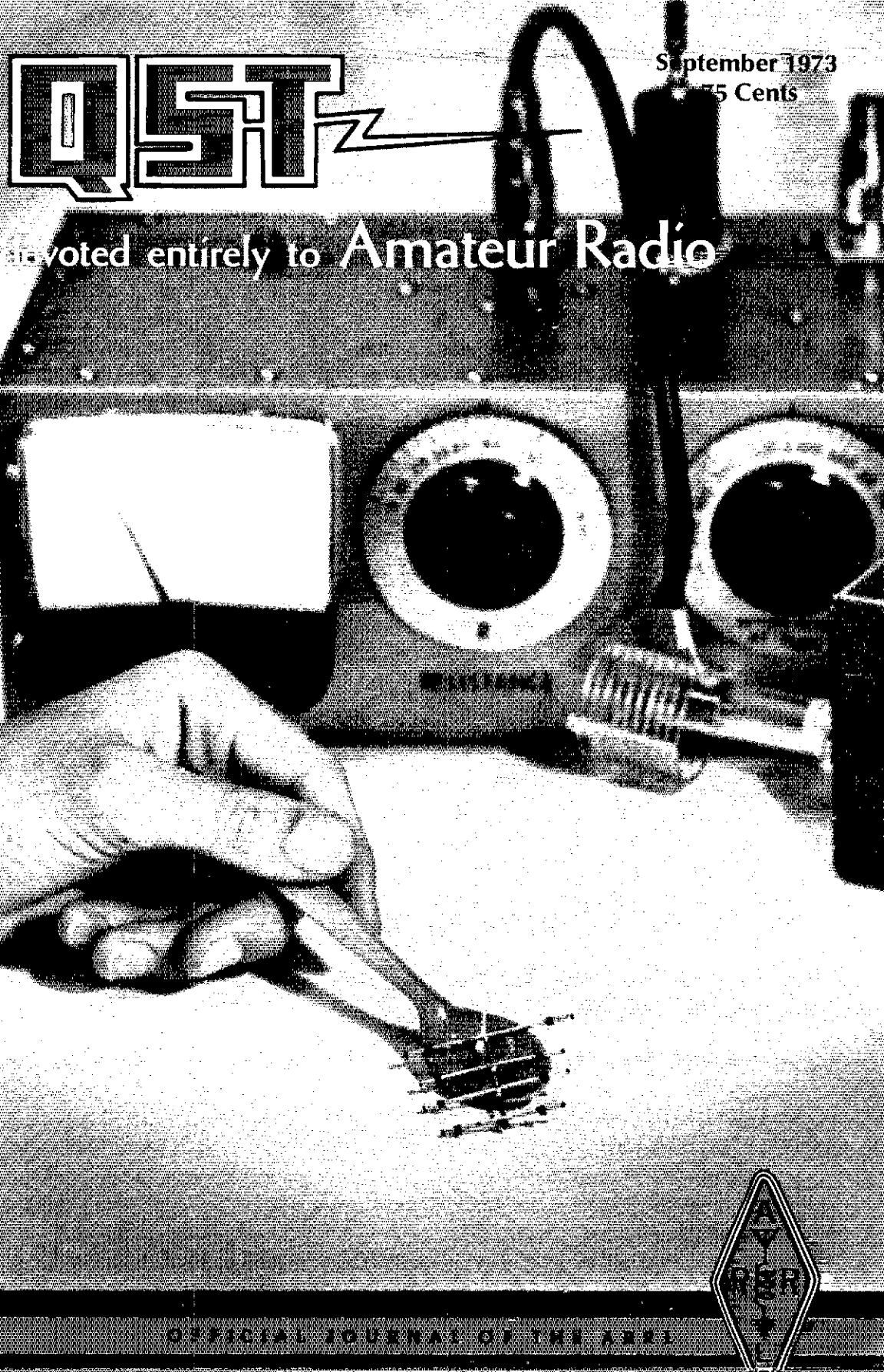
QST

September 1973
75 Cents

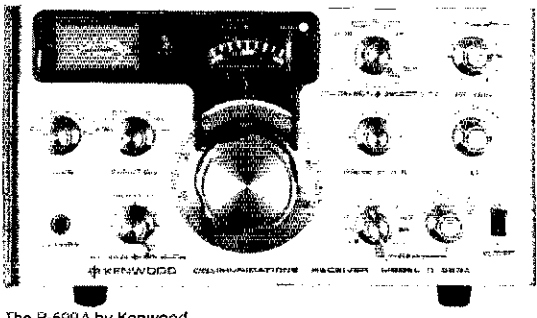
devoted entirely to Amateur Radio



OFFICIAL JOURNAL OF THE ARRL

it wasn't easy...but Kenwood improved the R-599 & T-599

THOUSANDS HAVE PROVEN THEMSELVES THROUGH DAILY USE. EVERYTHING THAT MADE THEM THE BEST REMAINS, BUT NOW KENWOOD DID THE IMPOSSIBLE BY MAKING THE "TWINS" EVEN BETTER. THE R-599A IS THE MOST COMPLETE RECEIVER EVER OFFERED... MANY FEATURES WHICH ARE "OPTIONAL AT EXTRA COST" IN OTHER RECEIVERS ARE STANDARD



The R-599A by Kenwood

the R-599A

Solid state . . . low power consumption, superbly reliable, small and lightweight • Full amateur band coverage . . 10 through 160 • CW, LSB, USB, AM, AM.N, FM reception • Selectable AGC . . . slow or fast • Built-in calibrator • Monitor T-599A frequency to calibrate transmitter • Squelch circuit • 1 KHz frequency readout. . . smooth VFO action • Versatile cross channel operation with T-599A • Automatic or manual selectivity selection • Built-in SSB/8 pole, CW/8 pole and AM filters • RIT circuit with RIT tuning separate from RIT switch • Five built-in fixed frequency channel positions • Provisions for installation of 2 and 6 meter converters • Stable, accurate VFO • Built-in power supply for 115/230 VAC operation or 12 VDC operation • Built-in WWV reception • Built-in S-meter • Excellent sensitivity —.5 uv • Easily adaptable to use with Kenwood TS-900 • Modern, beautiful design

New Features:

New easy read dial, same 1 KHz readout . . . same smooth VFO action • Excellent built-in noise blanker • Improved 2 and 6 meter operation with optional accessory converters, easier installation • Continuous RF gain control replaces stepped attenuator • Built-in 11 meter coverage • AGC turns off if desired • VFO indicator light for cross channel operation •

The R-599A . . . $439.00 • Converters . . . $31.00 • S- 599 Speaker . . . $18.00

the T-599A

Mostly solid state . . . only 3 tubes • Built-in power supply • Full metering: ALC, Ip, RF output, high voltage • CW, LSB, USB, AM operation • 1 KHz frequency readout, smooth easy VFO action • Built-in VOX, with delay, sensitivity and anti-VOX adjustments • Built-in semi-automatic CW with sidetone • Built-in calibrator function when used with the R-599A • Full amateur band coverage . . . 10 through 80 • Versatile cross channel operation with the R-599A • Stable, accurate VFO • Modern, beautiful design • ALC feedback • Maximum TVI protection • 200 watts PEP input nominal • Tube saving TUNE position • Built-in cooling fan • Selectable low or high microphone impedance

New Features:

Front panel MIC Gain control • Front panel CAR LEVEL control • Improved, easy read dial, same smooth VFO action • VFO indicator light for cross channel operation • New high reliability final amplifier layout • Improved keying characteristics • New chain drive •

The T-599A. . . $459.00

Prices subject to change without notice.

Why buy from Henry Radio?

Over 40 years experience. No finance charges if paid with-in 90 days. Low interest contracts - 8%/yr add on (14% annual rate) - as long as 24 months, 10% down or trade-in down payments. Good used equipment. Most makes and models. Used equipment carries a 15 day trial, 90 day warranty and may be traded back within 90 days for full credit towards the purchase of NEW equipment. Write for bulletin. Export inquiries invited.

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

Savoy

BASSETT

igh efficiency mobile nd portable antennas or all amateur bands, AP, MARS, CB, ECURITY, UBLIC SERVICE, ARINE, AND OVERNMENT USE.

2-6-10-15-20-40-75

Identical size, cost, and appearance

FULLY ADJUSTABLE TO FREQUENCY IN FIELD

Low weight, low drag, high strength fiberglass

Polished chrome brass standard ⅜-24 thread

High gain collinear on 2 meters

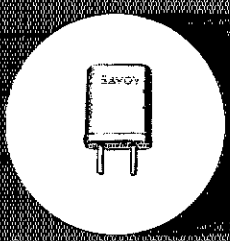
MODEL DGA-2M

$29.50 postpaid in U.S.A.

$3.75

Postpaid in U.S.A.

TYPE 900 A TYPE 901



HIGH ACCURACY CRYSTALS

FOR OVER 30 YEARS

Either type for amateur VHF in Regency, Swan, Standard, Drake, Varitronics, Tempo, Yaesu, Galaxy, Trio, Sonar, Clegg, SBE, Genave.

Quotes on request for amateur or commercial crystals for use in all other equipments.

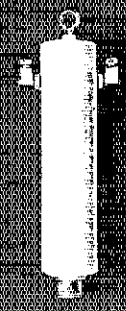
Specify crystal type, frequency, make of equipment and whether transmit or receive when ordering.

BASSETT VACUUM TRAP ANTENNA SYSTEM

Complete packaged multi-band antenna systems employing the famous Bassett Sealed Resonators and Balun from which air has been removed and replaced with pure helium at one atmosphere. Operating bands are indicated by model designation.

MODEL DGA-4075	$59.50
MODEL DGA-204075	$79.50
MODEL DGA-2040	$59.50
MODEL DGA-152040	$79.50

BASSETT VACUUM BALUN



The famous sealed helium filled Balun employed with the DGA Series Antenna Systems. Solderless center insulator and easily handles more than full legal power while reducing unwanted coax radiation. Equipped with a special SO-239 type coax connector and available either 1:1 or 4:1.

MODEL DGA-2000-B $12.95

Postpaid in U.S.A.

CONTACT YOUR DISTRIBUTOR OR WRITE FOR DATA

Savoy Electronics, Inc.

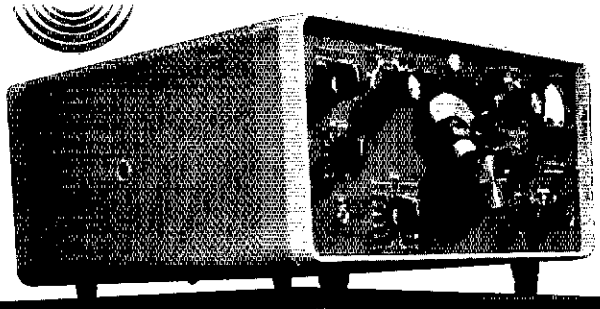
P.O. Box 5727 - Fort Lauderdale, Florida - 33310

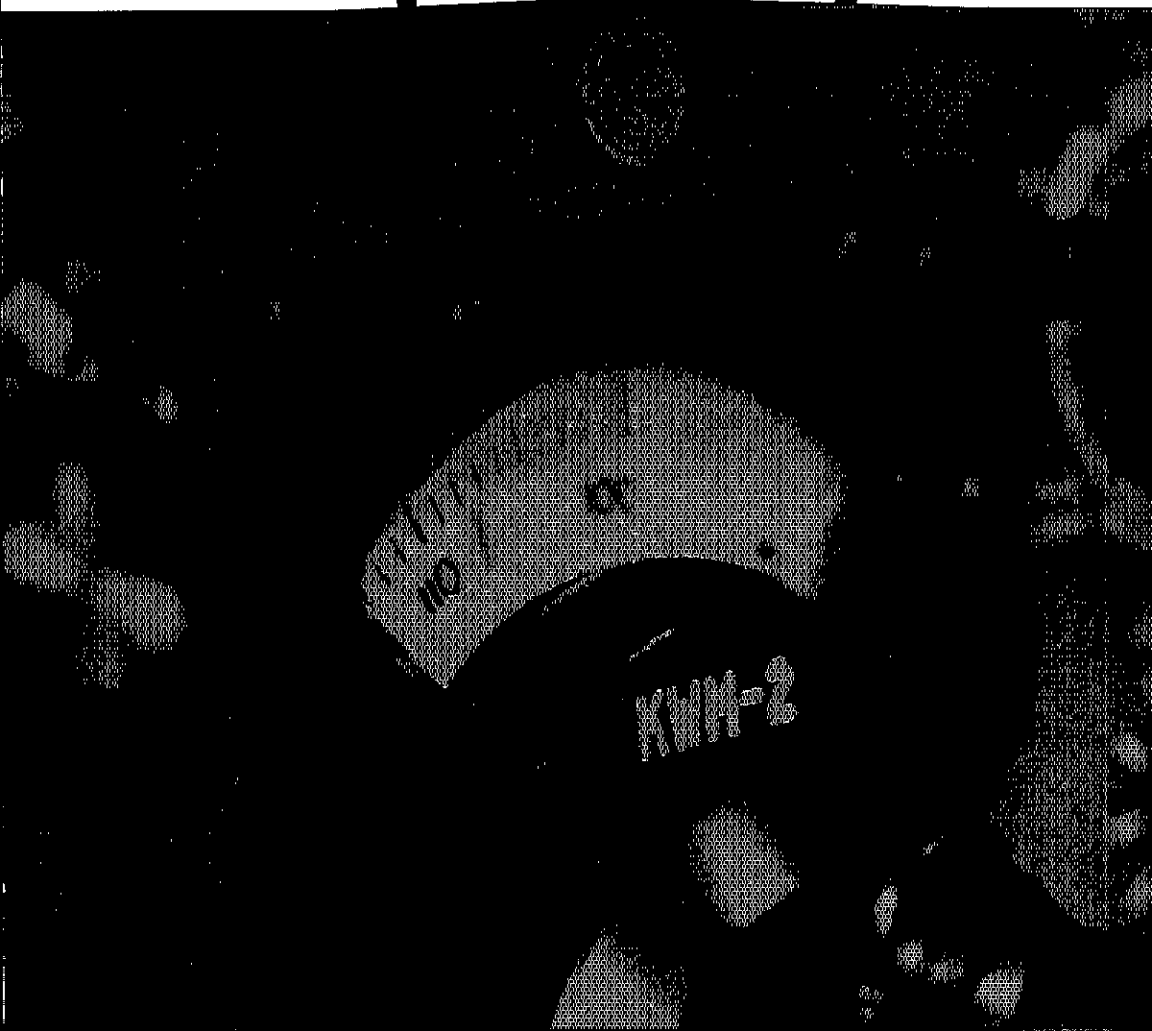
Tel: 305-566-8416 or 305-947-1191

If anything can beat S/Line performance and dependability, Collins will be the first to let you know about it.

