith 72901
Louisiana	W8PM	J. Allen Swanson, Jr.	RFD 1, Box 399 Covington 70433
Mississippi	W8NGB	Walker J. Coffey	R110 No. 2 Oxford 38658
Tennessee	W84GLS	O. D. Keaton	Rt. 1, Medaris Dr. Old Hickory 37138
GREAT LAKES DIVISION			
Kentucky	344UD	Ted H. Huddle	604 Amanda Furnace Dr. Ashland 41101
Michigan	8KZBT	Ivory C. Clinghouse	1227 Rose Dr. Niles 49110
Ohio	8E1IU	Richard A. Egbert	6479 Red Oak Road Reynoldsburg 43068
HUDSON DIVISION			
Eastern New York	K2SIN	Graham G. Berry	50 Parson Ave. New Rochelle 10801
N. Y. C. & Long Island	K2HIG	Fred J. Brunjes	22 Ivy Drive Jericho, L. I. 11753
Northern New Jersey	077Z	Don J. Amodeo	180 Pleasant Ave. Bergenfield 07621
MIDWEST DIVISION			
Iowa	K8YVO	Al Culbert	P.O. Box 306 Charles City 50616
Kansas	K8BXI	Robert M. Summers	3045 North 72nd Kansas City 66109
Missouri	W9BV	Robert J. Peavler	Route 4 Kirksville 63501
Nebraska	K8QAI	V. A. Cashion	334 Pine St., Box 488 Chadron 69337
NEW ENGLAND DIVISION			
Connecticut	W1GVT	John J. McNassar	218 Berlin Ave. Southington 06489
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	88 South Ave. Braintree 02185
Maine	K1IEV	Peter E. Sterling	39 Latham St. So. Portland 04106
New Hampshire	W1SWV	Robert Mitchell	Box 137-A Chester 03016
Rhode Island	K1AAV	John E. Johnson	30 Fruit St. Pawtucket 02860
Vermont			
Western Massachusetts	W1HVR	Percy C. Noble	P.O. Box 5 Lanesboro 01231
NORTHWESTERN DIVISION			
Alaska	KU7LVO	Kenneth R. Klopf	265 Steele Cr. Rd Fairbanks 99701
Idaho	W1ZNN	Donald A. Crisp	1508 Alder Drive Lewiston 83501
Montana	W7RZY	Harry A. Roylance	P.O. Box 671 Harlowton 59036
Oregon	K7WVK	Dale T. Justice	1369 N. E. Sunrise Lane Hillsboro 97123
Washington	87PZ	Arthur Henning	4316 N.E. 60th St. Seattle, 98114
PACIFIC DIVISION			
East Bay	W869HH	Paul J. Parker	2236 Whyle Park Ave. Walnut Creek 94598
Hawaii	K8H8F	Lee R. Wenz	458-011 E. Ilika Rd. Kaneohe 96744
Nevada	W7PQV	Jonathan M. Norman	652 Utah St. Boulder City 89005
Sacramento Valley	W6KYA	John F. Minke, III	6230 Rio Bonito Drive Carmichael 95608
San Francisco	K6SKM	Kenneth S. McTaggart	484, 4th St., E. Sonoma 95476
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave. Fresno 93707
Santa Clara Valley	W6VZ1	Albert E. Gaetano	115 Adobe Rd. Los Gatos 95030
ROANOKE DIVISION			
North Carolina	W44RQC	Clyde M. Dempsey	1654 West Canal St. Lenoir 27886
South Carolina	W44E1P	Mrs. Elizabeth Y. Miller	6509 Highland Ave. Camden 29202
Virginia	K4GJR	Robert J. Shagle	1515 - 25th St. N.E. Arlington 22207
West Virginia	W5JM	Donald H. Morris	1136 Morningside Lane Fairmont 26554
ROCKY MOUNTAIN DIVISION			
Colorado	W58HIG	Clyde G. Longway	1436 Lovell St. Denver 80220
New Mexico	W5NUI	James R. Price, D. V. M.	P.O. Box 1128 Los Alamos 87544
Utah	K7SO1	Carroll L. Soper	4422 Immigration Canyon Salt Lake City 84108
Wyoming	W7COL	Wayne M. Moore	142 South Montana Ave. Casper 82601
SOUTHEASTERN DIVISION			
Alabama	W84FKJ	James A. Brashear, Jr.	1007 Rowell Drive Huntsville 35811
Carol. Zone*	K2EDA	Edward K. Johnson	Drawer 943 Fort Clayton
Eastern Florida	W4KGI	John E. Porter	P.O. Box 1247, 1 Indian Branch Miami 33155
Georgia	W4WQU	A.J. Garrison	2529 Blueberry Dr. Augusta 30906
West Indies	K14CO	Jose Medina-Hernandez	Box 1480 Mayaguez, P. R. 00709
Western Florida	W4RKH	Frank M. Butler, Jr.	3731 Drott Rd. S. E. Fort Walton Beach 32548
SOUTHWESTERN DIVISION			
Arizona	W7CAF	Gary M. Hamman	2813 E. Campbell Ave. Phoenix 85016
Los Angeles	W6JNH	Eugene H. Violino	2839 Canada Blvd. Glendale 91208
Orange	W6MNY	Jerry L. Verduff	6472 Cymbal St. Verba Linda 92686
San Diego	W6SBS	Paul C. Chapman	7331 Hamlet Ave. San Diego 92120
Sanita Barbara	W6ADLI	D. Paul Gagnon	1914 Gaucho Way Oxnard 93040
WEST GULF DIVISION			
Northern Texas	W5LR	J. E. Harrison	1314 Holly Glen Drive Dallas 75232
Oklahoma	W5PML	Uecil C. Cash	1807 Smith Ave. Lawton 73501
Southern Texas	K5HJR	J. Lee Utrey	4218 Dvart Drive San Antonio 78220
CANADIAN DIVISION			
Alberta	VE6TK	Don Southland	444-25th Ave. N. E. Calgary, Alta.
British Columbia	VE71B	H. E. Savage	4551 West 12th Ave. Vancouver S. B. C.
Manitoba	VE44J	Steven Fink	14 Grandcrest St. Winnipeg 13 Manitoba
Maritime	VE1NR	William J. Gillis	Shediac Road, RR 6 Moncton N. B.
Ontario	VE3IV	Holland H. Shepherd	5016 Cowan Creek Ottawa K1V 8L1
Quebec	VE2ALE	Joseph Unsworth	163 Mgr. Bourget Vaudeuil, P.Q.
Saskatchewan	VE5RO	Harry Ogden	2533 MacDonald Ave. Prince Albert

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

There Is a Difference In Quartz Crystals



Space age communication equipment demands a crystal that meets all standards of technical advancement. Crystals that were acceptable some years ago do not meet present day specifications. As a general rule, your crystal must be selected from the best quartz . . . (no throw off cuts). Tight tolerances demand selected angles of cut. The x-ray is important in making this selection. The crystal should be preaged with stress cycling. It should be checked for frequency change vs temperature change. It must be checked for optimum spurious response. It should be calibrated to frequency with the correct oscillator. International Crystals are manufactured to meet today's high accuracy requirements. That's why we **guarantee** all International crystals against defective materials and workmanship for an unlimited time when used in equipment for which they were specifically made.

WRITE FOR CATALOG



CRYSTAL MFG. CO., INC.
10 NORTH LEE
OKLAHOMA CITY, OKLA. 73102

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111.



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
HERBERT HOOVER, JR. W6ZH, 1962-1966

Officers

President ROBERT W. DENNISTON,* WØDX
First Vice-President CHARLES G. COMPTON,* WØBUO
Vice-Presidents ROEMER O. BEST, W5QKF
CARL L. SMITH, WØBWJ
Secretary JOHN HUNTOON, W1RW
Treasurer DAVID H. HOUGHTON

Honorary Vice-Presidents WAYLAND M. GROVES, W5NW
FRANCIS E. HANDY, W1BDI

General Manager JOHN HUNTOON,* W1RW
Communications Manager GEORGE HART, W1NJM
Technical Consultant GEORGE GRAMMER, W1DF
Assistant General Manager RICHARD L. BALDWIN, W1RU
Assistant Secretaries PERRY F. WILLIAMS, W1UED
WM. I. DUNKERLEY, JR, WA2INB
MORGAN W. GODWIN, W4WFL

225 Main St., Newington, Connecticut 06111

General Counsel ROBERT M. BOOTH, JR., W3PS
1150 Connecticut Avenue, N. W., Washington, D. C. 20036

Associate Counsel ARTHUR K. MEEN, G.C., VE3RX
Sulta, 2210 44 King St. West, Toronto, 1, Ontario

DIRECTORS

Canada

NOEL B. EATON* VE3CJ
Box 660, Waterdown, Ontario
Vice-Director: A. George Spencer VE2MS
171 Kipling Ave., Beaconsfield, Quebec

Atlantic Division

HARRY A. MCCONAGHY W3EPC
8704 Fenway Dr., Potomac Bethesda, Md. 20034
Vice-Director: Jesse Bieherman W3KTT
RD 1, Box 66, Valley Hill Rd., Malvern, Pa. 19356

Central Division

PHILIP F. HALLER W9HFG
6000 S. Tripp Ave., Chicago, Ill. 60629
Vice-Director: Edmond A. Metzger W9BPN
1520 South Fourth St., Springfield, Illinois 62702

Dakota Division

LARRY J. SHIMA W9FAN
11417 Goodrich Rd. S., Bloomington, Minn. 55431
Vice-Director: Edward C. Gray W4BCPX
2402 Hoefler Avenue, Rapid City, S. D.

Delta Division

MAX ARNOLD W4WIN
612 Hogan Rd., Nashville, Tenn. 37220
Vice-Director: Franklin Cassen W4WBK
925 N. Trezevant St., Memphis, Tenn. 38108

Great Lakes Division

ALBAN A. MICHEL W8WGO
359 Bonham Rd., Cincinnati, Ohio 45215
Vice-Director: Chrin L. Skutt W8BSZ/K8EPT
119 N. Foster St., Lansing, Mich. 48912

Hudson Division

HARRY J. DANNALS* W2TUJ
16 Archer Lane, Dix Hills, N. Y. 11744
Vice-Director: Stan Zank K2EJO
13 Jennifer Lane, Fort Chester, New York 10575

Midwest Division

SUMNER H. POSTER W6GQ
1720 Willow Way, Applewood Grove, Golden, Colo.
80401
Vice-Director: Ralph V. Anderson K9NL
528 Montana Ave., Holton, Kansas 66436

New England Division

ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, Conn. 06340
Vice-Director: Roger E. Coffey W1AXC
60 Warwick Drive, Westwood, Mass. 02090

Northwestern Division

ROBERT B. THURSTON* W7PGY
7700 31st Ave., N.E., Seattle, Wash. 98116
Vice-Director: David O. Bennett W7QLE
Box 455, St. Helens, Ore. 97051

Pacific Division

J. A. DOUGMELIN W8ZRJ
10835 Willowbrook Way, Cupertino, Calif. 95014
Vice-Director: Hugh Cassidy W8ARA
77 Coleman Dr., San Rafael, Calif. 94901

Roanoke Division

VICTOR C. CLARK* W4KFC
12927 Popes Head Road, Clifton, Va. 22024
Vice-Director: L. Phil Wicker W4ACY
4821 Hill Top Road, Greensboro, N. C. 27407

Rocky Mountain Division

CHARLES M. COTTERELL W8STN
430 N. Swadley St., Lakewood, Colo. 80228
Vice-Director: Allen C. Auten W8ECN
2675 South Dahlia St., Denver, Colo. 80222

Southeastern Division

H. DALE STRIETER W4DQS
928 Trinidad, Cocoa Beach, Fla. 32931
Vice-Director: Charles J. Bolvin K4KQ
2210 S.W. 27th Lane, Miami, Fla. 33133

Southwestern Division

JOHN R. GRIGGS W6KW
1273 13th St., Baywood Park, San Luis Obispo,
Calif. 93401
Vice-Director: Arnold Dahman W8HET
14940 Hartland St., Van Nuys, Calif. 91406

West Gulf Division

ROY L. ALBRIGHT W5KYB
107 Rosemary, San Antonio, Texas 78209
Vice-Director: Lenn Vire W5VCE/W5BOC
2652 1/2 Campbell, Houston, Texas 77036

* Member Executive Committee

"It Seems to Us..."



DISCIPLINE, HOME BREW . . . AND VOTES

AS MENTIONED in last month's report on the world space conference, amateur radio was given a rather hard time in its quest for additional satellite privileges. While there was considerable support from various national administrations, and indeed enough to accomplish basic objectives, there was sufficient opposition — some of it quite intense — to stop us short of complete success.

The IARU team of observers naturally made a point of attempting to determine, in discussions with various delegates, the reasons behind their opposition. These were quite varied, and most were no surprise: disbelief that amateurs are skilled enough to design and build space gear; concern that amateurs might load the skies with satellites and crowd normal "ground" two-way activity out of the bands (no kidding!); fear of interference to other services (usually considered more important than amateurs). But two aspects were wholly new — i.e., never before specifically mentioned at a world radio conference, to our knowledge — and merit deep concern on our part.

One of the African delegates (and Africa was a major source of opposition to amateur desires) was a most pleasant chap who quite frankly told us the basis of his decision to vote against us. "I issue the amateur licenses in my country," he said. "We have about a dozen amateur licenses outstanding, only one to a native; the rest are mostly engineers and technicians from other countries, here professionally to help us develop our communications systems. As required, I make a formal inspection of their amateur installation, and find an XYZ transceiver of about 150 watts, which is fine. But a few days later I happen to be passing by and stop in for a visit. Something new has been added! — a 2 kW amplifier, which does not comply with our power limits. The same sort of thing happens time and again. Further, monitoring the operation of most of these people indicates that night after night they handle phone patch traffic, some personal but some hording on business transactions — all wholly in violation of my regulations. Frankly, I feel I cannot discipline these people too much because they are also (in a sense) working for my government and indeed contributing a good bit to our

development. But I cannot *encourage* continuing illegal operation and therefore feel I cannot support additional privileges for you."

Here is a case of a few people, entirely selfishly, abusing courtesies extended them and probably thinking they are "getting away" with something, while actually they have harmed the rest of the world's half million amateurs. One needed vote was lost because of their actions (how many more we don't know). We do know who some of them are, and believe us, they're privately being told what they've done! Let the incident be a lesson to all of us, especially those with overseas relationships.

The second "new" reason came from several sources. "You fellows aren't amateurs any more," the comment went. "An amateur is supposed to be primarily an experimenter, to build his own equipment, to try out new circuits, to develop ideas. You did this years ago, but no longer. All you do is lay out a few hundred dollars and buy station equipment entirely commercially made. When something goes wrong, you even send the unit back to the manufacturer for repair! You are not amateurs; you are just communicators. We can't afford frequencies for such activities."

This second comment did not come from darkest Africa, or an undeveloped country. It came from delegates of several of the most enlightened and progressive administrations! It should be added that this view was not universal among all delegates of said countries, but in at least one case it was strong enough to cause loss of a needed vote in our favor. It represents a view toward amateurs in general, rather than isolated instances such as the African incident mentioned. It suggests that if this recent conference had dealt primarily with our high-frequency bands, results might not have been at all to our liking.

There are plenty of positive reasons for the existence of amateur radio, to counter the above critical comments. The question is will they do so in the minds of a sufficient number of government representatives to ensure majority support at future conferences. "Accentuate the positive, eliminate the negative," goes the song title — and methods of eliminating the negative points mentioned merit some soul-searching on the part of all of us.

QST

League Lines . . .

K4PJ in the Oak Ridge (Tenn.) club bulletin asks if Life Membership is a good investment, then answers his own question: "If you are under fifty it is definitely a good buy. Even if you are older, prices will go up, so if you haven't reached 65 it is a good investment. If you are past 65 it is still money well spent for a good cause." The likelihood of life membership going to \$150 (or more) with the imminent rise in dues makes the above comment all the more rational.

If you are a public relations, advertising or journalism professional and interested in developing ways to improve amateur radio and ARRL PR, a PR net has been suggested. If the idea appeals to you write PR consultant Don Waters at Hq. and we'll see if we can set up an exploratory time and frequency.

The old chain-letter fad/fraud has popped up again, this time in ham radio. Send a buck and get \$8,000 back, goes the pitch. W1AW carried a bulletin of warning as soon as we heard of widespread use of this illegal gimmick, hoping to keep too many schemers from getting rich quick from the rest of us.

In its petition to FCC to steal a piece of our 220 MHz band for CB, the Electronics Industries Association speaks of the "growing requirement" for citizens personal communication. The figures we find in FCC records show that in the twelve months ending June 30, 1971, CB station licenses decreased by 20,000, with a total approximately the same as existed three years earlier. What growth?

Postage increases almost alone will require upping membership dues. And they are especially severe for QST copies going outside the U.S. -- we put an extra \$1.26 per year on copies going to Canada (and some other countries in this hemisphere) and \$1.84 extra on copies going elsewhere in the world.

The President signed into law on August 10 the Goldwater Bill (now Public Law 92-81), allowing aliens who have filed a Declaration of Intention to Become a U.S. Citizen to obtain amateur licenses. Applications should be filed on both Form 610 and 610-A and sent, along with the \$9 fee, to FCC, Washington, DC 20554. On account of newness, initial processing may be slow.

Do you remember SOS at Midnight, a ham radio adventure story for teenagers by Walker Tompkins, K6ATX? It's been republished in paperback by Peregrine Press, P. O. Box 8084, Salt Lake City, Utah 84108, along with its companion books, CC Ghost Ship and DX Brings Danger, each for \$2.45. These stories are ideal to introduce a young friend or relative to the fascinating world of ham radio.

Were you confused by Homebrew DX Prediction (Moore, page 52, August QST) and the Technical Correspondence by K1PLP on page 40 of the same issue? See the Stray on page 21 of this issue, which clarifies the whole situation admirably.

Ballots for the election of ARRL directors and vice directors will be in the mail the second week of October. As we write this, the closing date for nominations is not yet at hand, and so we don't know how many contests there are this fall, but elections were scheduled for the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific, and Southeastern Divisions.

Quote-of-the-Month, from the membership certificate of a CB club in West Palm Beach: "This is not a legal club because we do not talk legal. Just one hell of a dam good bunch of drunks that enjoy unlawful modulation and completely disorientating the FCC 28 hours a day 370 days a year."

A

Transverter

for 1.8, 21,

or 28 MHz

Using a 75-Meter Transceiver

BY DOUGLAS A. BLAKESLEE,* W1K1K,
AND GUS WILSON,** W1NPG

OWNERS OF mono- or tri-band transceivers often get the urge to try "top hand," or to chase DX on the 15- and 10-meter bands. Converting a transceiver to cover a frequency range for which the rig was not designed is difficult indeed. A far better approach is to build an outboard transverter, such as described here, for the desired band.

The Circuit

A schematic diagram of the transverter is given in Fig. 1. V1A operates as a crystal oscillator to produce 5.8-, 17.5-, or 32.5-MHz local-oscillator energy. This stage operates continuously. Output from V1A is fed to the transmitter mixer, V1B, and to the receiving mixer, Q2. During transmit on the 160-meter band, for example, 3.9-MHz ssb or cw energy is supplied to the cathode of V1B. This signal is mixed with the 5.8-MHz output of the local oscillator at V1B, producing a 160-meter output which is amplified in the following 6GK6

* Assistant Technical Editor, *QST*.
** Laboratory Technician, *QST*.

and 6146B stages. A high-*Q* tuned circuit is used to couple the output of V2 to the grid of the parallel-connected 6146 tubes. The PA stage delivers approximately 100-watts PEP output.

During receive, an incoming signal is amplified by Q1, a dual-gate, diode-protected MOSFET. The output from the rf amplifier is mixed with local-oscillator energy by Q2 to produce a receiving i-f of 3.5 to 4 MHz. Operation on the 10- and 15-meter bands is achieved in the same way. The inductance of the coils, the value of the capacitors, and the frequency of the crystal in frequency-determining circuits are the only changes required to change bands. Switching from transmit to receive is accomplished by K1, which is controlled by the associated transceiver.

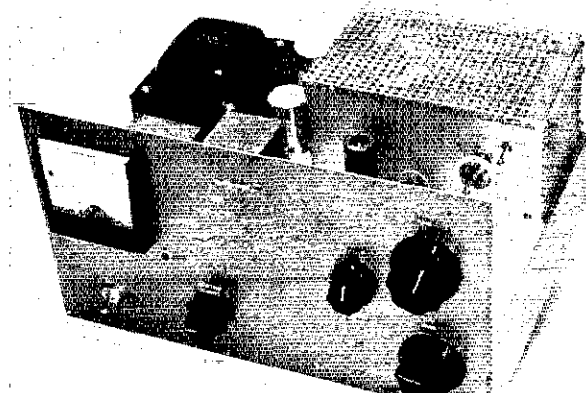
The popular "economy" design shown in the Power Supply chapter of the *Handbook* is employed for the power supply. The 6.3- and 5-volt windings of T1 are series-connected to provide 11.5 volts to power K1 and the receiving converter. The windings must be phased properly to prevent cancellation of the voltages. If no output is obtained when the windings are connected, merely reverse the leads of one winding. The 11.3-volts ac is rectified by CR6 and filtered by an RC pi-section network.

Bias voltage is obtained for V3 and V4 by connecting a 6.3-volt filament transformer in back-to-back fashion with the 6.3-volt winding of T1. The 125-volt ac output from T2 is rectified, filtered, and then routed to the bias-adjust control, R1, to establish a PA resting plate current of 50 mA.

The metering circuit indicates plate current by measuring the voltage drop across a 51-ohm, 5-percent resistor connected in series with the plus-B lead to the final plate circuit. The 1500-ohm, 5-percent multiplier resistor, R3, produces a 450-mA full-scale reading on M1, using a basic meter movement of 0 to 15 mA. Other meters may be employed with suitable changes of R2 and R3, as described in the Measurements chapter of *The Radio Amateur's Handbook*.

Construction

An aluminum chassis which measures 10×14×3 inches is used as the base for the transceiver. A homemade panel and cabinet enclose the unit. The panel is 7 5/8 inches high and 14



The transverter is shown here removed from its case. The smaller knob at the lower center of the panel controls the receiver preselector. Controls to the left are DRIVER TUNE (small knob), PA TUNE and PA LOAD.

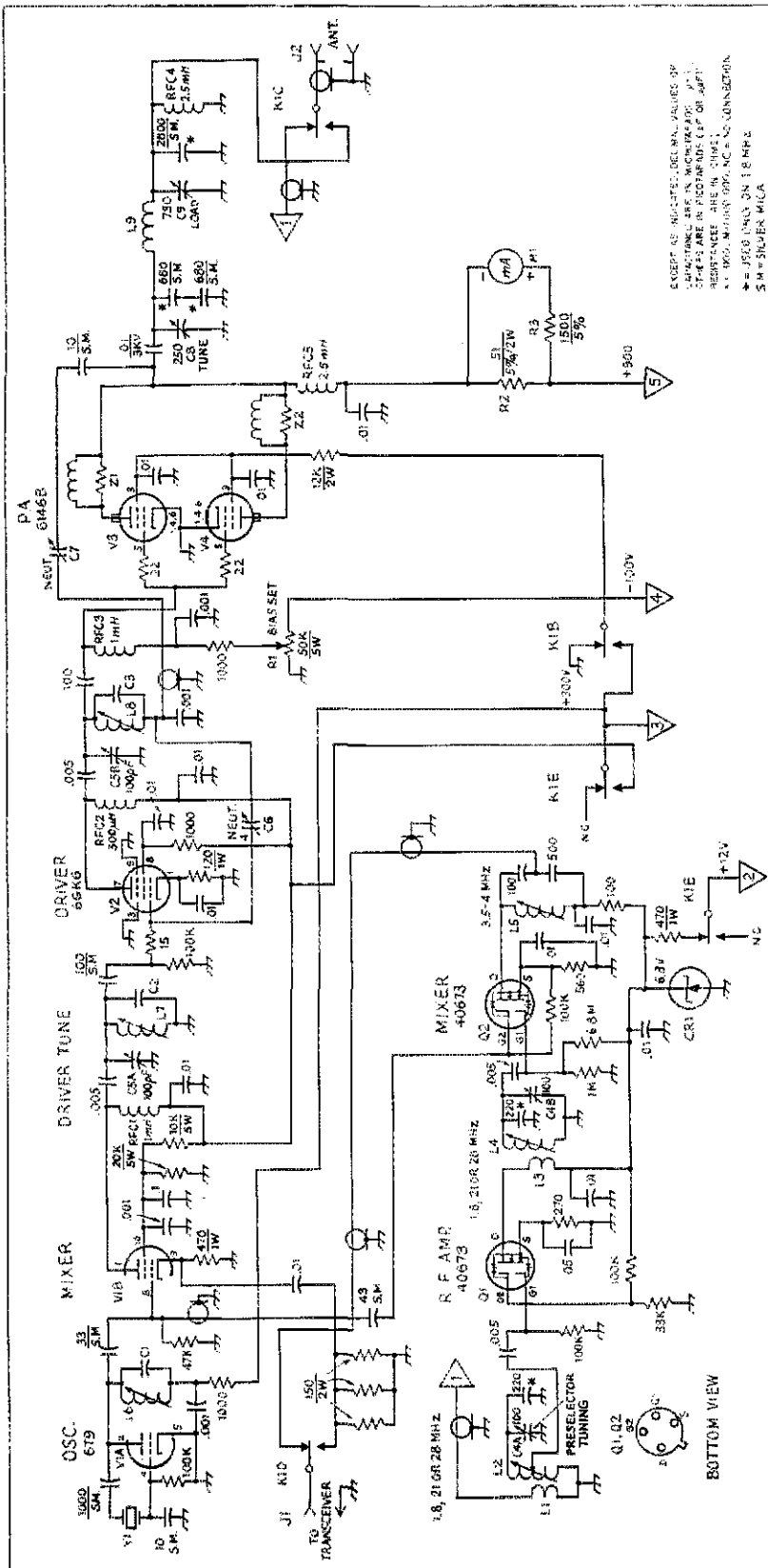


Fig. 1 - Schematic diagram of the transmitter. Resistors are 1/2-watt composition and capacitors are disk ceramic, unless otherwise noted.

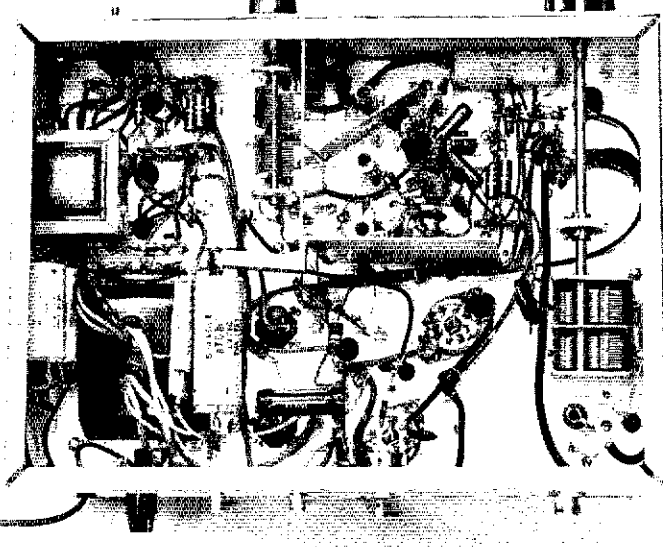
C1-C3 incl. - See table.
 C4, C5 - Dual-section air variable, 100 pF per section.
 C6 - Pc-mount air variable (Johnson 189-501-5).
 C7 - Air variable (Johnson 160-102 or equiv.).
 C8 - Air variable (Hammarlund MC-250-M).
 C9 - Dual-section broadcast variable, 365 pF per section, both sections connected in parallel.

CR1 - Zener, 6.8 V, 1 W, 1N4736.
 J1 - Phono type, chassis mount.
 J2 - Coaxial receptacle, chassis mount.
 K1 - See Fig. 2.
 L1-L4, incl. - See table.
 L5 - 16-26- μ H slug-tuned coil (Miller 21A225RB1).
 L6-L9, incl. - See table.
 M1 - Milliammeter, panel mount (Simpson 06350 or similar).
 Q1, Q2 - RCA MOSFET.

CR1 - Zener, 6.8 V, 1 W, 1N4736.
 J1 - Phono type, chassis mount.
 J2 - Coaxial receptacle, chassis mount.
 K1 - See Fig. 2.
 L1-L4, incl. - See table.
 L5 - 16-26- μ H slug-tuned coil (Miller 21A225RB1).
 L6-L9, incl. - See table.
 M1 - Milliammeter, panel mount (Simpson 06350 or similar).
 Q1, Q2 - RCA MOSFET.

CR1 - Zener, 6.8 V, 1 W, 1N4736.
 J1 - Phono type, chassis mount.
 J2 - Coaxial receptacle, chassis mount.
 K1 - See Fig. 2.
 L1-L4, incl. - See table.
 L5 - 16-26- μ H slug-tuned coil (Miller 21A225RB1).
 L6-L9, incl. - See table.
 M1 - Milliammeter, panel mount (Simpson 06350 or similar).
 Q1, Q2 - RCA MOSFET.

CR1 - Zener, 6.8 V, 1 W, 1N4736.
 J1 - Phono type, chassis mount.
 J2 - Coaxial receptacle, chassis mount.
 K1 - See Fig. 2.
 L1-L4, incl. - See table.
 L5 - 16-26- μ H slug-tuned coil (Miller 21A225RB1).
 L6-L9, incl. - See table.
 M1 - Milliammeter, panel mount (Simpson 06350 or similar).
 Q1, Q2 - RCA MOSFET.



Looking into the bottom of the chassis, the sockets for the 6146B tubes are at the lower right. A shield isolates the oscillator and driver stages. The power-supply components are located along the left-hand wall.

inches wide. The layout employed should be apparent from the accompanying photographs. All long runs of rf wiring should be made with subminiature coaxial cable (RG-174/U or similar).

The converter is constructed on an etched circuit board, which is housed in a $4 \times 2\frac{1}{4} \times 2\frac{1}{4}$ -inch Minibox. Short leads are run from the circuit board to the PRESELECTOR capacitor which is located on the underside of the chassis. The final amplifier is housed in a $7 \times 5 \times 3\frac{1}{2}$ -inch enclosure. The particular capacitor used for C8 can be rotated so far that the rotor plates will short to the stator mounting rod. To prevent an accidental short, the travel of the capacitor shaft is limited by a long bolt extending from the PA cage, which prevents the long bolt protruding from the shaft coupling from moving past (see front-view photograph).

Tune-Up

Provision must be made to reduce the power output of most 75-meter transceivers that might be used with the transverter, as only about 5-watts drive is required. Too much rf can damage V1B and will "smoke" the input loading resistors. Approximately 30 volts of rf will appear between the transmitter-mixer cathode and ground when the correct level of 3.8-MHz energy is applied. Some transceivers are capable of supplying sufficient drive by removing the screen voltage from the PA stage. Or, it may be practical to disable the PA and obtain a sample of driver output by means of link coupling.

Before testing the transverter, insure that the changeover relay, K1, is connected to the remote-keying terminals of the 75-meter equipment. Then connect an antenna to J2 and listen for signals. Peak the incoming signals with the PRESELECTOR control. The slugs of L2 and L4 should be adjusted for the highest S-meter reading on the 75-meter transceiver. L5 should be set for maximum output at 3.7 MHz. If the receiving converter is functioning properly, it will be possible to copy a 0.1- μ V cw signal or a 0.3- μ V ssb signal without difficulty in areas where atmos-

pheric and man-made noise is at a minimum. If no signals can be heard, check V1A to make certain that it is working properly. A wavemeter or general-coverage receiver can be employed to see if the crystal oscillator is operating.

Attach a 50-ohm dummy load to J2 before testing the transmitter section. Set R1 for an indicated resting plate current of 50 mA on M1. This adjustment should be made without drive applied, but with K1 energized. Next, apply about 2 watts of 3.8-MHz cw drive at J1. Then, tune L6, L7, and L8 for maximum meter reading. L6 should be detuned slightly after peaking to insure that the oscillator will start each time that power is applied. While monitoring the plate current, tune C8 for a dip. C9 is the PA LOADING control, and it should be adjusted so that the dip in plate current is rather broad, an indication of tight coupling. When the PA capacitors are properly adjusted the plate current will be about 220 mA.

If the driver and final stages are stable, the changes in plate current will be smooth. If a number of dips or peaks occur, one or more stages are probably self-oscillating, and neutralization will be required. Adjustment of the driver stage should be accomplished first. With the plate and screen voltages removed from V2, V3, and V4, and with a wavemeter coupled to L8, adjust C5 for maximum indicated rf. C4 should then be set for a minimum reading on the wavemeter. Reconnect the plate and screen voltage to the 6GK6 and place the wavemeter near L9. Repeat the neutralization process, peaking C8 for maximum reading and then C7 for minimum. When all of the steps listed above have been completed, reconnect the 6146 plate- and screen-voltage leads.

Cw operation is accomplished by keying the associated transmitter or transverter. To tune up, insert sufficient carrier to bring the plate current up to about 220 mA. Dip and load the final in the usual manner. For ssb operation, the output of the transverter should be monitored by an oscilloscope to determine the correct level of drive. The final should not be driven to flat-topping, even on voice peaks.

QST

A CW Man's Kilowatt

Part I

BY ROBERT M. MYERS,* W1FBY

A CW-ONLY transmitter of modern design is difficult to find. Many circuits have been published over the years; however, building some of those older units is becoming impossible in view of today's parts-procurement problem. With the T-9er, an attempt has been made to use components which can be purchased with little difficulty. The up-to-date circuit uses techniques usually found only in ssb transmitters.

The Solid-State Oscillators

The VFO and buffer, Q1 and Q2 in Fig. 1, are an adaptation of a unit previously described in *QST*.¹ Q3, a second buffer, provides additional gain to assure adequate current to drive the base of the mixer, Q5. The VFO range is 5.0 to 5.2 MHz.

The heterodyne-frequency oscillator (HFO), Q4, operates at one of six crystal-controlled frequencies selected by the band switch. All of the crystals chosen oscillate at a frequency above the operating band. For this reason, the VFO dial tunes in the same direction on each band. CR13 is included to limit the oscillator voltage appearing at the mixer to 0.6.

The Mixer

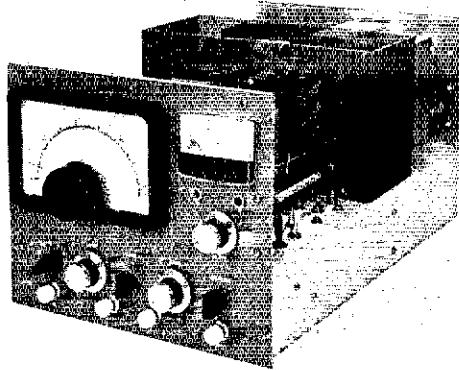
Voltage from the VFO and HFO are coupled to the mixer, Q5, via C9 and C5, respectively. A tuned collector circuit operates at the difference frequency and provides a low-level signal to the driver stage, V1. The VFO actually tunes backwards with respect to the mixer output signal. The bottom edge of each amateur band corresponds to a VFO setting of 5.2 MHz.

Advantages of Frequency Conversion

One of the most prominent features of this system is that only one set of calibration marks is needed. The dial face is divided into 5-kHz increments to give an uncluttered appearance (1-kHz divisions can be included, if desired).

* Assistant Technical Editor, *QST*.

¹ DeMaw, "Building a Simple Two-Band VFO," *QST*, June, 1970.



When the harmonic of a 7-MHz VFO is used on 15 and 10 meters, any drift at the fundamental frequency becomes pronounced on the higher bands. However, by heterodyning instead of multiplying the VFO energy to the higher bands, the stability of the VFO fundamental frequency is maintained. Since both the HFO and VFO are placed at frequencies far removed from the operating band, the chance of "pulling" is reduced considerably. Stability is further assured by allowing both oscillators to run continuously.

Keying

A conventional grid-block system provides clickless, chirpless operation because neither oscillator is keyed. Q6 activates the mixer only when the key is depressed. The waveform transmitted is determined by R2 and C11 in the grid circuit of V1. Since the 6GK6 keys at a slightly slower rate than the mixer, any clicks generated in the earlier stages are not heard.

The Driver Stage

Voltage from the mixer is sufficient to power the driver to nearly full output on all bands. The plate circuit uses separate slug-tuned inductors for 160 through 20 meters. The 15- and 10-meter bands are covered with one coil. Neutralization of the 6GK6 is not required.

Operating a transmitter and amplifier designed with cw as an afterthought can make cw very dull. Presented here is the T-9er, a hybrid circuit built with cw as the prime mode of service. Included are such features as full break-in, shaped keying, linear VFO calibration, T-R switch, built-in power supply, and a solid-state heterodyne conversion scheme. The PA stage uses a pair of 6146Bs and is capable of producing up to 240-watts input on 160 through 10 meters.

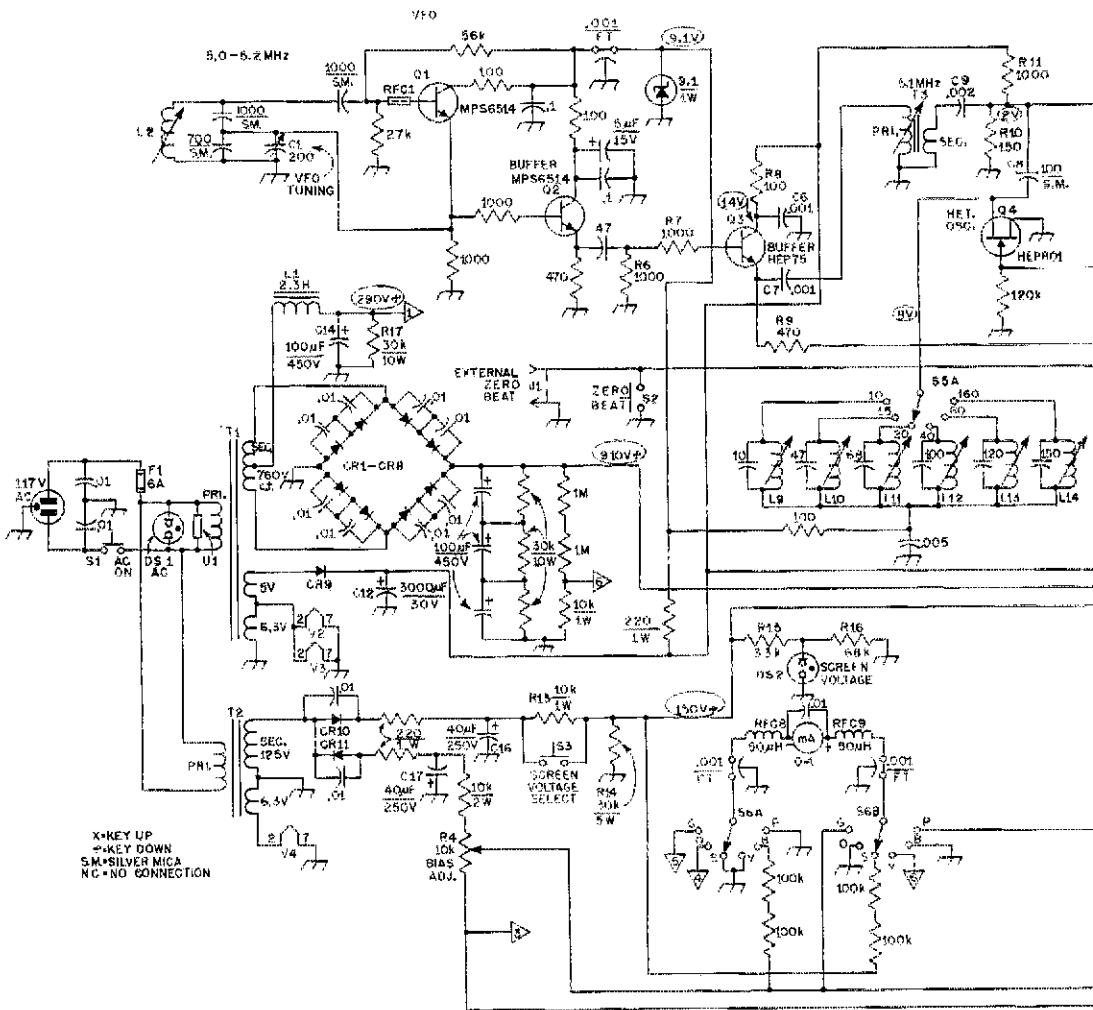
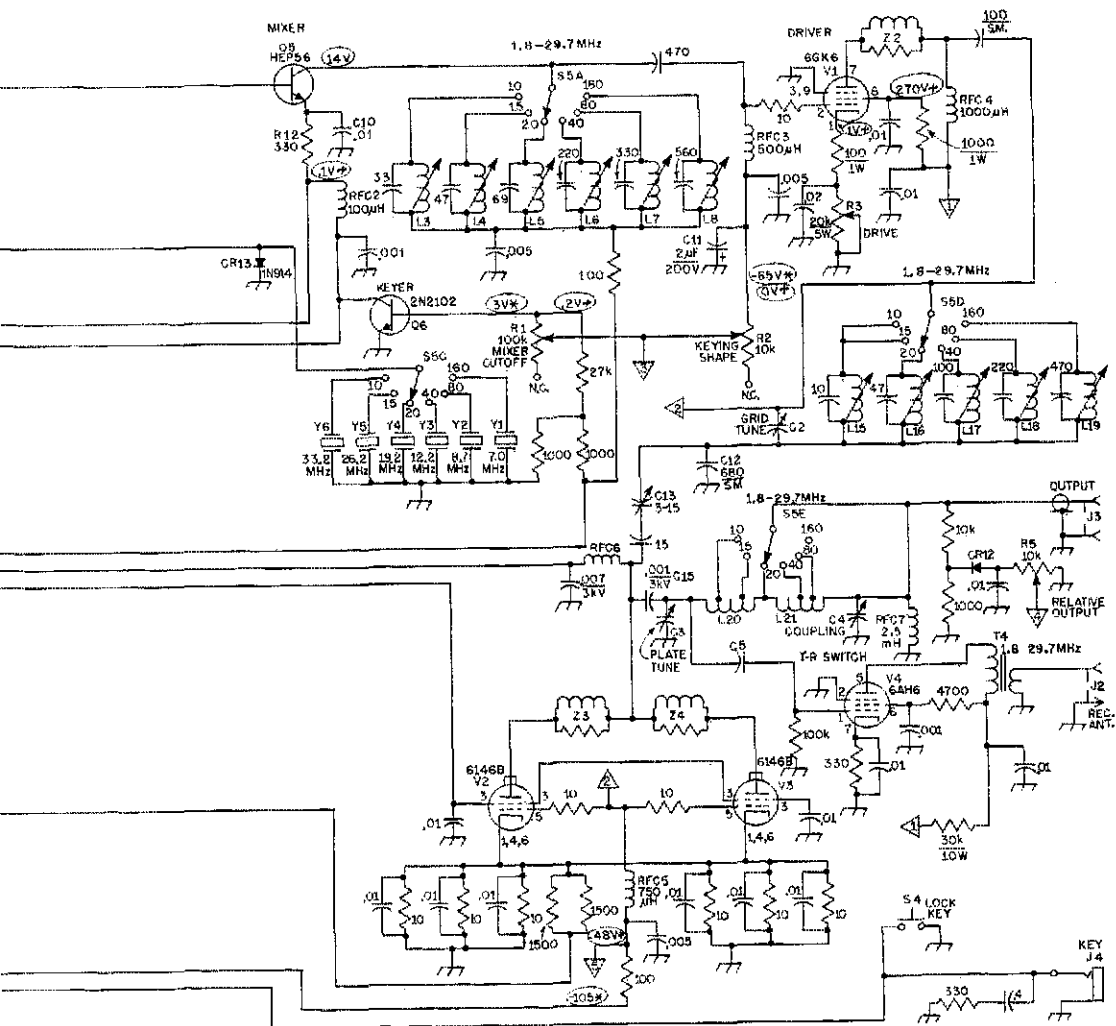


Fig. 1 — Circuit diagram for the T-9er. Component designations not listed below are for text reference.

- C1 — 200-pF air variable (Hammarlund HFA-200A).
- C2 — 100-pF air variable (Hammarlund MAPC-100B).
- C3 — 300-pF air variable (Hammarlund RMC-325-S).
- C4 — 1200-pF air variable (J. W. Miller 2113).
- CR1-CR12, incl. — 1000-PRV, 2.5-A (Mallory M2.5A or equiv.).
- CR13 — Silicon small-signal switching diode (1N914 or equiv.).
- DS1, DS2 — Neon indicator lamp, 117-V (Leecraft 32-211).
- J1, J2 — Phono jack, single hole mount.
- J3 — Coax chassis connector, type SO-239.
- J4 — Open-circuit key jack.
- L1 — 2.3-H filter choke (Stancor C-2304 or equiv.).
- L2 — 2.2- to 4.1- μ H slug-tuned inductor (J. W. Miller 42A336CB1).
- L3, L16 — 1.0- to 4.1- μ H slug-tuned inductor (J. W. Miller 42A156CB1). Both coils are rewound

- with the wire supplied: 3 turns spaced over a 3/4-inch length.
- L4, L9, L10, L11, L15 — 1.0- μ H slug-tuned inductor (J. W. Miller 21A106RB1).
- L5 — 2.2- to 4.1- μ H slug-tuned inductor (J. W. Miller 42A336CB1).
- L6 — 1.6- to 2.7- μ H slug-tuned inductor (J. W. Miller 21A226RB1).
- L7, L8, L13, L14, L18, L19 — 6.8- to 8.5- μ H slug-tuned inductor (J. W. Miller 21A686RB1).
- L12, L17 — 1.5- to 1.8- μ H slug-tuned inductor (J. W. Miller 21A156RB1).
- L20 — 9 1/2 turns, 8 tpi, 1 1/2-inch dia tapped from tube end at 2 1/2 turns for 10 meters and at 4 3/4 turns for 15 meters (B&W 3018).
- L21 — 38 turns, 6 tpi, 2-inch dia tapped from J3 end at 18 turns for 40 meters (B&W 3027).
- M1 — 1-mA dc.
- R1 — 100,000-ohm, linear-taper, 2-watt carbon control (Allen Bradley).
- R2, R4, R5, R6 — 10,000-ohm, linear-taper, 2-watt carbon control (Allen Bradley).



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR $\mu\mu\text{F}$); RESISTANCES ARE IN OHMS; k = 1000, M = 1000000.

- R3 - 20,000-ohm, linear-taper, 4-watt, wire-wound control (Mallory M20MPK).
- RFC1 - Three Amidon ferrite beads threaded on a 1/2-inch length of No. 22 wire. A 15-ohm 1/2-watt resistor may serve as a substitute. (Amidon Assoc., 12033 Otsego St., N. Hollywood, CA 91607.)
- RFC2 - 100- μH rf choke (Millen 34300-100).
- RFC3 - 500- μH rf choke (Millen J300-500).
- RFC4 - 1000- μH rf choke (Millen 34300-1000).
- RFC5 - 750- μH rf choke (Millen 34300-750).
- RFC6 - 1-mH rf choke (E. F. Johnson 102-752).
- RFC7 - 2.5-mH rf choke (Millen 34300-2500).
- RFC8, RFC9 - 50- μH rf choke (Millen 34300-50).
- S1-S4, incl. - Spst push button (Calectro E2-144).
- S5 - Ceramic rotary switch, 5 poles, 6 positions, 5 sections (Centralab PA-272 index with 5 type XD wafers).
- S6 - 2-pole, 6-position, single-section rotary (Centralab PA-2003).

- T1 - 117-volt primary; secondary 760 volts at 220-mA, center tapped; 5-V at 3-A; 6.3-V at 5-A (Stancor P-8170 or equiv.).
- T2 - 117-volt primary; secondary 125 volts at 50 mA; 6.3-V at 2-A (Stancor PA-8421 or equiv.).
- T3 - Primary: 8.2- to 8.9- μH slug-tuned inductor (J. W. Miller 46A826CPC). Secondary: 2 turns No. 22 enameled wire wound on the cold end of the primary.
- T4 - 20 turns, No. 24 enameled wire wound on a 1-inch long, 1/2-inch dia iron core from a slug-tuned coil form. The secondary is 3 turns No. 24 enameled wire wound over the cold end of the primary.
- U1 - Transient voltage suppressor, 120-volt (General Electric 6RS20SP4B4).
- Z2 - 3 turns No. 22 wire space-wound on a 100-ohm, 1-watt composition resistor.
- Z3, Z4 - 5 turns No. 18 wire space-wound on a 100-ohm, 2-watt composition resistor.

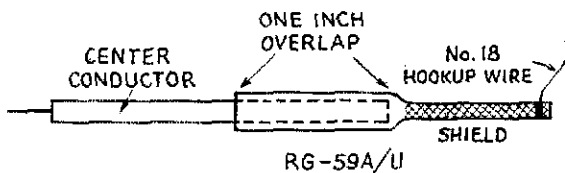


Fig. 2 - A high-voltage capacitor is constructed from a 3-inch piece of RG-59A/U. A 1-inch overlap between the braid and center conductor provides the correct amount of coupling for the T-R switch.

The Power Amplifier

A pi-network output circuit is employed with a pair of parallel-connected 6146Bs. Six 10-ohm resistors are connected between the cathodes and ground. Voltage developed across these resistors is used to indicate cathode current on the meter.

The amount of screen voltage is determined by the position of S3. When this switch is closed, the screen voltage is 150. Releasing S3 places R13 in series with the screen bus, lowering the voltage to 50. This lower voltage limits the transmitter input to approximately 60 watts. A neon lamp, DS2, has been included to indicate the position of S3. R15 and R16 form a voltage divider which allows ignition of DS2 during high screen-voltage conditions only.

A T-R switch, V4, permits using the same antenna for transmitting and receiving. The theory and operation of this unit was described in an earlier *QST*.² An antenna relay is not required.

Metering

The operating conditions of the final-amplifier stage may be checked with the panel meter, M1. A 6-position switch allows monitoring of grid current, relative output, screen, plate and bias voltages, and cathode current. The range and typical values are listed in Table 1.

The Power Supply

A silicon-diode full-wave bridge rectifier is used in the secondary of T1 to produce slightly over 1000 V dc during no-load conditions. Although this is somewhat high for 6146Bs, it has not shortened tube life. A choke-input filter is

² Myers, "Stepping Up TR Switch Performance," *QST*, December, 1967.

TABLE I

Meter Switch Positions

Panel Designation	Function	Range	Relative Readings	
			Key Up	Key Down
G	Grid Current	0-10 mA	0	2
O	Relative Output	-	0	*
S	Screen Voltage	0-200 V	155	150
V	Plate Voltage	0-2 kV	990	910
B	Bias Voltage	0-200 V	105	60
P	Cathode Current	0-500 mA	0	260

* R5 should be adjusted for a 3/4-scale reading during full-power-output conditions.

connected in the transformer center-tap lead to obtain 300 volts for powering the driver tube and the T-R switch. Sixteen volts of dc for operating the solid-state circuitry are obtained by rectifying and filtering the combined output of the two filament windings, which are connected in series. If the windings buck each other, producing no voltage, one set of leads should be reversed.

Final-amplifier screen and bias voltages are developed by T2. This part of the supply uses one half-wave rectifier for each voltage.

TABLE II

Measuring point to ground	Resistance (ohms)	Voltage
V1 - Pin 7	20,000	335
Pin 8	21,000	330
Pin 2	7,100	-47
V2 - Pin 3	25,000	155
Pin 5	10,000	-92
plate cap	30,000	980
V4 - Pin 5	20,000	335
C12	300	16

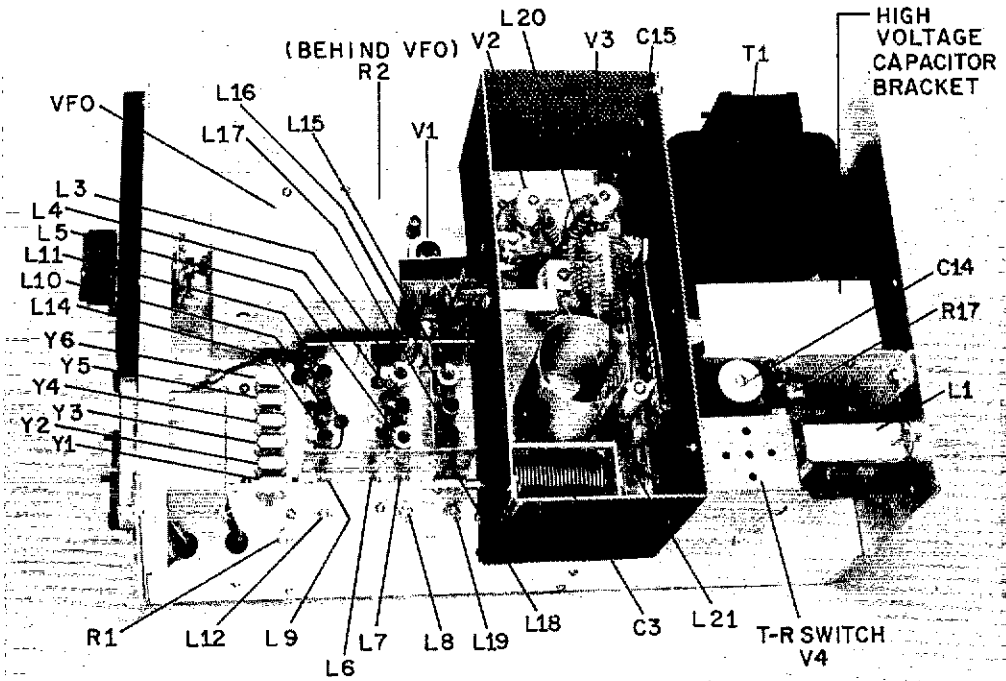
Construction

The transmitter is completely self-contained. It is built on a 10 x 17 x 3-inch chassis with an 8 1/2-inch-high front panel. Shielding is used between each stage and between each band-switch wafer as shown in the photograph. The final-amplifier section on top of the chassis is completely enclosed in a perforated aluminum shield. Small pieces of circuit board are soldered together to form a compartment for the slug-tuned coils. The etched circuit board for the buffer, Q3, and the mixer, Q5, is mounted vertically between the slug-tuned coil compartment and the driver tube, V1. An aluminum box measuring 2 1/2 x 2 1/4 x 1 3/4 inches is used as a meter enclosure.

Most of the power-supply components are mounted on the rear quarter of the chassis. The bracket located next to the power transformer supports the three filter capacitors for the high-voltage supply. Accidental contact with the 1000-volt line is prevented by the top lip.

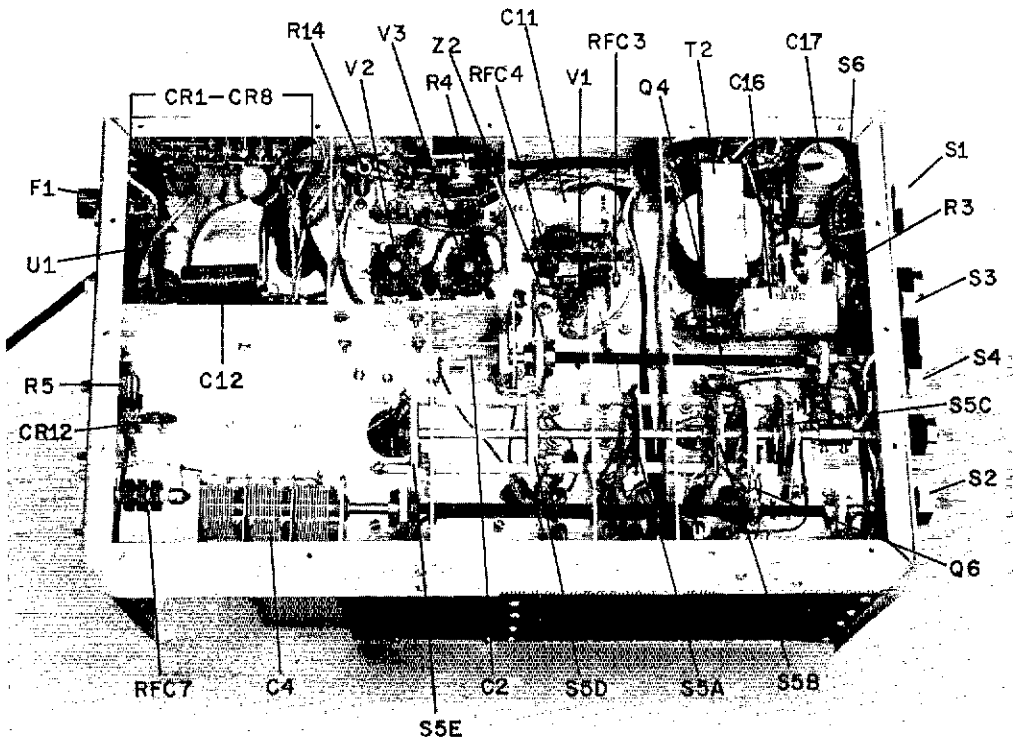
The T-R switch, V4, is mounted inside a Minibox attached to the rear of the amplifier shield compartment. The signal-input connection to V4 is made through the shield. Five holes in the top of the Minibox cover provide ventilation for the 6AH6.

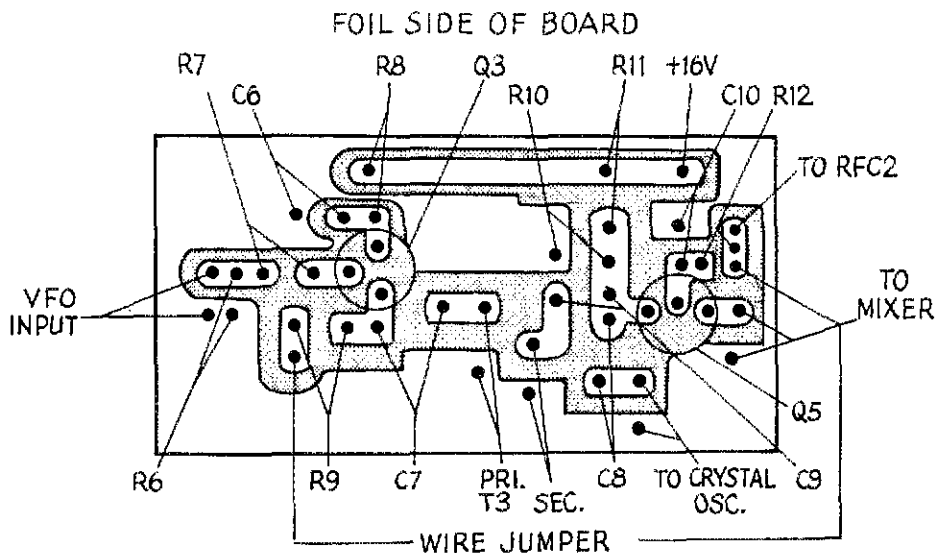
The VFO is built on an etched circuit board and is completely enclosed in the shield cover behind the tuning dial. In order to enhance mechanical stability, the cover is made of 3/16-inch-thick aluminum. A small hole is drilled in the side of the cover to allow for adjustment of L1.



▲ Top view of the T-9er.

▼ Chassis bottom view. The opening next to S5E is needed to make connections to L20 and L21.





A full-size template of the mixer board.

All of the wiring between stages is done with shielded cable. Additionally, all leads to the meter-switch compartment are shielded.

A capacitor constructed from a short piece of RG-59A/U is used for C5 (Fig. 2). The shield and inner conductor overlap approximately 1 inch. If a ceramic capacitor is used at this point, it should have a capacitance of roughly 3 pF, and a voltage rating of 3 kV.

A full-size template of the mixer board is shown in Fig. 3. Shielded wire must be used between it and the other points in the circuit, as well as for the jumper lead.

Adjustments

Aligning a complex transmitter is difficult without the use of test gear, so a grid-dip oscillator, a VFM, and a general-coverage receiver are required here.

Before power is applied to the T-9er, resistance measurements should be made at several points to assure there are no wiring errors which could cause damage to the power supply. Typical resistance values are given in Table 2. Caution! When primary power is applied, lethal voltages are present at all times. Allow several minutes for the bleeder resistors to discharge the capacitors after the power is removed. Then, it is a wise practice to "screwdriver test" (short circuit) the capacitor bank. All of the voltage points listed on the circuit diagram, Fig. 1, should be checked.

The general-coverage receiver is used to check the operation of the heterodyne oscillator on each crystal frequency. Then, the receiver antenna is coupled to pin 2 of V1 through a 100-pF capacitor. By setting the band switch at 160 meters

and adjusting the VFO signal to 5.2 MHz, a signal should appear at 1.8 MHz when the spotting switch is depressed. Adjust L3 for maximum S-meter reading. Tune L4 (80 meters) through L8 (10 meters) in a similar manner. All of the tubes should be removed for these tests.

The biggest pitfall in aligning the mixer is tuning the output circuit to something other than the desired frequency. For instance, on 20 meters, the mixer can be tuned to the third harmonic of the VFO, producing output at 15.6 MHz! There are a few similar combinations which might be encountered.

After determining that the solid-state circuitry is functioning correctly on each band, the tubes are installed and the driver coils are adjusted. To set the final-amplifier bias, set the drive control at minimum (ccw), depress the key, and adjust R4 for a PA cathode current of 5 mA.

The entire alignment must be "touched up" under full-power-output conditions. The heterodyne oscillator coils should be detuned to a point where the power output drops approximately 2 percent. This procedure assures proper oscillator injection at the mixer. When the rf alignment is completed, a receiver should be connected to J2. If any backwave is heard under key-up conditions, adjustment of R1 should eliminate it.

In a transmitter of this type, leads to the band-switch lugs contribute stray inductance and capacitance. For this reason, the builder is advised to "tack" the mica capacitors across the inductors until it is determined that the various circuits will resonate at the proper frequencies. Only then should the capacitor leads be soldered permanently in place.

Performance

Power output from the T-9er is roughly 150 watts on 160 through 20 meters. On 15 meters the

output drops to 125 watts, and on 10 meters it is slightly over 100 watts. The reduced output on the higher bands is caused by marginal drive to the 6GK6. It is not considered important enough to add another buffer stage with its associated coils and band-switch wafer.

The screen voltage (SV) switch is included to provide a low-power tune-up function. It is best not to operate (on the air) in the low-voltage position. If low power operation is desired, the drive can be reduced during normal screen-voltage conditions.

Every effort has been made to produce a TVI-free transmitter. The addition of a low-pass filter should make harmonic radiation almost immeasurable.

Keying Wave-Form Adjustment

A wide range of keying characteristics is available. R2 should be adjusted while observing the transmitted signal on an oscilloscope. Typical patterns are shown in *The Radio Amateur's Handbook*. If an oscilloscope is not available, keying adjustment could be made on the air with

the help of a local amateur. These tests should be made on a dead band, however, thus preventing needless QRM!

Adequate Planning

It is worth mentioning that this is not a beginner's project. Building the T-9er should not be attempted by someone who lacks experience in constructing amateur gear.

One of the biggest problems these days is that of obtaining parts. The builder should arm himself with several parts catalogs and be familiar with the minimum billing requirements of each.³ A project such as the T-9er requires as much planning in the parts procurement phase as in the layout work.

Part II

An accompanying kW amplifier - The S-9er - will be presented in a subsequent issue of *QST*. It uses a single 3-500Z triode in a grounded-grid circuit.

QST

³ DeMaw, "The Ham Builder's Nightmare," *QST*, October, 1970.

Strays

The article by Moore, "Homebrew DX Prediction" (*QST*, August, 1971, p. 53), was scheduled for publication just as we received the Office of Telecommunication's announcement that their monthly publication, *Ionospheric Predictions*, was being discontinued. (See "Publication of Ionospheric Predictions," Technical Correspondence, same *QST* issue, p. 40.) The appearance of both of these items in the same issue of *QST* may be confusing to some of our readers.

Advance information has been obtained from the Institute for Telecommunication Sciences, Boulder, Colo., regarding the new volumes. Volume 1, titled *The Estimation of Maximum Usable Frequencies from World Maps of MUF (ZERO) F2, MUF (4000) F2 and MUF (2000) F*, describes the maps of the remaining three volumes and describes their usage in the estimation of maximum usable frequencies (MUF). In effect, this new volume takes the place of *Handbook 90*, described by Moore in his article, although the procedure to be used for making estimations manually will not be the same.

To use the predictions for estimating MUFs, at least one of the three remaining volumes is required - the one applicable to the level of sunspot activity for which predictions are to be made. Volume 2 presents maps for a predicted Zurich smoothed relative sunspot number of 10 (minimum solar activity), Volume 3 for 110 (maximum solar activity period of an average solar cycle), and Volume 4 for 160 (maximum solar activity period of an above average solar cycle). For periods such as exist now (the predicted number for October, 1971, is 57.8) it would be necessary to use both Volumes 2 and 3, making a linear interpolation of the data obtained from each. Thus, the 4-volume set will permit estimations to be made for any period of solar

activity, once the relative sunspot number is known or predicted. In the future, information on predicted relative sunspot numbers will be contained in Propagation Forecast Bulletins, transmitted by WIAW and many Official Bulletin stations.

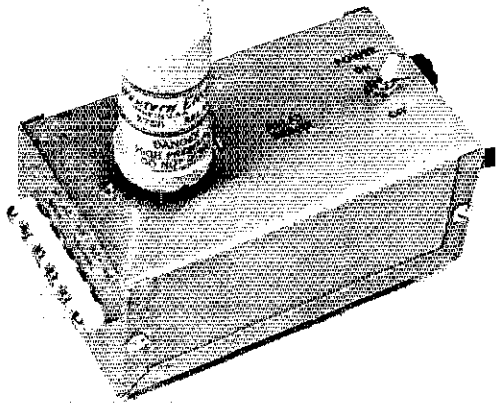
The new *Ionospheric Predictions* report, available approximately October 1, 1971, will be distributed through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The price for a complete set is \$9.30. Individual volumes may be purchased at the following prices: Vol. 1 - 30 cents; Vols. 2, 3, and 4 - \$3.00 each volume. Stock numbers are: Vol. 1 - 0300 0318; Vol. 2 - 0300 0319; Vol. 3 - 0300 0320; and Vol. 4 - 0300 0321. These are volumes of the OT Telecommunications Research and Engineering Report *Ionospheric Predictions*, OT-TRER 13.

- - - - -

QST has twice run warnings about possible radio transmitter interference to electronic anti-skid and braking systems in certain luxury automobiles. The more we "hear" of the matter, however, the less concrete the information seems to become. Will any readers who have had *first-hand* experience with RFI to these systems please write to WJED at Hq? We'd like the following details: 1 Type of automotive electronic system involved. 2 Year and make of automobile. 3 Power and frequency of transmitter and antenna location. 4 What operator action or equipment condition was necessary to cause a problem? 5 What happened that shouldn't have, or what didn't happen that should have? 6 Comments. Specifically, anything unusual about the situation; e.g., being near a broadcast station, or no trouble in humid weather, etc.

A Relay Driver

for Use with Solid-State Keyers



The relay driver as constructed by WA1CQW. The Western Electric 275B relay plugs into an octal socket.

SOME OF today's transistorized electronic keyers will not operate with all transmitters because of the limitations of the transistor in the switching stage of the keyer. In many cases, voltages above 100 volts and currents greater than 30 to 40 mA will damage the switching transistor. One solution to this problem is the addition of an external circuit to actuate a keying relay, as shown in Fig. 1. The relay contacts then key the transmitter.

A medium-voltage power supply provides the current needed to operate the relay, K1. Relay keying is accomplished by closing the terminals connected to the relay coil. Keyed current is 8 mA, while the open-circuit voltage at the key-line terminals is less than 40 V — safe enough values for virtually any transistor-output keyer. And by observing the voltage polarity of the key-line terminals, the driver may be keyed with either an npn or a pnp transistor. The relay may also be keyed with a hand key connected to the key-line

terminals. This would avoid contact arcing and the relatively high voltages which result across the open key terminals when a medium-power transmitter is cathode keyed. In addition, the relay driver may be used in conjunction with light-duty keying relays, such as reed relays often used in solid-state electronic keyers, if it is desired to key large currents. The mercury-wetted contacts of K1 are fast acting with minimal bounce. This relay will have no problem following speeds of 50 or 60 wpm, and it is quiet in operation. For proper results, however, the relay must be operated in the vertical position. Otherwise the mercury pool will cause false closure of the contacts.

Construction

The relay driver shown in the photographs is built into a metal box measuring 2 1/8 x 3 x 5 1/4 inches. The power-supply portion of the circuit is contained completely inside the enclosure, to avoid

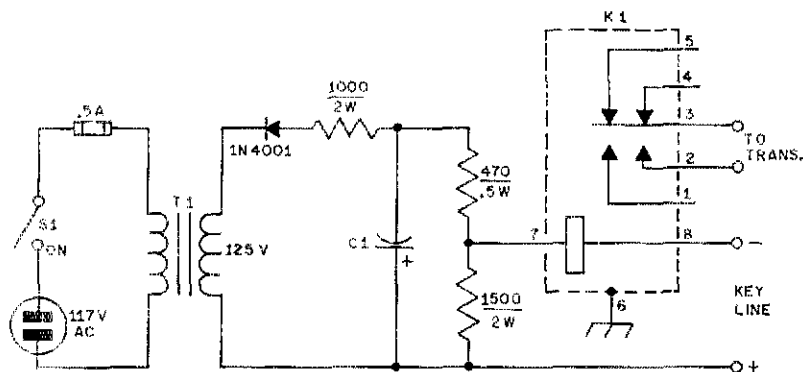
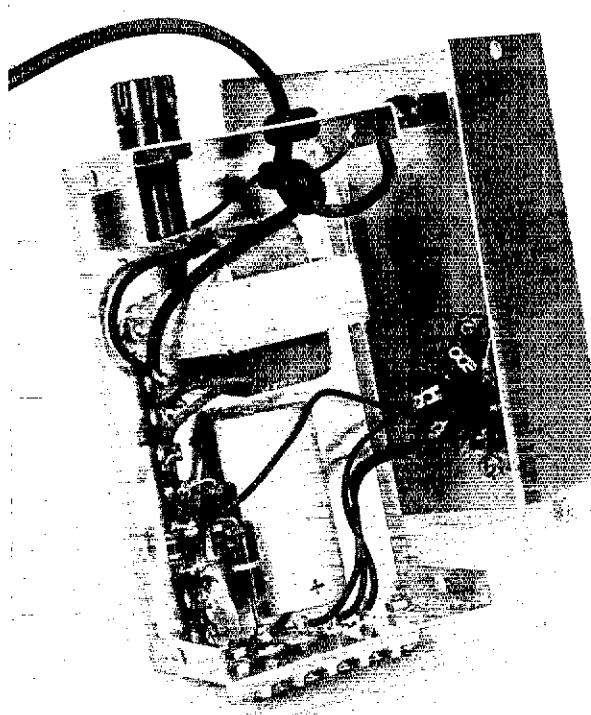


Fig. 1 — Schematic diagram of the relay driver. Resistances are in ohms.

- C1 — Electrolytic; any value between 10 and 100 μ F. 250- or 450-V rating.
- K1 — Hermetically sealed relay, 4500-ohm, 8-mA operating current; mercury-wetted spdt contacts (Western Electric 275B or equiv.).

- S1 — Spst toggle.
- T1 — Plate-filament power transformer, 125-V 15-mA and 6.3-V 0.6-A secondaries; 6.3-V secondary unused (Stancor PS-8415 or equiv.).

This inside view shows the transformer mounted on the enclosure, and the rectifier and filter components mounted on a tie-point strip. The 4-lug screw-terminal strip for making external connections is ceramic, a Millen No. E-304; a phenolic strip may be used instead.



having exposed voltages which could be dangerous to an operator. Although a 4-lug screw-terminal strip was used for making external connections to the instrument, phone or phono jacks could just as well have been used. Having all connections isolated from the metal enclosure offers advantages, though, if versatility regarding polarity of connections is desired — there need be no worry about negative- or positive-ground configurations.

Parts layout is not critical. Several types of relays having mercury-wetted contacts are available either new or on the surplus market,¹ and any having a dc coil resistance in the range of 4000 to 5000 ohms should work in this circuit. Be sure to take variations in pin connections into account. — *KIPLP*

¹ Surplus W. E. 275B relays are available from Barry Electronics Corp., 512 Broadway, New York, NY 10012, under Catalog No. 20-145GA.



October 1921

... Whaaat?! We are back to "Citizen Wireless" on the cover this month. Thought I'd seen the last of that sort of thing.

... Some twenty pages are devoted to a full report on the first ARRL National Convention. Every district was represented and there were quite a few booths for the display of new apparatus, including the Grebe CR8. Matty, 9ZN, was the gavel pounder. League President Hiram Percy Maxim delivered the opening address and the text is given in full. Don Hoffman, 8UX, did the cartoons.

... The forthcoming transatlantic sending tests this winter are the subject of a piece which also introduces Paul Godley to the gang. Paul was the first to put the three-circuit tuner to work on short waves and fathered the famous Paragon receivers. Paul is being sent to Scotland by the League. Everybody getting to work on his rig, uppin' the power, etc. Some brand new stations will be built, too. I had a hand in one of them, 2BML, which got across handily.

... The editorial makes further comment on the convention. It was a great success from all angles. Secretary of Commerce Hoover sent Chief Inspector Terrell up from Washington to express the Department's good will toward the amateurs and to offer their services for the advancement of the art. And, of course, the great goings-on somewhat delayed the publication of this issue.



October 1946

... An aerial view of our Headquarters station W1AW in Newington, Conn., is our cover picture. The big rhombic is still there and still one of the very best. (What are now streets look like cow paths.)

... K. B. Warner laments that circuits and rigs are getting so complicated he has difficulty in keeping up with the rapid advances in the art. He also seems to see an increasing and deplorable trend toward the use of more and more manufactured products. (How right he was!) He also chides the manufacturers of some broadcast receivers about their poor design in the matter of avoiding ham interference even from well designed and operated rigs.

... Richard M. Smith, W1FTX, describes his medium power bandswitching transmitter. Complete with photos and wiring diagram, it winds up with a 4-125A final. He also tells how to adjust it. Judging from the photos, it appears to be a beautiful piece of work.

... The FCC announces that two-letter calls may be applied for by those who have previously had such a call.

... For those interested in experimenting with the 24-cm. band, Frederick A. Jenks, W2MTH, has a piece on a "soup can" wavemeter for this band. Complete instructions for building it are given.

WIANA

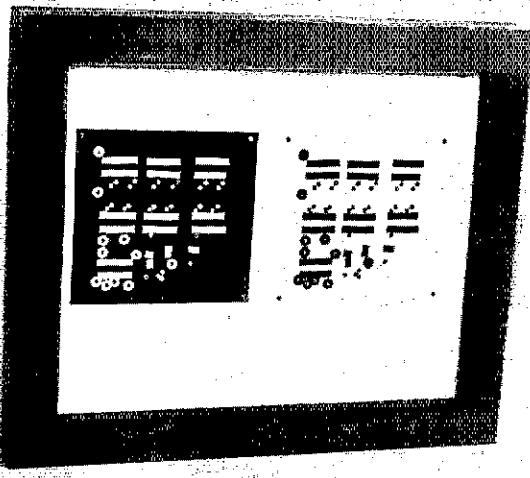


Fig. 1 — The art work (r.) and the resulting negative (l.) contact printed on Ortho A Litho film.

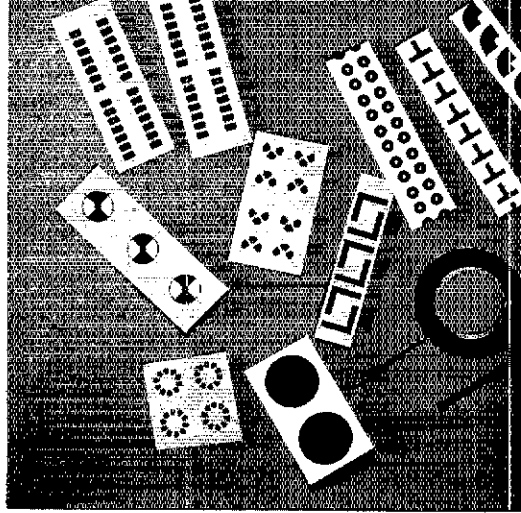


Fig. 2 — Some of the drafting aids which are available.

Fabrication of Printed-Circuit Boards

BY E. R. V. ANDERSON,* K6AWG

FOUR PRINCIPAL ways to fabricate printed circuit boards are available to the amateur. Each one requires a certain amount of skill acquired through practice; in addition, some knowledge of drafting, photography, and electronic circuit building is helpful in developing self-assurance in the work. But after the various techniques are mastered, numerous projects become possible using these same skills.

The first technique, and probably the most applicable to the needs of the amateur experimenter, is **SCREEN PROCESS PRINTING**. This process is also called **SILK SCREENING**, since the screens were originally made of silk stretched on a wood frame. We now have screens made of monofilament synthetic fibers, as well as of metal cloth, and these have characteristics which are superior in some respects for the screening process.

In this process, a stencil of the circuit interconnections is made and applied to a porous screen. Etch-resist lacquer is squeezed through the stencil and screen onto a copper-clad board, a positive print in the etch-resist material being obtained. After drying, the board is immersed in etching solution which removes the unprotected copper, leaving the printed circuit.

A second and important technique is **PHOTO-SENSITIVE RESIST** printing. The copper-clad board is covered by a light-sensitive chemical coating and is then exposed through a photographic negative to ultraviolet light. After development by a special solution, a positive image of the circuit is left in the etch-resist material on the

copper-clad board. Copper-clad boards may be obtained already coated by the manufacturer, or the coating material may be obtained in spray cans or in bulk, to be applied by the technician.

While this method is direct and simple, the details for obtaining good results require rigid control. In addition, the cost of materials is greater; only one board at a time can be made; and auxiliary equipment, such as an oven for controlled drying, is desirable.

A third method involves the application of a metallic-silver lacquer through a stencil directly onto plain unclad boards. The material may be sprayed on, or applied by screen-process printing, creating the circuit directly without etching.

The fourth method is to apply the etch-resist material by hand, as described in *QST*.^{1,2} This works well, but is much more time consuming and is much less accurate in small detail.

In the paragraphs which follow, the steps for screen process printing are described in detail. They are:

- 1) Preparation of the artwork.
- 2) Preparation of the stencil.
- 3) The application of the etch-resist to the copper-clad board. (Boards clad with gold, silver, or other metals are also used.)
- 4) Etching the copper away.
- 5) Drilling the board to permit mounting of the circuit components.
- 6) Final assembly and testing.

¹ Schiebold, "Fast 'n' Easy Printed Circuit Boards," *QST*, August, 1969. Also see Fisk, "Sheet Frisket for Etched Circuit Boards," Technical Correspondence, *QST*, November, 1969, p. 45.

² DeMaw, "Etched-Circuit Boards — Make 'em at Home," *QST*, January, 1970.

* 11600 Wilshire Blvd., Suite 326, Los Angeles, CA 90025.

Fig. 3 - The finished art work for the front of the board using drafting aids.

Step 1 - Preparing the Art Work

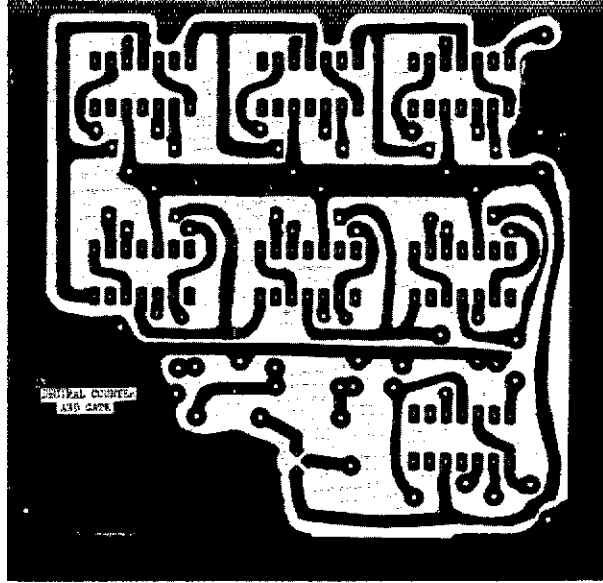
While preparing the art work, a schematic of the circuit to be designed must be available for frequent reference. By "cut and try" methods, the components are arranged to determine what size board will be necessary to accommodate a given circuit. A modest amount of practice will be required to find the most economical layout without crossing connections. When crossed connections are unavoidable, they can be made by using wire jumpers on either side of the board.

Grid drafting paper, and grid Mylar (see Fig. 1), marked in 0.2- or 0.1-inch squares are available at the drafting supplies store. The author does the preliminary layout on paper because many starts will be made before the optimum design is arrived at. The grid permits accurate dimensioning of the various components. A 1/2-watt resistor, for example, requires 1/2 inch between connectors, when it is mounted flat. An IC dual-in-line package has seven or eight pins on a side, spaced 0.1 inch apart, each row separated by 0.3 inch. The size of the art work must remain accurate but large enough to be worked easily. The author therefore designs the layout at exactly twice the size of the final circuit board; afterwards by photographic reduction, a negative and positive transparency of the final circuit are obtained.

A statement concerning drafting aids should be made here. Tapes of various widths, as well as terminal rounds, corner pieces, and socket layouts for ICs, transistors, and tubes, are available. These are black and have adhesive material on the reverse side. If they are used instead of attempting to draw the design, neat, precise, and professional-looking art work can be achieved with little drafting experience. Fig. 2 shows some of these aids.

After the final design is on paper (usually after many changes), the layout is reproduced on the grid drafting Mylar, with the grid serving to position the components. The interconnections are then made with drafting tape, after which the unused areas of the work are blacked out with india ink or poster paint (Fig. 3).

It is well to prepare the Mylar before drafting begins. The Mylar and a piece of white art board are cut to exact size and sandwiched together with double-sided adhesive tape (Fig. 1). The design on Mylar with a white backing is finally mounted on a sheet of black art paper, so that the reducing camera sees only a black and white positive rendition of what is to be the circuit board (Fig.



3). The next step is to obtain a positive transparency, produced photographically at exactly a two-to-one reduction in size. All blueprint firms have these facilities and will perform the work at modest cost.³

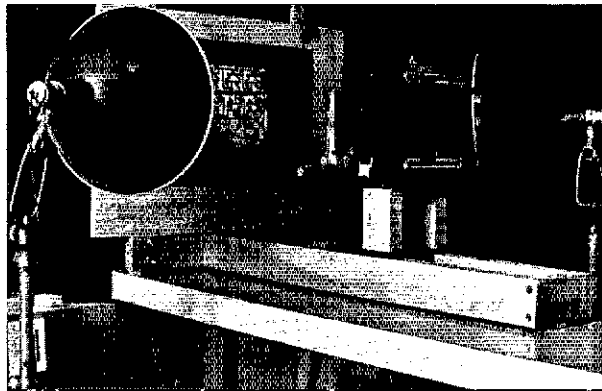
If both sides of the board are to be etched, the register for printing the reverse side must be accurate, and two pieces of art work, one for the front side, the other for the reverse side must be prepared. A negative transparency of the art work (Fig. 1) is used in preparation of the stencil for the reverse side, so that every point where components are to be mounted will be free of copper, thus preventing shorts to ground. Another scheme is to protect the copper on the reverse side with etch-resist material during the etching process, and after drilling, to mill or file away by hand the unwanted copper. Needless to say, this latter method is rather laborious.

For one wishing to do his own photographic reproduction, camera equipment and darkroom facilities must be available. The author uses the following equipment:

- 1) A 4 x 5-inch Speed Graphic camera with an f/32 127-mm lens.
- 2) Darkroom facilities including a 4 x 5-inch contact printer.
- 3) An easel constructed in a home workshop (Fig. 4).

³ \$6.50 in Los Angeles during 1970.

Fig. 4 - The easel and camera arrangement for photographic reduction of the art work.



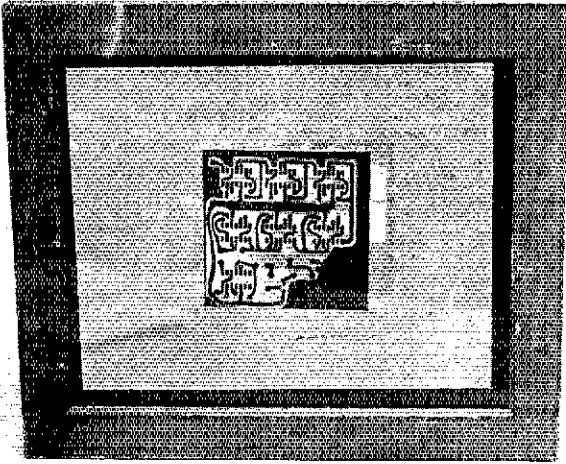


Fig. 5 - The positive transparency and stencil material mounted in the frame, prepared for exposure to ultraviolet light.

The easel can accommodate a drawing board upon which the art work is attached. The camera is mounted on a slide, so that the exact point for the desired reduction and focus can be ascertained. Preliminary trial with rulers mounted on the drafting board, and on the ground glass of the camera, was helpful in this determination.

The photographs, both positive and negative, are prepared on lithographic copy film⁴ which renders blacks and whites only with no half tones. The grid of the Mylar art work does not photograph on this film. Most ordinary films are panchromatic, recording shades of all colors, and are not suitable for this purpose.

The exposure is made at $f/32$ to obtain the sharpest focus, with two photoflood lamps as a light source, each placed at 45 degrees and approximately three feet from the art work (Fig. 4). The exposure time is three seconds with this arrangement. Special developer, producing high-contrast negative or positive transparencies with completely opaque blacks, is used. Thereafter, processing is the same as in ordinary photography. A contact print on the same film provides the positive transparency necessary to make the stencil.

Step 2 - Preparing the Stencil

McGraw light-sensitive stencil material No. 4571⁵ on stable-base vinyl is available in large sheets or in smaller packages designed for school

⁴ Kodak Kodalith Ortho Type 2, or DuPont Cronar Ortho A Litho film.

⁵ McGraw Colorgraph Co., 175 W. Verdugo Ave., Burbank, CA 91502.

graphic art courses. A chemical developer which is dissolved in water, and afterwards stored in the refrigerator, is provided with each kit. Hydrogen peroxide, 3 percent, as purchased in the pharmacy, serves just as well, if diluted to 1/2 percent and discarded after each run (one part of 3-percent H_2O_2 to five parts of water).

The stencil material is exposed to an ultraviolet light source in an ordinary photographic proofing frame provided with a Plexiglas front (Fig. 5), since ordinary glass is opaque to ultraviolet light. The orientation of the positive transparency and of the stencil material is important. The frame is opened and placed with the Plexiglas side down on a flat surface. The positive transparency is positioned on the Plexiglas so that when viewed from above, it appears in the right orientation (i.e., not as the mirror image of the art work). An ample piece of the unexposed stencil material is placed on top of the transparency with the vinyl backing *next* to the film, and with the emulsion side of the material uppermost. The back of the frame is then closed and all is ready for the exposure.

The midday sun on a clear day at middle latitudes will expose the stencil material properly in 30 to 60 seconds. Longer times will, of course, be required for less intense sunlight. Since the author works mostly at night, he uses a 15-watt black-light fluorescent lamp mounted in an ordinary fixture (Fig. 6). A stencil exposed for 30 minutes, with eight inches between the printing frame and the light source, develops in 2 to 3 minutes. After development, the stencil is washed in hot water (110 to 120 degrees Fahrenheit) until the unexposed material softens and washes away, leaving the negative image on the vinyl backing. The stencil must then be washed for several minutes in cold water to harden the gelatin material which constitutes the image.

Our attention must next be directed to the silk screen (Fig. 7). The screen may indeed be of silk, graded as to fineness of the mesh as "10XX" or "12XX." Screens made of nylon or metal cloth have excellent characteristics, but are more expensive. The screen frame generally is not obtainable in assembled form, so, if possible, one should buy the screen at a screen printing supply store where the customer may watch the stretching of the cloth. After observing the procedure once, the amateur should be able to master the technique easily.

A back board made of 3/4-inch plywood, to which the screen is attached, must be obtained. Since one must remove the screen from its back board at various stages of the process, hinged clamps, called Jiffy clamps (Fig. 8), are desirable.

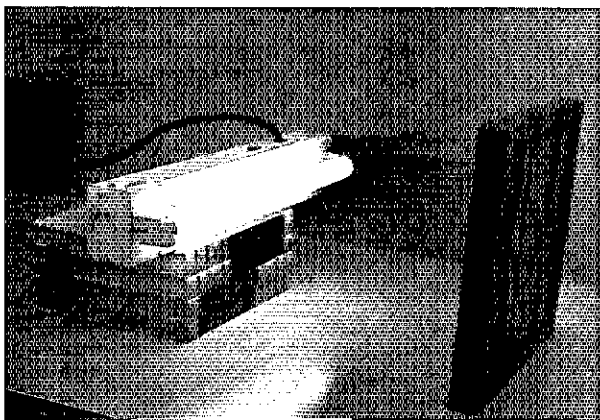
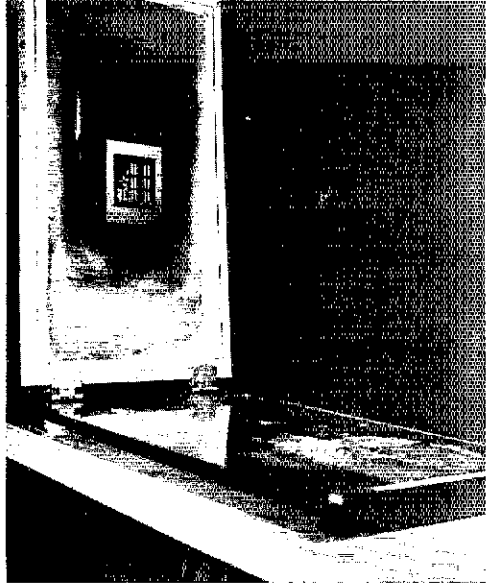


Fig. 6 - The ultraviolet light source and printing frame set up for exposure of the stencil material.

Fig. 7 - The printing screen with stencil mounted on the back board by "Jiffy" clamps.



Ordinary hinges with removable pins will also serve. A screen of something like 15 x 28 inches is preferable to a smaller one, as it allows more space for manipulation of the squeegee. A new screen must be scrubbed well with trisodium phosphate, followed by an abrasive washing powder such as Ajax, and flushed well afterwards to remove all remnants of the washing compound. This procedure removes any oily residue and sizing, as well as foreign matter which might obstruct the mesh. Furthermore, the stencil will not adhere properly to a poorly prepared screen.

The screen as well as the vinyl-backed stencil, which by now has been prepared, should be wet. The stencil is placed on a hard surface, the stencil side up and the vinyl backing down. The screen, which has been detached from the back board, is lowered carefully into contact with the stencil. The area over the stencil is blotted with absorbent paper toweling to insure intimate contact as well as complete removal of all air bubbles. The screen is then allowed to dry. After the first 15 minutes, under average conditions of heat and humidity, the drying can be forced with the heated air from a hair drier. When the screen and stencil are completely dry, the vinyl will come away, leaving the stencil attached to the screen. If the vinyl does not separate easily, the screen is not dry enough.

Step 3 - Application of the Etch-Resist to the Copper-Clad Board

This step in the process is perhaps the most difficult, and requires considerable skill. An extremely important consideration for success is to have a scrupulously clean copper-clad board. Even a finger print on the otherwise cleaned copper can interfere with the etching process. The author scrubs the board with a suspension of pumice in household ammonia, after which the board is washed thoroughly and permitted to dry. Care should be taken not to touch the cleaned surface.

The area of the screen around the stencil is now covered with masking tape, so that the screen is

protected from the etch-resist lacquer everywhere except through the stencil (Fig. 9). The register of the print is determined by placing the circuit board under the stencil in the best position, then sticking it to the base board with double-sided adhesive tape. Register guides made of thick art paper, and fixed with the same tape, are helpful, especially if more than one board is to be printed (Fig. 10).

The etch-resist lacquer is obtained at the screen printing supplies store. Its consistency, when the can is opened, may not be right for the purpose. The material can be treated with lacquer thinner,⁶ but only slightly. If it is too thick, it cannot be forced through the screen properly; if it is too thin, it will bleed out from the desired markings, contaminating those portions of the board which should remain clear. To obtain the proper consistency, place a portion of the lacquer in another container. Thin this portion so that when it is lifted from the main mass with the mixing stick and allowed to drip back, the bead will stand above the surface for three or four seconds before it gradually disappears.

⁶ Some lacquers require solvents other than common lacquer thinner. Be sure to consult the manufacturer's specification sheet for the particular brand of etch resist being used.

Fig. 8 - A close-up view of the "Jiffy" clamps for holding the printing screen on the back board.