COLLINS

Cedar Rapids, Iowa 52406





QST

SEPTEMBER 1973

VOLUME LVII NUMBER 9

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

OFFICES

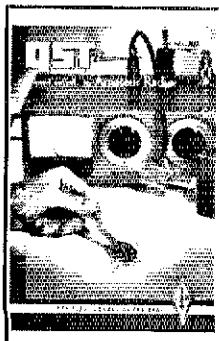
225 Main Street
Newington, Connecticut 06111
Tel.: 203-666-1541

Subscription rate $7.50 per year postpaid, U.S. funds, U.S. & Possessions; $8.50 in Canada; $9.00 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.

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

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



OUR COVER A bit of symbolism is used to defend the title of an article commencing on page 11. The hand of Hq. lab assistant, WA7ISP, holds a typical support for the "Bite Size Beam."

— CONTENTS —

TECHNICAL —

A Bite Size Beam
Robert M. Myers, W1FBY and Clarke Greene, WA1JLD 11

A High-Performance Balanced Mixer for 1296 MHz
Paul Wade, WA1ZZF 15

An HF-Band Solid-State Amplifier . . *Jack Mannon, W6FIG* 18

A DSB and CW QRP Transmitter . . . *Mel Ringer, W6CJM* 26

MOSFET Preamplifiers for 10, 6, or 2 Meters 30

A Medium-Power HF SSB CW Transmitter, Part III
Timothy P. Hulick, W9MIJ 32

A Packaged Keyer and T-R Switch . . *Dave Wood, W9AJR* 41

Technical Correspondence 44

Recent Equipment

The Heath HM-2103 RF-Load Wattmeter 46

E. F. Johnson Fleetcom 550 and 557 UHF FM Transceivers 47

New Apparatus

Microwave Associates, Inc. Circulators and Isolators . . . 49

BEGINNER AND NOVICE —

Some Ideas for Packaging the W7ZOI Keyer
Doug DeMaw, W1CER 24

OPERATING —

13th RTTY DX Sweepstakes Announcement 58

Results, Novice Roundup . . . . *Rick Niswander, WA1PID* 59

EMP 63

GENERAL —

Presentation for the Amateur Service 50

Oscar News 96

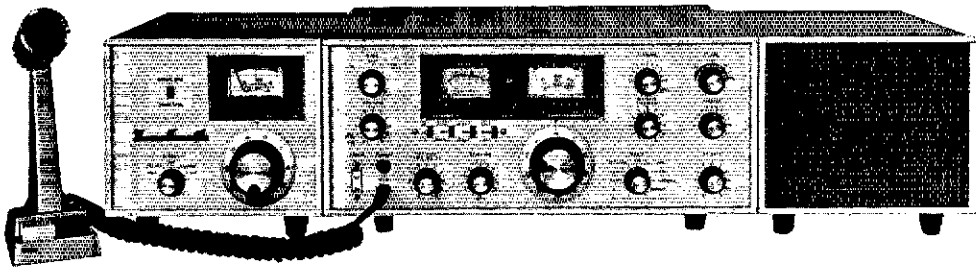
Marconi Commemorative 108

ARRL QSL Bureau 108
Coming Conventions . . . 93
Correspondence 70
Hamfest Calendar 92
Happenings of the Month . 74
Hints & Kinks 42
How's DX? 87
I A R U News 72
"It Seems to Us . . ." . . . 9
League Lines 10
New Apparatus 49
Operating Events 109
Operating News 103
public Service 63
Silent Keys 110
Station Activities 111
World Above 50 Mc. 100
YL News & Views 97
W1AW Schedule 104
25 and 50 Years Ago in *QST* 95

YAESU

Your assurance of Performance and Quality

YAESU **FTdx401** Transceiver



More For Your Money

FTdx401	$599.00
Built-in AC Power Supply	No charge
Built-in WWV 10 MHz Band	No charge
Built-in Noise Blanker	No charge
25 and 100 KHz Calibrators	No charge
VOX	No charge
Clarifier	No charge
Break-in CW with Sidetone	No charge
600Hz CW Filter	No charge
1 KHz Readout	No charge
Selectable SSB	No charge
6 Month Warranty by Dealer	No charge
Cooling Fan	

Total only $599.00

Amateur Price Net
Price Subject To Change

Tomorrow's Transceiver Today: 20 tubes plus 50 silicon semiconductors, passive crystal filter (6 pole), velvet smooth tuning, superb noise blanker, standard electrical parts. This is truly the best buy in the amateur field today. See your local dealer for brochure & demonstration.

Factory Service is available even after your warranty has expired for the cost of labor and parts.

YAESU DEALERS:

HENRY RADIO STORES / 213-477-6701
Los Angeles, Anaheim, Ca., Butler, Mo.

HAM RADIO OUTLET / 213-272-0861
Burlingame, Ca.

RACOM ELECTRONICS / 206-255-6656
Renton, Wash.

WILSON ELECTRONICS / 702-457-3596
Pittman, Nev.

ED JUGE ELECTRONICS / 817-926-5221
Fort Worth, Tex.

AMATEUR ELECTRONICS SUPPLY / 414-442-4200
Milwaukee, Wis., Cleveland, Ohio, Orlando, Fla.

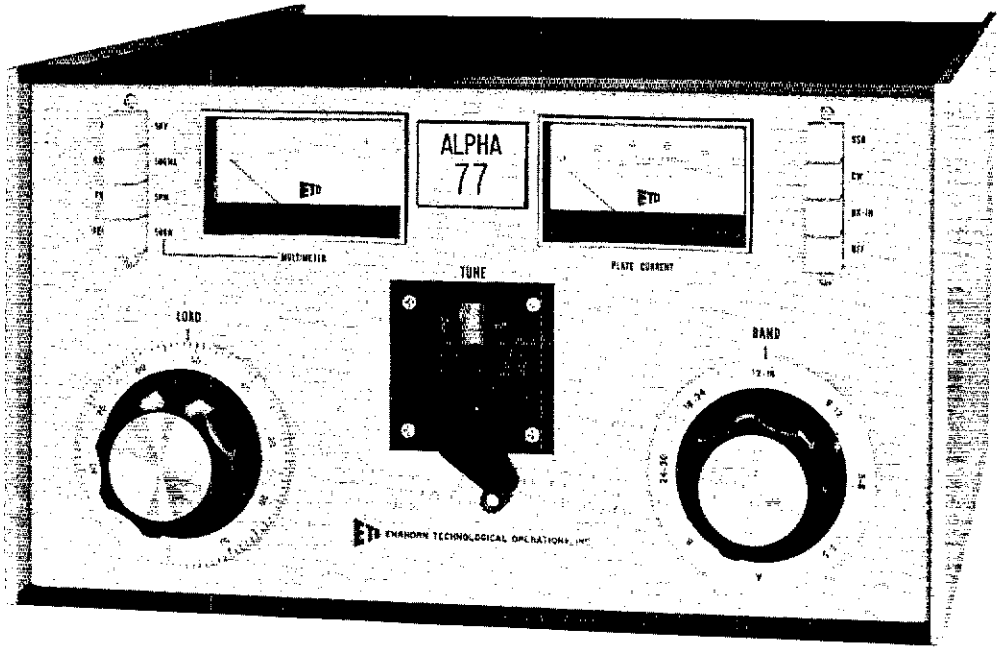
FRECK RADIO & SUPPLY / 704-254-9551
Asheville, N. Carolina

HARRISON RADIO / 516-293-7990
Farmingdale, L. I., Valley Stream, L. I., New York City, N. Y.

YAESU

YAESU MUSEN USA INC.
7625 E. Rosecrans Avenue, Unit #29
Paramount, California 90723 Phone 213-633-4007

HOW RELIABLE IS AN **ALPHA 77?**



ETO's FACTORY WARRANTY PROVIDES A HINT . . .

IT'S AN UNPRECEDENTED FULL YEAR ON EVERYTHING AND TWO YEARS ON THE TRANSFORMER

HERE ARE SOME *MORE SPECIFIC* FACTS:

In the first full year of production, *ALPHA 77's* suffered a total of . . .

- *NO* high voltage power supply failures
- *NO* bandswitch or tank circuit failures
- *NO* cooling system failures
- *NO* significant damage in shipment

Those results speak louder than any specification. Of course an occasional problem does arise, and then we do everything feasible to help get it corrected *fast*. Ask an owner . . . *if you can find one who's needed service.*

For detailed literature telling the inside story of the *ALPHA 77*, write or phone. Model PA-77, $1995.

ETO EHRHORN TECHNOLOGICAL OPERATIONS, INC.
BROOKSVILLE, FLORIDA 33512
(904) 596-3711

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 or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F. PAM. SCMs desire application leadership posts of SEC, FC, RM and PAM where vacancies exist.

ATLANTIC DIVISION

Delaware	W3DKX	Roger E. Cole	346 E. Roosevelt Ave.	New Castle 19720
Eastern Pennsylvania	W3HK	George S. Van Dyke, Jr.	4607 Convent Lane	Philadelphia 19114
Maryland-D.C.	W3IA	Karl R. Medrow	RFD 1	Davidsonville 21035
Southern New Jersey	W2NYP	Charles E. Travers	State Police Drive	Trenton 08625
Western New York	K2KTK	Richard M. Pitzeruse	407 Woodland Rd.	Syracuse 13219
Western Pennsylvania	W3NEM	Robert E. Gawryla	1463 N. Allen St.	State College 16801

CENTRAL DIVISION

Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9BUQ	William C. Johnson	2838 Hillside Ave.	Indianapolis 46218
Wisconsin	W9OMT	Joseph A. Taylor	1951 Mulberry Ln.	Green Bay 54303

DAKOTA DIVISION

Minnesota	WA0VAS	Casper Schroeder,	10971 Quincy Blvd. N. E.	Blaine 55434
North Dakota	W0DM	Harold L. Sheets	21 Euclid Ave.	Grand Forks 58201
South Dakota	WA0CPX	Ed Gray	Rt. 4	Salem 57058

DELTA DIVISION

Arkansas	WA5VWH	Jimmie N. Lowrey	6301 Euper Lane	Fort Smith 72901
Louisiana	WB5AEH	*Louis Muhleisen	Box 927	Metairie 70004
Mississippi	W5NCB	Walker J. Coffey	RFD No. 2	Oxford 38655
Tennessee	WA4GLS	O. D. Keaton	Rt. 1, Medearis Dr.	Old Hickory 37138

GREAT LAKES DIVISION

Kentucky	W4CID	Ted H. Huddle	604 Amanda Terrace Dr.	Ashland 41101
Michigan	W8ZBT	Ivory J. Olinghouse	1227 Rose Dr.	Niles 49120
Ohio	W8IMI	William E. Clausen	403 Canyon Dr. S.	Columbus 43214

HUDSON DIVISION

Eastern New York	K2SJN	Graham G. Berry	50 Parcot Ave.	New Rochelle 10801
N.Y.C. & Long Island	K2DGI	Fred J. Brunles	22 Ivy Drive	Jericho 11753
Northern New Jersey	WA2UOO	John M. Crovelli	436 Mt. Airy Road	Basking Ridge 07920

MIDWEST DIVISION

Iowa	KØVVU	Al Culbert	P.O. Box 306	Charles City 50616
Kansas	KØBXI	Robert M. Summers	3048 North 72nd	Kansas City 66109
Missouri	KØVVH	Larry S. Phillips	2482 W. Randolph	St. Charles 63301
Nebraska	KØOAL	V. A. Cashon	344 Pine St., Box 488	Chadron 69337

NEW ENGLAND DIVISION

Connecticut	W1GVT	John J. McNassor	318 Berlin Ave.	Southington 06489
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02184
Maine	K1IEV	Peter F. Sterling	39 Latham St.	So. Portland 04106
New Hampshire	W1SWX	Robert Mitchell	Box 137-A	Chester 03036
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	W1BRG	James H. Viele	101 Henry St.	Burlington 05401
Western Massachusetts	W1HVR	Percy C. Noble	P.O. Box 5	Lanesboro 01237

NORTHWESTERN DIVISION

Alaska	KL7CUK	Roy Davie	Star Route 1 Montana Creek	Willow 99688
Idaho	W7ZNN	Donald A. Crisp	1508 Alder Drive	Lewiston 83501
Montana	W7RZV	Harry A. Rowlance	P.O. Box 621	Harlowton 59036
Oregon	K7WWR	Dale T. Justice	1369 N. E. Sunrise Lane	Hillsboro 97123
Washington	W7QGP	Mary E. Lewis	10352 Sandpoint Way N.E.	Seattle 98125

PACIFIC DIVISION

East Bay	WB6DHB	Paul J. Parker	2236 Whyte Park Ave.	Walnut Creek 94598
Hawaii	KH6BZE	Lee R. Wical	P.O. Box 9274	Honolulu 96820
Nevada	K7ZOK	Harold P. Leary	1812 N. Saylor Way	Las Vegas 89108
Sacramento Valley	WA6JVD	Norman A. Wilson	Route 1, Box 730	Woodland 95695
San Francisco	W6NUT	Thomas A. Gallagher	Box 31365	San Francisco 94131
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno 93702
Santa Clara Valley	WA6LFA	James A. Hauser	13065 Franklin Ave.	Mountain View 94040

ROANOKE DIVISION

North Carolina	W4WXZ	Charles H. Brydges	4901 Tiffany Ave.	Winston-Salem 27104
South Carolina	WR4CRB	Joseph Rubin	P.O. Box 117	Pelion 29123
Virginia	K4GR	Robert J. Slagle	3515 – 25th St., N.	Arlington 22207
West Virginia	W8IM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554

ROCKY MOUNTAIN DIVISION

Colorado	WAØHLQ	Clyde O. Penney	1626 Locust St.	Denver 80220
New Mexico	W5RE	Edward Hart, Jr.	1909 Moon N.E.	Albuquerque 87112
Utah	W7OCX	John H. Sampson, Jr.	3618 Mt. Ogden Drive	Ogden 84403
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601

SOUTHEASTERN DIVISION

Alabama	WB4EKJ	James A. Brashear, Jr.	3002 Boswell Drive	Huntsville 35811
Canal Zone	KZ5ZZ	James L. McMillen	P.O. Box 2869	Balboa
Georgia	W4BYG	Ray LaRue	2758 Hudson Drive	Lilburn 30247
Northern Florida	W4RKH	Frank M. Butler, Jr.	323 Elliott Rd., S.E.	Fort Walton Beach 32548
Southern Florida	*W4KGJ	John F. Porter	6890 S.W. 51st St.	Miami 33155
West Indies	KP4AS1	Pedro J. Pizá	Box 2001	Ponce, PR 00731

SOUTHWESTERN DIVISION

Arizona	W7CAF	Gary M. Hamman	2813 E. Campbell Ave.	Phoenix 85016
Los Angeles	W6INH	Eugene H. Viulino	2839 Canada Blvd.	Glendale 91208
Orange	W6CPB	William L. Weise	1753 Iowa St.	Costa Mesa 92626
San Diego	W6SRS	Paul C. Thompson	7331 Hamlet Ave.	San Diego 92120
Santa Barbara	WA6DEI	D. Paul Gagnon	1791 Hedon Cir.	Camarillo 93010

WEST GULF DIVISION

Northern Texas	W5LR	L. E. Harrison	1314 Holly Glen Drive	Dallas 75232
Oklahoma	W5PML	Cecil C. Cash	1802 Smith Ave.	Lawton 73501
Southern Texas	W5KR	Arthur R. Ross	P.O. Box 3561	Brownsville 78520

CANADIAN DIVISION

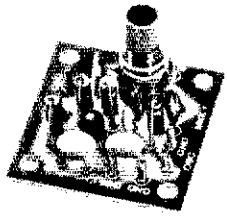
Alberta	VE6FK	Don Sutherland	444-25th Ave., N.E.	Calgary, Alta. T2E 1Y3
British Columbia	VE7FB	H. F. Savage	4553 West 12th Ave.	Vancouver 8, B.C.
Manitoba	VE4EO	Steven Fink	14 Grandcrest St.	Winnipeg 17, Manitoba
Maritime	VE1AMR	Walter D. Jones	39 Waverley Ave.	Moncton, N.B.
Ontario	VE3DV	Holland H. Shepherd	3016 Cowan Cres.	Ottawa, K1V 8L1
Quebec	VE2ALE	Joseph Unsworth	163 Mgr. Bourget	Vaudreuil, P.Q.
Saskatchewan	VE5RP	Percy A. Crosthwaite	R.R. 3	Saskatoon S7K 3J6

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

for the EXPERIMENTER!