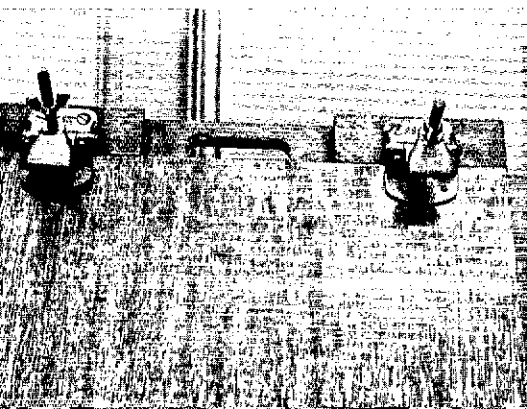
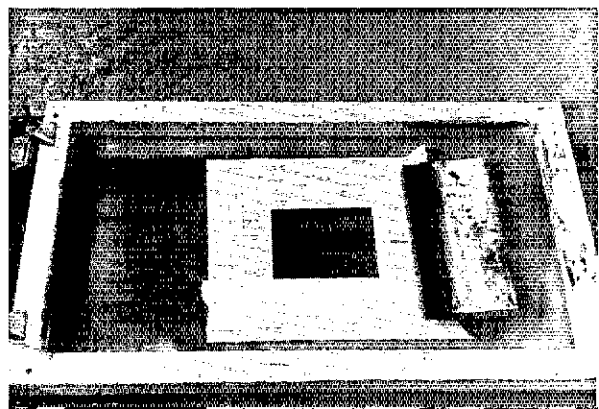


Fig. 9 - The printing screen, the stencil masked with masking tape, and squeegee, ready for printing.



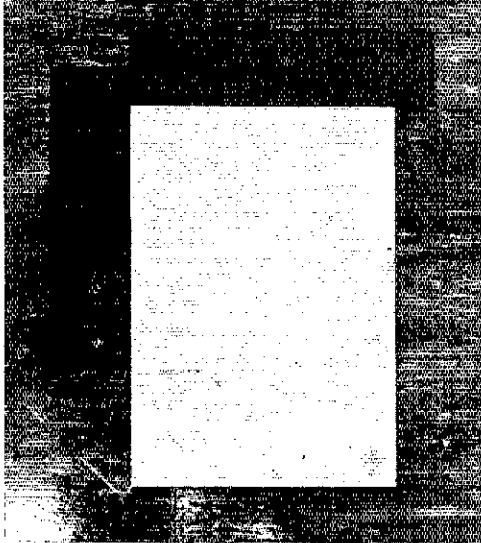


Fig. 10 -- The register margins prepared from heavy art paper fastened to the back board with double-sided adhesive tape. A copper-clad board is shown in place, ready for printing.

Squeegeeing is the next step in the process. Plenty of paper towels should be at hand, as well as a large disposable paper bag to receive the soiled materials at the end of the procedure.

To begin the printing, a line of lacquer is laid neatly with the mixing stick at one end of the stencil, on top of the masking tape. After charging the squeegee with lacquer, it is drawn with firm pressure across the stencil. Prior to the pass, a 1/4-inch-thick strip of wood is placed under the end of the screen frame, so that the screen does not actually touch the work (Fig. 11). When the pass is made, the screen stretches down into contact with the work. If more than one board is to be printed, all boards should be clean and in readiness before the printing begins.

A number of soft, clean rags should be available for the clean-up operation. The soiled masking tape is stripped off the screen and thrown into the paper bag. The screen is then cleaned with a cloth saturated with lacquer thinner. The stencil is durable and should remain in good condition for many printings.

When it is desired to remove the stencil from the screen, the screen is scrubbed briskly with a detergent containing an enzyme, but not a bleaching agent. A soft brush is used. A final scrubbing is given with Ajax followed by a thorough rinsing of both sides with water. The screen is now ready for the application of another stencil.

Step 4 -- Etching the Copper

In the etching process, one of two solutions may be used. Either works well when means are

provided for agitation and warming during the process. These solutions are:

- 1) Ferric chloride, ($FeCl_3$), 500 grams; water to make 1000 milliliters. (This quantity is approximately 33 ounces.)

Since the solution is acid, only earthen, glass, or plastic containers should be used. Metal utensils should not be permitted to contact the solutions. Needless to say, care must be exercised to protect clothing and eyes, and prolonged contact with the skin is not advisable.

- 2) Ammonium persulphate, $(NH_4)_2 S_2O_8$, 250 grams; mercuric chloride, ($HgCl_2$), .060 grams (60 mg); concentrated sulfuric acid (96 percent), 15 milliliters; water to make 1000 milliliters.

The water must be hot to get the salts to dissolve. Mercuric chloride is a dangerous poison if swallowed, so one should carefully wash his hands after working with this solution. Kitchen utensils should *never* be used and then returned to the kitchen cabinet. These solutions are generally available (already prepared) from electronics supply houses where printed circuit materials are sold.

Steps 5 and 6 -- Drilling the Board and Final Assembly

The etch-resist material is removed from the circuit board with lacquer thinner, and again cleaned with pumice in ammonia. For drilling, the author uses a Dremel tool with a No. 2 dental burr. Your dentist can order the burrs for you from his supply house at a cost of less than two dollars per dozen. Carbide burrs are also available at approximately two dollars each. They remain sharp, however -- many times longer than steel ones, even after drilling glass-epoxy boards. Diamond burrs do not work well because they fail to bite in quickly enough to drill an accurately placed hole.

Final assembly, soldering, and testing follow. If the copper is cleaned well before the soldering begins, the results will be superior. If the required facilities are available, dipping the board in hot, molten solder, after liquid flux has been applied, greatly facilitates the soldering. Without the molten solder, just painting the board with liquid flux protects the exposed copper from oxidation while "stuffing" and soldering is going on. All traces of chlorides should be removed, since they are the chief cause of subsequent corrosion in a humid environment.

QST

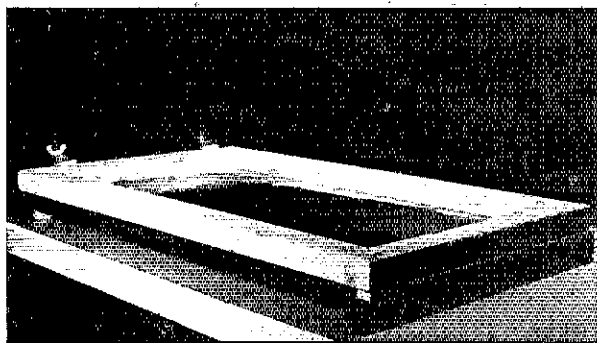


Fig. 11 -- The printing screen in position on the back board, ready for printing. Note the wood strip under the end of the screen. It is used to prevent the screen from touching the work until the actual printing is done.

Voltage Multipliers

BY JACK ALTHOUSE,* K6NY

VOLTAGE-MULTIPLIER circuits have been around for a long time. Most of them were developed in the days when the vacuum-tube rectifier was popular. Unfortunately, when the only rectifiers available are vacuum tubes, voltage multipliers are seldom practical, because many diodes may be needed, and vacuum tubes take up a lot of room. Also, in most of the popular multiplier circuits, the rectifier cathodes are at differing dc potentials, so each tube must have its own filament transformer. The silicon rectifiers and the low-cost high-capacitance electrolytic capacitors that are now available eliminate these disadvantages. So, we can dust off a number of the old circuit designs and use them to advantage.

The truth of the matter is, of course, that you don't get something for nothing with the voltage multiplier. If you get twice the dc output voltage of a full-wave rectifier, you have to settle for half the current. At four times the voltage, one-fourth the rated current is available. Still, the switch from tubes to transistors is leaving around a lot of unused 5-volt and 6.3-volt filament transformers in amateur junk boxes that can be used to power transistor rigs.

The 5-volt transformer will deliver more than 50 volts in an octupler circuit. The old filament transformers are usually rated for several amperes; so, after dividing the current rating by the multiplication ratio, there will be several hundred milliamperes of output current available to power a transistorized rig.

The Half-Wave Rectifier

Voltage multipliers are assemblies of half-wave rectifiers connected together in various ingenious ways. Thus, an understanding of the half-wave rectifier is basic to an understanding of multiplier circuits. In Fig. 1, on the half cycle of the ac voltage, when the top lead of the transformer secondary is positive, CR1 conducts and charges the capacitor to E , the peak transformer voltage. On the other half-cycle of the ac, the top lead of the transformer is negative, the diode is cut off, and no current flows through it.

The peak transformer voltage is 1.4 times the rms voltage. For example, a 5-volt transformer will charge the capacitor to 1.4×5 , or 7 volts.

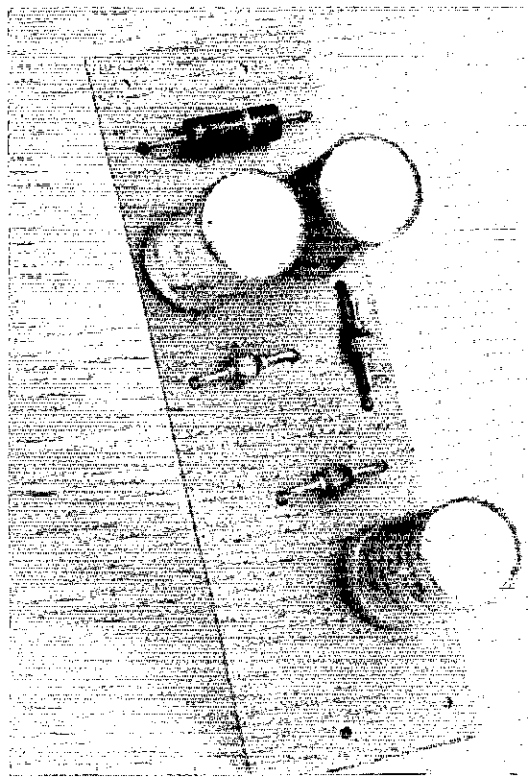
* 2742 Bernardo Avenue, Escondido, CA 92025.

It's nice to be able to get something for almost nothing. A rectifier circuit that develops double or triple the output voltage delivered by a transformer surely must be a good investment. This article describes circuits that deliver dc output up to eight times the peak input ac voltage.

If the power supply has a load (RL in Fig. 1), the capacitor will not charge to the peak transformer voltage. This is because of the voltage drop in CR1. If CR1 is a silicon diode the drop will be about 0.7 volt. In the example above, instead of getting 7 volts from our 5-volt-rms transformer, we will get $7 - 0.7 = 6.3$ volts. This effect is of considerable importance in the high-order multipliers where several diodes are connected in series. Also, during the half cycle when CR1 is cut off, current is flowing out of the capacitor into RL. This causes an additional voltage drop.

Half-Wave Multipliers

The first family of multipliers that we will examine is the half-wave type. They are called half waves because, like the half-wave rectifier, the output capacitor receives current on just one half cycle of the ac input.



A half-wave voltage tripler.

Doubler — Fig. 2A shows a schematic of a half-wave doubler. When the voltage on the top lead of the transformer secondary goes negative, diode CR1 conducts and charges the capacitor to E , the peak transformer voltage. On the other half cycle, the top lead of the transformer is positive and CR1 is cut off, but CR2 conducts. Note that the transformer and the voltage of capacitor C1 are now in series aiding. Thus the output capacitor is charged up to a voltage $2E$, twice the transformer peak voltage.

Power is supplied to the output capacitor every other half cycle, so the circuit is half wave. But, unlike the simple half-wave rectifier, power is drawn from the transformer on both half cycles.

Tripler — In Fig. 2B capacitor C2 is charged as described for the voltage doubler. But now, when the top secondary lead goes negative and C1 is charged through CR1, there is another path for current flow — from the bottom transformer lead through C2, CR3, and the output capacitor back to the top lead of the transformer. The transformer voltage, E , is series aiding the voltage $2E$ so that the output capacitor charges to $3E$, and we have a voltage tripler.

Higher Voltages — Figs 2C through 2G carry the idea from quadrupler ($4E$) to octupler ($8E$). Here is a good way to look at these circuits: Electrons from the transformer are passed down the line from one capacitor to another until they finally get to the output capacitor and then the load, RL. If the capacitor chain is long, as in the higher order multipliers, the electrons get tired of the trip before they reach RL. Thus, the longer the chain, the poorer the regulation. In our discussion of full-wave multipliers we'll show how the length of the chain can be cut in half to give better regulation.

The half-wave doublers have one feature that is not present in the full-wave types. One side of the output is connected directly to the transformer secondary. This allows half-wave circuits to be operated directly from the ac line without a transformer, if proper safety precautions are taken. Ac/dc radios in plastic boxes sometimes use this feature. Transformerless operation has not been popular in amateur circles because of the shock hazard involved. The key, the microphone, the antenna, and anything else connected to the circuit becomes "hot," if the line plug is reversed. The peak inverse voltage rating required for all diodes in the circuits of Fig. 2 is $2E$ ($2.8 \times E_{rms}$).

Full-Wave Multipliers

Doubler — The full-wave doubler is shown in Fig. 3. Diode CR1 charges the top capacitor to the peak transformer voltage on one half cycle of the ac input. On the other half cycle, CR2 charges the bottom capacitor to the peak transformer voltage. The output is taken across the two capacitors, connected in series. Thus, the output is $2E$, and we have a voltage doubler. One of the output capacitors receives current from the transformer on each half cycle of the ac input, so we have full-wave operation. The ripple is at 120 Hz,

HALF-WAVE RECTIFIER

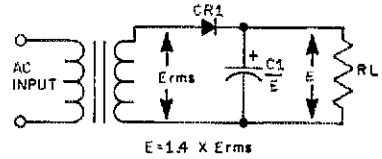


Fig. 1 — The half-wave rectifier.

instead of 60 Hz as with the half-wave multiplier circuits.

Tripler — Fig. 4A shows a full-wave tripler. Diodes CR1 and CR2 form a half-wave doubler, charging the top output capacitor to $2E$. Diode CR3 is a half-wave rectifier connected to operate on the other half cycle. The output is taken across the two circuits in series to provide $3E$.

Since diode CR2 charges output capacitor C2 on the half cycle of ac when the upper lead of the transformer secondary is positive, and diode CR3 charges output capacitor C1 on the other half cycle, this is a full-wave circuit. That is, current is supplied to the output capacitors on each half cycle of the ac voltage. It is unbalanced, however. The voltage pulse to the load on the positive half cycle is twice as large as that on the negative half cycle. Thus, there will be a 60-Hz ripple component in the output. This unbalance is a feature of all the full-wave circuits of Fig. 4 that provide odd multiples of the transformer voltage.

Quadrupler — The circuit of Fig. 4B is a full-wave quadrupler. Diodes CR1 and CR2 form a half-wave doubler and charge the upper output capacitor to $2E$. Diodes CR3 and CR4 form another half-wave doubler of opposite polarity; they charge the lower capacitor to $2E$ on the opposite half cycle. The output is taken from the two capacitors in series to provide an unloaded voltage of $4E$. This circuit is balanced and gives true full-wave operation.

In this circuit, no electron from the transformer has to go through more than two capacitors before it reaches the load. Some follow route CR1, CR2 to RL. Others go via CR4, CR3 and to the load. Compare this situation to that of Fig. 2C, the half-wave quadrupler. Some of the transformer electrons here go from capacitor C1 to C2, to C3, to C4, then to the load. Clearly, the regulation of the full-wave quadrupler is going to be better than

FULL-WAVE DOUBLER

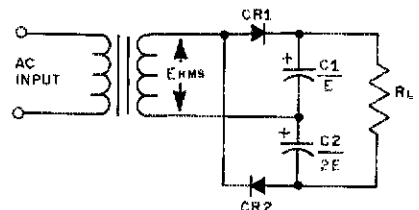


Fig. 3 — The full-wave doubler.

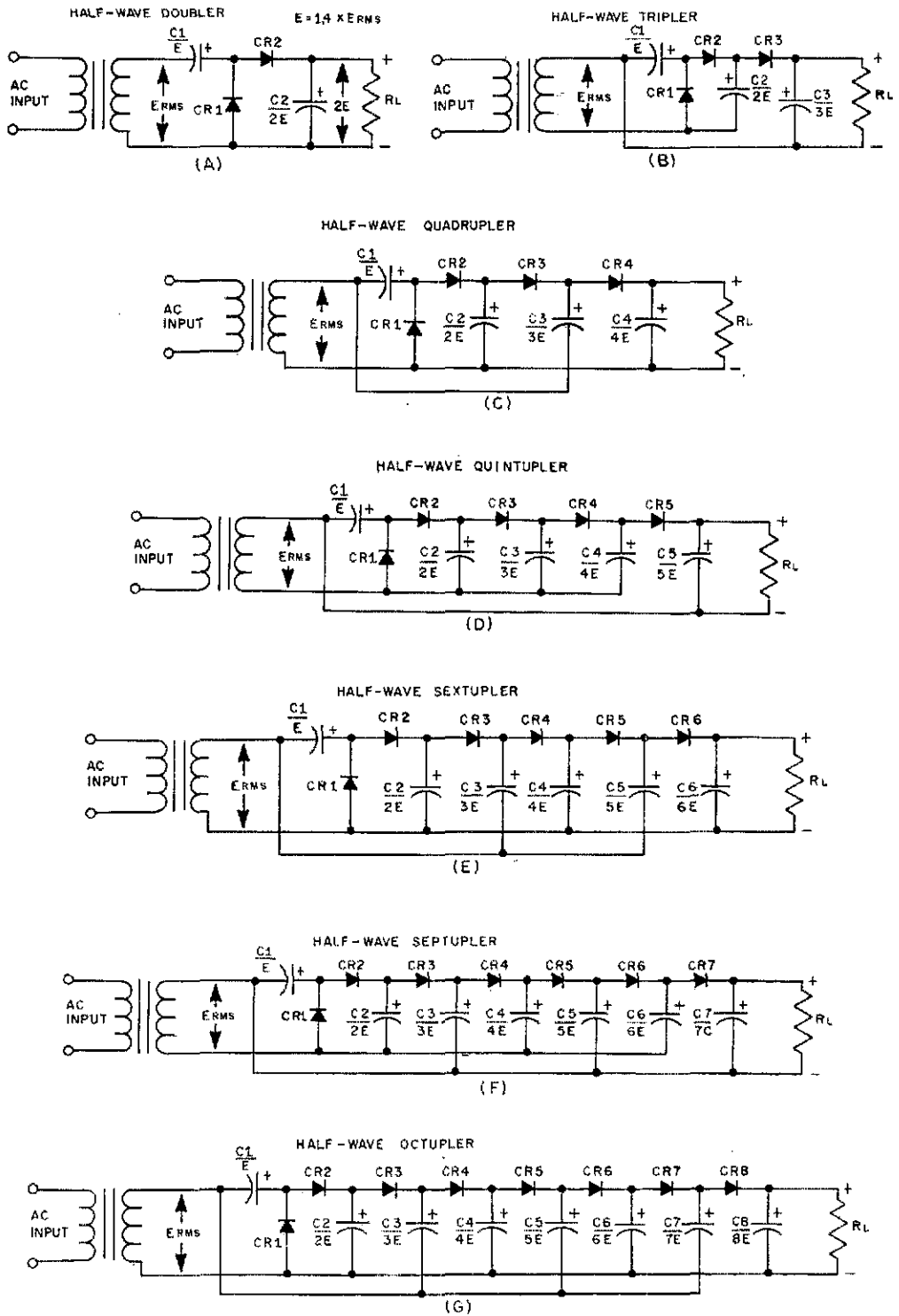


Fig. 2 — Half-wave voltage multipliers. E values given on the diagram indicate minimum capacitor voltage ratings.

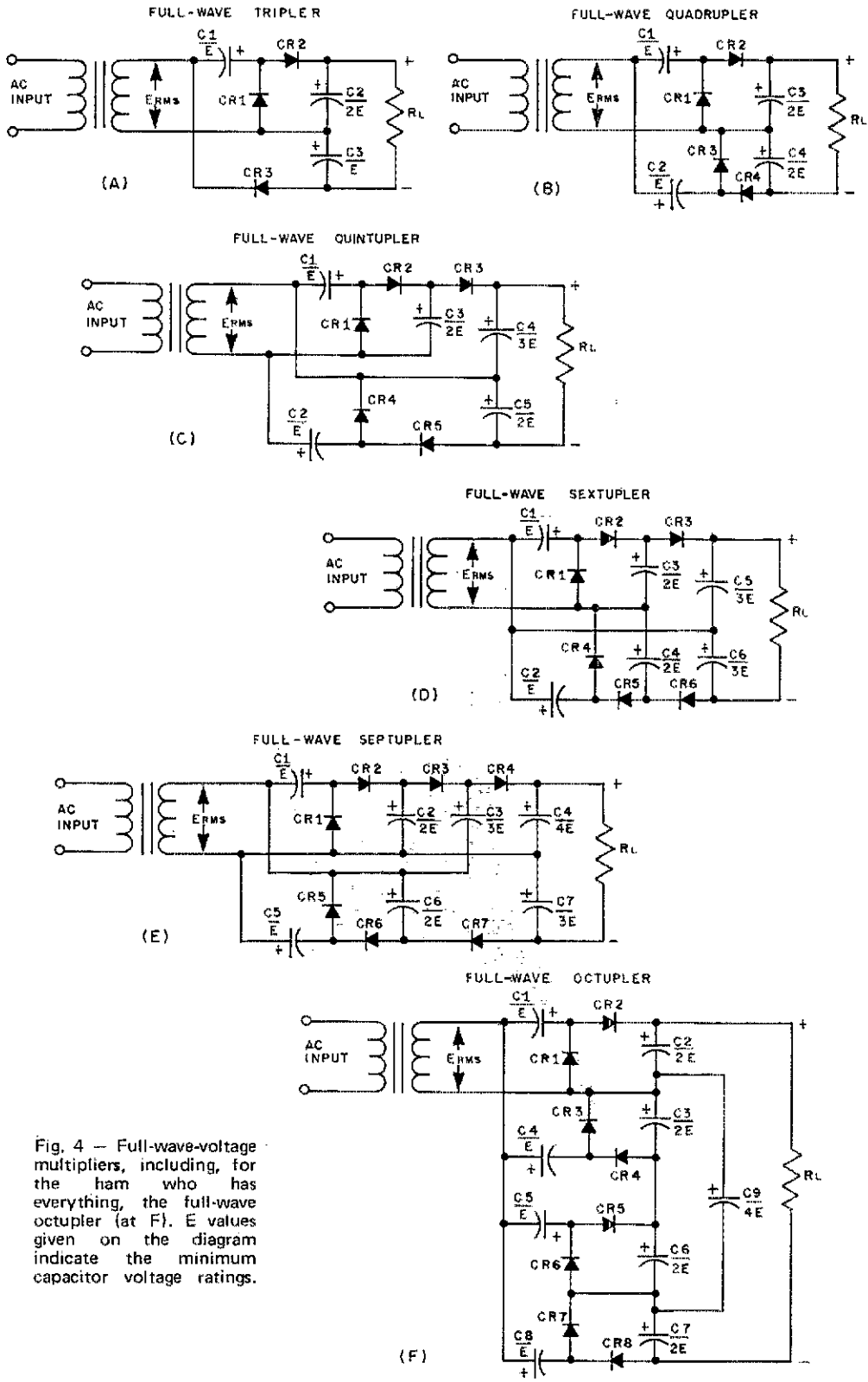
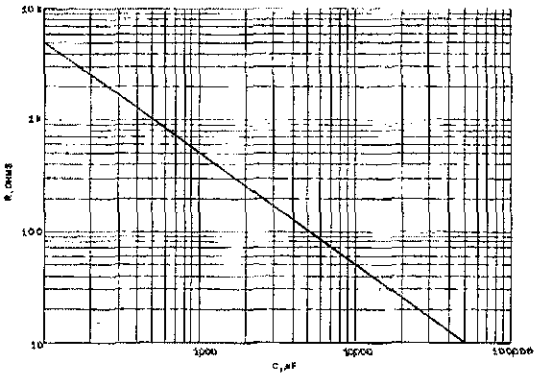


Fig. 4 - Full-wave-voltage multipliers, including, for the ham who has everything, the full-wave octupler (at F). E values given on the diagram indicate the minimum capacitor voltage ratings.

Fig. 5 — Chart to determine the size of filter capacitors needed for 1-percent ripple in a half-wave or full-wave doubler power-supply circuit.



that of the half-wave version. Yet both require exactly the same number of parts.

Higher Voltages — The circuits of Fig. 4C, D, and E carry the full-wave multiplier on through 5-times, 6-times, and 7-times multiplication. Fig. 4F is a full-wave octupler that is made of two full-wave quadruplers in series. To make this scheme work, an extra capacitor, C4, is added; it serves as the ac transformer return to the bottom quadrupler, meanwhile blocking the dc voltage. This capacitor must have low reactance (high capacitance). As octuplers go, this circuit has good regulation. The peak inverse voltage rating for all diodes in the full-wave multiplier circuits shown is $2E$ ($2.8 \times E_{rms}$).

Capacitor Size

The required voltage rating of the filter capacitors is shown in each schematic diagram. To find the capacitance required, first find the load resistance,

$$R_L = \text{Output Voltage} \div \text{Load Current.} \quad (1)$$

Then refer to Fig. 5. The capacitance value shown here is correct for the half-wave rectifier of Fig. 1. If you are constructing a half-wave doubler (Fig. 2A), multiply the size of each capacitor by two. For a half-wave quadrupler (Fig. 2C) use four times the indicated capacitance, and so on. For the full-wave doubler (Fig. 3), use the capacitance shown by Fig. 5. Use twice the size for the full-wave quadrupler.

Capacitors chosen in this manner will keep the ripple down to 1 percent and will give fairly good regulation, plus predictable output voltages.

Output Voltage and Regulation

With no load, the output voltage of a voltage multiplier supply will be

$$E_{NL} = N \times 1.4 \times E_{rms} \quad (2)$$

where E_{rms} is the transformer voltage and N is the order of multiplication (two for a doubler, three for a tripler). Under load the voltage will drop because the capacitors do charge to the peak applied voltage. The voltage will drop to approximately

$$E_o = N \times 1.25 \times E_{rms} \quad (3)$$

at the load resistance chosen and with the capacitor sizes selected as described above.

In addition, there will be a voltage drop across each rectifier diode. If the diodes are silicon, the drop will be about 0.7 volt per diode. So, the total diode drop is

$$E_d = N \times 0.7 \text{ volt} \quad (4)$$

Subtract this from the voltage found above to obtain the full-load output voltage

$$E_{FL} = E_o - E_d \quad (5)$$

Design Example

Let's use a 6.3-volt transformer in a full-wave quadrupler circuit (Fig. 4B). The peak transformer voltage is

$$E = 1.4 \times E_{rms} = 1.4 \times 6.3 = 8.8 \text{ volts}$$

From Fig. 4B we see that we need two capacitors rated at at least 8.8 volts and two at 17.6 volts. We'd use perhaps two 10-volt and two 20-volt capacitors. Our diodes must all be rated at 17.6 PIV or more. Diodes with a rating of 50 or 100 PIV would be suitable.

We can use equation 3 to find the output voltage.

$$E_o = 4 \times 1.25 \times 6.3 = 37.8 \text{ volts}$$

And from equation 4 we find that there is an additional voltage drop of

$$E_d = 4 \times 0.7 = 2.8 \text{ volts}$$

So, the probable output voltage is, from equation 5,

$$E_{FL} = 37.8 - 2.8 = 35 \text{ volts}$$

We expect our transmitter to draw about 50 mA. So

$$R_L = 35 \text{ volts} \div 50 \times 10^{-3} \text{ amperes} = 70 \text{ ohms}$$

Fig. 5 shows 6700 μF would be needed if we were using a full-wave doubler circuit. Our full-wave quadrupler will need 6700×2 or 13,400 μF for each of the four capacitors. We'll use the next-larger size available.

References

- 1) Althouse, "Modern Power-Supply Design," *QST*, February, 1968.
- 2) Everitt, *Fundamentals of Radio and Electronics*, Prentice-Hall, 1958, 2nd Edition, page 176.
- 3) Rumble, "Voltage Multiplying Circuits," *QST*, January, 1953.
- 4) Blair, "Using the Voltage Doubler," *QST*, November, 1955.



SWITCH
TO SAFETY!



• *Beginner and Novice*

The Apartment Dweller's Dilemma

How to Use Random-Length Wire Antennas

BY LEWIS G. McCOY,* WHCP

IT IS APPARENT from our mail that many would-be amateurs living in apartment buildings believe it is impossible to get an effective signal on the air. They feel the need to have an outdoor antenna in order to make contacts. This isn't true. Of course, the apartment dweller can always go mobile, but there comes a time when the amateur wants a home station. This article treats the problem and, hopefully, will get a few more hams on the air.

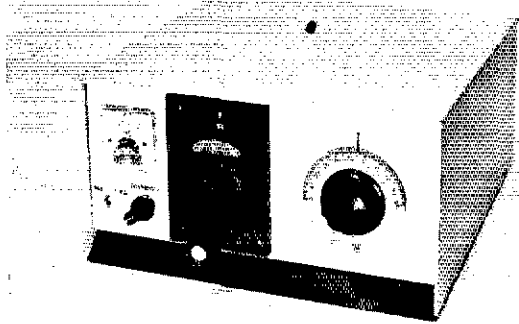
Some General Considerations

There are exceptions to the following rules but, in general, they can be depended upon.

- 1) An outdoor antenna will work better than an indoor one.
- 2) An antenna inside a frame building with wood exteriors is better than the same antenna in a steel-and-concrete building.
- 3) The higher above ground, inside or out, the better the antenna will work.
- 4) The bigger (or longer) you can make an indoor antenna, the better — even if it means running the wire around corners.
- 5) Even a poor antenna *should* produce some contacts.

The Coupling Problem

Most transmitters are designed to work into a 50-ohm load, and contain little or no provision for adjusting the transmitter when the load is other than 50 ohms. Unfortunately, there is no random-length wire antenna that will present a 50-ohm load on all bands. What is required is a Transmatch. A Transmatch is simply an adjustable LC network that converts the unknown antenna impedance to 50 ohms. This unit, shown in Fig. 1 and the photographs, will cover the 80- through 10-meter bands and can handle 1 kW of rf power. In addition to matching the transmitter to the antenna load, the Transmatch helps reduce



The completed Transmatch. The counter dial and knob are James Millen Mfg. Co. Inc. products.

harmonic radiation. Many Novices get in trouble with the FCC because of 2nd-harmonic radiation from the 80-meter signal. This unit should reduce such harmonic radiation. Also, the use of a Transmatch can provide better front-end selectivity for the receiver. Some receivers are subject to severe cross modulation when operated near a broadcast station. The Transmatch should reduce this effect.

Circuit Details

The unit shown in Fig. 1 is designed to be used in three configurations. They are shown at B, C, and D. With one of the three hookups, it should be possible to match practically any antenna to the transmitter.

In order to get complete band coverage and avoid the complexities of band-switching, banana and jack plugs are used to change the circuit to the configuration needed. For example, if one wanted the setup shown at B, he would jumper terminals 7 and 8, 1 and 3, and 4 and 5. Using the banana plugs makes for easy changing of the circuit.

Whenever a Transmatch is used, the operator should have a way of knowing when the unit is adjusted correctly. The answer to this need is a Monimatch or other SWR indicator. If you have an SWR meter, it can be connected in the line between the transmitter and the coupler. If not, you can build the Monimatch¹ shown in Fig. 1, and include it in the cabinet with the Transmatch.

Construction Details

The chassis for mounting the Transmatch is made from a piece of aluminum measuring 10 × 19 inches. The ends of the 19-inch length of aluminum are bent up to form a U-shaped chassis, the ends being 4 1/2 inches high to form a chassis 10 × 10 × 4 1/2 inches. The back side of the U has an opening cut out, 3 1/4 inches high by 4 1/2 inches long. A piece of Plexiglas is mounted over this opening. The jack-plug sockets are installed directly on the plastic. Connections from the roller

¹ McCoy, "An Etched-Circuit Monimatch for Checking Your Antenna System," *QST*, October, 1969.

* Novice Editor, *QST*.

inductor, L3, and variable capacitor, C1, are made to the banana jacks. Be careful when drilling the holes for the jacks to insure that they will mate with the plugs. Fig. 2 shows the details for a pc-board Monimatch.

Methods for making etched circuit boards are given in detail in the construction chapter of *The Radio Amateur's Handbook*, so we won't treat the process here. When installing CR1 and CR2 on the board, be sure to use a heat sink while soldering the leads. Too much heat can ruin the diodes. Shielded leads are used from the circuit board to S1 to prevent unwanted rf pickup.

Today's equipment builder soon finds out that locating parts can be a tough problem. Fortunately, we have found a distributor who will furnish all the parts. With the exception of the chassis, the parts for the Transmatch can be purchased from Barry Electronics.²

Some Antenna Ideas

With this Transmatch one should be able to match any random-length antenna to his transmitter. To test the system, we strung up 25 feet of wire in the ARRL lab (a steel-and-concrete building, first floor). The Transmatch provided the desired 50-ohm impedance on all bands. We didn't get any "60-over-9" reports, but we *did* make contacts.

² Barry Electronics, 512 Broadway, New York, NY 10012.

As to your antenna installation, we suggest running the wire up to the ceiling, around the room, perhaps into the next room, making the antenna as long as possible. If the XYL objects to the wire, use an invisible antenna. Nope, we're not joking! You can make the antenna from No. 26 or 28 wire, which will be practically invisible. Also, you can conceal the wire behind molding. Be sure to insulate the wire if it runs near any metal. In some cases, it is impossible to get the wire outside. However, if you have a screen in one of your windows, terminate the end of the antenna at the screen. The screen is outside and it will help the system radiate. While it may be difficult to install, the antenna length to shoot for is approximately 120 to 130 feet because this is a good length for multiband operation.

If you cannot put an antenna on the apartment roof, there is still a trick or two for having an outside antenna. You can drop a wire out the window and let it hang down. How long the wire should be will depend on how high up you are. You can make the wire long enough to reach nearly to the earth, but high enough to be beyond the reach of passers by. *Safety first*, always! There is no electrical law that states that a vertical must be fed at the bottom. Just connect the end of the wire to your Transmatch and tune up the system. You can use small-diameter wire. Use a lead sinker on the end of the wire and possibly imbed the sinker in a small sponge-rubber ball. (That way, you won't break your neighbor's window.)

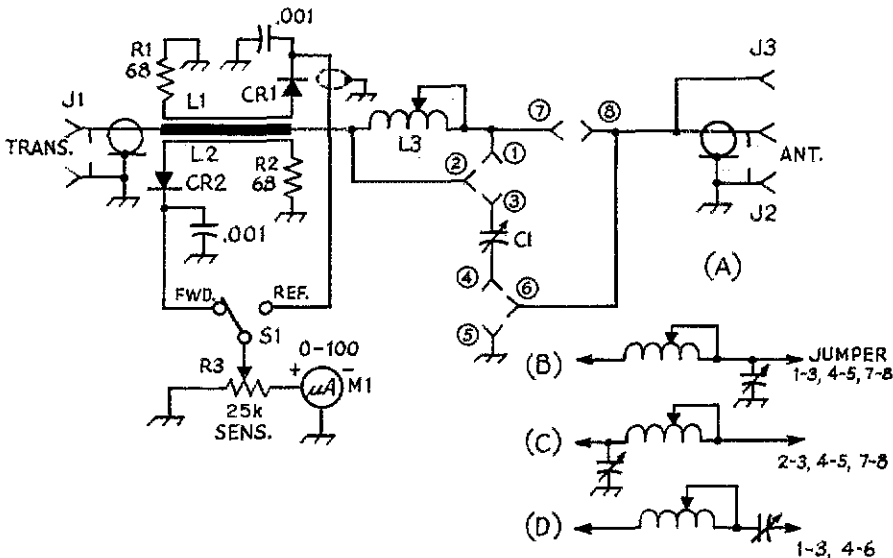


Fig. 1 — Circuit diagram of the L-network Transmatch. The eight banana jacks are E. F. Johnson type 108-900, and three dual banana plugs are required., E. F. Johnson type 108-200. C1 — Variable capacitor, 350 pF (E. F. Johnson 154-10).

CR1, CR2 — 1N34A germanium diode.
J1, J2 — Chassis connector, type SO-239.
J3 — Feedthrough terminal, isolantite.

L1, L2 — See Fig. 2, part of etched-circuit assembly.

L3 — Variable inductor, 28 μ H (E. F. Johnson 229-203).

M1 — 100- μ A meter.

R1, R2 — 68-ohm, 1/2-watt carbon or composition, *not* wirewound.

R3 — 25,000-ohm carbon control, linear taper.

S1 — Spst toggle.

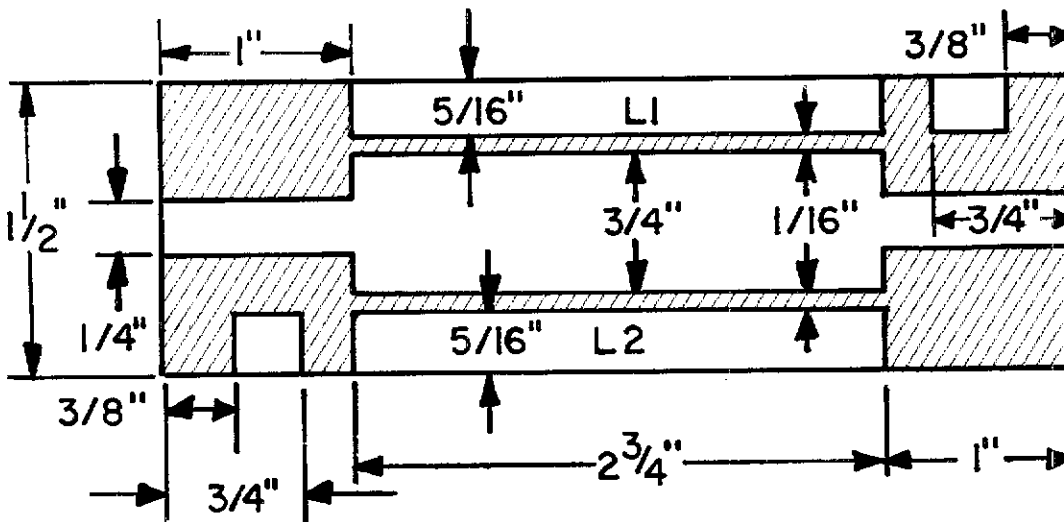


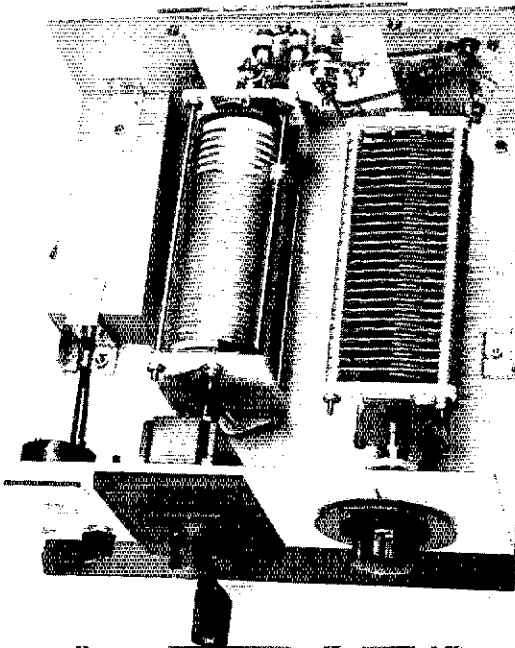
Fig. 2 - Etched circuit-board template. The foil side is shown, the etched portion is shaded.

If there is a support to which you can attach the far end of the antenna you can use the invisible-wire trick. Use rubber bands for insulators. Erect No. 26 or 28 wire. Don't be too discouraged if the wire gets broken by passing birds!

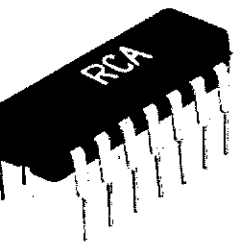
We know one ham who lived in a basement flat. He ran a wire through the wall to the bottom of a rain gutter, tuned up the system, and managed to work DXCC. (Safety first, again. The downspout should be beyond the reach of human beings!) The general idea is to use ingenuity. With a Transmatch you never can tell *what* will prove to be a useful antenna.

How to Tune Up

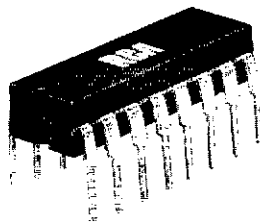
Using the Transmatch is not complicated. Although it takes some time to find the correct combination of settings, once determined, they can be logged for later reference. Use a short length of 50-ohm coax to connect the Transmatch to the transmitter. Attach the antenna to the Transmatch. Tune up your transmitter on the desired band, making sure that the final amplifier is resonated, but with the power output reduced. With the Monimatch in the forward-reading position, set the sensitivity control for a full-scale reading. You may have to increase the output of the transmitter to get full deflection, but be sure to keep the final amplifier tank in resonance. Switch the meter to the reflected position, and then adjust L1 and C1, until you get the lowest indication of reflected power. It should be possible to get the meter to read zero. When you have a zero reading in the reflected position, versus full scale in the forward setting, the Transmatch is correctly adjusted, and the SWR is 1. You may have to change the circuit to one of the other configurations in order to get a match, but one combination *should* work. Once you have the Transmatch set properly, you can then adjust the transmitter to its rated power input. One other point: It isn't always possible to get a good ground connection in an apartment. Therefore, a connection to a cold-water pipe or earth ground should be used. QST



The Monimatch is at the upper left, covered by a metal enclosure. Connections from the roller inductor and the variable capacitor to the terminals on the jacks are made with thin strips of copper, although No. 12 or 14 wire can be used instead. The two antenna terminals are at the rear right. The top terminal is for use with a coax-fed antenna, if desired.



Two New ICs



for the

Receiver Builder

BY DOUG DEMAW,* WICER

HOW'S THIS for an advance in the IC state of the art? A pair of dual-in-line integrated circuits, each containing most of the essential circuitry for a receiver, and which seem to be tailor made for the radio amateur! The first, an RCA CA3089E, is intended for use in fm receiver circuits. The second unit, an RCA CA3088E, is designed for a-m receiver use, but can be used for cw and ssb reception by adding a BFO separately. The cost per unit is less than \$5, and this feature should hold particular appeal for those amateurs with a frugal attitude about hobby expenditures. Certainly, one should be able to build very compact portable gear with either of these IC's, and since the operating voltage can be anywhere between 6 and 18 volts dc (negative ground) it should be an easy matter to provide an inexpensive power source.

This is not intended to be a construction article, but rather an information piece which, hopefully, will inspire a whole new generation of solid-state amateur receivers. The imaginative and creative reader should not have to perform very many mental gymnastics in order to come up with a workable circuit for the mode of his choice.

The CA3089E FM Chip

A block diagram of the CA3089E inner workings is shown in Fig. 1. It can be seen from this illustration that all that is needed to complete the circuit for fm reception is a front end (converter), i-f filter, external controls and meter, detector tuned circuit, audio power amplifier, and power supply. The regulators for the power supply are contained in the IC, and there are terminals for afc, delayed agc, and a tuning meter.

Here are some more specifications for the CA3089E:

- 1) Limiting: 12 μ V typical at the -3dB point.
- 2) Distortion: 0.1 percent (typ.).
- 3) Recovered audio: 425 mV (typ.).
- 4) Detector: Quadrature, with single-coil tuning capability.
- 5) Resting current: 23 mA.
- 6) I-f: 10.7 MHz.

7) A-m rejection ($V_{in} = 0.1$ V, 30 percent a-m mod., 10.7 MHz) 43 dB.

8) S+N/N (Signal plus noise-to-noise ratio): 67 dB.

Other operating characteristics can be obtained from the RCA CA3089E data sheet.

Specifications for operation at an i-f of 455 kHz are not given in the data listing, but it is likely that good performance can be had at the lower frequency.

A reprint of RCA's simplified schematic diagram is shown at Fig. 2. This drawing shows the complexity of the CA3089E electrical circuit. Imagine if you will how much chassis space would be required to assemble the same circuit while employing discrete components! Because of the miniaturization made possible by the small size of this chip it is no longer fantasy to think in terms of Dick Tracy's legendary wrist radio.

Some Practical Circuit Ideas

A suggested hookup for an amateur 2-meter fm receiver is shown in Fig. 3. RCA does not specify how much gain the converter section should have for operation with the IC, but an educated guess would suggest that a front end with an overall gain between 20 and 30 dB should do the job. The insertion loss of the i-f filter used must be taken into account too.

The "missing-data syndrome," unfortunately common to most IC specification sheets, holds true in this instance. No mention is made of input or output impedances for our integrated circuit. Because of this omission it will no doubt be necessary to do some experimental work to arrive at optimum operating conditions.

A Look at the CA3088E IC

This little dandy should inspire all kinds of interesting thoughts about the design of that small size hf-band ham receiver. A copy of RCA's schematic diagram is given in Fig. 4. This chip is not quite so involved as is the CA3089E, but there is still plenty of solid-state circuitry etched on the CA3088E substrate.

A few more external tuned circuits are needed for this IC, but most of what else will be needed is available at the 16 terminals of the package.

*Technical Editor, QST.

ALL RESISTANCE VALUES ARE IN OHMS
 * L TUNES WITH 100 pF ICL AT 10.7 MHz
 Q0875

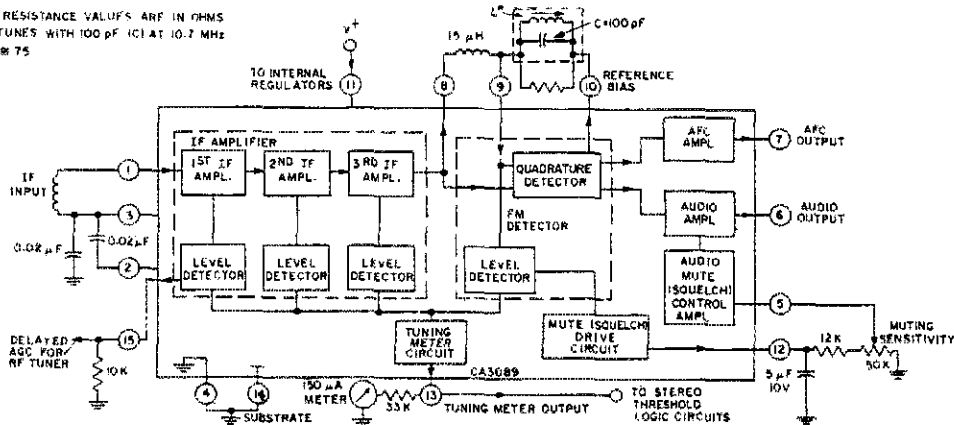


Fig. 1 — Reprint of RCA's block diagram, showing how the internal sections of the CA3089E 16-lead IC are connected. Though a single-tuned detector is shown here, a double-tuned circuit can also be used.

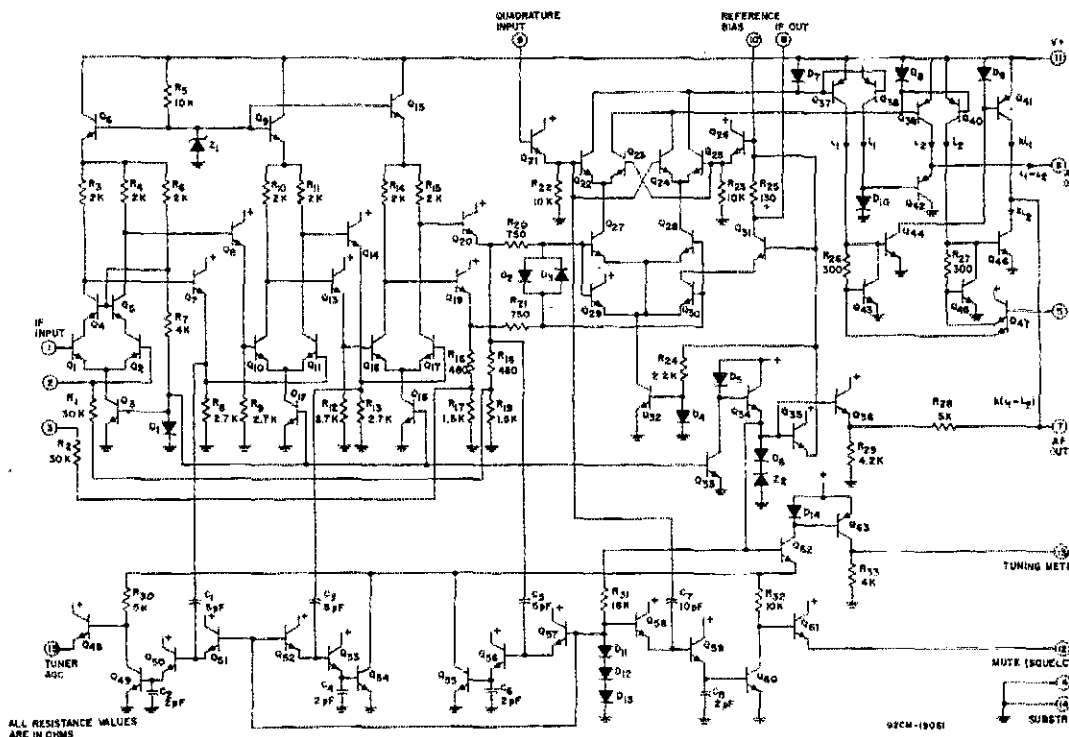


Fig. 2 — Reprint of the schematic diagram taken from RCA's data sheet. The internal workings of the CA3089E are complex, indeed. Note the large number of bipolar transistors, diodes, and resistors on the chip.

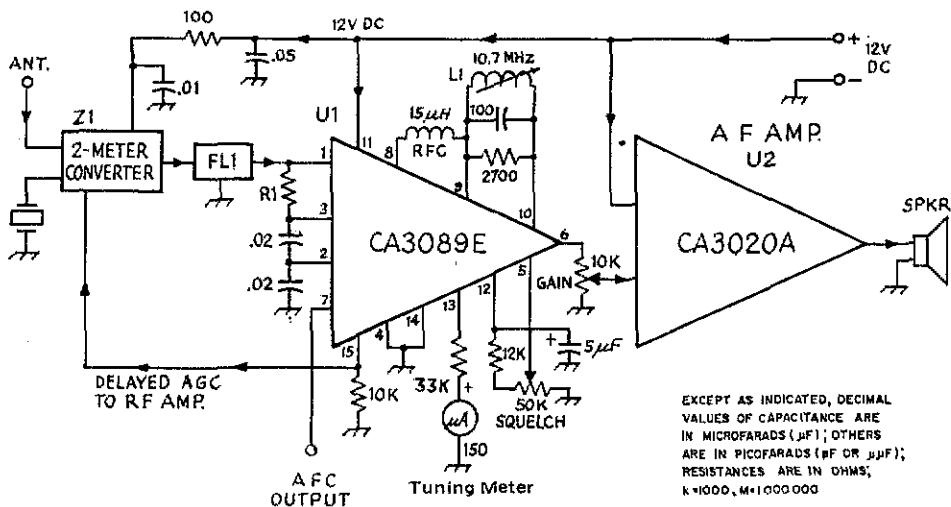


Fig. 3 – Simplified hybrid diagram of a suggested fm receiver for 2-meter use. A CA3089E serves as the heart of the equipment, and is followed by a 1-watt CA3020A IC audio amplifier. R1 is chosen to establish an input characteristic for U1 which matches the output impedance of FL1. L1 is the tuned circuit for the quadrature detector. Arrows indicate the direction of flow for the signal and operating voltages.

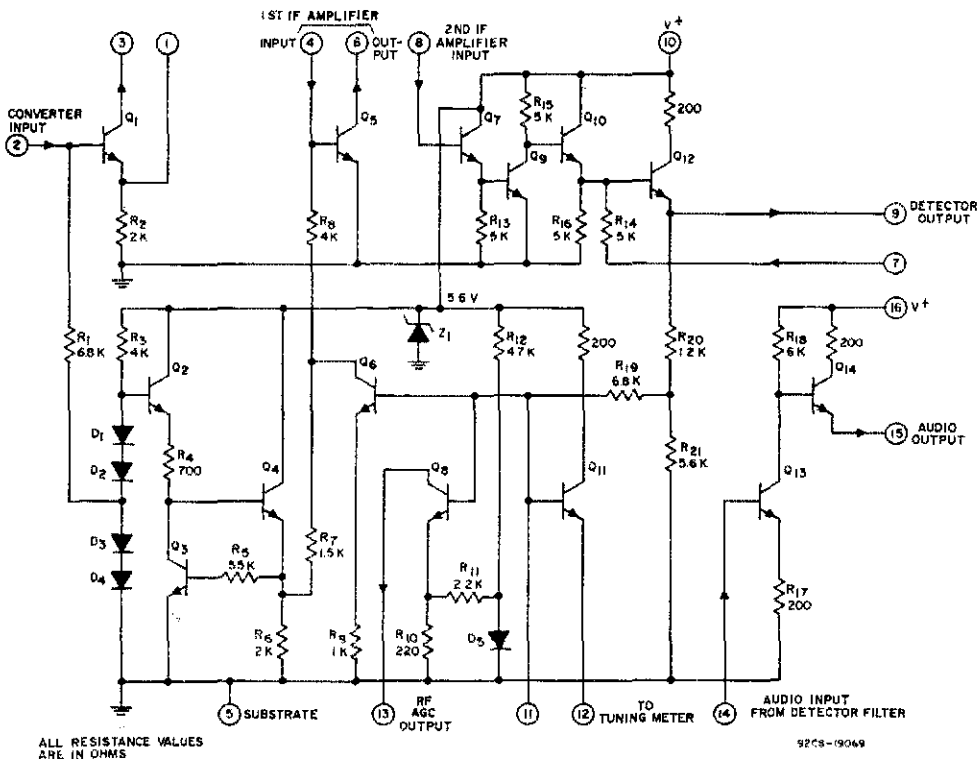


Fig. 4 – Schematic diagram reprint of RCA's CA3088E a-m IC. Fewer components are used than in the CA3089E, but there is still plenty of circuit to work with.

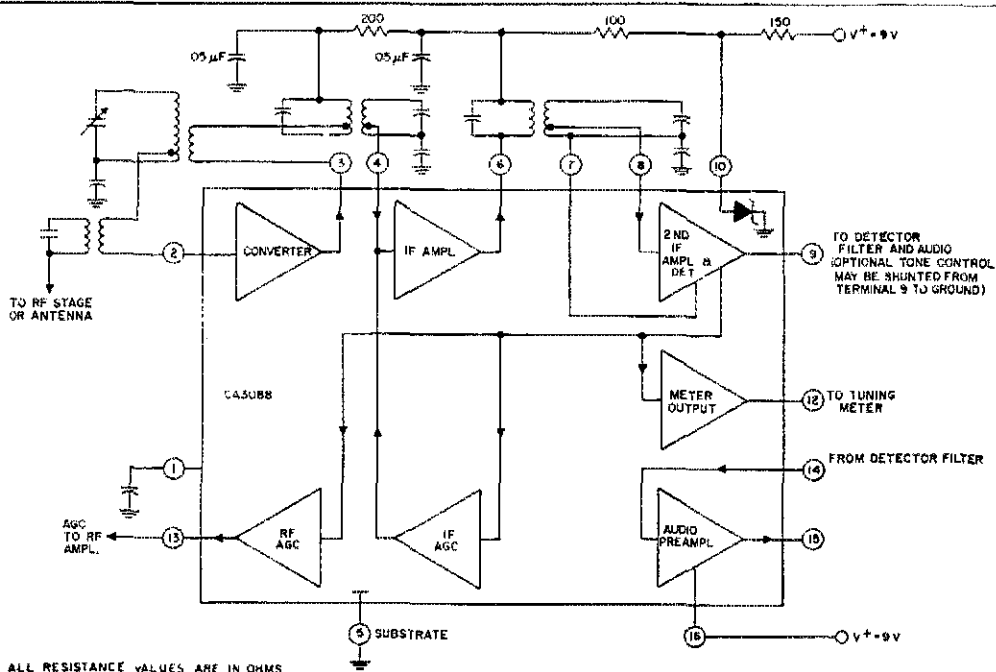


Fig. 5 - Functional block diagram of the CA3088E. The circuit is shown set up for use as an a-m bc-band receiver. The input stage serves as a common mixer/oscillator (converter) in this illustration.

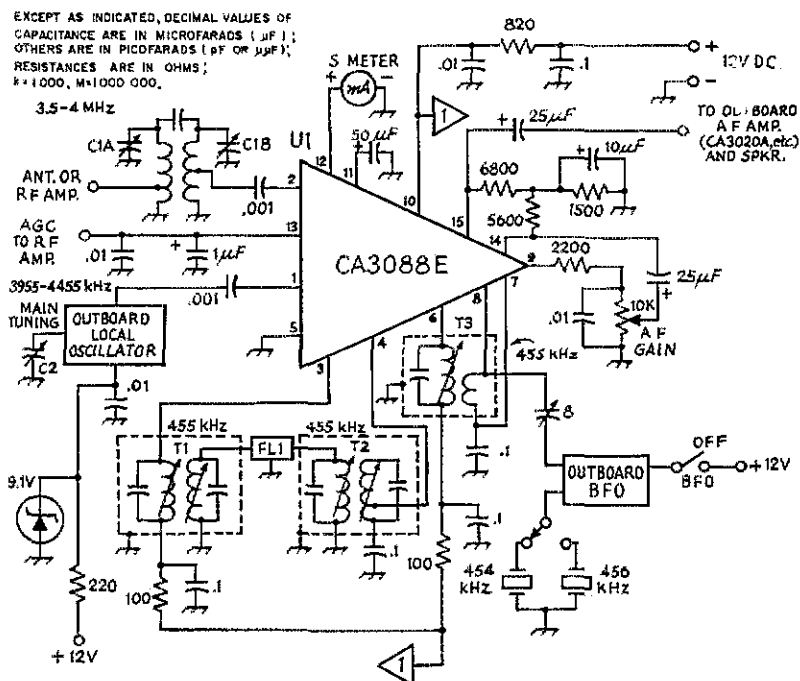


Fig. 6 - Author's suggestion for an experimental a-m, ssb, and cw receiver for 3.5 to 4 MHz. In this example the input stage of U1 serves solely as a mixer (see text), and the oscillator is outboard. Transformers T1 through T3 are miniature 455-kHz types of the kind available from J. W. Miller Company. Other components are numbered for text discussion purposes. The CA3088E has 16 pins.

Revisiting the syndrome mentioned earlier, there is no information given in the data sheet regarding the upper frequency limit of this chip. Apparently, this IC was designed for use in the commercial a-m frequency range (550 to 1650 kHz), and with an i-f of 455 kHz. Chances are that a higher i-f can be used without a sacrifice in gain. Some empirical work may be in order on this subject. The upper frequency limit of the converter and oscillator sections is also unknown to this writer. However, the CA3088E should be quite useful as the second half of a double-conversion receiver, using a circuit similar to that of Fig. 6.

Here are some of the more interesting features of the CA3088E:

- 1) Internal agc for the i-f amplifiers.
- 2) Delayed agc for use with outboard rf amp.
- 3) Buffered output signal for S meter.
- 4) Terminals for optional inclusion of tone control.
- 5) Internal Zener-diode regulation of operating voltage.
- 6) Useful with operating voltages between 6 and 18.
- 7) Can be used with internal local oscillator as shown in Fig. 5.

Other characteristics of interest are given in RCA's data sheet.

A Practical Application

The circuit of Fig. 6 shows a typical circuit in which the CA3088E might be put to work. In this illustration an outboard local oscillator is indicated. RCA shows in Fig. 5 that the mixer serves also as the local oscillator, a common trick in broadcast-band receivers. However, unless considerable selectivity is available at the input tuned circuit the chance for images is a bit frightening. This results from a lack of isolation between the mixer and the harmonic energy produced by the oscillator. The author prefers to avoid that possibility by keeping the oscillator separated from the rest of the circuit, thus allowing for harmonic filtering prior to mixer injection. In the circuit shown, C1 would serve as the preselector tuning, while C2 would function as the main tuning control.

For cw and ssb operation some form of i-f filtering is necessary. FL1, in this example (Fig. 6), could be a Collins 455-kHz mechanical filter, a ceramic filter, or a homemade crystal filter of the builder's choice. A simple half-lattice crystal filter of the kind shown in *Single Sideband for the Radio Amateur* may suffice for simple portable or emergency receivers using this IC.

We have shown a BFO which is crystal controlled for upper- and lower-sideband reception. Those wishing to could use an LC circuit to provide a tunable BFO, thus saving the cost of the crystals.

The agc time constant would have to be set to suit the builder's requirements. If it not readily apparent just how the i-f agc line could be disabled if one wanted to do so. This feature may be the main "sticky wicket" of the CA3088E. The time constant could be set, however, by using outboard combinations of R and C in the base returns of the two i-f amplifiers.

The audio amplifier needed to drive a speaker could consist of a pair of bipolar power transistors, or one could use an IC of his choice. The CA3020A will provide 1 watt output, and would seem to be an ideal mate for the rest of the circuit.

Some Closing Comments

Late word from RCA indicates that the over-the-counter single-lot price for a CA3089E is less than \$4. The CA3088E, a somewhat less costly IC, sells for under \$2.

This may be the beginning of a whole new ball game for amateurs who like to build simple receivers. Certainly, there should be a vast number of ham applications for these two interesting integrated circuits. This writer is most anxious to heat up the soldering iron and try a few ideas of his own . . . after, that is, finishing up the several dozen half-completed projects that presently clutter the home workshop! The ARRL technical staff would be interested in hearing from readers who use these new ICs. The information could be of value to other readers who are experimenting along similar lines. Who will be first, say, to use the pair in a so-called all-mode ham receiver - a-m, ssb, cw, RTTY, and fm? Q57

From the Museum of Amateur Radio

Here is shown a rather choice piece of gear. This is the Paragon Model RD5 short wave receiver. It was designed by Paul Godley and incorporated one of his several three-circuit tuner designs. This particular receiver was given to the donor, Dr. Henry Field, ex-U1BGO, by the Shepard Company of Boston for making the first confirmed reception of WNAC in Europe, while a student at Oxford. He was also G6ZX and G6ZY. - *WJANA*



High-Frequency

Atmospheric

Noise

Part I — Whither Comest Thou?

BY MARVIN R. CLINCH,* K2BYM, and
CALVIN R. GRAF,** WSLFM.

RADIO AMATEURS, like all other communicators, want to have the best possible communications quality when they are operating. A predominant factor in conventional communications quality is the signal-to-noise ratio, or S/N. The usual practice of most communicators, professional and amateur alike, when faced with an objectionably low S/N, is to increase the transmitter power, all other things being equal. However, doubling the power, for example, will only increase it by 3 dB, and doubling it again will only increase it by a total of 6 dB. This means that a ham with 150-watts output to his antenna will have to raise his power to 600 watts to increase the S/N by a mere 6 dB, approximately one S unit on some receivers.

A less obvious way to improve the S/N, but perhaps more appropriate in these days of highly crowded frequencies, is to decrease the noise received. Until recently, amateurs have been concerned with the level of internal receiver noise. W7IV has presented an interesting thesis concerning atmospheric noise.¹ However, there is evidence that the atmospheric-noise picture is not as black as he presented (or should we say white, since noise is involved²). In fact, there have been studies which show that atmospheric noise is both directional and predictable. One way of understanding this is to look at a world map which shows the distribution of thunderstorms to be concentrated in certain parts of the world. Since the noise is propagated just like a coherent radio signal in an approximately great circle path, one might paraphrase the DXers bible and say, "Where

* 4500 Skenandoah Dr., R.D. 2, Oneida, NY 13421.

** 207 Zornia, San Antonio, TX 78213.

¹ Hyder, "Atmospheric Noise and Receiver Sensitivity," QST, November, 1969.

² There is a class of noise called "white noise," which has a broad band of frequencies present, just as white light has a continuous broadband spectrum.

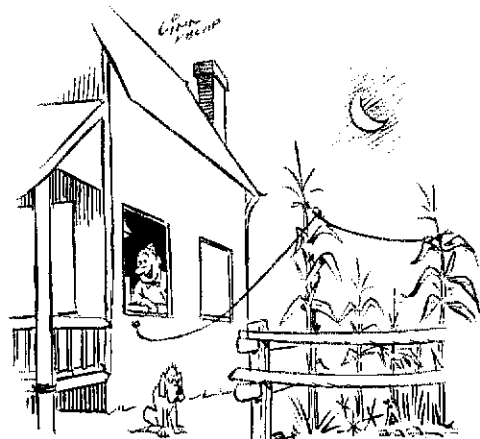
the thunderstorm is located, there ye shall find the noise also." It is known that the greatest noise sources, in terms of both time and intensity, are along the equator, with very large concentrations at well-known spots along the Amazon, in Java, and in central Africa.

Geographic Considerations

Now, since these concentrations are distributed geographically, each will have a different azimuthal bearing from a given receiving location. In addition, the farther one gets away from these great noise concentrations, the more dependent the received sferics will be on propagation and the less the received strength will be. This is also observed from the noise maps shown in the W7IV article. The intensity of the sferics can therefore vary in two ways, being dependent on the bearing angle of the receiving antenna and the distance from the source.

To the ham who has spent all his amateur career operating from the midwest (Iowa) or the far north (Canada), it is not at all uncommon to operate in the 75- and 80-meter bands as if it were 40 meters to the ham from the southern part of the U.S. (southern Texas to Florida). The ham in Iowa easily receives the W5 on 80-meter cw from Texas, but the poor chap in Texas with a simple dipole who is close to the Gulf of Mexico and its thunderstorm areas has a hard time making sense out of the WØ's dits and dahs among the sferics crashes.

However, if the W5 were to string some antennas with directive gain from his oil-well towers in his back yard, he would be able to look away from his nearby noise sources. He would easily receive the WØ chap who is happy for the years of success he has had with his dipole antenna stretched between two tall corn stalks. Perhaps it was a Louisiana 160-meter cw man, who, after using a broadside array to make WAS, wrote the well-known antisferics song, "Look Away, Dixieland."



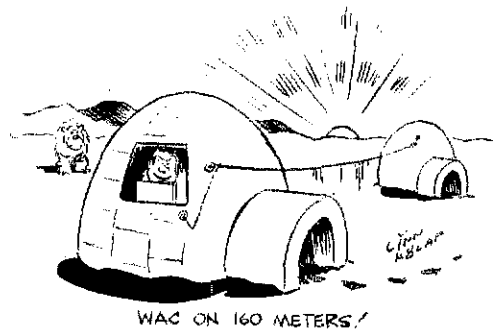
THE WØ WITH YEARS OF SUCCESS!

Determination of the directional properties of atmospheric noise to a degree for fully acceptable prediction requires the use of a fairly directive and expensive antenna system (i.e., antenna gain of 10 to 15 dB with all side lobes 15 to 20 dB down) either capable of being scanned 360 degrees in azimuth or having multiple fixed beams over the full circle. The multiple beams are by far the more desirable. It is also desirable to determine the vertical angle of arrival of the signal as well as its polarization. Such an antenna system could then be used with the same ARN-2 type of receiving set used by ESSA (Environmental Sciences Service Administration) in their collection of the data for the CCIR Report 322.³

The general conclusions reached in the CCIR Report 322 are based upon the early excellent work of W. Crichlow *et al* at ESSA. These data were taken in certain parts of the world using the ARN-2 with an electrically short, vertical, omnidirectional whip antenna. The output of this antenna is fed to the ARN-2 receiver which integrates the noise over a 90-second or more integration period. Thus, no strong conclusions can be reached concerning the directivity of atmospheric noise based upon the data taken. The short whip receives lightning-crash noise from all directions and can't "look away" from the sferics source as can the lucky W5.

Local Thunderstorm Activity

It is well known that thunderstorm activity is localized (as discussed above) and somewhat predictable (spring showers, summer thunderstorms), although only on a short-term probability basis. Since a greater part of the received atmospheric noise is the integration product of the lightning strokes throughout the viewing angle of the receiving antenna, it can be seen that a directional antenna looking away from the storm centers will reduce the noise received. It is also true that most (if not all) of the noise, for any given day, is a function of the propagation conditions and frequency. A single storm might be in the skip zone and not be heard. Therefore, to a somewhat lesser extent, the received noise might be predicted by using the new *Ionospheric Predictions Handbook*.⁴ It should be realized that the maximum usable frequency (MUF) is calculated from an estimated sunspot number and predicts what the MUF might be 50 percent of the days of the month. Because of this uncertainty, when sitting



down at the rig and being unable to work the W0 in Iowa, the W5 from oiltown was heard to mutter the definition of median MUF — "Fifty percent of the time I can't hear them when I should, and fifty percent of the time I hear them when I shouldn't!"

Because of the above sage observations it might be more useful to look at the weather map in the evening paper to see where the rain showers might be, before turning on the rig. In the meantime, the VE8 to the far north chuckles as he makes WAC on 160 meters (low power) with his dipole stretched between push-pull igloos.

There has been some professional communicator interest generated in the determination of the directional characteristics of atmospheric radio noise. One paper in particular, by P.A. Bradley and C. Clarke in the British journal, *Proceedings of the IEE*, Vol. III, No. 9, Sept., 1964, describes an observational program. Simultaneously using both omnidirectional and directional antennas in a tropical environment, the data were taken to determine the relative noise and signal-to-noise relationships. The results of the data are presented in a statistical form as amplitude-probability-distribution charts. In the paper, Bradley and Clarke state, "Noise values observed from the present series of measurements on the rhombic aeriels have been as much as 12 dB greater than would be expected from the assumption of uniformly distributed incident noise." That is, they saw more noise when they looked at the storm center with a very directional antenna, as compared to the omnidirectional whip antenna. This difference of 12 dB is equivalent to a power difference in a transmitter of almost 16 times, for the same signal-to-noise ratio. Elsewhere in the paper they state that their results "may be regarded as representative of conditions at tropical receiving sites. At temperate- and high-latitude locations where the azimuthal distribution of long-distance thunderstorms is less uniform, the influence of directional-aerial heading on relative noise power pickup will be greater." The last sentence says that the more antenna directive gain you have, the more you can "look away" from the noise sources. So, even the VE8 with phased rhombics would see more noise when he tried to work toward one of the noise concentrations described earlier.

³EDITOR'S NOTE: The International Radio Consultative Committee (CCIR) Report No. 322, published in 1964 by the International Telecommunications Union, Geneva, is the "bible" on atmospheric noise. This report is discussed in some detail by Hyder. See footnote 1.]

⁴EDITOR'S NOTE: The Institute for Telecommunications Sciences, formerly a branch of ESSA, publishes a handbook of ionospheric predictions consisting of four volumes. These volumes replace the former monthly publication, *Ionospheric Predictions*. Three volumes contain world maps for various degrees of solar activity, and the fourth describes the maps and illustrates their usage. The set is available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, for \$9.30. Volumes may also be obtained individually.]

Man-Made Noise

Another factor which must be taken into account in the receiving case is the localization of man-made noise. It is well known that heavily industrialized/populated areas are sources of radio noise. (neon signs, arc welders, electric blankets, and so on). These sources may be treated somewhat as thunderstorms except that their locations are fixed and their signal levels perhaps more predictable (arc welder off, electric blanket on).

Since the atmospheric noise is not isotropic, that is, not radiated equally in all directions, a directional antenna should show an increase in S/N ratio when its beam is pointed away from the high-noise areas. This however, depends heavily upon the beam characteristics, both the side-lobe structure and the elevation take-off angle.

No great store of information exists on all the directive characteristics of atmospheric radio noise.

While atmospherics, in general, propagate the same as radio waves, little is known about many of their properties. These are azimuthal distribution, backscatter influence, predominant polarization, elevation angle of arrival, symmetry of radiation of a lightning flash, fading characteristics, and others. Perhaps the future will allow research work in these areas to be conducted.

In years past, the amateur fraternity has done a terrific job in conducting tests and gathering data which point out to the scientific groups that certain phenomena do, indeed, exist. Some examples of these are: radio astronomy, moon-bounce, meteor reflection, transequatorial vhf propagation, long-delay echoes, and communication by backscatter. It appears that, once again, perhaps the skilled radio amateur can advance his hobby and develop a keen technical insight by listening *to* spheres rather than *through* them. Part II of this article will describe some simple hf-atmospheric-noise experiments. QST

Strays

Back Copies and Photographs

Back copies of *QST* referred to in *QST* issues are available when in print from our Circulation Department. Please send money order or check - 75¢ for each copy - with your order; we cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (*only*) can be furnished at \$2.00 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order - we do not bill or ship c.o.d.

Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless specifically mentioned in the article.

- - - - -

Please advise us direct of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

The National Bureau of Standards, with the cooperation of the National Aeronautics and Space Administration, is now relaying a frequency and time format similar to that of WWV and WWVH (the NBS standard and frequency stations) from the ATS-3 geostationary satellite. These broadcasts are strictly experimental, operating under NASA's "User Experiment Program," and will not be continued indefinitely. The satellite relays voice announcements of the time of day, ticks every second, audio frequency tones, and a digital time code.

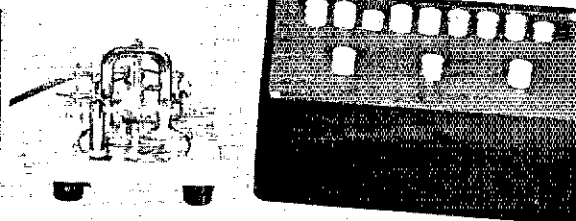
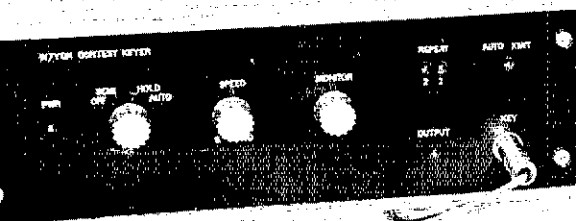
The broadcasts occur at 1700 to 1715 and 2145 to 2200 GMT. The broadcast occurs Monday through Friday, excluding holidays. Being an experimental program, some interruptions to the schedule are expected. August 1, 1972, is the expected termination date for these experiments.

The broadcasts from ATS-3 are centered at 135.625 MHz with a 30 kHz bandwidth. The signals are frequency modulated. An fm receiver with a noise figure of approximately 5 dB fed by an antenna with 12 dB gain above isotropic will provide good reception. The signals are linearly polarized; thus, if a linearly polarized antenna is used it may require rotation for maximum received signal.

The satellite is located approximately 22,300 miles above the equator at 70 degrees west longitude. Complete information regarding its operation and equipment requirements may be obtained by contacting the Time and Frequency Dissemination Research Section, 273.01, National Bureau of Standards, Boulder, CO 80302.

Three generations of hams are represented as proud father, W1SVQ, and grandfather, W1DTW, watch WN1ODD make a contact. When not hamming or keeping up with his fifth grade studies, Gordon indulges his interests in trains and adventure stories.





The W7YGN Contest Keyer

A Secret Weapon for CW

BY JOHN D. ALLYN,* W7YGN

General Features

AFTER SEVERAL years of operation in major cw DX contests, an avid contester will usually try all kinds of short cuts and operating conveniences to improve his all-important final score. Clearly, with the computer age upon us, it will not be long before it may seem impossible to win a contest without the aid of a "minicomputer." But right now it is relatively easy to automate a station with simple computer circuitry which can do much of the routine work. The device described in this article may be considered a "microcomputer," which acts as a station controller for cw operation.

As a result of a suggestion placed in the W7RM "contest suggestion box" last year, a new idea germinated which resulted in solving an old problem and created new operating conveniences not thought possible before. The old tape-recorder method of transmitting CQ-type messages had several shortcomings: the tape broke or wore out during contest operation; messages were not readily synchronized at the beginning; speed was fixed; only one message was possible on single-track recorders; if interference was difficult to correct; and on and on. Although some of these troubles could have been corrected, the solution to the whole problem was reached by using a message generator that had a solid-state read-only memory (ROM). Added to this was a means of repeating automatically any one of five separately selectable messages, automatic control of the station transmit-receive relay, an iambic memory keyer for manual keying, and a continuously variable clock or pulse generator for speed control.

The result is contest operation free of the routine burden of calling CQ, giving signal reports, signing your call sign manually, and so on. This allows more time for logging, checking duplicate sheets, or even for a quick break without interrupting contest operation. Operator fatigue is reduced, efficiency is improved, and the final score is the benefactor.

Fig. 1 shows the front view of the keyer. The controls are (l. to r.) OFF/SEMI/HOLD/AUTO, SPEED (6 to 40 wpm), and MONITOR volume. These controls are used less often than those located on the remote control box shown in Fig. 2. The remote control box, via a four-foot cable, connects by plug into the rear of the keyer. This box is normally located on the operating table near the key so as to minimize motion necessary to activate the automatic-message portion of the keyer. Push-button switches are used for convenience. The upper row consists of five mutually exclusive switches for message selection and four mutually exclusive switches for selection of the desired number of message-repeat cycles. Messages can be transmitted up to four times in succession with the final portion of the message sent as the last part of the transmission, or the message can be repeated indefinitely if no repeat button is pushed.

The lower three push-button switches are momentary types which are (l. to r.) MESSAGE INITIATE, MESSAGE STOP, and AUTO XMIT. The MESSAGE-INITIATE push button is tapped to start the message instantly, and the STOP button is tapped to halt the message for emergency stops. When the AUTO XMIT button is tapped, the transmitter can be turned on by a set of internal relay contacts and after a 100-ms delay, the message is initiated. This delay allows all station control relays to actuate before the message is transmitted. At the end of the message, the transmitter is automatically turned off and the station assumes the receive mode. AUTO XMIT is used primarily for CQ-type messages, whereas MESSAGE INITIATE is used to interject a message such as a signal report into a manually sent sequence. In the use of the MESSAGE INITIATE button, the 100-ms delay is not activated and station control is by manual means, such as a foot switch.

Fig. 3 shows the rear view of the keyer. The three vertical boards contain (1) the power supply/keying monitor, (2) iambic memory keyer, and (3) ROM counter/memory control/master

* 8200 Sierra Dr., Edmonds, WA 98020.

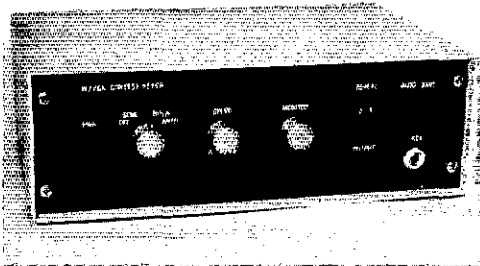


Fig. 1 — Front panel view of keyer. Control knobs are (l. to r.) OFF/SEMI/HOLD/AUTO, SPEED and MONITOR. Light-emitting diodes are used as indicator lamps.

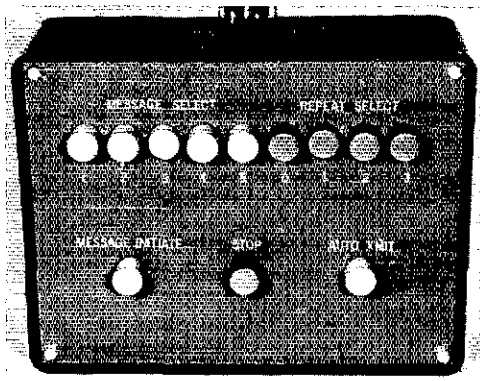
clock/output circuitry. Each of the five horizontal boards contains a diode-matrix ROM which is designed for a specific message, selected on the remote control box. All boards plug into a "mother" board which contains the necessary interconnections. Plug-in board construction was used because it is volumetrically efficient and allows a convenient means of changing messages. One may choose any five messages out of his "library" to tailor the keyer instantly to a particular contest. An overall block diagram of the keyer is shown in Fig. 4.

The Iambic Memory Keyer

The iambic memory keyer is similar to the popular ICKEY.¹ The main difference is the use of DTL/TTL logic instead of RTL, and the addition of ICs U1, U2, and U6. DTL/TTL logic was used because the present industrial-design trend is toward this logic family and prices are dropping rapidly. In addition, a large array of logic functions is available, and these ICs have better rf immunity than RTL. The addition of U1, U2, and U6 improves performance at high speeds. Without these ICs it is relatively easy to send an unwanted dot or dash at 30 wpm or higher. The theory of operation is similar to the ICKEY and is not discussed here except with respect to U1, U2, and U6. The iambic characteristics of this keyer allow squeeze-type keying operation, if desired.

The ICKEY and many others using digital ICs are driven from a free-running clock. If the dot memory is set during the time when a space is

¹This and subsequent references are given in the bibliography at the end of the article.



being sent, on the next negative-going clock transition a mark will appear at the keyer output. If a mark is not desired at the next negative clock transition, it is necessary to have the key up or in the neutral position *before* the next space occurs. At 30 wpm a dot is 40 milliseconds in duration, a very short period of time in which to react if a successive dot is not desired! A similar analysis can be made for dashes.

In this iambic memory keyer, all but the first of a series of dots (or dashes) are loaded into their respective memories just prior to a negative clock transition at the *end* of a space. Therefore, even if the key remains on the dot (or dash) side shortly after the dot (or dash) is completed, the corresponding memory cannot be set until just before the negative clock transition. This nearly doubles the time to react, being equivalent to that at half the code speed in the conventional design.

Circuit Description

In Fig. 5, U1C and U1D form a one-shot multivibrator which is triggered on the positive-going transition of the master clock. The output of U1C is a series of 10-ms pulses which have the same period or repetition rate as the master clock. These pulses are used as the clock in the iambic memory keyer. U3B and U3C form the dot flip-flop memory. Initially the output of U3B is assumed to be at logic 1 (2.7 to 5 volts), as it is during the idling condition. In this case, NAND gate U2B will invert the clock output of U1C which then allows U6A to be clocked so that its Q output is a 1. Since the Q output of U6A is connected to pin 9, the input of NAND gate U2A, U2A will invert the output of U1A, its inputs being connected to the dot side of the key.

When the key is initially pushed to the dot side, the input of U3A goes to logic 0 (0 to 1.4 volts) and the dot memory is set, i.e., the output of U3B is at 0. Thus, the pin-13 input to U2B and the CD input of U6A are also at 0. This prevents the clocking of U6A and forces its Q output to 0. With U6A Q output at 0, the output of U2A is at 1, and is unaffected by the key position.

During the next negative-going transition of the clock at the U1C output, a dot is initialized and terminated on the succeeding clock pulse. When the dot is terminated, the dot-memory flip-flop is reset as in the ICKEY by U5A and U5C. With the dot-memory flip-flop reset, the CD input of U6A and the pin-13 input to U2B are at 1. This allows U6A to be clocked into a state with its Q output at

Fig. 2 — Remote control box. This box is normally located on the operating table near the key to minimize motion during operation with automatic messages.

Fig. 3 Rear view of the keyer showing the plug-in card construction.



1. Thus, the next positive-going transition of the clock output at U1C, when inverted by U2B, provides a negative-going transition to the clock input of U6A, causing its *Q* output to assume a 1 state. This causes the pin-9 input of U2A to go to 1, thereby allowing the output of U2A to depend again upon the position of the key, just in time to set the memory for another dot, if desired.

U2C, U2D, and U6B provide the same action for the dash portion of the iambic memory keyer and a similar analysis can be made. Even with the extra time provided to take the appropriate keying action, it is important to initiate the next code element (dot, dash, or space) as soon as possible. Remember, the dash memory can be set during the time a dot is being sent and vice versa. If the operator gets lazy and spends too much time reacting, it is possible, for instance, to send the letters EN in lieu of R. This would happen if the transition of the key from the dot to the dash side occurred late and the key was half way between the dot and dash side during the 10-ms clock pulse. This would produce an unwanted space in the middle of the character R. Experience has shown that this effect is much less troublesome than the problems associated with extra dots or dashes. Additional features such as weight control, automatic letter and word spacing, and others could be added by using principles similar to those in other articles.^{1,2,3}

Automatic Message Generation

Automatic message generation is accomplished with a diode-matrix ROM and a binary counter. The basic principles of operation are the same as in a previous issue of *QST*⁴ and need not be repeated here. The unique and useful features of the secret-weapon message generator are obtained by adding circuits to allow (1) repetition of a message, (2) selection of any one of five messages, (3) automatic control of the station transmit-receive relay, and (4) remote-control operation.

A diode-matrix ROM is used to decode successive states of a binary counter, producing a Morse-code output. The binary counter is capable of counting up from 0 to 255. Consideration was given to extending the maximum count to 511 or 1023 by adding flip-flops to the counter. This would allow longer messages to be sent, but the added complexity of the ROM and other circuitry, as well as the work necessary to design an ROM, would have been "out of sight." Instead, a more efficient technique was developed — a recirculation technique. Lengthy messages which would otherwise require more than 256 states of the binary counter can usually be developed by recirculating message portions back through the memory. For example, the message CQ CQ TEST W7YGN W7YGN K, which takes nearly all 256 binary states, could be recirculated back to the beginning

at a point just preceding the final K. This type of message, if lengthy, is redundant anyway, and recirculation does not make it any less effective but does make efficient use of the ROM. During the final time through the ROM, the terminal K portion of the message will be read. Shorter messages can take advantage of this technique also. The message can be sent automatically up to four times, with the terminal portion sent only during the last cycle, using the circuit shown in Fig. 5. If desired, the message can also be recirculated indefinitely. Typical messages that have been successfully proved out include the following: CQ CQ DE W7RM W7RM K, 579 WASH DE K7HTZ BK, and CQ SS DE K7VPF K. With only one repeat, these become: CQ CQ DE W7RM W7RM CQ CQ DE W7RM W7RM K, 579 WASH 579 WASH DE K7HTZ BK, and CQ SS CQ SS DE K7VPF K. The point at which the message repeats can be set anywhere in the message.

Message selection is accomplished by switching to another ROM via the remote control box. Only a single-pole switch is required to switch messages since all five ROMs are OR wired. The 5-volt power-supply output is simply switched to the appropriate ROM to activate it.

A message-repeat counter keeps track of the number of times the message is recirculated and causes message termination on the final pass. A flip-flop is set by the AUTO XMIT button, which closes a station control relay. This flip-flop is reset at the end of the message.

The diode matrix is similar to the ones shown in *QST* for June, 1970.⁴ The main differences between these and the originals are that silicon diodes are used instead of germanium types, and the STOP 1 and STOP 2 outputs each contain an additional diode which allows them to be wired OR with the other ROMs. STOP 1 has been renamed REPEAT (R) and STOP 2 has been renamed STOP (S). Resistors used in the R and S gates are 6200 ohms, while those in the keying gates remain 47k ohms. Silicon diodes are preferred since their leakage current is low enough that the loading effect of inactive ROMs will not load the output of the ROM in use. More than five messages could be accommodated by continuing the wired-OR configuration and adding positions to S2.

Binary-Counter Control

The R output of the ROM is normally at 0 and goes to 1 when the repeat point of the message is

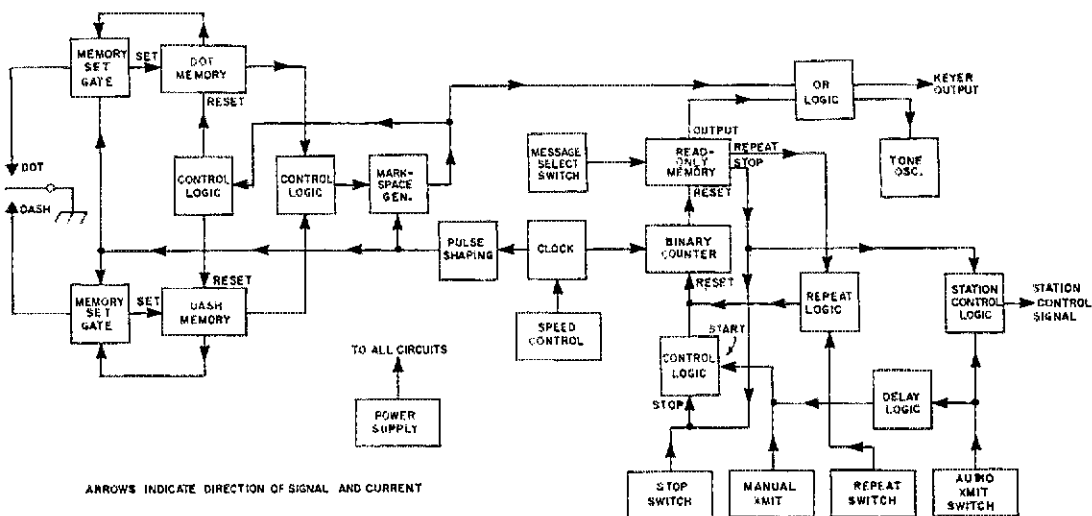


Fig. 4 - Block diagram of the Contest Keyer.

reached. This output is used to reset the binary counter to a count of zero (all Q outputs of U10 thru U13 at 0), which reinitiates the message. The S output of the ROM produces a 1 at the end of the message. Overall operation may be understood if one assumes first that the message generator is in an idle or not-sending condition. The binary counter is held in a reset state and is prevented from counting by a 0 at the CD inputs of U10 thru U13, from the output of NOR gates U16B and U16C. The outputs of these NOR gates are held at 0 by a 1 at one of their inputs from the Q output of control flip-flop U9B.

At this time, ROM output R is at 0, thus causing the other input to U16B and U16C to be at 0. When the MESSAGE INITIATE button is momentarily closed, flip-flop U9B is reset, causing its Q output to assume a 0 state, and thereby causing the CD inputs of the binary counter to go to 1. This allows the binary counter to start counting up toward 255. Finally a state is reached where R goes to 1. At the same time as U9B is reset, repeat counter U15A and U15B is also reset by the MESSAGE INITIATE button. Assume that the REPEAT switch is set for one repeat. When the output R goes to 1 (repeat point of message), the output of U17D goes to 0, which is fed to one input of U16D. The other input of U16D is also at 0 because U15A has been reset. With both inputs of U16D at 0, the output will be at 1, thus causing the output of U16B and U16C to assume a 0 state, resetting the binary counter. When this happens, ROM output R returns to 0, the outputs of U16B and U16C return to 1, and the binary counter starts counting up again. When ROM output R changes to 0, so does the output of U16D. This negative transition of the U16D output causes the repeat counter to count up one digit. Thus, the Q output of U15A will be at 1, thereby holding one input to U16D at 1 and its output at 0. When R goes positive during the first repeat cycle, it is blocked from resetting the binary counter, since

the repeat counter holds the output of U16D at 0 regardless of the R output. The binary counter continues to count until ROM output S goes to 1.

When S goes to 1 (end of message), the output of U17A goes to 0, thereby setting control flip-flop U9B and causing the output of U16B and U16C to go to 0. This holds the binary counter in a reset state and terminates the message. The STOP button on the remote control box also sets the control flip-flop and thereby holds the binary counter in a reset state.

If the REPEAT switch was set for two or three repeats, then one or two additional message cycles would be required to advance the repeat counter so that subsequent R outputs would be ignored. When the REPEAT switch is set for zero repeats, the R output is always ignored. With the REPEAT switch set for infinity, the R output always resets the binary counter. The infinity position can be used when more than four message cycles are desired. For automatic message termination, the REPEAT switch can be set to the zero position when the necessary number of repeats is reached.

The number of times that the message is repeated is displayed in binary form by two light-emitting diodes (LEDs). The cathode of the 1-bit LED is connected to the Q output of U15A, and the 2-bit LED is connected to the Q output of U15B. When the message begins its second cycle (first repeat), Q of U15A is at 0; during the second repeat, Q of U15B is at 0. Both Q s are at zero during the third repeat cycle. When the cathode of an LED is a 0 it will conduct approximately 10 mA of current and emit visible red light. The two LEDs form a register giving an up-to-date status of the number of times the message has recycled. These lamps are located on the front panel, as shown in Fig. 1.

Station Transmit-Receive Control

Automatic transmit-receive station control is accomplished through a set of relay contacts which

are closed when the AUTO XMIT button is momentarily depressed. These contacts are automatically reopened at the end of the message. Depressing the AUTO XMIT button on the remote control box sets two flip-flops consisting of U14A/B and U14C/D. When the U14C/D flip-flop is set, the output of U14C is at 1, thus causing Q5 to conduct and close station-control relay K1. When power is initially turned on to the keyer, this flip-flop always comes on in a reset state because of the 2200-ohm resistor at pin 10 of U14C. This prevents inadvertent transmitter operation.

The action of U14A/B is slightly more complex since it forms a one-shot multivibrator in conjunction with Q3, Q4, and U17B. This one-shot multivibrator provides approximately 100 milliseconds of delay to allow the station control circuitry to reach a safe transmit condition before the message is initiated. If the message was sent without delay, arcing of the antenna changeover relay, or damage to other station equipment could result.

When flip-flop U14A/B is set, the output of U14A is at 0 and Q4 is turned off. This allows the 3.3- μ F capacitor in the anode of programmable unijunction transistor (PUT) Q3 to start charging through a 47k-ohm resistor. When the capacitor charges to approximately 4 volts (in approx. 100 ms), Q3 conducts and produces a short positive pulse across the 100-ohm resistor in its cathode. This pulse is inverted in U17B and is used to (1) reset flip-flop U14A/B, thus turning on Q4 and preventing the 3.3- μ F capacitor from recharging, and (2) resets control flip-flop U9B which allows the binary counter to start counting up, and thus initiates the message with a 100-ms delay.

Finally, at the end of the message, ROM output S goes to 1 which, after being inverted in U17A, (1) sets control flip-flop U9B which holds the binary counter in a reset state, and (2) resets flip-flop U14C/D which opens the station-control relay. An LED connected to the collector of Q5 indicates when the station control relay is closed. Germanium diodes in the output of U17A and U17B prevent their pull-up transistors from being damaged when the MESSAGE INITIATE or STOP switches are depressed.

Master Clock

The master clock consists of Q1, Q2, and U9A. Clock pulses at the output of U9A are used to drive the iambic memory keyer and the binary counter. The circuitry associated with Q1 forms a linearly variable constant-current source in which the collector current of Q1 is linearly related to the angular position of the speed-control potentiometer. The collector current of Q1 charges the .047- μ F timing capacitor in the anode of PUT Q2. When the capacitor charges to approximately 5 volts, the PUT discharges the timing capacitor into the 47-ohm cathode resistor to produce a clock pulse for U9A. The U9A output alternates between 0 and 1 to provide a square-wave output at half the frequency of the clock input. The square-wave outputs of U9A at both \bar{Q} and \bar{Q} provide the master-clock signals for the iambic memory keyer

and binary counter. Each time the timing capacitor is discharged, it immediately begins to recharge to the conduction point of the PUT. Since the time it takes to charge the timing capacitor to the firing point of the PUT is proportional to the collector current of Q1, linear calibration of the speed control results.

It is worth mentioning that short ground connections from the timing capacitor and the 47-ohm resistor to the ground of U9A should be made. The same is true of the clock input lead to U9A. Excessive lengths can cause ringing and improper clock operation.

Output Circuit

The output of the iambic memory keyer is connected to one input of OR gate U16A. The ROM output is inverted in Q6 and connected to the other input of U16A. When either input goes to 1, the output of U16A goes to 0 which is inverted in U17C to turn transistor Q7 on and close the keying relay, K2. An LED is connected to the collector of Q7 to indicate the state of the keyed output. This LED is located on the front panel as shown in Fig. 1. A 1-mH rf choke and a .01- μ F capacitor in the base of Q6 act as a filter to prevent rf pickup in the ROM. The use of shielded cable is recommended to minimize rf pickup in the connections to the remote control box.

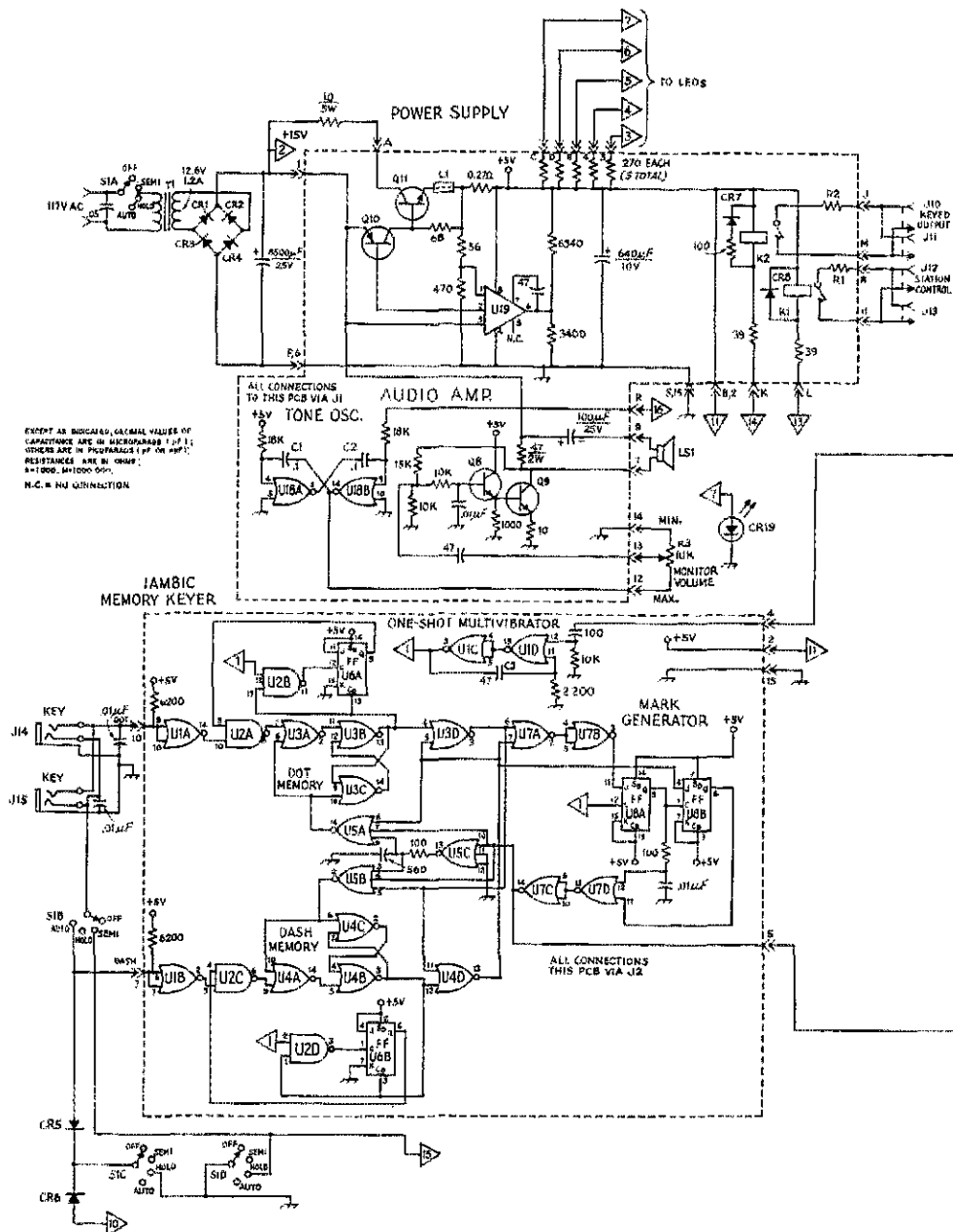
Keying Monitor

The keying monitor consists of a tone oscillator and an audio amplifier. The tone oscillator U18A/B is a keyed multivibrator which produces a square-wave output at a fundamental frequency of approximately 750 Hz. The two resistors at pins 4 and 9 of U18 can be changed from 18k ohms to a slightly different value if a different tone frequency is desired. The tone oscillator is keyed by the output of U17C which is connected to one of the 18k-ohm resistors at U18B. When the output of U17C is at 0 (space) the tone oscillator is off. Conversely, the output of the tone oscillator is on when the output of U17C is at 1 (mark).

The square-wave output of U18B is attenuated by the monitor volume control and applied to the input of Q8 through an RC filter which attenuates high-order harmonics of the square wave to give a pleasing tone. The audio amplifier consists of Q8 and Q9 and is used to drive a speaker. Although a 2 1/4-inch speaker was used, there is plenty of power available to drive a much larger one if desired.

Power Supply

Regulated +5 volts and unregulated +15 volts are required to operate the keyer. The 5-volt supply is regulated by U19, which controls the voltage drop across Q11 to provide exactly 5 volts at the power-supply output. The regulated output is virtually independent of the input voltage across the 8500- μ F capacitor and the load current. Integrated circuit U19 contains a high-gain feedback control amplifier, an internal voltage reference, and an output-current sensing amplifier.



(Continued from previous page)

- J3-J8, incl. - 22-pin double-row (44 contacts) circuit-board edge connector, Amphenol type 225-22221-110 or equiv.
- J9 - 24-pin connector (15 pins used); Amphenol type 57-40240.
- J10-J13, incl. - Phono jack.
- J14, J15 - 3-conductor phone jack.
- K1, K2 - Reed relay, Magnecraft W102MX-1 or equiv.
- L1 - Ferrite bead
- LS1 - 8- or 16-ohm impedance.
- P9 - 24-pin connector (15 pins used); Amphenol type 57-30240 or equiv.
- Q1 - Silicon npn, 2N3906 or equiv.
- Q2, Q3 - Programmable unijunction transistor, GE D13T1 or equiv.
- Q4, Q6 - Silicon npn, 2N3643 or equiv.
- Q5, Q7, Q9 - Silicon npn, 2N3945 or equiv.
- Q8 - Silicon npn, 2N3565 or equiv.
- Q10 - Silicon npn, 2N4037 or equiv.

If the regulated output is short circuited, the output current will be limited automatically to a safe value. Transistor Q10 is a driver transistor for series pass transistor Q11. The ferrite bead in the emitter lead of Q11 is used to prevent high-frequency oscillations (parasitics) which can occur with long lead lengths in the power supply. The +5-volt output is determined by the 3400- and 6340-ohm resistors at pin 6 of U19 and are one-percent 1/4-watt metal-film types. The +15-volt power is obtained from a bridge rectifier and a 12-volt 1.2-A filament transformer. This supply is used as the input to the regulated 5-volt supply, as well as for the master clock and audio amplifier. An LFD connected to the +5-volt power supply indicates if power is on or off.

Ac power is switched by S1 which also controls the keyer function. When S1 is in the SEMI position, the dash side of the key is switched to the input of Q6. This point is also connected to the output of the ROM, which, when at 0, produces a mark. The HOLD position of S1 is used to produce a key-down output and to preset all internal flip-flops so that when power is turned on the keyer comes up in the idle state. The key-down output is used for tune-up operation of the station transmitter and is obtained by placing the input of Q6 at 0. Power-on/preset is accomplished with germanium diodes at SIC. These connect the dash input of the iambic memory keyer and the stop line of the message generator to 0 in the HOLD position. The AUTO position of S1 connects the dash side of the key to the dash input of the

- Q11 - Silicon power npn, RCA 40251 or equiv.
- R1, R2 - See text.
- R3 - Audio taper.
- R4 - Linear taper.
- S1 - 4-pole, 4-position rotary, shorting (Oak 399-328F or equiv.).
- S2, S3 - Single-pole, 5-position rotary, nonshorting (Oak 399-323F or equiv.).
- S4, S5, S6 - Spst momentary push, normally open.
- T1 - Power; 117-V primary, 12.6-V 1.2-A secondary (Triad F-25X or equiv.).
- U1, U3, U4, U7, U16, U17, U18 - Quad 2-input NOR gate (Signetics SP380A or equiv.).
- U2, U14 - Quad 2-input NAND gate (Motorola MC846P or equiv.).
- U5 - Triple 3-input NOR gate (Signetics SP370A or equiv.).
- U6, U8-U13, incl., U15 - Dual J-K flip-flop (Signetics SP322B or equiv.).
- U19 - Voltage regulator, National Semiconductor LM300 or equiv.

iambic memory keyer for full automatic dot and dash keying. When turning the keyer on and switching to AUTO, the keyer will automatically be in the idle state since S1 passes through the HOLD position. If desired, the switch could be rewired so that the HOLD position was first encountered when turning power on. Rewiring the switch as suggested would cause the keyer to come on in the idle position in both the SEMI and AUTO modes.

Construction

The completed keyer is housed in a Hammond model 1426v slim-line cabinet (Hammond Mfg. Ltd., Guelph, Ontario, Canada) and measures 4 x 12 x 8 inches. Some modification of the cabinet was necessary. Fig. 6 shows the internal construction which slips into the outer box. Aluminum sheet-metal brackets were fabricated for mounting of internal hardware. As shown in Fig. 6, one bracket is used to hold various connectors, the power transformer, and the 10-ohm power resistor. The other two brackets contain card guides to position the ROM circuit boards. The three vertical boards are positioned by another bracket, as shown in Fig. 3. The front panel is attached to a subpanel with the control-shaft panel nuts.

Q11 is mounted on a U-shaped heat sink as shown in Fig. 7. Although not absolutely necessary, small clip-on heat sinks were used on Q9 and Q10. A small 2 1/4-inch speaker is mounted on a spacer off the power supply board. Careful analysis of the iambic memory keyer-board photograph will reveal two additional ICs not shown on the schematic. These are for an experimental additional circuit not covered in this article. All circuit boards are double sided to eliminate as much wiring as possible. The remote control box is a standard black phenolic type

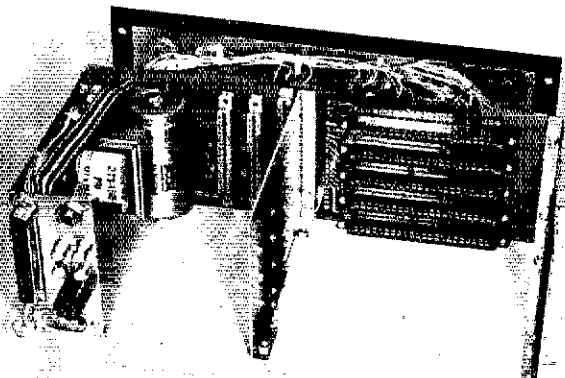


Fig. 6 - Internal construction of the keyer. Aluminum brackets are used to support various pieces of hardware and components.

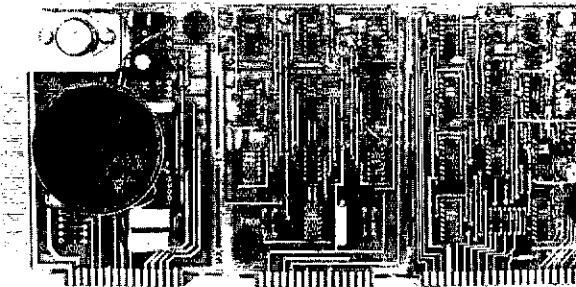
Fig. 7 — Plug-in circuit cards: (1) power supply/keying monitor, (2) iambic memory keyer, and (3) ROM counter/memory control/master clock/output circuitry.

found at most distributors. Push-button switches were used on the remote control box for convenience. However, these types of switches may be difficult to find and one may have to use the rotary types listed in the parts list. It would also be possible to locate the MESSAGE SELECT and REPEAT SELECT switches on the front panel. Although this may be less convenient, the amateur who uses primarily one message only may find it satisfactory. In any event, the MESSAGE INITIATE or AUTO XMIT button should be located near the key. It would be possible to use an automatic key with a hand key on the same base (such as the Brown Bros. Model CTL) where the hand key could be used to initiate the message. The diode-matrix ROM board is shown in Fig. 8. The components were placed on end as a means of providing a compact design with a generalized approach. Components are located on 0.15-inch centers and use bus wires to make connections at their upper ends. Room is provided for up to 51 diode AND gates, one repeat, and one STOP gate. The overall size of the ROM circuit board is approximately 6.2 x 5.8 inches. The other plug-in boards each measure approximately 3.8 x 5.8 inches. The author used information available from the ARRL as mentioned in a previous QST article⁴ to design the diode matrix ROMs. Be sure to make the component changes as mentioned earlier in the text when using this information.

Additional Comments

Components R1 and R2, shown in Fig. 5, are used to limit the current through K1 and K2 contacts to a safe value. In most modern transmitters using grid block keying, this current is low enough to prevent contact damage. Damage usually occurs by contact arcing on the make or break. This can be checked by shorting and unshorting the transmitter keying leads in a dark room and observing if any arcing exists. The reed relay specified in the parts list has a contact rating of 15 volt-amperes maximum. In addition, a key-down current of less than 1 A and a key-up voltage of less than 250 V should be observed. If arcing occurs on make, then R2 should be made a value to minimize the arc and yet allow normal operation of the transmitter keying circuitry. Usually a few hundred ohms are sufficient. If the contact ratings are exceeded, it is advisable to use a different type of keying relay, such as one with mercury-wetted contacts.

Fig. 8 — Diode-matrix ROM board for the message CQ CQ TEST W7YGN W7YGN K. Note that all components are mounted on ends. Bus wires make connections along the top ends of components. The circuit board is double sided.



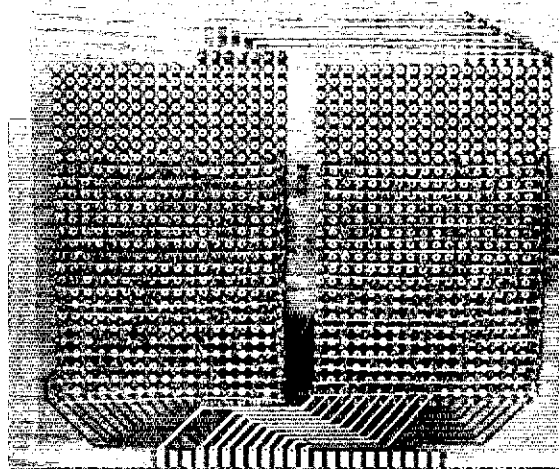
The contacts of K1 are intended to operate the PTT circuitry of the station transmitter. The same precautions should be made for K1 contacts as for K2, with the value of R1 chosen accordingly. Solid-state switches could be used, but mechanical relays provide operation in either polarity, and since neither terminal needs to be grounded, rf ground-loop problems can be minimized.

The performance of the keyer has proved to be quite satisfactory. Improved efficiency in the ARRL Field Day, Sweepstakes, and numerous DX contests has resulted in more QSOs per hour, better jobs in logging, better-kept "dupe" sheets, a less-fatigued gang of operators, and a higher final score.

The author wishes to express gratitude to W7RM, K7HTZ, W7IEF, K7VPF, W7EXM, and WN7OTT for their ideas and help in construction and testing of the keyer. K7GCO is also given credit for help with the photos.

References

- 1) Van Cleef, "ICKEY — An Integrated-Circuit Electronic Keyer with Dot and Dash Memories," *QST*, November, 1968.
- 2) Van Cleef, "Automatic Letter Spacing for ICKEY," *QST*, February, 1969.
- 3) Stone, "SPAKEY — A Controlled-Space IC Keyer," *QST*, December, 1970.
- 4) Hall, "A Digital Morse-Code Message Generator," *QST*, June, 1970.



Technical Correspondence

MORE ON THE RTTY TERMINAL UNIT OF WIDE DYNAMIC RANGE

Technical Editor, *QST*:

In the May 1968 issue of *QST*,¹ an autostart circuit using an FET and a pnp transistor is shown. Unfortunately, the circuit as reproduced is incorrect. In addition, clarification of certain parts of the circuit, notably the power supplies and external connections, may be in order. The correct circuit is shown in Fig. 1. Suitable transistor substitutes are shown in Table I.

TABLE I	
Q1	Q2
TIS34	2N3644
MPPF102	2N3638
TIS88	2N4037
2N4416	2N5323
2N5458	2N4402
2N5485	40319

Suitable substitutes for Q1 and Q2 of Fig. 1.

The first transistor is a TIS34, not a TID34. Additionally, the second transistor is a pnp type, not npn as shown originally. This device is a 2N3644 — the three was left off. Confusion has arisen over the -9-V supply. This is a separate supply, and a small transistor battery powering *only* this circuit can be used. The +9-V to +15-V supply can be any convenient dc supply, perhaps within the unit to which this circuit is to be added. It must provide closing current for the relay.

Note also that relay K1 must switch a larger relay with heavier contacts, as the starting current of most motors is high. All other factors mentioned in the original note regarding resistor ratios and changed values of time constant still apply. Experimentation has shown that a capaci-

¹ Buttschardt and Olson, "An RTTY Terminal Unit of Wide Dynamic Range," *QST*, May, 1968.

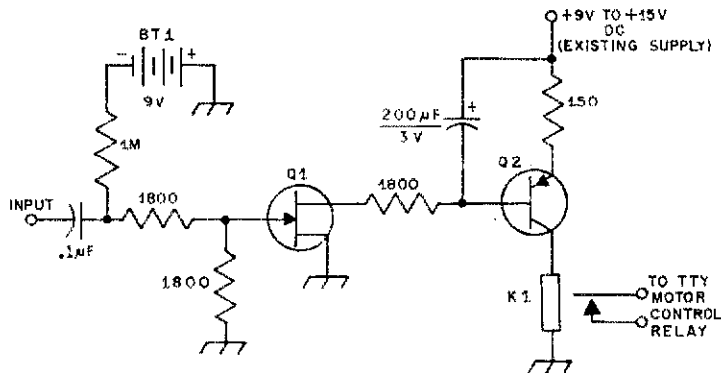


Fig. 1 — RTTY autostart circuit. See text and reference of footnote 1.

tance change from 200 µF to 100 µF will halve the time delay. Larger changes of capacitance will require a change in value of the 18k-ohm resistor. DELAY and HOLD values become dissimilar unless larger resistance values are used with smaller capacitance.

A final test of the circuit is easy to make. The transistor 9-V battery is usually wired into the circuit with a snap-on connector. Simply disconnect this battery and the timing cycle will start. After the relay has closed, reconnection of the battery will cycle the relay open. When the cells become exhausted, the HOLD portion of the cycle will become foreshortened, eventually causing the motor to run continuously. — Clifford Buttschardt, W6HDO, 275 Chiquita Ave., Mountain View, CA 94040.

SELECTION OF TUBES FOR PARALLEL OPERATION IN SWEEP-TUBE AMPLIFIERS

Technical Editor, *QST*:

I would like to relate the experiences I have had in replacing the final-amplifier tubes in my commercially-made transceiver. It uses a pair of 6LQ6s in parallel. Just any two 6LQ6s will not work. One of the tubes will almost always draw more current than the other and heat up excessively. In addition, one can't match two tubes on an ordinary tube tester, since these testers test only the emission. The manufacturer recommends replacing the finals with a factory-issued matched set. In my case, the matched pair solved all my problems. — Richard Andelfinger, WB2PNF, 1593 Union Ave., Union, NJ 07083.

TTL CRYSTAL OSCILLATOR

Technical Editor, *QST*:

The unit shown in schematic form in Fig. 2 meets several important needs. It's simple. It's cheap. It can furnish up to 50 milliwatts into a 500-ohm load, and it has a wide frequency range. It's quite versatile for a single IC.

The oscillator is basically an astable multivibrator using a crystal as the frequency-determining element, and also features a buffer stage for stability. It functions well with supply voltages from 3 1/2 to 6, and with crystals from 1 MHz to 28 MHz. No tuned circuits are required. Crystals will oscillate at their fundamental series-resonant mode.

C1 is a 50-pF trimmer which may be omitted if fine frequency adjustment is not desired. Z1 is a



Hints and Kinks

For the Experimenter



SOURCES OF FERRITE MATERIAL FOR CHOKES AND COILS

If you plan on winding your own rf choke or coil and the design calls for the use of ferrite as core material, where can it be found? One source of ferrite cores is older portable radios. These radios usually have ferrite rod antennas. The existing wire can be either unwound or cut off. Another source of ferrite cores is the horizontal output (flyback) transformer in television receivers. Use a hacksaw to remove the windings.

Many of the cores, whether from television sets or radios, are approximately 1/2 inch in diameter. This dimension is satisfactory for most bifilar choke designs, but sometimes a smaller diameter is required. These cores can be cut and ground to size, but caution must be exercised since they are brittle. If breakage does occur, not all is lost. These cores can be glued or taped together. — *Warren MacDowell, W2AQQ*

EDITOR'S NOTE: Ferrite material obtained from horizontal output transformers and loop antennas from portable radios may be usable up to 10 MHz. One particular ferrite sample tested gave good performance up to 7 MHz. In general, these ferrite cores can be used in equipment that covers the 160- through 40-meter bands.]

SIMPLE OSCILLOSCOPE PREAMPLIFIER

Having spent considerable time trying to find a simple ready-made circuit for use as an oscilloscope preamplifier, I finally designed one which would serve my purpose. Since my oscilloscope is an old Dumont 274 which was designed primarily for audio work, I needed a solid-state amplifier with a voltage gain of approximately 100, and which could be powered by a 9-volt battery.

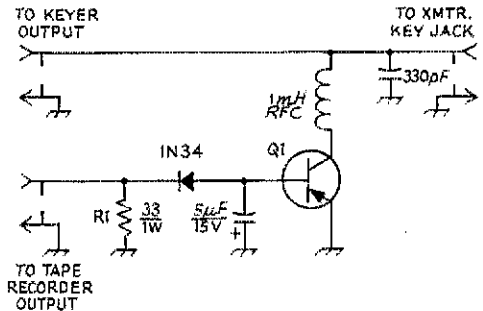
Shown in the circuit is a small-signal voltage amplifier which uses a Motorola HEP S9100 Darlington pair as the active amplifying device. This amplifier has a voltage gain of approximately 100 over a frequency range from 20 Hz to over 30 kHz. The amplifier is powered by a 9-volt transistor battery. The input impedance is nearly equal to the parallel combination of R1 and R2,

while the output impedance is roughly 20,000 ohms.

The amplifier could have been built using two separate transistors, but since the HEP S9100 is inexpensive (\$1.32), it was used. If it is desired to use reverse polarity in the circuit, use a Motorola HEP S9120 pnp Darlington pair. — *J. H. Ellison, W6AOI*

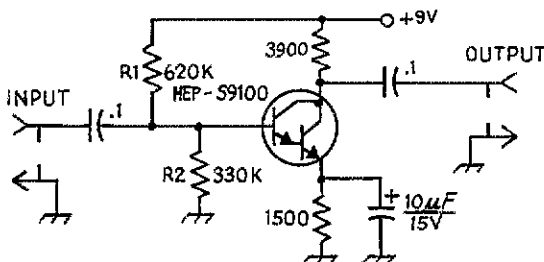
TAPE-RECORDER-DRIVEN SOLID-STATE KEYS

A while ago, a tape-recorder-driven relay keying device was described by WA2BCT in "Hints and Kinks," May, 1971, *QST*, which he used to replay W1AW Official Bulletins. An alternative to the relay-keying device is a solid-state keying circuit using a transistor to do the switching. The transistor should have a collector-to-emitter voltage rating in excess of the voltage across the terminals to be keyed.



A circuit for keying a transmitter with the audio output from a tape recorder.

Q1 — 2N4126. For keying over 40 volts, use a 2N4888 or an SK3025 (RCA).
R1 — For text reference.



A simple oscilloscope preamplifier.
R1, R2 — See text.

Component values shown in the diagram are not critical. Just make sure that the transistor is a pnp type when the voltage to be keyed has a negative polarity. This circuit can be used to key most transmitters as long as the current through the keyed circuit is within the collector-to-emitter rating of the switching transistor. R1 may be changed in order to provide a better impedance match between the output of the recorder and the input to the keying circuit. A transformer can also be used, if desired, in place of R1, to match impedances.

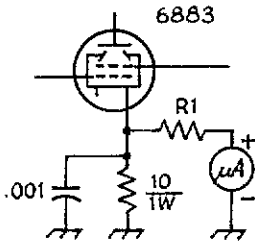
Once the keying circuit is connected as shown in the diagram, start the tape recorder. Increase the volume of the tape recorder until the transmitter keys correctly. — *Al Francisco, K7NVH/8*

MONITORING BOTH LIMITER VOLTAGE AND PA PLATE CURRENT

When operating fm, it is desirable to have some monitoring capability, especially if one is used to using the S-meter and the final plate current meter. Since I have an AChieverfone¹ transceiver which I use on the two-meter band, I looked into the possibility of installing meters. Since it was inconvenient to mount two meters under the dashboard of the car and extra relay contacts were not available, the problem narrowed down to that

¹ Schleicher, "Putting a 'Spark Plug' on Two Meters," *QST*, June, 1971.

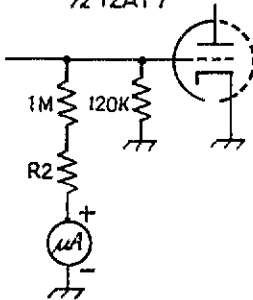
POWER AMPLIFIER



A metering circuit for measuring voltage across the cathode of the power amplifier.
R1 - See table.

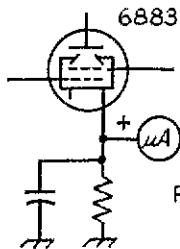
1ST LIMITER

½ 12AT7



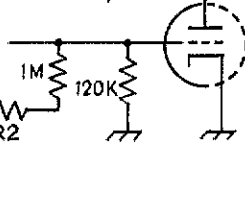
A metering circuit for measuring limiter grid voltage.
R2 - See table.

POWER AMPLIFIER



1ST LIMITER

½ 12AT7



Combined metering circuit for measuring both final-amplifier plate current and limiter grid voltage.

R1, R2 - See table.

TABLE

Meter Movement	R1	R2
25 μ A	100k	1M
50 μ A	56k	0

of a single meter installation that would be permanently connected. This meter would read final-amplifier plate current or limiter grid voltage.

When the receiver is turned on there is limiter grid voltage, but there is no plate current being drawn by the final amplifier and therefore no voltage appears across the cathode resistor. On the other hand, if the transmitter is on, there is no limiter grid voltage but there is plate current being drawn by the final amplifier. Using these conditions, the first figure shows a metering circuit that measures voltage across the cathode resistor in the power amplifier. This voltage is proportional to the plate current drawn by the tube. The second figure shows a metering circuit that measures grid voltage of the first receiver limiter. The third figure shows how these two metering circuits can be combined so that one meter can be used to read both functions.

Since the voltage across the cathode resistor might go as high as 2.5 and the limiter voltage might reach minus 50, a set of multiplier resistors and meter movements are listed in the accompanying table. The error in combining both functions is only a few percent of the full-scale reading. This system has worked fine in the AChieverfone and possibly could be used in similar transceiver units.
- Edward Pienkowski, W8BEB

PROTECTIVE FINISH FOR PANEL MARKINGS

Save the leftover coating material that comes with Polaroid film. This coating makes an excellent protective finish for transfer-type panel markings. The Polaroid applicator can be used to apply the print coater to the panel without the necessity of masking or spraying the entire panel. - Albert D. Helfrick, K2BLA

QUICK ANTENNA ANCHORS

About a year ago I put up a trap vertical antenna in my back yard and used 5-gallon paint pails as guy anchors. I dug holes in the ground, put the pails into the holes, and filled the pails with rocks and dirt. I left the handles above ground to be used as connection points for the guy lines. - Ed Miller, VE7AEK

A SIMPLE MAKESHIFT ALLEN WRENCH

Trying to get a knob off a shaft which uses Allen-head screws can be pretty difficult if you do not have the right size Allen wrench. Get a nail with a diameter a little larger than the hole in the Allen screw and file a four-cornered point on the top. Bend the other end of the nail at a right angle. Insert the nail into the head of the screw and turn, just as you would with a regular Allen wrench. If the screw is difficult to loosen, use more pressure, while supporting the knob from underneath with a wooden block. - George Leininger, W8QZF



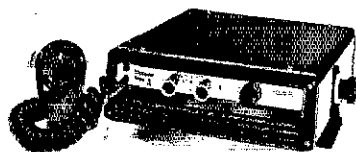
Recent Equipment



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

Simpson Model A

FM Transceiver



A DECADE or more ago, the writer went a-mobiling, working in the two-meter band with the latest word in a-m transceivers, the "Gooney Box." Two cubic feet of equipment usurped the passenger's leg room; a huge (in the XYL's opinion) horizontally polarized antenna stuck up from the back bumper. And still many QSOs required moving the car back and forth a few feet to peak a signal when parked.

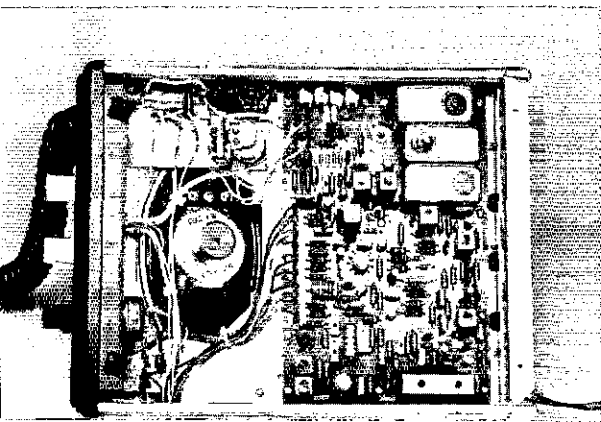
In the summer of 1971 mobile operation was again tried, this time on 2-meter fm with the new Simpson Electronics Model-A and a quarter-wave whip protruding up from the cowl of the car. What a contrast . . . all in favor of the little black box with the 1930 name and the ultra-new solid-state insides. Of course the use of a local repeater helped, too.

There is a family resemblance between the Model-A and Simpson's well-known line of marine gear. But, this rig was built for hams; it contains several features not found on units costing much more. The transmitter and receiver have independent channel switching — a necessary convenience for anyone who travels, because of the many unusual input/output frequency combinations of two-meter repeaters. The Simpson comes equipped for transmit on 146.34 and 146.94 MHz, while the receiver is set up for "76" and "94." Two additional crystals may be added to complete the available four transmit and four receive channels.

Overview

The "A" is housed in a vinyl-clad aluminum box that measures 2 1/2 inches high by 8 1/2 inches wide by 11 inches deep. (That leather-like finish doesn't chip off the way that enamel paint is prone to do when exposed to the rigors of mobile operation.) The carbon microphone is permanently wired into the rig, in the fashion common to most marine transceivers. At the center of the front panel are the two channel-selector switches. Changing from one crystal to another is done with diode switching, as shown in Fig. 1. Between each crystal and the oscillator transistor is a 1N625 diode which offers a high series impedance, except when the crystal-selector switch applies 9 volts. Then, the diode is forward biased, connecting the crystal to the oscillator. Trimmers are included on both the transmitter and receiver crystals to allow the frequency to be set exactly "on channel," a feature nussing from some other 2-meter fm rigs.

Concentric controls on the front panel provide switching on the power to the rig plus varying the volume level and squelch sensitivity. In addition to these controls, there is a place to letter in a call sign, although it must be a forgetful ham indeed who could not remember his "second name." Below the controls is the opening for the speaker. One impressive feature of the Model-A is a powerful audio system. Even high-speed driving with the car windows open fails to drown out the big (for this class of gear) 3 x 5-inch speaker. The rated audio output is 7 watts, but the circuit shown in Fig. 2 will deliver more than 8 watts when operated from a 13.5-volt supply. Output from the discriminator, after de-emphasis, is fed to an RCA CA3020 linear integrated circuit. Here the audio level is amplified sufficiently to drive a pair of Delco DTG-110 pnp transistors. The audio



The receiver section. Perched at upper right are the high-*Q* tuned rf circuits, two of which precede the common-emitter, low-noise rf amplifier. At bottom right is the ceramic filter.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR $\mu\mu\text{F}$); RESISTANCES ARE IN OHMS; $k=1000, M=1000000$

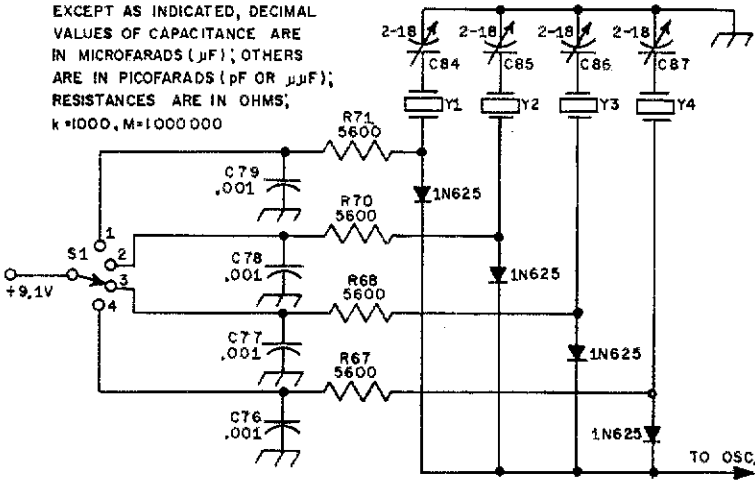


Fig. 1 — Diode switching circuit used in the Simpson Model-A.

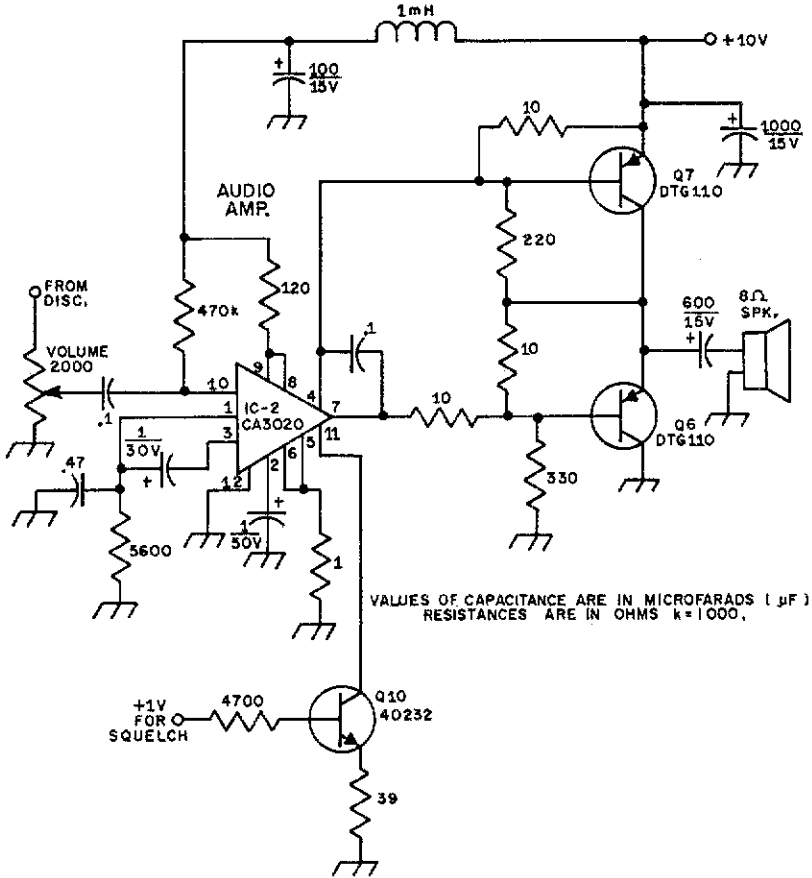
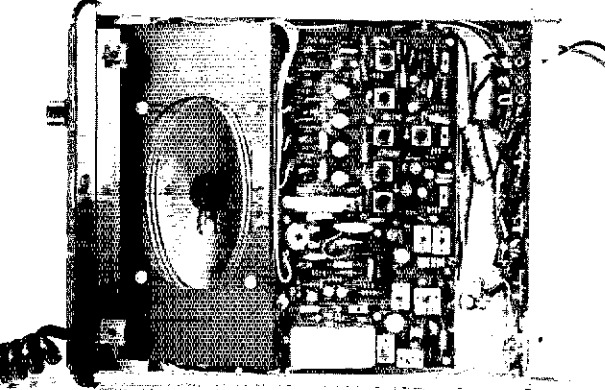


Fig. 2 — Audio driver and output amplifier.



The transmitter compartment. At bottom center is the low-pass output filter. At its upper right corner is the output test jack. The circle to the right is the Motorola 2N5589 — the automatic goof-proof BET type. The oversized speaker is mounted at an angle; the audio orifices are on the bottom half of the front panel.

output transistors are mounted on the rear wall of the transceiver providing a heat sink. All other receiver components are located on a glass-epoxy circuit board. Squelch gating is applied to pin 11 of the CA3020 by Q10, an npn transistor. When noise only is received, the noise rectifier will develop sufficient voltage to turn Q10 on, shutting down the audio integrated circuit.

Other circuits used in the receiver include a bipolar rf amplifier and dual-gate MOSFET first mixer. A ceramic filter provides a 13-kHz bandwidth (measured at the -6 dB point). I-f amplification and limiting are provided by an RCA CA3043 IC. Although the '3043 contains diodes for the discriminator, the Simpson engineers have chosen to use an external discriminator, perhaps because the diode load resistors in the IC are better suited for wide-band detection.

The Transmitter

The lower half of the case is occupied by the transmitter board, which is rated at 6-watts rf output. However, our Bird wattmeter indicated that 8 watts were being delivered to a 50-ohm load. Audio from the microphone is amplified and clipped to provide a constant-level signal for the phase modulator. Double-tuned circuits couple the various stages in the $2 \times 3 \times 2 \times 2$ multiplier chain to suppress unwanted harmonics. The final stage is a Motorola 2N5598 balanced-emitter transistor which is rated by the manufacturer to take open or short circuits momentarily without damage. The output from the transmitter is passed through a 4-section low-pass filter to insure that the harmonic energy (always produced by a bipolar rf power amplifier) is adequately suppressed — another item that has been forgotten in some rigs on the market today.

Troubleshooting

The bugs which plague most rigs once in a while will find it hard to hide out in this apparatus — all wiring is color-coded and there are color-coded test points on each board. The manual is quite explicit, too, at telling how to use these points when tuning up and troubleshooting. American components are used almost throughout; the boards are plug-in, and easily demountable.

Speaking of bugs, we had one. A slug-tuned coil in the transmitter multiplier chain kept wandering, no doubt largely due to road shock during the rebuilding of the street past the home QTH — what was being called the "world's longest foxhole"! A few drops of Silastic sealer, applied to each of the slugs, held them down just fine thereafter.

Crystals

The receiver "rocks" operate in parallel resonance on the third overtone (45.41333 MHz for 146.94 MHz). Load capacitance is 12 pF, plus or minus 0.5 pF, and maximum drive is 1.2 mW. The holder is a type HC-25. On the transmitter side, the same holders are used. Load capacitance is 27 pF, plus or minus 0.5 pF. The multiplication factor is 24; thus, for 146.94 MHz, the crystal frequency required is 6122.5 MHz.

Summary

The rig was easy to install — cradle fastened to the underside of the dashboard, box slid in, and two thumb knobs tightened. An alligator clip on the plus line was attached to the fuse block of the car, and the negative return clip went to ground. The rig has been used almost daily for three months in mobile service, with complimentary reports from fellow users of the local (146.28/146.88 MHz) repeater. A far cry from our earlier venture on 2-meter mobile! — *WIUFD*

Simpson Electronics Model-A FM Transceiver

Height: 2 1/2 inches.
 Width: 8 1/2 inches.
 Depth: 11 inches.
 Weight: 5 pounds.
 Frequency Range: 144 to 148 MHz.
 Receiver i-f bandwidth: 13 kHz.
 Deviation: 5 kHz.
 Power Output: 6 watts (min.) @ 13.5 V.
 Power Requirements: 12 V dc; receiver current 0.25 A squelched, 0.48 A open; transmitter current 5 A. An ac supply is optional, extra.
 Manufacturer: Simpson Electronics, Inc.,
 2295 N.W. 14th Street, Miami, FL
 33125.

Millen Solid-State Dipper

THE JAMES MILLEN Company has always been known for the quality of the items it produces. As any ham who has used one knows, Millen's grid-dip meters can be depended on to provide faithful service. After considerable time in development, Millen has introduced a solid-state FET dipper, the Model 90652.

Two problems have shown up in many solid-state dippers. One is a lack of sensitivity, making it difficult to get a good "dip" indication without very tight coupling between the instrument and the circuit being checked. The other problem is keeping the solid-state dipper oscillating at a nearly constant level across each range. Most of the solid-state models, and many tube types, have "holes" in the tuning range where the circuit drops out of oscillation or indicates a false dip. These problems don't exist in the Millen dipper; sensitivity is excellent, and there are no holes in any of the oscillator ranges.

The frequency range of the Millen unit is 1.6 to 300 MHz. A separate plug-in coil is used for each of seven bands. All the coils are enclosed in plastic and, with the exception of the highest-frequency coil, they are 5/8-inch diameter and 2 1/4 inches long. With a long coil holder which has the winding installed at the end of the form, it is easy to couple to hard-to-reach circuits.

The oscillator is a Colpitts type, using a 3N128 single-gate MOSFET. The sensitivity of the dipper is increased by using the suppressed-zero metering circuit shown in Fig. 1. The zero suppression in the meter circuit has the effect of greatly expanding the meter range. The SET METER control, which is mounted directly below the meter, sets the bias on the dc amplifier, a 2N5459. The JFET does not draw current until the established bias is exceeded. Thus, meter readings are indicated only for the upper portion of the current range, accentuating the dip indication.

The Model 90652 can be used as an absorption wavemeter. When used in this mode, the DETECTOR-OSCILLATOR control is adjusted so



that the 3N128 becomes a regenerative amplifier, increasing the detected-signal output from diodes CR1 and CR2, two 1N3604s. Essentially, the 3N128 functions as a *Q* multiplier, greatly increasing the selectivity and sensitivity of the detector output.

The dipper is powered by a 9-volt battery. Battery life, during normal ham usage, will be about six months. The SET-METER control has a bright yellow band that is very apparent when the control is turned on and not visible when the unit is shut off. This serves as a handy reminder to turn off the unit when it isn't being used.

We cannot help but admire the 90652 instruction manual. Every operating feature is covered in detail, and complete trouble-shooting data is given. The manual is a short course on the use of a dip meter. We wish that other manufacturers would furnish customers with such complete details of the operation and maintenance of their equipment. — *W1ICP*

Millen Solid-State Dipper, Model 90652
 Length: 7 1/4 inches.
 Width: 3 1/4 inches.
 Height: 3 1/4 inches.
 Power Requirements: 9 V at 3 to 7 mA,
 from internal battery.
 Price Class: \$110.
 Manufacturer: James Millen Mfg. Co., Inc.,
 Malden, MA 02148.

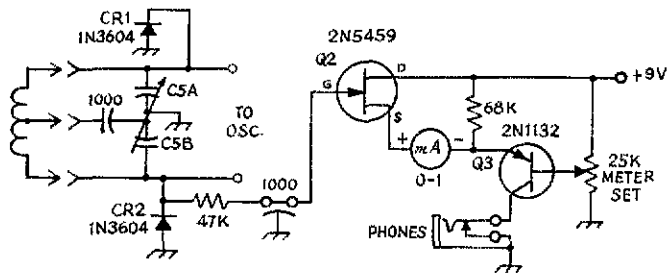


Fig. 1 — Circuit diagram of metering section of the solid-state dipper.



Melville Shavelson, W6VLH

In his book, How to Make a Jewish Movie,¹ Melville Shavelson, W6VLH, describes experiences while writing, selling, and filming the motion picture, "Cast a Giant Shadow." One of the most humorous chapters in the book describes his involvement with ham radio. By permission of the author, we reprint portions of that chapter here.

How to Make a Jewish Movie

BY MELVILLE SHAVELSON,* W6VLH

I HAVE A confession to make. I have a secret vice, which I share with a mere 300,000 denizens of the planet Earth. It is not an uncontrollable urge to become the Casanova of 1971 — mine, alas, is only too controllable — or a need to smoke pot, hashish, cocaine, or other interesting flora. I trip out if I inhale English lavender. No, my vice is something deeper and more insidious: I am a Radio Amateur. In the vernacular, a "ham." I have spent untold hours soldering wires together and building equipment so I could speak to mysterious parts of the world; many times I have turned on the power in my transmitter and, immediately, carried on interesting conversations with my next-door neighbors who threatened to come over and smash the darn thing if I didn't get off Channel 2.

I had had several reasons for wanting to go to Israel; one was to make the picture; another, and possibly a more important one, was that Israel at that time had no television. If I could find some way to operate from that Promised Land, not only would I be free of neighborhood complaints, but any station I could hear would be *foreign!*

Furthermore, the overriding, urgent, earth-shattering purpose behind what was about to befall me was that, somewhere in Brentwood, California, which is the Beverly Hills of Beverly Hills, an even more enthusiastic enthusiast than myself was waiting for me to call him via the ether. There is something about the thrill of amateur radio that makes it increasingly enjoyable to talk to your friends the further they are away from you. There may be a deeper meaning here, but let's not go into that. At any rate, I knew he was waiting for me to establish radio communication because he cabled me every day he was waiting. I cabled back every day that I was hurrying, but my equipment hadn't arrived. Then he cabled back that he was glad I was hurrying, but he was still waiting.

My alter enthusiast was Ernest Lehman, the distinguished screenwriter and producer of such films as "Who's Afraid of Virginia Woolf?" and "Hello Dolly!" but this is merely a cover for his real occupation, which is being enthusiastic. He works so hard at enjoying his hobby, he sometimes doesn't realize he's enjoying it. I once drove up to his house in Brentwood and found him riding up and down the street on a bicycle, speaking into a tiny walkie-talkie.

"What are you doing, Ernie?" I inquired.

"I'm talking to Australia from my bicycle," he said enthusiastically. "What are you doing?"

I was only talking to Hawaii from the transmitter in my car; I realized he had one-upped me by several thousand miles and 280 horsepower, so I didn't mention it. It turned out he was remote-controlling the powerful transmitter in his



* 11947 Sunshine Terrace, North Hollywood, CA 91604.

¹ Prentice Hall, New York \$6.95.

home via the walkie-talkie, thus his seemingly miraculous ability to communicate with the other side of the world while riding no-hands. The only thing left for him to do was communicate with Antarctica from a unicycle, which he has probably managed by now. He has also spoken to Japan while floating in his swimming pool. On December 7th.

Getting the Gear

From the time of my very first trip to Israel, I had instituted negotiations with the Israel Post Office Department and the Army. After some delay, I was granted permission to bring in radio receiving and transmitting equipment and an antenna.

Note that last: *an antenna*. A modern directional rotary beam antenna is some thirty feet in length and contains three or more "elements" over twenty-six feet long. Even knocked down, it makes a considerable package to ship nine thousand miles; but that is nothing compared to the problem of putting it together and raising it thirty or more feet into the air.

Yaakov, the Electrician!

There was the answer to everything, electrical and constructional. I spoke to him about it. He smiled enthusiastically and asked my wife what I was saying. She explained as best she could in basic Hebrew, a language not constructed to distinguish between linear power amplifiers and beat frequency oscillators — but then, neither is my wife — and he assured her it was no problem. Whatever she was talking about.

Thus encouraged, I waited for the equipment to arrive from the United States.

The Israeli government had given the production a blanket clearance for all equipment and supplies to pass duty-free through customs. Unfortunately, the blanket had a few holes in it. First came the problem of the ammunition, which required an act of the Knesset, and the customs agents still weren't certain what kind of plot we were hatching. Then a crate of secret-looking and complicated radio transmitting apparatus arrived at the port of Haifa, together with an antenna that looked as if it were meant to communicate with Mars. While Israel had never had trouble with Mars before, from sad experience the Israelis felt the odds were pretty good that whoever lived there was anti-Semitic. Customs refused to clear my radio equipment.

I finally reported my problem to the government, in the form of Asher Hirschberg. Asher was then the one-man ruler of the Israeli film industry. To his credit, he has done more than anyone else to bring foreign productions — and money — into the country, and make it simple and easy for them to operate. As simple and easy as anything can be in the Land of Job. Asher is also the leading race car driver in the country, no mean feat since Israel contains no race tracks. Asher hasn't noticed this yet. He drives between his offices in Jerusalem and Tel Aviv as if he were on the Indianapolis Speedway, and sometimes gets as far as halfway. It's a little like the story of the drunk who phoned his wife and said, "Get the kids off the streets. I'm drivin' home!" When word leaks out that Asher is driving someplace, mothers grab their children, truck drivers pull into the ditch, and the Asher Hirschberg Rescue Tow Truck warms up its engine, waiting for the sound of breaking glass.

Colliding with Asher in the course of the performance of his duties is a little like trying to pass him on the right. Five minutes after I had

called him, he was on the phone to the commander of the Port of Haifa. I don't know what he said to him, but it must have included a hint of a firing squad.

Special Delivery

A few short hours later, an old Plymouth, laboring mightily under a load of aluminum tubing, coils, condensers, transformers, receivers, and assorted subversive equipment, turned into Simtat Cherem Hazeitim and coughed to a stop at our door. Two boys climbed out of the windows — there was no possibility of getting the doors open with all that aluminum plumbing lashed to the outside — and introduced themselves as the sons of the president of the Eilat Shipping Company. Apparently there was some sort of national emergency and they had been ordered by their father to deliver this *immediately*, even though today was *Shabbat*. They would unload the car as quickly as possible if I would show them the command post, then they would have to return to Haifa, where no doubt they would be called up by their units.

A little embarrassed, I explained as well as I could that this was a toy. In somewhat of a daze, they carried the equipment inside, circling carefully around me as they did so. My wife felt obliged to cheer things up a bit by asking if they would like a gin and tonic.

"Yes, of course," said the older instantly. And then he added, "What's a gin and tonic?"

After learning several times, both young men were in a more understanding mood. We all shook hands and they returned to Haifa to report that, fortunately, the enemy had seen all that sophisticated equipment being installed in Savyon and had called off the attack.

Yaakov the Electrician, arriving the next morning, looked over the array of wires and tubes and dials and knobs and couldn't understand why I wanted to use this to talk to America. Didn't I know Israel had telephones? When I asked him if he had ever tried to make a long-distance call on that system as I had during an earlier incident, his eyes lit up with understanding. You mean with this you could *hear* the person on the other end? What would they think of next!

The aluminum elements of the beam antenna were set out in our front yard, the ends hanging over into the street. We carefully assembled it



according to the instruction book, a process that took only three days. Meanwhile, any visitors to the house had to use the back entrance. Somewhere, Yaakov located thirty feet of pipe – I thought I saw a legend on one length that read, “ARAMCO – British Arabian Oil Company,” but I can’t be certain. Eventually the antenna was to be raised on top of this pipe, if we could locate a flying carpet.

Rotor Problems

Finally everything was in readiness, except the motor. If you are not acquainted with the insanity of amateur radio, it would never occur to you that anyone would attempt to install a large motor at the top of thirty feet of pipe, remotely controlled so it will turn one hundred pounds of antenna from the ground. The purpose of turning the antenna is to point it at various parts of the world in the hope of hearing them better. It is also handy for shaking off pigeons.

The motor didn’t work. Fortunately, I discovered this *before* placing it atop the thirty feet of pipe, which, for me, approached genius. Having done my part, I handed the motor to Yaakov the Electrician to fix.

Yaakov inspected it carefully and told me he knew just what to do with it. He had a friend at the hospital. I assured him the motor was not critically ill, just lazy, and hospitalization would not help much, unless his friend was a psychiatrist. Yaakov explained patiently that this acquaintance of his was *chief electrician* at the hospital. A motor would be child’s play for him. I hesitated to mention that I had hoped it would be child’s play for Yaakov, for fear of hurting his feelings. But Yaakov the Electrician, I was beginning to understand, was frightened of electricity. He didn’t really believe in it.

After much telephoning, we were informed that the chief electrician would receive us that evening, at his home. Yaakov suggested I bring the motor, and some honey cake, since the chief electrician was a gourmet.

That night, after destroying the honey cake and a bottle of Mt. Carmel wine I had thoughtfully brought along, the chief electrician took the motor completely apart, explained to me exactly what had gone wrong, and in fifteen minutes had reassembled it. We congratulated him, finished another bottle of the wine, and plugged in the motor.

It whined pitifully and suffered a mild coronary.

The chief electrician of the hospital took it apart again, with the rueful smile of a surgeon who had sewn his tobacco pouch inside a patient’s kidney, and in only two hours discovered the wire he had connected incorrectly. This, he explained, could happen to anyone, and he reassembled the motor. When he finished, we had some more wine, some more honey cake, congratulated him again, and then my wife noticed several parts of the motor sitting on the floor that should have been inside it.

With the rueful smile of a surgeon who had forgotten to sew his tobacco pouch inside a patient’s kidney, the chief electrician disassembled the motor, installed the parts, reassembled the motor, and asked for some more wine. This time the motor worked and, as I recall – my memory of everything that occurred after we finished the third bottle is strangely incomplete – we carried him around the apartment on our shoulders and

promised to come down to the hospital and appeal the next lobotomy.

Yaakov took personal credit for repairing the motor and, for all I know, for the lobotomy.

Getting up the Antenna

Now the moment of truth had arrived. The next day it was time to get a hundred and more pounds of antenna and motor raised above the roof of our house on thirty feet of shaky pipe from the British-Arabian Oil Company. Yaakov had come up with some guy wire that had once been used as a hawser for the *Queen Mary*, and insisted we needed a winch for the job. However, I knew better, having done this many times before; all we needed was a lot of manpower, to place one end of the pipe in a hole in the ground as several men *walked* the pipe up into place, with several others to hang on to the guy wires in case it wavered and threatened to topple onto the house.

There was, as usual, a problem: it was Passover, and none of the Israeli crew of the production was available for work. So we called the Italians away from their pastime of throwing spaghetti on the ceiling and asked them to help. Led by all five feet of Aldo Tonti, they came over en masse to help *il regista* (me, the director) get his curious arrangement of aluminum crosspieces high into the air. I had informed them that once it was raised, I would be enabled to speak directly with Rome, and from the approving looks they gave me I am convinced they thought it was some sort of huge crucifix to show my Sayvon neighbors I had finally been converted.

Not daring to disillusion them, I masterminded the operation which saw ten Italians straining at the guy wires while ten others walked the pipe with its motorized Gentile symbol at the top into an upright position against the roof. Several Americans from the production had come over to assist in what, as it happened, turned out to be a house lowering.

Our unit manager had climbed to the roof on a ladder and decided to direct traffic. The Italians pulled the guy wires like assembled puppeteers manipulating a mammoth aluminum-and-steel Pinocchio; other Italians thrust mightily against the pipe. Unfortunately, their enthusiasm got the better of their judgment. The pipe rose rapidly, to a storm of Italian *bravos*, the huge antenna swaying at the top, and kept right on going toward the house.

The unit manager stepped back on the tile roof, and that is the last we saw of him for fifteen minutes.

In Israel, a tile roof is made of tile. That’s all. Tile. Underneath there is no supporting wooden structure. Who would see it, anyway? One piece of tile, resting on another piece of tile, resting on another piece of tile will cover a nice area, if you hold you breath. The pieces are fitted together carefully, possibly by angels lowered by cable from helicopters. When the unit manager took his step onto the roof, the whole angelic mess disintegrated into a mass of brick dust and pottery shards that resembled the archaeological digs I had seen at Masada and Caesarea. Now I understood why so many ancient civilizations in the Holy Land collapsed: their roofs were constructed by Jewish masons who were saving a little money on the job.

Meanwhile, the antenna and its supporting pipe wavered, hesitated, then, like a huge redwood under the axe, fell in slow motion to the ground under a stream of Italian curses, damaging, in the

process, several of the aluminum elements and the morals of any neighbor within earshot who understood Italian.

The Italians refused to be frustrated. They attacked again, hauling, lifting, sweating; the antenna again rose to heaven and came to rest in a somewhat vertical position, its bottom end securely in the hole Yaakov had somewhat wonderingly dug for it, its middle leaning against a piece of jagged tile that remained on the roof.

There were cheers and shouts. I was congratulating the workers on the first unified Italian effort since the last time their government surrendered, when I realized one of the shouts was coming from *inside* the roof. The unit manager! I ran into the house, climbed to the attic, opened the trap door, and lo and behold, there he was, flat on his back amid the wreckage. He was helped out and, after several trips back into the shambles to locate his wallet, his wristwatch, and one of his shoes, persuaded to join in the victory celebration in the back yard, consisting of a case of Passover wine, a sickly sacred liquid made of one part alcohol, two parts grape, and three hundred parts sugar. In ancient times Jews were accused of using not wine for Passover but the blood of Gentiles; however, this myth was exploded when everybody realized you couldn't get diabetes from the blood of Gentiles.

A Trial Run

After everyone left, congratulating each other because we were more than two weeks away from the rainy season, and surely the roof would be repaired in two weeks - I think my raincoat is still there, covering a hole in the roof shaped like a unit manager - I feverishly turned on the radio equipment to find out what God had wrought. The pipe was some ten degrees off the vertical; two of the elements were twisted; when I turned the control for the motor to the north, the antenna rotated to the west; and it was necessary to reach one hand into the high voltage section of the transmitter to turn a balky switch, within inches of four thousand volts; but to a real enthusiast, being electrocuted by four thousand volts is an admirable way to go, proving our hobby *does* have some practical value.

I have neglected to mention that the cables from Ernie had been accumulating daily, and by now made a neat pile the size of a small child, which we both undoubtedly were. Our last exchange of \$2.40-per-word commercial communication between Israel and California had set a target date of 6:30 A.M., Tel Aviv time, the next morning, which would be 8:30 P.M. in Brentwood, for us to have our first momentous meeting on the air, talking *free*.

By the time the antenna had been erected and the house cleaned of debris, it was already evening. In twelve short hours, I knew, Ernie would be crouched at his receiver, heroically ignoring the pain from writer's cramp in the hand that wrote the cables, waiting for the miracle of hearing my voice. Moses, one hand cupped to his ear on Mt. Sinai, could not have been more attentive. I had to be certain everything was in operating order so I would not disappoint Ernie the next morning. With bated breath I threw the switch to put the transmitter on the air and see if I could actually talk to someone. I did at once - my wife, who wanted to know where all the smoke was coming from.

It was 2:00 A.M. by the time I had repaired the damage and located the faulty switch that had



caused the short circuit. Then, as I mentioned, it was necessary to hold my hand in close proximity to the high voltage to get the switch closed, but I was *on the air!*

The first gentleman I spoke to was named UA3KBD. We *aficionados*, of course, address each other by our radio call letters. UA3KBD's given name was Victor, but that didn't sound half as romantic. I myself had *two* names. I had been christened W6VLH by the Federal Communications Commission, but my Hebrew name was now 4X4UT. In the phonetic code, that became Four X-ray Four Uncle Tom, which has a lovely anachronistic sound to it.

Victor was in Moscow. I never asked him what he was doing up at two in the morning, but I thought, possibly, he was worrying about who to vote for in the next election. Anyway, it was only 1:00 A.M. in Moscow. But he could *hear* me, which was the most important thing, and I could hear *him!* We spent half an hour assuring each other of this miracle - Victor's English and the atmospherics made it a real challenge - and then I spoke to two gentlemen in Germany who had had too much *Hasenpfeffer* for dinner and couldn't sleep. Finally, I retired to snatch a few hours rest before my momentous appointment with Ernie.

Early Morning DXing

I awoke, somewhat refreshed, at about 6:00 A.M. and dashed to the transmitter and threw all the switches. Everything was fine, except that I couldn't hear anybody. Instead of its usual delightful cacophony of atmospherics, automobile ignition noises, and the voices of my brother hams pleading with each other to get off the frequency, the receiver gave forth only a gentle, contented hiss. I tried another frequency band. Utter silence. It was as if a huge, godlike hand had been clamped over the mouth of every radio amateur in existence, perhaps to prepare for the return of the Messiah. I hastily looked out of the window, in the direction of the Mount of Olives, but there was no undue glow in the sky.

What there was seemed to be a loose wire.

I went outside and stared up at the antenna, erected the day before at such expense of time, wine, Italian perspiration, and unit manager's rear end; it was still leaning ten degrees off the vertical and the elements had been somewhat twisted by their hectic adventures, but those, I knew, were not the problem. What was the problem was that the lead-in wire that connected the transmitter and receiver to the antenna was hanging loose, thirty feet above the ground, and I immediately knew why. I had soldered it to the antenna with an Israeli soldering iron. An Israeli soldering iron is

designed, basically, to save money. It gets just warm enough to melt the solder, then turns off the electricity automatically so you shouldn't run up a bill.

I was standing there, horrified at the thought of having to lower the entire affair to the ground to fix the wire, and more horrified at the thought of attempting to raise it again. One more unit manager through that roof and we might as well live in a tent, like the Arabs.

It was at that moment that Yaakov the Electrician arrived, took in the situation at a glance, and announced he could fix it.

Well, he couldn't exactly fix it, but he had a friend in the Petah Tikvah fire department. A hasty call to the fire department elicited the news that they could come, but their ladder wasn't working. Yaakov suggested they take their ladder to his friend at the hospital, which they promised to do. I wondered vaguely what they would do if there were a fire, since obviously they wouldn't have a ladder for several days unless they had a lot of honey cake, but Yaakov shrugged that off. You could reach the roof of most buildings in Petah Tikvah by standing on a chair, and the chairs at the Petah Tikvah fire department worked fine.

I stared again at that loose wire, thirty long feet above the soil of the Holy Land, and prayed for a miracle. Yaakov answered my prayer. In Israel, today, when they need a miracle, they no longer rely on long-haired Saviors running around in sandals; they call on the Army. Didn't I, Yaakov inquired, have some kind of drag with the Israel Defense Forces?

Five minutes later, I was explaining my situation to Sgan Ajuf Gershon Rivlin, unsung hero of the War of Liberation. Rivlin was sympathetic, and announced he had a friend who had worked with him in the underground for twenty years. I explained patiently that we had a problem here for the *overground*, and twenty years would be too long. Ernie Lehman's nervous system would never make it.

Rivlin explained just as patiently that his friend had survived numerous attempts by the occupying British forces to blow his head off, and was now chief of the fire department at Ramat Gan, where they had the tallest fire ladder this side of the Sahara. Gershon would phone him immediately and explain this was a matter of life and death — Ernie's.

A 4X4 Cherry Picker

In half an hour an olive-drab jeep came roaring through Savyon, towing behind it a trailer containing the Tallest Fire Ladder This Side of the Sahara. It screeched to a halt in front of the house in a cloud of dust, and three Jewish firemen leaped out, clutching axes and sniffing for smoke.

Where was the darned fire? they inquired in Hebrew, according to Yaakov, who was translating into Yaakovese to my wife, who translated into English for me. I sent back, through the chain of command, the information that there was no fire. What there was was a loose wire.

Yaakov refused to translate their reply, except to remark that for a dead language Hebrew certainly had a lot of life in it. The firemen were in no mood to stay, feeling somewhat naked without a holocaust; I was prepared to light one for them if that were the only way open. But, gradually, I managed to get through to them the information that this was a vital radio installation that had the

secret blessing of the Army, and they would do well not to question me further. They looked somewhat dubious, so I played my trump card. I had imported, in my luggage, one of the first Polaroid color cameras to be found east of Suez, and while they were arguing, I snapped their picture. Sixty seconds later I handed it to them, in full color, and I thought for a moment they were going to kneel at my feet. However, they probably recalled all the trouble they had got into with the Romans the last time they did that, so instead they agreed to do what they could to repair the antenna at the fixed fee for fighting fires — sixty Israeli pounds per hour. It seemed only logical that a country that had a set price for burning tanks would also have one for burning houses, so I was not too surprised. I agreed, and they seemed somewhat disappointed. I gathered that, usually, there was a bit of haggling over the charge, depending upon how close the flames were getting to the owner of the house, and they rather missed it.

However, the lure of more Polaroid pictures overcame their disappointment, and the jeep hauled the trailer into the backyard, knocking down two hedges and a rose bush so they could feel they were accomplishing something, and in no time the Tallest Ladder This Side of the Sahara had been cranked up into position, placing a spacious work platform right at the antenna.

But there was nothing to work with. The only soldering iron I had was the frugal Israeli model, and the firemen had never had any necessity to solder a burning building together, so they carried no iron of their own. Lucille and Yaakov were dispatched in the Peugeot to buy a new and more spendthrift type. An hour went by. Two. They had not returned. I was running out of Polaroid film and realized I soon would be running out of firemen, when Yaakov and my wife finally appeared, 120 Israeli pounds' worth of fire department time later.

It seemed that, since this was Passover, all the stores were closed. They had finally located an Arab establishment in Jaffa that had surreptitiously opened the back door and allowed them to make a purchase, if they promised to keep their mouths shut.

But at last I had a soldering iron that *worked* (it had the Arab Good Housekeeping Seal), and in a short time the firemen, clambering up and down the ladder like Hebrew Tarzans, had straightened out the bent elements, forced the water pipe into a truly vertical position, and soldered the loose wire firmly to its connectors. They descended, and cranked down the ladder. I paid them their fee and offered a bonus, which they indignantly refused. They were civil employees, fire money was the property of the community — do you tip the President of the United States for doing his job? I admitted nobody had wanted to lately, we shook hands all around, I promised to send enlargements of the Polaroid pictures to be hung in the Ramat Gan firehouse, and they got back in their jeep and drove it through the shrubbery again, waving a fond goodbye as their trailer ripped a small olive tree out by the roots.

By this time, my original schedule time with Ernest Lehman had long passed. I had cabled him suggesting he leave his receiver long enough to eat something and possibly say hello to his wife, who hadn't seen him recently except when she

(Continued on page 150)

Fine Business Claude

or How I First Became a Hopeless Addict

BY JOEL ROSE,* W8GOE

I REMEMBER THE day I first met Old Doc, face-to-face. It was July in Ohio, and hot, sweaty, oppressive tropical air was blowing like a blast furnace, and my mother was saying, "We won't have too many good days like this . . . go outside and get some sun . . . you're pale as a ghost. . . ."

The pallor set in a few weeks earlier when I had discovered fiddling with the wooden-cabineted *Freshman* console radio in the family den. That monstrous floor model, with its giant oval dial and brass station pointer, was one of those three-banders with big clear glass tubes, with plate caps on top, that glowed through the ventilation holes in the side of the cabinet. But the rest of the family only knew about "Band One," the one where on Sunday night you got Charlie McCarthy and Edgar Bergen, and Jack Benny, and Walter Winchell . . . "Hello, Mr. and Mrs. North and South America and all the ships at sea. Let's go to press. . . ."

I could imagine a ship's radio operator, his Cannonball headsets perched high on his head, carefully copying down Walter Winchell's every word, only to run with it, fifteen minutes later, just after the Fitch Shampoo commercial, to his captain, who would sternly peruse it, then order him to tack it up for all the passengers of the *Normandie* to read.

Discovery of Short Waves

But I had discovered that while Band One could get you KDKA and WJR, or late at night, KMOX, the real stuff was on Bands Two and Three. Most of it was unintelligible thumping and squealing, and music that sounded like the Polish program on Sunday morning, but there was Old Doc . . .

I heard him several times, during those first few weeks, right at the red marker along the white stripe, on Band Two, at the place marked "amateurs."

*467 Letchworth Dr., Akron OH 44303.

"Fine business, old man, fine business Claude, nice to QSO again . . . we're running the 833s here Claude, and the hearing aid is an HRO-5 . . . Fine business on the wind taking down your antenna, and fine business on your wife's foot getting caught in the wires. . . ."

By the time the July dog days were at their hottest, I was continuing to get paler. I had now heard Old Doc talk to Gary, Indiana, Dunkirk, New York, Hot Springs, Arkansas, and, of course, good old "fine business Claude," in High Point, North Carolina, all on Old Doc's 75 meters. He often told other amateurs he had twenty meters, and while that could not be nearly so impressive as 75 meters, it was still a lot of meters, since the *Freshman* floor model console three-bander had none at all, only a green tuning eye tube that not only closed - it crossed itself - whenever Old Doc came on the radio. I finally deduced that Old Doc just used as many meters as he needed to talk to any particular station, so why use all 75 when you can get by with 20?

I also deduced that Old Doc lived somewhere in the neighborhood, because my mother would often hear his voice too, while she was listening to "Baukhage and the News," on Band One, and she would refer, in rather strong language, to that "damn ham operator" down the street.

The Visit

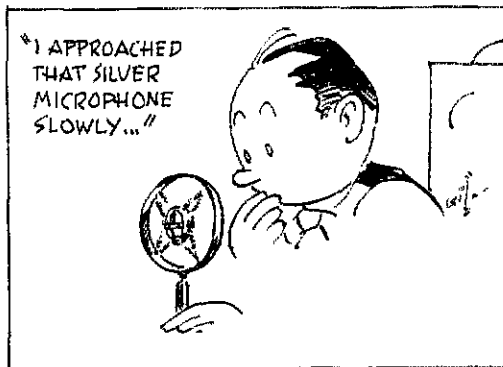
When my mother finally threw me out, insisting that I would soon die for a lack of sunshine, I knew the time had come to see just what those 75 meters looked like. There was no question about it. The trail of wires, strung from garage to roof, the paint peeling from the siding, the grass, now growing over the hand lawnmower rusting in the yard. This had to be "the shack," that Old Doc was always telling "fine business Claude" about. I rang the bell, and when it creaked open, the door revealed a rather large, unshaven man, with a giant shock of grey hair, a dirty black and red checked shirt, and a crusty black pipe, which deposited ashes on the shirt whenever he puffed on it.

"What can I do for you sonny?" . . . I could hear the noise of the radio set from the next room. He was listening to Band Two, the same one I listened to . . . "Back to you Doc," the voice metallically clucked. He motioned me to follow, and then I saw that wondrous room. It was the biggest radio set in the world, fifty times the size of the one operated by the thick-eyed-glassed boy scout in the "radio" section of the *Book of Knowledge*. One entire wall was covered with that radio . . . I didn't see the seventy-five meters he was always telling "fine business Claude" about, but I'll bet there were more than twenty of them, too . . . probably thirty-five,



that would swing back and forth when Old Doc would talk. The chipped and scarred desk was black with burns from a soldering iron, like battle ribbons, and it was piled high with cigar boxes, that had given up their R. G. Dun panatelas long ago, to be filled with resistors and capacitors. And right in the middle of it was a giant silver microphone, the same one Old Doc had talked into less than two hours earlier in his never-to-be-forgotten ragchew with Elmer in Traverse City, Michigan. "You don't know me, Doc, but I live near here, and I listen to you all the time on Band Two" . . . "Hold it son, I'm in QSO now with North Carolina." I'll bet he's talking to "fine business Claude" I thought to myself. "Fine business Claude, and fine business on the XYL denting the fender on your Nash . . . Yessir, you know women, Claude, and fine business on the grid bias dropping. . . ."

Old Doc was puffing on that pipe as he talked, and the haze from the smoke gave the room the same appearance as the place where they had the secret radio the Germans operated in "Spy Submarine," I had seen last Saturday afternoon at the "Strand" . . . Except, instead of Lloyd Nolan, it was Old Doc, sending the secret codes back to the Reichstag in Berlin. . . . "Fine business too, Claude, on the cat crawling in the final, and electrocuting himself . . . and



Claude, there's a visitor here in the shack . . . step up here son, say hello to Claude." I approached that silver microphone slowly, and when I spoke the voice didn't sound like mine, but like somebody else's in my throat . . . "Well Claude, I'm just visiting here in Doc's shack, and it sure is fine business Claude. My receiver is a Freshman console on Band Two, and I've heard you on it before Claude, but I haven't talked to you because I don't have a license, but when I get one I will. I'll talk to you Claude, and that would be really fine business . . . fine business, Claude. QST

2nd A.R.R.L. 160-Meter Contest

'TOP BAND' TEST DECEMBER 10-12

All set for the 2nd ARRL 160-Meter Contest? This year's test will incorporate two changes on the recommendation of the ARRL Contest Advisory Committee. They are:

Contest Starts at 2200 GMT
Each DX country = 1 multiplier

The reason for the suggested time change (moving up starting time 2 hours) is to include sunrise/sunset paths for both coasts to work DX. Increased points for DX were considered but the Contest Advisory Committee feels that either points or multipliers should be used as an incentive, not both.

W/Ks are asked to limit, as much as possible, their use of the frequencies 1825-1830. This will afford European DX the maximum opportunity of being heard through the "DX Window."

Rules

1) This contest will start at 2200 GMT Friday, December 10 and end at 1600 GMT Sunday, December 12 1971. This is a 42-hour period with no limitation on operating time. Cw only.

2) The contest is open to all amateurs. A QSO with an amateur in an ARRL section (see page 6, QST) is worth 2 points. QSOs with amateurs not in an ARRL section are worth 5 points, DX to DX QSOs will not count.

3) Multipliers are the 74 ARRL sections, VES and each foreign country worked.

4) The exchange will be the report, plus ARRL section for those in an ARRL section. Those participants outside of an ARRL section will send a report and the name of their country.

5) Competition is within the section and non-W/VE country for certificate awards. Division high scorers will have their section award endorsed with an appropriate seal. Multioperator work is permitted with scores to be shown after single-operator listings (no certificates).

6) To report, use one of the special ARRL summary sheets and an alphabetical list of stations worked (Operating Aid 6), or equivalent. Effectively, your "dupe" sheet and complete special summary constitute your entry. A copy of your log is not required, unless specifically later requested by ARRL Hq. Illegible entries and entries without the special summary (or complete information contained thereon) and an Op. Aid 6 will be classified as invalid.

7) Disqualification: In addition to the usual grounds for disqualification (operating contrary to your governing regulations, non-observance of contest rules, etc.), any entry which incurs a 5% reduction of score through the checking process (elimination of duplicate and incomplete contacts and correction of claimed multipliers) will be subject to disqualification review by the ARRL Award Committee.

(Continued on page 79)

June VHF QSO Party Results

REPORTED BY AL NOONE,* WA1KQM/WB6SAZ

EACH YEAR on the second weekend of June, VHFers throughout the USA and Canada prepare to participate in the June VHF QSO Party, held this year June 12-14, 1971.

While conditions appeared no more than normal, poor in some areas, there were still some good 50 MHz *E* openings to make the party worthwhile. To give you some idea of activity, let's take a quick look around the country. WA1MUG (WMass) worked most states East of the Colorado border; VE3ASO/3 (Ont) QSO'd all but the W6/7 call areas. W4SGI and WB4HEL/4 (Tenn) worked North as far as Manitoba, West to Arizona. K5WVX (Okla) and WA5HMK (Tex), taking advantage of extensive *E*, managed QSOs in 50 and 43 sections, respectively. The only area escaping them appears to have been the Pacific Northwest. In California K6BPC/6 worked as far East as Tennessee and Texas, North to Idaho and Washington. K6YNB/7 (Nev) managed two-ways with most of the Gulf states; WA8PLZ (Ohio) got out as far West as Wyoming and K9UYK/Ø (Iowa) made contacts as far East as New Hampshire and Florida.

Logs were received from 387 participants representing 67 sections and Mexico. This is a slight decrease over last years 412. Certificates are scheduled for an October 15th mailing.

Single-op multiband entries were led by WB2SIH (ENY) with a score of 24,426 (ABCD). Second place goes to K3WRY (EPA) with 17,220

(ABCD). And third, to K1AGB (EMass) 13,090 (ABCD).

The rest of the TOP TEN are as follows: WA2FGK 12,840 (ABCDE); WA1JLD 12,720 (AB); K9HMB 11,220 (ABD); K1GYT 10,812 (AB); K4FKD 9300 (ABD); K2YCO 9295 (ABCDE) and K8WKZ 9020 (AB).

Single band leaders were (50 MHz) K8LEE 8120; WB5AEH 6944; WA8PEB 6720; WØPFP 5600 and WB4JDQ 4320. On (144 MHz) WA2DPF 2175; W3LUL 1640; W2AQT 1394; K2YFE 1088 and WIJSM 1008.

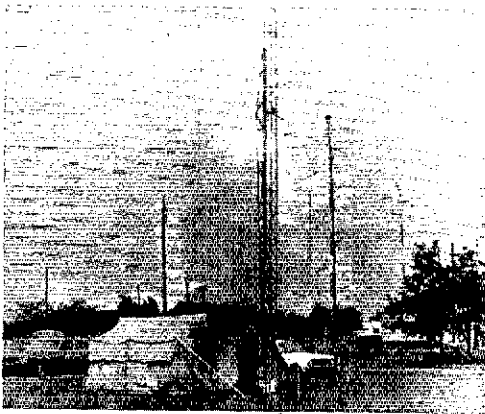
Canadian High Scorers were VE7ANP with 450 points on 50 MHz and VE3DSS with 408 on 144 MHz.

Multip scores were fantastic! WA1MUG, the Mt. Greylock Expeditionary Force, lead the pace with 101,088 (ABCD). Not too far behind was W1DC/1, the 1200 Radio Club, at 90,307 (ABCDE). A close third place goes to WA2WEB/2, the East Coast VHF Society, with 89,572 (ABCDE). Other excellent scores were submitted by K1PXE/1 75,854 (ABCDE) and W3CCX/3 73,040 (ABCDE).

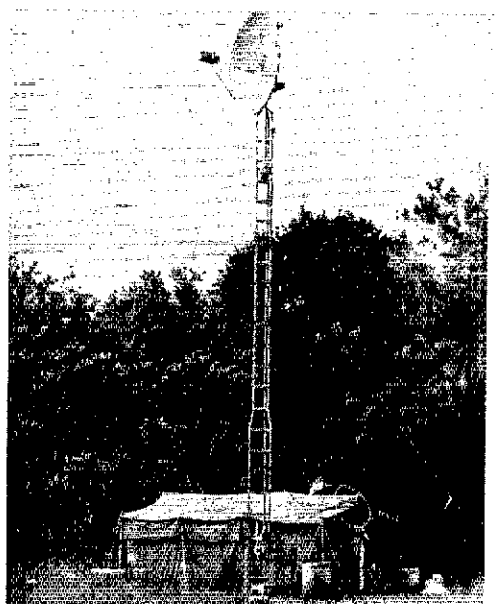
High Canadian multiop was VE3ASO/3 at 24,857 (ABCD).

Section totals were high. K1GYT had 42 (50 MHz) sections; W2AZL had 21 on (144 MHz); K1AGB, K9AQP/1 and WB2SIH tied with 10 on (220 MHz); K2RIW and W2OMS tied with 16 (432 MHz) and K2JNG had 6 on (1215 MHz). Multiop section totals went as follows: K5WVX - 50

* Asst. Communications Mgr., ARRL.



Over 100 of this year's entries were multiops. Here's W3CCX/3, the Mt. Airy VHF Radio Club, operating from Bucks Co. in Eastern Pennsylvania. Pictured above are their towers holding the 50, 144 and 220 MHz antennas while to the right, the 432, 1296 and 2300 MHz tent and 6' parabolic dish.



DIVISION LEADERS

Single Op.	Division	Multip.
K3WRY	Atlantic	W3CCX/3
K9HMB	Central	WB9HUC/9
WAØWZY	Dakota	WAØDMS
WA5QBX	Delta	WB4HEL/4
K8WKZ	Gr. Lakes	WA8PLZ
WB2SIH	Hudson	WA2WEB/2
WØPFP	Midwest	K9UYK/Ø
K1AGB	New Eng.	WA1MUG
W7FN	Northwestern	K7WXW/7
K6YNB/7	Pacific	K6TJL/6
K4FKD	Roanoke	WA4WZO
K5EFP	Rocky Mt.	WAØPHZ/Ø
W4OJU	Southeastern	WB4TON/4
W6NLO	Southwestern	K6BPC/6
WA5ZUC	West Gulf	K5VWX
VE3CRU	Canadian	VE3ASO/3
XE1AAN	Foreign

sections on (50 MHz); WA2WEB/2 - 31 (144 MHz); WA1MUG - 16 (220 MHz); WA1MUG and WA2WEB/2 tied with 18 (432 MHz) and W1DC/1 had 11 on (1215 MHz).

A welcome surprise was an entry from XE1AAN of Jalisco, Mexico who gave a foreign multiplier to 106 participants in 25 sections on 50 MHz. Thanks, John.

And finally, some time in the future may we suggest that each and every serious VHF contestant take a close look at the present VHF contest formats with an eye towards possible areas of improvement. Get together with your club, consolidate your thoughts, and put forth your recommendations to that member of the ARRL Contest Advisory Committee nearest you. They are: W3GRF (chairman), W1AX, K2KIR, W3WJD, W4UQ, W6DQX, KH6IJ, WØHP and VE2NV.

Activity in VHF contests has been slowly, but surely, dropping. Let's reverse the trend!

We had some very good band openings this year and believe we worked more different sections than ever before. - W4GZX/4. Sporadic-E conditions not up to past years. No openings to areas east of Alabama and, other than XE1AAN, no double hop openings. - W8UCI. With two skips into the Southwest, we were able to work Mexico. - W2OW. My XYL should receive a special award. This was our first wedding anniversary and she spent it on Black Mountain cooking for WA8TYF and myself. - WA4CQG/4. Es on 50 MHz was good in the early contest hours to the East Coast and Gulf area, although, not what could be considered "wide-open". - KØLCB. Heard WA4CQG/4 and WA4ELH in Kentucky but no contact. - WA8LLY. No noticed openings on 6 other than an occasional opening down to Texas and a fairly constant path to Ohio. Two meters was open with S9 signals from Ohio and Canada for a short period due to a little tropo. - W2FCL/3. Real glad for my 12 sections on six especially Arizona and Mississippi which were new ones for me. - WB4KGW. Ground wave conditions were good on 6 and 2 meters with some very weak tropo on 2. - WB2OZA. Heard almost all states up to the borderline of Nevada. - K8NOW/8. First contest I have worked after being licensed for about ten years and I absolutely enjoyed it. - K4NHO/4. The 50 MHz activity pretty good this contest, but 144 MHz virtually non-existent from my perch atop Big Savage mountain in Western Maryland. - WA3NZL/3. Other than a few minutes of E openings, except for a two-hour opening to WA5HNK only, we were eclipsed here in the West by the Easterners. - K7ICW. This years contest was great, 50 MHz sbb was the place to be. Worked XE2XN and XE1AAN, VE3CÜA was worked on scatter. - WB9EDP. The stiff competition from fellow N.C. stations and the terrific band opening in the west certainly kept things hopping. - WA4WZO. Had openings to the West and Southwest, band conditions good. - W8TTU. Please thank all those who answered my CW CQs, a fine bunch of hams. - WA2MZH. Good skip Saturday afternoon, heard stations mainly in SE part of the country. Next morning the band opened suddenly to VE3 and I worked three, one after another, the first I had ever heard. - WAØVIE. I believe it would promote better interest and activity if each foreign country were counted as a separate multiplier. - W3KMV. First contest for most of our gang and it was a lot of fun, I was impressed by the large number of sharp cw operators on 50 MHz. Have you ever considered moving the contest to earlier in June? Seems like conditions may be better at that time. - W7EXM.

SCORES

In the following tabulation, scores are listed by ARRL divisions and sections. The top single-operator scorer in each section receives a certificate award. Multiple-operator scores are shown at the end of each section tabulation; in sections where at least three such entries were received, the top multioperator scorer receives a certificate award. Asterisk following call indicates Headquarters staff member, ineligible for award.

Columns show final score, total number of contacts, section multiplier, and bands used. A represents 50 MHz.; B, 144 MHz.; C, 220 MHz.; D, 432 MHz.; E, 1215 MHz. and above.

Here's the gang at VE3ASO/3. Their combined effort netted 346 QSOs in 67 total sections for a final score of 24,857.



ATLANTIC DIVISION

Delaware
 WU (WA3PQL, opr.)
 4110-137-30-AB
 LU/3 1900-76-25-AB
 BHG 918-54-17-B
 JGV 448-24-16-ABU

Eastern Pennsylvania
 VRY 17,220-259-60-ABCD
 ETB 1500-100-15-AB
 BNLU 1387-73-19-A
 BMRF 1003-59-17-AB
 DYLL 928-58-16-AB
 BPSA 176-44-4-AB
 BEYD 42-21-2-A
 CXJ/3 (7 oprs.)
 AD/3 (6 oprs.)
 RLZD/3 (12 oprs.)
 ARW (+K3SQ,W3GF)
 CL/3 (4 oprs.)

5907-179-33-AB
 NGU (+WA3s NVD NVJ)
 2016-84-24-AB
 FD (4 oprs.)
 1638-126-13-AB

Maryland-D.C.
 KMV 7076-191-37-AB
 BNZL/3 6612-174-38-AB
 PUA 3796-146-26-AB
 UL 1640-82-20-B
 ASN 360-36-15-AB
 BR 440-40-11-B
 LWQ 248-31-8-B
 TE 26-13-2-B
 EH 5-5-1-B
 NNUL (WA3s EOP EQ FYZ)
 9028-244-37-AB
 NZ/3 (+K2UOP,K4LHB)
 4898-158-31-AB

Southern New Jersey
 GRI 2552-88-29-AB
 FT 1088-68-16-B
 BNE 798-57-11-B
 BLV 418-19-14-D
 WR (+K2ZRJ)
 8680-142-56-ABC
 WRP (4 oprs.)
 4704-196-24-AB

Western New York
 CO 9295-130-55-ABCDE
 RZ 7854-142-51-ABD
 RV/2 3128-136-23-AB
 PTFY 1824-76-24-AB
 ITH 1539-57-27-A
 PKND 672-44-14-ABD
 ZHYK 410-41-10-B
 W (15 oprs.)
 22,400-306-64-ABCD
 RQ (7 oprs.)
 5580-155-36-AB
 JOQ (5 oprs.)
 1890-90-21-AB
 KO/2 (+WB2MXS)
 1540-77-20-AB
 FB (+WA2GJA)
 1380-60-23-AB

Western Pennsylvania
 HUR 4710-157-30-AB
 WU 2886-111-26-AB
 GSH 690-46-15-A
 NLO 540-45-12-AB
 JM 504-42-12-A
 AP 126-21-6-AB
 KK (5 oprs.)
 9264-183-48-ABCD
 TD/3 (9 oprs.)
 4524-156-29-AB

CENTRAL DIVISION

Illinois
 MB 11,220-214-51-ABD
 EPD 2289-109-21-AB
 /I 2163-103-21-AB
 BA 1880-94-20-AB
 QPM 348-58-6-AB
 QG 248-62-4-AB
 ZYG 246-41-6-B
 AXH 175-35-5-B

K9TSX 152-19-8-A
 K9DNW 72-36-2-AB
 WA9YGR 66-33-2-AB
 K9DTB 48-12-4-AB
 K9ULM 20-5-4-AB
 K9ORP 15-15-1-B
 K9VHB (4 oprs.)
 5880-235-24-ABD
 WB9FRX/9 (+WA9DDSD)
 1134-81-14-AB
 WA9DBI (+WN9GKM)
 462-77-6-AB
 WA9VKG (+K9AAN)
 90-45-2-AB

Indiana
 K9QCB 7385-209-35-ABCD
 K9EKI 4672-146-32-AB
 W9JBD 3542-154-23-AB
 K9KFR 2160-90-24-AB
 WA9RRZ 1479-87-17-A
 K9LSB 912-57-16-A
 K9UNM 517-47-11-B
 W9GMJ 468-52-9-B
 WB9HUC/9 (WB8s GFU GEW GEZ)
 11,132-253-44-AB

Wisconsin
 WB9FEW 2568-107-24-A
 W9DI 8-4-2-B
 K7HSJ/9 2-2-1-A
 WA9SDC (+K9OXV)
 8568-238-36-AB
 K9DKW (3 oprs.)
 4059-123-33-AB
 K9IFF (+WA9SQG)
 90-15-6-AB

DAKOTA DIVISION

Minnesota
 WA0WZY 2200-100-22-AB
 WA0DMS (+WA0ZDY,WB0CSN)
 324-36-9-A

South Dakota
 WB0FLN 341-3F-11-A

DELTA DIVISION

Louisiana
 WA5QBK 7960-199-40-AB
 WB5AEH 6944-224-31-AB
 WB5CZV 496-62-8-A
 W5JFB 494-38-13-AB

Mississippi
 WA5RMS 5796-161-36-AB

Tennessee
 WB4JDO 4320-144-30-A
 WB4ASA/4 1408-64-22-A
 W4WQZ 1092-51-21-ABD
 WB4LHD 954-53-18-A
 WA4BXZ 675-45-15-AB
 WB4HEL/4 (4 oprs.)
 14,100-300-47-AB
 W4SGI (5 oprs.)
 7696-208-37-AB
 WB4CXK/4 (+WB4s GXB KMK LSK)
 5440-170-32-AB
 W4GZX/4 (8 oprs.)
 2310-105-22-AB

GREAT LAKES DIVISION

Kentucky
 WA4CQG/4 (+WA8TYF)
 9424-243-38-ABD

Michigan
 K8WKZ 9070-205-44-AB
 K8HWW 5735-185-51-AB
 WA8WJO 5332-172-31-AB
 WSUCI 5208-168-31-AB
 WB8BGY 3102-141-22-AB
 WA8LBH 1656-92-18-A
 W8DBL 1278-71-18-A
 WRNOH 1134-63-18-AB
 WB8EY 952-56-17-AB
 WA8YYW 896-128-7-B
 WA8UVG 658-94-7-B
 WA8LLY 624-78-8-B
 WA8EOW 390-39-10-A
 WB8ATZ 166-83-2-B
 K8AJC 72-18-4-AB
 WN8JYP 26-26-1-B
 WB8IDD 6-2-2-BC
 WB8DSG 2-2-1-B

K8NOW/8 (3 oprs.)