INTERNATIONAL EX CRYSTAL & EX KITS

OSCILLATOR • RF MIXER • RF AMPLIFIER • POWER AMPLIFIER

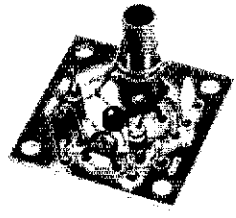


1. MXX-1 TRANSISTOR RF MIXER

A single tuned circuit intended for signal conversion in the 3 to 170 MHz range. Harmonics of the OX oscillator are used for injection in the 60 to 170 MHz range. Lo Kit 3 to 20 MHz, Hi Kit 20 to 170 MHz (Specify when ordering).....**$3.50**

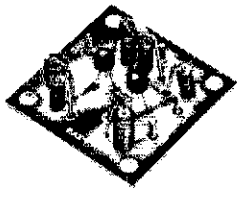
2. SAX-1 TRANSISTOR RF AMP

A small signal amplifier to drive MXX-1 mixer. Single tuned input and link output. Lo Kit 3 to 20 MHz, Hi Kit 20 to 170 MHz (Specify when ordering).....**$3.50**



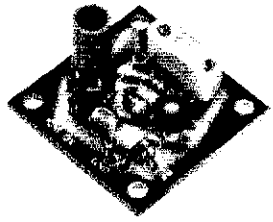
3. PAX-1 TRANSISTOR RF POWER AMP

A single tuned output amplifier designed to follow the OX oscillator. Outputs up to 200 mw, depending on the frequency and voltage. Amplifier can be amplitude modulated. Frequency 3,000 to 30,000 KHz.....**$3.75**



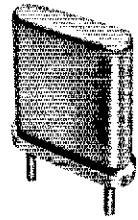
4. BAX-1 BROADBAND AMP

General purpose unit which may be used as a tuned or untuned amplifier in RF and audio applications 20 Hz to 150 MHz. Provides 6 to 30 db gain. Ideal for SWL, Experimenter or Amateur **$3.75**



5. OX OSCILLATOR

Crystal controlled transistor type. Lo Kit 3,000 to 19,999 KHz, Hi Kit 20,000 to 60,000 KHz. (Specify when ordering).....**$2.95**



6. TYPE EX CRYSTAL

Available from 3,000 to 60,000 KHz. Supplied only in HC 6/U holder. Calibration is ± .02% when operated in International OX circuit or its equivalent. (Specify frequency) **$3.95**

for the COMMERCIAL user...

INTERNATIONAL PRECISION RADIO CRYSTALS

International Crystals are available from 70 KHz to 160 MHz in a wide variety of holders. Crystals for use in military equipment can be supplied to meet specifications MIL-C-3098E.

CRYSTAL TYPES:

(GP) for "General Purpose" applications
(CS) for "Commercial Standard"
(HA) for "High Accuracy" close temperature tolerance requirements.

write for CATALOG

INTERNATIONAL

CRYSTAL MFG. CO., INC.

10 NO. LEE • OKLA. CITY, OKLA. 73102

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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

Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914 — 1936
EUGENE C. WOODRUFF, W8CMP, 1936 — 1940
GEORGE W. BAILEY, W2KH, 1940 — 1952
GOODWIN L. DOSLAND, WØTSN, 1952 — 1962
HERBERT HOOVER, JR., W6ZH, 1962 — 1966
ROBERT W. DENNISTON, WØDX, 1966 — 1972

Officers

President ..... HARRY J. DANNALS,* W2TUK
16 Arbor Lane, Dix Hills, NY 11746
First Vice-President ... CHARLES G. COMPTON,* WØBUO
1170 E. 90th St., Inver Grove Hgts., MN 55075
Vice-Presidents ..... ROBERT W. DENNISTON, WØDX
Box 73, Newton, IA 50208
ROEMER O. BEST, W5QKF
P.O. Box 1656, Corpus Christi, TX 78401
Secretary ..... JOHN HUNTOON, W1RW
Treasurer ..... DAVID H. HOUGHTON

* * * * *

Honorary Vice-Presidents ..... CARL L. SMITH, WØBWJ
FRANCIS E. HANDY, W1BDI
WAYLAND M. GROVES, W5NW

* * * * *

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
MORGAN W. GODWIN, W4WFL
DAVID G. SUMNER, K1ZND
225 Main St., Newington, Connecticut 06111

* * * * *

General Counsel ..... ROBERT M. BOOTH, JR., W3PS
1302 18th Street, N.W., Washington, DC 20036
Associate Counsel ..... ARTHUR K. MEEN, Q.C., VE3RX
7th Floor, Frost Building, Queen's Park, Toronto, ON

DIRECTORS

Canada

NOEL B. EATON* VE3CJ
Box 660, Waterdown, Ontario L0R 2H0
Vice-Director: A. George Spencer VE2MS
171 Kipling Ave., Beaconsfield, Quebec

Atlantic Division

HARRY A. McCONAGHY W8SW
8708 Fenway Dr., Bethesda, MD 20034
Vice-Director: Jesse Bieberman W3KT
RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355

Central Division

PHILIP E. HALLER W9HPG
6000 S. Tripp Ave., Chicago, IL 60629
Vice-Director: Edmond A. Metzger W9PRN
1520 South Fourth St., Springfield, IL 62703

Dakota Division

LARRY J. SHIMA ..... WØPAN
11417 Goodrich Rd. S., Bloomington, MN 55437
Vice-Director: Edward C. Gray ..... WAØCPX
Rt. 3, Salem, SD 57058

Delta Division

MAX ARNOLD W4WHN
612 Hogan Rd., Nashville, TN 37220
Vice-Director: Franklin Cassen W4WBK
925 N. Trezevant St., Memphis, TN 38108

Great Lakes Division

ALBAN A. MICHEL W8WC
359 Bonham Rd., Cincinnati, OH 45215
Vice-Director: Richard A. Egbert W8ETII
6479 Red Fox Rd., Reynoldsburg, OH 43068

Hudson Division

STAN ZAK K2SJO
13 Jennifer Lane, Port Chester, NY 10573
Vice-Director: George A. Diehl W2IHA
20 Wilson Ave., Chatham, NJ 07928

Midwest Division

RALPH V. ANDERSON ..... KØNL
528 Montana Ave., Holton, KS 66436
Vice-Director: Paul Grauer ..... WØFIR
Box 190, Wilson, KS 67490

New England Division

ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, CT 06340
Vice-Director: John G. Sullivan W1HHR
Whitney Road, Columbia, CT 06237

Northwestern Division

ROBERT B. THURSTON* W7PGY
7700 31st Ave., N.E., Seattle, WA 98115
Vice-Director: Dale T. Justice ..... KTWWR
1369 NE Sunrise Lane, Hillsboro, OR 97123

Pacific Division

J.A. "DOC" GMELIN W6ZRJ
10835 Willowbrook Way, Cupertino, CA 95014
Vice-Director: Albert F. Gaetano W6VZT
115 Old Adobe Road, Los Gatos, CA 95030

Roanoke Division

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

Rocky Mountain Division

CHARLES M. COTTERELL ..... WØSIN
430 S. Swadley St., Lakewood, CO 80228
Vice-Director: Allen G. Auten ..... WØECN
6722 West 67th Ave., Arvada, CO 80003

Southeastern Division

LARRY E. PRICE W4DQD
P. O. Box 2067, Georgia Southern Branch
Statesboro, GA 30458
Vice Director: C. James Roux K4THA
P.O. Box 1710, Largo, FL 33540

Southwestern Division

JOHN R. GRIGGS* W6KW
1273 13th St., Baywood Park, San Luis Obispo
CA 93401
Vice-Director: Arnold Dahlman W6URI
3022 Las Positas Rd., Santa Barbara, CA 93105

West Gulf Division

ROY L. ALBRIGHT W5EYB
107 Rosemary, San Antonio, TX 78209
Vice-Director: Jack D. Gant W5GM
521 Monroe, N.W., Ardmore, OK 73401

* Member Executive Committee

"It Seems to Us..."

FOUNDATION

FROM TIME to time, ARRL has been the recipient of substantial contributions from individual amateurs – to further the work of the League in particular, and to promote amateur radio in general. When so specified by the donor, they have been kept as dedicated funds within the League treasury – e.g., one for promotion of amateur radio overseas.

Most often they come from older amateurs who have achieved financial success, who give amateur radio considerable credit in starting them on a desirable and rewarding path in life, and who wish to express their gratitude. The funds have in some instances been outright donations of cash or stock (e.g., W6UF); in some cases, future income with ARRL as beneficiary of a life insurance policy (W6KG); in some cases, legatee in a will (W8FX).

The ARRL Board of Directors, after exploration over a period of several years, has decided to set up a separate entity specifically to solicit, receive and disburse such gifts. By unanimous vote, it directed the formation of an ARRL Foundation. It will be governed by a board of its own, with a majority of ARRL directors, but with remaining membership open to others not eligible for League directorships – e.g., industry figures.

There are many areas in which the foundation could usefully provide funds for expanded or new activities – examples are: preparation for the World Administrative Radio Conference; scholarships; foreign student exchange; expansion of Hq. facilities; research. However, the ARRL Board expressed the strong view that the Number One objective at the start should be funds to encourage and assure continuation of amateur space communications functions. Indeed, the Board backed up its expression with an authorization to advance up to $38,000 to speed up completion of projects currently under way, to provide continuity in the Oscar series.

Formation of such a corporation is now in process. Assuming normal time lapse for the project, the foundation should be "in business" early next year.

220 DEFENSE

THIS PAGE last month encouraged amateurs to stand up and be counted by registering individually with the Federal Communications Commission their opposition to the proposal to turn a Megahertz of 220 over to a new form of CB activity. The ARRL Board of Directors has now made a unanimous and resounding decision not only to file strong opposition in behalf of the League, but to urge each member to join in a mass protest against this invasion of valuable amateur operating territory.

The supporting arguments were not so much anti-CB, though not much credence was placed in the FCC's apparent belief that a "new" CB service is going to be less plagued with the violations and enforcement problems long evident at 27 MHz. The basic concern is that 2 meters is full to overflowing, that in some areas of the country (mostly east and west coasts) there isn't a repeater frequency to be had, and that *all* of 220 is our only salvation to take care of this rapidly-growing phase of amateur activity. Without the full 5 megs, amateur radio will be seriously hurt.

Considerable encouragement was evident in numerous letters already addressed to FCC – and some Congressmen – by individual hams acting on their own (before the appearance of the August issue). This underscores that the Board's position does indeed reflect the basic views of amateurs. Some of the directors are sending bulletins to League members urging more individual participation in the protest. It is fully recognized that an extensive campaign will cause an exceptional workload for the Commission. This will be particularly true in letters to Congressmen, who usually check with FCC before acknowledging to constituents, and the Commission staff has to prepare answers. Yet, since an earlier League filing against the Electronics Industries Association proposal apparently had little effect, it seems the best way the amateur body can get its message across. The Commission's notice invited comment from interested parties. You are an interested party. *Let them hear from you!*

League Lines . . .

Acting promptly on the Board's completion of paperwork for a new ARRL Emergency Communications Advisory Committee, President Dannals has named WA4PBG (acting chairman), W2URP, W3PST, W4IYT, K5SVD, W6INI, W7IEU, W8ERD, W9QBH, WØPB and VE3DV to membership. More details in "Happenings" next month.

ARRL officials made an extensive presentation on amateur radio to five of the seven Commissioners at FCC offices in early July. See page 50 for details.

W6NJU was complimented with a job promotion, but it meant transfer out of the Southwestern Division and thus resignation as Vice Director. Arnold Dahlman, W6UEI, who previously held the post two terms, has been named to fill the vacancy.

ARRL TECHNICAL SYMPOSIUM

The first-ever ARRL Technical Symposium, this one to treat the subject of amateur radio space communications, will be held at the Sheraton Hotel, Reston, Virginia, near Dulles Airport at Washington, D.C., on Friday, September 14.

Subjects will include "inverted Doppler;" a basic ground station for Oscar contacts; 432-MHz moonbounce; features of the next amateur satellite (Oscar 7), with orbital considerations, automatic ground commands; and so on. Here is a wealth of information on the newest phase of ham radio, in an afternoon and evening program under the co-chairmanships of Raymond Spence, W4QAW (Chief Engineer of the Federal Communications Commission) and George Jacobs, W3ASK (Frequency Manager of the Voice of America and CQ Magazine propagation columnist).

September 14 is the day prior to the Roanoke Division Convention at the same location, and convention registration covers symposium participation; otherwise the fee is $1. Attendees will receive copies of major papers to be presented. CU there!

S P A C E C O M M U N I C A T I O N S

Every once in a while, a member will suggest that for a price we should permit him to get QST by first-class mail. We do already -- and the price is $12 extra, in the U.S. and Canada.