1140-76-15-AB
 WA8PST/8 (+K8VBUL,WA9JNZ)
 748-68-11-AB

Ohio

K8LEE 8120-232-35-A
 WB8GIW 8018-211-38-AB
 WA8PFB 6720-210-32-A
 WA8LOW 5472-144-36-ABCD
 WB8HXR 2695-153-15-AB
 WA8STX 1298-106-18-A
 WB8ZUQ 1692-94-18-AB
 K8YYK 1632-96-17-AB
 WA8ITS 1547-91-17-AB
 WA8YHN 1139-67-17-AB
 WB8BBP 1122-66-17-AB
 WA8MNV 564-47-12-B
 K8RPL 506-23-11-D
 WB8AHA 420-70-6-A
 WA8MEM 396-36-11-A
 WA8WMP 374-34-11-A
 WA8MLV 268-52-7-A
 K8UQA 238-17-1-D
 W8JRN 180-30-6-AB
 WA8KQQ 87-29-3-B
 WB8CQC 86-14-4-A
 WA8PLZ (9 oprs.)
 31,010-432-70-ABD
 WB8AP/8 (4 oprs.)
 2247-107-21-AB
 K8SXC (5 oprs.)
 696-58-12-AB

HUDSON DIVISION

Eastern New York

WB2SH 24,426-315-69-ABCD
 W2GHQ 2000-100-20-AB
 W2VTR 702-26-13-BDE
 K2ARO 414-23-9-D
 WA2RUF 372-31-12-AB
 W2HF 280-21-10-BCD
 W2NG/2 60-20-3-A
 K2JYL 36-12-3-A
 WB2FKJ/2 (11 oprs.)
 26,180-428-55-ABCD
 WB2NPR/2 (8 oprs.)
 15,840-263-55-ABCD
 WA2RAT/2 (4 oprs.)
 3744-208-18-B
 VK1ZAR/W2 (6 oprs.)
 2080-104-20-AB

New York City-Long Island

WB2OZA 2464-154-16-AB
 WA2DPF 2175-145-15-B
 WB2MEC 2006-118-17-A
 K2RIW 1952-61-16-D
 K2OV5 1377-69-17-3D
 W2KXG 560-70-8-B
 WA2MZH 60-12-5-A
 WB2MZE (+WB2s DIN QLP)
 5577-169-33-AB

Northern New Jersey

WA2FGK 12,840-170-60-ABCDE
 W2AZL 7134-147-41-ABD
 WA2JVO 3625-110-25-ABCDE
 WB2HEO 3358-146-23-AB
 W2OMS 1632-51-16-D
 W2AQT 1394-82-17-B
 WA2FUI 840-70-12-B
 K2DQT 798-42-19-AB
 W2C/VV 456-32-12-ABCD
 K2JNG 216-12-6-E
 WB2IRX/2 95-7-5BE
 K2MFF/2 (WA2FUI, opr.)
 80-16-5-B
 WA2WEB/2 (8 oprs.)
 89,572-785-98-ABCD
 WB2GKE/2 (7 oprs.)
 65,570-682-83-ABCD
 WB2KKO/2 (6 oprs.)
 53,630-536-59-ABD
 K2DEL/2 (12 oprs.)
 23,800-434-50-ABCD
 WA2UDT (+WA2s PKY QKR)
 4060-203-20-B
 WB2OHV (+WA2OHV,WB2OQQ)
 1414-101-14-AB

MIDWEST DIVISION

Iowa
 W0PFP 5600-160-35-A
 K9UYK/0 (6 oprs.)
 10,760-267-40-ABD

Kansas

WA0VJV 1771-77-23-A
 WB0BCC/0 1323-63-21-A
 WA2FZW/0 828-46-18-A

Missouri

K0LCB 4488-132-34-AB
 W0YZS (+K0TLM)
 10,437-211-49-ABD
 WA0NQA (4 oprs.)
 4104-114-36-A

Nebraska

W0EOM 2352-84-28-A
 WA0IWF 2289-109-21-AB
 WA0RKK 645-43-15-A

NEW ENGLAND DIVISION

Connecticut

WA1JD 12,720-240-53-AB
 WA1FFO 6480-162-40-AB
 WB2CHO/1 2064-86-24-AB
 WA1CQW 1273-67-19-A
 K1YON 950-47-19-ABC
 WA1GOI 896-56-16-AB
 WIENZ 702-54-13-B
 WIWHL 689-52-13-ABC
 WIHDD 396-33-12-A
 WIQIL 189-27-7-B
 K1BNO 175-25-7-B
 WINRV 88-22-4-B
 WIWE 9-9-1-B
 WA2INB/1 8-4-2-B
 K1PXE/1 (7 oprs.)
 75,854-680-97-ABCDE
 WIANI/1 (5 oprs.)
 13,677-291-47-AB
 WA1GTP (+K1VYU)
 945-45-21-AB
 WA1LOU/1 (+WA1EXE)
 64-16-4-B

Eastern Massachusetts

K1AGB 13,090-205-55-ABCD
 WI1EUJ 9235-172-45-ABCD
 WA1MSK 2000-125-16-AB
 WA1FCD 1554-111-14-AB
 K9AQP/1 1449-34-21-CDE
 WA1MGC/1 1168-73-16-A
 K1HBY 1071-119-9-AB
 K1PTE 852-71-12-B
 WA1ETC 715-65-11-AB
 W1BDC/1 690-46-15-AB
 WA1MKE 405-81-5-A
 WA1NLE 272-68-4-A
 W1OXK (K4GGI, opr.)
 105-10-7-ABCDE
 W1MCP 84-28-3-B
 WA1MHN (10 oprs.)
 9684-250-36-ABD
 WA1DGW/1 (6 oprs.)
 7161-231-31-AB
 W1MHL/1 (5 oprs.)
 5160-215-24-AB
 W1AAI (4 oprs.)
 1500-100-15-B
 WA1LED (+K1FEM)
 1407-67-21-AB
 WA1NPO (K1YBS,W1BDC)
 588-84-7-AB

Maine

W1YTW 5328-134-36-ABCD
 K1GOV/1 (+W1CPL)
 69-23-3-B

New Hampshire

W1JSM 1008-63-16-B
 WA1JSD 136-34-4-A
 W2MNK/1 96-16-6-AB
 WA1GDR 85-17-5-A
 W1DC/1 (25 oprs.)
 90,507-826-97-ABCDE
 WA1FSZ/1 (4 oprs.)
 4950-150-33-AB

Rhode Island

W1AJR 1113-27-21-BCDE
 W1FEO 189-21-9-AB
 W1SYE/1 (10 oprs.)
 182-91-3-AB

Vermont

K1GYI 10,812-204-53-AB
 WA1DLA/1 (5 oprs.)
 6798-206-33-AB
 W1MX/1 (WA2KZV,WB2GLQ)
 4847-119-37-ABCD

WAI1ZO (+K1NZQ,W1BXD)
78- 6- 6-BDE

WAI1QJ/1 (+WN1NOW,WB2BXP)
4- 2- 2-AB

K7AUO (6 oprs.)
(1287- 96-13-ABCD

PACIFIC DIVISION

Western Massachusetts

WAI1HHN 6396-148-41-ABD
K1ZGB 3960-120-33-AB
K1JIX (W2BVU, opr.)
1136- 56-32-ABCDE
WAI1LR 741- 57-13-A
WAI1AM/1 156- 26- 6-A
WTUCB 44- 10- 4-ABC
WAI1MUG (25 oprs.)
101,088-961-96-ABCD
WAI1LJ/1 (+WAI1s JIJ JYB)
1071- 63-17-AB

NORTHWESTERN DIVISION

Alaska
KL7HAM 5- 5- 1-A
Montana
W7JRG 320 16-16-ABCDE
Oregon
W7TYR 806- 58-13-ABCD
K7WXW/7 (5 oprs.)
5512-198-26-ABCD

Washington

W7JFN 1649- 97-17-A
K7DBR 930- 93-10-AB
WA7PVH/7 31- 31- 1-A
W7DZO/7 (6 oprs.)
4879-278-17-ABCDE
K7IEY/7 (5 oprs.)
2353-180-13-ABC
W7EXM/7 (7 oprs.)
1846-142-13-AB
W7QCV (multiop.)
66- 33- 2-AB

East Bay

WB6NMT 1105- 47-17-
K6RNO 896- 56-16-

Nevada

K6YNB/7 7960-189-40-
K7ICW 1173- 50-23-

Sacramento Valley

WB6NKO 954- 49-18-
WA6FWO 102- 17- 6-

Min. Sections	30	15	4	3	1				
MHz.	50	144	220	432	1215				
K1AGB		16	10	8					
K1GYT	42								
K1JIX			7	11	3				
K1PXE/1*					6				12
K9AQP/1			10	10	1				
W1AAI*		15							3
W1AJR				7	5				
W1ANI/1*		18							
W1DC/1*	37	21	13	15	11				3
W1EUJ			6	3					
W1JSM		16							
W1MX/1*		18	6						
W1QXX					1				
W1YTW			4	4					
WA1FFO		17							
WA1HHN				6				8	6
WA1IZO*					1				4
WA1JLD	34	19						6	
WA1MHN*				7				4	
WA1MUG*	41	21	16	18				8	8
K2ARO				9					4
K2BWR*	31	17	8						5
K2DEL/2*			5	8				5	5
K2DQT		17							1
K2JNG					6			5	3
K2OVS				6				6	5
K2RIW				16				5	5
K2YCO			7	11				5	5
K2YFE		16							4
K2YRZ	33			4				6	4
W2AQT		17						4	
W2AZL		21		14				6	
W2BLV				11				4	5
W2HF				3					
W2OMS				16					1
W2OW*		18	7	10					1
WA2DPF		15							
WA2FGK		17	9	9	2				7
WA2JVO			4	5	1				
WA2RAT/2*		18							
WA2UDT*		20							3
WA2VTR				4	3				
WA2WEB/2*	38	31	12	18	9			17	6
WB2FKI/2*		20	7	8					
WB2GKE/2*	38	21	12	12					
WB2IRX/2					4				5
WB2KKO/2*	30	18		11					
WB2NPR/2*	30		5	7					
WB2SIH		32	18	10	9				
WB2WRP*		16							
K3HKK*		15		4					
K3WRY		39		6	7				
W3AD/3*		19	8		1				
W3ARW*		16	12	7					
W3BHG		17							
W3CCX/3*	31	20	13	14	5				
W3CGV				4					
W3LUL						20			
WB2LZD/3*						17			3
K4FKD						17			5
K4GL									
K4PKV						35			
W4FJ									12
W4SGI*						31			
WA4CQG/4*									3
WB4HEL/4*						40			
WB4JDQ						30			
K5WVX*						50			3
W5KA/5*						34			
WA5HMK*						43			
WA5QBX						38			
WA5RMS						32			
WA5ZUC						31			
WB5AEH						31			
K6BPC/6*								8	6
K6HMS									4
K6IBY						6			
K6SSN						4			
K6TJL/6*						8		8	1
W6AJF									4
W6FZJ									5
W6NLO								5	5
W6QED									1
W6VMY/6*						5		5	3
W7HAR/6*						6		6	5
WA6HPJ/6*						5		5	5
WA6HXM*									4
WA6UAP									5
WB6KBZ/6*								6	4
WB6LAY/6*								4	
WB6NMT								6	
K6YNB/7								4	5
W7DZO/7*									1
W7JRG									1
K8LEE						35			
K8RPL									11
K8UQA									7
K8WKZ						32			
W8TTU						30			
WA8LOW									3
WA8PEB						32			
WA8PLZ*						47	17		6
WB8FOY						31			
WB8HXR						31			
K9HMB						39			5
WA9SDC*						30			
WB8HUC/9*						30			
K0LCB						30			
K9UYK/0*						31			
W0PFP						35			
W0YZS*						42			
WA0NQA*						36			
VE2HW								6	7
VE3ASO/3*	34	23	4					4	6
VE3EVW									4

* Multioperator Station

38th A.R.R.L.

November Sweepstakes

Announcement

ALL SET for the 38th ARRL November Sweepstakes? As you read this there's only little over a month to go 'til that first "CQ SS." The basic SS rules are unchanged from last year, but please note carefully the following:

CAC re the SS

In July, the ARRL Contest Advisory Committee (CAC) unanimously agreed that the SS exchange was in need of revision. This agreement was prompted by input from avid contesters and casual participants alike, all of whom complained that the exchange was too unwieldy, too long and that it broke the rhythm of the contest. The CAC, feeling that the exchange was not accomplishing its intended training purposes because it was universally disliked, proposed to Hq. that the time of QSO and month and day of birth be eliminated from the SS exchange. The CAC wants you to know that the new format is designed to be similar to the true message preamble and that the deletions were made to enhance the contest aspect of the SS. Remember, however, in actual traffic work that while the time is optional with the originator of the message, the date is a *required* part of a message preamble.

Another Hq. staff idea under CAC study is possible substitution of the call of the station you last worked for your call in the SS exchange. (Following the first QSO, of course!) All SS and other contest ideas would be welcomed by the CAC: W3GRF (chairman), W1AX, K2KIR, W3WJD, W4UQ, W6DQX, KH6IJ, W0HP and VE2NV.

Recent changes which remain the same are: Low power multiplier dropped, Message credit eliminated, Time-off periods changed to 15 minutes and suggested operating frequencies are as follows:

CW	PHONE
3550-3650	3850-3950
7050-7100	7225-7275
14050-14100	14250-14300
21050-21100	21300-21400
28050-28100	28600-28800

And don't forget to check the Novice bands, I'm sure you'll find the time well spent.

CONTEST PERIODS

Starts		Ends
Saturday, Nov. 13 2100 GMT	PHONE	Monday, Nov. 15 0300 GMT
Saturday, Nov. 20 2100 GMT	CW	Monday, Nov. 22 0300 GMT

Otherwise, you'll observe that the format is familiar. You may operate 24 hours out of the total 30; your times-off must encompass at least 15 minutes; ARRL-affiliated clubs are eligible to compete for that handsome coco-bolo gavel.

Read the rules thoroughly, then send for our "SS Package": log-sheets, summary-sheet, Op Aid 6. (Be sure to specify approximately how many log-sheets you'll need and whether you intend to participate on both modes.) Your entry (and, for clubs, the Secretary's letter) must be postmarked no later than December 15, 1971.

GL, see you in the pile-ups. -- WAIKQM.

Rules

1) *Eligibility*: The contest is open to all radio amateurs in (or officially attached to) sections listed on page 6 of this issue of QST.

2) *Time*: All contacts must be made during the contest period indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 74 sections. Yukon-N.W.T. (VE8) counts as a separate multiplier, for a possible total of 75 multipliers. Time spent in listening counts as operating time. No more than 24 hours of operation are permitted during the 30 hour period. "Off" periods may not be less than 15 minutes at a time. Times on and off must be entered in your log.

3) *QSO*: Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. CW stations work only CW stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) *Scoring*: Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (plus VE8) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either

EXPLANATION OF "SS" CONTEST EXCHANGE

	Nr	Precedence	Call	CK	Place
Exchanges	Consecutive Serial Number	Power input less than 150 watts dc	Send your station call	CK (Last two digits of year first licensed)	Your ARRL section
Sample	NR 1	A	WA3FHB	65	MDC

point(s) or multiplier. If your power is 150 watts or less, send "A" as your precedence; otherwise, send "B."

The final score equals the total "points" X the "sections multiplier."

5) **Reporting:** Contest forms (log sheets, summary-sheets, Operating Aid 6) are available free from ARRL Hq., or you may use forms of your own design provided they follow the indicated format. Every competing entry claiming 200 or more QSOs must have cross-check sheets (Op Aid 6 or similar) attached. To aid us in getting these forms to you as fast as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with zip code. We suggest a minimum of 16c postage attached. This will assure your receiving 1 summary sheet, 1 Op Aid 6, and 4 log sheets, enough for 400 QSOs. Using this as a guide-line you can adjust the postage according to your needs. **ANY LOG OMITTING TIMES ON AND OFF, OR OMITTING CROSS-CHECK SHEETS (WHEN REQUIRED), OR OMITTING A SUMMARY-SHEET OR ANY INFORMATION**

REQUESTED THEREIN (see sample), WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTINGS OR AWARDS. Such logs will be classified as "check-logs" and processed accordingly. Entries must be postmarked no later than December 15, 1971 to insure eligibility for QST listings and awards. All entries become the property of ARRL, and none can be returned.

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

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously, is not allowed.

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

6) **Awards:** Certificates will be awarded to the highest-scoring cw entrant and to the highest-scoring phone entrant in each ARRL section, provided that either (1) there are at least three single-operator competing entrants from that section, or (2) the top single-operator score is 10,000 points or more. Similarly, a certificate will be awarded to the highest-scoring Novice or Technician licensee in a section if (1) there are at least three single-operator competing entrants of that license class in that section, or (2) if, in the opinion of the Awards Committee, the entrant displayed exceptional effort. Multiple-operator entries, regardless of license class of operators, are not eligible for certificate awards and will be listed separately in the final results in QST.

A gavel will be awarded to the highest affiliated club entry. The aggregate scores of phone and cw reported by club secretaries and confirmed by the receipt at ARRL of contest logs constitute a club entry. Segregate club entries into phone and cw totals. Both single and multiple-operator scores may be counted, but only the score of a bonafide club member, operating a station (his or another club member's) in local club territory, may be included in club entries.

The highest single-operator cw score and the highest single-operator phone score in any club entry will be rewarded with a "club" certificate where at least three single operator phone and/or three single-operator cw scores are submitted.

7) **Disqualification:** Failure to comply with the contest rules on FCC/DOC regulations and the necessity for avoiding interference with channels handling emergency communications shall constitute grounds for disqualification. In all cases of question, the decisions of the ARRL Awards Committee are final.

QST

DO NOT WRITE ABOVE THIS LINE

ARRL November Sweepstakes

CALL LETTERS: WA3FHB PHONE: C.W. ARRL NUMBER (1, 6 or 7): 65-100

NOTE: Separate logs must be submitted, with separate summaries, for each mode.

SCORES: 27 230 points X 1 sections = 270 234 claimed score

Count 7 points per complete QSO. Cross out sections worked on the list below

3.5:5 P. (1st class zone)	2500 QSOs	42 Sections	250 Points	1/6	Dist. of Cont.
---------------------------	-----------	-------------	------------	-----	----------------

QSO: Single Operator Station Multiple Operator Station

If multioperator, give calls of all operators, loggers:

Two participants? Yes If yes, print the name of your club:

Affiliated club:

Equipment Description:

Transmitter: IC-7A Receiver: IC-7A

Antenna: 20m dipole

Full mailing address (please print):

Name: John H. Simpson Number and street: 2100 1st St.

City, state/province, zip: GREENSBORO, N.C. 27407

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

Entrant's Signature: John H. Simpson Call: WA3FHB

Mail your entries and other materials on the reverse side of this sheet. Enclose your photos, as well as your QSO logs and check sheets, and mail promptly to: ARRL, Communications Department, 221 Main Street, Newington, Connecticut 06111.

MULTIPLYING TABLE										
1	1	2	3	4	5	6	7	8	9	0
1	1	2	3	4	5	6	7	8	9	0
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
0	0	0	0	0	0	0	0	0	0	0

LS-1 (1970) Printed in U.S.A.

The log-sheets and summary sheets are now available without charge from your ARRL Headquarters. (Ask for Op. Aid 6, too.) Unless first-class postage is included with your request, log sheets will be sent by third-class mail.

This story was originally published in the Tiger, the 1925 edition of the yearbook of Lewis and Clark High School of Spokane, Washington. Al Boehnlin, WBEBZ, saw the article while visiting his parents in Michigan and sent it to us. We reprint it here.

Radio Robert

BOB JONES was a radio ham. Almost any evening could be heard the steady dah dit dah dit of his transmitter. The radio shack in the Jones' backyard was a tumble-down, disreputable-looking stack of boards, but, like many others in the country, it was the acme of perfection in the eyes of the ham. About its interior was scattered a tangled, hopeless-looking conglomeration of apparatus, for Bob hoarded the most complete supply of parts in town.

Bob always did a great deal of experimenting, but late one spring there was unusual activity in the shack. He had just been promised work with a lumber company as soon as school closed for the summer vacation. Immediately, Bob had decided to take a radio receiving set with him. His present receiver was far too bulky for convenient transportation in a pack-sack, so Bob planned a new set. After many hours of study he decided to build a one-tube reflex.

For the next two weeks Bob worked as if all the legions of red imps of mythology were after him. Where confusion had been before, chaos now held absolute control. Batteries, binding-posts, rheostats, receivers, switches, screwdrivers, taps, and tools of all descriptions were piled upon the table, while wire, in coils and rolls, all sizes and lengths was to be found overhead, under foot, and in all corners until the whole place resembled a gigantic spiderweb more than it did a wireless station.

It was slow, particular work, so several weeks passed before the new set was completed. It reposed on the table, truly a beautiful piece of work, with polished panel of bakelite, glistening bakelite dials, resplendent with their white markings, a gleaming semicircle of silvery taps, and perfectly spaced binding-posts which shone like stars against the dark panel. Certainly it was a thing to be proud of, if it only worked.

Bob had planned to test the new set, but his evenings were mysteriously filled with labor of another kind - his friends said it was geometry. However, school closed with the set still untested.

The next evening he arrived at camp five. It was deep in the forest, connected with the nearest town by only one telephone line, which was frequently down. The occupants of the camp were all lumberjacks, the hardest-boiled crew west of Missoula. Bob felt lost among the crowd of rough, swearing men.

The next morning, the "Kid," as they called Bob, was started "swamping," or clearing brush before the sawyers. The work was hard, but there was plenty of time to talk. The sawyers, who were the roughest of the bunch, delighted in kidding the newcomer. One of them suddenly became curious. "Say, Kid," he said, "what's the idea of bringin' a number three pack-sack up here? I bet you got a whole campin' outfit."

I had to use a large one," Bob replied. "There wasn't room for my radio set in a number two."

"A what?" yelled the big fellow.

"A radio set," replied Bob.

"Jumpin' old Jupiter!" howled the logger. "Did you hear that, Bill!"

But Bill didn't answer, for his loud guffaws made an answer unnecessary.

The news spread rapidly, so that night the whole camp was laughing about the Kid and his radio set. Most of them scoffed at the idea of operating a radio set there, while a very few admitted that it might work, although they were very doubtful. Bob strung his antennae that evening, but had no chance to try the set.

During the next day, the Kid and his radio set were the principal topic for discussion. One old logger sat on a stump, industriously chewing "Brown's Mule" between sentences. "I seen one of those radios once," he said, "but all I heard was a lot of buzzes and squeaks. I don't think any Kid is goin' to show me any better, either."

The fellow working with him replied, as he made a cigarette, "Guess you're right, Blaze. Wonder what Chipmunk thinks about it?"

Chipmunk, who was the foreman, thought that radio was "haywire." "Never did see one that worked," he said at supper. "I'll bet a week's wages that the Kid can't get a squeak out of the fake."

No one took up his bet.

After supper Bob brought forth the set. His hopes were centered on just one question. Would it work? If it did, he would be the hero of the camp; if it didn't, he would - well, he would be something else. The set was built carefully and should give the best of results at once, but, on the other hand, it hadn't been tested yet, so some trifle might be wrong - a broken wire or a loose connection, just enough to prevent good reception. A group of silent loggers watched him with cynical smiles as he carefully traced the wiring and tested each piece of apparatus. Everything was apparently in the best of condition, so, with a silent prayer, he turned on the rheostat. The tube lighted! Eagerly he turned the dials. Intently he listened, so that not the slightest sound could escape notice. A minute passed, two minutes, nothing but silence greeted his ears. Several more minutes slipped by. Still the silence remained, dead, unceasing, heart-breaking silence. At last it was broken by the laughter of the observing men. Bob knew then that he had, in their eyes, failed.

The Kid was a true ham, so, despite the men, he started trouble-shooting. First the wiring was again traced; then each piece of apparatus was again tested, but still the refractory receiver failed to respond.

The night wore on and the men retired, but Bob still labored with the set. Finally, near midnight, the trouble was located. It was a broken connection, which he quickly repaired. Again he placed the "fones" on his head and lighted the tube. Again he turned the dials. Again he strained

to catch the slightest sound. What was that? Tensely he moved the dials, just the smallest part of an inch, but, O, what a difference! Faintly at first, then louder came the silvery clear voice of a grand opera singer. To the eagerly-listening ham, it was the voice of an angel. Presently the music ceased, and a masculine voice announced, "This is Radio KFI, the Examiner, Los Angeles, California."

Again Bob turned the dials, and again he was rewarded. Calgary, Portland, Dallas, and Victoria all came in. Visions of an astonished group of loggers passed through his mind as he sat enjoying the wealth of music. Suddenly he gripped the dials more tightly. What was this? Faintly but steadily it came, "dah dit dah, dit dit, dah dah dah - KIO KIO KIO." Again it came, "KIO KIO KIO." Bob grabbed a piece of paper and began copying the faint signals. Rapidly they came, rapidly he copied, growing more and more excited with each letter. The signals stopped. Bob tore off the "phones" and rushed wildly to the foreman's bunk.

"Hey, Chipmunk, get up!" he shouted. "Hurry, or it'll be too late!"

Chipmunk sat up sleepily and gazed around, much like a large owl. He woke with a start, however, when Bob thrust the piece of paper into his hand.

"KIO KIO KIO," it read, "7XG speaking. Large fire on Brush Cr. Running toward camp 5. Rush big crew at once, or camp will be destroyed."

"Who's 7XG?" snapped the foreman.

"Lookout station at Roundtop," Bob replied. Chipmunk hastily dressed, at the same time yelling, "Roll out, you loafers. There's work to be done! Hurry up there, Jack. We got to fight fire."

The big logger addressed looked startled for a moment, then leaped from his bunk. "There's a fire, boys," he cried.

"Yeh, in the stove, I suppose," growled a sleepy fellow who was awakened by Jack's yell, thinking that it was morning.

"You're wrong this time," replied Jack. "Ask Chipmunk."

The cook was aroused, so that there was an enormous pile of doughnuts and an immense pot of red-hot coffee ready when the men appeared at the cook-shack.

They were soon on their way, after consuming enormous quantities of the doughnuts and fiery coffee. Each one carried a pack-sack containing emergency rations, besides a shovel, grub hoe, and axe. Rapidly they pushed ahead through the tangled masses of fallen trees, bushes, and vines. Each man was filled with the spirit of adventure natural to all "timber beasts." They knew of the hours of heart-breaking toil which lay ahead, yet they sang and cracked jokes as they proceeded. The foreman led the way, closely followed by his men. Bob Jones was there too; it was a new adventure for him, so he meant to make the most of it.

After an hour of exceedingly difficult progress through the underbrush, they arrived at the fire. Except for torn clothing and scratched faces, the crew was in fine condition for the battle with the fire, which already covered several acres. Chipmunk distributed his men with the skill of an experienced ranger. The men were fresh, so they soon had a splendid fire line started. It was necessary to remove every bit of vegetable matter in a line several feet wide the whole distance around the fire. Every foot of the completed trench had to be patrolled constantly so that sparks would not start new fires on the other side.

The flames raged and roared as they rushed through the thick growth of trees and underbrush. Until the fire "crowned," the men had a chance to win, but when it did, nothing could stop the great flames, which would leap from treetop to treetop with the speed of the wind and the power of a million devils. It was like a gigantic poker game with the camp, the forest, and the lives of the men at stake. The loggers knew this and reveled in the unfair contest with super-human powers.

Gradually the night wore on, and the men grew tired, but the fire grew stronger with each passing minute. Solid sheets of flame leaped upward, changing immense trees into gigantic torches. Sparks showered by millions upon the perspiring men, but still they fought on in the terrific heat. Their clothing was in tatters, and their hands were blistered, but the fight must be continued, for a wind had sprung up, and the fire was likely to "crown" at any moment. If it did so, they would be roasted like flies trapped in a hot oven. They were nearly exhausted, yet they must fight on. Only a few more feet of trench was needed, but the flames were sweeping down on them. Nothing could resist that terrific heat, yet the trench must be completed! Only a few feet of the thick brush remained. The men fought doggedly. They were losing, the fire was gaining! Its hot breath withered the leaves of the trees. The sizzling sparks started miniature blazes behind them. They kept on, but each painful stroke was weaker than the last. Each inch gained was harder than the last. It seemed as if they had lost, for the fire was upon them and they were exhausted. Bob, who had been patrolling, rushed up and, seizing a shovel, began to work like the seven devils. Following his example, the loggers made a last supreme effort. They resembled men of another age as they toiled savagely, demolishing the last stretch of brush. The flames roared defiance, but they were defeated, for the workers suddenly saw nothing before them but the other end of the trench.

They had won! The flames rushed forward, then suddenly stopped as they met the bare earth.

It was dawn when the Government fire-fighters arrived, only to find their work done. The ranger in charge was a bit surprised, so Chipmunk told of Bob's exploit. At the last, he turned to the Kid, saying, "I want to apologize for the bunch, Bob. I bet a week's wages that the set wouldn't work. You win!"

- Fred Johnson



JOHNSON, FREDERICK ELON

Nickname: "Fred"

Course: Manual Arts

School Clubs and Activities: Papyrus Club; Radio Club; Senate: Pres. Radio Club; Vice-President Radio Club; Treas. Papyrus Club; Tiger Staff.

'25

Grade School: Jefferson

Future: U. of Montana

Some QST Abbreviations used in Text and Drawings

- A – ampere
ac – alternating current
A/D – analog-to-digital
af – audio frequency
afc – automatic frequency control
afsk – audio frequency-shift keying
agc – automatic gain control
alc – automatic load (or level) control
a-m – amplitude modulation
anl – automatic noise limiter
ARC – amateur radio club
AREC – Amateur Radio Emergency Corps
ARPSC – Amateur Radio Public Service Corps
ATV – amateur television
avc – automatic volume control
bc – broadcast
BCD – binary-coded decimal
bci – broadcast interference
bcl – broadcast listener
BFO – beat-frequency oscillator
BPL – Brass Pounders League
CAM – content-addressable memory
CB – Citizens band
CCIR – International Radio Consultative Committee
ccw – counterclockwise
c.d. – civil defense
CD – Communications Department (ARRL)
CMOS or COSMOS – complimentary-symmetry metal-oxide semiconductor
coax – coaxial cable, connector
COR – carrier-operated relay
CP – Code Proficiency (award)
CR – cathode ray
CRT – cathode-ray tube
ct – center tap
cw – continuous wave (code), clockwise
D/A – digital-to-analog
dB – decibel
dc – direct current
DCTL – direct-coupled transistor logic
DF – direction finder
DOC – Department of Communications (Canadian)
dpdt – double-pole double-throw
dpst – double-pole single-throw
dsb – double sideband
DTL – diode-transistor logic
DX – long distance
DXCC – DX Century Club
EC – Emergency Coordinator
ECO – electron-coupled oscillator
ECL – emitter-coupled logic
EME – earth-moon-earth
emf – electromotive force (voltage)
FAX – facsimile
FCC – Federal Communications Commission
FET – field-effect transistor
FD – *Field Day*
fm – frequency modulation
FMT – frequency measuring test
fsk – frequency-shift keying
GDO – grid-dip oscillator
GMT – Greenwich Mean Time
H – henry
hf – high frequency
HFO – heterodyne frequency oscillator
Hz – hertz
IARU – International Amateur Radio Union
IC – integrated circuit
ID – inside diameter
i-f – intermediate frequency
IRC – International Reply Coupon
ITU – International Telecommunication Union
IW – Intruder Watch
JFET – junction field-effect transistor
k – kilo
kc – kilocycle
kHz – kilohertz
kW – kilowatt
lf – low frequency
LMO – linear master oscillator
LO – local oscillator
lsb – lower sideband
LSB – least-significant bit
LSD – least-significant digit
LSI – large-scale integration
luf – lowest usable frequency
mA – milliamperes
MARS – Military Affiliate Radio System
Mc – Megacycle
mf – medium frequency
MG – motor-generator
mH – millihenry
MHz – Megahertz
mic – microphone
mix – mixer
MO – master oscillator
MOSFET – metal-oxide semiconductor field-effect transistor
MOX – manually-operated switching
ms – millisecond
m.s. – meteor scatter
MSB – most-significant bit
MSD – most-significant digit
MSI – medium-scale integration
muf – maximum suitable frequency
MUX – multiplex
mV – millivolt
mW – milliwatt
nbfm – narrow-band frequency modulation
NC – normally closed
NCS – net control station
NO – normally open
npn – negative-positive-negative
NTS – National Traffic System (ARRL)
OBS – Official Experimental Station
OD – outside diameter
OO – Official Observer
op amp – operational amplifier
OPS – Official Phone Station
ORS – Official Relay Station
osc – oscillator
OVS – Official VHF Station

oz -- ounce
 PA -- power amplifier
 PEP -- peak-envelope power
 PEV -- peak-envelope voltage
 pF -- picofarad
 PIV -- peak-inverse voltage
 PLL -- phase-locked loop
 pm -- phase modulation
 pnp -- positive-negative-positive
 pot -- potentiometer
 PRV -- peak-reverse voltage
 PSHR -- Public Service Honor Roll
 PTO -- permeability-tuned oscillator
 PTT -- push-to-talk
 RACES -- Radio Amateur Civil Emergency Service
 RAM -- random-access memory
 RCC -- Rag Chewers Club
 rcvr -- receiver
 rf -- radio frequency
 rfc -- radio-frequency choke
 RFI -- radio-frequency interference
 RM -- Route Manager
 RM-(number) -- FCC rulemaking
 rms -- root-mean-square
 RO -- Radio Officer (c.d.)
 ROM -- read-only memory
 RST -- readability-strength-tone
 RTL -- resistor-transistor logic
 RTTY -- radio teletype
 s.a.e. -- self-addressed envelope
 s.a.s.e. -- stamped s.a.e.
 SCM -- Section Communications Manager
 SCR -- silicon-controlled rectifier
 SEC -- Section Emergency Coordinator
 SET -- simulated emergency test
 SNR -- signal-to-noise ratio
 spdt -- single-pole double-throw
 spst -- single-pole single-throw

SS -- Sweepstakes (contest)
 ssb -- single sideband
 SSTV -- slow-scan TV
 SWL -- short-wave listener
 SWR -- standing wave ratio
 sync -- synchronous, synchronizing
 TCC -- Transcontinental Corps
 TD -- transmitting distributor
 TE -- transequatorial (propagation)
 tfc -- traffic
 tpi -- turns per inch
 T-R -- transmit-recvie
 TTL or T²L -- transistor-transistor logic
 TTY -- Teletype
 TV -- television
 TVI -- television interference
 usb -- upper sideband
 uhf -- ultra-high frequency
 V -- volt
 VCO -- voltage-controlled oscillator
 VCXO -- voltage-controlled crystal oscillator
 VFO -- variable frequency oscillator
 vhf -- very high frequency
 vlf -- very low frequency
 VOM -- volt-ohm-milliammeter
 VOX -- voice-operated break-in
 VR -- voltage regulator
 VTVM -- vacuum-tube voltmeter
 VXO -- variable crystal oscillator
 W -- watt
 WAC -- Worked All Continents
 WAS -- Worked All States
 wpm -- words per minute
 ww -- wire wound
 wv -- working voltage
 xtal -- crystal
 μ -- micro (10⁻⁶)

QST

160-Meter Contest

(Continued from page 68)

8) Entries become the property of ARRL, none can be returned. Awards Committee decisions are final. Send an addressed stamped \$10 envelope for appropriate entry forms. All entries must be received at ARRL Hq. no later than Jan. 10, 1972 to be eligible. Mail entries, photos, soapbox, ideas for contest improvement, etc. to ARRL, 225 Main Street, Newington, Connecticut 06111.

Strays

RULES FOR LIFE MEMBERSHIP

1. A paid-up Life Membership in the League shall be available to any Full or Associate Member, other than a Family Member, upon payment of a fee twenty times the annual dues rate, and upon approval of the application by the League's Executive Committee.
2. The Life Membership fee for U.S. and Canadian applicants is currently \$130, and for other applicants is currently \$140.
3. An applicant may choose an alternative time-payment plan of 8 quarterly installments (\$16.25 each for U.S./Canadian applicants, \$17.50 each for other applicants). In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
4. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the installment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of \$2, but without receipt of QST. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
6. Life Membership is also available to blind amateurs upon payment of a fee of \$40, without the receipt of QST.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJMJ

AREC AND RACES

MORE ALPHABET soup! AREC is the Amateur Radio Emergency Corps, sponsored by ARRL since 1935 (when it was called the ARRL Emergency Corps - AEC) and now the emergency preparedness division of the Amateur Radio Public Service Corps (ARPS). The other division is the National Traffic System (NTS).

Got that? Okay, now RACES is the Radio Amateur Civil Emergency Service, created in 1951, sponsored by government at federal, state and local levels and regulated by FCC under a subpart of the amateur regulations. At one time, RACES was considered a part of ARPSC and still appears as such on the ARPSC emblem, but for practical purposes it is and always has been separate insofar as sponsorship, administration and regulation are concerned. The principal purpose of RACES is to permit amateur radio to serve civil defense, while the principal purpose of AREC is to enable amateurs better to serve the general public in all ways, through whatever means and whatever agencies, along emergency communications preparedness lines.

Thus it can be seen that the two amateur groups have much in common and that there is bound to be overlapping both in function and in personnel. This was foreseen at the very beginning of RACES and immediate steps were taken by your League to try to make the overlapping an advantage to both groups rather than a source of conflict between them. Inclusion of RACES as a part of ARPSC was one of these steps - one which backfired as government sponsors of RACES took

* Communications Manager, ARRL.

exception to it. Despite all the efforts, conflict did inevitably arise in some places.

In recent years, the federal government sponsorship and implementation of RACES, which started out with such a rush in the fifties, has slowed to a walk, although all the motions are still being accomplished. Many states are reducing civil defense expenditures and personnel as well, and this has had its effect on RACES. Meanwhile, AREC has also had its ups and downs. During the heyday of RACES in the fifties, AREC was somewhat in the background as all the talk was about defense against nuclear attack. Now that this talk has decreased and the probability, at least on the surface, is being taken less seriously, AREC is in a position to take a more active part in emergency preparedness, in conjunction with RACES where the latter is still a going thing, unilaterally where RACES is inactive or dormant. One big holdback is the matter of Docket 19245, which will prevent much real progress in emergency preparedness in conjunction with welfare and other concerned agencies until it is resolved.

In the late 40's emergency preparedness was a "big deal" and the League hired a "National Emergency Coordinator" to head up the program nationally. In the fifties, the preoccupation with preparedness for natural emergencies was replaced by preoccupation with defense against enemy attack, and the League was an active midwife in the birth of and a veritable "nanny" in the rearing of RACES. As the fifties wore into the sixties, continuous attempts were made to keep the subject of emergency preparedness and public service in the forefront, but amateurs in general were bent in a different direction and inevitably the League's course has bent with it. While public service remains a number one objective, in view of the change in direction it is now receiving a somewhat different interpretation, in that the public can be served in other ways, perhaps better ways, than in preparing for communications emergencies and in handling third party messages. It can also be served by making better, sharper



As part of amateur radio week in Georgia and a public demonstration of emergency communications, a portable station was set up in Gainesville by the Lanierland ARC. Pictured manning the station are left to right: WN4QYY, K4FOW, WB4PGG (seated), W4NSO, WB4FNS, and WA4FNY (in car).

QST for

As reported in the "Diary" this month, WA7OHL is shown passing traffic on 2 meters during the recent search for a lost youngster on Casper Mountain, Wyoming. (Photo by WN7OHL)



operators through sponsoring bigger and better contests, by fostering more international good will through a beefed-up DXing program, and by creating more electronics expertise through various incentive programs in that field. Mind you, nobody is saying that emergency preparedness and other public service through similar direct means is not important. It is just that the emphasis is changing to focus on some of the less direct means and on the need to keep the public informed on what we are doing in these various fields.

But back to AREC and RACES. As far as the League is concerned, both AREC and RACES are and always have been part of amateur radio, part of the direct public service we amateurs always have offered — the kind of public service that stares John Q. right in the face. They are of great importance, but they are not all there is. And between now and some time in the not-too-distant future, some kind of a compromise is going to have to be made so that AREC and RACES and a number of other service-rendering amateur organizations can all work together, in unison or within well-defined "spheres of influence," for top performance in the kind of public service we all know amateur radio is capable of.

What's the point of all the above? Just some background and comment, to keep the subject before you — lest we forget. — *WINJM*.

Public Service Diary

On March 21, the EC for Hamden, Conn., WINFG, received an urgent request from the Red Cross to provide communication at the scene of a serious tenement house fire. Via 2-meter repeater, WA1NRS and W1EKZ were directed to Red Cross headquarters, while WA1EQN and WINFG set up operations at the fire scene. KIAMO acted as net control. Fifteen messages were handled for the Red Cross who were relocating 11 families to temporary quarters. — *WINFG, EC Hamden, CT*

On April 17, the U.S. Coast Guard based in San Diego initiated a search for two missing boats out of San Felipe, Baja Calif., Mexico. XE2SN maintained many hours of contact with XE2PJO and XE2LLP in San Felipe, while W6GWL ran phone patches and messages to the Coast Guard headquarters in San Diego. The search was terminated April 23 with one body located. On April 25, families of three lost men initiated further search. Operations were further aided by XE2XXX, XE2BY, WB6TZD, K6MVF and WB6OTP. The second search was terminated May 1 with no success. — *W6OZD*

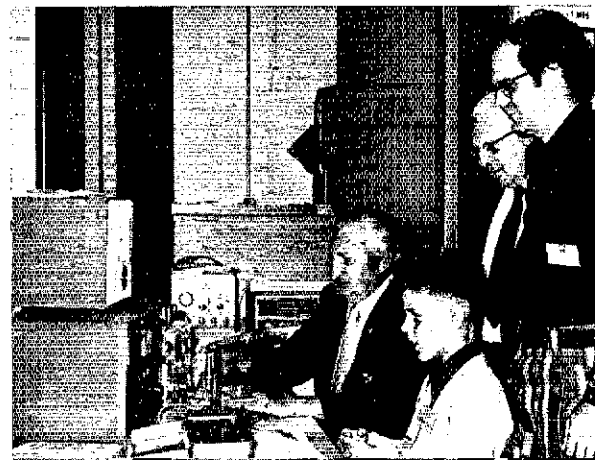
The Cleveland Society for the Blind's May Festival featured an on-the-air demonstration of amateur radio. Seated in the background is W8QFK; seated in foreground, W8HZJ; standing left, W8KC, a volunteer class instructor; and standing right, W8FQC. Others participating were W8CPF, K8ONA and W8ZUK.

At 0300Z April 20, WB4PWF, while listening on 14,285 MHz, heard a "super-urgente emergencia" from HC1CV in Quito. Five children in an orphanage had been poisoned by lead sulphate from a battery. Two were dead and the others required an antidote not available in Ecuador. WB4PWF arranged for the medication to be picked up in Miami, and himself drove to the Miami airport with some of the antidote from West Palm Beach. The medication arrived by plane just in time to save two of the children's lives. — *W2NNB*

The Carroll County Emergency Net was activated on 3980 kHz by ECs WB4PRF and W4RMJ at 0015Z, May 8, after a tornado struck the northwest part of Carroll County, Tenn. WB4PRF/mobile assisted authorities as communications link until power was restored at 0430Z. The net was reactivated for a short time at 1700Z when a second tornado threatened. Assisted by WA4HZP, K4TKR, WB4TER and others, a total of 49 messages were handled for the police, sheriff's dept., and the Red Cross. — *WB4ANX, SEC TN*

A search for a missing girl in Alvin, Texas, on June 20 prompted action by many amateurs in the area. Communication coordinating over a thousand searchers was provided by the West Gulf Emergency Net, WSDWI, WA5RUE and WASOYG on 75-meters. Utilizing 2-meter repeater were WA5DID, K5QQG and WASZWG. The search was to no avail. — *K5QQG*

Field Day weekend of June 25 and 26 produced a real communications emergency in Marysville, Ohio, as severe thunderstorms knocked





Ed Brichta, W6RSY, makes a point to Louise Moreau, WB6BBO, at the San Jose convention in July. (WINJM photo.)

Staring at you is the complete history of net managers of the Georgia State Net. GSN, a stalwart NTS net, was organized in 1954 by W4OCG, its first net manager. Left to right: W4PIM, K4BAI (present Georgia RM), W4OCG, W4DDY, W4CZN, and W4FDN. (Photo by K4BAI)

out virtually all power and telephone service with many fallen trees and high water. By 2120 local time Friday the Central Ohio AREC/RACES in Columbus was activated via the telephone tree. W8CRX/mobile and WA8TRE/mobile were immediately dispatched to Marysville to provide communication to the c.d. emergency operating center, K8DDG. Others went on yellow alert (check into net from home) on 10, 6 and 2-meters, as others activated K8DDG as NCS. The Red Cross station was also activated. Two additional mobiles were dispatched to Marysville at 2245. Twenty-five messages were handled for c.d. officials and the Red Cross, including the dispatch of generators from Dayton. Extensive use was made of repeaters WB8CQK and W8WTB/W8AIC. By 1900 local Saturday power and telephones had been partially restored and the operation was secured after providing nearly 24 hours of the only source of communication in and out of Marysville. — K8EHE, Acting EC, Central OH

On July 4, W4CID/mobile and W4OXM/mobile assisted city police in locating and clearing fallen debris from city streets in Russell and Bellefonte, KY, following a tornado which hit that area. Twenty messages were handled over a two hour period on 75 meters. — K4YZU, SEC KY

On July 4 and 5, five Kentucky amateurs supplied backup communications during an actual CAP mission involving a downed plane in Eastern Kentucky. Links were provided with Wing Headquarters at Louisville from the hazard area and between airports at London and Whiteburg. WB4RVO/4 and K4EEN/4 were outstanding in their work, and much official praise was received. — K4YZU, SEC KY

During the period of July 19-28, many amateurs assisted in the search and eventual rescue of a missing 9-year-old boy, who wandered away from a picnic on Casper Mountain, Wyoming. Under the direction of EC W7TVK, communications was provided for the police and sheriffs

departments, CAP, Boy Scouts, National Guard, Salvation Army, Red Cross, search dog teams and mountaineer teams. — W7CQL, SCM WY

Reports were received from 38 Section Emergency Coordinators for June. Total AREC members barely squeaked past the 12-thou mark with 12,068. Local ECs are reminded to report your activity to your SEC, so he can report to headquarters. Sections reporting: AB, AZ, AR, CO, CT, EFLA, ENY, EMASS, EPA, IN, IA, KS, KY, Los Ang, LA, MAR, MI, MT, NE, NV, NNI, NTEX, OH, OK, ON, OR, SDgo, SK, SD, SNJ, TN, UT, VA, WA, WV, WFIA, WMASS, WPA.

Traffic Talk

Traffic handling must be getting more popular. Lots of material for the column this month; more,

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for July Traffic

Call	Orig.	Recd.	Rel.	Del.	Total
WB6PKA	2405	1356	136	121	4018
W3CUL	346	996	270	111	2323
WB9BJR	304	406	363	10	1083
K0ZSO	-	437	1	436	874
K0ONK	112	350	328	16	806
W6LCX	14	391	310	18	734
WB4NNO	44	353	310	8	715
W7BA	15	351	311	33	712
WA0VAS	107	291	46	285	689
W3FML	30	354	239	3	646
W3WLH	40	282	269	10	601
WA1NMZ	70	257	250	2	579
W3VR	171	196	180	7	554
WA2EPI	50	233	157	70	520
K9APH (June)	207	35	35	-	277

BPL for 100 or more originations-plus deliveries

K9APH	389	K1RUQ/3	148	WB2FUG	109
W3FRF/1	338	WA9YSD	133	W01YO	108
W2CU	291	W46BYZ	127	VE2RM	101
WA7ZUK	155	W8OCU	122	W4EVN	100
		K8ONA	117		

More-Than-One Operator Station

W44PDM/2 184

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: WA3QGM, WB6ZVC, WB9BJR.

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 originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

in fact, than we can use. Thanks very, gang. We'll dispose of a couple of small items first, then quote from one of the many fine net bulletins we receive.

K4KA suggests a new HX prosign authorizing cancellation of a message if delivery requires mailing. The next one in alphabetical sequence is HXC. Does this "grab" anybody? The pure traffic man takes a dim view of failure to deliver one way or another, regardless of the reason; but we have to be realistic in that in this day and age a message delivered by mail might as well have been mailed by the sender in the first place. Is it fair to expect the delivering operator to spend six cents? Who is impressed by a "radio" gram received in the mail, usually several days old? Maybe we don't need a new HX prosign. Maybe it ought to be standard procedure not to deliver by mail, but to service the originating station advising him of the difficulty. Or maybe HXB can serve the same purpose. We're not inclined to act unless K4KA's proposal receives enthusiastic acclaim by at least a dozen people.

We received in the mail a copy of a document entitled "A List of Places in the Western Pennsylvania Section of the American Radio Relay League. Along With Stations in the Western Pennsylvania CW Traffic Net Who Will Accept Traffic for Them for Delivery by Land Line or Mail." With a title like that, you'd expect quite a document, and you wouldn't be disappointed. It's 23 pages long, lists all places in the section with a population of more than about six, and keys each place to indicate which stations can deliver by mail or telephone. It takes a RM with real enthusiasm, ambition, ability and dedication to put out something like this in a section as populated as WPA. That RM is Leo Weiner, W3LOS.

One of the best traffic bulletins that comes "down the spout" at headquarters is the Texas CW Traffic Net Bulletin, put out by Jim Hicks, W5EZY, net manager. We quote from the May '71 issue, an item entitled "Up the Ladder": "I suspect that stations sometimes ask 'What is the point in just checking into a net?' It's true that just 'checking in' can get pretty dull, but we have to look at the long-range picture. A lot of our RNS reps and our NCs are people who began by 'just checking in.' They checked in enough to recognize a need or a challenge, then volunteered for a job. Their proficiency began to grow, imperceptibly, perhaps, but they eventually felt comfortable and capable. Then they tried an RNS job. They were introduced to other good operators and snappier operation, and soon they were asked to serve as RNS net controls. From there, they went to CAN where the traffic is heavier and the speed faster. Now they are helping to sustain a system that is the best-organized emergency facility in the ARRL structure - the National Traffic System. They are the cream of the crop and they know it. When we graduate people to RNS and CAN, we are not really losing them. They are the backbone of the system and a credit to our net. Each time one of them steps us, he leaves room at the bottom - for someone else who will begin by 'just checking in.' Anybody ready for a new job?" Well said, Jim. TU! - WINJAL.

National Traffic System. In this column last month we presented a short synopsis of a plan submitted by W6BGF to the Pacific Area Staff - a plan to supplement the evening NTS cycle with a series of daytime nets designed to get NTS into the daytime traffic picture, rapidly becoming more important. Copies of this plan, along with the

Public Service Honor Roll July, 1971

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category. Those making fewer than 45 points are listed with point totals only.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	12	20	3	-	5	
WB6ZVC	10	5	12	12	12	15			5	69
WB9BJR	10	10	12	12	12	3	3		5	67
W3FCS	10	10	12	12	12	5			5	66
K7CTP	10	10	12	12	12	10				66
W3EJT	10	10	12	3	12	9				61
WB4KDI	10	10	12	12	12				5	61
WB4LAA	10	10	12	12	12				5	61
WB8CYB	10	5	12	12	12	5			5	61
WA2JCU	10	10	12	12	12	3				59
WA1LPI	10	10	12	12	12					56
W1YNE	10	10	12	9	12	2				55
WB2UEG	10	10	12	3	12		3		5	55
W4OGG	10	10	10	12	12					54
WB2OYV	10	10	12	9	12					53
W7OCX	10	5	8	12	12					52
VE3ARS	10	5	12	12	12					51
WA8UPI	10	10	12	12	12	2			5	51
WA0VAS	10	10	12	6	20	3				51
W3MPX	10	10	12	12					5	49
WB4DAJ	10	10	12	12	12					49
WB4MIO	10	10	12	12						49
WB4OKT	10	10	12	12						49
W5EDT	10	10	12	12	12					49
WA8ETX	10	10	12	12	12					49
WBIMI	10	10	12	12	12					49
W9HRY	10	10	12	12	12					49
WBLCX	10	5	12	12	12		3	1	5	48
W2CU	10	10	12	12			3			47
WB2NOM	10	10	12	3	12					47
W4NOM	10	10	12	12	20				5	47
W6BGF	10	8	12	12	12				5	47
W7MCW	10	10	12	12	12	15				47
W7BQ	10	10	12	9					5	46
WB8CWD	10	5	12	6	12					45
WB2VLS	44	VE3ERU	39	W60AW	35					
WB4IMH	44	W2FER	39	VE3JWE	34					
WA4RMZ	44	W2RUF	39	VE3DDV	34					
K4SXD	44	W3LOS	39	VE3EKI	34					
WB411-B	44	W3NEM	39	VE3GFN	34					
K5ROZ	44	K4LND	39	K1SKF	34					
W5SBM	44	W4SVQ	39	WA3PGT	34					
W6MNY	44	W6INH	39	W3YA4	34					
W7CAF	44	W6VNO	39	WB6AKR	34					
W7LBK	44	W46VKF	39	W5YBV	34					
W7PI	44	W9HI	39	W8IZ	34					
WB8CLF	44	W43PLP	38	KRLGA	34					
WA8NOQ*	44	W5RBB	38	W9LO	34					
W9BV	44	W47MAD	38	W4QZWA	34					
WA3IPU	42	W1RVR	37	W6FJT	33					
WA3JGM	42	WB8ALU	37	WB2LQP	32					
WB6PKA	41	WA2MPC	35	WB1EF	32					
W7AXT	41	WA2NLP	35	K2KTK	31					
W2MTA	40	WB4EJZ	35	VE2AJT	30					
K0MRI	40	W45JVW	35	WB6ZII	30					

* Denotes multipoint operator.

Category Key. (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

complete minutes of the PAS meeting in San Jose, have been mailed to all SCMs in the Pacific Area, and to chairmen of the other two Area Staffs. We have a few copies left, if anyone wants to take a look and perhaps comment. We have received one very lucid comment already, and it looks as though some such system will be tried out during the coming traffic season.

There are 155 section/local NTS nets listed in the new *Net Directory*. Of these only 50 reported for the month of July. This is only 32%. So that monthly traffic totals can more accurately reflect activity, all NTS nets are encouraged to report each month directly to ARRL Headquarters. CD-125 is used for this purpose and is shown elsewhere in

this column, CD-125 is available on request from ARRL. Note that section/local nets reporting are now listed by state and province in the monthly reporting in this column. Is your section or local NTS net listed as reporting?

First-time 2RN certificates were earned by WB2OYV and WB2YIG. Annual 9RN wallpaper to W9FHJ and WB4KPE, and initial certificates to WB9AWY, WB4PVC and WB9DXK. K7NHL says: "For a 30 day period starting 3 August, TWN is trying a second session on ssb. So far it's been rough with lousy conditions. August is the worst month of the year out here in the high altitude country. But we will try it and perhaps if not continue it, give it another try during a month like November or December." TEN Region Net certificates were issued to K0WNV, K0ZXE, WA0JFC and WB0BFL. Other than that, the troops are pretty quiet.

July Reports

Net	Sessions	Traffic	Rate	Avg. Rep. (%)
EAN	.31	1450	1.057	46.8
CAN	.31	907	.852	29.3
PAN	.31	865	.814	27.9
IRN	.62	552	.369	8.9
2RN	.58	579	.754	10.0
3RN	.62	435	.343	7.0
4RN	.55	386	.279	7.0
RN6	.59	566	.388	9.6
RN7	.62	380	.352	6.1
8RN	.60	349	.350	5.8
9RN	.59	433	.396	7.3
TEN	.62	425	.486	6.9
ECN	.56	97	.152	1.7
TWN	.54	218	.201	4.0
TCC Eastern	124 ¹	575		
TCC Central	93 ¹	483		
TCC Pacific	134 ¹	774		
Sections ²	1804	8477		4.7
Summary	2581	17,951	EAN	6.2
Record	2590	26,748	1,267	15.2

¹TCC functions, not counted as net sessions.

²Section and local nets reporting (32%) - AL: AENB AEND AENM AENR AENT; AR: OZK; CA: NCN SCN; CT: CN CPN; FL: VFN GN FMTN QFN EAST QETN FPTN; GA: GSN GTN; IL: ILN; LA: LAN; ME: SGN; MD-DC: MDCTN; MI: OMN; MN: MSN M3N MSPN; NJ: PVTEN NJSN; NM: NMRRTN; NY: NYS; NC-SC: CN (E); OH: BN OSSB; ON: OPN OQN GBN; PA: PTN PEN EPA WPA; PQ: WQVHF; RI: RISP; TX: TTN TEX; UT: BUN; VA: VSN VSNB; WA: WSN; WI: BEN.

Transcontinental Corps. W1YNE joins TCC and will take over W3EML's Wednesday D function. W3EML issued TCC Eastern certificates to W1s BIG E11 NJM QYY, K1SSH, W1JTM, W2s FR GKZ QK, K2KTK, W42BICU UWA, K3MVO, W4s NLC SOQ UQ, K4s GTS KNP, WB4NNO, W8s PMJ RYP, K8KMQ, WA8s PIM YVR. Central Area (W0LCX, Dir.) - W4s OIG ZJY, WB4KPE, W5s MI SBM, W9s CXY DND, WA9VZM, W0s HI INH LCX ZHN, W4s IAW WFZ, K0AEM. Pacific Area (W6VNO, Dir.) - WSRE, K5MAT, K6s ECB DYX, W6s BGF EOT IPW MLF MNY VNO VZT, W46s DEI LFA, W7s EM KZ PI DZX EKB, K0JSP.

Area	Functions	% Successful	Out-of-Net	
			Traffic	Traffic
Eastern	124	89.5	1539	575
Central	93	95.6	972	483
Pacific	134	91.1	1548	774
Summary	351	92.1	4059	1832

The TCC Roster: Eastern Area (W3EML, Dir.) - W1s BIG E11 NJM QYY YNE, K1SSH, W1JTM, W2s FR GKZ, K2KTK, W42s BAN UU UWA, WB2RKK, W3EML, K3MVO, W4s NLC SOQ UQ, K4s GTS KNP, WB4NNO, W8s PMJ RYP, K8KMQ, WA8s PIM YVR. Central Area (W0LCX, Dir.) - W4s OIG ZJY, WB4KPE, W5s MI SBM, W9s CXY DND, WA9VZM, W0s HI INH LCX ZHN, W4s IAW WFZ, K0AEM. Pacific Area (W6VNO, Dir.) - WSRE, K5MAT, K6s ECB DYX, W6s BGF EOT IPW MLF MNY VNO VZT, W46s DEI LFA, W7s EM KZ PI DZX EKB, K0JSP.

Independent Net Reports (July)

Net	Sessions	Traffic	Check-ins
ECTTN	.28	76	277
Hit & Bounce/MW	.31	585	299
Eastern Area Slow	.27	54	177
All Service	.4	49	60
Mike Farad	.27	219	368
7290	.44	571	1796
Northeast Traffic	.31	336	404
Clearing House	.27	489	518
North American SSB	.26	410	439
20 Meter Interstate SSB	.21	1012	431

New Net Directory

The new *Net Directory* became available in mid-August. The directory has the usual three-part listing, by net name, state or province, and frequency. If your net does not appear, then it wasn't registered. Only public service nets qualify; ragchew nets and the like do not qualify.

The new directory contains 567 net names of which 170 are part of ARRL's National Traffic System. To qualify for NTS listing, nets must indicate proper coverage and liaison according to the system concept.

To get your copy of the *Net Directory*, send s.a.s.e. (legal-size envelope) to headquarters. We'll gladly send you one.

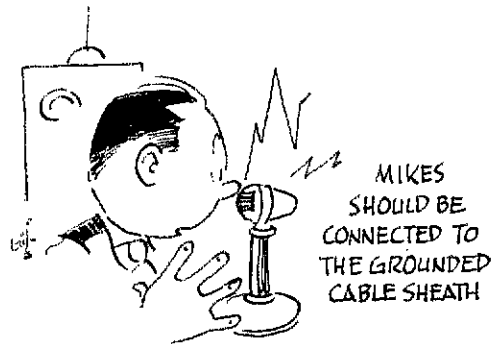
QST

National Traffic System Monthly Report

(for use by Section or Local NTS nets only)

1. Net Name:			
2. Net Abbreviation:		3. Month:	4. Year:
5. No. of sessions:		6. No. of messages handled:	
7. No. of check-ins:		8. Manager's Calls:	
9. NTS Liaison is maintained with the			Set
10. Stamped by:		Call:	
11. (W6VNO/10691)		American Radio Relay League 225 Main Street Newington, Connecticut 06111	

Is your NTS section or local net reporting monthly to ARRL Hq? Should be. During 1971 only 37% of NTS section/local nets have been reporting. For your net to be listed in *QST* as reporting, net managers please use CD-125 to arrive at Hq. by the 15th of each month. CD-125 available on request from ARRL.



I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

NEW MEMBERS PROPOSED

The *Singapore Amateur Radio Transmitting Society (SARTS)* and the *Society of Thai Amateur Radio (STAR)* are seeking membership in IARU, the world-wide federation of national amateur organizations. Current Union membership is 83. IARU headquarters has circulated a proposal to the member-societies calling for a vote regarding admission of the new applicants.

The *Singapore Amateur Radio Transmitting Society* has a total membership of 40 - 28 are licensed to transmit (there are 55 licensed amateurs in the country). *SARTS* has its own official publication called "Saura Singa." Until 1965, when the country left the Malaysian Federation, representation for 9VI amateurs was via the *Malaysian Amateur Radio Transmitters Society*.

The *Society of Thai Amateur Radio* is the national society for Thailand. The total membership is 57, constituting the entire HS population. "STAR Bulletin" is the society's official publication.

In proposing the societies for membership, IARU Hq. stated that it is satisfied that the applicants are desirable members and the logical representatives of amateur radio for their respective countries. Mail voting is now underway. The results are expected to be known in early 1972.

50 YEARS FOR SRAL

The *Soumen Radioamatooriliitto*, the Finnish IARU member-society has recently celebrated its 50th anniversary. The first official meeting, then under the name of the NVL Radio Society, was called on September 15, 1921. In 1927, the organization's name was changed to the present form.

SRAL now has a membership of 2232. According to Finnish amateur regulations, all of the 2000 licensed amateurs are *SRAL* members. The society publishes a monthly journal, "Radio-amatoori." Its headquarters station, OH2A (OG2A during 1971) is active on all bands from 80-2

ARRL Central Division Director W9HPG (left) and Vice-Director W9PRN greet JR1BMU at the annual Hamfesters picnic near Chicago. Aoki is attending advanced English classes in the U.S. before assignment to a foreign service post by his government. He is active in the *Japan Amateur Radio League* and has contributed articles for its official publication.



At the mike is the President of *Radio Club Peruano* Mr. Enrique Gainza, OA4VT, welcoming as active members of the Club, the Ambassadors of, left to right, Chile, Sr. Luis Jerez Ramirez; Argentina, General Juan Carlos Demarchi; and Panama, Sr. Regulo Franceschi.

meters. The society also operates two vhf beacon stations, OH6VHF and OH8VHF, in northern Finland.

STRENGTHENED IARU LIAISON

Intensified liaison between IARU member-societies and national licensing administrations has been proposed by Union Hq. in a recent communication to the national amateur organizations. Hq. suggested that opposition to amateur requests at the World Administrative Radio Conference for Space Telecommunications (see *QST* for September, 1971, pg. 78) tells that many

(Continued on page 89)



Happenings of the Month

MISSOURI LICENSE PLATES

Missouri, the only state to discontinue amateur call-letter license plates in the past twenty years or more, has restored the privilege. The new rules for obtaining the plates were sent us by Harris Fromhold, W0LBB:

"1. The effective month for registration will be October beginning in 1971. 2. License issued in October or any other month except the month your present license expires will be charged a full year's fee. 3. License issued in month your present license expires will be prorated for remainder of year to October. For example your license expires in January, 1972, and if you applied in January it would cost you for ten months' fees. 4. The license fees will be normal fees based on horsepower plus \$5. 5. It is recommended a license application be completed and submitted with your affidavit of unrevoked or unexpired call letters plus appropriate fees and to arrive here not later than the first day of month (October or month of expiring plate). - *Wilson S. Smart, Assistant Supervisor, Vehicle Registration*"

VANCOUVER DOC OFFICE MOVES

The Canadian Department of Communications Regional Office for British Columbia has moved to Room 320, 325 Granville Street, Vancouver 2. Applications for amateur licenses or for reciprocal operating authorizations within that area now go to this address.

FCC WARNING RE DX PILEUPS

In July a DX-pedition to Equatorial Guinea attracted quite a crowd of amateurs on the air. Some of them let impatience get the upper hand, creating unnecessary interference and displaying atrocious manners. In a recent letter to an amateur who had called the mess to the attention of FCC, the chief of the Amateur and Citizens Radio Division replied:

The matter referred to in your letter concerning the 3C1EG/3C0AN operation had already come to my attention. I also had observed it personally. Your observations and feelings express very well the reactions of all of us here, and I'm sure, the majority of radio amateurs throughout the United States.

It is frustrating to observe such tactics and not be able to do more than place a call to one of our monitoring stations. *Indeed, should such obviously illegal and disgusting practices become prevalent, they could form the basis for measures to require automatic identification of amateur transmissions, over and above those now contained in the Rules.* Certainly I would not like to advocate such a step, for it would mean a significant departure from the traditional concept of a service which has regulated itself, by and large, up to the present.

It is reassuring to receive your letter. I know you will do whatever is within your means to bring such operating tactics to a halt. I wish I could offer you some definite suggestions, but in matters like this an individual is somewhat limited. Thank you for writing and I hope to see you on the air some day. - *A. Prose Walker, Chief, Amateur and Citizens Division*

This letter is worth reading twice by every active amateur, especially the warning which we have set in italics. Our thanks to E. W. Farley, W7TE, for sharing his letter with *QST* readers.

GOLDWATER BILL SIGNED BY PRESIDENT

Last month in this department we reported on the House hearings on the Goldwater Bill, S-485, which would allow aliens possessing "first papers" to acquire amateur licenses. The measure was signed by the President on August 10, thus becoming Public Law 92-81.

FCC procedures for handling applications under the new Public Law have not yet been made final. However, the Commission tells us that in the interim, applicants should file both FCC Form 610 and FCC Form 610-A with a \$9.00 filing fee, all addressed to Amateur and Citizens Radio Division, FCC, Washington, DC 20554. We suggest that applicants also attach to the forms a photocopy of their "declaration of intention to become a citizen."

West Virginia observed Amateur Radio Week June 28-July 4, 1971, with highlights including the State ARRL Convention in Jackson's Mill July 3-4 and issuance of a special-events call, W8WVA, by FCC for the period. At the signing: (left to right) W8BDOD; W8BDBH; K8NVF; Governor Arch A. Moore, Jr.; Dorothy Morris; W8JMJ, SCM of West Virginia.



When Cleveland, Ohio, celebrated its 175th anniversary this summer, the Apricot Net provided communications for its downtown festival and parade. Leading the parade was comedian Bob Hope. The Apricot Net's Eunice Bernon, K8ONA, interviewed the celebrity, who appeared interested in the net's public service work. His recorded remarks were later played back on the net.



POLITICAL RULE DENIED

FCC has dismissed a petition for rulemaking, RM-1631, filed May 19, 1970, by Gerald A. Cohen, WA1CYT, of West Hartford, Connecticut, which would have added some paragraphs to amateur regulations specifically permitting political discussions on the air by amateurs. It also called for the Commission to rescind all the warnings and citations issued to amateurs as a result of National Student Information Net activities (May 5 to June 1, 1970). The Commission pointed out that it has no specific rule restricting the nature of amateur communications (except of course its prohibition of profanity and the like). The citations mentioned were for supposed violations of Sections 97.39 and 97.111, use of stations "on behalf of non-amateur organizations" and solicitation of funds respectively, rather than for political activity; in any event, the Notices of Violation had been settled with the licensees involved, the Commission said. Thus, the issues raised by Mr. Cohen are moot.

EXECUTIVE COMMITTEE MINUTES

No. 335

July 30-31, 1971

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Shoreham Motor Hotel, Hartford, Conn., at 9:10 P.M. July 30, 1971. Present: President Robert W. Denniston, WØDX, in the Chair; First Vice President Charles G. Compton, WØBUO; Directors Victor C. Clark, W4KFC, Harry J. Dannals, W2TUK, Noel B. Eaton, VE3CJ, and Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. Assistant General Manager Richard L. Baldwin, W1RU, was also present.

On motion of Mr. Eaton, Life Membership in the League was unanimously GRANTED the following applicants: Carl E. Andersen, K3JYZ; Kenneth E. Anderson, WØETT; Phillip G. Baer, WA9YCZ; Robert C. Barr, WA1MQQ; Donald G. Beattie, W8CFA; Jesse Bieberman, W3KT; Robert D. Blue, Jr., W8NDH; Charles A. Bowers, WA6GZZ; William G. Brinkman, KØUII; Charles P. Crow, WB9CQZ; James M. Carroll, W1UYI; Coy C. Day, K5LMG; Bob P. Denton, WB4FGL; Richard R. Eggleston, WA6KKS; Shelby Ennis, W4WNH/WB8DMD; Donald H. Feld, WA9HJM; Don L. Fox, K5BBM; Judith Kay Fox, WB5AYK; Harry S. Gartsman, W6ATC; Gordon G. Girton, W6NLG; Peter W. Glaser, W6OKG; the Rev. Albert Godlewski, KØZIO; Jim Gordon, WN9GGD; Clarence M. Griffith, W6IZR; Robert J. Gurski, WB2TCN; David O. Guthrie, K4QX; William R. Harmon, W1KPU/CN8ED; George R. Hill, W9TGN; Jack T. Hill, K8YPW; Curt M. Huff, W2FED; Donald R. Hulbert, W6NQZ; Henry Clyde Johnson, W8AMZ; Albert P. Jones, K4GZT; Hans J. Kaufmann, W4GFZ; Donald G. Kiefer, W5QXK; George M. Kindt, WØMKZ; Paul P. Kluwe; William

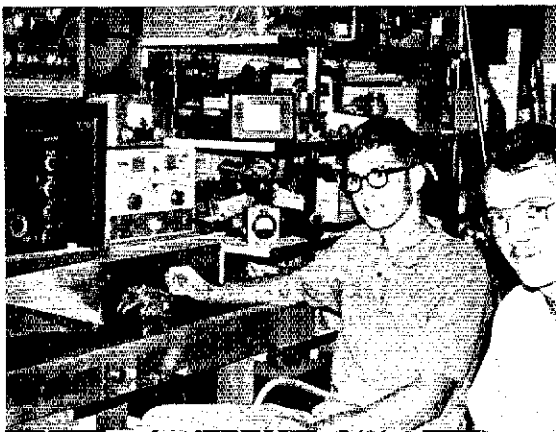
RUDY JEPSON, W6KEI

QST has just learned of the death last November of H. R. Jepson, W6KEI, director from ARRL's Southwestern Division in 1947-1948, first licensed in 1932, Rudy was a past president of both the Valley Radio Society and the San Fernando Valley Radio Club and had been active in Civil Defense. His home, after retirement from Pacific Telephone, was at Lake Isabella, California.

DC EXAM SCHEDULE

FCC has announced changes in the examination schedule at its field office in Washington, D.C. (Room 216, 1919 M Street, N.W.). Commercial radiotelephone tests are now scheduled on Tuesdays and Fridays, 8:30 A.M. to 2:30 P.M.; commercial and amateur code tests Friday 9:00 and 10:30 A.M.; amateur exams without code tests Friday 8:30 A.M. to 2:30 P.M.

A scene at 4-H Radio Operators station K2UOK, Bridgeton, New Jersey — operators are the vice president, Steve Doughty, WN2NTG, left, and the president, Patrick Meehan, WN2NTF, right. The club's founder, teacher and advisor is Robert J. Westcott, W2MAS, in whose home the club meets and has its station. Any other radio clubs in the 4-H program?





The 1971 ARRL *Handbook* won first place in a regional contest sponsored by the Society for Technical Communications and will be automatically a candidate in the national competition to be held in 1972. ARRL Senior Assistant Secretary Perry F. Williams, W1UED, accepts the certificate from John Andrews, Chairman of the Professional Group on Writing and Editing, Boston Chapter STC.

H. Kunzler, W2AVI; Matthew D. Lee, WB6BWZ; Bruce LeMond, WA9CYG; Carl L. Lindberg, W4PH/K4MAA; Clement A. Lios, WA2FGT; Lloyd W. Locke, K1COS; John R. Lucas, K2CPE; William R. Marks, W1AP; Hugh Y. Meetze, W4BSB; William G. Mills, KZ5MM/WA5TMT; Gerald R. Moore, K8AYJ; James F. Nash, W5GNL; William C. Oglesby, Jr., WA5MPA; John J. O'Keefe, Jr., W6ZQY; Joseph T. Olesik, WA1JQA; Stephen Pawlowicz; John B. Power, W2AXU; Harry S. Pyle, K4DPW; Winfield A. Ramsdell, W1FBI/W4LAT; John Rogers, WA6LQO; Morris L. Schmidt, WA8SVL; Richard A. Scott; Leroy D. Smith, Jr., W0QHO; Francis M. Strait, W8LGI; Gerald J. Strein, WA2JOR; Norman Smyth, VE7GS; Alan M. Taylor, W9JZH; Charles M. Waite, WA3JWF; Eugene A. Walter, Jr., W2CP; Wesley G. Weathers, K6OZK; Ronald E. Wyllys, WB9HEQ; Cleyon O. Yowell, WB6EHT; Carl S. Zelich, W1DZA; Marvin C. Zitting, W7MWR/W7OAD.

On motion of Mr. Thurston, affiliation with the League was unanimously GRANTED the following societies: Department of State Amateur Radio Club, Washington, DC; The Durham FM Association, Durham, NC; Edgewood High School Amateur Radio Club, West Covina, CA; Lincoln Amateur Radio Club, Brooklyn, NY; The Mad

River Radio Club, Bellefontaine, OH; Maryland Chapter Telephone Pioneers Radio Club, Baltimore, MD; The Maryland Mobileers Amateur Radio Club, Inc., Hanover, MD; Mitre-Bedford Amateur Radio Club, Bedford, MA; Rochester Amateur Radio Club, Rochester, MN; Sherwood Secondary School Amateur Radio Club, Hamilton, Ontario; Spring Valley Senior High School Amateur Radio Club, Spring Valley, NY; Tatt Amateur Radio Club, Watertown, CT; 3900 Club, Sioux City, IA; Tuscarora Amateur Radio Club, Mercersburg, PA.

In accordance with its assignment from Minute 80 of the 1971 meeting of the Board of Directors, the Committee examined in considerable detail the proposal of the Electronic Industries Association to reassign 220-222 MHz from amateur use to the Citizens Radio Service, and discussed at length additional courses of action.

The Committee recessed at 11:00 P.M., reconvening at 9:15 A.M. July 31, 1971, at the headquarters offices of the League in Newington, Conn., at which time Treasurer Houghton joined the meeting.

The Committee heard and discussed an extensive oral report from President Denniston, plus Messrs. Eaton, Baldwin, and Huntoon, on activities and results during six weeks' representation by IARU of the Amateur Service at the recent World Administrative Radio Conference on Space Telecommunications.

There being no further business, the Committee adjourned at 1:30 P.M.

(During the course of its sessions the Committee discussed, without formal action, the tax status of the League under new rules of the Internal Revenue Service; the new youth film, "This is Ham Radio"; the ARRL directory of repeater stations; filing of officer and director reports under the new schedule of two Board meetings per year; and Hq. representation at League conventions.)

John Huntoon, W1RW
Secretary



The Illinois Amateur of the Year is Elmer P. Frohardt, Jr., W9DY, who here receives the trophy from Ralph King, K9YSH, president of Hamfesters Radio Club at the 37th annual hamfest, Santa Fe Park near Chicago, August 8. Bud has been licensed since 1939; is a member of ARRL's Intruder Watch and Official Observer corps; is president of the Radio Amateur Megacycle Society and past president, Northern Illinois DX Association. (Photo by Jordan Kaplan, W9QKE)

Hamfest Calendar

OCTOBER

1971

S	M	T	W	T	F	S
	3	4	5	6	7	8
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

District of Columbia - The Foundation for Amateur Radio, Inc., an organization consisting of 27 amateur radio clubs located in the greater Washington D.C. area, will hold its Annual Hamfest on Sunday, October 24 from 10 A.M. until 5 P.M. at the Gaithersburg Fairgrounds in nearby Gaithersburg, Maryland, just off Interstate 75.

Illinois - The Chicago ARC First Annual Hamfest and Mini-Auction is Sunday, October 17 at St. Viators Church, 3610 North Kedvale in Chicago. Kedvale is 4100 West in Chicago at Addison Street. Swap and shop area in parking lot. Mini-Auction in school auditorium, Refreshments available in auditorium annex. Donation \$1 in advance, \$1.50 at the gate. For tickets contact Don De Johg, W9KJ, 6158 West Grand Ave., Chicago, IL 60639.

Indiana - The Hoosier Hills Hamfest is Sunday, October 10 at Spring Mill State Park, Mitchell, Ind. Gate and advance registration, \$2. Free coffee and doughnuts. Send your registration and motel reservations to Hoosier Hills Ham Club, P.O. Box 375, Bedford, IN 47421.

Maryland - See District of Columbia.

Michigan - The Monroe County Radio Communication Assn. Hamfest is Sunday, October 10 from 10 A.M. to 4 P.M. at the Monroe County Fairgrounds in Monroe. The fairgrounds are located on M 50, 6 miles west of I 75 or 12 miles east of U.S. 23. Call-in on 146.96 MHz. Tickets are \$1 in advance or \$1.50 at the door. There will be numerous activities including games, feats of physical and verbal endurance, and eating! Write Monroe County Radio Communications Assn., P.O. Box 486, 202 So. Macomb Street, Monroe, MI 48161.

New York - The Chautauqua County FM Repeater Assn. public auction is Saturday, October 16 at 1 P.M., Shore Acres Boat Yard, Old Route 17, on the lake, Bemus Point, New York. Equipment and parts. Write K2DPA, R.D. 1, Box 98, Bemus Point, NY 14712 for more information.

Ontario - The Radio Society of Ontario Convention hosted by the Guelph ARC, is October 22 and 23 at the Holiday Inn, Hespeler, Ontario. For further details contact D. Gore, VE3DGA, or R. Jenning, VE3CAE, Box 342, Guelph, Ontario, Canada.

Pennsylvania - The RAE Annual Hamfest is on Saturday, October 9 at Sara Coyne Restaurant, 44 Peninsula Rd., Erie, from 6 P.M. to 2 P.M. Buffet style dinner starting at 7 P.M., \$4.50 donation per person. Guest speakers and awards. For full information and reservations contact George Dickey, K3VLP, Radio Assn. of Erie, Inc., P.O. Box 844, Erie, PA 16512.

Texas - The 17th Annual Brownfield Free Swapfest, sponsored by W5HPI, Terry County ARC, will be held in the National Guard Armory, Brownfield, on October 24. Army MARS and West Texas VHF Clubs meetings. Doors open at 7 A.M. Catered dutch buffet lunch. Eyeball OSOs, refreshments and entertainment evening of October 23 for early arrivals.

Virginia - See District of Columbia.

QST

COMING A.R.R.L. CONVENTIONS

October 9 - Dakota Division, Sioux Falls, South Dakota

January 22-23 - Southeastern Division, Miami, Florida

March 17-18 - Great Lakes Division, Muskegon, Michigan

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

DAKOTA DIVISION CONVENTION

Sioux Falls, SD

October 9

The 1971 Dakota Division ARRL Convention will be held Saturday, October 9, at the Cataract Motor Inn, Sioux Falls, South Dakota.

A full schedule of events is planned to insure something of interest for everyone. Activities include a hidden transmitter hunt, MARS program, and a session devoted to vhf and repeaters. ARRL Communications Manager George Hart, WINJM, will be on hand for the traffic session, and Hq. staffer Lew McCoy, W1ICP, will give his popular presentations on antennas and for Novices and beginners. Dakota Division Director Larry Shima, W0PAN, will conduct the League Forum, with WINJM, W1ICP, and other ARRL officials sitting in to answer your questions and give you the latest word on League affairs. Famed DXer Gus Browning, W4BPD, will be the featured speaker at the buffet supper.

Registration, which includes all convention activities and the buffet supper, is \$7.50. Room reservations may be made direct to the Cataract Motor Inn. Singles are \$8.75-\$10.50 and doubles \$12.75-\$15.00.

QST

IARU News

(Continued from page 85)

societies had not been successful in convincing their authorities - either through lack of effectiveness or through lack of any effort at all.

The needs of the amateur service at international conferences go beyond having a mere favorable attitude toward amateur radio from administrations. It is important that they understand in detail the desires of the amateur service, and be prepared to support proposals favorable to amateurs.

Evaluation by IARU Headquarters of conference results indicates a positive correlation between amateur contact with the licensing authorities and their attitude toward amateur radio. Conversely, in cases where contact is minimal, the official attitude toward amateur radio wanes. The space conference further indicated that the quality of this contact is an equally important factor.

QST

Use your Zip code when writing ARRL.



Correspondence From Members -

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

SPEAKING UP

● I must respond to W1KGR's letter in August *QST* by saying that the "quibbler" is a great asset to this fraternity. Without the individual who questions the decisions or indecisions of others, there would be little or no progress. It is this "quibbler" who has so often stimulated creative thought and experiment. Many of the problems we face today within amateur radio and elsewhere are the result of those who have ideas, right or wrong, remaining quiet.

The cure for this apathy is carefully thought-out response to whatever stirs your interest no matter how trivial — not in keeping quiet and being satisfied with a less-than-perfect status quo. — *Thomas M. Gooding, K4LHB, Fairfax, VA*

● I have read much criticism of the League and feel I should voice my opinion. If all the people who complain took time to think out their dislikes and present them to the League instead of complaining and offering no solutions, all could benefit. — *T. Kent Phillips, WB8HWO, Lancaster, OH*

● The letter from WR2JDM in August Correspondence has set me off. Add the one from W8OJI and W2QOB's in the June issue. In effect these hams are saying, "If you don't play my way, I'll take my marbles and go home." People who refuse to join ARRL have no right to complain that the League doesn't represent them.

In this vein, I cite the letter from WA0VBX (August): "I have not been for everything the ARRL has done, but when I didn't agree, I kept my mouth shut." *Au contraire!* When I disagree, I let the League know (as Hq, my director, and my SCM can surely testify). This is, I believe, a privilege and duty in an open society.

At such time as I feel that my director or SCM deviates excessively from what I believe to be the best interests of hamdom, I shall campaign against them. Until then, I shall support them.

I disagree with the League's position on Docket 19162. I filed my own comment with the FCC (copy to my director). I don't know what the League will say on Docket 19245. I have already filed my comment with the FCC (copy to my director). I disagree with the complainants about "trivia" in *QST*, but their opinions are valid and should be considered in formulating *QST* editorial policy.

I could go on and on, but there are sufficient examples.

In short: If you don't like the ARRL, join it! Then take active part in League politics and help modify it to what you think it should be. Of course, there may be some opposition and disagreement. If you are such that this will hurt your feelings, go back and crawl under your bed — but don't complain about the League's failure to represent you! — *Michael J. Keenan, WA2VLS, Chappaqua, NY*

● ARRL is doing FB. Many of those who criticize do not take the time to understand

organizational structure and procedures through their field representatives. Perhaps *QST* should run a few elementary articles on these topics. — *Francis S. Dunn, W8DTR, Vaudain, OH*

● Thank you for all the code practice I got from W1AW. Without it I never could have got my license as VE1APH. Please accept my encouragement for the ham-oriented works you do and also my vote in favour of an increase in membership dues soon. *QST* alone is worth much more than members presently pay. — *Peter Payzant, VE1APH, Dartmouth, N.S., Canada*

PHILLIPS CODE

● "KGNS" and amen to the piece by WA6HDX, "Phillips Who?" in August *QST*. Here is hoping that we begin to hear more real Phillips Code and less simplified phonetic spelling.

Phillips code is as authentic as the dictionary, forged out in the heat of high speed accurate telegraphy which had to be received and recorded letter perfect. The receiving operator was allowed about one BK per shift.

To the newer hams who have not had the actual experience of using Phillips code there will be opened a great number of abbreviations without actually having to learn or remember them all, such as RJ, reject; RJD, rejected; RJG, rejecting; RJN, rejection. OJ, object; OJG, objecting; OJD, objected; OJN, objection; etc.

Think of it for a moment — 18,000 words per trick, 35 wpm all day long, including interruptions, actual word count, not five letters to the word. All was received letter perfect, news, box scores, stock market quotations — everything in the newspaper.

The operators who could do this were not supermen. They were just first class telegraphers who knew and had pride in their trade. We hams can do a lot better than we are now doing. — *Ralph W. Johnson, W6PMH, Saint Helena, CA*

● I hope not too many hams start using WA6HDX's shorthand. After all, radio is a hobby to most of us. I don't think we need to send maximum information in minimum time to enjoy it. To me, a person who spends all his time working trying to figure out what the other fellow sent is not having fun. It is bad enough trying to copy with all the junk that comes through with his signal without needing an interpreter to let you know what he said. Let's see some straight words for a change. How about some of those old timers who told me to stick with cw making it a bit easier on us new kids. I can copy twenty and am going to get my Extra when the two years are up, but I have trouble with fifteen when you throw in the QRM and QRN. I like cw but feel that I am going to be driven out and on to the phone bands. — *Bob Gearhart, WB8HCL, Lincoln Park, MI*

OVER EMPHASIS?

● Your constant emphasis on building everything is a bit much. As a medical student and in the

future as a physician, my time must be consumed, as the code in your *Handbook* states, by my profession and family. One gets the impression from reading your publications that everyone who does not build his entire station is a complete waste. This I feel is erroneous. The important aspect is to derive as much fun and personal satisfaction from your hobby in the way that suits you and is, of course, legal and good for the good of your friends who enjoy the same hobby. — *Jeffrey Lance Elliott, Prairie Village, KS*

[EDITOR'S NOTE: nowhere have we said a ham should build "everything." Many times we have said, and repeated, a ham should build at least something among his station gear.]

NOVICE VXOs

● It was with considerable disappointment that I read in July *QST* of the FCC ruling regarding the use of variable crystal oscillators by Novice Class licensees. I think the ruling is unfortunate in that it sets an undesirable precedent that will not act in the best interests of the Amateur Radio Service and the public interest in general.

It is stated that such operation is to be permitted only with factory built equipment whose frequency control section carries a warning against "unauthorized tampering." This marks the first occasion, to my knowledge, that the Commission has made distinction, in regulatory matters concerning amateurs, between homebrew and commercially built equipment. Furthermore, this ruling raises a host of other questions with regard to the definitions of "factory-built" and "unauthorized tampering."

Equipment made for the Amateur Service is not type approved in any way by FCC, and hence there is no control over manufacturers of this equipment. While much of this gear is built by firms respected for their products, some is produced by persons whose competence is no greater than that of the average licensee. The latter products are generally quite acceptable, but sometimes the difference between homebrew and manufactured equipment is that several amateurs choose to call themselves a company. Thus the ruling seems unfairly discriminatory against those who would choose to construct their own equipment.

I find myself confused as well in deciding what is meant by "unauthorized tampering." Who is to be authorized to modify amateur equipment? Extra Class licensees only? General Class and higher? Holders of Second Class Radiotelephone licenses? There is no sufficiently correct answer to this question unless we are to change the present structure of the Amateur Radio Service as a means of encouraging experimentation with radio and electronics. I am sure this is not the Commission's intent. I see no reason to stray from the interpretation that what the amateur does with his equipment is purely his concern, as long as his station is constructed according to good engineering practice, and the signal he transmits on the air is consistent with the regulations.

In the case of Novice operators and variable crystal oscillators, I think the rules are quite clear. The transmitter must be crystal controlled, and changing the load capacitance on the crystal does not alter the fact that the crystal is the frequency determining element of the transmitter. Clearly, if the circuit is improperly modified or adjusted, the licensee may violate the rules concerning purity and stability of emissions or operate outside of amateur bands, but the point is that these conditions are adequately covered by other regulations.

To rule either that Novices may use variable crystal oscillators as long as they observe all other regulations, or that they may not use them at all, would be consistent with long-held policy concerning construction of amateur equipment, although I think the former opinion is more reasonable, as explained above. Neither of these two choices, however, sets new and dangerous precedent pointing towards eventual type approval of amateur equipment, as this new ruling seems to do.

I hope that this interpretation of the regulations regarding restrictions on transmitters used by Novice Class operators will be reconsidered. — *Richard L. Gelber, WB2WOI/WA INLT, New York, NY*

● I read in July *QST* that Novices may now operate transmitters with variable crystal oscillators. With the way the announcement was worded I think maybe we ought to turn this one back to the FCC. This could be setting a precedent for type-accepted equipment which would be a blow to Amateur Radio! I don't think I have to explain my reasons to you on this subject as I am sure you have the same fears. Please watch for any developments on this subject and keep us informed because I am afraid we have trouble brewing. — *Charles J. Collingwood, WB9BUV, Indianapolis, IN*

THE HANDBOOK UNDERGROUND

● The ARRL has won recognition in another field of our society. In Abbie Hoffman's book, *Steal this Book*, the chapter about guerrilla broadcasting says, "One of the best sources of information on both television and radio broadcasting is the *Radio Amateur's Handbook*, published by the ARRL. . . the *Handbook* gives a complete course in electronics and the latest information on all techniques and equipment related to broadcasting." — *Doug Pongrance, WA3JBN, Lower Burrell, PA*

LASER CONTACT

● In July, *QST* (Schrader, page 93), a claim was made in regards to the first amateur laser contact. I tend to disagree. In 1969, at St. Peter's College, Jersey City, N.J., the college club station, W2GTF, and I, in conjunction with the physics department established cw communications via a helium-argon laser with an output of 1 milliwatt. We did not, however, have the facilities to conduct A3 communications.

Our experiment was conducted in daylight over a distance of better than 1000 feet.

Our initial thoughts upon conclusion of the experiment were: fm modulation would be more beneficial for serious communications; laser communication is the most QRM free form of communication that can be devised and may prove to be the most reliable since propagation conditions as such do not exist except for rain, etc.

Upon discharge from the service next year, I will attend Stevens Institute for my masters in physics and hope to pursue this aspect of communications further. — *Joseph Boniakowski, WB2MIC/KG4EY, FPO, NY*

LONG DISTANCE PATCHES

● I would like to make it known that we KA2s would have a devil of a time trying to place a call to New York or New Jersey for a patch as many Stateside fellows request. Furthermore, I don't think the receiving party would appreciate the "savings"! — *Sgt. Duane A. Calvin, KA2AH/WB2HDS, APO, San Francisco*

ARRL QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

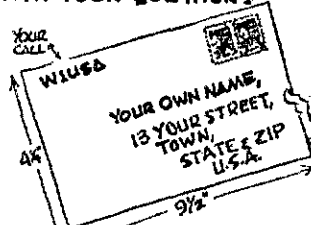
- W1, K1, WA1, WN1¹ - Hampden County Radio Association, Box 716, Forest Park Station, Springfield, MA 01108.
 W2, K2, WA2, WB2, WN2 - North Jersey DX Assn. P.O. Box 505, Ridgewood, NJ 07451.
 W3, K3, WA3, WN3 - Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
 W4, K4 - WA4, WB4, WN4¹ - J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.
 W5, K5, WA5, WB5, WN5 - Kenneth F. Isbell, W5QMJ, 306 Kesterfield Blvd., Enid, OK 73701.
 W6, K6, WA6, WB6, WN6¹ - No. California DX Club, Box 11, Los Altos, CA 94022.
 W7, K7, WA7, WN7 - Willamette Valley DX Club, Inc., P.O. Box 555, Portland, OR 97207.
 W8, K8, WA8, WB8, WN8¹ - Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
 W9, K9, WA9, WB9, WN9 - Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
 W0¹ - Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, IA 50169.
 WA0¹ - Lloyd Harvey, W0QGI, P.O. Box 7, Attica, IA 50024.
 K0, WB0, WN0¹ - Dr. Phillip D. Rowley, K0ZFJ, Route 1, Box 455, Alamosa, CO 81101.
 KP4 - Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.
 KZ5 - Canal Zone Amateur Radio Association, Box 407, Balboa, CZ.
 KH6, WH6 - John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.
 KL7, WL7 - Alaska QSL Bureau, Star Route C, Wasilla, AK 99687.
 VE1 - L. J. Fader, VE1FO, P.O. Box 663, Halifax, NS.
 VE2 - John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, PQ.
 VE3 - R. H. Buckley, VE3UW, 20 Almont Road, Downview, ON.
 VE4 - D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, MB.
 VE5 - A. Lloyd Jones, VE5H, 2328 Grant Road, Regina, SK.
 VE6 - Karel Tettelar, VE6AAV, Sub. Po 55, N. Edmonton, AB.
 VE7 - H. R. Hough, VE7HR, 1291 Simon Road, Victoria, BC.
 VE8 - George T. Kundo, c/o Ministry of Transport, Norman Wells, NT.
 VO1 - Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.
 VO2 - Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.
 SWL - Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

¹ These bureaus prefer 5 x 8 inch or No. 50 manila envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the June and December issues of QST.