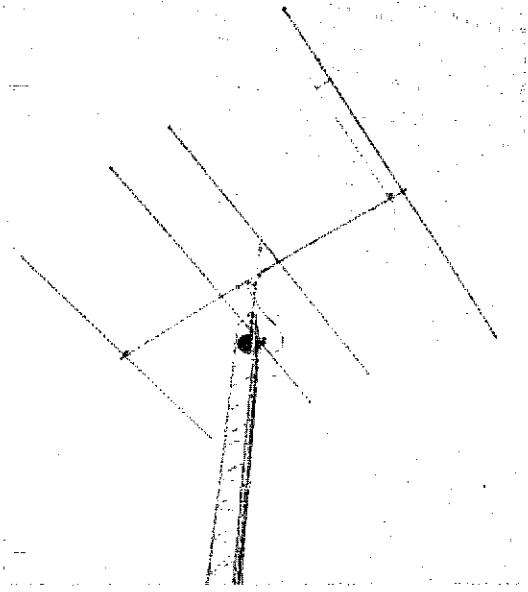
Computer headaches: If someone were to ask us, "Is John Smith a member of ARRL?" the answer would depend on which JS is meant. We have 21 of 'em (and there are probably that many more who are also hams but not League members). There are 992 Smiths on our roster, not to mention Millers and Johnsons and such. Thank goodness for call signs, to help us know who is who.

Each month, one of several volunteers on the Hq. staff reads the major editorial content of QST onto tape for the Library of Congress, which then makes multiple copies for loan to the blind. If you have a sightless buddy not aware of this service, please tip him off. Address queries to Division of the Blind, Library of Congress, Washington, D.C. 20542.

There are now more than 2,600 elected Life Members of the League, with about the same number more in the instalment payment process. We'll likely hit 5,000 by mid-1974. Will you be one?

Quote-of-the-Month: Which is more important? The possibility of a repeater malfunction and a carrier on the air for an hour or two, or the crippling of a valuable service at night or on weekends because someone isn't available to monitor the system? — (MORI Newsletter).

A Bite Size Beam



GAIN AND DIRECTIVITY FOR 20 AND 15 METERS

BY ROBERT M. MYERS,* W1FBY AND CLARKE GREENE,** WA1JLD

THERE IS NO DOUBT that a hundred-foot tower with stacked monobanders for 20 and 15 meters is one way to generate an effective signal in the pileups. But what are the characteristics of this big system which make it perform better than a dipole strung between two trees? First, the tall tower places the antenna up in the clear, away from most of the surrounding ground clutter. Even a relatively short tower (40-foot variety) provides this advantage in many instances. The ability to point the major radiation lobe of the antenna in the correct direction is another reason the high monobanders outperform the kinky wire. But if the antenna is capable of supporting its own elements, the directional characteristics can be used to good advantage whether the beam is mounted at 100 feet, or at 40 feet. And without any question, the ability to reject interference aids substantially in the reception of weak signals.

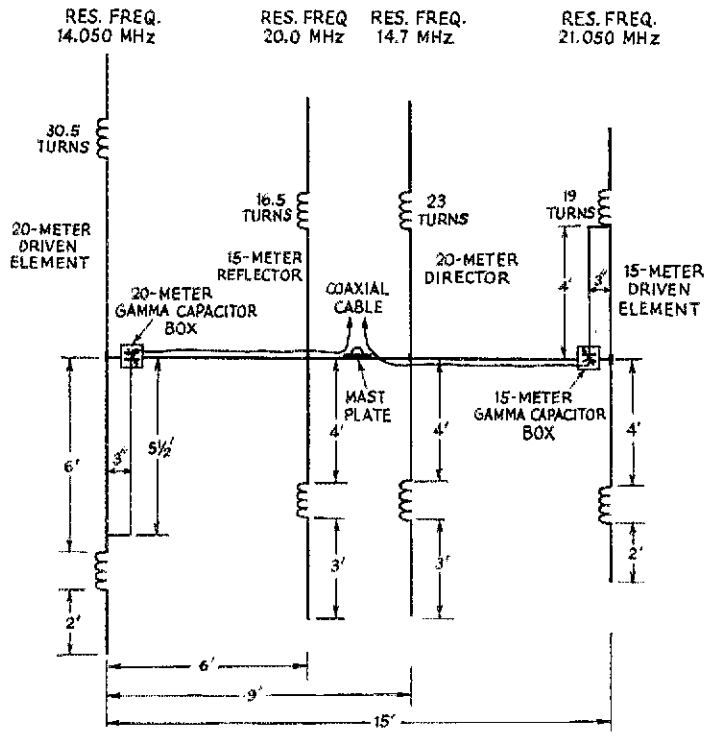
A typical one-foot-per-side triangle tower is self supporting (when properly installed) to 40 feet in height and requires less than one square foot of property. For many amateurs, the major limiting factor is the inability to turn a monoband beam (or even a large tribander) without hitting some object like a tall tree. Hesitation on behalf of the amateur to place what might be considered by his neighbors an offensive amount of hardware in the sky near his home is another reason beams are ruled out. The two-element-per-band 20- and 15-meter interlaced Yagi presented here, overcomes these problems. It is lightweight and is less than 16-feet square. And it's probably no more obtrusive than a large TV antenna.

* Assistant Technical Editor, *QST*.
** 187 Stafford Ave., Forestville, CT 06010.

So, What if it's Short!

A popular misconception among amateurs is that any element short of full size is no good in an antenna system. Reducing the size of an antenna by 50 percent does lower the efficiency by a decibel or two, but the gain capability of a parasitic array outweighs this small loss in efficiency. Mounting the antenna above the inter-

Do you dream of working DX from your space-restricted QTH? Do you have problems with the neighborhood gang knocking down your No. 28 "invisible-wire" antenna with a football? Are tribanders too big for your backyard? If the answer to any (or all!) of these questions is yes, perhaps the two-band Yagi system described here is just the ticket needed to increase your DX effectiveness. Of course, the noticeable improvement in receiving conditions is a bonus feature which comes at no extra charge!



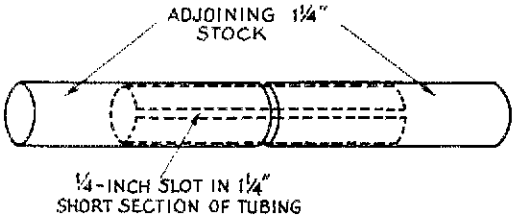
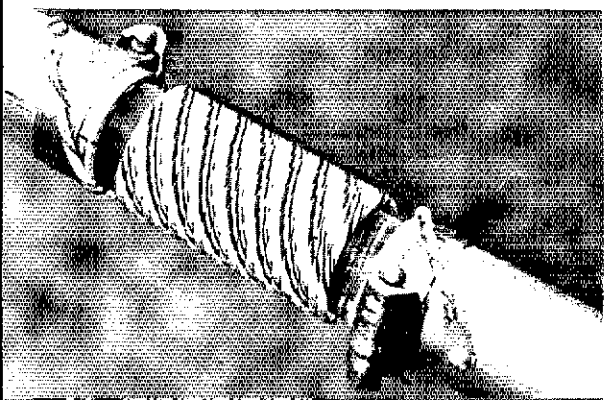


Fig. 1 — Constructional details for the 20- and 15-meter beam. The coils for each side of the element are identical. The gamma capacitors are each 140-pF variable units manufactured by E.F. Johnson Co. The capacitors are insulated from ground within the container. Since the design is one-half size for each band, the tuning is somewhat critical. The builder is encouraged to follow carefully the dimensions given above.

ference-generating neighborhood can greatly reduce susceptibility to man-made noise and certainly aids in the reduction of rf heating to trees, telephone poles, and buildings. It has been said that a brick wall, or dense foliage, can attenuate a signal passed through it by as much as 20 dB. Placing the antenna above these energy-absorbing objects is very desirable.

It is a generally accepted fact that traps are difficult to build and adjust, as well as their being lossy. Loading coils, on the other hand, are easy to wind and require essentially no adjustment. If the wire size is large, losses are not a major factor. W2FMI lauded the merits of short antennas in an earlier article explaining that in reality, short (50 percent) elements do not materially depreciate the gain.[1] With these ideas in mind, the authors designed and built a shortened-element, but wide spaced, director array for 20 meters interlaced with a similar 15-meter reflector configuration also having optimum spacing for maximum gain. By placing the 15-meter driven element in front of the 20-meter array, the longer 20-meter elements tend to act as reflectors on 15 meters. There are no unwanted reflectors "in front" nor any directors

[1] Sevick, "The W2FMI Ground-Mounted Short Vertical," *QST*, March, 1973.



The coils are wound on Plexiglas rod. Compression clamps are used to hold the Plexiglas in position. Sheet-metal screws and solder lugs provide attachment points for the ends of the loading coils.

View of the short beam from the front yard at W1CER.

"behind" the active array – elements which could cause pattern distortion and poor front-to-back ratio.

Construction

The dual-band beam has four elements, the longest of which is 16 feet. All of the elements and the boom are made from 1-1/4-inch diameter aluminum tubing available at most hardware stores. Element sections and boom pieces are joined together by slotting a 10-inch length of 1-1/4-inch tubing with a nibbling tool and compressing it for a snug fit inside the element and boom tubing. Coupling details are shown in Fig. 2.

The loading coils are wound on 1-1/8-inch diameter Plexiglas rod. The rod slips into the element tubing and is held in place with compression clamps. Be sure to slit the end of the aluminum where the compression clamps are placed. The model shown in the photographs has coils made of surplus Teflon-insulated miniature audio coaxial cable with the shield braid and inner conductor shorted together. A suitable substitute would be No. 14 enameled copper wire wound to the same dimensions as those given in Fig. 1.

All of the elements are secured to the boom with common TV U-bolt hardware. Plated bolts are desirable to prevent rust from forming. A 1/4-inch thick boom-to-mast plate is constructed from a few pieces of sheet aluminum cut into 10-inch square sheets and held together with No. 8 hardware. Several cookie tins could be used if sheet aluminum is not available. One local amateur used a plate from a large electrical box as a boom-to-mast bracket. Since it is galvanized, it is quite resistant to the harsh New England winters.

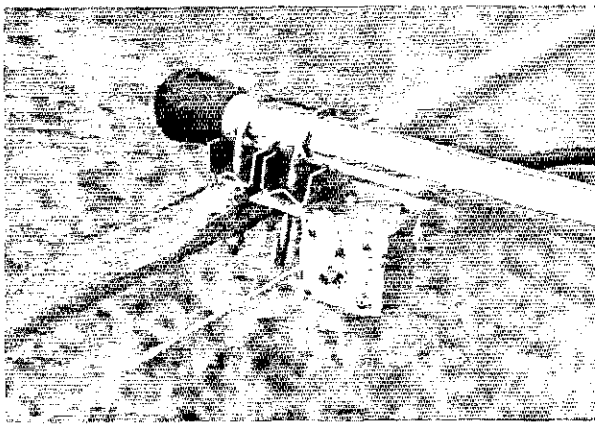
A boom strut (sometimes called a truss) is recommended because the weight of the elements is sufficient to cause the boom to sag a bit. A 1/8-inch diameter nylon line is plenty strong. A U-bolt clamp is placed on the mast several feet above the antenna and provides the attachment point for the center of the truss line. To reduce the possibility of water accumulating in the element tubing and subsequently freezing (rupture may be the end result), crutch caps are placed over the element ends. Rubber feet suitable for keeping furniture from scratching hardwood floors would serve the same purpose. In fact, the rubber tips prevent the element ends from damaging surrounding objects during installation.

A heavy-duty steel mast should be used, such as a one-inch-diameter galvanized water pipe. Steel TV mast is also acceptable. Any conventional TV type antenna rotator should hold up under load conditions presented by this antenna. Nevertheless, certain precautions should be taken to assure continued trouble-free service. For instance, whenever possible, mount the rotator inside the tower and extend the mast through the tower top sleeve. This procedure relieves the rotator from having to handle lateral pressures during windy weather conditions. A thrust bearing is desirable to reduce downward forces on the rotator bearings.

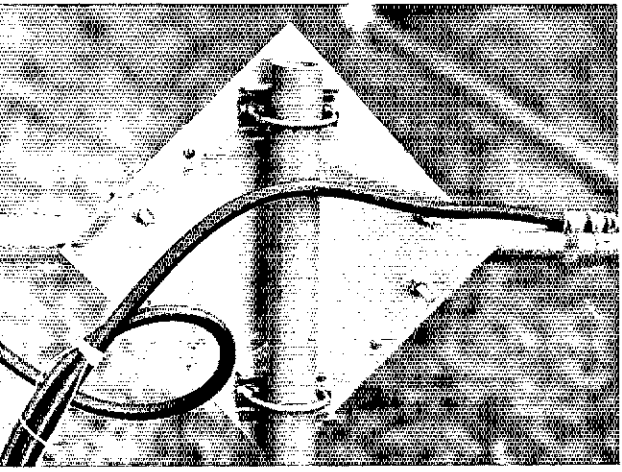
Hookup and Operation

The monoband nature of the beam requires the use of two coaxial feed lines. The coaxial cable is attached to the 15-meter element (at the front of the beam) at the gamma-capacitor box. The other end of the cable is connected to a surplus 28-V dc single-pole coaxial switch.[2] The cable for the 20-meter element is connected in a similar fashion. The switch allows the use of a single feed line from the shack to a point just below the antenna where

[2] Purchased from Fair Radio Sales, Lima, OH.



The gamma assembly is held in place by means of a small U bolt. The capacitors are mounted on etched circuit board.



The boom-to-mast plate.

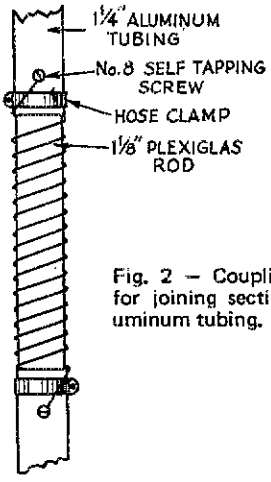


Fig. 2 — Coupling details for joining sections of aluminum tubing.

the switch is mounted. It is a simple matter to provide voltage to the switch for operation on one of the two bands. At the price of coaxial cable today, a double run of feed line represents a substantial investment and should be avoided if possible.

An etched-circuit board was mounted inside an aluminum Minibox to provide support and insulation for each of the gamma tuning capacitors. Plastic refrigerator boxes available from most department stores would serve just as well. The capacitor housing is mounted to the boom by means of U bolts.