Note: First Class mail in the U.S. is now 8¢ an ounce. QSL Bureau users should send their manager enough two-cent stamps to cover the envelopes on file.

IS YOURS ON FILE WITH YOUR QSL MGR?



Silent Keys

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

- ex-IATV, Hyman Cohen, New Haven, CT
 K1KTC, Ronald L. Vaccaro, Revere, MA
 W2AO, Millard F. Bennett, Millville, NJ
 W2ACWE, Ruth M. Dargue, Holmdel, NJ
 W2DGT, Robert B. Covey, Kendall Park, NJ
 K2KMD, Merle B. Thompson, Sr., Vineland, NJ
 WB2NDS, Michael T. Theodorou, Brooklyn, NY
 K2IT, Rudolf G. Hils, Kenmore, NY
 WB2PDY, William J. Gordon, Farmingdale, NJ
 W2ZGU, John W. Campbell, Jr., Mountainside, NJ
 W3ADZ, Joseph A. O'Donnell, Philadelphia, PA
 W3CEO, A. W. McAuley, Oakmont, PA
 K3HHK, Robert B. Dier, Verona, PA
 W3KSI, Richard S. Johnstone, Pittsburgh, PA
 W3KSR, Clyde H. Grossarh, Pittsburgh, PA
 W3QOZ, Edgar J. Kohr, York, PA
 K3TVQ, Reuben H. Meisel, Arnold, MD
 W3YN, Regis F. Fennessy, Pittsburgh, PA
 K4BXV, E. Alton Akes, Savannah, TN
 W4CNO, Roderick G. "Bud" Stevens, Ft. Lauderdale, FL
 K4DVF, Marshall E. Fabian, Elon College, NC
 W4HKK, James D. Grimes, Memphis, TN
 K4IS, M. Howard Osborn, Ormond Beach, FL
 W4JSU, Charles A. Jennings, Charlotte, NC
 W4KHR, Fred L. Keisling, Burlington, NC
 W4NTW, Capt. Julien J. Edgerly, USNR, Asheville, NC
 W4OYG, Emmett "Gh" Karnes, Louisville, KY
 WA4VYQ, Alfred R. Weismantel, Seminole, Largo, FL
 W5N1H, Harry J. Desposito, Conroe, TX
 W5ZON, Waverley Ford Coates, Ft. Stockton, TX
 K4IS, M. Nicholas, Ivanhoe, CA
 W6EEF, Herbert E. Blasier, Pasadena, CA
 W6KST, The Rev. J. Brian Reid, Pacoima, CA
 W6FRU, John M. S. Hutchinson, Newport Beach, CA
 K6HDJ, Joseph A. Gargan, Rancho Cordova, CA
 WB6HTM, David M. Lombardi, Van Nuys, CA
 WA6JWH, Eddie R. Freed, Rialto, CA
 W6OQC, Harold "Steve" Stephenson, Venice, CA
 W6QKT, Ernest A. Beard, Cayucos, CA
 W6RJJ, Hugh M. Spencer, Monrovia, CA
 K6SC, Eugene B. Bunker, Fair Oaks, CA
 K6TFR, Donovan A. Dutton, Carmichael, CA
 W6WX, David P. Baker, Menlo Park, CA
 K6ZWY, Robert A. Meyers, Saugus, CA
 K7KLE, George M. Vuylsteke, Sheridan, WY
 W7MTX, Ivan H. Cook, Tacoma, WA
 K7WKU, Charles H. Yack, Olympia, WA
 K8AMF, Kenneth R. Troyer, Hamilton, OH
 W8DXL, Vaiano W. Gustafson, Tawas City, MI
 W8GOZ, Harold E. Richards, Freeland, MI
 W8HR, Clarence R. Roy, Canton, OH
 W8KJP, Dr. Charles S. McElroy, Wellsburg, WV
 W8MJJ, Harry J. Cunningham, Weirton, WV
 W8MMG, William L. Monkhouse, Lake George, MI
 K8NNE, Nelson L. Henderson, Princeton, WV
 WA8QIK, James L. Martin, Sr., Columbus, OH
 K8VRF, Thomas L. Perron, Ontonagon, MI
 K8ZFR, Joseph J. Guzowski, Cleveland, OH
 WA9BHG, Paul R. Lawrence, Terre Haute, IN
 W9HFL, Kenneth J. Howe, Rochester, WI
 K9JBG, Roy J. Albert, Monticello, IL
 W9WPB, Earl Masterson, East St. Louis, IL
 W0BQO, Willard C. Wright, Denver, CO
 W0DMT, Tyre D. Magruder, Higbee, MO
 W0EEG, Cecil S. Long, Garrison, IA
 W0HGY, Reidar Gilbertsen, New Effington, SD
 W0VAU, Dick H. Caldwell, Audubon, IA
 W0VCB, James L. Grant, Clifton, CO
 WA0WRJ, Kenneth H. Fry, Colorado Springs, CO

The Post Office Department promises faster mail service with Zip codes. Use Zip codes.

The World Above 50 Mc.

129-1340 2300-2450 3300-3700 5650-5925 10,000-10,500 21,000-22,000 50,000-9

CONDUCTED BY BILL SMITH,* KØCER

1296 Moonbounce in Europe

DURING 1971 the shift in moonbounce activity has been toward 1296 MHz, where two European stations are interesting catches for US 1296 moonbounce buffs. They are operated by Hans Lohman Rasmussen, OZ9CR, of Odense, Denmark, and Peter Blair, G3LTF, who has been active on the EME scene for several years. At last report, OZ9CR was debugging a transistor preamplifier. When that is completed, Hans will be ready for his first two-way work.

Successful transmission tests were made June 29 and 30 from OZ9CR to W3KE near Silver Spring, Maryland, which proved the capability of the OZ9CR transmitting system. On the 30th, OZ9CR was heard at G3LTF. The tests were also monitored by the Crawford Hill VHF Club, W2NFA, and by W9WCD, DeKalb, Illinois. Weather and related antenna tracking problems apparently prevented OZ9CR from being heard at these stations. During the tests, W3KE, assisted by W3BLC, happened across the robust signal of W2NFA, apparently in two-way contact with G3LTF. The English station was heard weakly. (Tropo scatter between W2NFA and W3KE?)

W3KE has access to a 150-foot dish, and the W2NFA group uses a 60-footer. We have previously discussed amateur use of large antennas built for other purposes. Certainly operators so blessed have a decided edge, but their work is very beneficial, providing systems of known capability for testing of all-amateur stations.

According to W3KE, Hans, like W9WCD, is another of the "do-it-yourself" clan. He built his entire system, including a 26-foot dish and 360-watt amplifier, with technical advice from the W2NFA group, and *QST* articles. Such assistance was also given George Komadina, W9WCD, who several months ago completed his first 1296 EME contact. George has now worked G3LTF at least twice, July 14 and 18. G3LTF uses a 15-foot dish. George says his biggest problem is tracking the moon with his 16-foot homebuilt dish. Like previous problems at W9WCD, this will undoubtedly soon be corrected. W9WCD runs a kilowatt input to an 8-tube ring amplifier using 2C39s. George is looking for tropo and moonbounce schedules. For tropo work, W9WCD has a 7-foot

dish, 50 feet in the air. While using his EME dish, he has heard W9JIY 225 miles away, on aircraft scatter. There are interesting happenings on 1296. Will the first long-haul 1296 tropo contact be made this fall?

Occasionally we are criticized for placing too much emphasis on the more exotic aspects of the vhf scene. Some say this tends to discourage amateurs having more modest interests and stations from reporting their activities. This is not intentional on the part of this writer. Our purpose is to document these activities, as was done during the discovery of tropo, sporadic E and aurora in the 1930s, and similar vhf milestones since. We are interested in what each of you is doing and every report is welcome.

Fall Tropo Starts Early

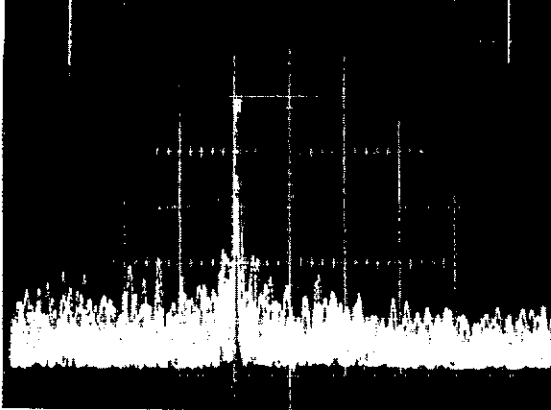
Stable weather patterns of early fall occasionally produce air-mass boundaries of extraordinary geographical extent. This year they came early, and with a vengeance, coincidentally with the arrival off the Atlantic Coast States of the first major tropical storm of the 1971 hurricane season. Abnormally strong signals were in evidence from the night of Aug. 15 on. By the morning of the 17th, many 144-MHz contacts had been made out to 1300 miles or more, and a new overland record for 432 MHz was set.

K1HTV, Meriden, Ct. reports that WØs were working east as far as Western New York and adjacent VEs, Sunday night, Aug. 15. The next morning, Rich worked W8YIO, Manchester, Mich., on 144, and heard him on 432, but the real bonanza started Monday night. K1HTV's 144-MHz contacts, with times in GMT (Aug. 16) follow: K8CTM, 0204; W8YIO, 0221; W9SUV, Arcola, Ill., 0516; WØALS, Girard, Kansas, 0529; WØNEN, Belton, Mo., 0602; WB8GIW, Fairborn, Ohio, 0630; KØMQS, Delta, Iowa, 0645; WA9DOT, Grafton, Wis., 0705; and W5UGO, Sand Springs, Okla., 0852.

* Send reports and correspondence to Bill Smith, KØCER, ARRL, 225 Main St., Newington, CT 06111.

Hans Lohman Rasmussen, OZ9CR, of Odense, Denmark, is one of two European amateurs now active on 1296-MHz moonbounce. The second is England's G3LTF. (photo via W3KE)





This is a scope display of the 1296-MHz moonbounce signal of OZ9CR as received at W3KE. The spike is the signal and the solid grass is background noise.

Only very small areas at a time were hearing the extreme DX. While K1HTV was working W5UGO, WA1FFO in East Hartford, less than 20 miles to the northeast, could not hear him. Later, WA1FFO worked W5UGO, and the 5 was not audible in Meriden. Stations within normal operating range southwest of the Hartford area were unable to hear the 5s, though they are 100 miles or so nearer to them.

As with other exceptional vhf DX periods of a tropospheric nature (see "A Night to Remember," January, 1970, *QST*) this DX appears to have resulted from a double inversion; one layer close to the ground and another at 7000 to 10,000 feet or so. A long northward-curving frontal area lying along an east-east line apparently accounts for the remarkable geographical selectivity of the propagation, at any given moment of observation. Our thanks to K1HTV and the Travellers Weather Service for help in understanding these situations.

New 432 Overland Record

K1PXE, Milford, Ct., had been in on the doings reported above, and had been working out well on 432. He finally called it quits at about 3 A.M. eastern time, but was back on a few hours later to check the band. Hearing nothing interesting, he put his 432 CQ tape on for a short time at about 8 A.M. (1200 GMT). When he stopped to listen, W2AZL was calling to tell him that WØDRL, Topeka, Kansas, had been calling him. In a short time they were in contact, for a new overland record for 432, about 1230 miles. K1PXE and WØDRL worked again around 10 A.M. (EDT), and observations indicate that conditions remained

extremely good throughout that day. More details next month, and hopefully more DX, as well.

Late report via Conductor KØCER - Bob Cooper, W5KHT, has a photo of the sign-on slide of Boston's Channel 34, for that same morning. Nearly 1500 miles on uhf TV! - *WIHDQ*

St. Pierre DXpedition Pays Off

For years, Rich K2OJD, has been travelling to St. Pierre, a small French island possession off the coast of Newfoundland. As FP8CA he is well known to the hf DX fraternity. The call was changed to FPØCA some years back, and Rich has been giving a major part of his expedition time recently to 144-MHz skeds, with only fragmentary results, 'til now.

The 1971 expedition was timed for the Perseids meteor shower - a smart move, as can be seen from the FPØCA 144-MHz results, below:

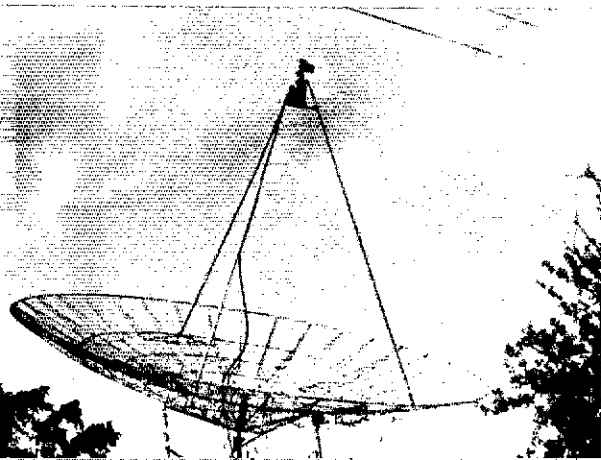
8/6 - K1HTV, 1124 GMT; 8/9 - W1JSM, 0950, and W2AZL, 1307; 8/10 - VE2DFO, 1225, and W2UK (remember him? - eastern end of the first 144-MHz ms QSO in history, with W4HHK, in 1953) 1258; 8/11 - K1ABR, 1135, K1PXE, 1345, K2RTH and W2AZL, 1402; 8/12 - W1YTW, 1010, W1EUI, 1128, W1AAL, 1223.

FPØCA was on 50 MHz part of the time, working K1KN on the 5th, at 0330; K2MUB on the 10th, at 2052; and on the 11th, WA1MS, 0330; K1MTJ, 0400; VE3BYG, 0401, and K1RON, 0405.

More good news: Rich is obtaining a permanent location at St. Pierre, in a better spot for vhf DX than the hotel, used up to now. Equipment and antennas will be left ready for use, cutting down the time required to set up and dismantle for each trip. He will make another trip this fall, and is definitely scheduling one in the latter part of June, 1972. This will be timed for best use of the 50-MHz band, though skeds will be taken for 144, as well. Random-meteor or shower skeds will be kept on either band. Ionospheric scatter skeds on 6 will be maintained through the mornings, as desired. Actual dates of available time at St. Pierre will be given in these pages, whenever possible. - *WIHDQ*

OVS and Operating News

50-MHz sporadic E during July and at least through early August reached unexpected high levels of activity. *WIHDQ* questions whether summer 1971 can be considered a poor E season, as earlier speculated, even though the season was slow to begin during May and June. WA1DFL, Mass., calls July "fantastic" and then reports several days of multihop to W7 and VE. Steve also noted aurora on the 21st. WB2LA1/1, R.I., reports frequent E openings during July, including a strong multihop opening to Southern California on the 10th. WB2JMM, N.J., worked two Washington stations on the 11th, bringing him to 37 states on



Pointed skyward, this is the 26-foot dish at OZ9CR. The dish was built entirely by Hans and is shown with the 1296-MHz feed horn in place. (photo via W3KE)

50 MHz. WB4KGW, Pensacola, found *E* good to New England and the midwest on numerous July days and WA5HMK, Texas, says "six very active down here." Joe caught several multihop openings including the 31st when he worked VE7ANP, Vancouver. W5K1DM, Miss., reports many single-hop openings and multihop on the 5th and 25th when he worked Washington stations.

W5ETG requests information on the coverage area of the San Antonio repeater, 52.88 in and 52.525 out. Anyone using or observing this repeater regularly is asked to contact the San Antonio Repeater Organization, P.O. Box 1753, San Antonio, TX 78206.

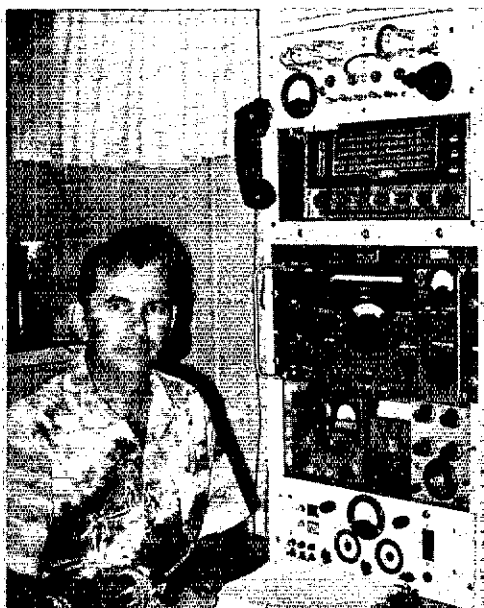
K7ICW, Nevada, says multihop was more frequent during July than at any other time since he began operating in 1959. Al noted multihop on eight days, and the band was open to somewhere 25 days during the month. The only states Al didn't hear during July were Delaware, Mississippi, South Carolina, and Hawaii. The July 10th opening to W1s was the best to New England he has ever heard. K7ZOK, also of Las Vegas, needs only New Hampshire for his 50-MHz WAS having worked KL7GFB on the 11th. Hal is close to being the first to make 50-MHz WAS under two calls. He did it as W0FKY, Grand Junction, Colo., years ago. W0AAM, Iowa, caught several openings and had many good contacts, while running only 5 watts, a.m. W0PPP, Iowa, says July was productive, listing contacts throughout the country on nine days. Since May, WA0VJF, Kans., has worked 32 states and heard nine more. Jon says he is surprised by how rare Kansas apparently is on 50 MHz. They're all rare until you've worked them, Jon! And there's a new crop of state-hunters every year!

Pat, WA5IYX/0, now working at the Institute for Telecommunication Sciences at Boulder, Colorado, says, "I'm nearly astounded at all the late July and August *E*." Pat is finding Colorado contacts popular and has his station at a 30-acre antenna field site northeast of Boulder. His better July days were the 25th, 490 minutes of observed 50-MHz *E*; the 28th, 410 minutes; the 30th, 595 minutes and an muf peak at 102 MHz; and the 31st, with 440 minutes. There were signals from all over the US in Boulder August 11, including multihop to Maine and Connecticut and the muf through channel 6, from Texas. On the 12th, during the Perseid meteor shower, Pat observed bursts on TV channel 4, some of which lasted 3 to 5 minutes.

Bill Derby, WA5IOD, operating as KX6HK, in the Marshall Islands, began airing a 50.11 beacon in September. The times of operation are (all GMT) 0530-0930 Tuesday through Saturday, 0100-0930 Sunday, and 0000-0930 Monday. A series of Vs followed the call sign, KX6HK, indicates no operator present, but a CQ tape is used when an operator is present. The receiver tunes 50.1 to 50.2 and calls will be answered on the 50.11 beacon frequency. Bill has been active since February, 1969, and has worked Australia, Korea, Hawaii, Western Samoa, Cook Island, and many JAs.

Also from the far Pacific, Ray Clark, KR6RI, reports working Japan on numerous July days, as well as HL9WI and HM1BB, Korea. The better days were July 10, 11, 17, 20, 21, 24, and 29. Ray says HL9WI and KI7HAM, Alaska, heard each other for a few seconds on July 16 but were unable to complete a contact.

144-MHz DXers paid special attention to the August 10-12 Perseid meteor shower. From early reports, the shower appears to have been good.



KX6HK operates a 50.11 beacon from the Marshall Islands with this equipment. From top to bottom, preamplifiers, converters for 50 and 144 MHz; spare receiver; Collins 51J4 receiver; 70-watt a-m and cw transmitter, vfo and ssb 70-watt rig; control panel for transmitter and tape recorders; tape recorder and power supplies.

From the Twin Cities of Minnesota, W0LER reports that W0RLI worked five new states, from New England to Montana, bringing his total to 30. W0LCN worked Texas and Rhode Island while W0MJS was working Texas and VE2DFO.

Elsewhere, K4GGI/1 at W1MX says there was good tropo July 4, 5, 23, and 24 and an afternoon aurora on the 21st which caught many operators unaware. Those needing Rhode Island on 2 meters should listen for WB2ALI/1 around 145.2. On July 5, Bill heard tropo signals up and down the Atlantic seaboard from North Carolina to Maine and west into Pennsylvania. K2RPZ, on Long Island, worked three Massachusetts stations on an August 2 tropo, while running less than 2 watts! Stu saw a snow-free picture from WGAN, channel 13, Portland, Maine, the same evening. WA2UDT, N.J., reports the July tropo openings and has been building receiver equipment.

K5BXG, Tulsa, after 16 years of low-band DXing has come up to 144 MHz with 500 watts and stacked 11-element Yagis. Welcome to vhf Charlie. You'll like it and you have good 2-meter company in Oklahoma. WA8NBD, Mich., was off 2 meters for a period during the summer while rebuilding his entire station. WA9QZE, near Chicago, reports good tropo July 3, 7, 8, and 9. Al would like to try meteor scatter and seeks schedules. W0AAM, Iowa, says tropo on 146.94 fm July 6, 8, and 9 was good throughout the midwest. From a location 120 miles north of Toronto, VE3ACL tries his hand on 144 with 25 watts of a-m and a 20-element collinear. Future plans call for an amplifier and 80 elements.

(Continued on page 107)

YL news and Views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

How Do I Look?

THE LAST question that we ask ourselves before we leave our room is "How do I look?" We assure ourselves that the clothes we have chosen are becoming, our make-up correct, the accessories all matching. We arrange our hair for the last time, and then we stand in front of the mirror for a final critical check and ask the question. In the sixty years since the calls FN and OHK introduced amateur radio's first ladies, the YL look has changed with the times for, as Spenser put it, "Times do change and move continually." As the amateur service branched out into more and varied activities, the ladies moved with it until there are now very few phases that do not have a YL working somewhere.

What would Olive Heartberg and Miss Glass see if they were looking at the YL picture in 1971? They'd see homemakers and teenagers, teachers, doctors, nurses, attorneys, and women in religious work. They'd see women whom they would recognize from television productions, as well as secretaries, military personnel, artists, musicians, and government employees, for these are the women who are the YL operators of today.

These gals would find that the YLs were operating cw and phone, sitting at the keyboards of the RTTY set-ups, or literally enjoying an "eyeball QSO" by the means of amateur TV operation. And they would nod understandingly as they saw the many gals who build and troubleshoot their own equipment, because back in 1910 that was the only way to get on the air; but they'd probably wish a little wistfully that they could have had such attractive stations and compact equipment.

Amateur radio's two first ladies would also see that the door that they had opened in the days before government licensing has admitted some 10,000 women amateurs in the United States to bridge that 3000-mile gap between their stations in New York City and San Jose, California; that there were over 400 more in Canada; and that, further, there were very few countries in the world that did not have YL operators.

They would see us operating with crisp efficiency in contests for all amateurs, as well as the ones designed for YL participation only. Or they would find others busily hunting some state or county or country, or even a single contact to complete the requirements for a certificate; handling traffic nightly in the public service nets; working sked after sked to help families keep the

personal touch with their loved ones half a world away; tracking a satellite that would be to them something right out of Jules Verne, or in a casual chat with a DX country. And they would be fascinated with our nets, our clubs, and the plans each year for women's activities in the many hamfests and conventions.

What is the 1971 YL picture? It is one of women operators who utilize our interest in the activity as more than a selfish pleasure. It is our on-the-air assistance of a beginner who is struggling to bring the code speed up until our logs look like a one-track mind for a while. It is our participation in an international good will program, that is a person-to-person contact with the neighboring countries, and it is also the YLRL "Adoptec" program that enables DX women operators to become a part of this world-wide organization more easily. It is working with the handicapped, as well as making our YL publications available to blind women operators.

It's been a long time since Olive Heartberg and Miss Glass pushed the big keys and smelled the ozone in the shack in the "brute force" days of wireless, but the women operators who have followed them have, as have YLs of all time, kept up with the fashions of the day, and in 1971, the picture is of a very up-to-date lady with an eye on the ever-advancing state of the art and quite prepared to keep in style.



Looking for the Canary Islands? E8BGZ, Christina, is quite active in the YL nets and always on the lookout for other YLs to widen her friendships on the air. (K7UBC photo)

* YL Editor, QST. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, CA 91001.

Jeanne Hamilton, WN6JSB, a victim of rheumatoid arthritis for the past 24 years, is finding new worlds to travel through her on-the-air activity.

PROCLAMATION
STATE of NEW YORK
Executive Chamber

The members of the Young Ladies' Radio League make important contributions for friendship and harmony among widely separated people. They are constantly expanding the channels of communication between individuals all over the world, as they contact members in other countries via shortwave radio.

The YLRL, as it is known in the International Morse Code, makes radio tapes for the blind, provides operators in times of emergency, helps servicemen talk to their families via a voluntary wireless network, holds competitions that increase radio knowledge and skills, and sponsors girls in many countries who want to participate in electronic communication.

The State of New York is proud of our members in the YLRL, and especially pleased that this year, for the first time, the League's president is from our state.

NOW, THEREFORE, I Nelson A. Rockefeller, Governor of the State of New York, do hereby proclaim the week of November 1-7, 1971, as **YOUNG LADIES' RADIO LEAGUE WEEK** in New York State.

GIVEN under my hand and the Privy Seal of the State at the Capitol in the City of Albany this twenty-third day of July in the year of our Lord one thousand nine hundred and seventy one.

Nelson A. Rockefeller.

"YL News and Views" is very proud to be able to report the news of this honor to the oldest of all world-wide organizations of women amateur radio operators.

This recognition should add a special significance to the participation in the YLRL Anniversary Party in 1971.

YLRL Tape Topics

"Tape Topics" is the project by which the publication *YL Harmonics* is read onto magnetic tape for the convenience of blind women amateur radio operators and is available to all sightless YLs. These tapes include the current issue of *YL Harmonics*, and other information regarding the activities of women in amateur radio.

Jan Fontana, WB2JCE, YLRL President, advises that those who are interested in receiving these tapes should contact the Tape Topics Librarian in the area in which they live. The Eastern Librarian is Dot Baumgardner, WA8IJW, 20470 Lorain Road, Fairview Park, OH 44126. The Western Librarian is Raj Rendsland, K7NZO, Star Route 1, Box 270, Tahuya, WA 98588.

At present this service is available to stateside blind YLs, but WB2JCE is investigating the possibility of extending it to those Canadian women who may be interested. Because of the time delay in mailing, as well as the problem of the language barrier, there is no such service contemplated for DX YLs.

Helena, YV5CKR, is quite active on the YL Nets as well as in the sideband system. (Photo courtesy K7URC)



YL Wireless Pioneer

"YL News and Views" of June, 1971, *QST*, erred in reporting that Esther Given, W6BDE, was the first YL to become a member of SOWP. Elsie Hermanson, W4CQL, was, according to OM Floyd, W2BFS, the first YL to join the Society of Wireless Pioneers through her equally outstanding position as the first YL operator of Press Wireless. While still on the "first" theme, the Hermansons also are the first OM-XYL couple to be affiliated with SOWP.

Membership in this organization of amateur radio operators, who have at some time been professional radio operators, is open to any YL with these qualifications.





WB6FME, Sharon Schepcke, student at Foothill College, also enrolled as a student at San Mateo Jr. College, California, in an electronics course to pass the Technician Class, and held her call while she was attending college. Now studying for General Class, Sharon is a member of the Redwood City, Calif. Civil Defense and Disaster Communications Net.

Each November, TOT sponsors a contest as a memorial to Albert Theodore Jensen, with a memorial trophy as a prize for the participant who works the most members of the club. The membership is on the air as contacts only and cannot qualify for the prize. Begun in 1967, this contest has grown in popularity each year.

The Trillium Certificate is available to all amateurs who qualify. Details on certificate requirements are available from the custodian, Mrs. Marion Course, VE3CLP, Oxford Road, RR 1, Welland, Ontario, Canada.

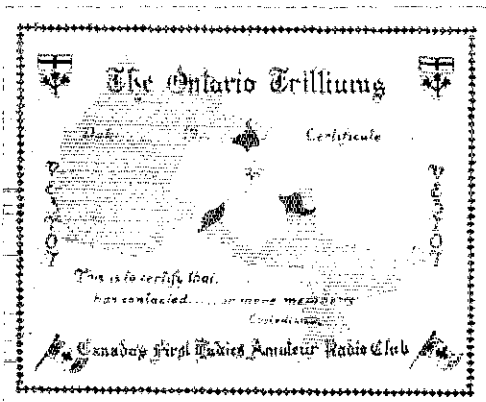
Meet the Club – The Ontario Trilliums (TOT)

These Canadian YL club members can give a fast answer to anyone who should ask them what happens when you build a better mousetrap, for they had not only all Canada, but a pretty good chunk of the world, come to join the fun.

In 1965, a group of Canadian women amateur radio operators decided to form the first YL club in their country. Although they all were from Ontario, they placed no geographical restrictions on membership, so that the organization, an on-the-air club, expanded almost at once until now, the membership includes six of the ten Canadian Provinces and Districts, many members from the United States, and from several other countries.

This on-the-air club meets both on cw and voice schedules. Because the area that it covers includes several different time zones, it has become quite a unique organization with a schedule of meetings that resembles a net directory. All YLs from all prefix areas are welcome to join TOT, and with their flexible schedule of meetings, modes of emission, bands, and times, there is something for just about everybody.

YLRL 1971 President, WB2JCE, Jan Fontana.



Ontario Trilliums certificate.

WB2JCE, Jan Fontana, YLRL President 1971

She started out by being so well brainwashed by OM, Fred, K2RYH, and his cw operation that Jan virtually had the code learned to the point of recognizing calls without consciously trying to do so. The final polish job was given at the local high school's radio class that began with Jan and 15 men, and ended with Jan receiving the only license issued. Six months later she lost her N when she passed the General class exam.

Because of the thorough indoctrination in her pre-radio days, Jan prefers cw and operates a great deal of the time on 80, 40, 20, and 15 meters in this mode. She operates ssb during her participation in YL Open House, Mid West, and Tangle Nets.

She is a member of ARRL and YLRL, where she has held several offices and is at present president of this world-wide YL club. Her activities as president have enlarged the Tape Topics project of YLRL.

Not a dyed-in-the-wool certificate hunter, Jan's activities on the air have brought her WAS, YLCC, TOT, WRONE, and RWW; and because of her peculiar status of being the only YL operator in Scuyler County, she tries to check in with the county hunters to give them this very hard-to-get contact.

QST



How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who:

Richard O'Brien, 17-year-old telegrapher, worked DX for the Pennsylvania Railroad and a commercial wire that passed through the town of Greensburg in the spring of 1858. His kid brother John hung around the place too, delivering telegrams on foot when called upon. John was only nine.

The little fellow had actually entered messenger service two years earlier when Richard was stationed at the Downingtown, Pennsylvania, depot. Teenagers running telegraph offices were no novelty in those days. Anybody bright enough and big enough, and many not big enough, took pride in doing a man's job.

Little John picked up Morse by ear like a duck takes to water, soaking up spelling, grammar, and other lessons with every eavesdropping. Before his eleventh birthday he went to Latrobe as an "extra," mastering matters of rail freight, postal legalities, passenger tickets, etc. By 1861, the kid had substituted satisfactorily for seasoned operator-dispatchers at Hollidaysburg, Duncannon and a dozen other offices.

Brother Richard received military orders that April and began pounding brass for Uncle Sam in Washington and Fortress Monroe. Naturally little John couldn't rest until he, too, had a job with the Army. So, aided by Richard's string-pulling (or wire-pulling) 13-year-old John Emmet O'Brien resigned from the Pennsylvania and successfully demonstrated his communications capabilities before astonished signalmen at Ft. Monroe.

There and elsewhere, to make a great story too short, he served the Union cause devotedly, got a close look at President Lincoln, witnessed the historic duel between *Merrimac* and *Monitor*, and survived enough wild wartime adventures to write his own 1910 book *Telegraphing in Battle*.

* * *

"The Youngest Op" is but one fabulous chapter in another book, *Brass-Pounders - Young Telegraphers of the Civil War* by Alvin F. Harlow

* 7862-B West Lawrence Ave., Chicago, IL 60656.

(Sage Books, Denver, 159 pp.), a nostalgic volume called to our attention by another old brass-pounder, ex-W9HPJ. Fascinating reading from the fateful night in '59 when John Brown's men silenced the "HF" wire to Harpers Ferry, through such ordeals as Jesse Bunnell's heroic operating at the Battle of Gaines's Mill, all the way to the fall of Richmond and weary Abe Lincoln's last friendly visit to his favorite Washington hangout, the War Department Telegraph Office. Ample rare photography, too, and something for the YLs - a telegrapher's tale about Confederate spy Nancy Hart whose fierce exploits might well make a sheltered debutante of Calamity Jane.

† † †

Where:

AFRICA - Nigerian stations will be signing their 5N5 prefix this month, activity expected by 5N5s AAH AAJ AAK AAU AAV ABG ABH and possibly Boy Scout Jamboree station 5N5BSN, 5N2ABG, NARS. . . My policy is to answer QSLs 100 percent but I find it often impossible to identify QSOs from information received. It's amazing how many hams can't figure GMT and GMD! So far I've worked about 3500 stations and sent out 1500 cards. - 9GIWW. . . Because logs were taking more than six months to arrive I am no longer QSL manager for CR6CA. Post him direct or via the CT bureau. - VE3GNM. . . I am 5Z4JP's QSL manager and hold logs for QSOs from July 26 to November 11, 1970. W5ZXS. . . VQ9TF logs up to July are in the hands of QSL manager JA0CUV/1. - WCDXB. . . In 1968-69 I operated 7Q7PAX for eighteen months, mostly 21-MHz cw. Because I answered QSLs as received and because cards were very slow coming through via bureaus I'll be pleased to confirm any QSOs I didn't get the chance to verify while in Malawi. W3YEK/2. . . As of late July QSL managers Fs 5QE 2MO 9MS and 8US were respectively awaiting logs from new operators at FB8s WW XX YY and ZZ. - DXNS.

ASIA - Society of Thai Amateur Radio will be glad to establish the validity of any HS callsign upon request and maintains forwarding addresses for all former members. HSs 1AB 1CW 1VS 3AM 3HD 3R and 4RRY are unknown to STAR. - HSIABU. . . I hold all logs for operation by TA3s HC HC/1 and TC3CH as of October 8, 1970,

VP2LY, under the peaceful palms of St. Lucia, has a lovely QTH of the Month you must agree. VE3s GCO and EWY also signed VP2LC/p here earlier this year.





7Z3AB, one of the most active and helpful DXers in the Middle East, will pitch in to keep 28-MHz interest high this fall. Henry runs his Dhahran outfit on several bands. (Photo via K6GLC)

except for the RSGB contest of that month. Cards sent via the Turkish QSL bureau will *not* reach me. — *LA3UF*. . . . BY1s AA AB AC and AD, rumored to be Radio Peking technicians, are reported active on cw. — *VERON*. . . . VS6DR disclaims knowledge of BY operations or QSLs; and WB2UKP reports BV2A logs very slow coming through. — *WCDXB*. . . . KA2SF replaces departing KA2UR as manager of our KA QSL Bureau. — *PEARL*. . . . VU2KV wishes it known that his successful Andamans and Laccadives efforts as VU5 9KV and SKV, contrary to earlier reports, were strictly his own doings without connection with Amateur Radio Society of India. — *W9BRD*. . . . For our Ogasawara DXpedition as JD1s AAZ (JA5BTY), AHS (JA1OJE), ABX (JA1KSO) and ABY (JA5CIE) all 3000 self-addressed envelopes to JA1s KSO OJE, JH1s EXV and HWN have been answered. Nine thousand cards were received and we are watching for 10,000 more. We may be QSLd via the JARL bureau. — *JA1KSO*.

EUROPE — Effective August 1, 1971, I have terminated my QSL services for UD6 UF6 UG6 UL7 and UO5 regions but I can still help with cards from UC2 UH8 UI8 UJ8 UK8 and UM8. *Large* self-addressed stamped envelopes are required. Also be advised that I'll handle QSLs for Crete operation scheduled by SV0WEE and friends in September. — *W3HNK*. . . . I manage QSLs for ZB7A operator Gordon's QSOs after May, 1970. — *WA9YNE*. . . . Germany is expected to begin using the DB prefix shortly. — *WCDXB*. . . . W6UZX, listed by the *Callbook* as QSL manager for 4U1TU, denies this responsibility. The error comes about apparently because he did operate that station for a few days some years ago. — *W5BZK*. . . . I now manage QSLs for DL2AA/w1, F0 1F ZN, FM7WN, G5ACX, HB0XIV, HC6s JB JK, KG6JAC, PJ8KG, TAS 1MT 1TT 6JB, VP5KG, VU2s CP FC, WN2LYN, 3A2AE, 4W1AF, and 9A1AA. — *DJ9ZB*.



HEREABOUTS — When operating maritime mobile I often encounter pile-ups equivalent to those for rare DX, especially on cw. Stations wanting QSLs for such QSOs can confirm their requests by sending their own cards to the mobile call's home address or via the appropriate bureau. I can no longer mail out QSLs for all QSOs "down the log" but I do answer each card received. — *W5FGO/mm*, *SS Delta Mexico*. . . . Peruvian OAs may be using OC along with their special OB prefix. — *WCDXB*. . . . WB2UKP, QSL manager for 8P6BU, indicates that Colin's call was used illegally by someone else this spring. — *K4ELV*. . . . I am QSL manager for FM7AA commencing April 9, 1971, and also hold logs for HU0A-VS2CEN operations. — *W4STDY*. . . . K7JRE, WA0SSU and WB2YKA offer to perform as QSL aides to DX operators hard pressed by confirmational complexities. . . . *Help!* These italicized correspondents seek hints toward hauling in tardy cards from holdouts mentioned: *W7HZL*, *CO5AS*, *VU2LE*; *K4ELV*, *CXs* 6BC 7AP 7BBW, FP0BS, T1s 2LL 2RLJ 2YSH 8RBE; *WA3HEU*, FP8AP, LA7MM, OA4QN '69, OK2SFO '69, SM6EPI, XE1BN '68; and *WA7MML*, EA9CC. Ideas? "QSLers of the Month" saluted for especially swift QSL shipments are CE3AQW, CO2FA, CP1IE, F8 3AT 8TC, GW3NWV, HB0XTO, HI8s XHR XLS, K4BZH/VP7, KG4EQ, OX3RA, OY9LV, PJ8DZ, PZ1BL, TG9DD, UW0LI, VP8 1RA 2MY 7NN 9GF, Ws 2LFL 3KV 8IZQ, XEs 21L 2Z 0AAA, ZP5TU, SX5NA, 8P6DT, 9E3USA and 9Y4CR, plus QSL tenders W3HNK, WN7OLT, G3LOP and XE3BL. The nominating committee includes Ks 4ELV 8PYD, WAs 2EAH 6CPP 7OUB, WB9CJS and 9J2ED. Any commendable quickies over your way?

OCEANIA — QSLs for my operation as FO0TG from Tahiti, Moorea and Bora Bora should now be in the mails thanks to QSL manager JA1DCY. — *WA6IVM*. . . . SW1AU serves as Western Samoa QSL bureau manager at P.O. Box 1069, Apia. — *DXNS*. . . . International Telecommunication Union has apparently assigned the 3DN-3DZ prefix block to the Fiji Islands. — *NNRC*. . . . VK9TB QSLs, according to the *Callbook*, go via WA8DXA and not via W8DXA as evidently erroneously specified elsewhere. — *CARA*. . . . Statesiders and Canadians may QSL DU1POL via W5QKO, others via P.O. Box 4083, Manila. — *DU1POL*. . . . Short-wave listeners reading these pages are urged to file s.a.s.e. with the ARRL SWL Bureau managed by Roy Waite as listed regularly in *QST*. — *NNRC*. . . . Now a few individual specifics in the QTH line but be aware that each item is necessarily neither "official," complete, nor accurate:

- AC5PN, T. Yonten, P.O. Thimpu, Bhutan (see text)
- BY1AB, 579-B Tong Tien Men, Peking 11, P.R.C. (see text)
- C21AA, R. Lear, Radio Station, Niue Island

TN8BK, in great DX demand on 20, finds his medical services also in great demand in Brazzaville. Bernard leaves Congo Republic soon for return to F5BD. (Photo via K2QHT)

9G1YA is as decorative on 10 through 20 meters as she is among these pages. Tara and OM 9G1WV, pictured here last month, expect to keep radiating from Tema for another two to four years. They'll be hitting 40 and 80, too, as sunspots decline.



CR5AJ, Box 68, Sao Thome Island, W. Africa
 EA5KF, Box 1072, Valencia, Spain
 FG7AF, Y. Reignard, 221 Rue de Chauvel,
 Abymes, Guadeloupe, F.W.I.
 FM7AF, R. le Joliff, Rue des Pointes, B.P. 619,
 Fort-de-France, Martinique, F.W.I.
 FM7AG, D. Scotte, Pointe des Sables, B.P. 619,
 Fort-de-France, Martinique, F.W.I.
 FM7AI, J. Coutin, Pointe des Sables, B.P. 619,
 Fort-de-France, Martinique, F.W.I.
 FR7AM/e, T. Chellier, 10 Rue Jules Auger, St.
 Denis, Reunion Island

FR7AN/e, Box 1004, St. Denis, Reunion Island
 HI8FED, Dr. F. Diaz, Box 431, Santo Domingo,
 D.R.

HR1TS, R. Shaw (WA7OJW), U.S. Embassy,
 Honduras, APO, New York, NY 09887

IASCQD, P.O. Box 511, Florence, Italy
 IC8QO, P.O. Box 336, Naples, Italy

IP1s MOL RB RBJ (via W2GHK)

JT1AW, P.O. Box 639, Ulan Bator, M.P.R.

JY6RS, Royal Jordanian ARS, P.O. Box 2353,
 Amman, Jordan

JY9s FB YL (to W2EMH)

K2YGM/VP7, R. Jacobson, P.O. Box 1175, L.I.C.,
 NY 11101

KH6EDY, USCG Loran Station, Kure, Box 36,
 FPO, San Francisco, CA 96614

KX6JM, J. Melody, Box 997, APO, San Francisco,
 CA 96555

PY1DVG, R. Rasp, Box 51-2C-00, Rio de Janeiro,
 Brazil

VA1TC, P.O. Box 412, Fredericton, N.B., Canada

VQ9MC, M. Carragher, Beau Vallon, Mahe,
 Seychelles

VQ9s XX YL, P.O. Box 193, Mahe, Seychelles

VR4CG, G. Cruikshank, P.O. Box 310, Honiara,
 Solomons

VR4EE, J.I. Sapir, Box 236, Honiara, Solomons

VS6CZ, B. Bloom (K3KZB), U.S. Consulate, Box
 30, FPO, San Francisco, CA 96659

VS9PIV, P.O. Box 5051, Aden, South Yemen

W6DDM/KB6, J. Wheeler, Box 160, APO, San
 Francisco, CA 96401

ex-WA7OJW/HR1 (to HR1TS)

YB0AAU, P.O. Box 2932, Djakarta, Indonesia

YS10EA, Aptdo. Postal 318, San Salvador, El
 Salvador

ZP1AT, P.O. Box 1682, Asuncion, Paraguay

4K2A, Central Radio Club, Box 88, Moscow,
 U.S.S.R.

5Z4JP, C. Allison, Box 30514, Nairobi, Kenya (or
 via W5ZXS)

ex-7Q7PAX, S. Kletzien, W3YEK/2, African-
 American Institute, 866 United Nations Plaza,
 New York, NY 10017

PHICZ, Victoria, Gozo Is., Malta

PN1FZ, P.O. Box 146, Kathmandu, Nepal

Q5KPK, K. Pickerel, U.S. Embassy, APO, New
 York, NY 09662

BV1USE (to JH1HW)
 C31AZ (to F9UX)
 C31DM (to F5HX)
 C31DN (to DJ9ON)
 C31DO (via DK2DZ)
 C31DS (to F6ARV)
 C31DX (to DJ3KH)
 C31DY (to PA0GMM)
 C31EG (to EA3QS)
 CR8AG (via PY7YS)
 ex-CR8AI (to CR5AJ)
 DF0AFZ (via DL9NU)
 DU1POL (see text)
 EI0DI (via EI7CC)
 EL2CB (via W3HMK)
 F0JR (to DJ9KH)
 F0US/FC (to W1PRI)
 FG0GD/FS7 (to W9IGW)
 FM0GD (to W4VPD)
 FO0TG (via JA1DCY)
 FP0BG (to VE1AH)
 FP0LK (to WB2RLK)
 GD3XMW/p (via RSGB)
 HB9XSX (to F5JA)
 HB9XSY (to F5SJ)
 HB0XTH (via DJ9MH)
 HB0XUW (to DJ9KH)
 HC8GG (via K9YBC)
 HL9VK (to WB6HDH)
 HPIIE (via W2GHK)
 IA5RCD (to I1RCD)
 IE9ZGY (to IT1ZGY)
 IF9PUG (to IT1ZGY)
 IG9XAI (to IT1ZGY)
 K4CSY/KC4 (to K4CSY)
 ex-MP4BCC (to VQ9MC)
 OE9ZEJ (to DJ9KH)

OG5A (via SRAL)
 ON8AN (to DJ9KH)
 PA9QX (to ON4QX)
 PJ8KG (via DJ9ZB)
 TI9AAC (via TI2CAP)
 VA2UN (via W2GHK)
 VB1MSA (via VO1FX)
 VK3UV/9 (via W7VRO)
 VP2MAA (via VE3GCO)
 VP2MAC (via VE3GCO)
 VR4BS (to WA6SBO)
 VS9MF (via G3VAO)
 VU2JEZ (via WA7MUY)
 WA2FBI/4X (to WA2FBI)
 WF7AIR (via K7ABV)
 XE1IJJ (via W2GHK)
 XE0AAA (via XE3BL)
 YS2CEN (via WA8TDY)
 ZB2A (see text)
 ZD8KO (via RSGB)
 ZD8MG (to K9FYD)
 ZD9TDC (via GB2SM)
 ZF1JS (to VE3AFY)
 ZL3PO/c (via ZL2AFZ)
 3A0FR (to DL3MO)
 3A0FW (to DJ9KH)
 3A0KH (to DJ9KH)
 3B9DR (via VE6AKV)
 3V8ZK (to FSZK)
 4W1AF (via DJ9ZB)
 5H5NE (via VE6AKV)
 5X5NA (via G3LQP)
 5X5NE (via VE6AKV)
 5Z4NE (via VE6AKV)
 8J1WJ (via JARL)
 8Q6AB (to 4S7WA)
 8Q6AC (to 4S7YL)
 9Q5LW (via WA2GZC)



ZB2A, installation of Gibraltar's RAF Radio Club,
 is operated here by Sgt. Gordon Kelly. Active on
 many bands including vhf, ZB2A needs only
 Alaska to complete WAS. (Photo via WA9YNE)



JD1s AAZ, ABS, ABX, and ABY, operated respectively by JAs 5BTY 1OJE 1KSO and 5CIE, logged some 25,000 QSOs with 160 countries during their recent Ogasawara Islands DXpedition. Here JA1KSO checks out their Trio gear and shelter upon arrival. Under the Japan DX Association banner Nob and colleagues warn of more such DXcursions to come.

7LE 8AG 9AK, CTs 1BH 1LN 1VE 2AP 2BB 3AS, CXs 1BBR 2CN 8CZ, DF0AFZ, DJs 40I 6YG 8RR, DLs 7BA 0VB, DM2AFO, EAs 2FO 2HX 3FP 6BJ 6BN 7DJ 8AQ 8DM 8EZ 8GK 8GZ 8HA 9AQ 9EA 9EJ, HIs 4AN 6E 6S 7E 8AI 9N, EL2s AW CB CH S, EP2s BK BQ DK FE JP TW WB, ET3s DS USA, FG7s TI/FS7 XT, FH8s CC CE CG CY, F08BJ, FP8s CS CT, FY7s AB AE YR, several Gs, GCs 30BM 3YIZ 5ANX, GD3s FBS FXN GMH, GI3s RXV UJH ZJR, GMs 3TWE 5AIW, GW3DZJ, HAs 2RB 4KYH 0KLZ, HBs 9ALC 0LL 0XUQ, HCs 1ARE 1HV 1RF 6MJ 8AA, HG2RI, HH9DL, HIBXJH, Hks 1CEY 0BKX 0BMO, HPI1C, HRs 1WSG 2HHP, HS1s ABC ABU, HV3SI, 1IBMI, IS1TDW, 1D1ABO, 1H1GUL, 1X81L, 1Y1, KA9KC, KC6RS, KGs 4CS 4EH 4ES 6AAV 6ASL 6JAJ 6JAN 6SF, KH6s GMP SP, KJ6s CD CF, KL7s AIR ERG GRF HCN, KM6s BI CE, KP4s ANH AOD AST DKX, KR6s DB IH MB SF, KS6DH, KV4s AD FZ GK, KX6s IS HV KS, KZ5s BK EK, LA87M, LUs 1DAB 1VD 2DEK 5DL SFEH 9DJA, LX1VW, LZ1KAA, MIs D B, MP4s BBA BEU BFO BHL BHO BIM BIO BIR BIV MBC TDM, OAs 1BU 4LM 8V, OD5s BA EP, OEs 1FF 1PC 9WGL, OK1ADM, OX3s AB BU, PA0NAP, PI1HRL, PJs 1AA 2AR 1 2PS 7JC 9AF 9JR, PYs 2DSQ 2ERS 3BXW 4AP 5AM 5UI, PZ1s AH AP CU DX, ST2SA, SVs 1AB 0WBB 0WU, SU1MA, TA3s GB HC, TF3HS, TI2EV, TN8TD, TR8s JM VW, TU2CX, TZ2AB, UAs 1KAE 0YAC 0YF, UD6s BD BR, UH8BO, UK8JAD, UM8MAA, UO5GQ, UP2s ER PD PG, UQ2HM, more Russians signing special U.S.S.R. above-28-MHz prefixes

Contributors of the preceding suggestions are Ws 1CW 1 SWX 1YYM 2DY/4 4YOK 5BZK 6AKM 6GSV 6KYA 7PHO 8KZO 9EY, Ks 2QHT 4ELV 8PYD, WAs 2EAH 7MMK 7MUY 7OUB, WBS WAEH 2AQC 4NXV 9CJS, s. Dildine, Columbus Amateur Radio Association *CARAScope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, N.72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall Ct., Bellwood, Illinois, 60104), North Texas DX Association *Bulletin* (W5SZ), Northern California DX Club *DXer* (Box 608, Menlo Park, California, 94025), Southern California DX Club *Bulletin* (K6HH), VERON's *DXpress* (PA0s FX LOU TO VDV WWP) and West Coast *DX Bulletin* (WA6AUD). Do you have "where" data to pass along?

† † †

What:

10 PHONE is at the autumn DX crossroads again for better or for worse. Better than during stagnant summer months but how much worse than last fall's rather prosperous propagation? Grip your knobs and find out. We'll have to make the best of it at any rate, at least until science finds a way to emancipate short-wave radio from traditional dependence on sunspot activity. Here's some of the voice stuff Ws 1PL 3HNK 3KVS 3OFI 8YGR, Ks 3YVN 8PYD, WAs 1HAA 7MUY 8VRB, WBS 2FOS 4IYB 4KZG and G3DME's *QUAX* clientele started working on 10 just about a year ago in substantial DX openings that persisted well into April: A2CAW, CEs 3ABZ 3IV 5FQ 8AO 0AE, CN8s BF DW, C02FA, CP6FE, CRs 4BS 5SP 6GA 6HH 6IK 6IY 6JW 6LX 7ER 7IK

RA9FGO, RD6DEL, RIs 1AF LAF, RJ8JRR, RP2s PAP PBF, VKs 1GD 3QV 4XJ 5MF 5QG 6LK 6NG 8CW 9XX, VPs 1JF 2AAP 2AAC 2EE 2EQ 2FZ 2MK 2ML 2LX 2VI 5CC 8KD 8KL 9DX, VQ9RK, VSs 6AD 6BC 6BF 6CO 9MB, VU2s JM 0LK REG, W7UXP/KH6, WAs 1EHO/KJ6 4QVP/8R1 8EKI/EL7, XE1s AE CE, XT2s AB AC, XW8s BP BS BX, YAs 1HD 0CDRC, YB0AAE, YNs 1HSM 1VMD 2DX, YOs 4AKA 9CN 9VI, YUs 3OV 4HA, YV5CDK, ZB2s A BV BY, ZC4s DB 1K JW MT RAF, ZDs 3P 5E 5F 5X 7BH 8H 8JA 8JK, ZEs 1BU 1JJ 4JW 5JJ 8JD 8JY, ZF1GC, ZL3AB, ZPs 4BR 5GO 5GS 5PO 9AC, ZSs 1FH 3AW 3B 3CJ 3JJ 3KC 6OF, 3B8s CS CW, 4U1TU, 4X4s UF WF, 4Z4FD, 5H3s MM MV, 5N2s AAF AAJ AAN ABG, 5R8s AP AS, 5Vs ZJS 4AH, 5X5FS, 5Z4s KSA LD, 6W8s AL DY, 6Y5GA, 7P8AZ, 7Q7s AA BC, 7X0WW, 7Z3AB, 8P6s AH AJ BQ BX, 9E3USA, 9F3USA, 9H1s BL BSJ BX CB CH R, 9J2s BR DT EA JY PH PV RO TL WR, 9N1MM, 9Q5s ER OR SD, 9U5VK, 9V1PX, 9X5s AA CC SP, 9Y4s DX and VU. Many of these mike men will be trying ten again as you read this. Better move to clinch your 28-MHz century for ARRL's Five-Band DX Century Club trophy now if you haven't already swung it. Or maybe you can make do with 160? Which reminds us to wonder who's closest to six-band DXCC. And some of the lads have more than a handful of countries on 50 MHz, for that matter. Somebody.



CP3BY consistently represents one of South America's rarer countries on our DX map. Phil and XYL serve as missionaries in Bolivia's rugged Oruro region. (Photo via W4BRB)

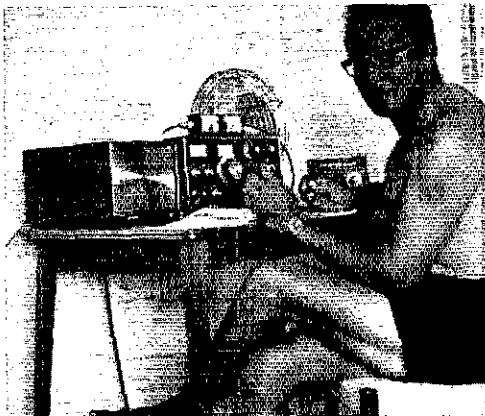
somehow, some day may yet roll up "7B-DXCC." Even 144 MHz could come into the picture via moon-bounce or Oscars. Yes, *some day*

† † †

160 meanwhile dispels the ancient myth that it slumbers through the warm months. W6NUT's summer 1.8 MHz log lists cw contacts with PYs 1DVG and 2BIH on June 5th, PY1DVG again on the 12th and 19th, and VK3ATN at 0758 GMT on the 26th. KL7CL and ZLIAYG were hooked on the 27th, the latter transmitting on 1877 kHz while copying W6NUT on 1804. The fun continued in July with PY1DVG showing up on the 3rd. The 11th was a hummer, OA8V, KL7HEE, VK3AML, and ZLIAYG being contacted between 1048 and 1156 GMT in that order. The 17th produced a choice ssb-to-cw QSO with VP8ME, Antarctica, on 1815 kHz at 0933 followed by a chat with KV4EZ. W6NUT, formerly W6KWE, is obviously an old hand at munching static. "I have high hopes of working Europe this winter now that Loran QRM has subsided," writes Tom. . . . On July 16th a whopper of a QSO was reported between VP8ME of Halley Bay and KL7HEE. Those two apparently solved the old 160-meter QRN problem by simply jumping over it. . . . Other top-band summer actives were DK3II, DL8KRA, Els 8H 9BH 9J, many Gs, GM3s WDF YOR, Gws 2XJC 4AEC 4QD, PYs 1MGF 2BKO, VKs 3QI 3XB 6A1 6CW 6HD 6IZ 6NK, ZD8AY and ZP9AY. . . . Cool, crisp evenings are now at hand up W/K/VE way to drop QRN levels but make way for increasing QRM as the 160-meter gang swells in power and number. Just joining the 1.8-MHz fun? See July '71 "How's" for more on the subject, and by all means check page 77, April *QST*, for necessary data on 160-meter frequencies and power maxima authorized by FCC at your location. See you on 10 by day and on 160 by night — good fishin'!

Q#7-

KC6SJ instructs physics at Truk's Xavier High School when not teaching geography and propagation to world-wide 20-meter DX students. Here Father Bill expounds a point for possible future KC6s. (Photo via W8RTN)



MP4TDM of Ras Al Khaimah puts out one of the more potent signals from the Trucial States and will do his best to keep the 10-meter DX ball rolling this season. Sam hails from Wales and is an electronics specialist for the R.A.K. government. (Photo via K1DRN)



Strays

This "all-purpose" letter showed up at Headquarters recently and we thought that we should share it with all League members.

All-Purpose Protest Format

Editor, *QST*

Dear Sir:

I have remained silent long enough, and am now writing to express my strong objections to a type of activity that seems to be on the increase in our amateur bands.

I refer to (a) . . . This minority of thoughtless and selfish hams makes the bands miserable for the rest of us who prefer the more normal and rational activities that go to make up amateur radio in its finest form. These amateurs engaged in (a) are persistently active with their own private purposes and have little or no regard for other operators who may be using or desire to use the frequencies.

I have been an amateur for (b) , and have long since outgrown such foolishness,

and believe that the League should cease to encourage this sort of misuse of our bands. The amateur bands exist for public service and these people do little if anything to improve our skills. Those who persist in (a) should be made to understand that amateur radio is a democratic hobby in which the rest of us have our rights.

I shall be forced to relinquish my subscription to *QST* if some action in this matter is not forthcoming promptly.

73

(a) Insert appropriate word:

Nets	Emergency drills
DXing	Testing
Rag chewing	Round tables
Contests	Repeaters
County-hunting	a-m
Phone-patching	ssb
RTTY	cw
SSTV	other

(b) insert years licensed (add any time spent bootlegging as this is also experience).

Operating News

GEORGE HART, W1NJM
Communications Manager

ELLEN WHITE, W1YL
Deputy Communications Mgr.

ROBERT L. WHITE, W1CW; DXCC

GERALD PINARD, *Training Aids*

ALBERT M. NOONE, W1KQM; *Contests*

How About a New Award? WA7KZP comes forward with an idea for a WACAP Award — Worked All Capitals. Sound interesting? The idea would be to work all state capitals, either the city itself or one of its suburbs. Bruce suggests that Washington could be counted for Annapolis, but perhaps we should add Washington as another capital, making it 51 to work instead of 50. We could endorse for bands, modes, etc., just as we do for WAS. This would give veteran award-seekers with nothing much left to live for a new lease on life — and it would be educational, too. Think of the number of amateurs, after a year or so of striving, who would be able to rattle off the state capitals as some of the DXers can now rattle off the rare DX “countries.” How many now know that in only 15 states is the capital the largest city, and of the 15 largest cities in the U.S. only *one* is a state capital?

If the above hasn't already sold you on the idea, no doubt it would be quite easy to do so — because, like motherhood, everybody is in favor of a new award, or at least hardly anyone is against it, even those who aren't particularly interested in this sort of a thing. So an idea for a new award comes up, a minority of enthusiasts support it, nobody opposes it, and soon it becomes a part of the League's sponsored activities to keep amateurs busy and the bands occupied. Not a bad idea, incidentally, provided it isn't overdone.

Who started all this award business, anyway? Well, hard to say for sure without doing a lot of research, but it *seems* that it all started with the WAS Award in 1936 — although of course there were appointments before then. But as a pure and simple continuing award, it looks like WAS was among the first. A-1 Operator Club started earlier, but just as a QST listing. In 35 years, then, we have added RCC, DXCC, Code Proficiency, Public Service, Old Timers, BPL (certificate and medalion), PSHR — we must have overlooked something — oh yes, SBWAS and SBDXCC. In addition, endorsements of various kinds, the expanding practice of issuing certificates to sectional or regional winners of contests and, for some of the awards particularly hard to achieve, plaques because a certificate attesting the accomplishment is no longer impressive enough.

Is this overdoing it? A matter of opinion, of course. Those who are inveterate (or compulsive) award-seekers will say no, of course not, a mere handful of additions in 35 years is nothing, considering amateur growth in that period of time. There even could be some sentiment that we are dragging our feet and should create more awards, such as WACAP above. But those amateurs who are

more interested in other things would like to see their League devoting its time, personnel and budget to those things, and would be apt to point out that while the number of new awards has not increased significantly (or at least not out of line), the demand for awards in general has increased far out of proportion to its importance in the amateur radio scheme of things. For example, we now have two people working full time on DXCC — 12.5% of the entire CD on a single award, and still hard put to keep up. Nearly all members of the department are involved in awards of one kind or another at one time or another during the working day.

Then of course there are awards sponsored by others — thousands of them — and some of them as much-sought-after as some of the League's awards. One amateur has even made a business out of listing awards available and sponsoring awards for achieving awards.

So in considering any new award, we should perhaps, each of us, give thought to factors other than the immediate and obvious one of self-application — that is, “is this something I would be interested in?” Such as: (1) Will it meet the general test of popularity? (2) Will it be educational? (3) Will it be difficult to administer? (4) What current award can be dropped to make room for it?

That last question is hardly ever asked, or even considered, by the person or persons making the proposal. But it's important if you want to keep your League headquarters from becoming primarily an award-issuing function.

Sweepstakes Rule Change. The rules for the November Sweepstakes appear elsewhere in this issue. A very significant change involves the information exchange between stations making contact. At the recommendation of the Contest Advisory Committee, the filing time and date have been dropped as requirements for the exchange, so all we have left is the number (of the contact), precedence (power range), station of origin (your call), check (year first licensed), and place of origin (your ARRL section).

The SS exchange originally was a complete message in standard ARRL form, but this was shortened to just the preamble. The idea was, and still is, to give contestants a small dose of painless indoctrination into proper message format. However, the CAC apparently feels that the dose has become too painful, thus the recommendation to further shorten. The new shortened exchange is on the usual trial basis for this year only, subject to reversion to the older exchange (i.e., including filing time and date) if the new exchange appears generally unpopular.

New Faces. Tony Dorback, W1YNC, has returned to the ARRL headquarters staff. Tony worked with us in the late fifties, both in Production-Editorial and at WIAW, and now returns to fill the vacancy created by departure of Chuck Watts, WA1NEU, as an attendant at the headquarters station. Also joining the staff as assistant DXCC is Rick Niswander, WA8VRB, a young man starting at the bottom for whom we have great hopes. — WINJM

WIAW CODE PRACTICE

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	Local Times/Days	GMT
10-13-15	7:30 PM EDST dy 4:30 PM PDST	2330 dy
5-7½-10-13-20-25	9:30 PM EDST S nTThS 6:30 PM PDST	0130 MWFSn
5-7½-10-13-20-25	9:00 AM EDST MWF 6:00 AM PDST	1300 MWF
35-30-25-20-15	9:30 PM EDST MWF 6:30 PM PDST	0130 TThS
35-30-25-20-15	9:00 AM EDST TTh 6:00 AM PDST	1300 TTh

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To permit

DXCC Notes

Announcement is hereby made of the addition to the Countries List of *Annobon Island*. Annobon Island is located off the west coast of Africa in the Gulf of Guinea and is territory belonging to Equatorial Guinea. The consideration of Annobon Island as separate from Equatorial Guinea comes under point 2(a) of the criteria, (see page 88, February, 1969, *QST*). Confirmations for contacts with Annobon Island may be submitted for DXCC credits starting September 1, 1971.

improving your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and *QST* practice text (from the issue 2 months previous) to be sent in the 0130 GMT practice on the following dates.

- Oct. 6: It Seems to Us
- Oct. 14: Correspondence
- Oct. 22: League Lines
- Nov. 2: ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio*, First Edition.

- Nov. 5: Monitoring Your Sending, p. 217
- Nov. 8: Other Useful Accessories, p. 220

WIAW SPRING-SUMMER SCHEDULE

(April 25–October 31)

(Specific frequencies shown below indicate general operating periods)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 p.m.-1 a.m. EDST, Saturday 7 p.m.-1:00 a.m. EDST and Sunday 3 p.m.-11:00 p.m. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed May 31, July 3 and September 6.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	←						→
0020-0030*	←		5.700*	14.020	14.020	7.150*	14.020
0030	←		3.700*	14.100	14.100	7.150*	14.100
0100	←				Phone-OBS†		→
0105-0130*	←		3.820	50.120	145.600	1.820	21.270
0130	←		CODE PRACTICE DAILY! (35-15 wpm TThSat, 5-25 wpm MWFSn)				→
0230-0300*	←		3.555		1.805		3.555
0300	←	RTTY-OBS‡		RTTY-OBS‡		RTTY-OBS‡	→
0310-0330*	←		3.625	14.095	7.095	14.095	3.625
0330	←	Phone-OBS‡	←		Phone-OBS‡		→
0335-0400*	←		7.220	3.820	7.220	3.820	7.220
0400	←	CW-OBS‡	←		CW-OBS‡		→
0420-0430	←		3.700*	7.020	3.945	7.150*	3.320
0430-0500	←		3.700*	7.080	3.945	7.150*	3.555
1300	←		CODE PRACTICE! (5-25 wpm MWF, 35-15 wpm TTh)				→
1700-1800	←		21.28*	21.28*	21.28*	21.28*	
1900-2000	←		14.280	7.255	14.280	7.255	
2000-2100	←		14.100	14.280	14.095	21.28*	
2200-2300	←		21.28*	21.100*	21.28*	14.280	
2300-2330	←				RTTY OBS‡†		
2330	←		CODE PRACTICE DAILY! 10-13-15 w.p.m.				→

* CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.588 MHz.
 † Phone-OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.588 MHz.
 ‡ RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 28.095 MHz.
 † Starting time approximate. Operating period follows conclusion of bulletin or code practice.
 ‡ Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
 † WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
 ‡ Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
 † Sent with 170-Hertz shift.
 Maintenance Staff, W1s QIS WPR, WA1NEU. *Times-days in GMT. Operating frequencies are approximate.

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings

July 1-31, 1971

New Members

4X4JU	333	JA7PL	131	WA1JOF	124	YU3CM	104	WASZRB	102	K4TXJ	100
WASVSL	230	4X4VB	131	WA0SSU	121	W5PAO	103	W6IAM	102	KH6EOQ	100
SM6CVX	198	KP4DIE	130	WA2HBZ	120	WASWMC	103	W8NHO	102	K8YQW	100
VK2BPN	165	PY7BFN	129	YV5CKR	120	WA9VGS	103	HA2RB	101	W2ABE	100
HB9AMO	159	W1CAB	129	K6UTW/5	109	G2HDR	102	SM7BUG	101	WB2QF	100
K8AVR	154	K4EYV	126	WA9WVW	107	L111DNU	102	WA1KMR	101	WB4PNG	100
W4GIW	142	D190X	125	YU2OH	107	VE3FXA	102	WB4KMH	101	WASVSC	100
K4NT	141	HB9ANZ	125	LX1CF	106	WA2AYP	102	WASHNK	101	W85WAS	100
DL7BL	138	YU1NTO	125	WB4NVJ	105	W4YJV	102	G3ASL	100	6Y5GB	100

4X4JU	378	SE6AW	176	EP4DIE	129	CR4BS	110	WB4PZM	103	W10E	101
11LLZ	301	11CRW	163	W3TBP	116	D16XG	110	W9RKP	103	W2MCD	101
K6AQV	259	WB1ABU	159	WA4JVN	115	W8BOPC	109	D19ME	102	K7PMY	100
W1BFB	232	W4GYP	152	JA4FHE	114	WASVMW	107	K9ODF	102	WA2NDO	100
WA4MMO	200	W4GIW	139	K8AVR	114	K9HYM	105	W4LMP	102	WASWMC	100
WA2HIN	185	WA4YJ	139	JR1BFT	113	VP7NO	104	WB4YX	102	WB6ZHL	100
11TIG	182	W4YOK	135	VK2BPN	113	DL2ZM	103	DL8TC	101	WA7CDM	100
		JA7GDU	131	W9KYG	113	OZ6RT	103	LUBBF	101		

Endorsements

In the endorsement listings shown, totals from 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

DJ2B	345	W3DKT	290	W8NPI	260	LA5YJ	220	WA4HHW	200	K3FUH	140
DJ2BW	340	W4REZ	290	W8SRK	260	W1GVZ	220	WA4YVO	200	K4LR	140
1T1TAI	335	W6EJ	290	W9LAX	260	W1SG	220	W8OKB	200	K4PK	140
W3MWC	335	DK3PO	280	WA9LZA	260	W2BBK	220	W9TJU	200	K9MMH	140
K01FF	330	K31LI	280	WA0NTC	260	WA2HIN	220	H1JAC	180	K0JPJ	140
W8MB	330	K9YXA	280	K4CEF	250	WA2TIF	220	VE2DCW	180	K0ZFL	140
W9RKP	330	WA3IUV	280	W3ZQ	250	W3LUD	220	VE4ST	180	VF1AL	140
W4BOY	325	W6MUM	280	WA5AUZ	250	W3POE	220	W1IA	180	W4MOX	140
ZL1AH	325	F8RU	270	W8FAW	250	W4PGW	220	W1PL	180	WASVMW	140
DL1JW	320	K4GSS	270	WA8THL	250	W9MCR	220	WA1IED	180	W6BPW	140
LA5HE	320	K9DKU	270	W9ALI	250	W0BX	220	W3RRP	180	W6CZP	140
W9HJ	320	OH2BAD	270	K4ARP	240	W0DAL	220	WB4FJO	180	WA6CTH	140
ZL4BO	315	OZ3PO	270	K4IE	240	DJ2AJ	200	W5QBM	180	WA6PTE	140
SM0KY	310	WA1CJR	270	KV4AM	240	K4CG	200	W8FXP	180	W86RKH	140
PZ1AX	305	W9IGW	270	W1ESN	240	K6AAW	200	G3QIZ	160	WB6VZI	140
W8ROC	305	WA0WKW	270	W4EZ	240	K6AQ	200	K2KTR	160	K9PJ	120
SZ4KL	300	ZS6TW	270	WA4ZYQ	240	PY7VON	300	PY1SJ	160	KP4DIW	120
HB9AHA	290	HB9NL	260	WA5VDH	240	VE2BZD	200	W1DAL	160	W4VE	120
K1KDP	290	11LCL	260	WB6APX	240	VE3CTA	200	W3SDV	160	W82WZB	120
K5LNN	290	K555Z	260	WA9VIZ	240	W2PSU	200	W3YHL	160	W4JVN	120
K8RWL	290	W1DS	260	DJ4PI	220	W6CLM	200	W6CLM	160	WB4DOY	120
OH2BR	290	W1TX	260	G3KAA	220	WB2BNJ	200	W8ODV	160	WB6ZHD	120
PY3APH	290	WA3HGV	260	K4LR	220	W4SD	200	WA9QAL	160	WB9FJX	120
W2LWI	290			K8ZBY	220			W0JYE	160		

W9WHM	335	W0STU	290	OH2BAD	260	WAKOGR	220	W8OAR	180	WB6RKH	140
DJ2BW	325	YV5EC	290	OH2BR	260	W9HI	220	W4WCE	180	W8PAW	140
F2MO	315	11WT	280	VE3BSJ	260	DJ8YQ	200	K4CG	160	WA8PWZ	140
LA5HE	315	W4E6EQ	280	W5EDX	260	DL7FP	220	VE3PWR	160	W0KAA	140
W5TIZ	315	ZL3QN	280	WA0WKW	260	11BKK	200	W4TXQ	160	W9JLV	140
YS1O	315	ZL4BO	280	11LCL	250	JA1AH	200	WA5AUZ	160	WB9AOH	140
PZ1AX	305	G5AFA	270	F9IE	250	K4ARP	200	WA9UCL	160	ZL1SZ	140
PY3AHJ	300	K6MHD	270	PY1JR	250	KV4AM	200	JY1	140	HB9VJ	120
W9HPS	300	WA1CJR	270	WA3HGV	250	W1ESN	200	K3GZE	140	K9DXO	120
DL1JW	290	WB2VFG	270	WA3IUV	250	WB2BNJ	200	K5GPI	140	W1MYA	120
HB9AHA	290	W4HOS	270	W4REZ	250	W4SD	200	VE2JD	140	W2VDX	120
11AT	290	W4QAW	270	SZ4KL	250	WA4YVO	200	W2CML	140	WB2GVE	120
PY2DSC	290	WA0WKW	270	W1CDA	240	WA9VGY	200	W3DKT	140	W3BLC	120
PY3APH	290	ZL1AH	270	9G1DY	240	VE1ARN	180	W3IWF	140	W3ZO	120
SM5IC	290	DK3PO	260	11TRA	220	W2PSU	180	W3YHR	140	W4VSV	120
W3MGC	290	K5LNN	260	LA5YJ	220	WA2TIF	180	WA5VDH	140	WB4MKB	120
W6CCB	290	OA4BS	260	W4BOY	220	W4PGW	180	W6TTS	140	W6KDI	120
W8ROC	290										

JULY "OPEN" CD PARTIES

High-Claimed Scores

The following high-claimed scores are those received at Hq. by August 13. From left to right are shown the call, claimed score, number of contacts, number of multipliers. - W4IKQM

CW	K4THA	100,890-347-57
K2KIR 366,360-1025-71	K4IFX 100,485-312-63	
WA6DKF 357,420-959-74	WA2EU 100,200-330-60	
K2KTK 340,200-965-70	W1AW (7 opr.) 538,180-1509-71	
WRFAW 334,440-923-72	WB2AEH (+WA2LQZ) 136,325-481-65	
K4PUZ 323,405-904-71		
W2FZK 315,180-920-68		
WBEDU (WA3BGE, opr.) 313,200-865-72		
WB8LT (WA8AJZ, opr.) 311,850-938-66		
WA1JLD 310,680-863-72		
K6FBB 307,430-862-71		
W3IN 301,395-843-21		
K4VYF 237,300-672-70		
W4KFC 234,360-644-72		
K4BAI 232,900-678-68		
W1FBY 237,500-644-70		
W7GLC 322,720-695-64		
WB9AWY 219,120-664-66		
W1E43 216,075-645-67		
WA8POS 210,800-675-67		
WB2RKK 205,920-617-66		
K8LUZ 201,480-578-69		
W8SH (WA3GBU, opr.) 199,530-610-65		
W4NOA 196,800-650-60		
WA1ABW 184,965-630-59		
WB8DL 181,815-527-69		
WA8TQT 180,695-530-71		
W0KIFH 179,520-528-68		
WA0RBW 176,000-530-64		
W5QGZ 175,680-542-64		
K4CAK 169,650-515-65		
W3EAX (WA3GVP, opr.) 167,680-520-64		
WA8ZTV 164,090-534-61		
WA2LBT 162,030-491-66		
WA6DFI 160,225-487-65		
K4FU 151,585-420-71		
W5RE 141,400-425-65		
WA0PRS 140,300-455-61		
K8HPY 138,560-433-64		
W4OZF 135,360-418-64		
W9LVH/9 128,100-415-61		
WASLES 124,500-410-60		
K1QFD 121,200-400-60		
WB40GW 120,900-355-62		
W1GHT 120,250-364-65		
WA2BEX 119,475-400-59		
WB2DZZ 119,130-413-57		
W8RCLF 117,300-387-60		
W8KAJ/VE4 116,400-385-60		
WA7OBI 114,880-354-64		
WB2IVR 114,860-361-63		
W8OXX 114,165-380-59		
WA9AUM 114,000-374-60		
WA7ISP 110,220-329-66		
K3HZL 109,800-366-60		
WA8VRB 108,990-343-63		
WA21HW 106,790-362-59		
K0PTK 104,980-359-58		
WA3OVZ 104,550-405-51		
W8TZZ 103,545-347-59		
K7LTV 102,660-341-59		

names will be listed on the ballot in alphabetical order.
The following nominating form is suggested. (Signers should be sure to give city, street address and Zip code.)
Communications Manager, ARRL (Place and date)
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the ARRL Section of the ARRL Division, hereby nominate _____ as candidate for Section Communications Manager for this Section for the next two-year term of office.
You are urged to take the initiative and file nominating petitions immediately.

George Hart, W1NIM, Communications Manager

Section	Closing Date	Current SCM	Present Term Ends
Wis.	10/11/71	S.M. Pokorny, W9NRP	12/10/71
Okla.	10/11/71	C.C. Cash, W5PML	12/11/71
W. Fla.	02/11/71	I.M. Butler Jr., W4RKH	12/15/71
Ill.	09/11/71	E.A. Metzger, W9PRN	12/15/71
W. I.	11/10/71	Jose Medina-Hernandez, KP4CO	5/1/71
P. Pa.	11/10/71	G.S. Van Dyke Jr., W3HHK	6/15/71
Ore.	11/10/71	D.L. Justice, K7WVR	7/1/71
E. Bay	11/10/71	P.J. Parker, WB6DHH	9/3/71
NYC-LI	11/10/71	F.J. Braves, K2DGI	1/2/72
S. N. J.	12/10/71	C.F. Traves, W2YFZ	3/4/72
S. E.	11/10/72	K.S. McTaggart, K6SRM	3/10/72
Ge.	11/10/72	A.J. Garrison, WA4WQU	3/26/72
Ohio	11/10/72	R.A. Egbert, WR8LU	3/28/72

SCM ELECTION RESULTS

Valid petitions nominating a single candidate were filed by members in the following sections, completing their election in accordance with applicable rules, each term of office starting on the date given.

Ks.	R.M. Summers, K0BXF	8/18/71
S. Barb.	D.F. Gagnon, W6JBE	9/2/71
W. Va.	D.B. Morris, W8JM	9/18/71
Manitoba	S. Fink, VE4FO	10/10/71
Va.	R.J. Slagle, K4CR	10/11/71



World Above

(Continued from page 95)

220-MHz activity continues to be spurred by the untiring efforts of WA6GYD, with his Northern California 220 News Newsletter which is getting nationwide circulation. Don is planning an additional newsletter, this one for 1296. In Michigan, WB8IDD has his second newsletter off the mill in a 220 promotion effort. Quite a few operators are getting their first taste of 220 by converting Heath Twers as per a WA6UAM article in WA6GYD's newsletter. The conversion is simple and I'm certain that WA6GYD will supply the details for a stamped, self-addressed envelope. WB4KGW, Pensacola, recently made a similar conversion with good results and reports WB4BSZ and WB4DHL active in the Florida Panhandle.

1296-MHz news comes from several sources this month. W1JOT, Mass., recently made his first 1296 contact working W1QXX, with a 2C39 tripler from 432. At Las Vegas, K7ICW acquired a 10-foot dish which is to be the beginning of sun-noise and moonbounce experiments. Al will be working with K7JPC, who is designing a polar mount for the dish.

K4QIF, Hobson, Va., is now on 1296 with about 250 watts output. Rusty has a fine shot up the East Coast, and he hears W1s and 2s on 432 almost nightly during summer and fall. His objective now is a 1296 QSO with W1GAN, for a new overland record.

Paul Wilson, W4HHK, got a nice write-up in a Memphis newspaper for his 2200-MHz reception of Apollo 15 as it circled the moon in July. Included in the article was a front-page photograph and good publicity for amateur radio. K2RIW and W4HHK swapped notes on the Apollo reception. K2RIW used the portable dish pictured in these pages some months ago.



SCM ELECTION NOTICE

To all ARRL members in the Sections listed below.
You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.
Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned are required on each petition. No member shall sign more than one petition.
Each candidate for Section Communications Manager must have been both the holder of amateur Conditional Class license (Canadian Advanced Amateur Certificate) or higher and an ARRL full member for at least two years immediately prior to receipt of petition at headquarters. Petitions must be received on or before 3:30 PM Eastern local time on the closing dates specified, in cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, Zip code of the candidate and signers should be included with the petition. It is advisable that a few extra full member signatures be obtained, to assure a valid petition.
Elections will take place as soon after the closing dates specified as full information on the candidates can be obtained. Candidates'

Operating Eventsde W1YT.

OCTOBER

- 2-3 **VK/ZL/Oceania DX Contest** phone, p. 105 Sept.
- 24 **California QSO Party**, p. 105 Sept.
- 24 **CQWE** cw, p. 105 Sept.
- 6 **W6OWP Qualifying Run** (W6ZRI, alternate) at 0400 GMT on 3590/7129 kHz, 10-35 wpm. This is 2100 PDST the night of October 5. Underline correct minute of highest speed copied, certify copy made without aid and send to ARRL for grading.
- 9-10 **Space Net VHF Contest**, p. 105 Sept.
- 9-10 **VK/ZL/Oceania DX Contest** cw, p. 105 Sept.
- 9-11 **CD Party** phone. This is a quarterly event for League appointees and officials, notified separately by bulletin. In this event, they exchange appointment designation and section. Check with your SCM, page 6, to see if you can qualify for an appointment.
- 9-11 **CQWE** phone, p. 105 Sept.
- 14 **WIAW Qualifying Run** 10-35 wpm, at 0130 GMT on 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.588 MHz. This is 2130 PDST the night of October 13. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL with your full name, call (if any) and full mailing address.
- 16-17 **Boy Scout Jamboree-on-the-Air** midnight Friday to midnight Sunday, local time.
- 17 **CQWE** rtty/vhf, p. 105 Sept.
- 16-18 **CD Party** cw.
- 16-18 **CARTG KITTY DX SS**, p. 77 Sept.
- 20-21 **YL Anniversary Party** cw, p. 102 Sept.
- 23-24 **Missouri QSO Party**, sponsored by the St. Louis ARC starts/ends 2200 GMT, open to all and no time/power limit. Stations may be worked on different bands/modes. Exchange QSO number, RS(T) and state/province/country for out-of-state stations and county for Mo. participants. Suggested frequencies: cw 3560 7060 14060 21060 and 28060; phone 3925 7275 14290 21360 and 28600 kHz. QSOs on other frequencies encouraged. Participants are urged to avoid interference to nets in session. *Score 1 point per QSO. Mo. stations use states/provinces/countries as multipliers. Non-Mo. stations use Mo. counties (115 possible). Appropriate awards. Mailing deadline Nov. 24. Logs to the St. Louis ARC, c/o Larry Robinson K8SGJ, 1582 San Miguel Lane, Fenton, MO 63026. Enclose an s.a.s.e. for a list of the winners.

23-25 **KY6PMR** operation, the Space Fair Amateur Radio Station (Pacific Missile Range), from 7 am to midnight each day, depending on activity and propagation. For a QSL, please mail an address label self addressed, not to exceed 2 X 4 inches. QSLs for phone operation go to Armand J. Filer, WA6WWC, 2406 Addison Circle, Thousand Oaks, CA 91360. QSLs for cw contacts go to Larry A. Beno, WA6GFE, 1154 N. Fifth St., Port Huenehue, CA 93041. No return postage required. The Space Fair, sponsored by the United States Navy, will be located at Pacific Missile Range Hq., Point Mugu, and will be open to the public, although the site of KY6PMR will not be available for inspection.

NOVEMBER

- 3-4 **YL Anniversary party** phone, p. 102 Sept.
- 4 **W6OWP Qualifying Run**.
- 6-7 **Illinois QSO Party**, sponsored by the Radio Amateur Megacycle Soc., Inc. starts 1600 GMT Nov. 6 and ends 2200 GMT Nov. 7. Use all bands, cw and phone. The same stations may be worked and counted for a QSO point on each band/mode. Ill. stations score 1 point per QSO with any station. Outside stations work Ill. only, scoring 1 point per QSO. Ill. stations multiply total QSO points by the sum of states/provinces/countries worked. Others multiply total QSO points by the number of different Ill. counties worked. Stations on Ill. county lines count as multipliers for EACH county. Additional bonus multipliers may be counted as follows: each group of 8 contacts with the same county counts as an extra multiplier, (10 QSOs = 1, 16 QSOs = 2, etc.). USA, Canada, Hawaii and Alaska count as country multipliers and K16/KL7 also count again as state multipliers. Exchange QSO number, RS(T) and county (for Ill.), state/province/country for others. Look for activity near 3560 3735 3900 7060 7175 7260 14060 14275 21060 21100 21360 28060 and 28660 kHz. Appropriate awards. Logs must show full info., and include a summary indicating single or multipl., name/address of op., pts., mults., as well as claimed score. Logs must be postmarked no later than Dec. 1 and go to RAMS,

K9CJU, 3620 No. Oleander Avenue, Chicago, Illinois 60634. Include a business size s.a.s.e. if results are desired.

6-7 **North Carolina QSO Party**, sponsored by the Raleigh Amateur Radio Society, starts 1800 GMT Nov. 6 and ends 0200 GMT Nov. 8, no time/power restrictions and open to all. N.C. QSOs are permitted. Stations may be worked on phone and on cw in each band. Exchange QSO number, RS(T) and QTH (county for N.C., and ARRL section or country for others). Log date/time in GMT, stations, exchanges, bands, emission and mults. Suggested frequencies: cw 1810 3590 7060 14060 21060 28060; ssb 3920 7260 14290 21410 28600; novice 3725 7175 21110. A complete QSO counts 2 points. N.C. stations multiply QSO points by the number of ARRL sections worked. Note that DX may be worked for points but do not count as multipliers. Non-N.C. stations use the number of N.C. counties as multiplier, possible total of 100. Appropriate awards. Mailing deadline Nov. 30. Send logs to RARS, Box 12541, Raleigh, N.C. 27605. Include the usual signed declaration.

6-8 **Massachusetts QSO Party**, sponsored by the MIT Radio Society, W1MX, will begin at 2300 GMT Nov. 6 and ends 0500 GMT Nov. 8, no time limit. A station may be worked once per band, cw/phone are considered separate bands. No crossband QSOs permitted. Mass. stations may work each other. Exchange RS(T), QSO number, county (for Mass.) and ARRL section (for country) for others. Count one point for each report received and two points for each report sent and confirmed (total of 3 points per complete exchange). Outside stations multiply total QSO points by the number of different Mass. counties worked (total 140). Mass. stations use the number of different Mass. counties plus ARRL sections and DXCC countries worked. (Do not include EMass or WMass as sections.) Logs containing more than 50 QSOs must be accompanied by a check sheet for each band worked listing, alphabetically, the calls of the stations worked on that band (ARRL Op. Aid 6, or equivalent). Suggested freqs. cw 3560 7060 14060 21060 28060, phone 3960 7260 14290 21390 28560; novice 3735 7175 21110. Try phone on the half hour. Appropriate awards. Logs must be postmarked no later than Dec. 1 and mailed to the MIT Radio Society, W1MX, 3 Ames St., Cambridge, Mass. 02139. Include the usual statement plus an s.a.s.e. if results desired.

12 WIAW Qualifying Run.

12-14 **QRP Contest** cw, starts/ends 2300 GMT. All entrants must operate cw with 100 watts of input power, or less. Stations that are worked do not have to operate under 100 watts. Stations may be worked once per band, exchange state/country and input power. One point per QSO, multiply by the number of states/provinces and non-WVE countries worked. Max. of 5 contacts per state. Contest call is CQ cw. Logs must include full data and must be received no later than Jan. 1, 1972. Send to Jon Weiner, WB8HXK, 2300 Lyndway Road, Beachwood, Ohio 44122. Enclose an s.a.s.e. or IRCs, if results desired.

13 **Frequency Measuring Test**, open to all, starts with a callup at 0230 and 0530 GMT Nov. 13. (Remember, this is the evening before, local time!) The periods for measurement start at 0237 (80 meters) 0245 (40 meters) and 0253 (20 meters); for the "late" run, 0537 0545 and 0553, respectively. Each measuring period lasts five minutes. Submit your average for each 5-minute period which will be compared with the umpire's average during the same period. The umpire is a professional frequency measuring laboratory. Tell how many readings you took to form your averages. Approximate frequencies for the early run are 3535, 7061 and 14,082 kHz. Late run frequencies are 3538, 7047 and 14,054 kHz. Your report must be RECEIVED by Nov. 24 to qualify for the QST report of the competition. WIAW will start transmitting the official readings starting Nov. 25. Next FMT scheduled for Feb., full info. will appear in the Jan. issue.

13-14 **Sweepstakes** phone, new rules this issue.

13-20 **QRP** cw contest, sponsored by QRP ARC International, starts 1800 GMT Nov. 13 and ends 2400 GMT Nov. 20; open to all. Exchange report, power, state/province/country and QRP number (for members) or NM, for others. Suggested frequencies are 3540 7040 14065 21040 and 28040. Stations may be worked once per band. Member contacts count 3 points, NM 2 points. Power mults. as follows: less than 1/2 watt output X 25, less than 1 watt X 10, less than 2 watts X 7, less than 3 watts X 5, less than 4 watts X 3, less than 5 watts X 2. To score: number of QSOs X M/NM points X states/countries X power multiplier. Appropriate awards. Full logs and summary plus description of your equipment and usual statement must be sent by Dec. 5 to contest chairman Earl R. Lawler, W5JLY, Route 2, Box 24-R, Burnet, Texas 78611.

20-21 **Sweepstakes** cw, new rules this issue.

Station Activities

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE - SCM, John L. Penrod, K3NYG - SEC: W3DKX. RM: W3EEB. Summer months means vacations. The amateur bands were at a low and many of the Delaware hams were on vacation. W3EEB was in Vermont. K3NYG went out west, WA3LTA to Iowa and W3ZNF attended the fm expo. at Chicago. W3TRC was busy with summer school. With the fall and winter months coming up, club activity will be at its highest. Plan to join a radio club this year. W3IUO kept in communication with K3NVV while he was out with his airstream. Form 1 and items of station activity should be sent to the SCM by the 7th of each month. Traffic: W3EEB 77, WA3LTA 74, K3TVV 42, W3DKX 26, K3NYG 10, WA3GSM 2, WA3DUM 1.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3ICC. RMs: W3EML, W3MPX, K3MVO, WA3AFI, K3PIF, W3CDB. PAMs: K3PSO, WA3PLP. OO reports were received from W3NNC, K3NSN, W3KEK, K3RDT. OVS reports from W3ZRR, W3CL. OBS reports from W3CBH, WA3AFI, WN3QOZ. W3EML, W3CUL, W3VR, W3MPX. PSHR: WA3PLP, K3OIO, W3MPX, WA3OGM. Summer vacations still taking its toll on traffic.

Net	Freq.	Operates	QNI	QTC	RM/PAM
EPA	3610	6:45 P Dy	199	292	W3MPX
PTTN	3610	6:00 P Dy	162	128	WA3AFI
EPAP&PTN	3917	6:00 P Dy	258	77	WA3PLP

W3CUL reports the camp traffic wasn't so large this year and is looking forward to the fair season. W3EML reports TCC holding up OK but he sure needs some Pa. stations with big signals to help out at higher levels. W3VR is building a rig for a blind lad and also is trying to get the PE-95 emergency power going. W3MPX could use more help as liaison between cw and phone nets. K3NSN is on vacation. WN3QOZ has a novice net going at 5:30 A.M. 3733! K3MVO is on vacation in Ky. WA3ATQ still maintains her skeds with SS Hope. WA3AFI reports that W3CBH let his license expire and will be off the air a few weeks! Keep an eye on that expiration date and don't let it happen to you. WA3OGM had a ball in his first TD party and 80,000 points too! WA3CKA is on vacation. VA3LMO work sked will keep him inactive until fall. W3FU got a first day QSL from WWVH! W3ID is on vacation. W3GMK is looking for someone with auto start RTTY for a sked. K3VFP manned a station at the Polish Festival in Doylestown with the help of local clubs. WA3OGM is doing a fine job on his net bulletin. VA3AGD/4 had a time of it for a while at the Ga. base, but all leaved up now. Traffic: (July) W3CUL 2323, W3EML 646, W3VR 54, W3MPX 380, WA3OVZ 202, K3NSN 189, WA3PGT 143, WA3PLP 137, WN3QOZ 90, W3CDB 89, K3MVO 89, K3OIO 82, WA3ATQ 77, WA3AFI 76, WA3OGM 63, WA3LVC 59, WA3CKA 3, W3VA 32, WA3IYC 22, W3BNR 16, W3HK 16, WA3PQA 16, 3KTH 14, W3VAP 11, W3ADE 9, K3KCM 6, W3CL 4, WA3BJQ, W3OY 3, WA3IAZ 2, W3EU 1, K3FOB 1, W3GMK 1, W3ID 1, W3KEK 1, WA3LMO 1, W3OML 1, W3YPF 1. (June) WA3PLP 44, W3BNR 14.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. edrow, W3FA - The traffic men got together at Patapsco July 18. ed certificates went to 12 fone and 21 cw netters. A good time was had by all with the man behind the mike or key now fully certified. Stations WA3GVP, W3BIK, W3MAH, WA3NYU and 3JYZ were all recently struck by lightning. Damage ranged from minor to extensive. A word to the wise - provide a good grounding stem and use it. WA3NYU opines 2 No. 10 conductors 10-ft. long aren't quite hack it. Now it can be told - the Springsbrook High school ARC is led by WA3MJF and WA3IYS VP and trustee. To gher education WA3MJZ, WA3OAO and WN3OHP. Congratula-

tions to W3ECP for 20 years as Maryland MARS director. The Randallstown Senior High ARC WA3NSZ has WA3MSW as boss man. The MDD QNI leader is W3EEB from Delaware. WA5GXN underwent an emergency appendectomy and is well on the road to recovery. W3FCS has a new beam, a new rotator and ideas for this winter. W3QDV finally made it with DXCC. He has retired and plans to move back to NH with a 2-letter W1 call. Appointment renewals: ORS: W3BWT, K3GPN, WA3KOQ and WA3IYS; OPSS: W3FCS, W3GLI; OOs: K3STU, WA3APQ; EC Prince Georges and Charles counties WA3AJR. MDD had 31 sessions in July, QNI average 10.1, traffic 172. MDCTN held 16 sessions QNI 12.6 with 25 messages. PSHR winners in July were W3FCS and W3FZT. fone and cw net managers. K3RUQ made BPL from the summer camp he counsels. W3CDQ entertained visitors from all over this summer. W3ZSR and W3ABC are cranking up for the ham call auto license again this winter. K3NCM and WN3OYP are attending ham picnics. W3GM finds it very busy this year. K3LFD likes the MDD bulletin of W3EZT. W3TN is doing a lot of visiting. WA3IV is busy and reports by radio. WA3OHF enjoys 15 meters this summer. New AREC members are WN3OEN, WN3POG, WN3OSC, WA3GML and WA3RBY. The Maryland Mobilizers had a nice hamfest with lots of uhf men and an active program. Traffic: W3WHL 601, K3RUQ/3 185, W3TN 120, W3EZT 81, W3CS 72, WA3MSW 57, K3BA 53, W3FZY 48, K3LFD 35, W3QU 31, W3FA 24, K3GZK 24, WA3IV 22, K3ORS 12, W3ECP 8, K3ORW 4.

SOUTHERN NEW JERSEY - SCM, Charles F. Travers, W2YPZ - SEC: W2LVW. PAMs: WB2JE, W2YPZ. RM: W2JI.

Net	Freq.	Time(PM)	Sess.	QNI	Tfc.	Mgr.
NIPON	3930	6 Su	4	77	16	WB2JE
McOVHF	145.9	8 F	3	9	0	W2YPZ
NJSN			18	55	16	W2FVH

It is gratifying to note that WA2KWB has completed a very busy and profitable summer. Frank has returned to his QTH at Rutgers U. to complete his Masters requirements in EE. WA2NPP the Rutgers U. college station will be heard on the evening nets as usual. W2ORS, is in there doing a fine job in spite of the summer heat and vacation distraction. K2ARY finds time to send the bulletins as usual. Our very active YL, WA2FGS continues to report great activity. Her weekly drills on 2-meter RACES is another of Rose's activities. She is NCS for the Salem Co. state RACES Net. Congrats are due W2BAY - he was the only reporting station in the Apr. CD party from Southern NJ (cw). It is a pleasure to report that W2JI has a new vertical antenna on 15, 20 and 40. Ed is quite active on these frequencies and enjoys his new vertical which was installed by W2HX and W2FDE with WA2TNS and W2YPZ as spectators. Traffic: WB2VEJ 167, WA2RLV 28, WA2KAP 24, WA2FGS 23, WB2JE 13, W2IU 12, W2JI 10, W2YPZ 7, WA2KWB 6, K2JJC 5, W2ORS 3.

WESTERN NEW YORK - SCM, Richard M. Pitzeruse, K2KTK - Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. The list of section nets appears in Apr. Station Activities. Congratulations to WA2BEX on his new Advanced. K2PVN reports the telephone strike has made him a 72-hour work week. W2CFP is now also WB6KLG. Dave has swapped gear so much lately he is not sure himself what he is running. W2MTA reports NYS cleared 334 messages with 758 check-ins for July. W2KLF, recently retired, beats up his antenna with a TR-4, W2RN, W2RUF, K2CI, WB2NE and WB2QGD were five of the 29 that enjoyed the Gassers picnic. Congrats to WN2PIX on passing the General Class exam. WN2NRK operated portable with 60 watts from Camden for the summer. K2SFP is now PY2ZAN in Sao Paulo and frequents 21290 kHz at 2230Z for anyone needing PY. His U.S.A. license is now Extra Class. WN2AOG has a new rotary dipole on 15. WA2BCK after breaking a 3-500Z has his new SB-220 on the air. The Empire Slow Speed Net meets daily at 6 P.M. local time on 3590 for those interested in a good training net. WN2ASZ is a new ham on Grand Island. WN2TOX operated portable 1/1 for a while during the summer. WA2MPC says the DX comes easier as did state number 50 (Utah) with his new tri-bander. If anyone missed WNY during the July CW CD Party, they just weren't on the air. It seems K2KIR, K2KTK and W2ZFK were all over 300K! BPL this month to WA4PDM/2 as regular W2OE spent most of the month in the British Isles. As club activities swing into high gear, be sure to support your

organization - also would like to receive a copy of your club's bulletin. The Radio Amateurs of Greater Syracuse are planning to move their 1972 hamfest from Apr. to Oct. Meanwhile the Binghamton Club plans on resuming the Penn-York affair in Apr. of '72. Traffic with * indicating PSJR: (July) WA2ICU* 328, WA4PDM/2 237, W2FR* 227, W2OE 136, W3MTA* 129, WB2LQP* 106, W2RUI* 99, W2BU 78, W2MSM 73, K2KTK* 71, WA2ELD 70, WA2MPC* 70, WB2VND 63, K2JBK 55, W2FEB 50, W2FZK 50, WB2HLY 39, WA2HTJ 23, WB2IKL 21, WB2YKY 18, W2MF 17, W2BYM 16, K2RTQ 16, K2DNN 13, K2UIR 12, W2PVI 11, WA2BEX 10, W2EAF 8, K2OFV 7, WN2AOG 6, K2IMI 5, W2WS 5, W2CFP 2, W2CGD 1. (June) K2UIR 18.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEM - SEC: W3KPI. PAM: K3ZNP. RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. 3585 kHz at 6:30 P.M. All times local (EDST and EST). It is with deep regret that we announce the Silent Key of W3FVH. The Etina RC reports the Breeze-shooters elected the following new officers at their annual picnic: K3FGQ, pres.; K3XKB, treas.; WA3MWM, checker; K3CHD, W3OFI, WA3BJS, wind gaugers. Good luck men. Two Rivers ARC report they had 24 helpers to make Field Day a real ball this year. The Presque Isle ARC reports their first Field Day effort this year sported five sub positions going full blast in the five transmitter class. W3LOD was in Tex. visiting his daughter, K3ZNP is vacationing in Greece, W3IDO is in Ocean City, Md., WA3JH vacationed in Ky. where he operated in the July CD party. K3JHZ finished his college education and now has extra time for ham radio activities. WN3RIZ is a new Novice in the WPA section. WA3JH is now Extra Class. The WPA gang had 22 licensed amateurs at their annual picnic/meeting. A great time was had by all. W3MJ had his second 100% month of checking into the WPA CW Traffic Net. Over 60 straight days without missing. Congrats. WPA traffic report for June: 30 sessions, 149 messages, 355 QNL. July: 31 sessions, 213 messages, 342 QNL. Traffic: W3KUN 170, WA3IPU 147, W3NEM 140, W3YA 136 (W2KAT, W3NFM ops), WA3NAZ 108, W3LOS 100, WA3RBS 62, K3ZNP 27, K3SMB 25, W3MJ 22, WA3MDY 15, W3ATQ 12, K3HZL 8, K3SN 7, W3LOD 5, W3SN 5, WA3JH 4. Total traffic 993.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU. PAMs: WA9CCP and WA9PDI (vhl). RM: WA9ZUE. Cook County EC: W9HPG.

Net	Freq.	GMT/Day	Tfc.
IFN	3940	1400 Su	5
ILN	3690	0030 Dy	152
NCPN	3915	1300/1800 M-S	90
III POIN	3915	2345/1430 M-F	524
III POIN	145.5	0200 MWF	23
III POIN	80.28	0200 M	3

W9HRY reports a traffic count of 402 for the Ninth Region Net. See Operating Events, this issue, for Illinois QSO Party rules. W9EY is back on the air after a lapse of a few weeks. K9HRC and K9QGR are home from W5-Land for a short visit. Now is the time for the beginning of code and theory classes for the fall and winter season. From reports received, many clubs have announced plans for these classes. Best wishes to W9SXL who just celebrated his 65th birthday and 37th year of hamming. WB9AUR has a new quad and finds it helps on 20 meters. WN9BWC has an FTDX-560 and waiting for his general ticket. It is with deep regret that this column notes the passing of W9GLT and W9LDP. Our sympathy to their families and many friends. K9DDQ/WB9AIE is going mobile on his vacation with a new Drake TR-4 unit. WB9GRH received his General Class in Mar. and in July he received his Advanced Class license. Susan Lundstrom, daughter of W9HUK and sister of WA9VXS received the Bronze Star medal for meritorious service while she was assigned to Thailand. WA9QYK is building a Heath SB-303 and an SB-401, and a homebrew Delta Loop triband antenna. WB9DPU/WA9MLE now is stationed at Chanute AFB in Rantoul until Feb. New officers of the York Radio Club are: W9QKE, WB9ADQ, K9YST, WA9ZDJ and WA9JXT. W3ZJY reports that the Chanute AFB Club was chartered on July 1, WN9DGF now is WB9DGF, WN9HUK is a new Novice in the Springfield area. Another new Novice heard was WN9HKA. WB9FRR passed his General and WA9SFB passed his Extra Class exam. The Moultrie Radio Club novice course taught by W9EWX, K9BOM and WA9WLE turned out nine Novices including: WN9CQX, WN9GRT, WN9GVL, WN9GVM, WN9GWR, WN9HCF, WN9HCF, WN9HWT and WN9HWU. The Rockford Amateur Radio Assn. held their annual picnic with an FB turnout of the club. The WA9TEC repeater will undergo modifications and the present single channel will be converted to a two channel on 146.28 MHz input

and 146.880 MHz output. This will be in addition to the present 146.360/146.940 MHz. Traffic: WA9WNH 283, W9NXG 175, W9FLF 129, WA9ZUE 128, WA9NZF 111, WB9AWY 102, WA9RTB 87, W9HTB 61, W9DOQ 52, W9JXV 50, WA9SFB 50, W9LNO 42, WA9LDC 36, W9FHL 23, W9PRN 20, WA9OTD 18, WA9LHU 12, W9QQG 12, W9QLN 7, WB9FLP 6, W9LFX 6, W9E 3, W9IDY 2.

INDIANA - SCM, William C. Johnson, W9BUQ - SEC: W9T RMs: W9FC, W9HRY, WA9ZXC. PAMs: WA9QHX, (vhl) W9PMT

Net	Freq.	Time/Day	Tfc.	Mgr.
IFN	3910	1330 Dy	272	WA9OH
		2130 M-S		
		2300 Dy		
QIN	3656	0100 Dy	43	W9HR
POIN	3910	1245 Su	56	WA9UM
		1830 S-S		

POIN VHF 50.7 653 K9AP
Hoosier VHF 43 W9PMT

It is with deep regret that I report WA9BHG as a Silent Key. WN9HVM is a new Novice in Portland. The Hoosier Hill Hamfest Oct. 10 at Spring Mill State Park. The W9INK repeater at Ft. Wayne frequencies are 146.28 input and 146.88 output, secondary frequency input 146.46-52.64 and 52.88 output. The IRCC Picnic was at the La Porte Fair Ground. If you missed this one you missed a fine time. W9HPG, the Central Division Dir. presented the Indiana outstanding award to W9DZC of Greentfield. SCM W9BUQ read the nominating letter. Don't forget the IRCC fall meeting Indianapolis Oct. 3, 1971. The location will be in the Buson. A clubs should send a delegate to this meeting. In July the Tri State ARC had their Hamfest at Evansville. I hope that Tri State and IRCC get together on their date next year so as not to have the Hamfest on the same day. Traffic is down, but the IPON vhf is going strong. I want to thank K9APH for getting so much traffic for the vhf. K9FZX may be off the air for a while, Annie is building a new home. W9HRY is acting RM for QIN until a permanent one is appointed. IPON vhf traffic for June was 956, hf was 56. B certificates went to K9APH for June and July and W9JYO. Amateur radio exists because of the service it renders. Traffic: (July) K9A 418, WA9WJA 211, W9HRY 171, W9JYO 127, WA9UHX 17, WA9ZKX 97, W9QLW 64, W9FWH 52, W9BUQ 44, K9IOH 4, K9YBM 32, W9PMT 30, K9CBY 25, W9DZC 21, K9RPZ 2, K9IQY 15, W9RTH 13, WA9AXF 12, WB9BAQ 11, K9ILK 9, W9VHY 7, K9DIY 6, WB9BAP 3, W9HWR 3, W9KWB 2. (June) K9APH 677, WA9ZCW 260, WA9BVL 3.

WISCONSIN - SCM, S.M. Pokorny, W9NRP - Asst. SCM Joseph A. Taylor, W9OMT. SEC: W9NGT. PAMs: WB9C K9FHI, WA9OAY, WA9PKM, WA9QKP. RMs: WB9BIR, K9KSC

Net	Freq.	Time/Day	QNL	QTC	Mgr.
WSSN	3662	0030 TTS			K9KSA
WIN	3662	0115 Dy	165	552	WB9BJR
WRN	3620	0130 Su (RTTY)			K9GBC
SW2RN	145300	0230 Dy	103	4	WA9PKM
SW6RN	50.4	0300 M-S	138	9	WB9CKE
BWN	3985	1245 M-S	361	184	WA9OA
W-RACES	3993.5	1400 Su	34		W9NRP
GEN	3985	1800 Dy	830	151	WA9QK
W-POIN	3925	1801 M-F	397	35	W9ELC
WSBN	3985	2300 Dy	1179	157	K9FHI

*All nets one hour earlier during the daylight saving time period. K9KSA is moving to Wausau, WA9NBU moving to Poyne. W9NN/W9JJ is a new Wis. resident at Plover. WA9QVT will start the next 12 months in HLX-Land. WB9CKE now has 35 state 6-meter sub including XE2XN and WB2RLK/VEL. WA9LHJ is an Advanced Class licensee, W9FUY, General Class (WB9FUY) Whitewater. New Novices are: WN9JLN and WN9HLP at Atkinson; WN9HLO and WN9HLQ at Lake Mills; WN9HQJ Whitewater. K9FHI and family on trip to Canada and mobile W9NN/W9JJ would like to hear any information on DXCC, be the ARRL DX Advisory Committee. WA9LHJ, K9RFZ, W9CFS, W9SLL renewed as EC's. W9NLJ renewed as ORS. K9UTQ renewed as EC and OPS. Traffic: (July) WB9BJR 1083, WA9SUD 993, W9CXY 367, K9CPM 190, WA9QVT 79, K9KSA 72, K9FHI 68, W9NRP 34, K9JPS 30, W9KRO 23, WA9OAY 9, W9RTP 12, W9IHW 11, WA9THE/9 9, K9UTQ 9, W9FBU 6, W9NN/W9JJ 6. (June) W9CXY 286.

DAKOTA DIVISION

MINNESOTA - SCM, John H. Halstead, K0MVF - Asst. Edna M. Thorson, WA0RRA. SEC: WA0MZW. RMs: WA0W9AAU. PAMs: WA0HRM, K0EFT, WA0JPR and WA0VNP passed the Extra Class exam. WN0DOU and WN0CGT have passed their General Class. WA0IAW is now a licensed pilot. K0O

helping restore street cars for a street car museum. W0B0RG received his Navy MARS license and WA0YER and WA0VYB received their Army MARS licenses. WA0VYB has an SB-200 on the air. K0ZXE has completed his SBWAS. All Minn. nets move up one hour GMT when we go to standard time. Local time will stay the same. MSPN (noon) 12:05 CST/1805 GMT 3.942 MHz daily except Sun. and holidays meets at 9:00 A.M. CST 1500 GMT; MSPN (eve) 5:45 P.M. CST/2345 GMT on 3.925 MHz daily; MSN 6:30 P.M. CST/0030 GMT 3.685 MHz daily; MJN (slow speed) 7:00 P.M. CST/0100 GMT 3.685 MHz daily except Sun.; MSTN 10:30 P.M. CST/0430 GMT 50.400 MHz daily; Minn. RTTY 8:00 P.M. CST/0200 GMT 3.620 MHz Sun.; Minn. AREC 5:00 P.M. CST/2300 GMT 3.912 MHz Sun.; Piconet 1:00 P.M. CST/1900 GMT informal Sat. 3.925 MHz, formal 1:00 P.M. CST/1900 GMT Sun.; Handi-Ham System 1:30 P.M. CST/1930 GMT following Piconet Sat. 3.925 MHz; Piconet Allday Watch (PAW) monitors Mon. through Fri. 9:00 A.M. until 12:00 Noon and 1:00 P.M. until 4:00 P.M. CST 1500 to 1800 and 1900 to 2200 GMT 3.925 MHz for emergencies, traffic, mobiles, informak. All times given are for Standard Time. Traffic: WA0VAS 689, K0CSE 183, W0B0RG 121, W0ZHN 100, WA0EBZ 92, WA0RRA 92, K0BOK 79, WA0IAW 69, WA0WEZ 68, WA0EPX 67, K0MVF 55, W0BUC 53, WA0YVT 53, WA0TFC 46, W0B0YZ 36, WA0YFR 31, K0FTI 29, WA0VYB 29, K0FLT 28, WA0HRM 28, W0WUH 28, K0ZRZ 28, WA0VHZ 27, W0NCGT 20, WA0EWC 20, K0ZBJ 19, WA0YAH 17, K0ZXE 12, WA0SGJ 10, W0ISJ 9, WA0NQH 9, K0ICG 8, WA0RKY 8, K0VPM 8, W0WAS 8, WA0YWA 8, WA0JPR 6, WA0WPP 6, W0KNR 5, W0KLG 4, WA0EAF 4, W0MXX 4, WA0YGE 4, W00CNB 3, W0PAN 3, K0SXO 3, WA0MMV 2, WA0VHO 2.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC: WA0AYL. OBS: W00ATB. PAM: W0RSR. QO: W0BF. The International Hamfest held July 10 and 11 at the Peace Garden with over 200 attending, was quite successful. W0BUO, Vice-Pres. of ARRL and W0PAN, the Dakota Division Director were also present with the latest news of the annual meeting and activities of the League. Chmn. WA0UKD and W00ATI are to be commended for the nice job done. The same date was chosen for next year and the chmn. will be WA0SJB and W0BHT. W0B0BHJ aided by W0GFF is working up a phone patch. WA0ZJZ spent a few days in the hospital. WA0ATB is a new OBS appointee. The Dakota feedbacks, a newly-organized club at Grafton with W0B0PD, pres.; W0B0PC, vice-pres.; W0NELW, secy-treas., operates a 160-meter net on 1995 kHz, 2130 P.M. and also were active on Field Day. Nice going fellows. W00DTI operated portable at the White Earth Boy Scout Camp. W0YKB, an OT from Grafton, after an absence of many years came back with a Swan 270 and is giving sb a whirl. W0DM has been getting excellent results with the HW-101 as a portable rig on trips to Minn. and western North Dakota. WA0OVT spent his vacation in Minn. and helped W0B0CK with his transmitter. WA0AYL went back to Ohio and NY on his vacation. Ex-W0PHH and XYL were back from Calif. for the Hamfest and visited relatives and friends in Grand Forks. They were guests of W0EJF and WA0MND enroute. W0TUF made it home from Sweden and reports a very nice trip.

Net	kHz	CDT/Days	Sess.	QNT	QTC
Goose River	1990	0900 Su	4	56	2
NDRACES	3996.5	1830 M-F	22	593	28

Traffic: WA0SUF 22, W0DM 15, W00BIN 5, W0CDO 4.

SOUTH DAKOTA - SCM, Ed Gray, WA0CPX - South Dakota has been represented on the Region Ten CW Net by WA0TMM, K0WNV, WA0AOY and WA0NZA. Region Ten certificates have been issued to WA0TMM and K0WNV. Remember that the SDN CW Net starts Sept. 1, on 3.645 MHz after a summer vacation. RM W0WCN would appreciate checks by all as often as possible. WA0QLP of Rapid City recently vacationed in Canada and got in some VE amateur operation. Don't forget the Dakota Division Convention coming up at Sioux Falls on Oct. 9. Thanks is expressed to the Huron Club for sponsoring the S.D. Picnic. The Black Hill ARC had a hamfest on Sept. 6. Net reports: Morning Net - QNI 479 and formals 44; NIJ - QNI 42 and formals 9; Late Evening - QNI 881 and 32 formals. Traffic: W0HOJ 66, W0CAS 17, W0ZWL 15, W0FJZ 9, W0DVB 4.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WA5VWH - SEC: WSRXU. PAM: WASKJT. RM: WASTLS. Welcome to new Novices WNSFAD, XYL of WASWMD, and WNSFAE, XYL of WBSBID. WASRCK has a new SB-101, WASKJT now has a Swan 500-C. WASKJT and WA5VWH now have a Regency HR-2. WASPPD has a new Drake TR-22 and has been doing a lot of aeronautical mobile work with it. WBSCLZ has a new TR-4. WA5TUR is now using an

SB-101. W5BEB is working over his antennas for the coming season. WASKAK is back from military service and plans to attend college in Little Rock beginning the first of the year.

Net	Time(Z)/Days/Freq.	Mgr.
OZK	0000 Dy 3790	WASTLS
Razorback	0100 M-S 3995	WASKJT
Ark Phone	1100 M-S 3937	W5VFW
Post Office	2130 M-F 3925	W5MJO
Hillbilly	2330 Dy 3995	WASZKE
CAREN	0100 Th 146.94/34	W5ODF
DX Info	2345 M 3860	WASFFL

Repeaters: Little Rock W5DI 146.34/94. Fort Smith WA5YUT 146.34/94. Traffic: WASZKE 55, WASTLS 23, W5SOQ 7.

LOUISIANA - SCM, J. Allen Swanson, Jr., W5PM - SEC: W5OB, RM: WA5VOE. PAM: WA5NYY. VHF PAM: W5DXA. WASZFB operates uhf either at home or mobile. WA5TYJ Net Mgr. reminds us the new LA Phone Net meets on 3915 at 2400Z. W5EA says he is still working 7 MHz to have fun on cw. WBSCHP reports the NOLA AREC Net meets on Wed. at 0100Z. W5DXA reports that uhf activities have really increased by leaps and bounds in South La. W5QVN also states that there is some 2-meter fm activity starting in the Monroe area, mostly around 147.3 MHz. The Twin City Hams would like to exchange newsletters with other state clubs. For details write Box 5015, Monroe. W5VUY recently presented a program on 2-meter antennae to the LARC gang. An auction is planned by the Lafayette fellows during the fall. W5ENP up Lafayette way lost his tower and quad to the winds of a thunderstorm. WASZDZ and WNSHSH completed exams with the latter a fine addition to our ranks. W5UHF represented La. at the International Scout Jamboree held in Japan. W5WEY has assumed the duties as pres. of the new Delta DX Assn. The GNOARC had its greatest FD activities in many a moon. W5RA, our local FCC bigwig, presented a most interesting program on regs, FCC, etc., to the New Orleans group. Traffic: WA5WBZ 50.

MISSISSIPPI - SCM, Walker J. Coffey, W5NCB - SEC: WA5IWD. RMs: W5SBM, WA51MC. PAMs: W54HS, WA5KEY, K5MDX. Welcome to new hams: W5CHZ, W5SEEB also to WNSs EGO, EMA, EMT, ENX, EFX, ERC, FWM, EWQ, EWW, EXY, EYW, FYX, EYJ and EYZ. If you want a W5 certificate, the Nov. 55 is a good time to work all states and qualify. Good openings on 6 in July. WSKDM worked or heard all call areas on 6. WNSDLW has a new 10 and 15 beam. W5EIN hopes to be more active soon. Only repeater registered in directory from Miss. is W5RMS. I can furnish form CD-85A. K8YUW/5 did fine job on the MSBN directory. WA5UIH spent the summer handling traffic. CGCHN had a good month with 1593 QNIs, 131 QTCs. MTN reported 163 QNIs, 94 QTCs. MSBN had 1014 QNIs, 101 QTCs. Need help with Intruder Watch program, more OOs and more vhf station activity information. W5SBM made PSIR again. Traffic: W5SBM 270, WA5UIH 131, W5EDT 127, WA5YZW 91, W5NCE 48, W5WZ 40, K8YUW/5 23, W5TMC 20, WA5YJA 15, WA5KEY 9, W5BW 6, WA5WQT 3, W5AIN 2.

TENNESSEE - SCM, O.D. Keaton, WA4GLS - SEC: W54ANX. PAMs: W4PFP, K4MQL, WA4EWW. A successful hamfest was reported at Crossville for 1971 with a talk by Dr. Arnold concerning proposed frequency allocations and WA4GLS concerning communications. The guest speaker was WA4BVT. The Tenn. Council of ARCs presented the Cleveland Amateur Radio Club with the Tenn. QSO party award, K4PUZ with the individual QSO party award and W4OQG the Tenn. Amateur of the Year award; new officers elected were WB4KHW, chmn.; WB4MPJ, vice-chmn. and W4CYL, secy. Oak Ridge Radio Operators Club won the best Field Day performance award. The Delta Amateur Radio Club presented the Dr. Nobel W. Guthrie Award to W4WJH. The recipient of the W4CYX/K4DE cw award was WB4DAJ. The Tenn. Amateur Radio Ten Meter Operator Society held its annual meeting and nominated W4PSN and W4SGH, pres.; WA4QXC, vice-pres.; W44CHS, awards mgr. for 1972. All novices interested in participating in a novice net, contact WB4R1X. WB4O6 reports plans to start a 2-meter fm net. WB4CQL is preparing a Tenn. directory. I want to thank all of you for willingness to help during this first month as SCM, keep up the enthusiasm. Traffic: WB4DAJ 112, W4OCG 103, W4ZJY 103, WB4ANX 76, W4WBR 70, WA4GLS 65, WB4FHD 53, K4PUZ 47, W4RUW 41, K4SXD 18, W4YAU 18, WA4ZRC 12, WB4MPJ 11, W4SYE 9, WA4EWW 8, W44VYW 8, W4CYL 7, WB4LHV 5, K4SJV 5, WB4FVM 3, W4LBD 1.

GREAT LAKES DIVISION

KENTUCKY - SCM, Ted H. Huddle, W4CID - SEC: K4YZU. Appointed: WB4PTC as ORS. Endorsed: WA4MKH as OPS.

Net	QNT	QTC	Net	QNT	QTC
KRN	329	25	KYN	275	191
MKPN	505	61	KNTN	207	135
KTN	1003	168	KPON	92	40

The Somerset Hamfest was a big success with 38 hams and their families attending. W4KCF walked off with first prize. Roses to WA4JOS and his tribe for starting a new Ky. hamfest. K4TXJ now has his DXCC. K4HGB from Ashland is back on with an SB-101 after several years of inactivity. A second repeater is on in Louisville with the call WB4RVX and frequency 146.46/38. The Kentucky Radio Teletype Net (KRTN) now is active on 3628.5 at 2345Z nightly. WN4WCM is a new Novice in Ashland. Traffic: WA4VZ2 76, 161, W4BAZ 127, WB4PVC 104, WB4EOR 80, WB4PSI 39, K4UNW 76, W4CID 64, WN4YU 52, K4MAN 47, K4TRT 37, K4TXJ 35, WA4JOS 33, K4YZU 30, W4OXM 25, W4OYI 23, W4CDA 20, WA4AVV 18, WA4AGH 17, K4AVX 17, W4BTA 17, WB4KPE 17, WB4AUN 15, WB4IGX 10, WA4HLW 9, WA4FAF 8, WB4HTN 8, WA4MEX 8, WA4MXD 8, WA4WQZ 8, WA4FNH 7, W4NBZ 6, K4YCB 3. Total reports 32, traffic 1195.

MICHIGAN - SCM, Ivory J. Ollinghouse, W8ZBT - Asst. SCM: R. Peter Trem, W8KBZ, SEC: W8MPD. RMs: W8SPM, W8RTN, W8WVL, K8KMQ, W8BDTT. PAM: W8STAN, K8MIK, K8PVC. VHF PAMs: W8CVQ, K8AEM.

Net	Freq.	Time/Days	QNT	QTC	Sess.	Mgr.
QMN	3663	2300 Dy	549	220	62	W8SPM
WSSB	3035	0600 Dy	848	119	31	K8PVC
BR/MEN	3930	2230 S-F	906	75	26	W8ARTAN
UPEN	3920	2230 Dy	402	34	28	K8MIK
GLETN	3932	0130 Dy	866	83	31	W8KHK
PON	3955	1600 Dy	883	278	31	K8LNE
W8N/CW	3645	0000 M-F	157	27	27	VE3DPO
OH.6M	50.7	0000 M-S	163	21	19	W8LRC

A new appointee is W8KHZ as asst. SCM and also asst. dir. for the Mich. U.P. The U.P. Hamfest was a great success with more than 250 hams registered. At the net meeting the evening and Sun. Emergency nets were combined under one mgr. and K8MIK was elected for the post. The vhf group has a new repeater just north of Escanaba up 600ft. (2-meters-34 in 94 out). The Net Picnic at Midland July 18 was very well attended with more than 500 hams and families. A great swap and shop and every one had a good time. WB9JP is out of the hospital. W8CNCW and W8NIM moved and now have antenna problems. W8VZC is on the air from South Boardman. W8FMB is a new General Class licensee. W8HIZ says he seems to have inherited a novice traffic net. Can anyone beat this new novice father W8BRI and 13 year-old daughter W8SRI. W8BJJ made 39 phone patches and had net time of 28 hours. W8DT also set up 27 patches. New officers for the GLET Net are W8KHK, mgr.; W8FKR, asst. mgr.; W8RXL, secy. W8DXL of Tawas City has joined Silent Keys. W8DCN is in the hospital. W8FEZ now has General Class and is active on QMN. W8KRI and W8KOK are new at Corunna. K8OVN is mobile on 160. K8IOK and K8HVG are going 2-meter fm. The PON Ham of the Month is W8TDA. W8VBY had fun on the open CD Party with 882 QSOs and 72 sections and is now getting ready for SS. Traffic: (July) K8KMQ 292, K8ZJU 170, K8LNE 141, K8PVC 99, W8JYA 87, W8ZDE 83, W8MO 81, W8SZ 67, W8ZBT 61, K8JED 57, K8CPW 56, W8FJ 50, W8STAN 50, W8NOH 47, W8SPM 47, W8BRI 40, W8LXY 40, W8SQC 39, K8MIK 38, W8RTN 32, W8TJ 28, K8TAK 25, W8WYI 24, W8FZL 23, W8SH 20, W8DT 18, W8VXM 18, W8BEE 17, W8BEN 17, W8UFS 17, W8VBY 16, W8RANR 14, W8KBE 14, W8OHU 14, W8HD 12, W8BONZ 12, W8RKY 11, W8FBG 10, W8BGT 10, K8JHA 10, W8FKR 9, K8AEM 8, W8FEZ 8, K8ACO 7, W8OBE 7, W8FX 6, W8TUC 6, W8AQ 5, W8WV 5, W8SHZ 4, W8DKO 2, W8EGR 2. (June) K8PVC 89, W8ZAV 55, W8LXY 22, W8DUL 17, W8H 14, W8VBY 3, W8BEZ 1.

OHIO - SCM, Richard A. Egbert, W8ETU - SEC: W8OHU. RM: W8IMI. PAM: K8UBK. VHF PAM: W8ADU.

Net	QNT	QTC	Sess.	Freq.	Time(Z)	Mgr.
OSSBN	2142	859	62	3972.5	1430/2245	K8URK
BN	671	342	62	3580	0200/2300	W8IMI
O6mTrn	408	45	62	50.16	0100	W8ADU
				50.61	2300	
OSN	171	42	30	3580	2225	W8WAK
BN RTTY	116	31	31	3605	2300	W8YUB

W8OCU, W8ZUK and K8ONA made BPL in July. Local AREC section nets and identify the local net being represented. W8GMY is a new OBS appointee. Ohio Slow Net certificates were earned by the W8CKY and W8IML. Certificates for regular participation in the Buckeye Net went to K8BPX, W8CHT, W8CWD, W8BDQU, W8GOE, W8HCR, W8IMI, W8IMD, W8LT, W8XQ, W8YRP,

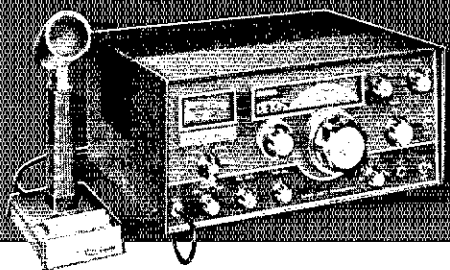
W8WAK and W8YUB, Ohio Single Sideband Net certificates were awarded to W8AZL, W8BCY, W8BEEZ, W8BNC, W8BGE, W8KVF, W8MVN, W8RQ, W8QJ, W8SVH, W8ZEB, W8WV and K8LOM. OVSA: W8BOK and K8TUT report excellent 6-me openings in July. DX enthusiast K8CSG has staged 142 countries and confirmed 92 since getting back in business in Ft. Congratulatory to Q-Match reports the club made a new high of 4524 points in the June VHF QSO Party. The club is considered operating from a W. Va. mountain top during the fall VHF Par SEC W8OUL's monthly report shows that our AREC membership up to 1341. We regret to report that W8AQZ has joined Silent Ke 8RN Mgr. W8CHT advises that the fifth Annual Eighth Regi ARPS Conference will be held in Detroit on Oct. 23. ARPS-minded amateurs should attend this affair and participate its several programs. Details from host W8MPD (Mich. 5th W8CHT or W8FTU. So long and best wishes to K8MMH who left Ohio for a new job in Chicago. ORS W8GOE waits over frustrations during a visit to Israel. He found a tower full of ant atop his hotel, and discovered that the hotel owner was a ham w a KW. Joel's dream of being rare DX was shattered when he fou that the owner was abroad in Canada. OO W8KAJ/VE4 racked 385 contacts during the cw portion of the CD Party. ORS K8OJ spoke before a Kiwaus luncheon on the subject of traffi ARPS Conference who led the section in the New Congratulations to W8GLY who led the section in all category Roundup. There are station appointments available in all category Please consider applying for one. If you're an active ham, y probably qualify for a station appointment. Traffic: (July) W8ONA 258, W8BGE 273, W8ZUB 250, W8IMI 211, K8ONA 170, W8DWL 186, W8WPO 179, W8QFK 173, W8PMJ 166, W8C 157, W8UPI 138, W8ASD 133, W8ZIV 125, W8GVX 113, W8BNU 120, W8MOK 114, W8BETX 113, W8NOU 113, W8BCLF 105, W8BEEZ 95, K8BFX 74, W8BGI 69, W8CWD 55, W8DUG 54, W8SUS 52, W8LFL 51, W8BAYC 48, W8BOK 47, W8JMD 45, K8BYR 42, W8KVF 40, W8CYZ 38, W8BNC 36, W8OL 32, W8TYF 30, W8ECC 20, K8OYR 29, W8ADU 26, W8HIG 24, W8BDF 24, K8DHJ 24, K8EHE 24, W8BMT 24, W8VWH 20, W8U 19, W8ARW 16, W8BHR 16, W8LAM 15, W8UX 14, W8JFH 14, W8HGH 12, W8NAL 12, W8GOE 10, W8BDOV 9, W8RDY 9, K8NOW 9, W8LZE 8, W8W 7, K8LFI 7, W8DOV 6, W8MCR 6, W8MGC 6, W8VNU 4, W8XQ 4, W8AZN 3, K8LMO 3, W8GRG 2, (Ju W8UPI 95.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2SJI Asst. SCM/PAM: Kenneth Kroth, W2VJB. SEC: W2URP. W2VYS. VHF PAM: W2YQU. Nets: Watch for time change return to EST at month-end. Current listing see last issue Attention County LC group: W2URP wants day/time suggest for coordinators net to be established. Special report for coordinators net to be established. 7,560 QNT; 1,504 QNC; NYSP&EN: 6 month recap shows 7,560 QNT; 1,504 QNC; 226 hours, 170 minutes. Congrats to net Os and NCS staff for an FB job! On the club circuit: Many inactive during Jul vacation period. LERA members WA2FBI and WA2FIO report scores in the NYS QSO party for section include W82 K2VGR, W2SZ, W2OCZ, WA2TIF and W2EY. Logs were rec 71 their first time topping Schenectady. Harmonic Hills now in the Katonah Library on the 1st Mon. Yunkers Club me putting up towers as result of last Spring's successful zoning The Communications Club of New Rochelle announces an Dinner for Sat., Nov. 20, reservation details from K2SJI. All once again - be sure SCM and Asst. SCM are on mailing list for activities announcements, newsheets, etc. Individual activities: W2QEI, W2MZW, W2VJB were all at Committee meeting for NYSP&EN. SEC W2URP an WA2VYS both "maritime mobile" with the summer boating and also K2DN in late July. WA2EUX operating carp stat the summer; WA2FBI dropped by SCM's QTH to report operations - 70 QSOs, 23 countries in only 5 hours! Cong W82SVH on dropping "N" in July. WA2HHO is now tak course at U. of Miami. K2BK now has QSO'd 340 countries filled logs to prove it. K2SIN and WA2QEG have daughter-in-law via K2RRZ. W2YCE is on a round-world month-end. WA2DPD seeing this country. W2VJB turning cw nets - good outlet for monthly reports for this WA2LUX/2 in CD and Ont. QSO parties. Division I Vice-Dir., W2TUK and K2SJO, both on 2-meter fm via repe any contacts. Don't forget to send information to W82 HARC Newsletter. Traffic: W82VLS 434, WA2VYT 268,

**INTRODUCTORY
OFFER FROM SWAN***

15 DAY TRIAL ON SWAN 600R RECEIVER, AND 600T TRANSMITTER



We'll give you a 15 day trial on either or both the 600R and 600T. If you are dissatisfied with them in any way, you can return them to the Swan factory and we'll refund your money immediately, with no questions asked.

This is an unusual offer, but the 600R and 600T are such unusual products that we feel you should have the opportunity to try them in your own shack at no cost, to convince yourself that the 600R and 600T are the finest amateur receiver and transmitter values you can own. You can order the units separately or as a pair, with or without accessories...any way you wish.

600R RECEIVER

3-CW-AM and FSK superheterodyne receiver. Covers 10 through 80 meters. **\$395**

600R CUSTOM

With I.F. noise blanker, and IC audio filter factory installed. **\$495**

600T TRANSMITTER

3-CW-AM self-contained transmitter with 600 watts P.P. input, 500 watts CW, 150 watts AM, and 100

watts continuous AFSK. Provides full coverage from 10 through 80 meters. **\$535**

600S STANDARD SPEAKER

With tone switch and headphone jack. **\$18**

600SP DELUXE SPEAKER

Includes Swan phone patch, tone switch, and headphone jack. **\$ 59**

CW FILTER with 600 cycle bandwidth **\$ 22**

AM FILTER with 6 kc bandwidth **\$ 29**

*Offer requires payment in advance for units desired. 15 day trial period begins upon your receipt of the units. If during the 15 day period you are dissatisfied with any of the units you ordered, return them to the factory, freight prepaid, and we will mail you a refund check for the full price of the units. Dealer participation in this program is optional. Offer expires December 31, 1971.



SWAN
ELECTRONICS
A Subsidiary of Cubic Corporation

SWAN FACTORY
305 Airport Road
Oceanside, CA 92054
Phone: (714) 757-7525

EASTERN OFFICE
P.O. Box 2288
Ocean, N.J. 07712
Phone: (201) 531-4114

Send for your 1972 Swan Catalog.

Please send me the following Swan Equipment on your 15 day Introductory Offer.

- 600R @ \$395
- 600R Custom @ \$495
- 600T @ \$535
- 600S @ \$18
- 600SP @ \$59
- AM Filter @ \$29
- CW Filter @ \$22
- 1972 Catalog
- I enclose \$ _____

California and New Jersey residents add 5% sales tax.

BankAmericard # _____

Master Charge account # _____

Interbank # _____

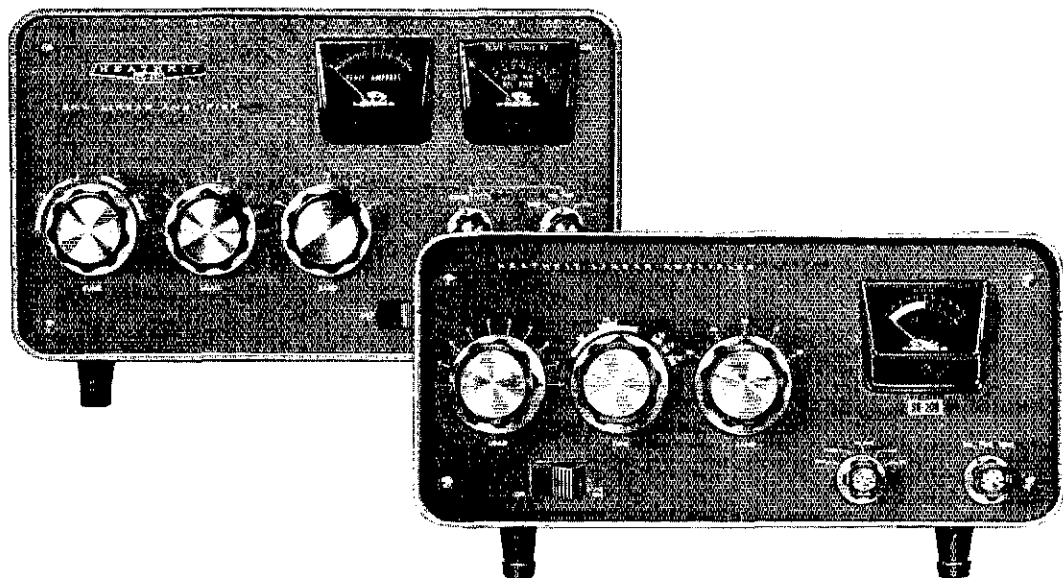
(4-digit number above name)

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

How to punch up your power without battering your budget:



Choose the Heathkit SB-220 or SB-200 Linear — You can't get more watts for your dollar!

The Heathkit SB-200: 1200 watts P.E.P. for \$220!*
A completely self-contained, compact, desk-top unit with built-in solid-state power supply that sets you up with 1200 watts SSB, 1 kW CW with 80 through 10 meter band coverage. And it requires only 100 watts P.E.P. drive, so it's compatible with almost all popular transmitters and transceivers.

Designed to outperform anything in its class! The SB-200 kit provides either a pair of 572-B's or T-160-L's (equivalent in specs) for final amplification — fan cooled and shielded for maximum TVI protection. Other features include a pre-tuned cathode input circuit for maximum efficiency, low distortion; ALC output for automatic exciter control; circuit breaker protection; built-in SWR meter and antenna relay that automatically switches to the exciter when the linear is off; 120/240 volt operation.

Sturdy, lightweight construction! You build your SB-200 on a heavy-gauge, one-piece aluminum chassis that is partitioned for extra strength and proper isolation of components and circuitry. The extremely clean arrangement allows you to have your SB-200 on the air 15 to 20 hours after you begin assembly. All you need are normal bench tools and a VOM for alignment. Order now!

Kit SB-200, 41 lbs., mailable 220.00*

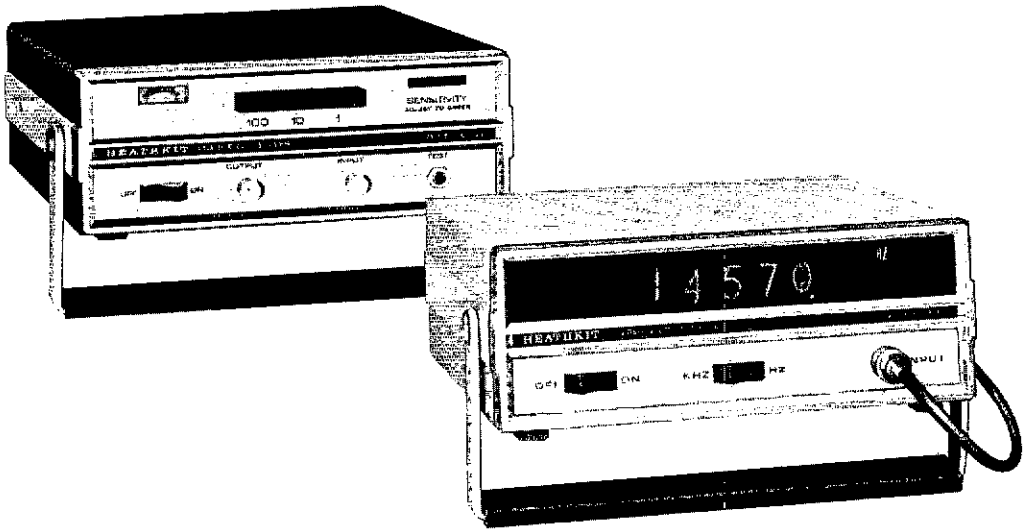
The Heathkit SB-220: 2 kW P.E.P., just 369.95!*
Here's the one that the competition tries to measure up to! The SB-220 utilizes two conservatively rated Eimac 3-500Z's in grounded grid circuitry to provide up to 2000 watts P.E.P. SSB input or a full 1 kW on both CW and RTTY! The broadband pretuned pi-input delivers maximum efficiency with low distortion over 80 through 10 meters.

All the power you can use requires only 100 watts drive. Has built-in solid-state 120/240 volt supply. Features include circuit-breaker protection; zener diode regulating operating bias to reduce idling current for cooler running and extended tube life; a large quiet fan; ALC to the driving unit to prevent over-driving; front panel switch-selected monitoring of grid current, relative power and high voltage.

Fast, easy tune-up! Just set the band switch, push CW-Tune/SSB rocker switch to CW-Tune position, adjust Tune & Load controls for maximum relative power. Push the rocker switch to SSB position and you're ready with a full 2 kW P.E.P. input — in the CW-Tune position you've got a full gallon for code or RTTY transmission. Bring your rig up to the performance limit, now. Order your Heathkit SB-220 today!

Kit SB-220, 69 lbs., mailable 369.95*

How to measure very high frequencies at very low cost:



Combine the new Heathkit IB-102 Scaler and IB-101 Counter and get 175 MHz capability for less than . . . \$300!

The Heathkit IB-101: 15 MHz for just 199.95!* An accurate, low cost counter for dozens of applications. Delivers instant, reliable counting from 1 Hz to over 15 MHz with 5-digit cold-cathode readout tubes. Computer-type integrated circuitry eliminates blinking readout...provides a rock-stable divider chain that never needs adjustment. Hz/kHz switch and overrange indicator give the IB-101's 5-digit readout the same capability as an 8-digit counter. Set the range switch to kHz and read out to the nearest kHz . . . push the switch to the Hz position and read down to the last Hz. Overage and Hz/kHz indicators light up to give correct range and error-free measurement...make an 8-digit measurement to over 15 MHz in seconds. The exclusive Heath-designed dual gate, diode-protected MOSFET input circuit provides proper triggering over a wide range of input levels...without adjustment or input attenuators. Input Z is 1 megohm shunted by less than 20 pF to minimize loading. A special low drift, temperature compensated 1 MHz crystal oscillator provides a highly stable time base. Other features include all solid-state circuitry using 26 ICs, 8 transistors and 6 diodes... combination carrying handle/tilt stand...BNC input with cable supplied...easy 6 hour assembly. Shipping weight: 7 lbs.

Extend the range of virtually any frequency counter to 175 MHz for only \$99.95!* The new Heathkit IB-102, in combination with the IB-101 or virtually any other existing counter, gives you fast, accurate, reliable measurement capability into the VHF region for less than \$100. The IB-102

will divide input frequencies from 2 MHz to 175 MHz with the scaled output fed to any compatible counter with a 1 megohm input. Front panel switch-selection of 10:1 or 100:1 scaling ratios... resolution down to 10 Hz with a counter having 1 second time base. For use with frequencies within the range of the counter being used, a 1:1 switch position provides straight-through counting without scaling. The exclusive Heath input circuit triggers at extremely low signal levels, increasing versatility greatly. At 100 MHz, for example, only 50 mV maximum is needed to trigger. The front panel Test switch gives a quick, easy method of checking input level. Other features include all solid-state IC/transistor design...handy tilt stand/carrying handle and easy 5 hour design. Get into VHF measurement the easy, inexpensive Heath way... with the new IB-102. Shipping weight: 7 lbs.

HEATHKIT	
Schlumberger	
HEATH COMPANY Dept. 9-10 Benton Harbor, Michigan 49022	
<input type="checkbox"/> Enclosed is \$ _____, plus shipping	
<input type="checkbox"/> Please send FREE Heathkit Catalog.	
Name _____	
Address _____	
City _____ State _____ Zip _____	
Prices & specifications subject to change without notice. *Mail order prices; F.O.B. factory.	
AM-254	

UNIVERSAL Aluminum Towers are GREAT!

* Strong * Lightweight * Easy to assemble * Rust-Free (less maintenance) * Self-Supporting Models are available from 30-90 feet with a choice of wind loads to meet your specific needs. Write us for literature. Shown here is a Model 18-50 (18 sq. ft. wind load - 50 ft. high) installed at Ted Willett's house (W9NHE), our Print Shop Manager. AMATEUR ELECTRONIC SUPPLY can recommend the proper UNIVERSAL TOWER to fit your particular needs.

AMATEUR ELECTRONIC SUPPLY

4828 West Fond du Lac Ave. Milwaukee, Wis. 53216

Phone (414) 442-4200

116, WB2IXW 92, WB2FUV 31, WB2VJB 48, WA2HHO 40, WA2FIO 36, W2ANV 29, K2S2N 27, K2DN 25, WA2EUX 24, WA2WGS 16, WN2SVH 9.

NEW YORK CITY AND LONG ISLAND - SCM, Fred J. Brunjes, K2DGI - SEC: K2OVN, RM: K2UAT, HF PAM: WA2UWA, VHF PAM: WB2ROF.

NLI*	3630 kHz	1915/2200 Nightly	WB2TUL Mgr.
NLI VHF*	145.8 MHz	1900 MTWTF	WB2RQI PAM
NLI Phone*	3925 kHz	1600 Dy	WA2UWA PAM
Clear House	4925 kHz	1100 Dy	WA2GPT Mgr.
Mic Farad	3925 kHz	1300 Ex. Su	
East U.S.	3685 kHz	0001 Nightly	
All Svc.	3925 kHz	1300 Dy	W201 Mgr.
NYSPJEN	3925 kHz	1800 Dy	WB2HLV Mgr.

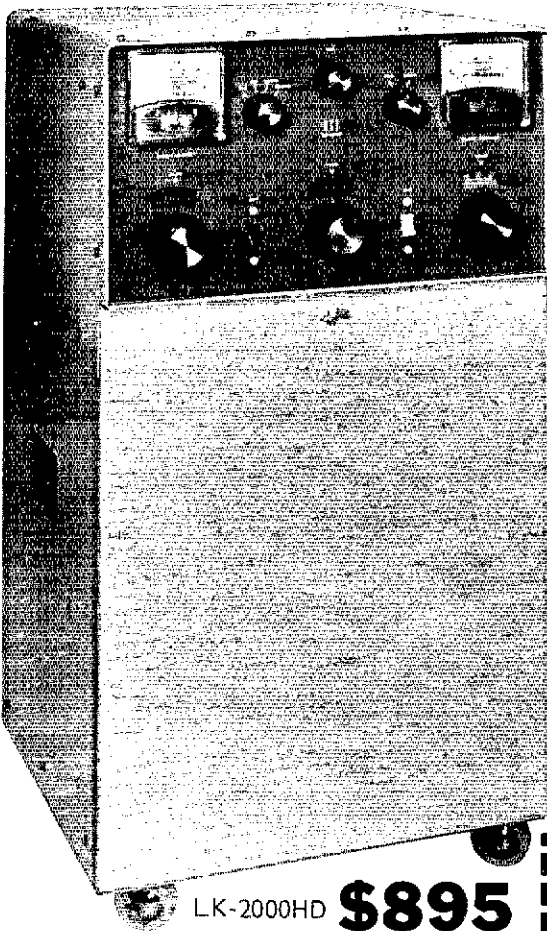
*Section nets: All times are local. This column is being written by W2TUK while K2DGI is enjoying a much-deserved vacation in Europe. I guess Fred will have the travel movies ready for the fall club meetings! Congratulations to WB2LZN on his fine traffic total. Bob says that NLI had a fantastic summer month with almost 500 check-ins and over 300 messages handled. Hats off to WB2UFG who earned a BPL for his work on NLI and 2RN. A new station heard on NLI is W2FET. The gang on 3630 kHz, as well as those on the nets listed at the masthead, welcome your participation at anytime, but especially when the traffic begins to pick up in the fall operating season. WB2OYV found time in between his traffic handling skeds for a little DX chasing and WAS hunting. WA2CIS has departed for Syracuse after 10 happy years in NLI. WNY has gained still another NLI section member as WB2HLM, Suffolk County RC proxy, pulled up stakes and settled in Cooperstown. Our loss is certainly WNY's gain! After many years W2DBQ finally got back on 160 cw and ssk and met a fellow he worked 40 years earlier. Dick also went up on the other end of the spectrum with a new Comcraft on 2-meter am and fm. W2GP has been fooling around with a Ten-Tec and its powerful one watt! W2FX, first pres. of OCWA, is home from the hospital and recovering from a stroke. Get well quick, John! K2BHV is on the air with a Swan 260, W2SLU tied the knot and K2LCK, K2SYA, WA2LXP, WB2BOD and WB2NGE added a harnest atmosphere to the wedding. Now that WA2GPT's OM has joined the retired ranks, they plan on jaunting around the country with the mobile. Wonder if Bea will make BPL as WA2GPT/M? WB2RZF is running an FTDX-560, WB2AXZ, harmonie of W2ITP, attended the World Scout Jamboree in JA-Land while the OM was getting his fm gear set up on 224.95 MHz. Byron is looking for activity on the high end of our 1 1/2-meter band - vertical polarization, please! WB2AOC and KYL, WA2BAV, are in a DXCC race. George now has worked 80 countries and Fva 65 in their short time on the air. WB2UIG says remember the Red Cross Net on 1.1. 2000 local at 28.835 MHz. W2LW finds that retirement has brought him lots of projects on the fire. WA2GTK is using the ng at W2UC while away at college. WB4SMA, ex-WA2HMO, visited WB2UZU during the vacation season. The Larkfield ARC's publication, "OSX" makes interesting reading thanks to editor K2HTX. How about the rest of the section clubs sending their club bulletins and newsletters to the SCM? Traffic: WB2LZN 392, WB2UIG 218, WA2GPT 155, WB2LGA 154, WB2OYV 95, WA2CIS 86, W2LCK 48, K2JFE 15, WB2KZF 10, W2DBQ 9, W2GP 8, W2PF 6, W2LW 5.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZZ SEC: K2KDQ, RMs: WA2BAN and WA2TAF, PAMs: K2KDQ and WA21AF.

Net	kHz	Time(PM)	Days	Sess.	QMI	U/c.	Mgr.
NIN	3695	7:00	Dy	31	567	420	WA2BAN
NIJN	3695	10:00	Dy	31	287	119	WA2BAN
NJSN	3740	8:00	Dy	24	94	33	WA21VF
NIEPIN	3450	6:00	Dy	31	624	247	WA2TAF
PVTEN	145710	7:30	Dy	31	156	61	WA2JIM
ECTN	145800	8:30	Dy	22	64	25	WB2LTV

W2COT is in his 51st year on the air with the same call and from the same QTH. WA2HLI is in KH6-Land and is on the air from KH6UL looking for QSOs with NNJ stations. WA2UDT worked VE1MX on 144 MHz and now has VE1, 2 and 3 on that band. W2LEP modified his IC keyer per OST article. WB2KNS on 2-meter fm with a Swan FM2X. WB2LTV putting up a Swan two-element Inlander. W2CVW recently received certificates from Korea and Venezuela. WA2FOO put up a new CT-36 and has new DXCC totals of 108/68. WA2NLP has a Model 14 and 15 setup for RTTY. WB2JZN won the Carrier of the Month award for the Passaic Herald News. WA2JNO passed the First Class Radiotelephone exam. WN2PCS passed the General. WB2ZYP, WB2NOM and WB2DWE all joined Navy MARS. WB2CXO is the new NNJ area coordinator for Navy MARS. K2KDQ attended the recent Pacific Division Convention. WB2SXY is a new ham in Clifton. WB2RSU is back from a mobile trip to Maine and WA2AMH is back from one to Kentucky. W2TRZ is back

Amateur Electronic Supply presents
the new IMPROVED BTI LK-2000HD Linear



LK-2000HD **\$895**

**AMATEUR
 ELECTRONIC SUPPLY**

4828 West Fond du Lac Avenue
 Milwaukee, Wisconsin 53216
 Phone (414) 442-4200

HOURS: Mon & Fri 9-9; Tues, Wed & Thurs 9-5:30; Sat 9-3

CLEVELAND Area Hams may wish to visit our NEW Branch store located at: 17929 Euclid Ave., CLEVELAND, OHIO, Ph. 486-7330, Pete Smith, WA8PZA, Mgr.

Please send ALL Mail Orders and Inquiries to our Milwaukee store. Our branch stores are set up to handle walk-in business only.

POWER TO SPARE - Conservatively Rated! Designed to operate continuous RTTY at twice the Amateur legal power input. Capable of round-the-clock SSB operation at 3000 watts P.E.P. - Plenty of reserve power for MARS work or where higher power is authorized.

FULL 1000 WATTS Plate Dissipation with rugged Eimac 3 - 1000Z triode. Solid state power supply furnishes 3000 Volts at 1 Ampere. Instant transmit - No warm up wait.

EFFICIENT Grounded Grid, zero bias linear circuit. Broad band tuned cathode input requires 50 to 200 watts drive. Compatible with most modern exciters.

IMPROVED Band Switching and Tuning - 80 - 10m Amateur Band Coverage plus adjacent frequencies for MARS work, etc.

NEW PHASE COMPARISON tuning/loading Indicator for easy tune up.

ADJUSTABLE ALC provides more and cleaner "Talk Power" without flat topping.

NEW IN-LINE RF WATTMETER reads forward and reverse power. 200/2000 watt scales. Reads true watts into 50 ohm load.

To: **AMATEUR ELECTRONIC SUPPLY**
 4828 West Fond du Lac Avenue
 Milwaukee, Wisconsin 53216

I am interested in the following new equipment:

I have the following to trade: (what's your deal?)

Ship me the following New Equipment:

I enclose \$ _____, I will pay balance (if any)

COD (20% deposit) Revolving Charge Plan

Name _____

Address _____

City _____

State _____ Zip _____

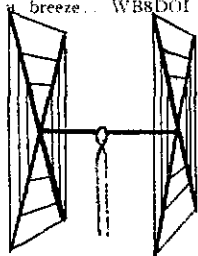
AHA! YOU THOUGHT GOTHAM

made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS Totally satisfied with quad. Worked DK4VJP, SM7DII, XE1AB, DM4SFE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze... W8BDCI

CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional!) ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 3/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD.....	\$37.00
10-15 CUBICAL QUAD.....	32.00
15-20 CUBICAL QUAD.....	34.00
TWENTY METER CUBICAL QUAD	27.00
FIFTEEN METER CUBICAL QUAD	26.00
TEN METER CUBICAL QUAD.....	25.00

(all use single coax feedline)

How to order: Send money order only (bank, store, or United States) in full.

We ship immediately by REA Express, charges collect. DEALERS WRITE!

BEAMS "Just a note to let you know that as a Novice, your 3-EI, 15 Beam got me R1 Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 EI 20.....	\$21	4 EI 10.....	\$20
3 EI 20.....	27*	7 EI 10.....	34*
4 EI 20.....	34*	4 EI 6.....	20
2 EI 15.....	17	8 EI 6.....	30*
3 EI 15.....	21	12 EI 2.....	27*
4 EI 15.....	27*		*20-ft. boom
5 EI 15.....	30*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MUV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWI, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE21, KP4-AOL, SM5BGK, G2AQB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15,	
10, 6 meters.....	\$14.95
V80 vertical for 80, 75, 40,	
20, 15, 10, 6 meters.....	\$16.95
V160 vertical for 160, 80, 75,	
40, 20, 15, 10, 6 meters...	\$18.95

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

TEN-TEC KEYERS

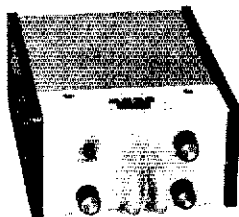
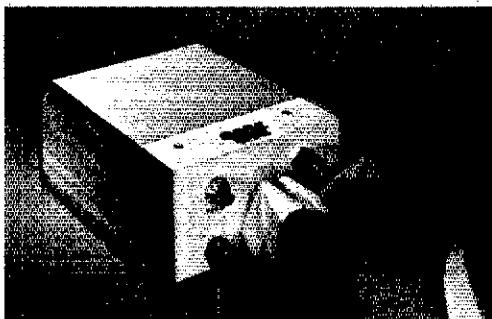
SOLID STATE—REED RELAY OUTPUT

Top of the line squeeze keyer. Designed for the serious CW operator. A technique of dit-dah insertion that reduces effort and error. Produces smoother, easier to send and copy CW. Full memories. Adjustable paddle force down to 3 grams. Side-tone. Variable dit-dah-to-space ratio.

KR40 Price \$89.95

Keyer, less paddle assembly

KA40 Price \$74.95



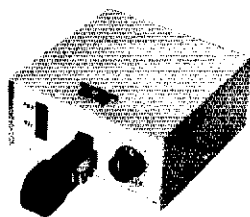
MODEL KR20

A popularly priced line keyer without the squeeze feature. Excellent "feel" for smooth, easy to copy CW at any speed. Self completing characters. Side tone. Two position weighting control.

KR20 Price \$59.95

Keyer less paddles

KA20 Price \$44.95

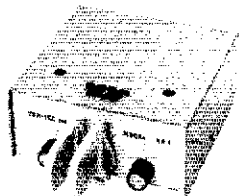


MODEL KR5

The KR5 embodies a new principle in paddle construction. It provides action usually associated with higher priced instruments. Operates from 12 volt DC source. Self-completing characters. Fixed factory adjusted paddle return and weight ratio. Ideal for fixed or mobile station.

KR5 Price \$34.95

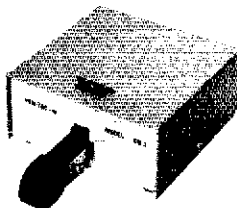
TEN-TEC PADDLES



MODEL KR1

The model KR1 assembly is used in the KR40 and KR20. Paddles are mounted on torque bars which actuate the contacts. Return force is magnetically controlled. Each paddle is individually adjustable down to a few grams of force. Best of all, there is a positive "feel" that enhances the enjoyment of CW communication.

KR1 Price \$18.95



MODEL KR2

The model KR2 assembly is used in the KR5 complete keyer. It uses a unique principle allowing low actuation force, yet retaining excellent "feel". Paddle tension is factory adjusted. Contacts are easily adjusted from the front.

KR2 Price \$12.95

TEN-TEC Dept. Z1
TEN-TEC, INC.

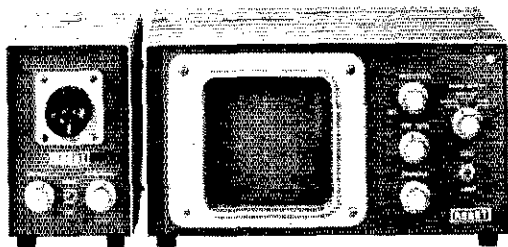
HIGHWAY 411 EAST, SEVIERVILLE, TENNESSEE 37862

AMATEUR ELECTRONIC SUPPLY

- has -

ROBOT

In Stock for
Immediate Delivery



- ROBOT MODEL 70 MONITOR. . \$495
- ROBOT MODEL 80 CAMERA . . \$465
- 25mm, f1.9 lens \$ 30
- 25mm, f1.4 lens \$ 40
- 25mm, f1.4 Macro lens \$ 60

AMATEUR ELECTRONIC SUPPLY

4828 West Fond du Lac Ave. Milwaukee, Wis. 53216
Phone (414) 442-4200

HOURS: Mon & Fri 9-9; Tues, Wed & Thurs 9-5:30; Sat 9-3

To: AMATEUR ELECTRONIC SUPPLY
4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216

I am interested in the following new equipment:

I have the following to trade: (what's your deal?)

Ship me the following New Equipment.

I enclose \$ _____; I will pay balance (if any)

COD (20% deposit) Revolving Charge Plan

Name _____

Address _____

City _____

State _____ Zip _____

Send Reconditioned Equipment Bulletin

on the air with his new 50-ft. tower. WB2LDW moved to Garfield. SFC K2KDO is looking for ECs in Essex, Sussex, Ocean and Hunterdon Counties. WA2NKL is completing a Linear for 432. Our work at the Salt Mine has been keeping us away from this job much of the time. We expect it to clear up shortly and will then catch up with the mail. Traffic: WA2EPI 520, WB2RKK 444, W2CU 264, WB2DDO 207, WA2NLP 160, WB2AEH 142, WB2NOM 81, WB2LTW 71, K2KDO 60, WB2CDI 58, K2DEL 52, WB2KNS 41, WA2FVH 38, WA2CCF 37, WA2JIM 36, WB2JAE 35, W2ZEP 34, WA2UOO 32, W2CVW 20, WB2JNQ 20, WA2CAK 16, WB2BKC 12, WA2KHQ 12, WA2FUJ 11, W2ZZ 11, WA2BHJ 9, W2ABL 5, W2EWZ 5, WN2KNT 4, WA2EUO 1.

MIDWEST DIVISION

IOWA - SCM, Al Culbert, K0YVU - SEC: K0LVB. I hope all you new ECROs have received your RACES licenses and established liaison with your respective agencies within your zone. Color me green with envy, W0KB has put up a 110-ft. self-supporting tower. W0DSP has retired from teaching and intends spending considerable time chasing "muskie." Judging from the new calls on from the Cresto/Hma area, W0CYY must have had some good students last year. WA0EFN is off to jolly old England for a month. Even with his NTS chores, W0LCX is finding time to rebuild a prop-chip motor for his beam rotator. Who gets more vacation than K0YVU, who is vacationing in W0-Land? K0EJT is back at Centerville for a year. The North Iowa ARC had a fine turnout for their annual picnic at Clear Lake where our SEC gave a demonstration of championship water skiing. An Iowan, WA0IRP whose call is familiar to those who operate on our 75-meter nets, is an announced candidate for our Division Director, the election for which shall be shortly.

Net	Time(Z)	QNI	QTC	Mgr.
Iowa 75 fone	1730	1555	94	K0LVB
Iowa 75 fone	2300	1442	42	W0Y1S
TLCN ew	2330	112	106	K0AZJ

Traffic: (July) W0LCX 734, K0BAZJ 110, W0MOO 100, K0LUZ 46, WA0VZH 23, K0JGI 20, WA0AUX 17, WB0AAM 8, WA0EFN 7, (June) K0LUZ 30.

KANSAS - SCM, Robert M. Summers, K0BXF - SEC: K0LPE. PAMS: K0JMF, K0ENU. RMS: K0MRI, WA0TZK. VHF PAMS: WA0CCW, WA0TRO. So far this year the hamfest season has been great. We need, as always, your help in putting Kansas at the top of the list for ham radio activity. C.W. Wade, W0INH recently was awarded the Rt Baker, Ham of Kansas award at the Concordia hamfest. Now is the time to think of some other deserving ham for next year's presentation. Clubs will be contacted at a later date. Can anyone top, a million miles of phone patching in a six month period? WB0BHF claims the world record for the first six months of this year with 60 patches, 1,000,000 miles. Net reports for July: QKS - QNI 457, QTC 133, KPON - 721/88; KSBN - 922/85; KPN - 208/14; Zone 1 - 75-meter 56/7 and Zone 2 - 2-meter 90/5. Midstates Mobile Monitor Watch - QNI 808, QTC 50, phone calls and patches 43, 95 mobiles assisted and 713 fixed station. Total for the year at the end of July a real fine 8033 QNI. Our hamming must be getting better, one of my OOs reported 45 hours of listening with no infractions cited. I hope I can continue to hold your confidence as a good SCM for my next term, Inx. Traffic: W0HI 201, K0MRI 116, K0BXF 76, K0JMF 68, W0INH 56, WA0LBB 59, WA0LLC 42, W0FCL 40, W0MA 38, W0GCG 30, W0PB 26, WA0JFC 16, K0LPE 16, W0CHI 14, WA0TAS 14, K0GKI 11, WA0SX 11, K0BGX 10, WA0SRQ 10, WA0OWH 9, WB0CZR 8, W0GUR 7, WB0BCL 5, W0NEE 4, W0LFI 3, WA0YXK 3, WA0OZP 2, K0GZP 1.

MISSOURI - SCM, Robert J. Peaver, W0BV - SEC: W0ENW. New appointments: WA0ITU as OES, K0RPH as PAM. Appointments renewed: K0BIX as EC.

Net	Freq.	Time(Z)/Days*	Sess.	QNI	QTC	Mgr.
HBN	7280	1705 M-F	21	477	47	WA0HPA
MEN	396.3	2230 MWF	13	219	10	K0KUD
MOSSB	396.3	2300 M-S	27	1149	50	K0RPH
MON	3585	0000 Dy	27	128	52	K0ALM
MON2	3585	0245 Dy	28	122	50	W0HH
PHD	50.45	0030 T	4	77	9	WA0KUH

*Please note that these nets will meet one hour later GMT with the change to Standard Time. K0BIX announces the formation of a slow-speed net, Sun, only, on 3703 kHz at 1600 local time. First session meets Sept. 12. All are invited to participate. The Missouri QSO Party will be held Oct. 23, 24. Success requires the participation of Missouri amateurs. Congratulations to WA0UB, who was named Amateur of the Year by the St. Louis ARC; to WA0RJM and W0YQY, who received Masters degrees; to K0MIS

AMATEUR ELECTRONIC SUPPLY

RECONDITIONED HAM EQUIPMENT

★ 10 Day Free Trial (Lose only Shipping Charges) ★ 30 Day Guarantee ★ Full Credit Within 6 Months on Higher Priced New Equipment ★ EZ Terms—Convenient REVOLVING CHARGE Payment Plan ★ Order Direct from this Ad!

AMECO CB-6 (14-18) conv. \$ 19 CN-50 (14-18) conv. 29 CSB Selector box 6 TR-67 VHF Xmitr 99 621 VFO 39	GI-25H Xcvt 329 AC-35 AC supply 69 DC-35 DC supply 69 AC-400 AC supply 75 RV-1 Remote VFO 59 V3A-1 7 VX-35C VOA 15 CAL-35 Labrator 12 SC-45 Speaker 15 DAC-35 Dlx. cons. 69 SC-550 Speaker 19 DC-348A DC supply 49 PSA-63 AC supply 15 FM-210 2m FM 125 AC-210 AC dc boost 75 R-530 Receiver with three filters 589 SC-430 Speaker 19	HQ-180AC Rec. 339 SP-200JX-1 Rec. 169 3-100 Speaker 15	HEATH GR-64 Receiver \$ 39 GR-78 Receiver 119 GC-1A Receiver 59 HR-20 Receiver 89 RX-1 Receiver 149 XC-6 6m conv. 25 SA-1003 conv. 4 QF-12 Q-multiplier 12 GD-125 Q-multiplier 12 DX-60 Xmitr 59 Tx-1 Xmitr 115 SB-10 SSB adaptor 75 HX-20 Xmitr 129 HX-20 6m Xmitr 169 HA-20 6m Linear 95 HX-20 6m Xcvt 89 HW-22 40m Xcvt 89 HW-22A 40m Xcvt 94 HW-32A 70m Xcvt 89 SB-100 Xcvt 325 SB-510 Receiver 299 SB-500 2m Xverter 149 VF-1 VFO 17 HG-10 VFO 29 HG-10B VFO 34 HW-10 6m Xcvt 129 HW-29 (Six'er) 34 HW-32 (Two m) 45 GF-11 DC supply 8 HW-100 Xcvt 249 HF-13A DC supply 49 UT-1 AC supply 24 HRA-104 calibrator 9 HW-17A 2m Xcvt 119 HW-171 DC supply 74	XCU-300 calibrator 9 XCU-303 calibrator 12 NCX-5 Mk II Xcvt 389 NCXA AC supply 75 NCX-500 Xcvt 249 Z10 Xcvt 239 AC-200 AC supply 59 NCL-2000 Linear 375	SBE SB-23 Xcvt 249 SB-2-DCP Inverter 25 SB-1-LA Linear 149 SB-34 Xcvt 278 SB-2-LA Linear 179	SINGER PR-1 Monoadaptor \$ 95	SIGNAL ONE CK-7 Xcvt 51195	TEN TEC PM-2A CW Xcvt 3 45 RX-10 Receiver 45	UTICA 650 6m Xcvt VFO 879 650A 6m Xcvt VFO 89	WATERS Codax keyer 3 49 369A Kettrometer 59
---	---	--	--	--	---	----------------------------------	-------------------------------	--	---	---

Specify 2nd & 5th choices (if any)



New Equipment Specials

BTI L.R-2000HD 3KW Linear reg. NOW \$995 \$795 RF-2000 Timing-Rp Set 516 450 FS 3000 3KW Supply 400 350	EICO 315 Deluxe Sig. Gen. Kit reg. NOW \$ 69 \$ 54	GALAXY GT-580A 80-10m Xcvt. reg. NOW \$500 \$389	VARI-TRONICS FDM-2 and BP-1 reg. NOW \$262 \$188 FM-20M Mobile amps 150 89 FM-20BM Base amp 235 125	SBE SB-34 80-10m 12 110v 3449 \$339 SB2-LA Linear Amplifier 259 219 SB2-VX AC Accessory Unit 38 24 SB2-MC Mobile Mtg. Bracket 12 7 SB2-CW CW Condaptor 42 37 SB2-MIC Mike (dynamics) 16 12 SB-AC Crystal Calibrator 79 28 SB4-FCP Mob. sup. SB2-LA 249 149 W 77 cable for SB3-HP 8 6	RAYTRAC reg. NOW 6 meter, 2kw PEP Linear 2649 \$549 Regency Monitor Receivers for 2m FM Ham Band (loss Crystals) reg. NOW 1MR-1H Single channel 3109 \$ 74 1MR-12H 12 channel 129 34
ETO We have a few ALPHA 70 linears left at the OLD PRICE of \$1595.	EICO 315 Deluxe Sig. Gen. Kit reg. NOW \$ 69 \$ 54	GALAXY GT-580A 80-10m Xcvt. reg. NOW \$500 \$389	VARI-TRONICS FDM-2 and BP-1 reg. NOW \$262 \$188 FM-20M Mobile amps 150 89 FM-20BM Base amp 235 125	SBE SB-34 80-10m 12 110v 3449 \$339 SB2-LA Linear Amplifier 259 219 SB2-VX AC Accessory Unit 38 24 SB2-MC Mobile Mtg. Bracket 12 7 SB2-CW CW Condaptor 42 37 SB2-MIC Mike (dynamics) 16 12 SB-AC Crystal Calibrator 79 28 SB4-FCP Mob. sup. SB2-LA 249 149 W 77 cable for SB3-HP 8 6	RAYTRAC reg. NOW 6 meter, 2kw PEP Linear 2649 \$549 Regency Monitor Receivers for 2m FM Ham Band (loss Crystals) reg. NOW 1MR-1H Single channel 3109 \$ 74 1MR-12H 12 channel 129 34

Amateur Electronic Supply Your 2m FM Headquarters

2m FM Equip	2m FM Antennas	BYCOMM AMPLIFIERS
* DRAKE	* CUSH CRAFT	101-500C "EM Booster"
* REGENCY	* LARSEN	44-2w int. 12-30w out \$ 59.95
* VARI-TRONICS	* HY-GAIN	101-500E "BRICK Booster"
* GALAXY	* ASP	13.5w int. 10-30w out \$ 69.95
* CLEGG	* NEW-TRONICS	101-500D "BROCK Booster"
* STANDARD	* GAM	84.5w int. 20-55w out \$ 85.95
* SWAN	* AVANTI	10-0 "100 WATT FINAL"
		84-10w int. 100w out \$185.00

AMATEUR ELECTRONIC SUPPLY
4828 West Fond du Lac Ave. Milwaukee, Wis. 53216
Phone (414) 442-4200
HOURS: Mon & Fri 9-9; Tues, Wed & Thurs 9-5:30; Sat 9-3
CLEVELAND Area Hams may wish to visit our Branch store located at: 17929 Euclid Ave., Cleveland, Ohio, Ph. 406-7330, Pete Smith, Mgr.
ALL Mail Orders and Inquiries should be sent to our Milwaukee store.

TO: AMATEUR ELECTRONIC SUPPLY
4828 W. Fond du Lac Ave. Milwaukee, Wisconsin 53216

Ship me: _____

I Enclose \$ _____ I will pay balance (if any):
 COD (20% Deposit) GECC Revolving Charge Plan
 Master Charge* BankAmericard American Express

Account Number: _____

* Master Charge Interbank Number _____ (4 small digits)

Name: _____

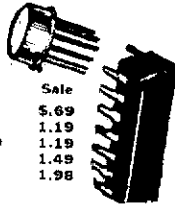
Address: _____

City & State: _____

LINEAR AMPLIFIERS

Brand new! Spec sheets.
Buy 3 — take 10% discount.

Type	Description	Sale
<input type="checkbox"/> 709C	Operational	5.69
<input type="checkbox"/> 723C	Volt. Reg.	1.19
<input type="checkbox"/> 741C	Freq. Comp 70h	1.19
<input type="checkbox"/> 709-709	Dual 709's	1.49
<input type="checkbox"/> 741-741	Dual 711's Stab case style	1.98



709-710-711

LINEAR AMP SET

3-pc. set \$1.25
10 sets \$10

3-pc. set includes: 709 op amp, 710 hi-speed diff. comparator, 711 dual comparator; flat pak case. With spec. sheets.

G-E 3.5W AUDIO "IC DIP" AMPLI



W/Spec Sheets

Brand New! \$3.95
3 for \$10

Type PA-263, 3.5w cont. duty, 9-10-30v supply. For phono, tape, stereo

GIANT SALE ON NEW TTL TEXAS & NATIONAL ICs

Any 3 — 10% Discount

Type	Description	Sale
<input type="checkbox"/> SN7400N	Quad NAND gate	5.45
<input type="checkbox"/> SN7401N	Open coll. out	.45
<input type="checkbox"/> SN7402N	Quad NOR gate	.45
<input type="checkbox"/> SN7410N	Triple 3 in. gate	.45
<input type="checkbox"/> SN7420N	Dual 4 in. gate	.45
<input type="checkbox"/> SN7430N	8 input gate	.45
<input type="checkbox"/> SN7440N	Dual 4 in. buffer	.45
<input type="checkbox"/> SN7441N	BCD-Noise driver	1.95
<input type="checkbox"/> SN7473N	Dual J-K flip flop	.88
<input type="checkbox"/> SN7474N	Dual "D" flip flop	.88
<input type="checkbox"/> SN7475N	Quad latch	1.49
<input type="checkbox"/> SN7476N	Dual J-K flip flop	.88
<input type="checkbox"/> SN7490N	Decade counter	1.49

Brand New!



P/V	1Amp	2Amp	3Amp
50	\$.05	\$.05	\$.08
100	.06	.06	.12
200	.07	.07	.15
400	.09	.09	.22
600	.12	.12	.28
800	.15	.16	.39
1000	.18	.22	.59

EPOXY SILICON RECTIFIERS



"FLAT PAK" EPOXY THYRISTORS (SCRs)

PRV	5-Amp	PRV	5-Amp
50	\$.49	400	\$1.10
100	.59	500	1.25
200	.85	600	1.35
300	.95		

Similar to RCA 40S04



LIGHT EMITTING DIODES

<input type="checkbox"/> INFRARED "LED"	\$1.45	Fluoresc
<input type="checkbox"/> INFRARED SENSOR *	.88	
<input type="checkbox"/> VISIBLE "LED"	1.45	
<input type="checkbox"/> VISIBLE SENSOR *	.88	Mercuride



FAIRCHILD IC SALE

Guaranteed W/Spec Sheets
Any 3 — 10% Discount!

75¢ 3 for \$2.00

Type	Description
<input type="checkbox"/> 909	Buffer
<input type="checkbox"/> 912	Half Adder
<input type="checkbox"/> 913	Shift Register
<input type="checkbox"/> 914	Dual 2 In. Gate
<input type="checkbox"/> 923	JK Flip Flop

15¢ CATALOG on Fiber Optics, 'ICs', Semi's, Parts

Terms: add postage. Rated: net 30, cod's 25%
Phone Orders: Wakefield, Mass. (617) 245-8829
Retail: 211 Albion St., Wakefield, Mass.

POLY PAKS

P.O. BOX 942 M
Lynnfield, Mass.
01940

and K0PKA, who were named Life Members of the PHDARA; to WN0ZCC, who passed the Tech. exam; and to new Novice licensees WN0FEK, WN0FES, WN0FHO, WN0FHR, WN0FHZ, WN0FIK, WN0FIY and WN0FJF. ex-WN0UNR. Traffic: K0ONK 83, K0AEM 284, W0BV 143, W0HH 140, WA0HTN 80, W0UD 30, WB4KSL/0 20, W0HVJ 16, WA0KUH 13, W0GBJ 6, WA0YCN 4, WA0ZLU 2.

NEBRASKA — SCM, V.A. Cason, R00AL — Asst. SCM: Velma Sayer, WA0GHZ. SEC: K0ODF. Appointments: WA0UGC as EC and W0YFR as OPS. Renewed appointment: W0IRZ as PAM. July net reports:

Net	Freq.	GMT/Days	QNT	QTC	Mgr.
NSN I	3982	0030 Dy	972	10	WA0LOY
NEB	3590	0300 Dy	158	33	W0TOD
NMN	3982	1230 Dy	1248	21	WA0JUF
WNN	3950	1300 M-S	554	13	W0NTK
AREC	3982	1330 Su	164	1	W0IRZ
CHN	3980	1730 Dy	1085	41	WA0GHZ
DEN	3980	2000 M-F	432	3	WA0AUX
NSN II	3982	2330 Dy	835	15	WA0LOY

Congrats to new Novice WN0EZE in Blair. W0LVO has moved to Maine and now is WIGCM. Bux Butte County 2-meter AREC Net QNI 21, QTC 1. The Central Nebr. ARC had a most successful steak fry at Victoria Springs with 150 amateurs and a total of approximately 300 in attendance. WA0LOY is having one heck of a time getting Storm Net reports compiled because of Net Control stations not submitting QNI and QTC. Cooperation would be greatly appreciated. Traffic: (July) W0L0D 256, WA0SCP 81, W0T0D 48, W0BCAU 29, WA0CBI 27, WA0OEX 15, WA0GHZ 10, K0SFA 9, WA0HWR 8, W0H0P 7, W0KPA 7, W0NIK 7, WA0YGI 7, K0JFN 5, W0J0K 4, K0TUH 4, W0WKP 4, WA0YDZ 4, WA0GAT 3, K0OAL 3, WA0OOX 3, WA0EEI 2, WA0LOY 2, WA0PIF 2, W0SWG 2, WA0BSX 1, WA0HQO 1, WA0PCC 2. (June) W0VEA 4.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, John J. McNassor, WIGVT — SEC: WIHHR. RM: K1EIR. PAM: K1YGS. VHF: PAM: K1SXF.

Net	Freq.	Time/Days	Secs.	QNT	QTC
CN	3640	1845 Dy	62	471	346
		2200			
CPN	3965	1800 M-S	31	403	192
		1000 Su			
VHF 2	145.98	2200 M-S	22	102	25
VHF 6	50.6	2100 M-S	22	125	13

High QNI: CN — WA1GFH, W1BYW, W1KUO and W1CTI. CPN — K1EIC, WIGVT, WA1KVI, WA1NMZ, K1SXF and K1YGS. SEC WIHHR is looking forward to increased AREC activity now that summer is over — ECs please send monthly report. Director W1QV "on the road" quite a bit during working hours but always makes CPN when at home — please make sure your secy. keeps him informed of club activities. Club bulletins are the best way to keep your members up-to-date and make your club known to other clubs — if you do not have one, this is a good time to start! Murphy's Marauders are accepting new members, contact K1VTM or W1AAR — this is your chance to become associated with THE outstanding world recognized Contest/DX Club — do it now! Tri-City area has an active fm Repeater Group also accepting new members. Summer picnics enjoyed by members of: TRN; Nutmeg VHF Nets and Murphy's Marauders. Vacations: W1GVJ in England and W1MPW in Portugal. WA1GGN active on the nets again. July CD Party enjoyed by many — this is open to all appointees and more participants would be very welcome. Congratulations to: WA1NMZ for July BPL; W1NNCC for WAC; W1NNGO and W1NNZP for Advanced Class and to W1NOHI for General Class! Now is the time to get ready with your contribution to the Halloween Patrols! Traffic: (July) WA1NMZ 579, W1EJH 285, K1EIC 219, K1EIR 208, WA1NES 126, W1CTI 93, WA1HOL 79, WA1MOW 58, K1YGS 55, K1SXF 50, W1NJM 40, W1GVT 39, W1QV 30, W1AW 24, WA1KVI 23, W1YBH 16, W1YYM 14, W1DQJ 12, W1MPW 10, W1BDI 7, WA1OFF 6, WB2CHU/1 5, W1CUH 5. (June) W1NJM 74.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, W1ALP — SEC W1AOG received reports from ECs: K1S DZG, NFW, ZUP, W1S LE, UJF, HKG and WA1DXL. W1MTO and also W1SR, ex-W2LC are moving back to this section. K1AJO going over to Holland for a while. The T9 RC met at W1KGH's. W1NT has a Tempo One. W1NF says the U.S. Navy is starting a Wireless Museum in Wash., D.C. WA1MES, now in Dover, is in our EMN. W1AAU is on a trip to Hawaii. WB2BLT is ex-W1HHU's son. K1CZO is now in Takoma Park, MD. W8PEY/1 in Marlboro. W1CWX in Fla. W1OZO is WA1RY's brother. W1NOYU is W1NOTE's father. W1LE is on many nets. W1BHD is on the WA1NJR repeater most of

Our fans take No.1 for granted.



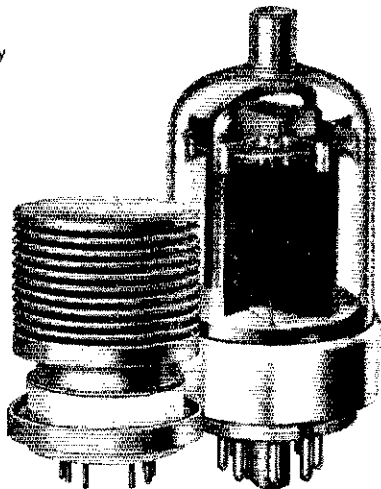
Take power tubes, for example. RCA amateur tube fans expect maximum performance year after year. And they get it. So do our professional customers. As a matter of fact, designers of amateur, commercial and military electronic equipment have rated RCA first in power tube brand preference studies year after year.* So take a tip from the professionals. When

you need power tubes, insist on No. 1—RCA. We have the widest choice. And the best. We suggest you obtain a copy of the 1970 Guide to RCA Industrial Tubes, TPG 200E.

The man to see is your RCA Industrial Tube Distributor. He's No. 1, too.

RCA | Electronic Components | Harrison, N. J. 07029

*Brand preference studies conducted by leading Electronic Publications.



RCA

Going for an Advanced or Extra Class License?

Why not go for a Commercial ticket too?

The exams are similar in many ways
— and a Commercial License can
bring you rich rewards

Thinking about going for your Advanced or Extra Class License? Then why not study up on your technical fundamentals with a CIE home-study course — and get a Commercial License too?

CIE license-preparation courses, while designed to get you a Commercial License, give you a thorough understanding of the "basics" common to all electronic gear — including amateur radio rigs. So they can be most helpful in preparing you for amateur exam Elements 4A and 4B.

This might be reward enough in itself. But the fact that these courses prepare you for a commercial ticket too provides the "icing on the cake."

With such a ticket, you're ideally equipped to turn your hobby into a richly rewarding career in the booming world of Electronics.

You might, for example, want to get into two-way mobile radio servicing, where many men earn up to \$200 and more a week. And there are many other golden opportunities in the aerospace industry, electronics manufacturing, computer servicing, and plants operated by electronic automation. The pay is good, the work is exciting, and the future is secure.

The "door-opener" to it all — and often a legal requirement — is a Commercial FCC License. For passing the Government's License exam offers proof positive that you really know Electronics.

The exam is so tough, as a matter of fact, that two out of three un-trained men fail it. But 9 out of 10 CIE graduates who take the exam pass it.

That's why we can offer this Warranty: upon completing one of our FCC courses, you must be able to pass the exam and get your Commercial FCC License — or you'll get your money back.

Mail Coupon for Two Free Books

Want to know more? Send coupon below for our 2 FREE BOOKS. Or send your name and address to CIE, 1776 E. 17th St., Cleveland, Ohio 44114.

ENROLL UNDER NEW G.I. BILL. All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, or are in service now, check box in coupon for G.I. Bill information.

CIE Cleveland Institute of Electronics
1776 East 17th Street, Cleveland Ohio 44114

1. Your 44-page book "How To Succeed in Electronics" describing the job opportunities in Electronics today and how your courses can prepare you for them.
2. Your book "How To Get A Commercial FCC License."

Name _____

Address _____
(please print)

City _____

State _____ Zip _____ Age _____

Check here for G.I. Bill information

Accredited Member National Home Study Council QT-91

the time, WAINII is a new OPS. Appointments endorsed: WI AYG, DFS, KIKTH as OOS; KIQDR as OVS; WIBVV, KILNQ as ECs; KICLM, WIEIN as ORSs. New Eng. Emergency Phone Net had 88 QNIs, 4 traffic. Barnstable RC, KIPBO/1 at their Fair and handled traffic with KIEPL doing his share. WAIMSB says the Early Eighty Free Net is doing well. 229 QNIs, 133 traffic. WNIOMM has a new net — Continental Drift on Fri. only, 0100 GMT 21.120 reports 12 QNIs, 5 QTC. WAI0JU says he is RO for Nantucket and is on our EMN. WAIMHI has new Tribander. WAINII has Advance Class, TR-4, looking for chess players on 40. WAF1NM has new antenna for 75. WNIOLV has DX-60 and DX-150A. WNIONH has trap dipoles. KIUAF is in the Mass. P.O. net on 6. WAIBYM now working for Uncle Sam. WILE is now an Asst. Dir. for the New England Div. WIUJF has 2-meter fm. EMN had 42 sessions, 92 traffic, 213 QNIs for June. RM KIPNB for the Novice Net reports that as of Sept. 1 the frequency will be 3720. WIFMW is RO for Lawrence. KIBGK reports the 6-Meter Crossband Net had 18 sessions, 68 QNIs, 1 traffic. EM2MN had 22 sessions, 124 QNIs, 57 traffic. WAI1FE has an 5B-500 for 2. W4KT/1 in Chatham is W1BIO's cousin. WAIMWN is on 20 and 6. WIEIN is working in Vt. WLOOP. WIGAN, K9AOP/1, WAILXU, WIOXX, K4GGI/1 attended the East Coast VHF Society picnic in NJ. W1BVP/7, Seattle, was back this way on vacation and now is a Lt. in the US Coast Guard. W1AYG says a gang of them get on 3.98 MHz at 7 A.M. and WIJOT are working on some rigs for 1296 MHz. Capeway RC met at KIHGT's QTH. Some of the active repeaters are: WAINJR Boston, W1PRI Weston, WAIKGS Waltham, WIVAL Falmouth, K1JMR Norwood, UHF only WIPNH and DL2AA. KIKED was mobile on 75 in Nova Scotia on a trip. New hams are WNI3 PAO, PAP, PAR, PAU, PAW, PBI, PBB, PAZ, PBG, WAI3 PAO, PAN, OZD, OZI, OZH, OZJ. Traffic: (July) W1QOM/1 285, W1PEX 275, W1QYY 266, WAI1EY 249, K1EPL 148, WAIMSB 102, W1EMG 99, WNIOMM 77, K1PRB 70, WAIBYM 51, WAI1FE 51, W1MKN 46, W1UX 43, WAIMSK 30, WAI1DJC 27, W1DOM 22, W1AOG 16, WAI0JU 14, WAIMHI 12, WAINII 11, K1LQC 5, WAIKFI 4, WAF1NM 2, WNIOLV 2, WNIONH 2, KIUAF 1. (June) WAIBYM 65, W1DOM 10, WILE 6, KIUAF 2. (May) WIUJF 8.