The builder is encouraged to follow the dimensions given in Fig. 1 as a starting point for the position of the gamma rods and shorting bar. Placing the antenna near the top of the tower and then tilting it to allow the capacitors to be reached makes it possible to adjust the capacitors for minimum SWR as indicated by an SWR meter (or power meter) connected in the feed line at the relay. If the SWR cannot be reduced below some nominal figure of approximately 1.4:1, a slight repositioning of the gamma short might be required. The dimensions given are for operation at 14.050 MHz and 21.050 MHz. The SWR climbs above 2:1 about 50 kHz in either direction from the center frequency. Although tests were not conducted at more than 150 watts input to the transmitter there is no reason why the system would not operate correctly with a kilowatt of power supplied to it.

TABLE I

Complete parts list for the short beam.

QTY	*MATERIAL*
9	Eight-foot lengths of aluminum tubing, 1-1/4" dia
11	U bolts
2	Variable capacitors, 140 pF (E.F. Johnson)
4'	Plexiglas cast rod, 1-1/8" dia
16	Stainless steel hose clamps, 1-1/2" dia
1	Aluminum plate, eight-inches square
10'	Aluminum solid rod, 1/4"dia
2	Refrigerator boxes, 4 × 4 × 4 inches
25'	Nylon rope, 1/8" dia
16	No. 8 sheet metal screws
16	No. 8 solder lugs
8	Plastic (or rubber) end caps, 1-1/4" dia

After many months of testing at the QTH of W1CER, several characteristics were noted. First, the antenna withstood several wind and ice storms common to Connecticut. Performance turned out to be what can be expected from a two-element Yagi. Since the 20-meter portion of the antenna is a director array, the front-to-back ratio is a bit less than 10 dB. On 15 meters where the system operates with a reflector parasitic element, the front-to-back ratio is considerably better — on the order of 15 dB.

This antenna was mounted atop a 40-foot tower where previously there was connected a 20-meter sloping dipole pointed at Europe (a multielement array for two meters graced the top of the tower!). The number of European stations contacted increased rather dramatically with the installation of the beam. Except in pileups on rare DX stations, DX is now worked as a routine, even though W1CER is a QRP fan and typically runs less than two watts of output power.

No doubt the increased effectiveness of the signal was caused by several factors. The antenna certainly has gain (although at ARRL Hq. we have no way of making accurate measurements) and is well above the nearby small trees. More importantly, the antenna is now far from the aluminum house siding which once was directly in the pattern of the 20-meter "sloper." Of course, the front-to-back characteristic has the tendency of making DX signals louder in relation to stateside stations and therefore makes receiving much easier.

If previously you've felt that a beam and tower were not possible at your QTH, perhaps re-evaluation of the situation is in order. This antenna, as shown in the photograph, does not appear offensive when viewed from the front yard. Yet the overall amount of property occupied (at ground level) is less than one square foot. And the turning radius is slightly over eleven feet! QST

A High-Performance Balanced Mixer for 1296 MHz

Simple, Cheap, and Easy-to-Build Mixer for UHF Reception

BY PAUL WADE,* WA2ZZF

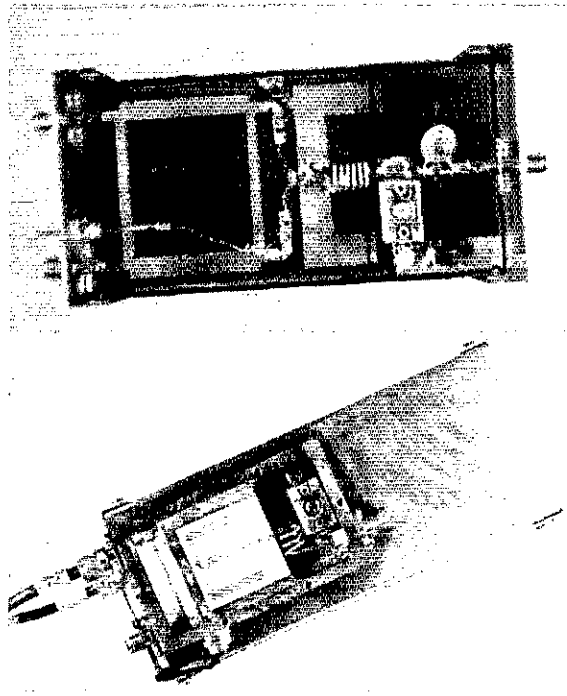


Fig. 1 — The balanced mixer for 1296 MHz was built in two forms. The version at the top is described in detail herewith. The lower one was built first, using ceramic techniques not readily adapted to construction by methods available to most amateurs.

HERE IS A MIXER for uhf use that is easy and inexpensive to build, and involves no tuning tradeoffs. It is the culmination of several attempts to make a good 1296-MHz mixer. The much-used trough-line mixer described in *QST* and several editions of the *Handbook* and *VHF Manual* provided an improved 1296-MHz converter at a time when it was greatly needed. However, the alignment compromises required involve simultaneous optimization of the diode multiplier, the input coupling, and a tapped output coil.[1] These tradeoffs frequently resulted in noise figures higher than they could have been. By employing the isolation of a simple-to-build hybrid coupler, the constructor can rest assured that none of the valuable rf signal will be lost in the LO circuitry.

Design

The basic balanced mixer, though well known in the microwave field, is little used in amateur work, perhaps because of the additional expense of using two diodes. The diodes I used cost only $3.50 for a matched pair, and even cheaper hot-carrier diodes are available. The heart of the design is the 3-dB quadrature-hybrid coupler, which distributes the signal and local-oscillator energy to the two diodes equally while isolating the antenna from the local oscillator. This is the result of isolation inherent in the coupler, described in a recent article.[2] One's initial reaction is that the mixer cannot be balanced with the diodes only 90° out of phase, but a simple vector analysis shows that if both rf and LO are shifted 90°, in opposite directions, it is equivalent to having the diodes 180° out of phase. (This mistake was made in another recent article[3].)

The coupler, and hence the mixer, is inherently a broadband device. This is a liability for amateur work, since it will increase the likelihood of spurious responses. To constrict the bandwidth, quarter-wave stubs are used instead of the usual bypass capacitors. They provide RF grounding for the mixing diodes only at the signal and local-oscillator frequencies. The i-f output at 144 MHz is impedance matched, rather than tuned, with a low *Q* pi-section, relying on the subsequent receiver for further selectivity. Local oscillator required is a clean 1 to 2 mW at 1152 MHz; I use a crystal oscillator followed by four transistor doublers, all operating at low levels (5 to 10 mW) to maintain a clean signal.

Construction

The mixer has been kept as simple as possible. It is a printed circuit mounted on a shelf in a 4 × 2-1/8 × 1-5/8-inch Minibox, as shown at the top of Fig. 1. The only tools needed are a drill and a vise. I derived this approach after several people com-

* 153 Woods Road, Somerville, NJ 08876

[1] Meyer, "A Crystal-Controlled 1296-Mc Converter," *QST*, September, 1962. A simplified version with improved coupling and a solid-state multiplier chain will appear soon in *QST*.

[2] Keen, "Microwave Hybrids and Couplers for Amateur Use," *Ham Radio*, July, 1970.

[3] Bittman, "Easy to Make 1296-MHz Mixer," *73*, July, 1972.

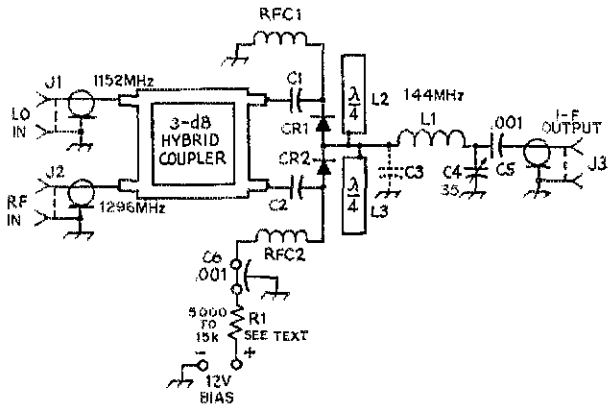


Fig. 2 — Schematic diagram of the balanced mixer for 1296 MHz.

C1, C2 — Chip or leadless capacitor, 50 to 1000 pF; value not critical. See text.
C3 — Stray capacitance of quarter-wave stubs.
C4 — 35-pF mica trimmer (Arco 403).
C5 — .001-μF disk ceramic.
C6 — .001-μF feedthrough.
CR1, CR2 — Hot carrier diode (H-P 5082-2717 or 2818 matched pair).
J1, J2, J3 — SMA receptacle (OSM 215 or E. F. Johnson 142-0297-001).
L1 — 6 turns No. 18, 3/16-inch dia, 3/8 inch long.
L2, L3 — Stubs for LO and signal frequencies; see Fig. 3.
R1 — 5 to 15k. Adjust for bias current of 1 mA.
RFC1, RFC2 — 3 turns No. 30, 3/16 inch long, 1/8-inch dia.

plained that my original version, built with ceramic substrates in a machined box (bottom, Fig. 1), could not be duplicated by amateurs. Performance of the two versions is identical. The schematic diagram is Fig. 2, and the printed circuit layout is shown in Fig. 3. Board material is 1/16-inch G-10 epoxy-fiberglass (green) with doubled-sided copper[4], and dimensions are fairly critical. Shelf dimensions are shown in Fig. 4. The board is soldered or bolted to the shelf. Blocking capacitors C1 and C2 are chip capacitors or other small capacitors without leads, such as disks with the outside chipped away to expose the plates for soldering directly. Grounds are made by wrapping brass or copper shim around the edge of the board to connect ground pads on top to the bottom metal. Connectors used were SMA (OSM) series, but any type that you can fit is worth a try.

[4] Available from Kimberly Research, 1013 Merrick Road, Baldwin, L.I., NY 11510. Item No. 207, $1.25 for 3 × 6 inch.

Adjustment and Performance

Adjustment is the height of simplicity. The mixer is connected to a two-meter converter, local oscillator energy is applied, and about 1 mA of bias current is applied to the diodes. With a moderately strong signal at the rf port, adjust the bias current and i-f trimmer capacitor for maximum signal. That's all! Using laboratory equipment if available, you would find that all three ports are now matched to 50 ohms at the proper frequencies.

The mixer was swept, to look for birdies. The only noticeable response was at the image frequency (1008 MHz) as expected and somewhat

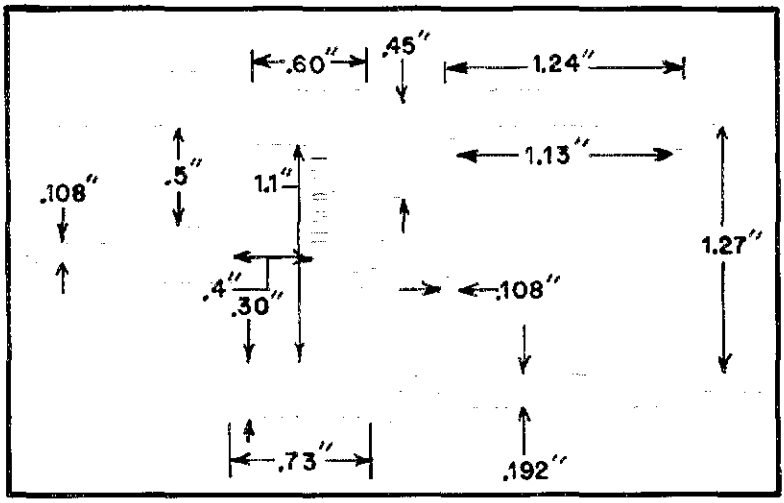


Fig. 3 — Details of the balanced-mixer circuit board. Metal areas are black.

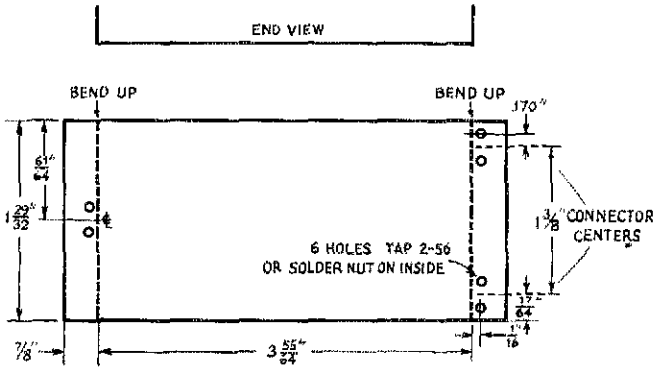


Fig. 4 — Shelf details for use with standard 4 × 2-1/8 × 1-5/8-inch Minibox. Connector center hole lines are for SMA type.

lower amplitude than the 1296-MHz response. Conversion loss for both versions was measured at 7 dB, which corresponds to a noise figure of 8 to 9 dB if a low noise i-f is used (noise figure = conversion loss + i-f noise figure). Noise figure was not actually measured, since noise at the image frequency can distort measurements by up to 3 dB.

The low conversion loss and lack of birdies in this mixer, together with a high theoretical dynamic range, should make for excellent 1296-MHz reception when it is used with a good preamp, or even barefoot. WB2IRX and I recently used a similar mixer, with no rf amplifier, at 2304 MHz, for a contact with W3CCX, approximately 40 miles away.

A word of thanks is in order to K2TKN, K2RIW, K2PPT, Mr. Bill Machrone, and to MSC for the use of their test equipment and facilities.

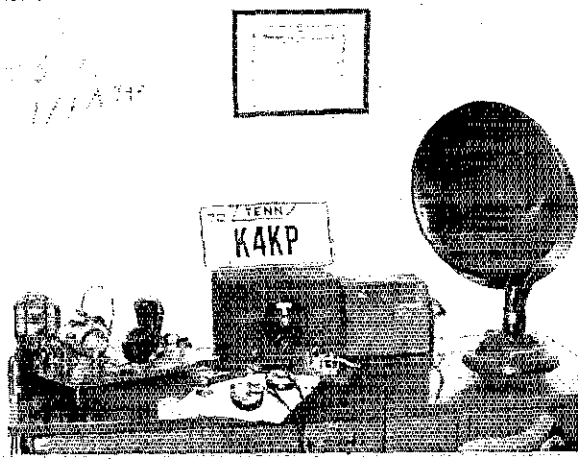
Strays

More 10-Meter Beacons

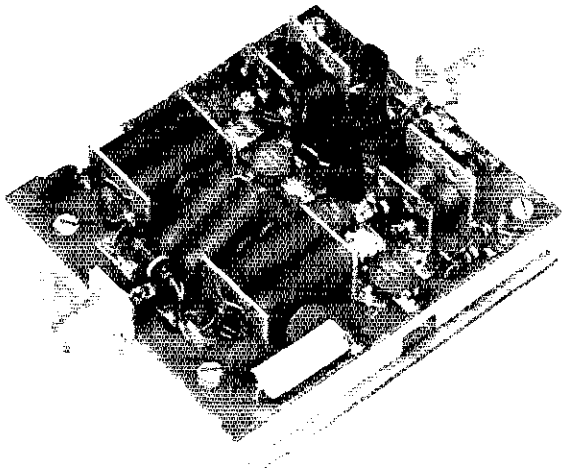
A table of known beacon stations, operating around the clock, on frequencies just below 29.2 MHz, was given in *QST* for June, 1973, page 77. Since the information was compiled we have learned of two more such stations:

Station	*Frequency*	*Location*	*Report to*
VP9BA	28.165	Ft. St. Catherine St. George, Bermuda	PO Box 73, Devonshire
ZC4CY	28.18	Limassol, Cyprus	Box 216, Famagusta, Cyprus

The stations listed in June *QST*, with the exception of GB3SX, were received very frequently during the winter of 1972 and early spring of 1973 in the Northeast, often when amateur signals from similar areas were conspicuous by their absence. ZC4CY was heard by the undersigned on many occasions, through the middle of April, many weeks after the last European amateur communications signal was heard from Europe. VP9BA and VE3TEN have proved very useful to 50-MHz operators in this country as clues to possible sporadic-*E* propagation in the vhf bands. — *W1HDQ*



Guess you could call K4KP's old rig "semi-retired." First used back in 1935 under his former call of W4DIJ, Hack now puts it on the air just once a year, on Straight Key Night each New Year's Eve. The transmitter was made from a circuit that appeared in December 1929 *QST* and the receiver is a National SW-3 of 1931 vintage.