MAINE — SCM, Peter E. Sterling, K1TEV — SEC: K1CLF, PAM: WAF1FCM. RM: W1BJG. WAF1FCM is operating ORP power with a ten-tee on cw. K1TEV has a new fm rig and is quite active. K1GAX worked his 300th country toward his DXCC. I am sorry to report the passing of the following hams: W1BG, ex-W1OHT and XYL, Oscar W1FD, and W1GRA of York, Maine who was very active in the Barnyard Net. They will be sadly missed on the bands. WAIJT has a new classic 33 beam and new tower and is chasing DX. K1MTJ is still in the Navy and expects to go to Guam, and perhaps activate K6G again. New hams in Maine are WNIOXE, WNIOXF, WNIOXC, WNIOYY, WNIOZM, WNIPAF, WAI1PA, WAI1PA. Congratulations fellows. Interested in an appointment? Get in touch with your SCM for information. Still looking for news, any tidbits are welcome. The Sanford repeater on Mt. Hope is working out very fine, and the frequency is always busy. Traffic: WAF1FCM 251.

NEW HAMPSHIRE — SCM, Robert C. Mitchell, W1SWX — RM. WAI1GCE. Acting RM WIUBG reports 109 check-ins and 96 traffic in 30 sessions for NHVTH. Welcome to WAI0US, WN10WC, WN10WZ, WN10XJ, WAI1QN and WAI0XJ. WAI1GCE says the northern NH gang is needed for better coverage of the NHVT Net. During spare time WIUBG works DX on 40 meters. K1ACL is busy on AF MARS but does monitor 50.73. Welcome to W2MKN/1. W1BYS handled emergency traffic while mobile 5 and VE3 during camping trip. W1JY built ham test equipment while in W6-Land. WN10JO and WN10QY report they are on 80-, 40- and 15-meters. W1DXB is building a big final amplifier for the new DX season. W1YWC and XYL are vacationing on Lake Winnepesaukee. WAI1TM's son Chris, WN0PHH will be a WN1 soon. W1BJF visited W1SWX and we had a nice chat. W1RPW worked a G3 on 80 meters. WN1NHF seems to be the most active Novice DXer. Traffic: (July) K1BCS 105, WIUBG 96, K1YMH 31, K1ACL 22, W1BYS 6, W1EWN 4, W1SWX 2. (June) WIUBG 120, K1YMH 73, WAIMXT 64, WAI1TM 2.

RHODE ISLAND — SCM, John E. Johnson, K1AAV — SEC: W1YNE. PAM: W1TXL. VHF PAM: K1TPK. RM: W1BTV. R1SPN report: 31 sessions, 472 QNL, 40 traffic. Appointment: W1YNE as OBS. The Providence Radio Assn. will hold a dinner in honor of the club's 50th Anniversary of affiliation with ARRL. The dinner will be held on Oct. 16 at the 1025 Club. Tickets can be obtained from W1YNE, WAI1AD, K1KKE or the PRA. Take a group from your club and join in the celebration. The W1AQ Club of Rumford had a visit from WB9CPH who was traveling in the area. After the eyeball OSO plans were made to contact the club when he returned to his

The most powerful antennas under the sun!



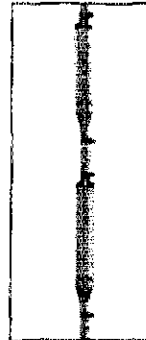
NOW... A GREAT NEW WIDE BAND VERTICAL for 80 through 10 Meters

HY-GAIN'S 18AVT/WB

Take the wide band, omni-directional performance of Hy-Gain's famous 14AVQ / WB, add 80 meter capability plus extra-heavy duty construction—and you have the unrivalled new 18AVT/WB. In other words, you have quite an antenna.

- Automatic switching, five band capability is accomplished through the use of three beefed-up Hy-Q traps (featuring large diameter coils that develop an exceptionally favorable L/C ratio).
- Top loading coil.
- Cross-the-band performance with just one furnished setting for each band (10 through 40).
- True 1/4 wave resonance on all bands.
- SWR of 2:1 or less at band edges.
- Radiation pattern has an outstandingly low angle whether roof top or ground mounted.

CONSTRUCTION...of extra-heavy duty tapered swaged seamless aluminum tubing with full circumference, corrosion resistant compression clamps at slotted tubing joints...is so rugged and rigid that, although the antenna is 25' in height, it can be mounted without guy wires, using a 12" double grip mast bracket, with recessed coax connector.



ORDER NO. 386

\$59.95 SUGGESTED RETAIL PRICE

*Take a look at that price...then see the best distributor under the sun
...the one who handles all Hy-Gain products.*

HY-GAIN ELECTRONICS CORPORATION

P. O. Box 5407-HJ Lincoln, Nebraska 68505

FREE!

JUST OFF THE PRESS

LAFAYETTE 1972 Catalog



468 PAGES



Our 51st Year

Complete electronics catalog for the hobbyist and experimenter. Widely used by leading electronic magazines in their construction articles. Featuring thousands of products at money-saving low prices.

STORE LOCATIONS

52 Convenient Store Locations in ten states:

NEW YORK
NEW JERSEY
MASSACHUSETTS

CONNECTICUT
PENNSYLVANIA
OHIO
ILLINOIS

VIRGINIA
MARYLAND
GEORGIA

Mail the Coupon Today
for your FREE
Catalog

LAFAYETTE Radio ELECTRONICS
P.O. Box 10 Dept. 34101
Syosset, L.I., N.Y. 11791

Send the FREE 1972 LAFAYETTE CATALOG 720 34 101

Name

Address

City

State Zip

QTH. WAIHUX will be traveling with the turbo train on its trip around the country this fall and will be transmitting portable /U from the train. WYNE has received an appointment to TCC and will have function delta on Wed. He is spending a few days in NH on vacation. WITXL is recovering at home and hopes to be back on the air soon. KINNT is doing an excellent job as Net Mgr. for RISHN and has never missed a monthly report to the SCM. Traffic: WYNE 153, WAIHBW 10, KIQFD 5, KIVYC 2.

VERMONT - SCM, E. Reginald Murray, K1MPN -

Net.	Freq.	Time(Z)/Days	QMI	QTC	Mgr.
Gr. Mt.	3932	2130 M-S	486	14	W1JLZ
Vt. Fone	3935	1300 Su	96	4	W1KRM
Vt. CD*	3990.5	1400 Su			
NHVI	3685	2300 Dy	102	96	W1AGCE
VTSB	3909	2130 M-S	444	5	W1HSG
		1230 Su			W1HSG
(June)				363	46 W1HSG

*Starting Sun., Sept. 12. Congrats to new Novice WNJOWK (Lauenburg). K1NF was the N.E. winner in the YL-OM Contest. K1OQG is home from the hospital. W1AGCE moved from Nashua to Hollis. Thanks to W1UBG for the July NHVT net report. Anyone interested in station appointments such as ORS, OBS, etc., please contact your SCM - also if your certificate needs up-dating. Traffic reports are lagging - perhaps they will increase with fall activity. Traffic: K1MPN 7, K1YGI 7.

WESTERN MASSACHUSETTS - SCM, Percy C. Noble, W1BYR - SEC; W1DNB, CW RM; W1DVW, PAM; W1MFB, VHF PAM; Berkshire Co.) W1KZS. The West. Mass. Emergency Net and the Tri-County Net held their regular sessions during the summer. The number of AREC members is slowly increasing, we need all we can get. Our CW RM W1DVW was hospitalized several weeks so no report on WMN this month. W3FBF/1 at Camp Emerson in Hinsdale made BPL with total traffic of 433. Congrats. W1FBF/1 enjoyed working in the PTN net (Maine) during the summer. Very little information received this month, but the following from W1CSF: Two of the West. Mass. Field Day operations were on TV - HCRA on Ch. 22 and VARC on Ch. 40. The Mt. Tom Repeater Assn. will restart its fall meetings in Sept. at the Holyoke CD rooms. Hampshire County AREC will resume meetings and theory and code classes about the time you read this. Mt. Tom Repeater is on 146.5 simplex. W1HH has moved to Fla. W1DNB is now on 2-meter (in addition to other bands). W1STR handled a great deal of "home traffic" for W1KK/1 while he was on southern camping trip with W1DVW. Much of the traffic for W1DVW while he was hospitalized was handled by K1TTU. Traffic: (July) W3FBF/1 433, W1LLP 378, W1BYR 143, W1DVW 64, W1LNF 60, W1STR 37, W1KK/1 22, W1FBF/1 16, W1ABW 5, W1MFB 5. (June) W1LLPJ 61.

NORTHWESTERN DIVISION

ALASKA - SCM, Kenneth R. Klopff, KL7EVO - The Arctic ARC again handled communications providing safety and information for the Yukon 800 boat race. KL7FCH took care of the turn around at Ruby. KL7FNL and KL7EVO fought the mosquito at the Nicholai Fish Camp. KL7FNM and KL7GBG manned Yanan and relayed the cw information to the base station KL7KC near Fairbanks. Tolovana sported KL7AD and KL7GAQ. KL7DP passed on the Nenana traffic and the base station was hosted by KL7GF and KL7GFI assisted by KL7GMY. KL7FDH manned Chen Lookout reporting incoming racers. Traffic was relayed to KL7BF at the Chamber of Commerce via RTTY and SSTV, courtesy of KL7BET and KL7FHN. 3905 ssb was used for most of outlying work, while the Nicholai Fish Camp worked 3866 on am and cw. RTTY and SSTV were on 2-meters. Fairbanks has a new local net the Mosquito Net on 3905 with KL7GMY as NC and meets at 0330Z Tue. and Fri. handling local traffic and feeding the Sourdough Net (KL7CAH 3915) with section and long haul traffic. Recent Mosquito traffic helped the Army in a communication problem and also let KL7FOR know about a delay in KL7FQQ return to their goldmine. KL7FNM and WL7HBD are maintaining schedules between Prince Cr. and Tanana. Traffic: (June) KL7CAH 32. (May) KL7CAH 70.

IDAHO - SCM, Donald A. Crisp, W7ZNN - The FARM Net meets each day on 3935 kHz at 0200 GMT. The Idaho RACES Net meets on 3990.5 kHz week days at 1515 GMT. The 39th annual WIMU hamfest was held at Mack's Inn, Idaho, Aug. 6, 7, 8. The hamfest was sponsored by Montana hams: WA7IZR, pres.; W7RZJ vice-pres.; XYL of WA7IZR as secy. Breakfast under the pines was provided by W7DWE and W7DUP. The program consisted of mobo transmitter hunts, swap table, MARS meetings, mobile efficiency contest, cw contest, homebrew contest, a talk on tuning antenn

NEW
(A)

NEW
(C)

Cush Craft

2 METER FM ANTENNAS

NEW FROM THE WORLD'S LEADING MANUFACTURER OF VHF/UHF COMMUNICATION ANTENNAS

(A) **FM GAIN RINGO:** The most popular — high performance, half-wave FM antenna. Gives peak gain, and efficiency, instant assembly and installation.

AR-2	135-175 mhz	\$12.50
AR-6	50-54 mhz	18.50

(B) **4 POLE:** A four dipole gain array with mounting booms and coax harness 32 ohm feed, 360° or 180° pattern.

AFM-4D 146-148 mhz \$42.50

(C) **FM MOBILE:** Fiberglass $\frac{3}{8}$ wave professional mobile antenna for roof or trunk mount. Superior strength, power handling and performance.

AM-147 \$26.95

(D) **11 ELEMENT YAGIS:** The standard of comparison in VHF communications, now cut for 2 meter FM and vertical polarization.

A147-11	146-148 mhz	\$17.95
A449-11	440-450 mhz	13.95

(D) **POWER PACK:** A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

A147-22 146-148 mhz \$49.50

(E) **4 ELEMENT YAGI:** A special side mount 4 element FM yagi can be fixed or rotated — good gain and directivity.

A144-4 146-148 mhz \$ 9.95

(F) **FM TWIST:** A Cush Craft exclusive — it's two antennas in one. Horizontal elements cut at 144.5 mhz, vertical elements cut at 147 mhz, two feed lines.

A147-20T 145 mhz and 147 mhz \$39.50

IN STOCK WITH YOUR LOCAL DISTRIBUTOR

Cush Craft CORPORATION

621 HAYWARD STREET
MANCHESTER, N.H. 03103

DIODES

PIV	TOP-HAT 1.5 AMP	EPOXY 1.5 AMP	EPOXY 3 AMP	STUD- MOUNT 6 AMP
50	.04	.06	.12	.15
100	.06	.08	.16	.20
200	.08	.10	.20	.25
400	.12	.14	.28	.50
600	.14	.16	.32	.58
800		.20	.40	.65
1000		.24	.48	.75

CAPACITORS

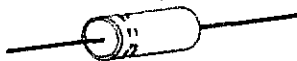
ALL NEW FULL AXIAL LEADS

1 MFD @	25 VOLT	5 for \$1.00
3 MFD @	6 VOLT	5 for \$1.00
5 MFD @	15 VOLT	5 for \$1.00
10 MFD @	6 VOLT	5 for \$1.00
30 MFD @	15 VOLT	5 for \$1.00
80 MFD @	2.5 VOLT	5 for \$1.00
100 MFD @	15 VOLT	5 for \$1.00
500 MFD @	50 VOLT	40¢ ea.
800 MFD @	20 VOLT	3 for \$1.00
1000 MFD @	12 VOLT	3 for \$1.00
1000 MFD @	50 VOLT	2 for \$1.00
1500 MFD @	25 VOLT	2 for \$1.00
3000 MFD @	16 VOLT	2 for \$1.00



DIPPED CAPACITORS
ALL 200 VOLTS
YOUR CHOICE 20 for \$1.00

- .033 Mfd @ 200 V
- .02 Mfd @ 200 V
- .22 Mfd @ 20 V
- .082 Mfd @ 200 V



CDE TYPE WMF MYLAR CAPACITORS
ALL 100 VOLTS

.033 Mfd @ 100 V	8¢ ea. or 14 for \$1.00
.22 Mfd @ 100 V	10¢ ea. or 12 for \$1.00
1.0 Mfd @ 100 V	25¢ ea. or 5 for \$1.00



AMERICAN MADE
CERAMIC DISC CAPACITORS
YOUR CHOICE 20 for \$1.00

.005 Mfd @ 1000 V
.001 Mfd @ 1400 V
.01 Mfd @ 1400 V



Back in Stock!
.1 MFD @ 50 Volt Dipped
Mylars. 20 for \$1.00 ppd.



NEW
Dipped Mylar Capacitors.

- .1 MFD @ 100 Volts
- .15 MFD @ 100 Volts
- .22 MFD @ 100 Volts

Your Choice! 16 for \$1.00 ppd.

NEW
Disc Ceramic Capacitors. Very Small — About 1/4" Diameter. All Full Leads.

.01 MFD @ 500 Volts
.001 MFD @ 500 Volts
.015 MFD @ 500 Volts

Your Choice! 20 for \$1.00 ppd.

SEND STAMP FOR BARGAIN LIST
Pa. Residents add 6% State sales tax
ALL ITEMS PPD. USA

m. weinschenker
K 3DPJ BOX 353 · IRWIN, PA. 15642

by Hypercom Electronics, and ARRL meeting. W7VSS is pres. of a 2-meter group that plans to install a repeater station on Ryan peak. W7DZH is moving to Portland. K7PCG is the new Eagle Rock club pres. FARM Net report: 31 sessions, 931 check-ins, 41 traffic handled. Traffic: W7GHT 57, W7Y 38, W7ZNN 36, WA7BDD 32.

MONTANA - SCM, Harry A. Roylance, W7RZY - Asst. SCM; Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7LR. VHF PAM: WA7IAC, WA7OBH and XYL have a new baby girl. WA7PDC is working for the forest service in Sula. WA7IZR and Pat are to be congratulated for the PB hamfest. Lots of nice prizes and activities. Repeater activity is high and we will have a repeater conference in Helena late in Sept. or Oct. Sorry to report the passing of Gene Bunker, ex-W7CRD. Tests were made from Bridger Ridge near Bozeman and contacts were made into Harlowton, Butte and Anaconda. Looks like this will give good coverage in this area on 2 meters. The Butte Repeater covers east to Livingston. Traffic: W7L BK 39, WA7OBH 27, WA8TX/M 8.

WASHINGTON - SCM, Arthur Henning, W7PI - SEC: W7DWT. RM: W7GYF. PAMS: W7GVC, W7MCW. VHF PAMS: K7BBO, K7LRD. New appointees: WA7IKZ as EC for Spokane, Lincoln, Stevens and Pend Oreille Counties; W7PGY as OBS; W7GLC, K7JRE, W7PGY as OOs. Best wishes to our newly-marrieds K7NZO and K7UEY.

Net	Freq.	Time(Z)	QNI	QTC	Sess.	Mgr.
WSN	3590	0145	297	100	31	W7GYF
NSN	3700	0200	299	88	31	WA7HCL
NTN	3970	1830	1392	137	31	WA7HKR
NWS5B	3945	0130	078	50	31	W7VDR
CBN	3960	0200			31	W7MHL

Congrats to K7BBO for WAS on 80 MHz. K7JRE, former WSN Mgr., is on the air again in a new QTH after a long absence in the SW. He worked WA5VDH with 2-watts on 40 meters. The WSN bunch getting ready for winter and 160-meter capability is being promoted by some stations. The Western SSTV Net meets 9 P.M. 3845 kHz and K7YZZ is preparing Italian and South African SSTV Safari. This month saw the inauguration of Northwest Amateur Monitoring Service, NAMS. Continuous coverage of 3970 kHz from 9 A.M. to 5:45 P.M. daily except for organized nets operating on this frequency will be provided. W7MDM was a prime mover in getting NAMS started. Check in and make your wants and contacts known to monitor control. With the rapid expansion of vhf repeater activities, definitely needed is a Washington State Repeater Advisory Council to be organized by the repeater groups to promote harmony and coordination in territorial coverage and frequency usage. W7QCV reports that 2-meter am activity has been poor. All the yak on repeaters is PB says W7FQE but what he would like is more vhf brasspounding. W7BQ is looking for Model 28 ASR to improve his RTTY operation. W7PGY has been very OKL traveling the NW Division and also the Hartford circuit. Bob is on the ARRL Executive Committee. Traffic: W7BA 712, WA7HKR 461, W7PI 256, W7BQ 88, WA7HCL 86, WA7AVI 75, W7JY 74, W7GVC 72, K7CTP 68, WA7OCV 55, W7JQF 48, W7AET 45, W7MCW 44, K7OXL 43, W7APS 41, W7ZHZ 40, WA7EDO 30, WA7DZL 19, W7IEU 19, WA7GWL 17, W7RUN 12, W7JWJ 12, W7QCV 10, WA7GV B 9, WA7LMO 9, WA7LOO 9, WA7AB 7, WA7LOV 2.

PACIFIC DIVISION

EAST BAY - SCM, Paul J. Parker, WB6DHH - Much activity has begun on 220 MHz to try to spur interest. WB6NMT and others are trying to keep the band for the amateurs. W6AKB has been chasing DX lately. K6HTT recently had the mobile rig stolen from his car. W6TIS recently added a Heath SB-401/SB-301 to the station lineup. W6RGG reports that July was a slow month for QOing. WA6DIL/6 reports that WB6QZZ is now mgr. of NCN/2. Dave had the job for a year and a half. W6AR needs two more zones for WAZ. W6IPW is a new RM appointee. WB6KBI, ex-WA2BCT, is busily working for WAC/WAS/DXCC after moving west. Planning something new for fall? Consider a League appointment. They are yours for the asking and can provide you with a whole new outlook on ham radio. Traffic: (July) W6IPW 107, WA6DIL/6 85, WB6VEW 45, WB6KBI 15, W6AR 5. (June) WA6DIL/6 137, K6HTT 14.

HAWAII - SCM, Lee R. Wical, KH6BZT - Asst. SEC: KH6BZE. RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. QSL Mgr.: KH6DQ. I recently attended the transfer of operations ceremony noting the transfer of NBS station W7VII from Punahoa, Maui to the West Coast of Kauai. The transmitters are AEL rigs capable of 40 kw and can be converted to ssb service if further needs dictate. All transmitters on the frequencies 5, 10, 15 and 20 MHz run 10 kw, and 2.5 kw on 2.5 MHz. New service was initiated on 20 MHz for the Hawaiian area. Mr. B.W. Birmingham, NBS/Boulder, Colo. was MC for the July 1 festivities. Following the ceremonies

DRAKE MODEL DSR-1

COMMUNICATIONS RECEIVER



FEATURING . . .

- Continuous coverage 10 kHz to 30 MHz
- Digital synthesizer frequency control
- Frequency displayed to 100 Hz
- All solid state
- AM, SSB, CW, RTTY, ISB
- Series balanced gate noise blanker
- Rack or desk mount
- Price \$2195.00
- Accessories available to accommodate specific requirements

SPECIFICATIONS • Frequency Range: 10 kHz to 30.0 MHz. • Modes of Operation: USB, LSB, CW, RTTY, AM, ISB. • Frequency Readout: Complete to 100 Hz on six NIXIE tubes. • Frequency Selection: 10 MHz, 1 MHz, 0.1 MHz switch selected; 0 to 0.1 MHz continuously variable. • Frequency Stability: Drift does not exceed 150 Hz in any 15 minute period with a temperature change of 70° C per hour over a range of 0° to 40° C. • Sensitivity: Less than 0.5 microvolt for 10 dB SINAD at 2.4 kHz SSB mode; Less than 1.0 microvolt for 10 dB SINAD at 6 kHz AM mode. • Image Rejection: Greater than 70 dB relative to 1 microvolt. • Blocking: Greater than 100 dB relative to 1 microvolt. • Cross Modulation: Greater than 90 dB relative to 1 microvolt. • Intermodulation: Greater than 80 dB relative to 1 microvolt. • Opposite Sideband Suppression: Greater than 60 db at 500 Hz into the opposite sideband. • I.F. Bandwidth: 6 kHz, 2.4 kHz, 1.2 kHz, 0.4 kHz; Selectivity @ -6 dB: 6 kHz, 2.4 kHz, 1.2 kHz, 0.4 kHz; @ -60 dB: 11.5 kHz, 4.3 kHz, 2.4 kHz, 0.8 kHz; Optional filters available for other bandwidths. • I.F. Outputs: 50 millivolts into 50 ohms at 1st I.F.; 5.05 MHz and 2nd I.F. 50 kHz. • Automatic Gain Control: Audio Output rises less than 3 dB for RF input change of 1 microvolt to 100 millivolts; Attack time 100 microseconds; Release time 750 milliseconds (Slow AGC), 25 milliseconds (Fast AGC). • Antenna Input Impedance: 10 kHz to 500 kHz, 1000 ohms; 500 kHz to 30 MHz, 50 ohms. • Audio Output: 3 watts at 5% maximum distortion into 3.2 ohm load; 1 volt into 600 ohm output line; 3.2 ohm unbalanced and two 600 ohm balanced outputs; ISB output is one of the two 600 ohm balanced outputs. • Audio Hum and Noise: Greater than 60 dB below rated output. • BFO: Derived from standard clock or variable over a ± 3 kHz range from front panel. • Power Requirements: 115/230 volts ± 10% single phase 50-420 Hz 15 watts; 12 or 24 VDC supply optional. • Dimensions: 5.25 in. H x 19 in. W x 15 in. D, (13.3 cm H x 48 cm W x 38 cm D). • Weight: 17 lbs (7.7 kg).

Available November . . . see your Dealer

R. L. DRAKE COMPANY
540 RICHARD ST., MIAMISBURG, OHIO 45342



Identical (almost) Twins!

The two hottest receivers we've ever made!
 One for Hams, one for SWL's... and both are
 crystal controlled on 11 bands for great DX.



249⁹⁵

speaker optional

SX-190 SWL RECEIVER
AX-190 HAM RECEIVER

Sold only by Allied Radio Shack

When Allied Radio Shack sets out to build the two "best buy" receivers on the market, you expect a lot! And you get it! A 4-FET front end with 0.5 uV sensitivity on SSB/CW at 10 dB S/N. Crystal controlled 1st oscillator and BFO for best USB/LSB/CW. Pre-selector, 25/100 kHz calibrator. Dual conversion. Ceramic filter. AGC and ANL. Q-Multiplier. Concentric RF/AF gain controls. Anti-backlash dial with ± 200 Hz visual readout. Dual 117VAC/12VDC supplies. And everything else you need for the DX you want. See the Big Two at your nearby "Shack!" We're in the Yellow Pages.

THE SX-190, 80 meters, 49 meters, 40 meters, 31 meters, 25 meters, 20 meters, 19 meters, 16 meters, 11 meters, plus two 500 kHz bands (crystals extra) between 3.5-10 MHz.

THE AX-190, 80 meters, 40 meters, 20 meters, WWV (15 MHz), 15 meters, 11 meters, 10 meters in 4 bands, plus one 500 kHz band (crystal extra) between 3.5-10 MHz.



**Over 1000 Stores
 Nationwide**

*Or order by mail...
 we'll ship anywhere in
 the U.S. for \$10 extra.*

Free Catalog

2725 W. 7th St. • Fort Worth, Texas 76107
 Dept. QST-3

I enclose check money order * Rush me the:

- SX-190 HAM Receiver @ 249.95.
- AX-190 SWL Receiver @ 249.95.
- Matching Speaker @ 19.95
- Free Catalog

Name (print) _____

Apt. No. _____ Route or Box No. _____

Street _____

City _____ State _____ Zip _____

*Include all Sales Taxes if applicable where you live

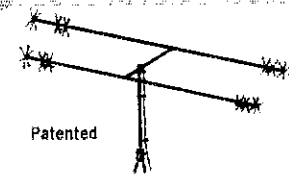


Now... 2000 Watts P.E.P.

Full Power/Minimum Size

FOR APARTMENTS • SUBURBAN HOMES

Marine and Portable Operation
Packaged for APD and FPO Shipping



6-10-15-20 METERS

The time proven B-24 4-Band antenna combines maximum efficiency and compact design to provide an excellent antenna where space is a factor. New end loading for maximum radiation efficiency. No center loading.

Model B-24
Net \$59.95

Bands	6-10-15-20 Meters
Power Rating	2000 Watts P.E.P.
El. Length	11'
Turn. Radius	7'
Total Weight	11 lbs.
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

MULTIBAND COAXIAL ANTENNA for 6-10-15-20 METERS

Needs no ground plane radials. Full electrical 1/2 wave on each band. Excellent quality construction. Mount with inexpensive TV hardware. Patented.

Power Rating	2000 Watts P.E.P.
Total Weight	5 lbs.
Height	11'
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

Model C4 Net \$34.95



Send for Free Brochure

If there is no stocking distributor near you order direct from factory. We pay shipping to your Qth if in Continental U.S.A.

Mini-Products, Inc.

1001 W. 18th Street • Erie, Pennsylvania 16502

• LEADERS IN COMPACT ANTENNAS •

HAM RADIO CENTER

WANTED
Used Amateur Equipment
Buy - Sell - Trade

Distributor for
COLLINS **KENWOOD**
DRAKE **TEMPO/ONE**
GALAXY **TEN-TEC**

Write to Bill Du Bord, W0KF
for Trade-In Quote & List

Ham Radio Center Inc.
8342 Olive Bl. St. Louis, Mo. 63132
Phone (314) 993-6060

Angels Camp with an SB-110. W6YKS operated with a shorted coax in the VHF Contest. WB6RSS reports no news. W6QON is on 2-meter fm. WA6CUZ received the honor award from the IARC. The Fresno Amateur Radio Club meets on the 2nd Fri of each month in the PGE building in Fresno. Traffic: WA6CPP 19, WB6RSS 9.

SANTA CLARA VALLEY - SCM, Albert F. Gaetano, W6VZT - RM: WA6LEA. By now the dust has settled on the Pacific Division Convention held at San Jose and from all reports everyone had a good time. One outstanding notation at the convention was the amount of vhf activity in the area. This is great and we should take our hat off to those pioneers working on those ham bands because you can't buy everything for operation up there yet. WA6LEA took a trip to Ireland. Now that most of the vacationing is over we hope that all skeds for the nets will be covered again. W6ZRJ has been very busy building a new shack in the garage as a new addition to his family has taken over the old one. HI, W6RFF has just received his thirty second renewal of his ORS appointment. That must be some kind of a record. Congratulations Jeffie. W6AUC is secy. for the Norcal Chapter OCWA. Traffic: W6RSY 478, W6YBV 409, W6NW 240, WA6LEA 162, W6BVB 129, K6DYX 109, W6DEF 91, W6VZT 72, W6AUC 70, WA6NHD 22, W6NLG 16, W6RFF 8, WA6OKF 4.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Calvin M. Dempsey, WA4UQC - SEC: W4EVN, PAM: W4AJT, VHF PAM: W4HJZ, WA4KWC has gone 2-meter fm mobile and fixed. WB4ODH has confirmed a QSO with DK4DD bicycle mobile. This was on 20 meters and DK4DD was running one and one half watts on a homebrew rig and antenna. OVS WA4WZQ reports a lot of openings on 6 meters. WA4WZQ, WA4WZP and WB4VDS will be operating from Mt. Mitchell in Sept. They would like skeds on 6, 2 and 432. WA4WZP has worked 42 states on 6 meters and WA4WZQ has 43 states on 6. We are happy to have the Durham FM Association of Durham, N.C. affiliated with ARRL. WB4OJA has ordered a new HW-101 and hopes to have it going soon.

Net	Freq.	Time(Z)/Days	QTC	Mgr.
NC SSB	3938	2330 Dy	17	WA4OP1
CN (E)	3573	2345 Dy	123	K4LND
CN (L)	3573	0200 Dy	60	WB4ETF

Traffic: (July) W4EVN 264, WN4PNY 61, WB4PNY 54, WB4JMG 39, K4MC 29, W4WXZ 23, K4VBG 20, WB4HGT 8, WA4UQC 8, WB4OZL/4 7, WB4HGS 4, WA4WZQ 4, K4TTN 3, WA4KWC 2. (May) WB4JMG 27.

SOUTH CAROLINA - SCM, Mrs. Elizabeth Y. Miller, WA4EFP - SFC: WA4ECL, Asst. SEC: W4WQM, PAM: W4JSD, RM: K4LND. K4HDX is at a new QTH with antenna farm possibilities. Congratulations to K4LND and WA4RMZ on making the PSIR in July. Also to W4MC for FMT Honor Roll in May, W4ZEQ winning out a quad on 10 meters. New ORS appointees are WA4RMZ and WB4RKKU. Plans are under way to establish an 80-meter cw training net for developing proficiency in traffic handling. This will be conducted in the novice band so as to give the WNs a chance. Very slow speeds will be the rule, so that even the most inexperienced can participate. Those wishing to learn about message form and cw net procedures will find this a most pleasant way. Our thanks to those who sent in activity reports. See all of you at Rock Hill Hamfest Oct. 3.

Net	Freq.	Time(Z)/Days	Mgr.
SC SSB	3915	2300 Dy	W4JSD
SCP/N	3930	1600 M-S 1230/1930 Su	
CN(early)	3573	2245 Dy	K4LND
CN(late)	3573	0200 Dy	WB4ETF

Traffic: (July) K4LND 122, WB4RKKU 50, W4MTK 46, W4NTO 32, WA4RMZ 30, K4OCU 21, WB4BSW 17, WB4TGG 6, K4QMK 4. (June) K4LND 101.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: A.L. Martin, Jr., W4THV, SEC: WA4PBG, Asst. SEC: WB4CVY, RMs: WA4EUL, WB4NNO, W4SHJ, PAMs: WA4FGC, WA4YXK. Our deep appreciation to W4QKN for his many years of service as PAM and mgr. of V5BN; we welcome WA4FGC who will carry on. W4YVK is a new OO, K4JM enjoying various tests. WB4DRC struggling to get on the air, WB4DRB is 2-meter fmv hearing. New county hunter W4JVN with 2603; W4JUZ 2284 and no late count from WA4WQG. Winchester Hamfest the best ever. K4LHB reports new call on Backbone Mountain, Md. - WA3RKT instead of K3LNZ/3. WB0BUM portable in Va. from APO San Francisco. W4DM making some and missing some contests. Summer is going

Gateway



to Amateur Radio!

- ★ HOW TO BECOME A RADIO AMATEUR
- ★ OPERATING AN AMATEUR RADIO STATION
- ★ THE RADIO AMATEUR'S LICENSE MANUAL
- ★ LEARNING THE RADIO TELEGRAPH CODE

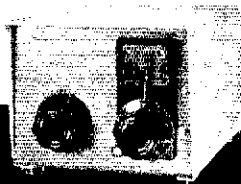
Anyone starting out in amateur radio will find these publications a necessary part of his reading and studying for the coveted amateur radio operator's ticket. Written in clear, concise language, they help point the way for the beginner. Tried and proven by thousands upon thousands of amateurs, these ARRL publications are truly the "Gateway to Amateur Radio."

\$2.50

POSTPAID

The American Radio Relay League, Inc.—Newington, Conn. 06111

UPC



Unique

WIRE TUNER

RANDOM WIRE ANTENNA TUNER

All band operation (80-10) with any wire over quarter wavelength. Absolute 1:1 SWR. Full amateur legal power. Turn counting dial on rotary inductor for exact resetability. Ideal for portable or field day operation.

- ALL BAND OPERATION
- UNITY STANDING WAVE RATIO
- IDEAL FOR PORTABLE
- COMPACT, 5" x 6 1/2" x 10"
- FULL YEAR MONEYBACK GUARANTEE

SOLD FACTORY DIRECT ONLY — \$63.00
W6's add 5% California sales tax. Send check or money order (\$15.00 deposit on C.O.D.'s)

Price F.O.B. factory.

to: **Unique PRODUCTS COMPANY**
1003 SOUTH FIRCREST STREET
WEST COVINA, CALIFORNIA 91791
TEL. 213-331-2430

radio amateur

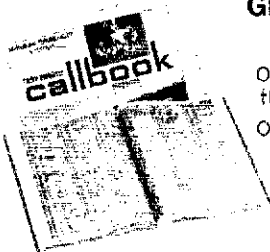
callbook

GET YOUR NEW ISSUES NOW!

Over 285,000 QTHs in the U.S. edition **\$8.95**

Over 165,000 QTHs in the DX edition **\$6.95**

NEW EDITION EVERY:
MARCH 1 — SEPT. 1
JUNE 1 — DEC. 1



These valuable EXTRA features included in both editions!

- QSL Managers Around the World!
- Census of Radio Amateurs throughout the world!
- Radio Amateurs' License Class!
- World Prefix Map!
- International Radio Amateur Prefixes
- Prefixes by Countries!
- Zips on all QTH's!
- A.R.R.L. Phonetic Alphabet!
- Where To Buy!
- Great Circle Bearings!
- International Postal Information!
- Plus much more!

See your favorite dealer or order direct (add 25¢ for mailing in U.S., Possessions & Canada. Elsewhere add 50¢).

WRITE FOR
FREE
BROCHURE!



RADIO AMATEUR

callbook INC

Dept. A. 925 Sherwood Drive
Lake Bluff, Ill. 60044

fast for K4JYM. Director, W4KFC busy attending more functions than I can list this month and is active in contests. WB4FDT has an FCC official living next door which keeps him on his toes. W4YZC vacationed but made Jacksons Mill. K4GTS getting married — and a Skva generator? WB4RNT talking with authority with new rig. WB4KBJ working on engine noise in camper mobile. W4UQ Michigined for a month. K0PIV working shifts, fishing, and obviously handling traffic. WB4SGV passed Advanced Class exam. W4SQQ brooding up RTTY Net for traffic. K4KNP losing PSHR qualification because he is giving up NCIS spots to Mod Squaders — what a grand guy he is! WB4NNO made BPL again — ho hum.

Net	Freq.	PM Daily/EDST
VSBN	3935	6:00/10:00
VSN	3680	6:30
VN	3680	7:00
VFN	3947	7:30

Traffic: (July) WB4NNO 715, K4KNP 285, W4SQQ 187, W4TE 140, WB4KSG 130, WB4SGV 85, K0PIV/4 83, W4UQ 74, K4KA 64, WB4KBJ 63, W4OKN 62, WA4JUF 58, WB4KIT 57, WB4RNT 51, K4GTS 46, WA4PBG 44, WB4SIC 42, W4YZC 31, WB4FDT 20, W4THV 10, WB4UMJ 9, WA4WQG 9, WB4FLT 7, K4JM 7, WA4NIG 7, WB4DRB 6, W4KFC 6, W4MK 6, WA4HQW 4, K4JYM 4, WA4TFZ 3. (June) WB4PWP 58, WB4DRB 55, WB4FDT 13, WB4DRC 12, K4JM 11, W4THV 11, W4KFC 6, W4OP 4.

WEST VIRGINIA — SCM, Donald B. Morns, W8JM — SEC WA8NDY. RM: WB8BBG. PAMS: W8DUW, K8CHW, W8IYD. Phone Net Mgr.: WA8POS. CW Net Mgr.: WB8CYB. Congratulations to WN8END, WN8III, WN8EPS and WN8GYY on their fine operation in the 1971 ARRL Novice Roundup. West Va. moved from 25th to 9th in this year's SET with W8DUW and the Cabell county group on top. I regret to report the passing of W8JKP and K8GWV. Wheeling Radio Club members held their annual corn roast at W8JDU's QTH. WB8BMV has new antenna system and will attend WVU. WB8CYB made PSHR. West Va. Phone Net reports 3 sessions, 428 stations, 106 messages. CW Net 31 sessions, 85 stations, 79 messages handled. WA8FRO set up a station at the Scout camp to demonstrate amateur radio in operation. WB8EV and W8DAR now living in Fla. visited amateurs in the Charleston area. Black Diamond ARC held their annual ham picnic at Bluefield. WA8FLF and WA8PFB are working on revised Constitution for State Radio Council to be presented at Nov. meeting in Charleston. Traffic: WB8CYB 112, WA8NDY 84, WA8POS 83, WB8BMV 39, K8OEW 22, WB8DOX 21, W8JM 20, WA8WCK 14, WA8LFW 11, WA8KAN 8, WA8OKG 8, WB8AKR 7, W8DUV 7, W8AEC 6, KRQYG 5, WB8DXF 4, WA8THX 4, K8HUH 3, W8KWL 2, WA8ROB 2, WB8BBG 1, K8CFP 1, WB8CPU 1, WB8EKG 1, WA8FRO 1, WA8LFZ 1, K8UUY 1, W8WVA 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Clyde O. Penney, WA0HLO — SEC WA0QOY. RM: W0LRN. PAMS: W0AWG, W0CXW, K0IGA, W0LRW. On Aug. 3, 1971, TWN initiated a late traffic session on ssb, meeting daily at 0430Z on a primary frequency of 3970 kHz secondary frequency of 7270 kHz. This provides an opportunity for additional exchange of traffic between Colo. section nets and TWN at a time that is more convenient for many of the Colo. Traffic Nets. Members and guests of the Denver Radio Club enjoyed special tour of the Hewlett-Packard plant in Loveland, Colo. on Jul. 21. Congratulations to the Rocky Mountain Radio League for the excellent communications coverage in connection with the Road Rally sponsored by the Sports Car Clubs of America, held in the Colorado Rockies Aug. 1, 1971. Also, congratulations to W0TV on being awarded the Rocky Mountain Division PICON award for 1971. WN0EBJ has received his 20-wp endorsement from ARRL and has acquired 36 states on his way to WAS. Net traffic for July: Hi-Noon QNI 738, QTC 41, 3 phone patches, 35 informals, time 0:887 min. Colo. Code QNI 133, QTC 55, time of 446 min. for 2 sessions. Columbine QNI 991, QTC 78, informals 164, time of 1:17 min. Traffic: (July) K0ZSQ 874, W0WYX 290, W0LQ 177, K0JIS 137, WA0ZWA 108, W0LRN 84, W0SIN 80, W0LLA 37, K0DS 26, K0FCR 24, W0CXW 21, WA0YNP 14, W0BY 11, WA0NFO 1, W0KFW 6, WA0HLO 5, WA0YED 5, K0IGA 3, W2PTV/0 1. (June) W0CXW 29, K0CNV 8.

NEW MEXICO — SCM, James R. Price, WSNUI — After many years of dedicated service WSDMG has resigned the post of PAM. Many thanks from all the section members for a job well done. WSNUI has taken over as the new PAM. W51XS, W51XR operate in the VHF QSO Party from Puerto del Oso (elevation 10,500 ft. with snow flurries) for 13 sections and 767 points. W5RVZ reports Field Day activity of 35 sections of 10, 15 and 20 during 5 1/2 hours. K5VXJ has added a new linear to the station. The opening week of

1971 ARRL HANDBOOK PROJECT KITS

SAVE TIME AND MONEY . . . Buy your electronic components in one complete package. Get exact material specified for best performance, from your B&W Distributor.

Available Kits . . .

* ARRL "Novice Special Transmitter"

Page 181

A 15 watt, 80-40 meter C.W. Transmitter for the novice constructor. Capable of spanning more than 1000 miles with its signal. 50-75 ohm Pi-net output.

B&W Kit No. A111 Price \$59.95

* QST "10 Watt One Tube Transmitter"

Page 25, March 1971 QST

The transmitter is a dual tube 10 watt transmitter with good keying characteristics. Simple to build. Designed primarily for 80-40 meters, the transmitter will also work 160 and 20 meters.

B&W Kit No. A112 Price \$69.95

* ARRL "R.F. Actuated C.W. Monitor"

Page 183

Permits the operator to monitor his C.W. sending and also can be used as a code-practice oscillator.

B&W Kit No. A113 Price \$19.95

* ARRL "A 75-120 Watt C.W. Transmitter"

Page 184

Designed to satisfy the C.W. requirements of either the novice or higher class licensee. A spot position is provided on the function switch which permits identifying the operating frequency in a band.

B&W Kit No. A114 Price \$85.00

* ARRL "Matching Indicator For Low Power"

Page 556

A reflectometer which is sensitive enough for flea-power transmitters as well as high power. Bridge type monimatch with null accuracy through the 3.5-144 MHz bands.

B&W Kit No. A115 Price \$17.95

* ARRL "Q.R.P. Rig For 3.5 and 7 MHz."

Page 177

Transmitter designed for low power home and field use. Battery operated 12 volts at 275 ma. or can be used with a small A.C. power supply.

B&W Kit No. A116 Price \$29.50

* ARRL "Front End Overload Protection"

Page 127

A rejection filter to eliminate overload from adjacent frequency or broadcast interference.

B&W Kit No. A117 Price \$8.25

* ARRL "Transistorized VOX"

Page 269

Voice-operated relay provides automatic transmit-receive switching. Eliminates the need for push to talk operation. Can be used with tape recorders, etc.

B&W Kit No. A118 Price \$39.95

* Kit includes all electronic and electrical components, knobs, wire and project instructions. One crystal supplied where applicable. Does not include chassis or other metal material, screws or housing, or batteries.

* ARRL "An FM Pip Squeak For 2 Meters."

Page 21, March 1971 QST

A 2 watt 2 meter F.M. Transmitter. Ideal for portable or field use and on repeater networks. Operates on 12 volts either from car battery, D size cells (10 required) or 12 volt lantern battery.

B&W Kit No. A119 Price \$56.00

* ARRL "All Band Electronic T.R. Switch"

Page 571

Self-contained T.R. Switch including power supply. Incorporates a tuned circuit which will add gain to your receiver. Operates 80 thru 10 meters.

B&W Kit No. A120 Price \$27.50

* ARRL "Low Noise Converter For 50 MHz."

Page 405

A Converter giving approximately 30 db gain. Noise figure is approximately 2.5 db. Designed for an I.F. frequency of 28-30 MHz. Operates from 12 volt-40 MA power supply or battery. (Battery not included in kit.)

B&W Kit No. A121 Price \$43.50

* ARRL "Low Noise Converter 144 MHz."

Page 407

A Converter giving approximately 30 db gain. Noise figure is approximately 2.5 db. Designed for an I.F. frequency of 28-30 MHz. Operates from a 12 volt-40 MA power supply or battery. (Battery not included in kit.)

B&W Kit No. A122 Price \$48.50

ARRL "Trap Antenna"

Page 367

An ideal Antenna system when space is not available for a full length antenna. Operates from 3.5-30 MHz at a full K.W. Kit includes coil, capacitor, insulators, center feed insulator (B&W CC-50) and plastic.

B&W Kit No. A124 Price \$21.50

ARRL "Two Broad Band Toroidal Balun"

Page 350

Low-loss high frequency ferrite core balun kit. Can be used to match 50 ohms balanced to 50 ohms unbalanced, 75 ohms balanced to 75 ohm unbalanced, 75 ohms unbalanced to 300 ohm balanced type antennas. Power rating of 1KW from 1.8-40 MHz. Kit includes core, wire, coax connector, feed thru insulators and project instructions. Does not include metal or housing.

B&W Kit No. A125 Price \$10.95

* ARRL "Wide Range Transmission

Line Coupler" Page 354

A coupler designed for multiband antenna system with built in SWR indicator. Rated at 1 KW - 3.5-21 MHz.

B&W Kit No. A126 Price \$89.95



BARKER & WILLIAMSON, INC.

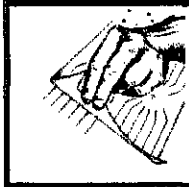
BRISTOL, PENNSYLVANIA 19007

TEL: 215-788-5581

Hey!

Hams, Engineers, Hobbyists

MARK LIKE MAGIC



Any surface
can be marked with
**DATA'S
DRY TRANSFER**
titles and symbols.
The results are
professional,
it looks like the
finest printing!

Write for your **FREE**
SAMPLE and Catalog,
listing hundreds of
letter sheets and
symbol sets.

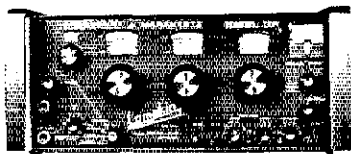
Order from your distributor
or directly from:

**THE DATA
CORPORATION**

* From #K-64 "1/2" letters
and numerals \$1.50
Also available 4x5 1/2
professional title
set for electronic
equipment... \$5.95

85 Highland Ave. / Passaic, New Jersey 07055

SAVE \$240.00!



New low price on Lampkin Type 107A
**DIGITAL FREQUENCY METER /
SYNTHESIZER / SIGNAL GENERATOR**

A money-making, time-saving, all-purpose instrument for mobile-radio maintenance!

Numerous applications in educational, aerospace, industrial laboratories; in AM, FM, and TV broadcast engineering; in commercial frequency-measuring services, and many others.

PRICE \$2150.00

Write, wire, or phone — NOW!

NAME
ADDRESS
CITY STATE ZIP

**LAMPKIN LABORATORIES, INC.
MFG. Div., Bradenton, Fla. 33505**

the late phone session of Twelfth Regional Net on 3970 kHz at 0430Z has been most successful. The New Mexico net on 80-meter CW will be back in session soon! Traffic: K5MAT 129, K5DAB 66, WSPDY 37, W5MYM 28, W5DMQ 22, W5NON 12, W5DAD 10, W5SOHI 7, W5SMY 5, W5SAXC 1, W5AJNC 1.

UTAH — SCM, Carroll F. Soper, K7SOT — SEC: W7WKF, RM: W7OCZ. The activities in this section have been at a rather low ebb because of conventions, vacations and the general run of activities that take their toll. W7EM and W7VTJ attended a convention in Houston and made many new friends in the amateur fraternity. The Ogden Amateur Radio Club and the Utah Amateur Radio Club had their combined steak fry July 31, with very good attendance and every one seemed to enjoy themselves. The WIMU 39th annual hamfest was held Aug. 6, 7 and 8 at Mack's Inn, Idaho. The attendance was very good and the representation from Utah was outstanding. The radio communications was through a 146.34 146.94 repeater and it was busy all the time. The Beehive Net operates daily on 7272 MHz. QNI 692, QTC K2, average time 17.48 minutes. K7ZJS operated portable/mobile from Monument Valley over the July 4 week end and issued 23 cooperative notices for July. Traffic: W7OCX 69, W7EM 50, WA7HCQ 22, K7SOT 21, K7CLO 19, WA7MEL 10, W7HKC 3.

WYOMING — SCM, Wayne M. Moore, W7CQL — SEC: K7NOX, RM: W7GMT. PAMS: W7TZK, K7SLM, K7NOX, W7SDA, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO daily at 1830 on 3610; Jackalope Mon. through Sat. at 1215 on 7260 (alt. 3,920); Wx Net Mon. through Sat. at 0630 on 3920; PO Net 1900 Mon. through Fri. on 3950. W7MZW now has his Advanced Class license. W7ELIZ and W7HDS have moved to Pencil Bluffs, Ark. WA7BDJ was elected pres. of the Wyoming Mobile Club. The state hamfest is scheduled to be held in Thermopolis next year — start now to think about attending — again the third week end in July. Sorry to report that K7KLF passed away on July 14. The Casper hams did a very good job assisting in the hunt for the lost boy on Casper mountain. Traffic: K7NOX 121, K7VWA 75, W7GMT 64, K7WRS 21, WA7OHI 19, WA7AUV 6, K7TWK 2.

SOUTHEASTERN DIVISION

ALABAMA — SCM, James A. Brashear, Jr., WB4EKJ — SEC: W4DGH, RM: W4HUF, PAM: W4WLG. The Birmingham ARC elected W4FKG, pres.; WB4PIU, 1st vice-pres.; WA4INB, 2nd vice-pres.; WB4TFB, secy.; K4HFL, treas.; K4OZQ, district EC; K4FZQ, board of dir. The BARC participated in the flood alert July 16 and the mine explosion July 25. There were 36 BARES (Birmingham Amateur Radio Emergency Service) stations on 2 meters immediately after the explosion. WB4SVH reports a new club has been organized in Tuscaloosa. Net activity has dropped. The AFNR group needs liaison stations to the section nets. K4JK is selling his gear. The NM of AEND, WB4OKT, reports Net Control Stations are doing an outstanding job of getting reports to him. A reminder to all stations: please send activity reports, NTS monthly reports, PSHR and FCC, for this column to me before the 7th of each month. Is your Ala. Emergency Net listed below?

Net	Freq.		
Net	Freq.	Time (Z)	Daily
AENB	3.575	0100	
AEND	3.725	2300	
AENM	3.965	0030	

Each net meets one hour earlier during periods of DST. All ARRL appointments should either be endorsed or cancelled annually — if yours is more than a year old please let me know. WN4KYA is forming a Kagechewers net; contact him if interested. Appointments: WA4SNU, WA4VEK, WB4SVH, W4ATD as ECs; K4LHT, WB4SVH as OBS; WB4SVH as ORS. Endorsed: WA4DYD, K4WSS, WA4NPL as ECs. Traffic: WB4OKT 128, WN4SON 84, WB4KDI 75, WB4SVH 71, WB4EKJ 63, WB4SVX 47, WB4NLEK 40, WB4ADT 34, WB4JMH 33, K4AOZ 33, WB4TFB 23, WB4KSL/0 20, WB4OAI 16, WB4SHD 16, WN4HIC 15, WB4OVR 10, WN4VSW 7.

EASTERN FLORIDA — SCM, John F. Porter, W4KGI — Asst. SCM: Regis Kramer, W4ILE. SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EHY and W4ILE. PAMS: W4OGX 75 and W4SDR 40. Our traffic hit a new low in July. Only 34 reporting. No BPLs for the first time in months. Mr. John Hatch gave a very interesting talk on the phosphate industry to the Brandon ARS, Aug. 9. Brandon is averaging close to ten in their Novice classes. W4OZF received his 5BWAS No. 60. Nice going Bob. Welcome to K4FZT, ex-W3OCW. He already is taking part in our section nets. We also welcome WB8GY to our fair state. WB4HIZB joins the 2-meter tm group with a new Swan. WB4ICJ, Space Center Amateur Radio had a busy

In a time when transceivers are a dime a dozen,



ours costs an arm and a leg.

The signal/one CX7A will set you back \$2,195 — but set you way ahead in amateur radio operation.

That's because the CX7A has just about every feature you can think of. Including the most sensitive receiver made, the most "talk-powered" 300 watts of power you ever heard, and much more. Like an extra receiver, an RF clipper, a built-in power supply and an electronic keyer.

Suddenly, \$2,195 sounds more like a bargain than a bundle. Because you're getting, in effect, a room full of gear in one compact desk-top unit. A unit that features the industry's highest quality control standards, the

finest components obtainable, the most features, the best performance . . . we could go on.

Better yet, you go on over to your signal/one dealer and see the rig for yourself. Or write us for a detailed brochure. Once you see the CX7A, you'll be willing to give up an arm and a leg for it. Or at least \$2,195.

 **signal/one**

a subsidiary of
COMPUTER MEASUREMENTS, INC.
1645 West 135th Street
Gardena, Ca. 90249 (213) 532-9752

QUADS! QUADS! QUADS!

Prices are for complete quads. Enjoy all the advantages of a full-sized quad. All quads complete with hardware. Noisy locations our specialty.

**SPECIAL DEAL ON A QUAD/
TOWER COMBO, OR ON A TOWER ONLY.**
Ppd to nearest freight terminal.

- ★ 2 element, 3 band (10-15-20) \$69.95
- ★ 3 element, 3 band (10-15-20) \$99.95
- ★ 4 element, 3 band (10-15-20) \$129.95

F.O.B. TAMPA, FLORIDA

(813) 988-4213

405 Bon Air Ave.
Temple Terrace, Fla. 33617

SKYLANE PRODUCTS

DIRECTION FINDER - SPACE AGE DESIGN

MODEL
DF-8



8 INCH
GLOBE

• IDEAL FOR A GIFT
• MOUNT IT YOURSELF CENTERED
ON YOUR QTH

• EASY TO USE ITS FAST
• QUALITY INSTRUMENT
• SHOWS SHORT OR LONG PATH
• GUARANTEED

SEND FOR BROCHURE

\$31.50 PPD USA

FLORIDA RESIDENTS
ADD 4% SALES TAX

DAVID M RUGGLES & ASSO.
1 SAN JOSE CIRCLE
ORMOND BEACH
FLORIDA 32074
K4DAY DAVE

signal/one CX-7A

New "A" model now available
Still \$2195. - Great New Reliability
Phone/Write DON PAYNE, K4ID
for a trade on your gear

PAYNE RADIO
BOX 525 SPRINGFIELD, TN

615-384-5573 days 615-384-5643 nites



? 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 north east side of
Indianapolis, Indiana 46205

A NEW TRANSMATCH - MODEL UT-1

A New Universal Transmatch from the ANTEC COMPANY

- 80 thru 10, including all MARS
- use with all antenna-feedline combinations
- 1700s, above 4.5 MHz.
- will match dipoles, quads, beams,
- 2kw, PEP SWR 1:1, 20w frequency
- zeps, random wires, verticals, etc.
- provides 50-70 OHM resistive load
- fully guaranteed, made in U.S.A.

Write for details to: \$94.95 (ppd, continental U.S.A.)
ANTEC COMPANY, INC.
67 Briarcliffe Road, Buffalo, New York 14225 Tel: (716) 837-7408



THE "HI-Q-BALUN"

- For Dipoles—Yagis—Inverted V—Doublet
- Puts Power in Antenna
- Full Legal Power 5-40 MC.
- Small—Light—Weather-proof
- 1:1 Impedance Ratio—Coax Fitting
- Takes Place of Center Insulator
- Built-in Lightning Arrestor
- Helps Eliminate TVI
- Fully guaranteed

\$9.95 PPD
U.S.A.

VANGORDEN ENGINEERING
Box 515, Brielle, N.J. 08790

day on the Apollo 15 launch. K4SZC is on 2-meter fm with no varitronics. FM activity is picking up in the Brevard County area. The West Palm Beach ARC in an effort to live up to 10 meters, has inaugurated the Salfish Net on 28.7 MHz each Sun, evening 014 GMT. "As if we didn't know," 2 meters has it all over CB for local emergency communications. On July 25, an endurance motorcyclist ran into a stump in the woods near Beeline Highway Palm Beach County. The stump won, leaving the cyclist with a broken leg. WB4POB, assisting with communications contact WB4PPW on 146.94 who made arrangements for first aid. WB4AA also assisted via the repeater and auto patch. WB4IAA and WB4MIQ made PSHR this month. Please check your appointment certificates. We have had several who have let them run out. There are many who can qualify for the QST PSHR listing. Keep track of your QNI's NCS duties etc. and ARL 7 to me the number of points in each category and total. Let's put Eastern Fla. on the map in the monthly listing. Traffic: (July) WA4SCK 276, WB4AIW 25, W4FPC 239, WB4HIW 150, WB4LAA 141, W4SDR 110, WB4GEE 104, WB4OMG 99, WB4MIQ 91, W4NGR 55, WA4IJH 51, W4DVT 48, 8R1Y/W4 47, WB4TPJ 42, WA4FJA 40, W4IA 38, W4ILE 3, W4IAD 24, W4YXP 24, W4KJG 16, W4SMK 15, W4GUT 1, WA4OWG 14, WB4FIY 13, WA4OHO 11, W4DQS 10, K4FZT 1, W4IYT 9, W4BCZ 8, W4DFP 8, K4SJH 8, WB4ISK 5, W4NSZS 4, W4BLM 4, K0LCG/4 3. (June) WB4MIQ 89, WB4PKP 15.

GEORGIA - SCM, A.J. Garrison, WA4WQU - Asst. SCM: Joe T. Laney, III, K4BAI. SEC: WA4VWV. RM: K4BAI. Acting R: WB4SPB. PAMs: K4HOI, W4LRR.

Net	Freq.	Time(Z)	Days	QNI	QTC	M
GSN	3595	0000/0300		690	196	K4B
CTN	3718	2300		73	4	WB4S
GRN	3975	0100		-	-	WA4VV
Ga. Cracker	3995	1300		91	6	WA4IQ

Section Net Certificates are being mailed to 14 members of the Confederate Signal Corps 2-meter FM net members. The Signal Corps Net is running around 50 QNI each Mon. night. We're receiving some mighty good reports on this group of 2-meter time. W4LRR is busy building the TTL/2 demodulator for RTTY. The Atlanta Radio Club repeater is going "auto patch." W4LYG is trying afsk on 2 meters. We're sorry to hear that WA4NMM has QSY'd Ala. Our loss of a good traffic man is Ala.'s gain. Welcome back W4JM who recently moved back to Ga. from the E. Fla. section. He's running the Collins S/Line fixed and a Swan 500 mob. W4FEW, K4HOI and K4VJJ are new Advanced Class licensees. Our recent visit to Huntsville, Ala., WA4WQU had the pleasure of attending a meeting of the Huntsville club and made a short address. K4BAI has moved to a new QTH, new address unknown, but P.O. Box is 421, Columbus, Ga. Traffic: K4BAI 101, W4EEP WB4KVE 63, WA4NMM 51, W4RNL 45, W4CZ2N 35, WA4WQU W4AMB 27, WB4SPB 27, W0GXQ 23, W4JM 10, W4PIM 10, K4I 5, K4HOI 1.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH. SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: W4NOG. VF: W4UUF, Pensacola: WB4SBD is active on traffic nets. WA4S suggests a 40-meter alternate frequency for the Fla. RTTY Net. Comments to him or W4WEB. Correction on the 6-meter am/ssb - it meets at 8:00 P.M. Sun. and Wed. on 50.7. WB4TZN is a net member. WB4KGW was appointed as QVS. K4DJ "News-Journal" feature writer, was hospitalized for heart surgery. WA4IZM operated /HIS with a group from the First Baptist Church. K4SVX is electronics instructor at Woodham H.S. Fort Walton "master plan" for use of touch-tone encoders to control 2-meter repeaters along the Gulf Coast has been adopted. For further information contact W4SMS or your SCM. A helicopter was hired to mount the new antenna for WB4KLT repeater! The local 10-meter fm repeater (WB4EQU) is becoming well-known throughout the country on 29.60. Input is 29.44, 1800-cycle tone. New hams begin AFB include WB4EVF, W4KZO, W4TAL, K3JVT, W4NSFM. Crestview has a new Novice - W4VVP. DeFuniak Springs: The W4PN picnic drew a big crowd with the assistance of K4KHV, K4VWE, WA4PXR and WA4IZS. Tallahassee: Last Novice class graduates include: WN4s V1R, V1S, V1T, V1U, V1V, V1W, V1P, V1M and V1N. W4VRR got his ticket in Monticello. Traffic: (July) K4VFF 294, 8R1Y/W4 47, W4RKH 11, W4FDL W4NOG 8, WB4NHH 2. (June) K4CFS 11.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - SEC: K7GR. RM: K7NHL. PAM: W7LUXZ. The annual Ft. Tuthill Hamfest Flagstaff was well attended and enjoyed by all. K7GPZ was surprised new owner of the 2-meter transceiver. Director Joe Griggs attended and brought us up to date on important top

WANTED!

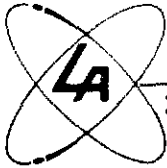
CLEAN DRAKE GEAR

REWARD: *

* MUST BE CLEAN, IN GOOD OPERATING CONDITION WITH MANUALS

- \$ 210.00 → FOR YOUR 2B ON A NEW R4B @ \$ 475.00
- \$ 250.00 → FOR YOUR R4 ON A NEW R4B @ \$ 475.00
- \$ 275.00 → FOR YOUR R4A ON A NEW R4B @ \$ 475.00
- \$ 300.00 → FOR YOUR T4X ON A NEW T4XB @ \$ 495.00
- \$ 400.00 → FOR YOUR TR4 ON A NEW TR4 @ \$ 599.00

**COLLECT YOUR
REWARD FROM**



Electronix Sales

23044 S. CRENSHAW BLVD., TORRANCE, CALIF. 90505
Phone: (213) 534-4456 or (213) 534-4402

Preferred By Pros!

VESTO TOWERS

Vesto self-supporting steel towers have been the choice of project engineers and advanced hams for years!

Renown world-wide for quality and economy. Vesto towers are shipped in compact bundles ready for easy erection using unskilled labor and basic tools. Hurricane-Proof 4 post construction of hot dip galvanized steel lasts a lifetime!

Ten Sizes In Stock!

Tower Height Above Ground	Price
22 ft.	\$318.82
28	412.66
33	490.98
39	573.44
44	663.04
50	765.15
61	962.56
77	1408.00
100	1986.00

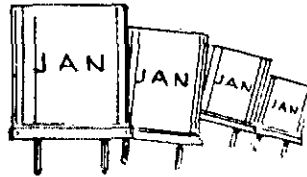
F.O.B. North Kansas City, Mo.
Prices Subject To
Change Without Notice
Price Does Not Include Platform

VESTO CO., Inc.
20th and Clay 816-221-3322
North Kansas City, Mo. 64116

FAA Installation
Topeka, Kansas

Write Or Call Today
For Complete Free
Information And
Site Photographs

NEED CRYSTALS?



We can supply crystals from 2KHz to 80MHz in many types of holders.

Color TV Crystal (3579, 545 kHz) wire leads	\$1.60
	4 for \$5.00
100 kHz freq. std. crystal (HC13/U)	\$4.50
1000 kHz freq. std. crystal (HC6/U)	\$4.50
Any CB crystal TR. or REC. (except synthesizer crystals)	\$2.50
Any amateur band crystal (except 80 & 160 meters) in FT-243 holders	\$1.50
80 meter — FT243 holders	or 4 for \$5.00 \$2.50

We have in stock over six million crystals including CR1A/AR, FT243, FT241, MC7, HC6/U, HC13/U, HC25/U, HC18/U, etc. Send 10¢ for 1971 catalog with oscillator circuits and stock freq. listing. Add 10¢ per crystal to above prices for shipment 1st class, 15¢ each for air mail.



Special Quantity Prices to
Jobbers and Dealers

ORDER DIRECT
with check or
money order to

2400-C Crystal Drive
Fort Myers, Florida 33901

KW
ELECTRONICS
LIMITED

A complete line of world famous British equipment Transceivers; separates, and auxiliaries: 160-10M
KW ELECTRONICS

10 Peru St., Plattsburg, N.Y. 12901

NOW in the USA

**AT LAST --
A SPEECH COMPRESSOR THAT
REALLY WORKS!**

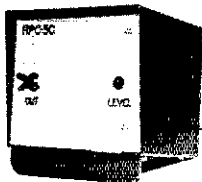


RPC-3M MODULE
(ONLY \$22.50)

- LOW DISTORTION CIRCUIT
- FULLY WIRED & TESTED NOT A KIT
- WORKS WITH PHONE PATCH
- INTERNAL UNITS & MODULES WORK MOBILE
- FULL WARRANTY - ONE YEAR
- INTRODUCTORY LOW PRICES (Illinois residents add 5% Sales Tax)

Write for specifications and information sheets (free)

Demonstration Tape (cassette) available (\$2.00 deposit)

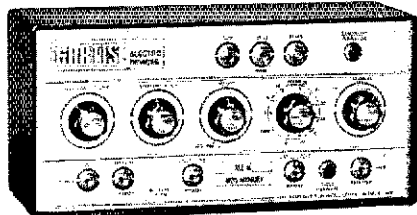


RPC-3C CABINET MODEL
(\$34.95)



RPC-3.3U INTERNAL UNIT
(\$24.95)

R_P Electronics
Box 1201 Q
CHAMPAIGN, ILL.
61820



PROGRAMMABLE - REPROGRAMMABLE!!

- The KING of Electronic Keyers
- 20 Character Read-Write Memory
- Every Conceivable Feature.....

EK 402 \$289.95 Complete, FOB Factory

WRITE FOR BROCHURE



GURTES ELECTRONIC DEVICES

Box 4090, Mountain View, California - 94040

concerning amateur radio, ARRL, FCC and IARU. He also had the opportunity to visit with many of his friends from Ariz. since the hamfest was quite informal. Planning trips to Europe in the fall. K7HQF and K7RDH. Visiting WI-Land this summer was WA7IS, WA7HT and the Snowflake group are working on putting a 2-meter fm repeater on Porter Mountain for RACES as well as general communications. Now that vacations are over, it is time to attend one or more of the local radio club meetings as well as to lend your support to the public service nets in operation. Contact your SC for details. Those earning Section Net Certificates for outstanding participation in July are K7EMM, WA7HT, K7NTG, W7OU, K7RLT and K7UOK. PSNR: W7CAF 44, WA7MAD 38, W7VY 17. Traffic: K7NTG 79, WA7MAD 68, W7DOS 21, W7OUF 6, K7MTZ 6, K7RDH 6, W7LLO 1.

LOS ANGELES - SCM, Eugene H. Violino, W6INH - Asst. SCM: Archie Willis, W6LPI. RM: W6LYY. Congrats to W6OAW OPS appointment. W6BPKA doing a great job on SCN late besides working lots of DX. Crescenta Valley RC had a very nice picnic in the Angeles Forest. W6BOLD is back with us after absence from school. W6BXR has finished a frequency counter and placed very high in the frequency measuring contest. K6NA turned in a large OO report this month. Fellows please try to get telephone numbers for the messages that you originate, its getting too expensive to mail traffic now-a-days. We also give better service when the telephone number is on the message. WPS and WESCA require phone numbers for their delivery. The Mon. 8:30 P.M. 38 kHz Section Emergency Net is progressing nicely. W6LPI attended the Council of Radio Clubs meeting July 15 and W6KW gave a good run down on the recent Board Meeting. W6WBS is now City of Torrance CD Commissioner and will soon be active with ARRL. Good going Paul, we need representation from that area. W6T still regular on SCN. K1QPH is active on SCN and on 20-meter 1. W6BDRH is planning on a four-element beam soon. W6MAB getting ready to install new beam - a Log Periodic 7 to 30 MHz. W6HS is in contact with VR6TC weekly. WPS (Western Public Service Net) very active in the evenings. Lots of mobile check-ins. W6BHG finds back on the air with new PTO and in business as an OBS. W6J regular NCS on RN6. I have been visiting a club a month and next three months are already filled up. W6USY says he keeps receiver tuned to 3600 kHz so you can call him most any time. W6HUJ has a new QTH. W6VZI captained the 40-meter ssb station for the West Valley Radio Club on Field Day. The JPL club (voice net, meets every Mon. evening at 2030 local time on 3.5 kHz. Here is a chance to get your code speed up. W6FAV has been working DX lately and wondering where his cards are. W6NUJ had a nice talk to the members of West Valley Radio Club. W6GH having troubles with foreign hams with slant six calls using the expiration of hand and says they cause excessive QRM. W6SZO is So. Calif. VHF Club repeater, am at present. Input freq. 22.1 output 223.54 MHz. W6RCV has been off the air because of a flut but now is back into swing. W6GGLT prefers am to sideband plans to get on SCN soon. W6ZKI has new Yaseu 400-F1DX 400-FRD. The TELCO Radio Club now giving a QST subscription as a monthly raffle prize. WA6TVH had big time in July CD Party. E6YHD spending most of his time working with CD. WA6A putting up full size 20-meter beam, going after 5BWAS. Tra (July) W6BPKA 4018, W6BZVC 301, W6JNH 185, W6L 150, W6AMV 100, W6AQQ 76, W6AZKI 55, K6CL 40, W6C 38, W6USY 38, W6EO 26, K6EA 25, W6DGH 13, W6JIT W6HUJ 11, W6FD 5, K6OPH 4, W6BZIT 3, W6GGGL 2. (JULY) W6HUJ 9, W6AM 6.

ORANGE - SCM, Jerry L. Verduft, W6MNY - Asst. SCM: Richard W. Birbeck. K6CID. SEC: W6CQR. RM: W6BA. W6QBD was pleasantly surprised to receive an A-1 Operator Certificate. Woody was 100% ON1 on SCN in July. W6AKR is Fri. night liaison from SCN to RN6 and received a BPL medal. Bill also is building an RTTY converter. W6FB mobilized 6000 n through the southern and western U.S. during June/July. Bill placed second in the May FMT. W6GB spent his vacation in Calif. and Ore. K6YNB spent his doing mountaintopping expeditions in Nev. and Utah. EC WA6TYA reports the 40-meter and 2-meter members of Orange County ARCC cooperate to provide communications for the Santa Ana tennis matches. Santa Communications, Inc., is joining the Santa Ana City Organization. W6WOO is coordinating code and theory classes technician and general at his home on Mon. nights, 8-10 P.M. W6BRL reports the So. Cal. VHF Club had a fantastic birthday party. Be advised of the new World QSL Bureau (not sponsored by ARRL). For information on its services write 5200 Panama A. Richmond, Ca. 94804. New officers of the So. Cal. ATV Club: WA6ZIO, pres.; W6TFS, vice-pres.; W6BFXL, secy. New officer Citrus Belt ARC are W6HAL, pres.; WA6IYN, vice-pres.; W6Z

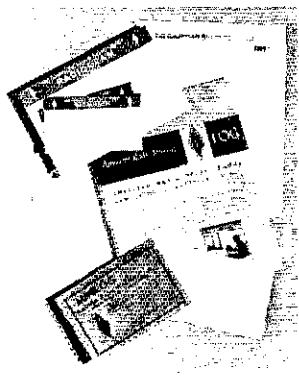
IT'S CONTEST TIME...and



THE *ALPHA SEVENTY* IS CONTEST BRED

ETD EHRHORN TECHNOLOGICAL OPERATIONS, INC.
Brooksville, Florida 33512 • Phone (904) 796-8400

OPERATING NECESSITIES



and they are available
postpaid from . . .

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 . . . **75¢**

Mobile and portable operational needs are met by the pocket-size log book, the *Minilog*. Designed for utmost convenience and ease . . . **50¢**

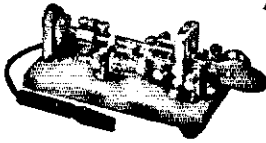
First impressions are important. Whether you handle ten or a hundred messages you want to present the addressee with a neat looking radiogram . . . and you can do this by using the *official radiogram form*. 70 blanks per pad. **35¢**

If you like to correspond with fellow hams you will find the *ARRL membership stationery* ideal. Adds that final touch to your letter. 100 sheets. . . . **\$1.75**

The American Radio Relay League
NEWINGTON, CONN. 06111

ENJOY EASY, RESTFUL KEYING

With **VIBROPLEX**

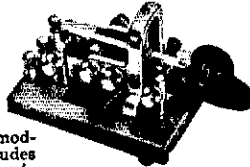


Sending becomes fun instead of work with the SEMI-AUTOMATIC Vibroplex. It actually does all the arm-tiring nerve wrecking work for you. Adjustable to any desired speed. Standard models have polished Chromium top parts and gray base. DeLuxe models also include Chromium Base and red finger and thumb pieces. Five models to choose from. Priced at \$31.95 to the 24K Gold Plated Base "Presentation" at \$43.95.

and thumb pieces. Five models to choose from. Priced at \$31.95 to the 24K Gold Plated Base "Presentation" at \$43.95.

VIBRO-KEYER

Works perfectly with any Electronic Transmitting Unit. Weighs 2 3/4 lbs., with a base 2 1/2" by 4 1/2". Has Vibroplex's finely polished parts, red knob and finger, and thumb pieces. Standard model \$20.95; DeLuxe model includes Chromium Plated Base at only \$27.50.

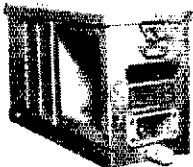


Order today at your dealers or direct

THE VIBROPLEX CO., INC.
833 Broadway New York, N. Y. 10003

FREE Folder

F.M. MOTOROLA GOVERNMENT SURPLUS



	USED: RE-COND.:		
R-394 RECEIVER			
152-172 MC	\$14.95	\$22.50	
T-278 TRANSMITTER			
152-172 MC	18.95	24.95	
R-257 RECEIVER			
25-50 MC	19.95		
T-208 TRANSMITTER			
25-50 MC	29.95		
CY-938 CABINET	7.95	9.95	
C-847 CONTROL			
BOX	8.95	12.95	

Also—Power Supplies, Amplifiers, Modules, etc. Write—Dept. QST

Send For Our **BIG CATALOG No. 71**

FAIR RADIO SALES

P.O. Box 1105 • LIMA, OHIO • 45802

SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB

SIMON SIDE BAND COMPANY

Holland Mt. Rd., Oak Ridge, N. J. 07438
201-697-4246

Dealer for Kenwood, Tempo & Henry Amplifiers

Service to all makes of Ham Radio Equipment. We sell, buy, and trade all used equipment. Antennas by Hy-Gain, Newtronics, Cush Craft, etc. Hours: Tues. ~ Fri, 4:30 ~ 9:00 P.M. (mornings by appointment)



Sat. ~ 11:00 ~ 6:00 P.M.

Sun. ~ 11:00 ~ 4:00 P.M.

Proprietor ~ Bert Simon W2UUN

SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB-SSB



SATURN SIX MOBILE ANTENNA
S-2 6M Ant. only \$12.50
S-1 Ant, Mast & Mnt 17.75
SL 6M Hilltopper 14.95
SL 2M Hilltopper 16.95

Also 6&2 Lunenburg Beams, Halos, Hula-Hoops
HI-PAR PROD. Box 88 FITCH, MASS. 01420

secy.; W6IWE, treas.; WB6ETE, act.; K6GGS, custodian; WB6CZO editor of The Modulator. The Victor Valley ARC continues to sponsor code and theory classes Tue. nights at Hesperia Fire Station No. 2 at 6 P.M. WB6HZS and WB6CZO gave a presentation on bar radio to the Yucaipa Kiwanis Club. Citrus Belt ARC regretfully reports the passing of WA6JWH. Public Service Honor Roll: W6MNY 48, WB6AKR 38, WA6TVA 27, W6CPB 5, Traffic: (July) W6MNY 122, WB6AKR 78, W6QBD 49, W6WRJ 25, W6BONU 17, K6GG 10, WA6TVA 7, W6CPB 6, W6BUK 2, W6FB 2. (June) WA6LZ 2

SAN DIEGO ~ SCM, Paul C. Thompson, W6SR5 ~ Asst. SCM Art Smith, W6INI. Now that the summer has drawn to a close the winter months should give you a little more time to enjoy your favorite mode of operation. Included in your activity is the added opportunity for amateur radio as a public service. Don't pass up the chance to handle traffic, even though you have not done it before or participate in your ARCC drills. Experimentation and practice are the keys to building a successful section organization. With your interest we will continue to grow as in the past. Listen to the SD OBS on 3905 kHz and other frequencies for information about new section activities. Clubs: Imperial Valley ARA elected K6CXK as their new pres. North Shores had a demonstration of ATV by WA6JCG. Forest fires was the subject for El Cajon. About 4 members of the Palomar Club toured the Micro-Minature Circuit Plant. SD fm has their new 34/85 repeater on Mt. Otay. SD D Club held their meeting at the home of W6HJA. Station activities: Many stations assisted in the Oscar Flyover in Sept. New Extra Class and Quad for K6TER. K6EC needs 2 for DXCC. WA6COE has completed his new shack. W6VNO is dir. of TCC Pacific. 1296 gear for K6BTO. New vertical for W6DEY. New 2-meter rigs for W6IN and W6SRS. Remember the AREC drill in Oct. Traffic: W6VNO 479, W6JOU 302, W6BGF 186, K6HAV 167, W6BHMV 89, W6DEY 27, WB6LYG 9, W6MI 4, W6SRS 4, WN6HJW 2, W6INC 2

WEST GULF DIVISION

NORTHERN TEXAS ~ SCM, L.E. Gene Harrison, W5LR Asst. SCM: Gene Pool, W5NFO. PAM: W5BOO. RM: W5QCG. T Brownfield and Texoma hamfests were quite successful. Dallas ARC made a FD score of 2933 points plus 25 operators, 3 ARCC members visitors included Col. McCoy, CD officials and plenty of publicists. Congrats to all hands. WASZVD, Temple ARC pres. is now back the Pacific. Irving ARC held a family picnic. Garland ARC says new directory now available at Sanford Book Shop. 35 people attend exhibits for swapfest. N.TX. DX bulletin shows W5RBO, pres. W5SZ, vice-pres.; W5KYD, secy. W5NFO is back from FL Headquarters is cleaning house so if your appointment is cancelled please check to see if your reports are current. The QSL Bureau requests you please use the 3 by 7 1/2" clip envelopes when renewing your QSL "stamps." Endorsed: WASKHE as OO. No.TX. has several RACES liaison officers. State staff college presented at Dyess AF. Ahilene. Region V and National office of CD represented. "Chaw Rag" RWK reports score 2281 on Field Day. Top team 2-hour operators include Messrs. Thorne/Johnson and 1-hour operators Fogg/Schriner with 160/111 OSOs. Congrats. W5OPK made observations this last month. WASKKG is interested in AREC work. STEN is now history. Hurricane season coming up. WASSUY work traffic on 3961 kHz. Tex. cw and 3961 fone net met at the La Whitney Arrowhead Lodge. WBSEMB/KR6A wishes to apply for AREC upon return from overseas duty. New Board Meeting Jan. 1961 so if you have problems tell W5FYB. Incidentally several local stations were heard checking in on the "Open CD Party." FB me keep it up. QCWA is going strong in No.Tex. ~ Tyler chapter organized and Dallas membership above 50. The 14th annual meeting of the Greater Eastex Amateur Radio Society (GETARS) W5HMQ, pres. and K5ILL, secy., was held at Lake Murv. WASHOG sent copy of the Southwesterner, a 3935 kHz group. OI WA5JVJ was renewed. PAM W5BOO reports many 2-meter station in his area. Has 5-county coverage. No Waco hamfest this year. NSEC applicants being investigated. Traffic: WASRJE 92, WA5VJ 49, W5QCG 24, W5LR 18, K5SXO 12, W5UF 9, WASEVS WASKHE 8, WASKZA 1.

OKLAHOMA ~ SCM, Cecil C. Cash, W5PML ~ SEC: W5SFS RM: W5ASYO. PAMS: W5MFX, WA5WHV, K5DLE and W5ZR. To each of you as you scan this column for news please remember my remarks at each and every club meeting and gathering that appear "You are my eyes and ears" unless you send in the news your activity and the happenings of your community I can't report them. A little birdy reports that W5QAC has a new touch code keyer on the air. A note from W5RB reports on a real nice & interesting visit to AKRL headquarters and WIAW, said he was treated as royalty. W5JJ has a homebrew amplifier under construction for 7 MHz. Homebrewing is almost a lost art. Was v

At last! A GOOD Solid State DIPPER

No power cord.

Performance equal to or superior to the best tube type dippers.

1.6 to 300 MHz

Smooth meter reading over tuning range.

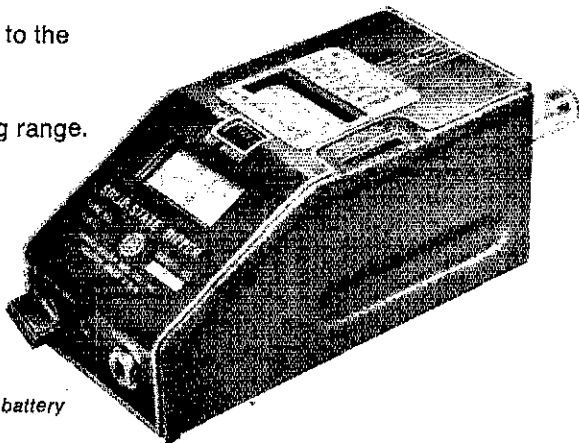
Good Dip.

Sensitive metering system, using zero suppressing circuit.

Q-Multiplier for very sensitive absorption-type wavemeter.

\$110⁰⁰

Complete with coils, alkaline battery and carrying case



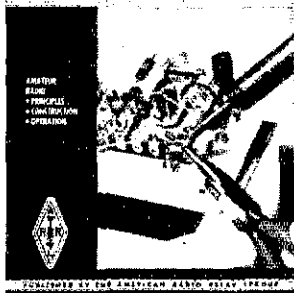
JAMES MILLEN MANUFACTURING COMPANY, INC.

150 EXCHANGE ST., MALDEN, MASS. 02148



UNDERSTANDING AMATEUR RADIO

\$2.50



FIRST EDITION

\$2.50 Postpaid

U. S. A. • \$3.00 Elsewhere

Just Getting Started?

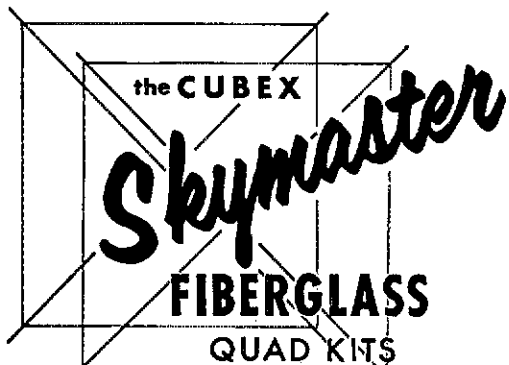
Then Understanding Amateur Radio is for you! Most of the material for this book has been drawn from the popular Lewis G. McCoy *QST* series for beginners and novices. The book is really a mini-Handbook, with all the basics you need to know about transmitters, receivers, antennas, setting up a station and operating.

If you are just starting out in amateur radio, this is a *must* book for you.

THE AMERICAN RADIO RELAY LEAGUE, INC.

NEWINGTON, CONNECTICUT 06111

"CHOICE OF THE DX KINGS"



All models available "WIDE-SPACED"
2 ELEMENT—3 BAND KIT SPECIAL

- CONTENTS** **ONLY**
- 8 Fiberglass Arms—skyblue color
 - 2 End Spiders (1 pc. castings)
 - 1 Boom/Mast Coupler—h.d. aluminum
 - 16 Wraplock Spreader Arm Clamps Add \$7.50 for PPD
 - 1 CUBEX QUAD Instruction Manual Frt. Cont. U.S.

\$69.95

2-3-4 or more element Quads available
 Write for FREE BROCHURE and Price List

CUBEX COMPANY

P.O. Box 732, Altadena, California 91001
 Phone: (213) 798-8106

YOU CAN'T SAY "QUAD" BETTER THAN "CUBEX"

NEW from NRI Home training in AMATEUR RADIO

NRI, leader in Communications, Television, Electronics and TV-Radio home training, now offers the first in Amateur Radio courses, designed to prepare you for the FCC Amateur License you want or need.

Don't lose your favorite frequency

The FCC has said "either-or" on licensing, but to pass Advanced and Extra Class exams, you need the technical guidance as offered by NRI. NRI Advanced Amateur Radio is for the ham who already has a General, Conditional or Tech Class ticket. Basic Amateur Radio is for the beginner and includes transmitter, 3-band receiver, code practice equipment. Three training plans offered. Get all the facts. Mail coupon. No obligation. No salesman will call on you.

NATIONAL RADIO INSTITUTE, Washington, D.C. 20016.



..... **MAIL NOW**

..... **NATIONAL RADIO INSTITUTE** 50-101

..... Washington, D.C. 20016

..... Please send me information on Amateur Radio training.

..... Name _____ Age _____

..... Address _____

..... City _____ State _____ Zip _____

..... **ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL**

glad to get a vhf activity report from W5SNP. Congratulations to new Advanced Class licensee WASZQH. Correction previous report of Extra Class not WB5CPB but Chuck Wilhite, WB5CPR. Elsewhere in this issue, I hope, is a report on your SCM and SEC trip to present charter of ARRL affiliation to the Great Plains ARC. Woodward. Have you ordered your vhf repeater and ARRL in directory? Send an SASE to ARRL Hq. for your copy. See you on the nets and please send me your activity reports. Traffic: (July) KSTFY 464, WB5CFZ 65, W5TKL 42, WASZOO 32, W5MFX 2, W5CDG 20, W5DRZ 14, W5PML 14, WASOOP 10, W5NZM, W5KRK 4, K5COX 2, W5SNP 2, K5WPP 2. (June) WASZOO 4, K5WPP 5.

SOUTHERN TEXAS - SCM, E. Lee Ulrey, K5HZR - SEC, K5HXR. PAMs: W5FUA, W5KLV, RM: W5EZY. Congratulations to new OO W5R1Y. Renewed appointment for EC W5TPY. W5M1L has applied for OO. W5BWW is contemplating ORS. EC W5ICL recovering and back on the air. OO K5F1Z has completed building new frequency counter. OBS W5OVH is back on schedule after major surgery. OBS W5AUB says the Corpus Christi vhf group has a second repeater under construction. OBS W5LPO is now on vhf fm mobile. OPS W5CBT is on the air again after a jaunt to Okla. school. OO K5TRJ just completed building a new transceiver. Congratulations to W5RBB and K5ROZ on PSUR again. OO reports were received from W5NGW, W5VW and W5RBB. Austin AR reports such good results with June VHF OSO party that they are trying again in Sept. A new club in Houston is the JCC ARC with the call WB5EJV: W5B1R, pres.; W5NDLY, vice-pres.; W5B5ED, secy.; W5HLL, trustee. K5QQQ pinch hit for SEC K5HXR while Jim and folks were in old Mexico. K5H1XN and K5JKV hosted the Amateur Radio Campers near Harwood with about 30 attending. San Jacinto Bayshore ARC received memorial station license call W5DQJ in honor of Leonard Stanford who was a charter member of old Bayshore ARC. OVS W5ETG reports San Antonio second 2-meter fm repeater by Sept. 1 with auto-patch by Oct. 1.

Net	KHz	Sess.	QMI	QT
TEX*	3770	62	412	2
TTN*	3961	31	1317	10
7290 Tfc	7290	44	1796	51

*NTS. Traffic: K5HZR 104, W5RBB 94, W5EZY 81, W5ABQ 7, W5BGE 63, W5VW 62, W5MXY 51, K5ROZ 46, W5BWW 2, K5RVF 23, W5TFW 19, W5SCTJ 8, W5TPY 8.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - SEC: VE6XN. July was a very busy month. The Powder Puff Derby started in Calgary. VE6YL organized the communications locally and was assisted by VE6LZ, VE6SB and VE6APF. CARA's exhibit at the Calgary Exhibition and Stampede did very well. Three vhf stations, three hf stations and one RTTY station made 1,975 contacts including all Canadian Provinces, WAS and WAC. Thirty hf contacts were made. Cooperation by club members and a few swatting for their tickets was excellent. VE6SB and VE6AM almost lived at the site. All QSLs have been sent - any accidental missed please notify CARA Box 592, Calgary. Many hams visited the station including two JS, one ZL and Vice-Director VE2MS. Y. Waterton Hamfest was well attended and blessed by beautiful weather. I wish to thank Sask. Asst. Director VE5CU, Alberta S. VE6XC and SCM BC VE7FB for their assistance during the AR meeting. It was nice meeting many of my traffic net buddies. Traffic: VE6FK 35, VE6YL 14, VE6XC 10, VE6SS 7, VE6KS, VE6LZ 2.

BRITISH COLUMBIA - SCM, H.L. Savage, VE7FB - Because of vacation the June report was missed. I visited VE7ALY and X in their new home. The next day we boarded the ferry for the trip to Prince Rupert. Several hours out, my XYU VE7SH took the porta-fo-ne to the stern of the vessel to see what was possible on meters. This started a great reception for us from the shore. Bear Cove, Alert Bay, Port McNeil, Sontula and Pultley Point. They greeted us with waving sheets or flashing lights. The passengers were able to hear our conversations and see the signals with glass. Pultley Point gave us the final salute and pleasant trip by letting the fog horn as we came about the light station. At Prince Rupert the amateurs were all away, but Kitimat made up for this. Hazelton, we visited VE7AQM. We arrived at the Waterton International Hamfest Fri. Sat. and Sun. the hamfest committee kept everyone entertained. Since then we have roamed Montana, Idaho, Washington and Oregon, where we are staying with VE7BGV/W7.

ONTARIO - SCM, Holland H. Shepherd, VE3DV - Don't forget to mark your calendar for the start of the Ont. cw Frats

GROUNDING GRID FILAMENT CHOKES

30 AMP BIFILAR WOUND FERRITE CORE
 SIZE 3/4 x 5" 3-30 Mc \$5.00
 RF PLATE CHOKES 2500VDC 800MA \$3.00
 Special Sizes Available
 WILLIAM DEANE 8831 SOVEREIGN RD.
 SAN DIEGO CALIF. 92123
 POST PAID USA 48 CALIF. ADD TAX

NOVICES
Need Help For Your General?
Recorded Audio-Visual
THEORY INSTRUCTION
 EASY — FAST — PROVEN
 No Electronics Background Necessary
 For Complete Free Information
 Write: Amateur License Instruction,
 Box 6015 Norfolk, VA 23508

DIGITAL FREQUENCY METER


Modernize your station by displaying your transmitter frequency while on the air. 100 Hz readout on AM or SSB transmitters through 35 MHz. Kit or assembled. 170 MHz prescaler available for 6 meter and 2 meter operation.

MICRO-Z COMPANY

P.O. Box 2426, Rolling Hills, Calif. 90274

NOW **EXCLUSIVE 66 FOOT** **MDR GAIN** **75 THRU 10 METER DIPOLE** **IS BACK**

NO TRAPS — NO COILS — NO STUBS — NO CAPACITORS
Fully Air Tested — Thousands Already in Use



#16 40% Copper Weld wire annealed so it handles like soft Copper wire—Rated for better than full legal power AM/CW or SSB Coaxial or Balanced 50 to 75 ohm feed line—VSWR under 1.5 to 1 at most heights—Stainless Steel hardware—Drop Proof Insulators—Terrific Performance—No coils or traps to break down or change under weather conditions—Completely Assembled ready to put up—Guaranteed 1 year—DNE DESIGN DOES IT ALL; 75-10HD—ONLY \$12.00 A BAND!

Model 75-10HD . . . \$60.00 . . . 66 Ft . . . 75 Thru 10 Meters	Model 75-40HD . . . \$40.00 . . . 66 Ft . . . 75 Thru 40 Meters
Model 75-20HD . . . \$50.00 . . . 66 Ft . . . 75 Thru 20 Meters	Model 40-20HD . . . \$33.00 . . . 35 Ft . . . 40 Thru 20 Meters
Model 80-40HD . . . \$42.00 . . . 69 Ft . . . 80-40-15 Meter (CW)	

ORDER DIRECT OR WRITE FOR FULL INFORMATION **MDR GAIN** 300 Shawnee Leavenworth, Kansas 66048 OR THRU YOUR FAVORITE DISTRIBUTOR

Yes!



I would like to become a member of ARRL and help support its many services to amateurs and amateur radio. Here's my \$6.50 (in the U. S. and Canada, \$7.00 elsewhere). Sign me up for a year's membership and twelve big issues of QST! Additional family members at the same U.S. or Canadian address, \$2.00

My name Call.....
 Street
 City State..... Zip.....