Top view of the 100-watt linear amplifier. No bias circuit is used with this model. The layout is straightforward; the location of all components can be seen clearly.

An HF-Band Solid-State Amplifier

Part 1

BY JACK MANON,* W6FIG

THE ONCE ubiquitous vacuum tube is being challenged for its last stronghold in medium-power hf-band transmitters. Economical transistors and integrated circuits have replaced tubes in virtually every function except the final power amplifier. Through advances in solid-state technology, 12-volt transistors are now competing with tubes in amplifiers delivering more than 100 watts output power.

Two amplifier designs are presented here along with complete construction information and performance data. These designs include the latest techniques for building broadband transformers.

* Applications Engineer, TRW Semiconductors, 14520 Aviation Blvd., Lawndale, CA 90260.

The linear amplifiers presented here have several design parameters in common:

1) Operate from power sources of 12.5 to 15.0 volts dc.

2) Provide better than −30 dB IMD at all power levels up to the maximum ratings.

3) Operate from 1.5 to 30 MHz without any tuning.

4) Provide a cw power capability equal to the ssb PEP rating.

5) Withstand open or shorted circuit at rated power output.

6) Are designed to operate at temperatures from −20° to +70° C.

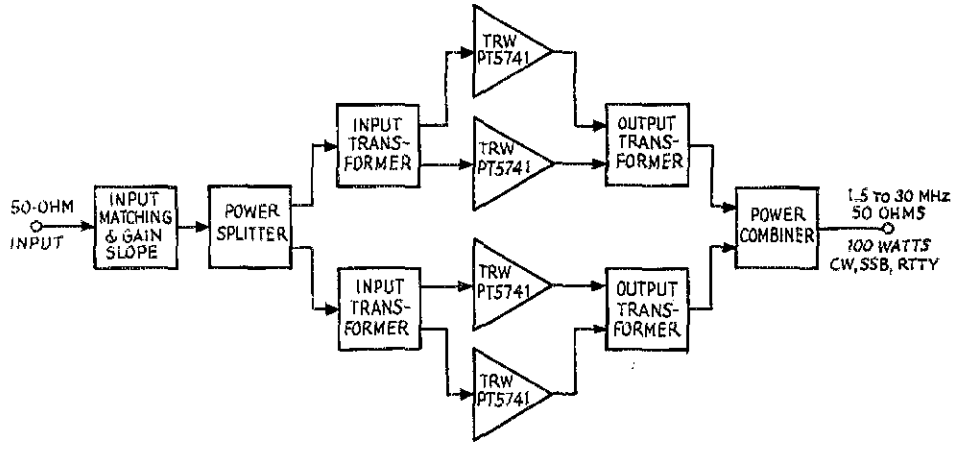


Fig. 1 — Block diagram for the 100-watt output amplifier.

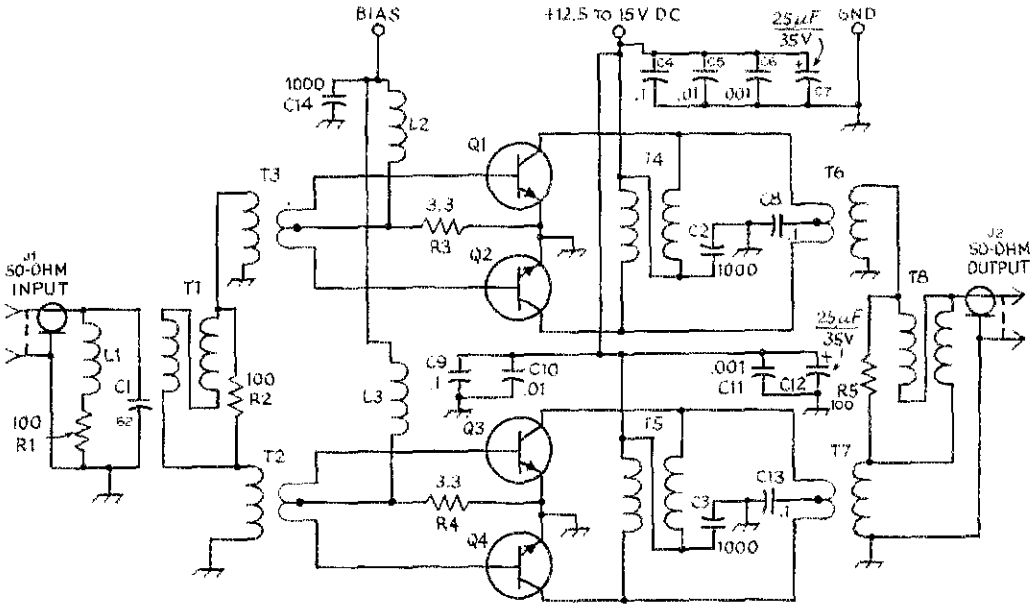


Fig. 2 — Circuit diagram for the 100-watt amplifier. Component designations not listed below are for text reference.
C2, C4, C14 — 100 pF (Unelco or equiv. See Table I).
T1-T8, incl. — See TRW Application Note CT-113-71, TRW Semiconductors, 14520 Aviation Blvd., Lawndale, CA 90260.
Q1-Q4, incl. — PT5741 (TRW Semiconductors).

7) Have 50-ohm input and output impedance.
8) Use readily available components.

Four Transistors in a 100-Watt Output Linear Amplifier

An output power of 100 watts appears to be a widely accepted level for both fixed and mobile equipments. The amplifier current requirement is reasonable for an automobile electrical system and 100 watts will drive most high-power linear amplifiers beyond the legal power limit. This amplifier has greater than 13 dB gain (five-watts maximum input for 100 watts output), thereby minimizing the driver power requirements.

Theory of Operation

Components C1, L1, and R1 accomplish both gain sloping and input matching. Without these components, the gain would vary more than 10 dB from 1.5 to 30 MHz (see Fig. 3) and the input VSWR would go from 1.5:1 to 3:1. With the matching circuit shown, the gain varies only 5 dB and the input VSWR is less then 1.5:1. T1 is a 0° hybrid transformer that splits the input power between two loads and transforms the impedance from 50 to 100 ohms. Any amplitude or phase unbalance at T1 causes power to be dissipated by

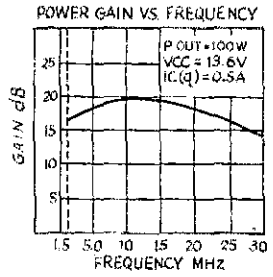


Fig. 3 — Power gain vs. frequency.

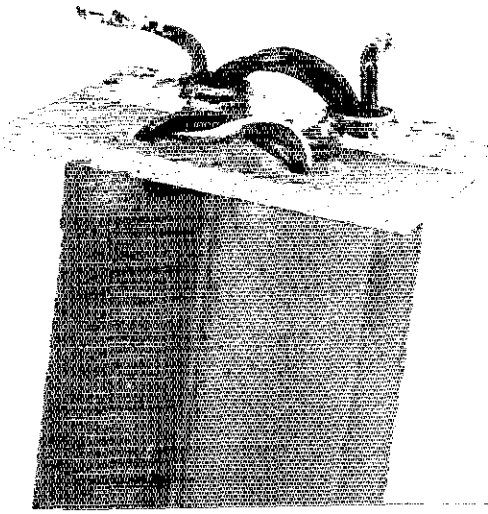


Fig. 4 — T2, T3 assembly. See Fig. 2 for TRW application note number.

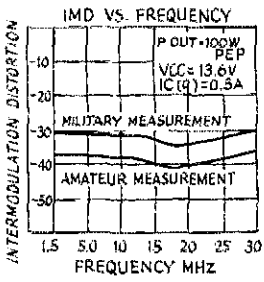


Fig. 5 — IMD vs. frequency.

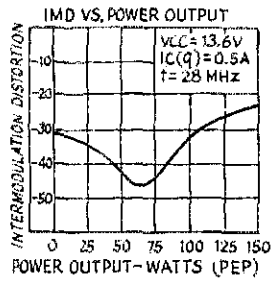


Fig. 6 — IMD vs. power output.

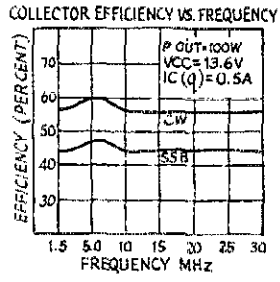


Fig. 7 — Collector efficiency vs. frequency.

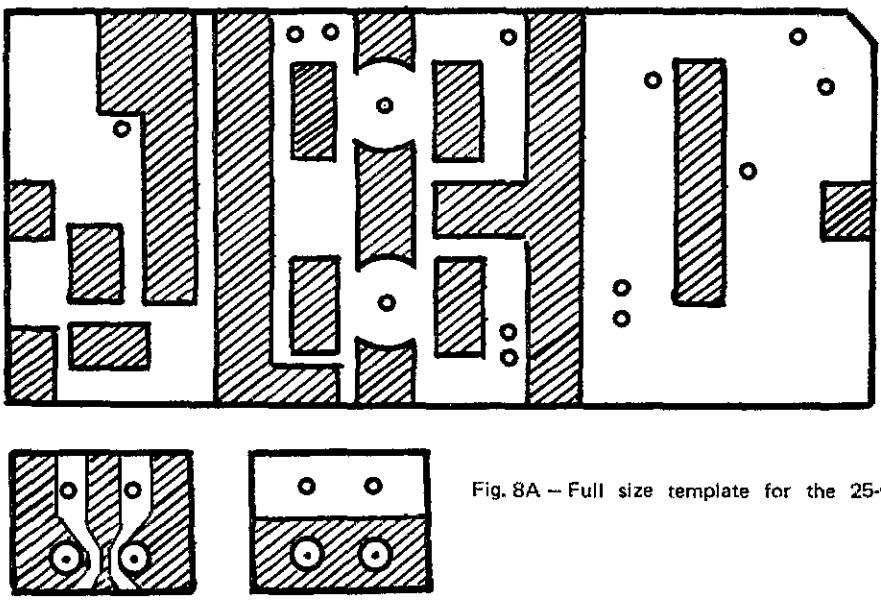


Fig. 8A — Full size template for the 25-watt amplifier.

R2, T2 and T3 each transform the 100-ohm impedance of T1 to four ohms where the power from each transformer is delivered to a pair of TRW PT5741 transistors.

At 100 watts output from the amplifier each pair of PT5741s is delivering 50 watts into transformers T6 and T7 at an impedance of six ohms. T6 and T7 convert the impedance up to 100 ohms and feed hybrid transformer T8. T8 is identical to T1 but is used to sum the output of the two pairs of PT5741s and changes the impedance to 50 ohms. R5 dissipates any phase or amplitude unbalance power. Dc voltage for the collectors is fed through a modified 180° combiner transformer (T4 and T5). They are mounted on the same form as T6 and T7 and make up the output transformer assembly. Dc bias is fed to the bases through the center tap of T2 and T3 via L2 and L3.

Bias Requirements

Class B linear operation of a solid-state amplifier requires the base-emitter junction to be forward biased, allowing a small amount of current to flow during no-signal conditions. The proper amount of current is normally specified by the manufacturer. When drive power is applied to the transistor, the base-emitter junction rectifies some of the drive power and develops an effect of reverse bias. To remain linear, the bias circuit must be capable of delivering enough current to overcome this reverse biasing. The base-emitter voltage changes with temperature at a rate of approximately two millivolts per degree Celsius. A simple technique may be used to hold the bias point relatively constant with variations in temperature. This involves the use of another semiconductor junction to sense the temperature and vary the voltage.

There is no need to reset the bias every time the supply voltage changes when using bias sources similar to those presented here. Current is the determining factor as far as bias is concerned. Because current gain is virtually unaffected by changes in collector-to-emitter voltage, the bias point does not shift with voltage changes.

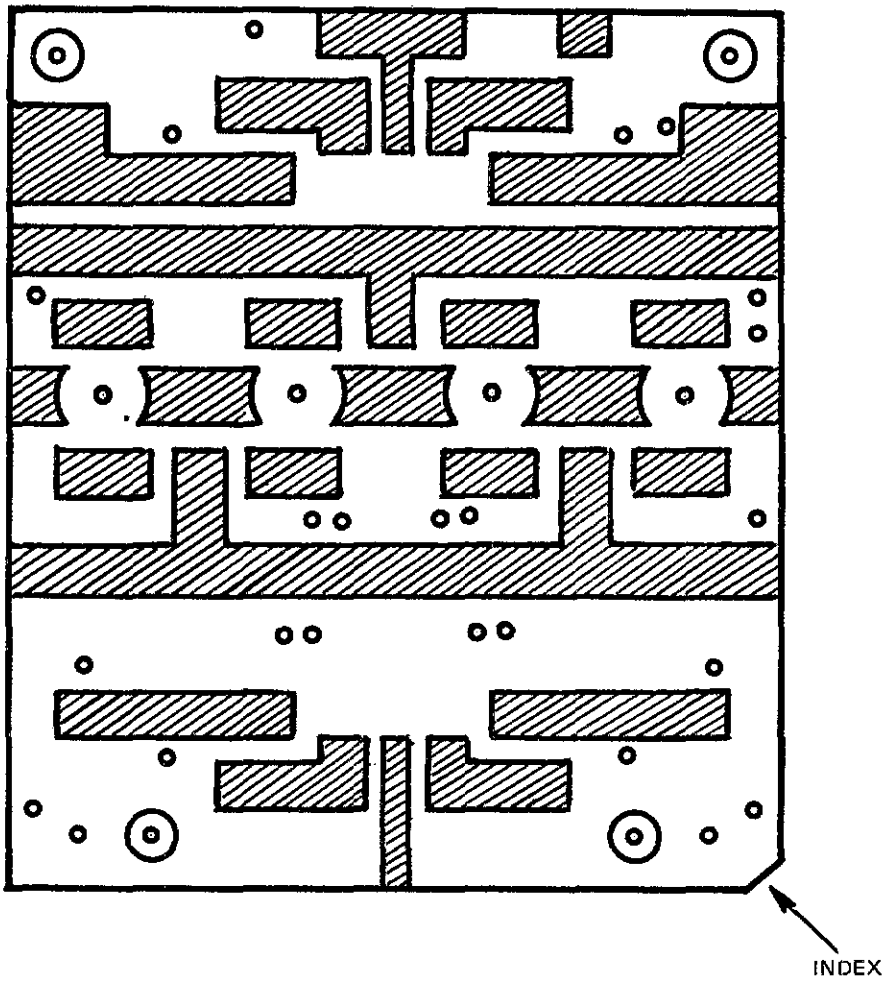


Fig. 8B — Full size template for the 100-watt amplifier.