(Please see the other side of this page for a list of available League publications.)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 10-71

Net-Training Net commencing Oct. 4 at 6:30 P.M. on approximately 3700 kHz. VE3CYR will be initial NCS. Your SCM must apologize to VE3FQZ and the Peel County AREC group for not ensuring that their part in the Ont. effort of SET '71 was adequately written up for publication in QST. Without the fine work of VE3FQZ, Ont. AREC groups would have been without a most realistic scenario as well as a most active group. We'll make up for it next year. While we are on the subject of SET '71 I would like to give you a few suggestions by the Communications Officials of the San Fernando area after reviewing events of the Calif. Earthquake disaster. (1) Obtain hard hats and official identification to avoid being turned away. Don't wait for someone to call you, turn on rig and check into your local AREC net. (2) The most useful mode was 2-meter fm. (3) Amateurs should hold a (St. John's Ambulance) First Aid card. (4) Health and welfare traffic should be limited to outgoing. (5) Trained technicians should come equipped to aid in keeping communications equipment on the air. This latter item seems to me to be most important and I would like to suggest to each Ont. ARC that they take steps to implement a program to this end. The article ends with the suggestion that all generators be removed from storage periodically and thoroughly checked. This item was printed with permission of W6MNY SCM Orange, Calif. I would like to thank those unsung heroes who throughout the hot summer months have filled in on the nets for our vacationing buddies. Glad to have you back with us chaps. Traffic: VE3FRU 108, VE3DV 99, VE3FXI 93, VE3DPO 69, VE3FQZ 34, VE3GFN 34, VE3BUR 32, VE3EHL 28, VE3DU 19, VE3BPC 18, VE3AWE 13, VE3CRW 11.

QUEBEC - SCM, Joe Unsworth, VE2ALE - SEC: VE2BTZ, VE2RM members, VE2s BU, JO, APT, ZA, BSQ, DM, BQN, BOK, AGW, AKI, BKP, BGF, ALE supplied communications for the Hudson Quebec Yacht Club regatta July 3 and 4. VE2s BU, APT, BQK, GA were on vacation. VE2BAI is working hard on communications for the Quebec Olympic games. VE2TQ was presented with son by the XYE July 25. VE2DM was looking for screech in VO1-Land then down to VP6-Land for a couple of weeks vacation. La Semaine de la Radio-Amateur se tient du 3 au 9 octobre 1971: faisons nous un devoir d'initier au moins une personne a la radio-amateur. Le Rallye du Club VE2CRS accompte beaucoup de succes. Plusieurs amateurs ont opere portatifs cet ete: ADL, DJP, AHZ, BLV, WS, 3BWI, 3FNQ, et OA4QI. VE2AUJ est de retour sur L'air avec un KW A8anta. Plusieurs VE2 ont coolabore

aux Jeux du Quebec, sous la direction de VE2RTZ. VE2DDM s'est procure un SB-102. VE2APC est tres actif sur VE2NY et VE2BVU a expose des oeuvres de ceramique au Festival de Baie St-Paul. Repeater groups VE2XW and VE2TA had picnic at Mount Orford in July. McGill Univ. ARC given OK by DOC to use call VA2UN for balance of the year. VE2DLG has rebuilt rig, antenna and match box. VE2XB is M/M VE8. VE2ARJ now QTH Mont Joli. Support RAQI in quest to retain VE2 car plates in 1972. Traffic: (July) VE2RM 175, VE2FC 79, VE2DLG 26, VE2DR 23, VE2ALE 21, VE2APT 17, (June) VE2DR 25.

SASKATCHEWAN - SCM, Barry Ogden, VE5BO - Hamcoming, the 1971 Hamfest in Saskatoon was a warm affair despite 6 inches of rain that fell all at once! Many thanks to the SARL and SARC for their joint efforts to make it a big "do." As SCM thanks on behalf of the ARRL for the time and courtesy afforded us at the ARRL meeting. Congrats to the Moose Jaw Amateur Radio Club for taking on the 1972 Hamfest. Heartwarming endeavours on behalf of RARA who sponsored two blind hams VE5PG and VE5GX. FB, VESHP received the Amateur of the Year award as contributing the most efforts toward ham radio for 1970-71 and also was unanimously elected to serve another term as pres. of SARL and editor of QSO. FB. Make an effort to check into VESXG and the Lake Net each day at 1830Z on 3780. VESUS reports 31 6-meter QSOs on E skip for May.

SWITCH

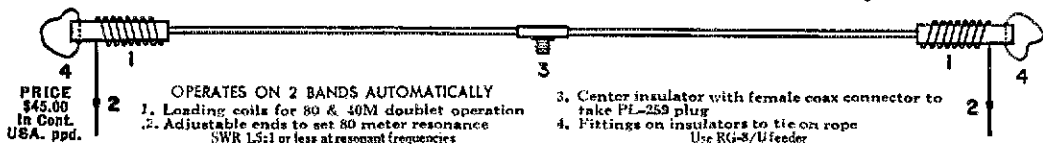


TO SAFETY!

LRL-70 ANTENNA

70' LONG, 80 & 40 M

Power rating 2 Kw, P.E.P. or over



LATTIN RADIO LABORATORIES

Box 44

Owensboro, Kentucky 42301

JUST DISCOVERED!

50 YEAR OLD FLAME PROOF KEY

TYPE J-7-A

Gov't. Order No. 141082 Dated: 1921



Beautiful heavy duty construction, in new working condition. For the collector, antique buff and antique gear museums. An unusual conversation piece, curio, desk weight and gift.

A RARE FIND! LIMITED SUPPLY!

ORDER TODAY! — \$9.95 PPD

RACE & RALLY ACCESSORIES
79 Washington St. • Brooklyn, N.Y. 11201



BILL'S ANTENNA CONNECTOR-COUPLING for DIPOLES

(either flat tops or inverted "V's")
Quads and BEAMS. Highest quality of materials and workmanship, supplied with wire connectors, or for soldering connections into your Antenna system. Fully guaranteed or your money back.

Order today. Literature on request. Delivery from stock, \$5.00 each post paid in the U. S. A.

BILL'S P. O. Box 5864, Asheville, N. C. 28803

THE BIG SIGNAL

"W2AU" BALUN = \$12.95 

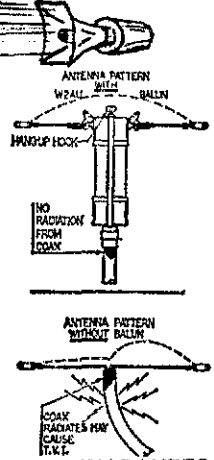
1. HANDLES FULL KW INPUT—THEN SOME. Broad-Banded 3 to 40 Mc.
2. HELPS TVI PROBLEMS By Reducing Coax Line Radiation
3. NOW ALL STAINLESS STEEL HARDWARE. SO239 Double Silver Plated
4. IMPROVES F/B RATIO By Reducing Coax Line Pick-Up
5. REPLACES CENTER INSULATOR. Withstands Antenna Pull of Over 600 Lbs.
6. BUILT-IN LIGHTNING ARRESTER. Protects Balun —Could Also Save Your Valuable Gear
7. BUILT-IN HANG-UP HOOK. Ideal For Inverted Vees, Multi-Band Antennas, Dipoles, Beam and Quads

NOW BEING USED EXTENSIVELY BY ALL BRANCHES OF THE U.S. ARMED FORCES, FAA, RCA, CIA, CANADIAN DEFENSE DEPT. PLUS THOUSANDS OF HAMS THE WORLD OVER

BIG SIGNALS DON'T JUST HAPPEN—GIVE YOUR ANTENNA A BREAK

Comes in 2 models. 1:1 matches 50 or 75 ohm unbalanced (coax line) to 50 or 75 ohm balanced load. 4:1 model matches 50 or 75 ohm unbalanced (coax line) to 200 or 300 ohm balanced load.

AVAILABLE AT ALL LEADING DEALERS. IF NOT, ORDER DIRECT



We'll GUARANTEE no other balun, at any price, has all these features.

UNADILLA RADIATION PRODUCTS

MFRS. OF BALUNS & QUADS
Tel: 607-369-2985

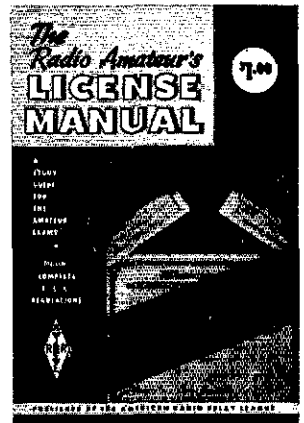
UNADILLA, N.Y. 13849
Dept. H



UP TO DATE...

THE 66th 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 licensing procedures; sample questions and answers for all FCC amateur exams; all of the current information on frequency privileges for the various classes of amateur licenses; the full text of RACES regulations; details of the Reciprocal Operating Agreement, and the current FCC examination schedule.

A useful manual for all, newcomer and oldtimer alike.



ALL the dope between two covers... complete and easy to understand.

- NOVICE • CONDITIONAL
- TECHNICIAN • GENERAL
- ADVANCED
- EXTRA-CLASS

Order YOUR copy today

PRICE \$1.00 POSTPAID

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



SAVE! Buy Direct from the Factory

E-Z WAY TOWERS

YOU can save really substantial money on America's finest towers by ordering direct from our factory. You'll get immediate delivery direct from stock. 100-ft. guyed towers.

See your local dealer or phone us direct at area code 813, 971-1961.

WRITE, PHONE OR SEE YOUR DEALER

E-Z WAY Products, inc.
P. O. Box 17196 TAMPA, FLORIDA 33612

GROTH-Type COUNTS & DISPLAYS YOUR TURNS

- 99.99 Turns
- One Hole Panel Mount
- Handy Logging Area
- Spinner Handle Available

Case: 2x4"; shaft 1/4"x3"
Model TC2: Skirt 2 1/2"; Knob 1 1/2"
Model TC3: Skirt 3"; Knob 2 1/2"

Prices

TC2	\$5.00
TC3	\$6.60
Spinner (-S)	\$.90

R. H. BAUMAN SALES
P. O. Box 122, Itasca, Ill. 60143

QSL FORWARDING TO BUREAUS
1 1/2 cents FREE mgrs directory, send 50 cents for mailing & handling

SCOTT'S QSL SERVICES (WA5UHR)
1510 Lynnview, Houston, TX 77055

160 METER ANTENNA

MODEL 48MV MATCHVERTER WILL RESONATE ANY 40 OR 80 METER DIPOLE/INVERTED VEE ON 160 METERS

- Handles 250W PEP (140W DC)
- Use coax or open feedline
- Use with any SWR bridge
- Made in USA—Guaranteed

\$3995 Ppd
TOP BAND SYSTEMS
5349 Abbeyfield, Dept. 4, Long Beach, Calif. 90815

How To Make A Jewish Movie

(Continued from page 66)

accidentally passed the Western Union office. He had cabled back that his confidence in my abilities had been severely shaken, but he would be listening again the next morning, also at the same ungodly 6:30 A.M., Tel Aviv time.

And Finally . . . Success

I dragged myself out of bed, turned on the receiver, and was rewarded with the sound of a hundred signals pounding through the loudspeaker with exciting volume. I called Ernie for twenty-five minutes, or until I was hoarse, whichever came first — I don't remember. I had quite a nice conversation with YU3LB in Lubljana, Yugoslavia, and UBSBX in Odessa, though. They didn't know Ernie.

In the next few days, I received three angry cables from Ernie. Every morning I got up at 6:00 A.M. and turned on the transmitter. I talked to Finland, Italy, England, Crete, and the U.S.S. Saratoga. I was beginning not to miss Ernie at all. Then I spoke to Boston, Chicago, Montgomery, Alabama, and my brother-in-law in Spring Valley, New York. I had ensnared him in the hobby several years ago in an effort to cut down telephone tolls between New York and California; by now he had \$4,800 invested in equipment and had cut his telephone bill by \$3.25 a month. We figured out if we both lived to be 420 years old, we would break even. If we were still talking to each other.

Several weeks went by, Ernie was calling me by radio every day. I was calling him. No contact. The cables were piling even higher. My wife was using them to light the barbecue. Now I was talking to stations in San Francisco, San Diego, and Santa Barbara. I had every one of them phone Ernie. He was never in. Naturally. He was down at the telegraph office, sending me cables.

According to my log book — by international regulation, we are required to keep a record of all this misery — it was April 17th at 15:39 Greenwich Mean Time that I finally heard, very weakly, a voice calling me on 14,246 kilohertz.

"4X4UT . . . 4X4UT," I heard Ernie's voice, "this is K6DXK. Do you read me? Over."

Excitedly, I grabbed the microphone.

"K6DXK!" I shouted, "this is 4X4UT! Ernie! Do you hear me?"

"Yes," Ernie shouted back, "I hear you! I hear you!"

Then we kind of lost interest.



Fifty Years of ARRL

A bound 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of QST is available from the ARRL for two dollars postpaid. Titled Fifty Years of ARRL, the book covers the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, and will make a companion piece to the classic 200 Meters and Down, a reprint of which is also available from the ARRL for two dollars.

SURPLUS CRYSTAL FILTERS



CRYSTAL DISCRIMINATOR
 MODEL AB-1
 CENTER FREQ. 10.7 MHz
 \$10
 L 1.0 W .75 H 1.4
 NOTE: External diode detector is req. PEAK TO PEAK MIN. 50 KHZ For min. distortion, use up to ± 12 kHz deviation.
 CIRCUIT INFORMATION INC.

10.7 MHz XTAL DISCRIMINATOR - MODEL AB-1C \$16
 TO ± 15 KHZ DEVIATION - TEST CKT INCL.

6 XTAL - 11.5 MHz - 3G KHZ 6 DB BW - MOD. EL-3A \$14
 60 DB BW 100 KHZ MAX. - 50 OHM TERMINATIONS
 MATCHING XTAL DISCRIMINATOR - MOD. AL-1 \$10
 TO ± 15 KHZ DEVIATION - DOPE SHEET INCL.

NEW NARROW BAND FM MODEL M2A \$22
 6 CRYSTAL CENTER FREQ. 10.7 MHz
 6 DB BANDWIDTH 15 KHZ
 60 DB BANDWIDTH 40 KHZ
 ULTIMATE REJECTION 80 DB
 IN & OUT TERMINATION 1K OHMS
 Same size as M9A except height is 1.0 inch

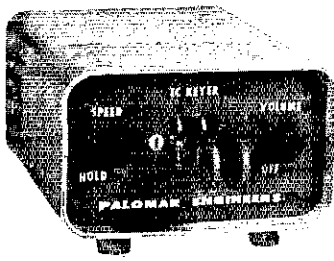
NEW 8 CRYSTAL SYMMETRICAL SSB MODEL M9A \$29.95
 2 3/8 L 1.0 W 3/4 H
 CENTER FREQUENCY 9 KHZ
 6 DB BANDWIDTH 2.8 KHZ
 60 DB/6 DB RATIO 1.8 / 1
 ULTIMATE REJECTION 100 DB
 IN & OUT TERM. 200 OHMS

FREE CATALOG - FILTERS AND CORES - NEW & SURPLUS

"E" TOROID CORES NEW
 2" DIA. T-200-2 EACH \$2.75 OR 3 FOR \$7.00
 .69 DIA. T-68-2 EACH 50¢ OR 7 FOR \$2.75
 .50 DIA. T-50-2 EACH 45¢ OR 8 FOR 2.75
 MINIMUM POSTPAID ORDER 2.75 TOTAL
 J. T. McCULLOUGH, W@BHG

E. S. Electronic Labs
 P.O. BOX 434 EXCELSIOR SPRINGS, MO. 64024

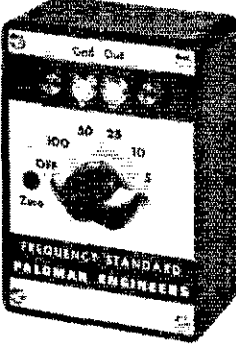
IC KEYS



- Self completing
- Dot memory

\$77.50
 PPD USA

FREQUENCY STANDARD



- Precision crystal
- Markers at 100, 50, 25, 10 or 5 kHz.

\$32.50
 (less batteries)
 PPD USA

- Send for free brochures

PALOMAR ENGINEERS

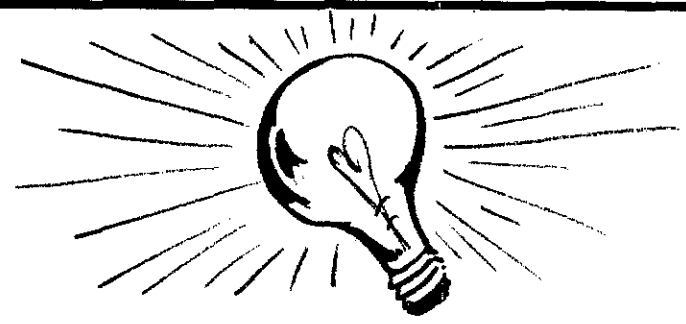
BOX 455, ESCONDIDO, CA 92025

HINTS AND KINKS \$1.00

Vol. VIII

\$1.00 U.S.A.

\$1.25 Elsewhere



All those little ideas that can improve your operating, building, experimenting, etc.

Pick up a copy of the latest edition of HINTS and KINKS and look over the "gold-mine" of ideas. There is something for you no matter what your "specialty" in Amateur Radio.

The AMERICAN RADIO RELAY LEAGUE, INC.
 NEWINGTON, CONNECTICUT 06111

you always get a fair deal at

TRIGGER Electronics



Where the
HAM IS KING

Trigger-fast delivery

Instant shipment from complete stocks of all the leading brand equipment—generally the same day your order comes in.

First with the new gear

If it's available, TRIGGER has it first for you.

Best trades in hamdom

Trade high with TRIGGER. You'll find we allow you more for your present gear. Write for a quick quote.

INSTANT CASH FOR YOUR USED GEAR. Tell us what you want to sell—get our cash offer quick.

SHOP LEISURELY AT OUR STORE JUST WEST OF CHICAGO

EASY ACCESS: Located at the western limit of Chicago. On North Ave. (State Route 64), 3 blocks west of Harlem Ave. (State Route 43). Accessible from all expressways and freeways. Plenty of free parking.

STORE HOURS: Weekdays, 10:00 A.M. to 7:00 P.M., Saturdays until 2:00 P.M. (Central Time). Come in and browse.

ALL PHONES: (Area 312) 771-8616

SHOP BY MAIL

Enjoy fast shipment on everything in ham gear. Ask for our 1971 catalog, packed with all the new equipment and loaded with special values.

Clean as a whistle like-new bargains for October

75A4.....	\$449	HQ110AC.....	\$159	GT550 & AC.....	\$599
30L1.....	389	HQ110A/VHF NEW..	279	AC400 SUPPLY...	77
DRAKE 3A.....	159	HQ180A & NB....	349	RV550 VFO.....	77
DRAKE 2C.....	189	5X110.....	107	DX60A.....	67
DRAKE R4A.....	309	5X111.....	149	DX60B.....	84
DRAKE R4B.....	357	5X146 NEW.....	199	GB610.....	69
DRAKE SPR-4.....	349	HT37.....	209	SWAN 240 & AC..	199
DRAKE T4XB.....	379	HA1 KEYSER NEW..	79	AMECO TX62.....	109
DRAKE MN2000...	157	HA5 VFO.....	69	KNIGHT T60.....	49
DRAKE ?NT.....	129	100V.....	349	WATERS 361 KEY.	67

CHECK COUPON TO GET OUR LIST OF LIKE-NEW GEAR

SEND FOR IT
TODAY!



TRIGGER Electronics

7361 North Avenue
River Forest, Illinois 60305
(West Suburban Chicago)

free

TRIGGER (Attn. W9IVJ)
7361 North Ave., River Forest, Ill. 60305

Q10-71

Rush the following: _____

_____ \$ _____ enclosed

- Send FREE 1971 TRIGGER Catalog
- Send complete list of like-new gear

Name _____

Address _____

City _____ State _____ Zip _____

Instant Cash for Your Used Gear

Describe fully what you have: Make, model, modifications, accurate description of condition: _____

GET A GOOD DEAL FROM TRIGGER

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 post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 50 cents 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 15 cents 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 15-cent rate. Address and signatures are charged for, except there is no charge for zip code which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 50-cent rate. Provisions of paragraphs (1), (2) and (5) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking copies can be supplied.

(8) No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QSL are unable to vouch for their integrity or for the grade or character of the products or services advertised.

Q.C.W.A. Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information, Q.C.W.A., Inc., Box 394, Mamaroneck, NY 10549.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc. invited to join Society of Wireless Engineers - W7GTAQ6 Box 530, Santa Rosa CA 95402.

FREE sample copy Long Island DX Assn bulletin. Latest DX news. Business size same to K2APY Box 74 Massapequa LI NY 11762.

FOUNDATION for Amateur Radio Annual Hamfest Sunday, 24 October, 1971, at Gaithersburg, Maryland Fairgrounds.

AN INVITATION NYC area hams and SWLs are invited to attend NY Radio Club meetings - 2nd Monday of every month, George Washington Hotel, 23rd St. & Lexington Av at 8 PM - New members wanted.

SAROC January 6-9, 1972. Advance registration \$9 per person includes tickets for admission to meetings, Ham Radio Magazine, Swan Electronics, Hy-Gain/Galaxy Electronics and SAROC parties, buffet lunch breakfast. Advance registration with mid-night show two drinks, \$14.50. Advance registration with Flamingo dinner show, \$17.50. Ladies who register receive transportation for shopping tour, Litchfield, crazy hat contest program. Frontier Airline SAROC group flight package planned from Chicago, St. Louis, Omaha, Denver. Send for details. Advance registration to SAROC, Southern Nevada ARC, Inc., Box 73, Boulder City, NV 89005, before 31st December. Accommodations request to Flamingo Hotel, Las Vegas, NV 89114, before 16th December.

CHRISTIAN Ham Fellowship now organized for Christian fellowship and gospel tract witnessing. Christian Ham Callbook 1st donation. Free details on organization. Write Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, MI 49423

10TH Annual Ham Auction and Flea Market sponsored by Penn Wireless Radio Club will be held on October 24, 1971, at Fairless Hills Community Center, Fairless Hills, Pa. Open from 9 A.M. till-? Auction from 2 P.M. till 5 P.M. Table space \$1. 2-meter FM Repeater Demonstration will be held. Talk in req on 80.4 MHz and 146.34 FM. Held indoors rain or shine. For further information, write K3JQH, 30 Horshoe Ln., Levittown, PA 19055

RECEIVING & Industrial Tubes, Transistors, all brands - biggest discounts. Technicians, Hobbyists, Experimenters - request Free Giant Catalog and save! Zalytron 469 Jericho umpike, Mineola, NY 11501

QSL Cards??? Personalized made-to-order!!! Samples 25c. Deluxe plus regular 50c. Religious 25c. (Deductible) Sakkers, W8DED, Box 218, Holland, MI 49423

QSLs. Second to none. Same day service. Samples 25c. Ray, K7HLR, Box 331, Clearfield, UT 84015

GORGEOUS QSLs, Rainbows, etc. Top quality! Low prices! Also photostamps. Samples 10c. Returnable. Joe Hartms, W4BLQ, Box 158, Edgewater, FL 32032

PICTURE QSL cards of your shack, etc. from your photograph. 500, \$12.50, 1000, \$16.25. Also unusual non-picture designs. Generous sample pack 25c. Half pound of samples 50c. Baum's, 4154 Fifth St. Philadelphia PA 19140.

QSLs, samples 10c. Fred Leyden W1NZJ 454 Proctor Av. Revere MA 02151.

CREATIVE QSL cards. Personal attention. Imaginative new designs. Send 25c. Receive catalog, samples and refund coupon. Wilkins Printing Box 787-1, Atascadero CA 93422.

SAMPLES 10c. Harry Sims, 3227 Missouri Ave. St. Louis MO. 63118.

QSLs 3-color glossy 100, \$4.50. Rutgers Vary-Typing Service. Free samples. Thomas St. Riegel Ridge, Milford, NJ 08848.

QSLs 300 for \$4.50, samples 10c. W9SKR, George Vesely, Rte. 71, 100 Wilson Rd., Ingleside, Ill. 60041.

RUBBER stamps \$1.50 includes tax and postage. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, NJ 07044.

QSLs "Brownie," W3CJ1, 3111 Lehigh, Allentown PA 18103, Samples 10c. Catalog 25c.

DELUXE QSLs. Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Bolles, Little Print Shop, Box 9848, Austin TX 78757.

QSL, SWL, WPE cards, Samples 25c. Log books, file cards, decals. Malgo Press, Box 375 Toledo OH 43601.

QSLs, SWLs, WPE samples 15c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 3 for \$1, 10 for \$8. prepaid and guaranteed. Tepabco Box 198T Gallatin TN 37066.

QSLs 100 3 color glossy \$4; 200 \$6; globe, eagle or straight key on front; report form on back; free samples. Rusprint Box 7575 Kansas City MO 64116

QSLs - Thin dime brings samples. Alkanprint, Box 3494, Papago Station, Scottsdale, AZ 85257

100 TWO color QSLs, \$3.25. Stamp for samples. Joe Yutz, W3LXY, Pottsville, PA 17901

QSL, SWL cards that are different. Quality card stock samples, 20c. Home Print, 2416 Elmo Ave., Hamilton, OH 45015

Excellent QSLs, reasonable, Samples 15c. W9CL Press, R.R. 1 Box 811, Carmel, IN 46032

ENGRAVED call signs for shack or car. Specify call sign, \$1 to P. Lansing, 744 Mirador Rd., Vestal, NY 13850

C. FRITZ, yes, we're still printing better QSLs! Samples 25c. Box 1884 Scottsdale AZ 85252

QSL Print. Samples, 25c. P.O. Box 33, Blaisdel, Melrose, MA 02177

NEW! QSLs professionally designed and printed. Every card original, exclusively for you. Samples 25c (deductible). W1FLX QSL Designs, 20 Britton St., Pittsfield, MA 01201

3-D QSLs - Far more spectacular, little more cost. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057

QSLs - Fast service, free samples. W711Z Press, Box 2387, Eugene, OR 97402

WANTED - All types of tubes. Top prices paid for Varian and Elmac. Jaro Electronics Corp., 150 Chambers St., New York, NY 10007.

WE BUY all types of tubes for cash, especially Eimac, subject to our test, Maritime International Co., Box 516, Hempstead, NY 11581

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY 10012.

WIRELESS sets, parts, catalogs, bought, traded, Laveriv, 118 N. Wycombe, Lansdowne PA 19050.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

WANTED: An opportunity to quote your ham needs, 32 years a ham gear dealer, Collins, SignalOne, Drake, Galaxy, Tempo, Kenwood, Henry 2-k, and all others. Also \$25 000 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, Inc. 1960 Peck St. Muskegon MI 49441. Tel: 616-726-3198

HAM ticket - Amateur radio license course for Novice, General, Advanced, Extra Class. Write for information. Clayton Radio Co. 220 Mira Mar Av. Long Beach CA 90803.

SPIDERS for boomless quads. Helicar welded aluminum. All's Antennas, 1339 So. Washington St., Kennewick, WSN 99336

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. Tel. 210-354-3141

CAPACITORS - brand new 275Vdc electrolytics at 500Vdc. Ten for \$19.50. Mehaffey, K4HP, P. O. Box 642, Marietta, GA 30060

TELETYPEWRITER machines, parts, bought-sold. S.a.s.e. list Typetronics, Box 8873, Ft. Lauderdale FL 33310

WANTED: Teletype machines, parts, Models No. 28, 32, 33, 35, 37. Cash or trade for Drake equipment. Alltronics-Howard Co., Box 19, Boston MA 02101. (Tel: day or night 617-742-0048)

WE'RE STILL trying to complete our collection of callbooks at Hq. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111

WANTED - For personal collection. The Radio Amateur's License Manual, Edition 12. W1CUT, 18 Mohawk Dr., Unionville CT 06085

VERY INTERESTING! Next 6 big issues \$1. "The Ham Trader," Spcamore, IL 60178

CLUBS: Send membership list for QSLs. World QSL Bureau, 5200 Panama Ave., Richmond, CA 94804

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando, FL 32806

DUMMY loads, 1 kw, \$9.95; phone patch, \$8.95. Wired, \$4.00. Ham-Kits, Box 175, Cranford, NJ 07016

PRIVATE collector wants old wireless gear. Buy, trade, Dick Seip, 1945 E. Orangegrove Blvd., Pasadena, CA 91104

HARDBOUND QSTs 1961-1970. K2GBH 12401

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer. 1025 Harrison St., Oakland CA 94607

GREENE - center insulator, with or without Balun - a tough number to beat - free flyer, Greene Insulator, 3 Pileam Dr., Bedford, NH 03102

NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk, VA 23508

VHF/UHF frequency meters, VFO or generator 85-1000 Mc, (44-148, 220-225, 400-460, schematic, calibration book, \$44.88, portable \$108, rack mounting \$88, no calibration book \$68. Nylon climbing belt with lanyard \$29, R388/51J3 Collins receiver \$295, Link, 1000 Monroe Pk., Monroe, CT

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord, NC 28025

SIX meter Virginia kilowatt final, pushpull 4CX1000s; \$495. Send \$2 for photos. W4UCH

WANTED: RME DB-20 preselector. Will consider later model. Price and condition in first letter. Also will buy an RME 69 receiver. W5PM, RFD 1, Box 399, Covington, LA 70433

RCA Model WO-33A(K) oscilloscope with probes and manual \$50; Lafayette Model HA-350 rev with speaker, mint, \$80; Heath "Twoer" with mike and manual, mint, \$45; Simpson 260 VOM, with manual and leather carrying case and two sets test leads, excellent condition \$35. M. T. Donnell, Jr., W5HSE, 2805 First St., Brownwood, TX 76801

HAM Bargains: Cleaning house, Sase for list. K3GEO, 4229 Estates Ct., Allison Park, PA 15101

QRPP, QRPP, QRPP - Interested in what it's all about? The Milliwatt: National Journal of QRPP has it all - operating news, construction projects, QRPP RAS, DXCC standings, awards. Volume 1 \$4 postpaid, \$3.40 per year (six issues). Ad: Weiss, Editor, Milliwatt, Meckling, SD 57044

WANTED: Hallicrafters HA-7 crystal calibrator for SX-122 receiver. Also want S-129 or S-210 receiver. Howard Hoagland, 639 North Sierra Bonita, Los Angeles, CA 90036

EDITING a club paper? Need public relations help? You should belong to Amateur Radio News Service. For information contact Rose Ellen Bills, WA2FGS, Secretary, 17 Craig Pl., Pennsville, NJ 08070

COLLINS 32S-1, 75S-1, 30L-1, 516F-2, 312B-4, SM-1. Excellent condition, \$1100. Will ship. Paul Alexander, CMR Box 2779, Robins AFB, GA 31093. Tel: 912-923-5896

TV Camera kits, plans, parts. Go ham TV the easy, economical way. Catalog 25c. ATV Research, Box 453-Q, Dakota City, NE 68731

5R8 Delta Tri-bander, proven DX antenna, 2 element, 10-15-20 delta loop, 30 lbs., brochure SASE, \$95. Order Island Electronics, 4103 Ave. S., Galveston, TX 77550

COLLINS 75S1, 3N1853. Excellent condition \$225 F.O.B. WIPTX, RFD 2, West Hill, Winsted, CT 06098

FORGOTTEN & teletype. Lowest prices anywhere. 40/\$10 postpaid. 32 KSR printer, reconditioned, \$225. Mine UGC 41, too! Model 14, 15, 19, 28, 32, 33! Many more bargains. List, stamp please! Van, W2DLT, 3022 Passaic, Stirling, NJ 07980

NIXIE & Pixie tubes. New & used, with & w/o sockets. All sizes. Limited quantity. Snack clean-out. Low prices. Request list. WA2LJK, Box 85, Union, NJ 07083

FOR SALE: Comdel Voice Processor \$69, B&W low-pass volts D.C. \$9. All A-1 condx. "Collectors' Item." Have three genuine DeForest tubular shape Audion tubes, date around 1918. Sell to highest bidder. Haskell, W1GJL, 135 Country Club Rd., Melrose, MA 02176

FOR SALE: COMP-40 meter mobile station HW22A, HP13A - xtal cal & mike ant. and speaker ext. condx. W1DBG, James Kunkle, 29 Hall Pl., Exeter, NH 03833. Tel: 772-2138

SELL: SBE-34, carrycase, mike, 12v-110v cords, Exceller 190, Swan 400, complete with 12v supply, remote VFO, \$22. Aerofon 6N20, 6-12-110v, Terrific 2 meter ng, \$75. See Laureatt Radio, \$95. Mel Fraass, 803 Deerfield Rd., Deerfield, IL 60015

Viking Thunderbolt, mint less 20 hr. \$300. (20) new 4-400 \$1 ea. QST history 1925 to 1968 some missing. 441 copies save for list \$50. Harvey Wells 6/12 p.s. unused 200-500V. B. Thermo WA3EIA, 31 Seaward, Bradford, PA 16701

FOR SALE: R-4B rev Henry 2K2 60 foot crank-up tower T66-DXX, Ham-Motor, W0KRU, 513 Longwood Dr., Cedar Rapids, IA 52402

NOVICE-Technician! NC-155 (80-6) receiver, HT-40 (80-transmitter, manuals, speakers, extras, \$125 or best offer. See Fleetwood, W84QK, Norris, TN 37828

WANTED! Mill typewriter in good condx. Hutch Towne W9LHN/OX4AE, c/o ITT ASI, APO NY 09121

EICO 753 transceiver with both ac/dc supplies \$150. Viking ant with Novice xtal \$25. All excellent condition. John Frankant WA2WZG, 286 Washington Ave., Brentwood, NY 11717. Tel: (516) 275-8969

FOR SALE: HT-32, \$130. NC-303, \$180. Good condition. W. Ship, K. Lucas, WA4WIN/9, 7408 Greenview, Chicago, IL 60622. Phone: 812-274-8150

NATIONAL NCL-2000 linear amplifier used less than five hours. Good condx and manuals. To college, \$450. R. WBSBZK, 2540 Armstrong Dr., Wooster, OH 44691. Tel: (216) 345-6627

TELETYPE pictures for sale. Vol 1, \$1. Vol 2, \$2. Vol 3, \$1.5. All for \$4. Perforated tapes available, 200 different pictures. Greve, W9DGV-B, 2210-30th St., Rock Island, IL 61201

SELL: Tempo "One" with w/one. Like new, used about 2 hours \$340. W2AH, 151 Rock Creek Ln., Scarsdale, NY 10515

2M FM 6 channel portable transistorized transceiver. New factory carton \$155. D. Anderson (213) 478-6738

HEATHKIT SB-200, \$160. SB-301, \$170. Eico 717 & Bro Bross key, \$50; 664 mic, \$27. All used very little and in excellent condition. Also Rohm 50 ct crankover tower, \$125. G. Carmack, WA7GFT, 4902 E 18th St., Tucson, AZ 85711

SALE: R390A receiver w/mech filters. Excellent condition. W. Ship, \$560. Dennis Pascoe, RT 2, Union Grove, AL 35173

PASS all FCC amateur, commercial examinations easily with simplified, economical books and code courses. Free catalog. Ameco Publishing, 314Q Hillside, Williston Park, NY 11596

AMECO model CMA transistorized all band converter, crystal controlled, 1.7 to 54 MHz and 108 to 174 MHz. Originally \$50 for \$39.95. Perfect condition, must sell. \$55. Ron Mend W9NC9G, 9243 Kibbourn, Skokie, IL 60076

COLLINS 75A2 \$145, R388/URR \$345, SB101 SB600 HP \$350, SB200 \$185, HT32A \$175, Clegg Interceptor \$200, Swan 400 410 417XC \$365, 753 \$75, Drake 2B \$160, old handbnd QST, Sams Riders antique tubes and spark equipment. L available. John Kaktys, W2PNT, 18 Hillcrest Terrace, Linden NJ 07036. 201-486-8917

COMPLETE station: NC300, Eico 720, Globe 755A VE Heathkit two meter Pawnee. Dew KW ft switch, Vibro in excellent. Best offer over \$250 takes all. John Waters, WA3NE ex-WB2ALF, 803A Cooke Dr., Pittsburgh, PA 15234

HEATH SB-102 transceiver, cw filter, custom power supply, 1 mike 7295K perfect \$400. Heath linear SB-220 like new \$3. Best model 43 wattmeter, kw element \$75. Measurements & dipper model 59, \$95. Heath power inverter MP-10, \$25. He signal generator IO-102, \$25. Gonset Communicator 3, meter, mike, good condx, \$65. Eico Signal tracer 147A, \$3. Moving to trailer. Edwin Kirchhuber, K4JK, 3958 Tangiebu Huntsville, AL 35810

SWAN 350-C transceiver, 50W ssb/w/amt with sidetone calibrator, and 117-AC power supply, excellent condition, m. sell. \$275 F.O.B. Denver. Jordan, 7185 South Birch W Littleton, CO 80122

RADIO Adventure! Thrill to the amateur radio adventures Tommy Rockford, K6ATX, in *Scars at Midnight*, *CO Ghost*, *SB*, *Colorful Lover*, a time traveling novel by Walker Tomp in original new editions. Order individually at \$2.45 plus postage and handling, or all three for only \$7.00 postpaid. U and California residents add sales tax. Send check or money order to Peregrine Publishers Inc., Dept. QST, Box 30565, SA Barbara, CA 93105.

SWAN 240 with manual and 117AC supply \$150 plus shipping Ray Beckman, 1734 Fredericksburg Ave., Lakeland, FL 331

COLLINS. Complete station. 75S-1, 32S-1, 30L-1, 31 antenna, odds and ends. From the estate of K4IS. \$1000. K4DAY.

MANUALS - \$6.50 each: R-274/FRR, SP-6001K, URM-2 TS-34A/JAP. Hundreds more. S. Conraro, 4905 Roanne Washington, DC 20021

DRAKE R-4 in perfect condition electrically and mechanics \$260 and will ship. C. Jones, Jr., 48 University Ct., Buffalo, 14226

SB101 with cw filter, HP-23 ac supply, SB600 spkr, all for \$1 F. Cunningham, 17 Brattle St., Arlington, MA 02174

FOR SALE: Hallicrafters SR150, PS-150-120, PS-150 MR, 150 amplifier and speaker from \$1.80 or more. Ship. J. D. Wotho, 1346 Lindenwood Dr., El Cajon, CA 9202

HAMMARLUND HQ0170C xtal calibration, matching speaker. Manual, excellent condition. Best offer over \$175. AHT13 with calibration book \$30. Partially built PS 30V110A and 400V solid state \$40. WAICPT, RFD #11, Derry, NH 03038. Tel: 603-432-9042

MUST sell complete Gonset six meter station including Communicator III-10 volt, with all accessories, Gonset 6/2 VFO, Model 225 w/xtal, with spare tubes, beam, hats, and ground plane antennas. With all manuals. Mint condition. Best offer takes entire package. K2YAL, 95 Grove St., Lynbrook, NY 11563

SB-301 with am and cw filters; SB-401 with crystal pack for sale \$450 or separately. Will consider selling SB-101 with SB-640 and HP-23 and cw filter. Any mature offer considered. Frank Williams, Box 19252, Washington, DC 20036

SELL: SR400 Mk II - HA20 VFO - power supply. Guaranteed mint condition \$750. Heathkit HD-10 keyer mint assembled \$45. Pick up or you pay express. Tugemayer, WGV, 348 2nd St. Pk., Southampton, PA 18966

HW-22 and HP-13 mobile power supply, speaker, microphone, and antenna with bumper mount \$140. Ship COD. Lance Sanders, 121 S. Eighth, Dixon, CA 95620, 916-756-5391

FOR SALE: Heath HW-10A tunnel Dipper. New, with manual, \$25. JA'DBG/W2, M. Maruya, 149-01 Barclay Ave., Flushing, NY 11356

TELETYPEWRITER Switchboard BD-100. New, 10 channels, patching fields, cords, meter, technical manual, 16x16x62", \$25. Same in chest \$5. Frank Hadu, Ledger Ln., Stamford, CT 06905

COLLINS KWM-2, 516F2, w/nb and Waters Q-mult, \$700. 62S1 \$650, 312B5 \$250, 30L1 \$350, SP-600 JX17 \$285, Bruce Bouvier, 2609 Finlaw Ave., Pennsauken, NJ 08109, 609-662-6575

WANTED: GE progress line fm receiver strip model 4ER25 150-174 MHz. W0BQL, 2202 Menlo Dr., Wichita, KS 67211

WANTED: Collins 32S3 or 32S1, p.s., l. Matho, 1517 Collingwood Rd., Alexandria, VA 22308. (703) 768-0106

CONTACT us for new or reconditioned Collins, Kenwood, Tempo-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler, MO 64730

VVC Jennings UCS-375 and UCLT-750 \$25 each, guaranteed, with spin knob, counter and limit stops. Swan 350-C wanted, will swap clean Hunter Bandit 2000-C. For sale 6 el. 20 meter quad, fiberglass arms with extra bracing. Jules Wenglar, 1416-7th Ave., Delano, CA 93215

SALE teleprinters - model 14 and 100. Write to Linn, 73 Jolo Way, York, PA 17403

DRAKE 2C, 2CQ, 2NT with crystal calib. 1 yr. o.d. Perfect cond. \$250 takes all. Xtra crystals and acc. Call or write Danny, WB5BQH, 2101 4th St., Lake Charles, LA 70601. 318-439-9778

2-METER fm IC-20, solid state, state of the art, fully Xtal'd, 4/mike, 10 mtr. & other accessories, \$220. Bob Brunkow, 15112 S.E. 44th, Bellevue, WA 98004

NOVICES: Drake 2-C revr, 2-CQ Q-multiplier \$210, Drake 2-NT xmtr, 5 xtals, key \$110, Both \$300. With op manuals, instructions, Excellent cond. Apt 5 hrs op time. Prices firm. WNTQW, 1116 E. Myrtle Ave., Phoenix AZ 85020

HOOSIER Electronics Your ham headquarters in the heart of the Midwest where only the finest amateur equipment is sold. Authorized dealers for Drake, Hy-Gain, Regency, Ten-Tec, Galaxy, and Shure. All equipment new and fully guaranteed. Write today for our low quote and try our personal friend Hoosier Service. Hoosier Electronics, Dept. C, R.R. 25, Box 404, Terre Haute, IN 47802

RTTY - Sell: Model 19 complete with power supplies, Model 14TD, Model 14 typing reoperator, but not TU, \$175 for w/xtal crystal amp. Write: Don Fermentier, WA6CPM, 737 Golden Oak, Sunnyvale, CA 94086

SWAP: Nokormat FTN, 55 mm 1.2 lens, 250 mm Zoom tele, 28 mm wide angle. Strobe, case, mint condx. Want Yaesu FRDX & PLDX 400's. WB8FUG, 6168487587

STUDENT - must sell Heathkit SB301, SB401, HN31 Cantenna, HDP21A mike, Drake TV1000LP, Vibroxplex paddle, homebrew keyer, \$600 or offer on part. WA3IRQ, 3518 Kings Point Rd., Randallstown, MD 21133

SB-200 \$200, Hewlett-Packard HP-120-B oscilloscope \$150. Jeff Evans, WA2DYK, 616-269-4340

SELL for best offer: NCX500 (with a few minor problems) and matching ac supply. Tom Dornbach, K9MKX, 2515 College Rd., Downers Grove, IL 60515

SB-301, New, Mint condition. Professionally wired. Will deliver N.E. \$290. R. Quintal, 10 Middlesex, Framingham, MA 01701

I.C. Bargains: 723 voltage reg. \$1 ea. SN7476 dual JK flip flops 50c ea. 709 & 741 op. amps 75c ea. New & guaranteed. K0GBC, P. Wentzel, 16278 Florida Way, Rosemount, MN 55068

FOR SALE: Globe vhf 6 & 2 meter transmitter \$70, Johnson 6 & 2 meter converter \$25, both for \$95 (will ship) May consider swap. Nick Swan, Route 2, Ludington, MI 49431

FOR SALE: Drake TR-4, RV-4, AC-4, amplifier, TA334R, and other accessories. WA1IWD, 136 So. 2nd Ave., Taffville, Conn. 06380

COLLINS 75A4, SN 15115 with three filters and manual. Exceptional condition. \$450. Frank Antal, K1ZCD, Box 404, West Springfield, MA 01089

MAMIYA C-33 twin lens reflex camera 105mm F 3.5 lens. Best offer or swap for 6 meter mobile or 2-meter portable. Paul Goldman, WA2LZV, 334 Rutland Rd., Brooklyn, NY 11225

TOUCH tone pads, 12 tone - \$35, 16 tone - \$45. Wired & ready swap? WA6EHD, 8165 Alton Dr., Lemon Grove, CA 92045

SELL: Knight R-100a w/xtal calib. & S-meter, fair condx. \$30. Doug Bradley, 1103 Pulaski Ave., Pearisburg, VA 24134

NOVICE crystals sale during Oct./Nov. 40-15M \$1.25; 80M \$1.75. Free flyer. Nat Stinnette Electronics, Umatilla, FL 32784

PREPARE for Amateur FCC exams! You need Post-Check. Original, expertly devised, multiple-choice questions, covering all areas tested in FCC exams. Same form as FCC exams. Over 300 questions and diagrams for each class. Keyed answers, explanations, IBM sheets for self-testing. Basic questions duplicated where they apply. General Class \$4.25, Advanced Class \$4.50. Extra Class \$4.75, including first class mailing. Add 25c each copy for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbandale Station, Des Moines, IA 50322

SELL: HT-37, \$185, modified for semi break-in cw and alc. SX-117, \$175, w/vol coverage. Both Amplitas just been completely redesigned. In good working order. John Kaufmann, WA1QGW/1, 487 Commonwealth Ave., Boston, MA 02215. Phone: 617-267-2199

SELL: Collins 75A4 +1075, KWS-1 +649, 32V3 Globe King 500B, Champ, 300, 755A VFO Globe Scout Deluxe, Hallicrafters SX101A, HT37, Galaxy V, ac 35 supply, Elco 753, 752, SASE brings details, prices. W0NBF, 2246 Lamplight Crt., Grand Junction, CO 81501

SELL: DX-60B, Excellent condition \$50. WN5VYU, Box 18, Terral, OK 73569

SELL: National NCL2000, NC0185, Waters 3001 coupler, 334 dummy load, Millen #908511 grid dipper, Gonset Comm. II, 2Mtr. VFO, G-77 and G-66B with 12V supply. SASE brings details, prices. WB0AHR, 2245 Lamplight Crt., Grand Junction, CO 81501

"DON and Bob" new guaranteed goodies, Motorola HEP170 Evox 100, 15A1000PFX, 33c, Amplitas PL 250, SO 233, 3.9S10; Ham-w rotor 99.00; TR44 55.95. Quote new discontinued tubes: industrial surplus list. Quote Drake, Galaxy, Hy-Gain, Mosley, Trix, 2-meter transceivers. Tempo, Kenwood, write specifications. Prices collect. Mastercharge, BankAmericard, Warranty guaranteed. Madison Electronics, 1508 McKinney, Houston, TX 77002

DX Awards log. 150 page book lists contacts for over 100 major worldwide awards. Individual logs for each award for record of contacts and confirmation. Required over two years to prepare. \$3.95 (\$4.95 foreign). McMahon Co., 1055 So. Oak Knoll, Pasadena, CA 91106

USED and upgraded Swan 360C sidetone, alc. mic, without p.s., \$270; Heathkit Apache TX-1 transmitter manuals \$70; Heathkit unassembled L/C impedance bridge, manuals \$50; HE45B Lafayette 6 meter transceiver rebuilt to 10 meters, ac/dc built-in VFO, 8 watts if output \$60; used Lafayette 50 watt mobile linear amplifier HA250 \$60, W1OSN, 175 Mill Rd., Chelmsford, MA 01824, 266-3533

DX60. HG10, 10, 15 mtr. beam. mint. All for \$75. WB9DXD, 62301

NEW ham outfitting Collins shack. Will buy late 76S-RB 32S-3 312B-4 301-1, All or any for cash. Want buy. Albert D. Young, 305-391-0763

NEW Ham Magazine: Interested in public service, humanitarian action and international friendship? Sample issue free. Worldradio, 2509 Donner Way, Sacramento, CA 95818 WB6AUF

COPYING cw 13, 20, 25 wpm difficult for you? Why? For your briefly written answer and two dollars the copyrighted 1971 booklet of forty seven pages designed to overcome your difficulties will be postpaid to you. Call letters and zip code necessary. Without statement \$2.95. Effective Preparation, P.O. Box 10125, St. Petersburg, FL 33733

SELL: Heath SB-102 with spkr, power supply & mic. \$375. Heath Warrior linear 1kw sb-cw, \$120. Ant. rotator suitable for 3 el triband beam. \$20. W. H. Wiley, P.O.B. 659, El Granada, CA 94018. Ph: 415-726-8406

FOR SALE: Heath SB-301, SR-600, SB-401 with crystal pack. \$475. New Heath HD-10 \$35. All equipment in excellent condition and used very little. Robert White, K9LWA, 300 North Salisbury Rd., Richmond, IN 47374

DRAKE 2B, 2AQ, w/xtal cal \$160, TR-4 with AC-3 \$450. Both in perfect condition. Contact: C. Dean Wagner, WA4DQT, 4121 Libby, Mobile, AL 36609

SELL: 2 swan 500Cs 117ac/412dc separate supplies \$400 each. FT. 200 separate ac/dc supplies, like new \$350. New power xmitter 301-1 \$30. W1HSC, Box 264, Hampton, NH 03844

MOTOROLA FCTR140D - transceive base station converted to ac power supply, narrow band fm, recv has FET pre amp, cables and control head with speaker, 60 watts output. Rev. 9476/9476 rev. 9476/34, \$175, no shipping. C. A. Pierce, K2JJP, Williamsville, NY 14221. Phone: 632-7278

TRADE or sell Heath six meter GD-19, 5 servos, Want Heath SB-500 or SB-100, WB4NVE, Lot 143, Stadlum Trailer Park, Key West, FL 33040

NAVY Kal-8 revr, and pwr. supply trade for HW-18 sbw CAP transcvr or HW-17 2-meter transcvr and HP-23 pwr. supply or best offer. WN0CD, Box 317, Ponca, NE 68770

COLLINS KWM-2A, (new series), PM2 - \$650. WA2QCM, 1480 Axel Ave., North Brunswick, NJ 08902

FOR SALE: HQ170C \$139. George Huett, W6LJK, 429 So. Valley St., Anaheim, CA 92804

MIINT condition: SB-300 and SB-400, \$450. Mike Schaff, 6750 W. 63rd Ave., Denver, CO 80234-230616

SELL: HW100 \$200, HP23 ac supply \$35, AR22 rotor/control w/cable \$25, D109 mike w/stand \$10, Lafayette bug \$5, Hornet triband beam \$10. All \$275. Kirby, WA2DZG (516) HA38944

SWAN 500 ac accessories, Excellent. 617-631-8570. Jim Warner, 147 Front, Marblehead, MA 01945

COLLINS KWM-2 16F2 WNB & waters Q-mult, \$700, 62S1 2550, 30L1 \$350, SB-600 JX-17 \$285. Bruce Bouvier, 2609 Finlaw Ave., Pennsauken, NJ 08109, 609-862-6975

WANTED: Heath HW-16-3 160 meter transceiver, M. H. Heiman, Box 744, Showlow, AZ 85901

CRYSTALS Airmail: Novice FT-243, active, accurate - \$0M \$1.75, 40M - 15M \$1.50, October QST "Novice Special" five or more, (band mix OK) - Scattered frequencies, four choice - \$0M \$1.50, 40M - 15M \$1.15 each. Your frequency choice (12%) \$0M \$1.65, 40M - 15M \$1.39. Postage/crystal - Airmail 12c. 1st-el. 8c. General purpose FT-243, any frequency, 0.1%, 3500-8600 kilocycles, \$1.90, (minimum five same or mixed \$1.75) (crystalize your net, ten same frequency \$1.45), 1701-3499 \$2.95, (0.05% add) Sidecrystal, MARS, CD, etc. Free general frequency order-bulletin. Your crystal shop since 1933. Bob Woods - W6LPS, C-W Crystals, Marshfield, MO 65706.

TELEVISION equipment for sale: G.E. transistorized camera 47FV14B31, 40mm f1.5 Wollensak lens, 17" monitor 47HT26A2. All excellent condition, with manuals. Write for info or quote, K. Linkhart, KTYJM, 719 12th St., Clarkston, VA 94403

DRAKE T4X and ac supply. Excellent condx. \$325. WA3GML, 5216 Riverdale Rd., Riverdale, MD 20840

SELL: package only Heath HW101 mike 400cps filter HP13A hombrew ac plus goodies \$425 A1, Willie Ustaszek, WB2HLH, 23 Tupac Ave., Budd Lake, NJ 07828

COLLINS 75A4, like new & Globe Chief 90A transmitter \$400. F. Hill, 16 Lazy Dr., Coonmuck, NY 11725

75S3 like new, serial 12223. Factory overhauled and aligned. Thomas C. Crow, 5801 Ambler St., Sacramento, CA 95823

SELL: Conar model 230 tuned signal tracer. Brand new. Never used. \$55. John Gerzi, W8OCP, 12901 Forest Ave., Cleveland, OH 44120

HW-100, HP-23 ac supply, like new condition for only \$240 FOB Conn. E. Eggert, W1EGM, 42 Ridgewood Dr., Rockville, CT 06066

SELL: Heathkits - SB101, SB600, HP23, SB640, SB610, SB630, mike & bug \$550. HD-15 \$10, TH-3, Ham-M 19" tower, cables, 125, SX-111 \$75. All in mint condx. Local pick-up please. Steven Weinstein, 865 Walton Ave., Bronx, NY 10451

SELL: Collins 75A-2 \$189; GE sbb slicer H \$24; PM-2 \$85; Drake W-4 \$39 - RA4 \$275; R4B \$319; NCL-2000 \$360; Viking Couter 990; HW-101 \$235; Eico 753 & 751 ac \$125; T834 scope \$19; Xtrms 3600-0-3600 at 1 amp 120/240 prt \$25. All excellent & FOB. Want Telex 20, 15, 10 Mtr beams. W0AII, Paul Bitner, 314 4th St. S., Virginia, MN

COLLINS KWM2 transceiver, Waters rejection notch filter, Collins 16F2 power supply, Johnson low pass filter, astatic 101 mike and stand, Jones micromatch, all mint condition, package price \$900. Collins 75S3B receiver, F-455/KC-200, F-35-A-04 filters, 3123 speaker, Alfa extended crystals for 28MHz band, package price \$750. Hallcrafters HA-1 keyer, chrome vibro key, both \$75. Rob Murray, 2908 Canada Blvd., Glendale, CA 91208. Phone: Area 213-241-1488

WANTED: SB-200 of equivalent state condition and price. For Sale: Heath Apache, good clean condition, make offer. W1AZT, P.O. Box 697, New Britain, CT 06050

WANT to buy transceiver and matching ac power, such as NCX5 Mark II, SR150 Galaxy, or what have you that is clean and priced right? Richard Schark, 417 North Ferry Ottumwa, IA 52501, (515-682-5741)

MOST QSTs 1924 thru 1950 surplus; what issues do you need? Offer \$25 for Sept. 1919 QST. W5ABY, 4808 Braeburn, Bellare, TX 77401

HEATH HW-32A with xtal calibrator and built-in speaker. Top condition. \$100. Herb Ostrom, R400, Boca Raton, FL 33432

SELL: Heathkit HX-10 transmitter \$125; Heathkit Ham Scop HO-10, \$75. W20UC 201-471-3432

WANTED for Hallcrafters amplifier model HT-41. New or good used 7094 output tubes. Write to K1PNI, in Callbook.

SELL: Collins 312A-1 console containing 10" speaker, 24 hour Numeron clock, 302C-1 rf wattmeter, 189A-2 phone patch. Mint condition \$110. A. H. Hardwick, W2YQ, Keasbey Rd., Orange, NJ 07050

SIGNAL/ONE CK7, ser. #226, modified by ECI 3/71. Works perfectly. Extremely low price, \$1350. Will accept trade. E. D. Shaffner, W3YXV, P.O. box 25, Mechanicsburg, PA 17055. Tel: 717-697-0323 (office)

KIRK Beams, best offer takes new 7MHz & slightly used 14MHz. Henry 2-K, NCL-2000, \$395. Complete S-Line, 75S3B, 32S3, 516E-2 and 30L-1, \$1260. Complete Drake line, R-4B, T-41B, M-5 and AC-1, perfect with cartons and manuals, \$750. Late model Swan Cymet never used, \$350. Swan 360-U with ac supply \$300. Good stocks of Kenwood, Tempo, Galaxy, Alpha 70, Signal/One, etc. Douglas Electronics, 1118 S. Staples, Corpus Christi, TX 78404

ANTENNAS - Dual bands: 80/40M, \$35; 40/20M, \$29.50. Others available. Free catalog literature. House of Hpoles, Box 8484, Orlando, FL 32806

A CLEGG Zeus with AC416 supply, Clegg Interceptor B, a 5 E 6M beam, a 10 E 2M beam, 2 feed lines RG-8, 1 Dow Key, coax relay, 3 on and off the air light, 1 24 hour clock, an Electrovoice microphone, 1000 cps tone for sell complete station for health reasons. \$550 or make offer. Roy LaDuke, K1COJ, 207 Clinton St., Concord, NH 03301, 225-3900

FOR SALE: SP-600 Hammarlund, good operating condx. receiver; Best offer: Hammarlund HQ129X, good operating condition; Heathkit SB610 signal monitor, mint operating condition, W20UC or sell complete station for health reasons. \$550 or make offer. Roy LaDuke, K1COJ, 207 Clinton St., Concord, NH 03301, 225-3900

WANTED: 1946 and 1946 issues of CQ Magazine. Have Radio News, QST, etc. for sale. W6LV, Carl Hvambus, Jr., 5447 Chicago Ave., MELB, MN 55417

New tubes - sell or swap: 81U5; 813; 815; 829B5; 955; 2B22; 2C39; 2C48; 4-125; 4-40U; 4CX250; 4CX1000; 6252A; 6935. Make offers to: SN Hoffman, R79 51 09 USNB WA5QB1/4, P.O. Box 14948, Sec. 18, NAVCOMMTRACEN, Pensacola, FL 32511

SALE: Viking 2 good - SX-96 very good. Make offer. W3ELV, Glen Rock, PA 17327

HALLICRAFTERS HT-37, mint condition with manual, \$170. W8SST, 2001 Parkwood Rd., Charleston, WV 25314. Phone: (304)434-0415

ANTIQUE ham equipment, early QSTs. Some items still available. W9AKH, 1720 East 81st St., Indianapolis, IN 46240

FOR SALE: Hallcrafters SX-100, Johnson Ranger, \$200 pair. All offers considered. W4TMM, Bruce Horn, 794 E. 11th, Apt. 3, Eugene OR 97401, 503-636-0721

SELL: Heathkit SB-301 rcr with cw filter, \$240; 10-14 oscilloscope, \$250. Both brand new. WA6DXA, Darryl Rubin, 1915 Carda Ridge, Beverly Hills, CA 90210. (213)273-3440

54-H HEIGHTS, 14 sq. ft. motorized alum tower, \$500. Swan Mk-11 (used 10 hrs) 2000 watt linear w/warranty card, \$400. Bill Org, 23044 Crenshaw Blvd., Torrance, CA 90605

20 MTR station: HW-32A, HP-23A (ac p/s), HRA-10-J calibrator, HS-24 speaker, GH-12A mike, 60" R4550 and connectors. Used less than 1 year and in excellent condx. Package of suggested test kit. Offer. Will Mail. W6BHN/S, 1741 Dean, Fayetteville, AR 72701

HALLICRAFTERS SR-400, good condition with power supply, \$160. Ten Tec PM-3A transceiver, little use, \$45. Both postpaid. Richard Nelson, 181 Oak Ridge, Summit, NJ 07901

"HOSS Trader Ed Moory" says he will not be undersold on each deal! Shop around for your best price and then call or write the "HOSS" before you buy! New Equipment: Gonset 2000 watt linear Mark IV, reg. \$525, cash \$389; Mosley MCQ-15, 15 meter pump. \$52; Write for prices on new Drake, NCX-1000s, Hy-Gain, towers, rotors, 2 meter transceivers, and other equipment. New, Rohb kit, 2 meter tower, priced \$235; New Mosley Class 33 and 60 Ham rotors, \$208; Used Equipment: TR-4, \$409; T4-XR, \$359; SR-150, \$245; TR-44 rotor, \$48; MN-2000, 149; Moory Electronics Co., P.O. Box 506, DeWitt, AR 72042. Tel: 501-946-2820

FOR SALE: Gonset two meter side-winday transceiver with power supply, Hammarlund 60 watt linear amplifier \$150, Gonset two meter transceiver Communicator 4 and Gonset VFO \$130. Factory wired Ameco two meter converter with power supply model CN144 14-18MC \$30. Manuals included. Above in good condition. Will ship. George Knoick, 64 Cynthia Ln., Cente Monches, NY 11934

HT-46: sbb transmitter. Extra final. Perfect working order. \$160. Dr. William Karl, W2EGX, 24 Mill St., Cooperstown, NY 13321

QUALITY stainless, other threaded, washer, hardware! Guyin accessories! Insulators! W8LBR, 29716 Barnback, Southfield Mich. 48076

NOVICES: DX-60, HR-10B manuals, all \$100. New HG-101 VFO \$30. You pay shipping. WA6PCP-Mark, 17481 Via Susans San Lorenzo, CA 94580

WANT SW-3 coils. W2NXN 29-29 213 St., Bayside, NY 11360

SELL: Eico 717 electronic keyer & vibroplex key, mint condition, \$65 ppd. Eico 656 dynamic tube tester with compactron & TV adapters \$35 ppd. W8VSL, Stuber, Amheis OH 44001

DRAKE R4A, T4X, M54, AC4, mint condx \$575. Henry 2 mini \$500. R4G \$100 \$75. NC57 w/fact. smtr. \$25. Gonset super srx \$16. Also Elmac air socket and chimney R189/4PR1000A tubes, unfinished kw final and pwr. sup. VTVM 20 amp powerstat etc. S.a.s.e. for list. Estate of WHQW W. Plon, 1 Bemans Ct., Worcester, MA 01605

SELL: Heath HW-32, 20 meter transceiver and ac power supply HP23, both excellent condition, \$115 for both. W. I. Bosselman, W1DO, 210 South Rd., Farmington, CT 0603; 203-621-3817

FOR SALE: National NC-300 receiver with crystal calibrator \$150. Johnson Viking-2 with homebrew VFO, \$120. Both with manuals and original cartons. George Culbertson, W7CBU, Spanish Fork, UT 84660

DRAKE R4A, T4X, M54 speaker, ac supply, New conditio \$650. Turner 454X mike \$10. Johnson matchbox antenna coupler \$20. DB-BB preselector \$8. WA4JTF, Frank Merlik, Ap 1, 3556 Old Chamblee Fucker Rd., Doraville, GA 30340

PRIVATE collector wants early wireless and communications gear teslacolts books magazines, etc. Quote r price. Will Nangle, 761 North 29th St., Milwaukee, WI 53208

HALLICRAFTERS SK-111 ham coverage rec., Hallcrafters transmitter with manual, fan built in, Dow key relay, D-14 100 watt stn, all very good \$300 takes all. W34PL, 560 Luddy Rd., Macon, GA 31204

FOR SALE: HRO-50T 5 coils \$170. HW-16 with swr meter \$100. AC-1 with coils-crystals \$15. Gr64 with Q-mult \$30. Crystal calib. ex key \$5. All mint, all manuals. Or best offer on all Arthur Morton, WN8JHL, 1340 Laffer Ave., Akron, OH 44306

NEW fans and twin blowers 115V 60/60Hz for electronic applications. Designed to fit 19" radio racks \$12.50. IMC boxer fans \$5.50. Paul E. Talley, 11011 Paddock Circle, Dallas, TX 75238. K5KMV

TELREX, Monarch, 6 element, 10 meter Yagi (10M636). Sparkles like new and rated lifetime! Asking \$195, best offer takes. K2GKI, 716 839 3335.

SALE: Hallicrafters SX115 receiver, \$210; HT32 transmitter, \$160; Jones Micro Match VSWR coupler and meter, \$20; Hal

311C electronic keyer, new \$45; Brown Bros. BTL key, new, \$18. First certified check for \$415 takes all. Sorry, no shipping pick-up only. Lou Hooper, W2FHF, 437 Caldwell Dr., Wyckoff, NJ 07461

WANTED: used am mobile rig - Heathkit, Gonset, Elmac - state price. Bob Aberle, 33 Falcon Dr., Hauppauge, New York, 11787

SELL: EZ-Way galvanized crank-up tower, Model RBS-40G. Attached to building. Pick-up only. Best offer. Write W2CMD, 2206 Smith St., Merrick, NY 11566

SSB station. Galaxy 5 Mk2, power supply, remote VFO, speaker console, cw filter, \$325. Johnson phone patch, \$10. Ameco Pt., \$30. Will ship. Chris Daly, WA2BAN, 2 Timber Hill Dr., Livingston, NJ 07039

SB301, SB401, Xtal pack, cw filter. All new tubes, realigned. Excellent. First certified check \$495 receives all freight Collect. Davis, Box 16005, Jackson, MS 39206

CLEANING house. HW-100, ps, mike, SB-500, 6N2, Telrex 20M-56-265, 3.5KVA plate xfmr, heavy duty Rohm tower sections, Telrex 6m beam, UHF coax, 1296 station, Parks 144, 220 converters, 2-5894s, Dick Crossett, 94 Sunnyside Ave., Pleasantville, New York 10570

75A-4, Vernier, 500, 2100, 3100 cycle filters, speaker, HT-32B, Johnson kW Matchbox with swr, \$800. Will consider selling separately. Francis Donovan, K1PL/3, 1014 Omar Dr., Crownsville, MD 21032

PAIR Bendix Microwaves Division vhf/uhf wattmeters 0-400W, 25-2000mc plus VSWR \$30 each; Trade Sylvania Noise Figure meter, BC8-250mc, swap vhf/uhf list sase. W4API, Box 3036, Arlington, VA 22204

DRAKE R4B, T4XB, AC4, MS4, 4 mo. old, \$785 pkg. Year old SB200, perfect, \$180. K8IKB, Redman, 15378 Sand Ridge, B.G., OH 43402. Ph: 419-354-3143

HAMMARLUND HX-50 \$125, Eico 720, 722, 730 \$125. WB2YRL, 7524 263rd St., Glen Oaks, NY 11004

TRADE 36" Winnebago insulated pickup top for SB401. John Greenfield, WB2BWM, 16 W. Brook, Pittsford, NY 14534

WANTED: Collins 30S1 linear. Also good used bug. Hal Cushing, W6LXZ, 5224 Bobbie Ave., San Jose, CA 95130

SELL or trade for??? Collins 51H3 general coverage receiver, \$60; 1968 Orbit 4-8 2 stick 4 channel RC \$125; Eico 435 dc wideband oscilloscope, mint, \$100. Norm Dick, WB2EHB, 3119 Bailey Ave., Bronx, NY 10463. Tel: 212-884-9694

COMPLETE station - immaculate equipment, Hallicrafters SX101A receiver w/Ameco 2 meter converter, HT44 transmitter w/PS150 ac power supply. Package will include Tecraft 2 meter 20W am transmitter, SWR bridge, Heath VFO - \$525. Local delivery preferred or freight collect. Phil, W6VQM (415)359-5833 Pacifica, CA 94044

WANTED: Surplus army T-784/GRC 109 transmitter, R1004/GRC 109 receiver, PP2685/GRC 109 power supply, PP-2685 power supply. WN5ENS, 812 Carey Dr., Norman, OK 73069

WANTED: Melehan Valiant mechanical, full automatic key. W6RQZ, tel: (415)-526-7345, 94702.

JNEAE 1000 P.E.P. SBE LA-1, clean, one owner, with manual, 195 (usual \$125), or will accept 10-10 scope, W2BXS, 101-433-4440, Dr. Morris Soled, 135 Belmont Ave., Jersey City, NJ 07304

IMPRESS Speech Processor for increased talk power with any sb, s-m or fm, fixed or mobile xmit/rcvtr. Custom models available for all name brand equipment. Economically priced. Write for specifications: C. E. Cox Company, 2415 South Broadway, Santa Ana, CA 92707.

HEATH SB-100 plus HP-23 power supply. Make offer, 87 copies popular Electronics 1963-1971, 28 copies Radio-TV Experimenter, 1965-1970; 20 copies Elementary Electronics 1965-1971; 27 copies Electronics Illustrated, 1963-1968. Make offer. Ed Katin, W1JZC, 75 Tumblebrook Ln., West Hartford, CT 06117

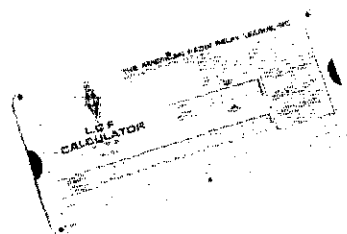
WANTED: Two Polycam Six or two and six covrs. Elward, 502 E. Mulberry, Clinton, IL 61727

WANTED to buy: Used Motorola T-1200 line amplifier or equivalent. Gordon W. Heffernan, W9HA, City Hall, Manitowoc, WI 54220

FANISH, German, Japanese courses on 5" tapes for ham radio. Retail price \$9.50. Dual language manuals, \$2.50 each. Foreign language QSOs, Box 53, Acton, MA 01720

DRAKE 1A revr. in exc condx, \$120; Heath HP-14 d.c. pwr. apply for use w/Heath mobile linear, \$60. Walt, WH2HDG, tel: 01-835-5490

SELL: Eico 753 transceiver with ac power supply; 200 watt E.P. Ward, 93 Clover St., Windsor, CT 06095, Tel: 688-0736



L/C/F CALCULATOR

EVER TRY TO DETERMINE COIL
DIMENSIONS FROM THE FORMULA

$$L = \frac{a^2 n^2}{9a + 10b}$$



Then you can appreciate the L/C/F Calculator. It will tell you at the flick of the wrist the number of turns you need for a particular coil, and determining the resonant frequency of a coil and capacitor is a snap!

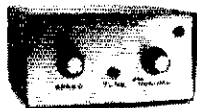
Save time and be accurate with this handy calculator.

\$2.00 Postpaid

AMERICAN RADIO RELAY
LEAGUE

Newington, Conn. 06111

HAL DEVICES



**HAL DEVICES
MODEL 1550
ELECTRONIC KEYSER**

All the features of previous HAL keyers and more TTL circuitry. Optional identifier for sending all letters, DX and RTTY ops. take notice. Transistor switching for grid block AND cathode keying. Rugged crackle cabinet with brushed aluminum panel. Designed for ease of operation. Model 1550 only \$64.95. With ID \$89.95



HAL MAINLINE ST-6 RTTY TU

Complete parts kit for the W6FFC ST-6 now includes all parts except cabinet. Only 7 HAL circuit boards (drilled G10 glass) for all features. Plug-in IC sockets. Custom transformer by Thordarson for both supplies 115/230V, 50-60Hz. \$135.00 kit. Screened table or rack cabinet \$26.00. Boards and manual \$16.50. Shipping extra. Wired units available.

HAL TOUCHCODER II KIT \$55.00

Complete parts kit, excluding keyboard, for the W4UX CW code-typewriter. All circuitry on one 3 x 6" G10 glass PC board. Plug-in IC sockets. Optional contest ID available, \$35.00. Watch for announcement of the new HAL code-typers, both Morse and RTTY.

HAL ARRL FM TRANSMITTER KIT

Drilled, plated, glass epoxy HAL PC boards. 2N5913 final transistor. RF detector with 0-1 ma. meter added. All parts, and the RF detector and meter only \$55.00 + shipping. Cabinet and crystals excluded. Board only \$7.50.

OTHER HAL PRODUCTS

- ID-1 REPEATER IDENTIFIER . . . \$75.00 wired
- W3EFG SSTV CONVERTER . . . \$5.00 kit
- DOUBLE BALANCED MODULATOR . . . 6.50 kit
- DIP IC BREADBOARD CARD . . . \$5.50
- MAINLINE ST-5 TU KIT . . . \$50.00
- MAINLINE AK-1 AFSK KIT . . . \$27.50
- HAL RT-1 TU/AFSK KIT . . . \$15.50

HOT CARRIER DIODES

PART NO.	DESCRIPTION	PRICE	QTY	PRICE	QTY	PRICE	QTY
1N4148	1N4148	10¢	100	10¢	100	10¢	100
1N4149	1N4149	10¢	100	10¢	100	10¢	100
1N4150	1N4150	10¢	100	10¢	100	10¢	100
1N4151	1N4151	10¢	100	10¢	100	10¢	100
1N4152	1N4152	10¢	100	10¢	100	10¢	100
1N4153	1N4153	10¢	100	10¢	100	10¢	100
1N4154	1N4154	10¢	100	10¢	100	10¢	100
1N4155	1N4155	10¢	100	10¢	100	10¢	100
1N4156	1N4156	10¢	100	10¢	100	10¢	100
1N4157	1N4157	10¢	100	10¢	100	10¢	100
1N4158	1N4158	10¢	100	10¢	100	10¢	100
1N4159	1N4159	10¢	100	10¢	100	10¢	100
1N4160	1N4160	10¢	100	10¢	100	10¢	100
1N4161	1N4161	10¢	100	10¢	100	10¢	100
1N4162	1N4162	10¢	100	10¢	100	10¢	100
1N4163	1N4163	10¢	100	10¢	100	10¢	100
1N4164	1N4164	10¢	100	10¢	100	10¢	100
1N4165	1N4165	10¢	100	10¢	100	10¢	100
1N4166	1N4166	10¢	100	10¢	100	10¢	100
1N4167	1N4167	10¢	100	10¢	100	10¢	100
1N4168	1N4168	10¢	100	10¢	100	10¢	100
1N4169	1N4169	10¢	100	10¢	100	10¢	100
1N4170	1N4170	10¢	100	10¢	100	10¢	100
1N4171	1N4171	10¢	100	10¢	100	10¢	100
1N4172	1N4172	10¢	100	10¢	100	10¢	100
1N4173	1N4173	10¢	100	10¢	100	10¢	100
1N4174	1N4174	10¢	100	10¢	100	10¢	100
1N4175	1N4175	10¢	100	10¢	100	10¢	100
1N4176	1N4176	10¢	100	10¢	100	10¢	100
1N4177	1N4177	10¢	100	10¢	100	10¢	100
1N4178	1N4178	10¢	100	10¢	100	10¢	100
1N4179	1N4179	10¢	100	10¢	100	10¢	100
1N4180	1N4180	10¢	100	10¢	100	10¢	100
1N4181	1N4181	10¢	100	10¢	100	10¢	100
1N4182	1N4182	10¢	100	10¢	100	10¢	100
1N4183	1N4183	10¢	100	10¢	100	10¢	100
1N4184	1N4184	10¢	100	10¢	100	10¢	100
1N4185	1N4185	10¢	100	10¢	100	10¢	100
1N4186	1N4186	10¢	100	10¢	100	10¢	100
1N4187	1N4187	10¢	100	10¢	100	10¢	100
1N4188	1N4188	10¢	100	10¢	100	10¢	100
1N4189	1N4189	10¢	100	10¢	100	10¢	100
1N4190	1N4190	10¢	100	10¢	100	10¢	100
1N4191	1N4191	10¢	100	10¢	100	10¢	100
1N4192	1N4192	10¢	100	10¢	100	10¢	100
1N4193	1N4193	10¢	100	10¢	100	10¢	100
1N4194	1N4194	10¢	100	10¢	100	10¢	100
1N4195	1N4195	10¢	100	10¢	100	10¢	100
1N4196	1N4196	10¢	100	10¢	100	10¢	100
1N4197	1N4197	10¢	100	10¢	100	10¢	100
1N4198	1N4198	10¢	100	10¢	100	10¢	100
1N4199	1N4199	10¢	100	10¢	100	10¢	100
1N4200	1N4200	10¢	100	10¢	100	10¢	100

CRACKLE CABINETS: W/ID \$89.95. W/O ID \$64.95. MANY OTHER DEVICES AND COMPONENTS IN STOCK. WRITE FOR CATALOG.

ORDERING INFORMATION

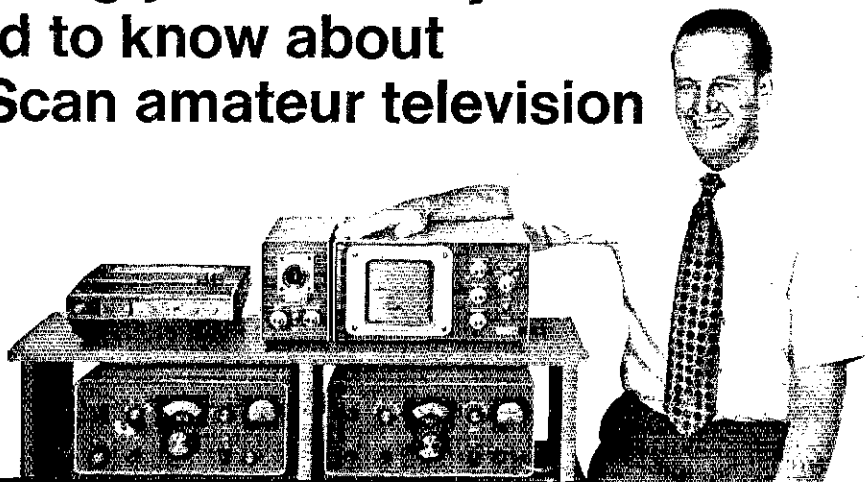
Catalog, including photos, of all items 24¢ postage. Please add 75¢ on parts orders, \$2.00 on larger kits. Shipping via UPS when possible. Give a street address.

HAL DEVICES, Box 365A Urbana, IL 61801
Phone 217-359-7373

Index of Advertisers

Allied Radio Shack	131
Amateur Electronic Supply	116,117,120,121
Amateur License Instruction	146
Ameco Publishing Corporation	130
American Radio Relay League	
<i>Binders</i>	147
<i>Calculators</i>	157
<i>Handbook</i>	Cov. II
<i>Hints & Links</i>	151
<i>License Manual</i>	149
<i>Membership</i>	146
<i>Operating Necessities</i>	141
<i>Publications</i>	145
<i>U.A.R.</i>	143
Antec Company	138
Barker & Williamson	135
Baumao Sales, Inc.	150
Bill's	148
Cleveland Institute of Electronics	124
Collins Radio Co.	2
Computer Measurements	137
Cubex Co.	144
Curtis Electro Devices	140
Cush Craft	127
Datak Corp., The	136
Deane, William	146
Egg-Key	145
Drake Co., R. L.	129
Ehrhorn Tech. Operations, Inc.	141
EIMAC, A Division of Varian	Cov. IV
Electronic Distributors	147
E. S. Electronic Labs	151
E-Z Way Products, Inc.	150
Fair Radio Sales	142
Gotham	118
HAL Devices	158
Hallcrafters Co., The	1
Ham Radio Center	132
Harrison Radio	160
Heath Co., The	114,115
Henry Radio Stores	5
Hi-Par Products	142
Hi-Gain Electronics	125
International Crystal Mfg. Co., The	7
JAN Crystals	139
KW Electronics	140
L. A. Electronix Sales	139
Lafayette Radio Electronics	126
Lampkin Laboratories, Inc.	136
Latin Radio Laboratories	148
Micro-Z Company	146
Millen Mfg. Co., The James	143
Mini-Products, Inc.	132
Mor-Gaan	146
National Radio Institute	144
Palomar Engineers	151
Payne Radio	138
Pickering Radio Co.	145
Poly Paks	122
Race and Rally Accessories	148
Radio Amateur Callbook, Inc.	134
RCA Electronic Components	123
Robot Research	159
RP Electronics, Inc.	140
Ruggles and Associates, David M.	138
SAROC	145
Savoy Electronics, Inc.	4
Scott's QSL Service	150
Simon Side Band Company	142
Skylane Products	138
Spectronics	Cov. III
Swan Electronics	113
Ten-Tec, Inc.	119
Top Band Systems	150
Tri-Ex Tower Corp.	147
Trigger Electronics	152
Unadilla Radiation Products	149
Unique Products	134
Vangorden Engineering	138
Van Sickle Radio Supply	138
Vesto Co., Inc.	139
Vibroplex Co., Inc.	142
Weinschenker, K.J.D.P., M.	128
World QSL Bureau	145

Everything you've always wanted to know about low Scan amateur television



What is slow scan television?

It is a system which permits the transmission of all the electronic components of a video signal in the same bandwidth required for an audio signal.

Do I need any special technical knowledge to operate SSTV?

No. The Robot SSTV equipment is so designed that a licensed amateur operator can easily set up and operate a SSTV station. The impression that SSTV required advanced technical knowledge was based on the fact that, until now, amateurs operating SSTV had to build their own sets.

What kind of radio equipment is required for SSTV?

The SSB or VHF/UHF radio set and antenna you now use for phone contacts are all that are required. To install the Robot Monitor, simply plug in the cord, furnished with the monitor, into the earphone jack on your receiver.

To install the Robot Camera, plug the cord furnished with the camera into the microphone jack. The station microphone then plugs into the Robot slow scan set.

On what bands is SSTV authorized?

The FCC has authorized SSTV operation on all phone bands except 160 meters and the General Class portion of the phone band on 80, 40, 15 and 10 meters. With the exception of the General Class portion, a licensed amateur can operate SSTV on the same frequencies he operates phone.

Presently, slow scan activity can be frequently found on 3845, 7220, 14230, and 21340 kHz. Call-ins with or without SSTV gear are welcome.

and you'll find that slow scanners are happy to answer any questions you may have.

What does an SSTV picture look like?

Slow scan television requires eight seconds to send each new image. Therefore, the monitor displays the transmitted video as a sequence of still pictures. As each picture is formed, it is "stored" by the persistence of a P-7 phosphor, and appears as varying shades of yellowish brightness on the cathode ray tube. When the picture is viewed in subdued light, it is comparable to a newspaper photo in clarity and detail.

Can I record SSTV pictures?

Yes. An inexpensive *audio* tape recorder running at 3 $\frac{3}{4}$ IPS is more than adequate. Present SSTV stations practice includes use of tape for preserving off-the-air contacts as well as preparing an interesting program to be transmitted.

How much does the Robot slow scan television equipment cost, and where can I obtain it?

The Robot Model 80 Camera costs \$465, the Model 70 Monitor costs \$495, and the f1.9 lens is \$30. You can purchase Robot equipment from your favorite amateur dealer, or direct from the factory. Mail in the coupon below and we will send you complete information on SSTV and the Robot SSTV equipment.

ROBOT

ROBOT RESEARCH, INC.
7591 Convooy Court
San Diego, California 92111

ROBOT RESEARCH, INC.
7591 Convooy Court
San Diego, California 92111

Gentlemen:
Please send me your complete information on the Robot camera and monitor.

Name _____
Street _____
City _____
State _____ Zip _____
Call _____

NOW! you can enjoy the NEW hallicrafters CYCLONE III because...

The Harrison Trade-In Center needs your old gear!

Late models, in good clean condition, are moving out fast! We must have more right away, so, we tempt you with these extra high allowances.

If you act fast, you can be the proud and happy owner of a brand new, higher power, Hallicrafters SR-400A "Cyclone III" transceiver, for far less than you ever dreamed! For example:

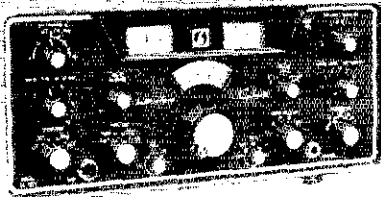
For Your	and only	For Your	and only
Collins 32S1	\$399	SR-400	\$363
Collins 32S3	299	SR-500	558
Collins KWM-2	215	HT-32B	499
Drake T4XB	430	Heath (?)	(Ask!)
Drake TR 4 WNB	364	Johnson 500	476
Galaxy V MK3	470	National NCX-500	495
Galaxy GT-550	416	National NCX 5 MK2	439
Hallicrafters:		Swan 350-C	495
SR-150	513	Swan 500-CX	460
SR-160	580	Other makes, models?	(Ask!)

Don't miss this rare opportunity. Rush a deposit in, now, while we still need your model.

[Got no trade-in? Let's make a real money-saving package deal!]

the NEW hallicrafters "CYCLONE III"

is just about the greatest value around today... and it's made in the USA!



AC POWER SUPPLY/SPEAKER.



110/220 VAC, 50/60 Hz. All solid state. Crisp voice response speaker. A 22 lb. powerhouse! \$129.95

MOBILE POWER SUPPLY

Nom. 12 VDC, negative ground. All solid state. Compact, but delivers plenty watts! \$159.95

MOBILE MOUNTING RACK

A real solid job, with fold-down wings. Includes heavy cable, etc. MR-400 — \$89.95

SAVE \$75. MORE!

We have some MR-150 Mobile Mounting Racks. Same size, De-Luxe heavy construction. Shift a few plugs, and it takes the SR-400A like a glove!

SPECIAL! — \$14.95

CHARGE IT!

On your Master Charge, Bank Americard or Uni-Card. Spread payments up to two years.

BLOWER KIT

Cools it! — For even more conservative higher power operation, or for installations with restricted ventilation. Whisper quiet. HA-60 — \$39.95

FREE BONUS!

Send check for full balance with your order, and we will include the HA-60 Blower Kit, at no extra charge.

ORDER NOW!

Or, ask for literature

It has —

... about the "hottest" receiver section in the business... built-in noise blanker (that really works!)... 38% power increase, to a conservative 550 PEP Watts — PA tube balancer — patented R.I.T. (now calibrated, $\pm 3k$ Hz receiver excursion) — full 5 band coverage (extendable to MARS) — 1 kHz readout — Full 175 Watt RTTY or SSTV continuous duty — built-in calibrator —

... plus dozens more wonderful features, to give you peak performance, plenty QSO power, and personal pleasure and pride!

New Hallicrafters SR-400A \$99!

SPLIT VFO CONSOLE



Plug in this remote VFO, and multiply your DX-ability! Gives separate control of receive frequency!

Built-in VSWR/relative power output meter helps you keep radiated power at maximum. HA-20 — \$199.95

SAVE \$70 MORE!

With your order for the "Cyclone III" and either power supply, you may include one HA-20 VFO for only \$129.95.



Harrison

"Ham Headquarters, U.S.A."

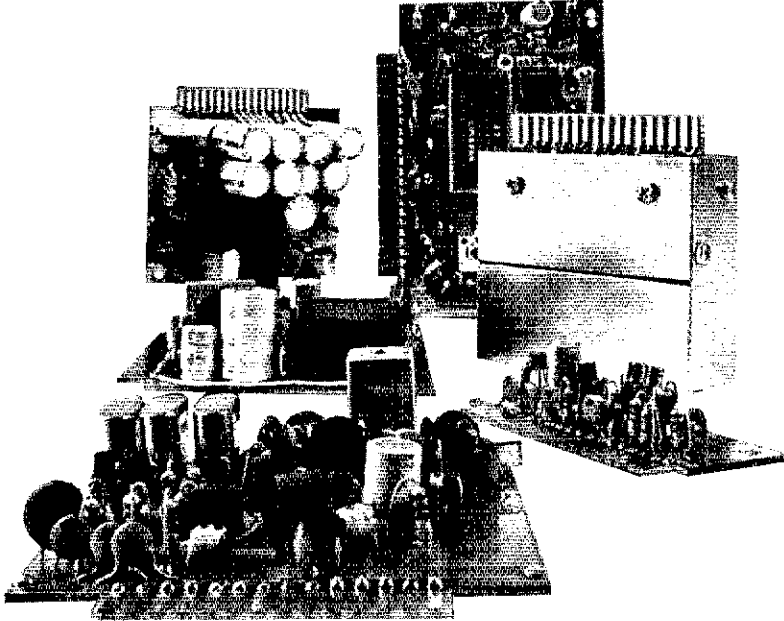
FARMINGDALE, L.I.

2265 ROUTE 110
2 miles south of LIE exit 49S
(516) 293-7990

NEW YORK CITY

8 BARCLAY STREET
Near City Hall
BARclay 7-7922

Here's just half a dozen reasons why the Yaesu FT-101 is the world's best portable rig.

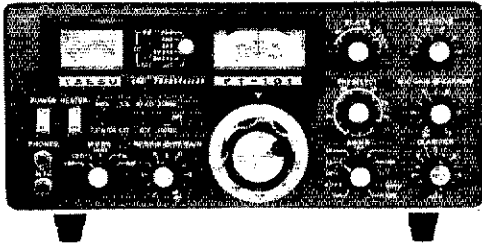


Those six computer-type plug-in modules hold most of the FT-101's 10 FET's, 3 IC's, 31 silicon transistors and 38 silicon diodes. Being solid-state, they're built to give you years of superior performance. But if any one of them ever gives you trouble, you simply mail it back to us for a factory-new replacement module.

Not that you should expect trouble. What you should expect — and what you get — is the most

The FT-101 is a thirty-pound package of DX punch, air-ready when you are, wherever you are. Just add an antenna, feed it 12 or 117 volts, and you're ready to work the world.

So sure are we of the 101's solid-state reliability, we guarantee it for one year from date of purchase. And we guarantee you that it will be a very good year . . . the first of many to come. The FT-101 — only \$499.95.



sensational portable rig ever offered to the American amateur. With features like these: a built-in VOX, 25 KHz and 100 KHz calibrators, the WWV 10 MHz band, a high Q permeability tuned RF stage and a 5 KHz clarifier. And 260 W PEP, 180 W CW and 80 W AM. With 0.3 microvolts receiving sensitivity — for a 10 db signal-to-noise ratio.

Not to mention a built-in 12 VDC and 117 VAC power supply. Plus an in-motion necessity — a noise blanker that picks out noise spikes, leaving only clean noise-free signal copy behind.

SPECTRONICS WEST

Dept. Q, 1491 E. 28th, Signal Hill, Ca. 90806 / (213) 426-2593

SPECTRONICS EAST

Dept. Q, Box 1457, Stow, Ohio 44224 / (216) 923-4567

Please send new color catalog of all Yaesu products.

Enclosed find \$_____

Please send model(s) _____

Name _____

Address _____

City _____ State _____ Zip _____

All prices F.O.B. Signal Hill, Ca.

NEW! Improved rugged 8122W's, 8121W's, 8072W's, and 8828W's, from EIMAC

EIMAC's new 8122W family of premium, second generation tubes are directly interchangeable with earlier equivalents in most FM, linear or modulated equipments.

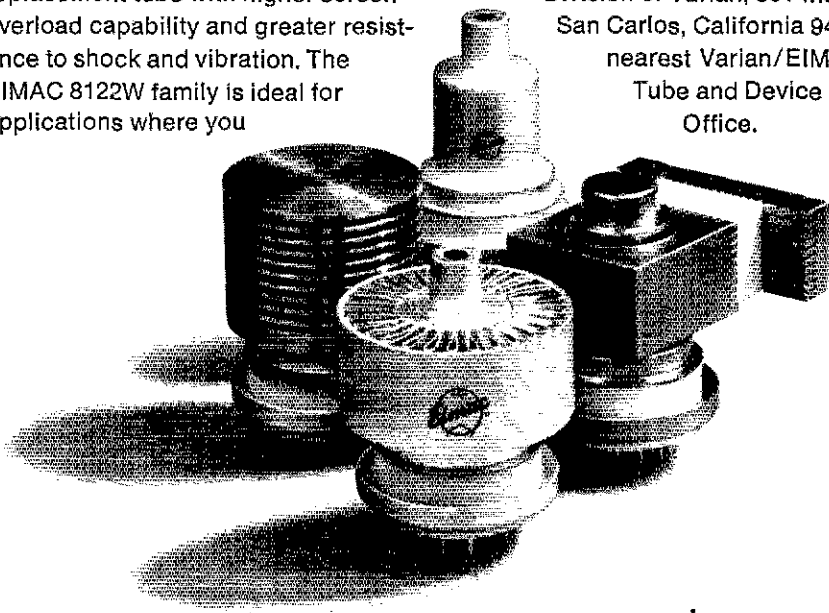
These rugged, long life power tetrodes combine high screen dissipation and excellent thermal stability in a heavy duty structure which gives you improved performance in demanding communication circuits.

EIMAC's new design features rigid precision-wound gold plated molybdenum wire grids. The result is a direct-replacement tube with higher screen overload capability and greater resistance to shock and vibration. The EIMAC 8122W family is ideal for applications where you

have experienced problems under environmental or electrical stress.

EIMAC's unique 8122W electron-gun structure is available in four anode configurations: Axial air flow cooling (8122W), Transverse air flow cooling (8121W), coolerless (8072W) and conduction cooled (8828W). Special heat sink coolers are also available upon request.

EIMAC's Application Engineering Section stands ready to assist you in designing these exceptional tubes in new equipments. Contact EIMAC Division of Varian, 301 Industrial Way, San Carlos, California 94070, or your nearest Varian/EIMAC Electron Tube and Device Group Sales Office.



EimacTM
division
varian