Fig. 9 — Circuit diagram for the diode bias circuit. The silicon power diode is TRW number DSR 5050. L1 consists of 5 turns, No. 20 wire on a ferrite bead (Amidon 43-2401 or equiv.).

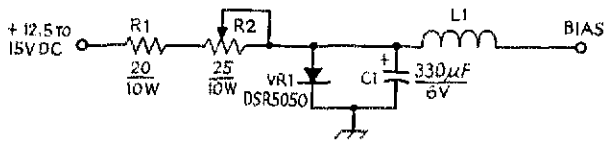
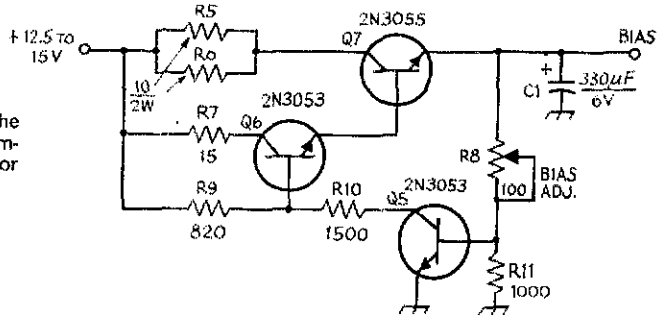


Fig. 10 — Schematic diagram for the 100-watt amplifier bias circuit. Component designations are listed for text reference.



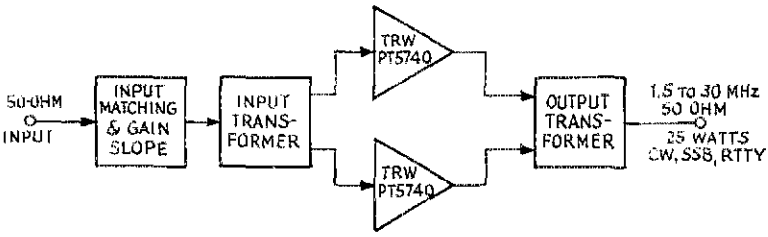


Fig. 11 — Block diagram for the 25-watt output amplifier.

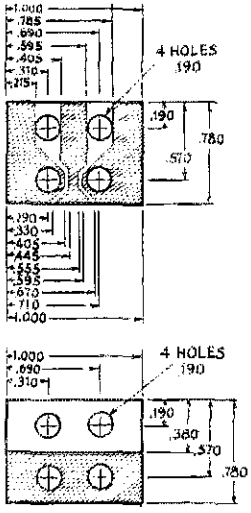


Fig. 12 — Dimensions for the end plates of T2 through T7, incl. The darkened area is copper foil.

Table I — Source For Purchasing Components

1. Unelco capacitors Type J1-HF1000 pF — Underwood Electric Co., 148 South 8th Ave., Maywood, IL 60153.
2. Ferrite Beads — Ceramic Magnetics P/N CN-20-C-1-2, Fair-Rite Products P/N 2643002401, Amidon Associates P/N 43-2401, 12033 Otsego St., North Hollywood, CA 91607.
3. Printed Circuit Boards — completely etched and drilled. Chalice Co., P.O. Box 209, Santee, CA 92071.
4. Transistors — from any TRW distributor or Ham Radio Center, 8342 Olive Blvd., St. Louis, MO 63132.

A Practical Bias Circuit

A diode mounted on the heat sink near the power transistor provides the bias source. Fig. 9 shows a typical circuit. R2 is used to set the idling current. As drive is applied to the amplifier, current is diverted from VR1 and delivered to the amplifier. R1 and R2 must be low enough in value to keep the bias voltage from dropping during peaks of collector current. VR1 must be capable of handling this current under no-signal-input conditions. In practical applications, this simple diode bias source is limited to use with amplifiers up to about 50 watts.

The circuit shown in Fig. 10 was developed for the 100-watt amplifier. It is basically a power supply regulator. Unlike the circuit previously described this circuit passes high current only on rf power peaks. Q5 is mounted on the heat sink near the rf power transistors and is used as a temperature-sensing element and a dc amplifier. Q6 and Q7

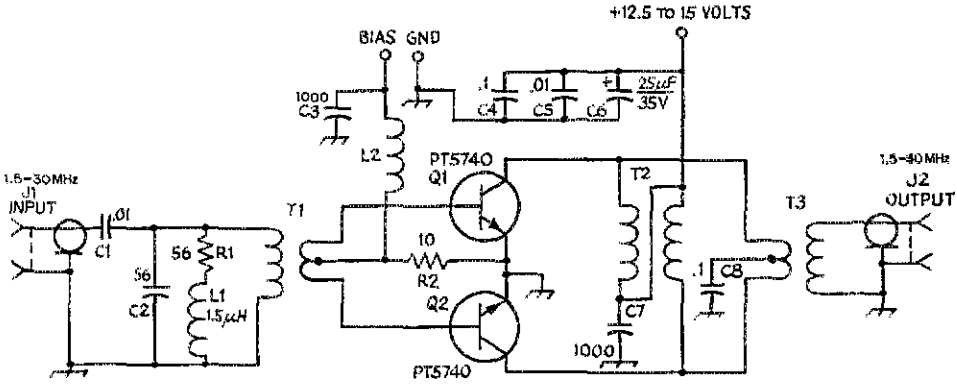


Fig. 13 — Circuit diagram for the 25-watt linear amplifier. Component designations are for text reference. T1, T2, and T3 are described in Fig. 2. C3 and C7 are manufactured by Unelco (see Table I). L1 is 1.5 µH.

Fig. 14 — T1 is described in the application note listed in Fig. 2.

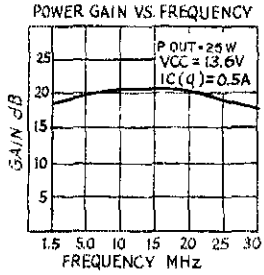


Fig. 15 — Power gain vs. frequency.

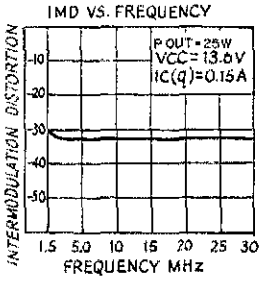


Fig. 16 — IMD vs. frequency.

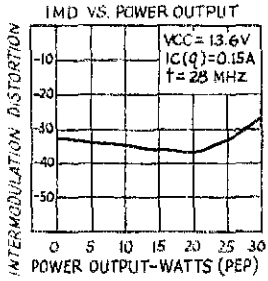


Fig. 17 — IMD vs. power output.

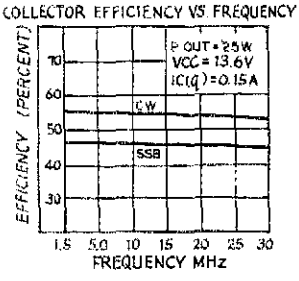


Fig. 18 — Collector efficiency vs. frequency.

are current amplifiers. R5 and R6 provide current limiting and reduce dissipation by Q7. R7 reduces dissipation by Q6. R8 should be set initially at *minimum* value and is used to determine the idling current.

Two PT5740 Transistors in a 25-Watt Output Linear Amplifier

Twenty-five watts output is only one S unit below the previously described 100-watt amplifier but still well above the QRP class. This amplifier will deliver 25 watts output at about the same current as a comparable tube transmitter would use for just filament power! The amplifier is ideal for use as a portable transmitter, an add-on linear amplifier for a low-power transmitter, or any time that low current drain is desirable. Minimum gain is 14 dB (1 watt input for 25 watts output).

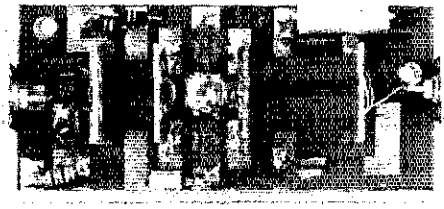
The theory of operation is the same as for the 100-watt amplifier except no hybrid transformers are used and the impedances are different. T1 matches the 50-ohm input to 3 ohms at the transistor bases. C1, C2, L1 and R1 accomplish the gain compensation. T3 matches the 12-ohm collector impedance to 50 ohms at the output. The bias network shown in Fig. 9 works very well with the 25-watt amplifier. Figs. 15, 16, 17, and 18 give typical performance data.

Component Availability

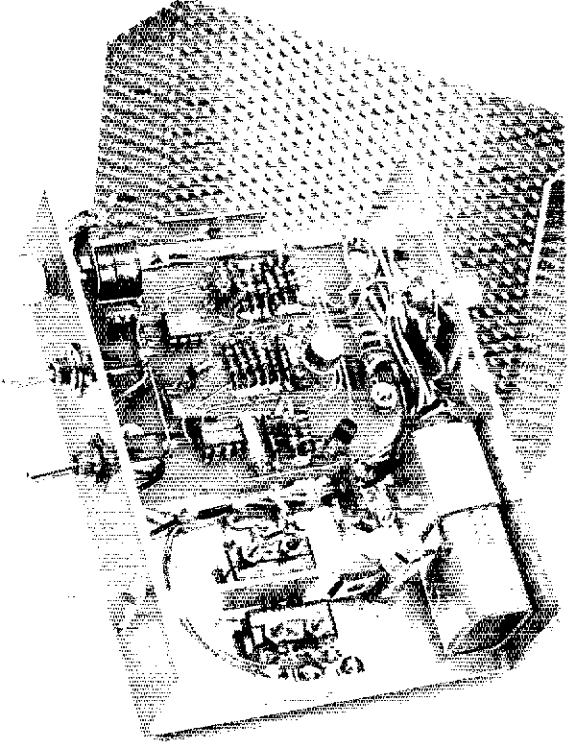
Locating the correct components to complete a project like this can be an awesome task! Listed in Table I are sources for the components described in this article.

Part II of this article will appear in a subsequent issue of *QST*.

(Continued on page 57)



Top view of the 25-watt amplifier. Its relative size can be determined by judging the dimensions for the BNC connectors.



The homemade paddle assembly is at the bottom. Slots, 1/8-inch wide by 1/4-inch long, are formed in the chassis for the mounting bolts used to retain the microswitches. This feature permits adjustment of the switches for centering of the paddle. The 9-volt battery is clamped against the rear wall of the chassis.

• *Beginner and Novice*

Some Ideas for Packaging the W7ZOI Keyer

BY DOUG DE MAW,* W1CER

QRP, portability, and compactness are terms that blend in concert for most low-power devotees. The intensity with which the QRP operator approaches the theme of miniaturization is dictated by the size of the station he can transport conveniently during his travels. It is by no means unusual to find the keyer paddle as large as the keyer it is used with, and it is that circumstance which inspired the author to construct the composite keyer described here. The writer has known the ridiculous experience of using a keyer and paddle that were each quite massive with respect to the QRP transceiver with which they were used! The effect was not unlike the annoyance that results from viewing a picture frame or mirror that dangles crookedly on a wall. An inexpensive solution to that problem is offered in this article. This self-contained dot-dash maker measures (HWD) 1-1/4 × 5 × 4 inches. Only one external connection is required to use the keyer . . . a suitable length of two-conductor cable between it and the key jack of the transmitter. A skilled packaging engineer (trained in the Orient, perhaps) should be able to slenderize the product even more.

* Technical Editor, *QST*.

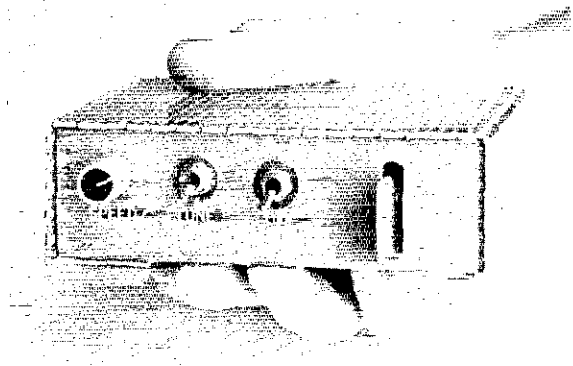
To judge from our mail bag, more and more Novices are discovering QRP and the joys of portable operation. Along the same lines, we have been getting requests for "miniaturized" keyers to go along with the QRP portables. Here is a do-it-yourself project that should fit right in. (But the paddle alone can be used with your home rig and separate keyer too.)

The Paddle

It would be redundant to belabor the circuit details of Hayward's QRP keyer in this presentation. The circuit for it has been described in *QST*.[1] The version of his keyer used here is a one-of-a-kind variety. A friend gave this writer the pc board used in this model. It is somewhat smaller than the original W7ZOI circuit board, and is double-sided with plated-through holes. Those who are gifted in pc-board layout work (cum Orient background again) should be able to implant the Hayward circuit neatly on a single-sided board, two inches square.

There is no originality in the approach used to produce this paddle. Heath uses microswitches for actuating the electronics of their keyer, and though the technique does not provide a precision paddle mechanism, a little practice will enable the

[1] Hayward "An Integrated-Circuit QRP Keyer," *QST* for November, 1971. Circuit boards for the keyer (somewhat larger than that shown in this article) are available from W7ZOI for $3 each. Address W. Hayward, 7700 S.W. Danielle Ave., Beaverton, Oregon 97005.



This mite-size keyer is completely self-contained. A 9-volt transistor-radio battery provides the operating potential for the circuit. Only a few milliamperes of current are taken by the keyer thereby assuring many hours of operation from the battery. The paddle is visible at the right, where it projects outward from the panel.

operator to manipulate it with suitable dexterity. Those amateurs who use high-quality adjustable paddles will note a certain "sloppiness" when working this mechanism, so let the builder beware.

A 3/4 × 1/4-inch metal spacer serves as the pivot at the rear of the paddle arm. A 6-32 bolt is passed through the spacer from the underside of the chassis, a washer is added next, then a small piece of spring stock (this one taken from a junked relay) is forced down over the bolt. A 6-32 nut is added last to maintain the spring tension desired.

The paddle arm is fashioned from a section of double-clad, glass-epoxy pc board. It is three inches long by 1/2-inch wide. When starting formation of the paddle arm use a piece of stock which is one inch wide. Then use a nibbling tool or coping saw to shape the paddle arm so that a wide portion remains at the operating end of the assembly. The rough edges can be smoothed by means of a file or sandpaper.

The paddle arm is attached to the rear pivot by soldering two 1/4-inch metal cable clamps (or equivalent homemade parts) to the metal spacer and paddle arm as illustrated in Fig. 1. Mount the microswitches so that their push buttons are engaged by the paddle arm approximately one inch away from the pivot. Mount the microswitches on short standoff spacers so that their push buttons make positive contact with the paddle. It is recommended that slotted mounting holes be used for the microswitches. This will enable the builder to adjust the switch positioning to permit centering the paddle in the front-panel egress slot. The spring tension provided by the push buttons is used to return the paddle arm to center after each code

(Continued on page 29)

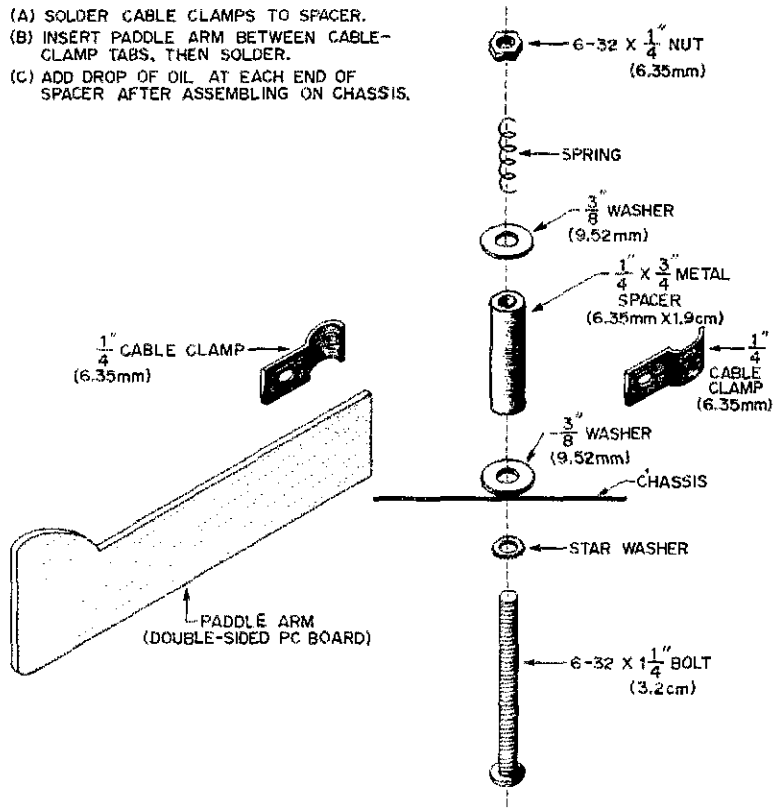
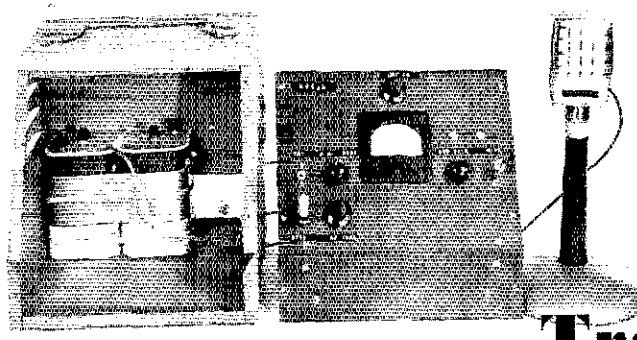


Fig. 1 — Breakdown illustration of the homemade paddle mechanism. Details concerning placement of the microswitches which are engaged by the paddle arm are given in the text. Those wishing to do so can fashion the paddle arm from brass.



A DSB and CW QRP Transmitter

BY MEL RINGER,* W6CJM

THE OBJECTIVE in building the transmitter outlined in this article was to provide reliable fixed-frequency dsb and cw communications over a short range for emergency service and local QSOs. This means, in practical terms, low power should be used to conserve the batteries, and that crystal control be incorporated for simplicity. It also implies solid-state circuitry, easy availability of parts, and low cost. In this unit, operating capabilities over the range from 3.5 to 4.0 MHz were desired.

The oscillator uses the circuit from the cw QRP transmitter of W2SMR,[1] which produces a balanced rf output for the mixers. The complete audio system is from the "GCR-2" receiver of Doug DeMaw.[2] The rf energy is mixed with the audio in a pair of dual-gate MOSFET transistors. The inputs of both the rf and af stages are push-pull, but the output is taken in parallel from the drain circuits. A similar circuit using tubes was the key feature of a G.E. Ham News article,[3] which simplified sideband production and balancing out of the carrier. The transmitter worked well by feeding the signal to the antenna through an output coil on the same core with L2. However, the output was less than 200 milliwatts, and had an effective daytime range of less than three miles under normal conditions on 80 meters. Therefore, a push-pull linear amplifier stage was added. This amplifier proved to be a stumbling block because of feedback and parasitic problems. The article by WA5UVM[4] was a great help in overcoming these obstacles. While his linear amplifier is different in many respects from the one described in this article, Mr. Lowe showed where the parasitic and feedback difficulties were located.

The circuit diagram is shown in Fig. 1. It is simple for a sideband rig, but it is not recommended as a first construction project. For one thing, soldering is tricky on most solid-state projects, and recommended reading is McCoy's article on the subject.[5, 6]

Construction Details

It should be noted that the power supply lead to each of the four stages has an audio decoupling circuit. These prevent feedback and should not be omitted. On the subject of feedback, the most sensitive section is the input and mic-gain circuits of the audio IC (CA3020). Wiring between the IC and the MIC GAIN control should be dressed away from other wires, as far as possible. The same is true of wiring from the mic jack to the IC.

Three toroidal coil forms (Amidon T-68-2) are used for L1 through L5. For those winding toroids the first time, a few pointers may help. First, figure the total required wire length for the winding. To do this, wrap a few turns around the core with a short piece of wire. Then unwrap the wire and measure the length. If, for example, five turns took 3 inches of wire, you can easily figure the length necessary for the full inductor. Measure the required amount of wire from the spool but include an extra foot. Clamp one end of the length of wire in a vise or other anchorage. Then thread the core on the free end of the wire, and slide the core down near the clamped end. Wind the free end of the wire around and through the core for each successive turn. If the winding is center tapped (with a total of forty turns for example), double the wire and proceed as above, passing both wires through the core for each of the 20 double turns.

* 24881 Middlebury Way, Sun City, CA 92381.

[1] Doolittle, "A JFET QRP Rig For 40 Meters," *QST* for June, 1968, p. 24.

[2] DeMaw, "The "GCR-2" Receiver," *QST* for June, 1968, p. 11.

[3] *G.E. Ham News*, March, 1948.

[4] Lowe, "A 15-Watt-Output Solid-State Linear Amplifier for 3.5 to 30 MHz," *QST* for December, 1971, p. 11.

[5] McCoy, "How To Do A Good Soldering Job," *QST* for June, 1968, p. 28.

[6] Hartkopf, "How to Solder," *QST* for August, 1973, p. 16.

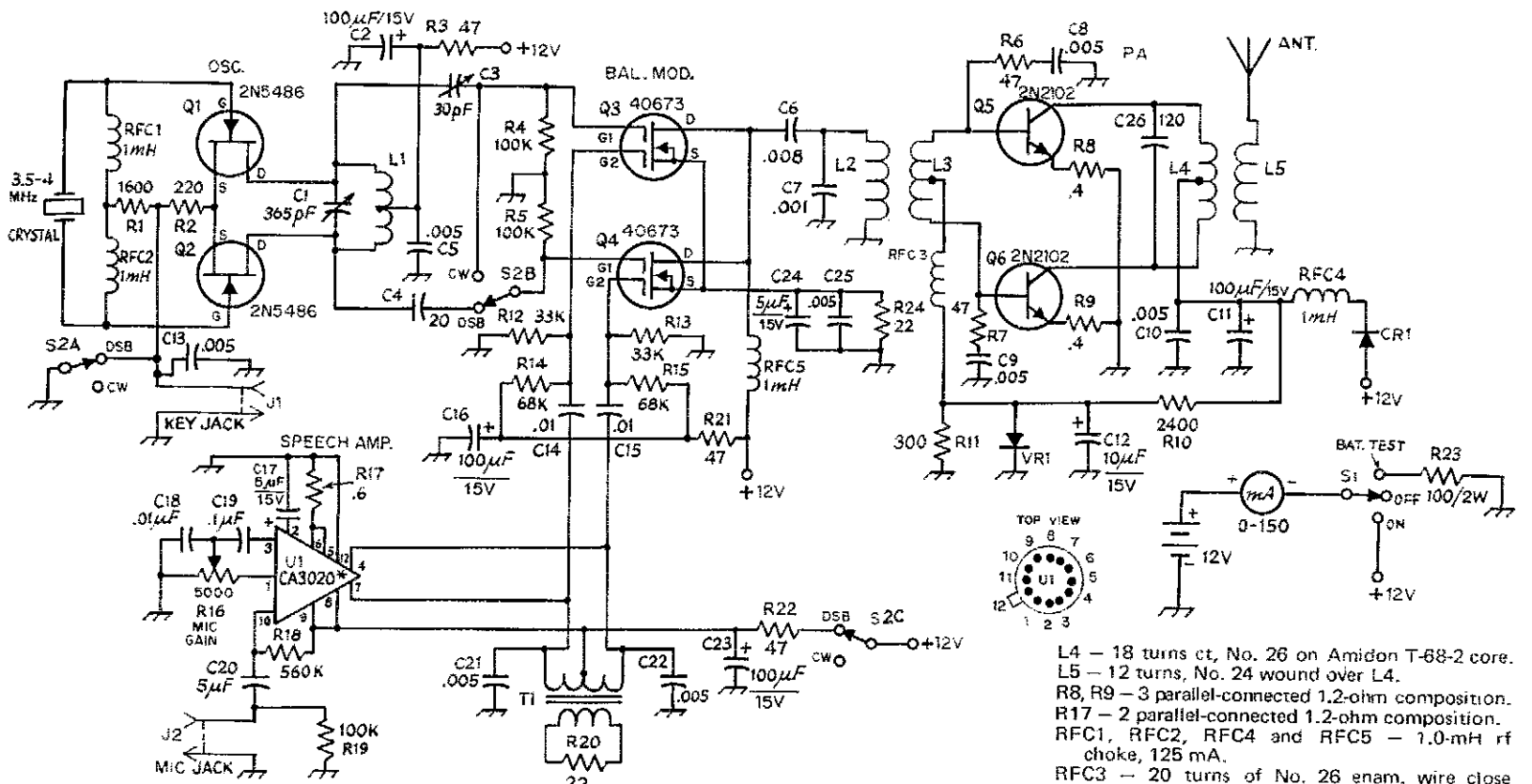


Fig. 1 — Schematic diagram of the QRP transmitter. Resistors are 1/2-W composition and capacitors are disk ceramic unless otherwise indicated.
C1 — 365-pF variable (Radio Shack, No. 272-1341 or equiv.).
C3 — 30-pF mica trimmer.
CR1 — 50 PRV silicon diode (Radio Shack, No. 276-1101 or equiv.).
L1 — 50 turns, No. 26 enam. wire on Amidon T-68-2 core.
L2 — 32 turns, No. 26 on Amidon T-68-2 core.
L3 — 18 turns ct, No. 24 over L2.
L4 — 18 turns ct, No. 26 on Amidon T-68-2 core.
L5 — 12 turns, No. 24 wound over L4.
R8, R9 — 3 parallel-connected 1.2-ohm composition.
R17 — 2 parallel-connected 1.2-ohm composition.
RFC1, RFC2, RFC4 and RFC5 — 1.0-mH rf choke, 125 mA.
RFC3 — 20 turns of No. 26 enam. wire close wound on 1/4-inch plastic rod.
S1 — Single-pole, three-position rotary (Centralab 1461 or equiv.).
S2 — Three-pole, two-position rotary (Centralab 1007 or equiv.).
T1 — Transistor output (Radio Shack, 273-1381 or equiv.).
VR1 — 50 PRV silicon diode.

It is advisable when the winding is finished to put a narrow strip of plastic electrical tape around the outside circumference of the coil.

After constructing a breadboard model, a final version was built to fit into an 8 × 8 × 8-inch sloping front cabinet. This cabinet came without front panels. These were made from 1/8-inch Masonite. *CAUTION: If a metal panel is used, care must be taken to insulate capacitor C1 from the panel.* Otherwise the battery will be shorted to ground through R3 and L1.

Nearly all of the components were mounted on "perf" board which was used as a chassis (4-1/2 × 6 inches with 10 perforations per inch). The general layout is shown in Fig. 2. The meter, jacks, switches, and controls were mounted on the panel, and the "perf" board chassis was fastened to the panel by means of brackets. Except for the batteries, the entire assembly can be removed as a single unit. The battery leads were made sufficiently long to permit this.

Brass escutcheon pins that fit tightly in the perforations were used for tie points to support the components. For ease of soldering, the heads were clipped off the pins before driving them through the holes. The wire leads on the toroid coils are soldered to these pins. The coil will be self-supporting if the leads are short. However, if there is a possibility of rough handling they can be held in place by tying them to the chassis with nylon thread.

Two 6-volt lantern batteries are taped together and connected to provide a 12-volt supply. This is held against the rear wall of the cabinet by two rubber bands. Current drain is approximately 125 mA on cw (key down) and averages 75 mA on phone.

Adjustment

Make the following test before placing the panel and chassis in the cabinet. Check the wiring; solid-state devices are generally unforgiving of mistakes. Place S1 in the OFF position. Set S2 in the CW position, and turn the MIC GAIN control fully counterclockwise. Plug a key into the key jack. Put a crystal for the 3.5- to 4.0-MHz band in the crystal socket. Set C1 at midrange. The transistors and the IC should *not* be in their sockets at this time. Connect the battery leads to the chassis; the negative terminal to a ground connection, and the positive terminal to S1 as shown in Fig. 1. There should be no indication of current on the meter. If the preceeding test fails, do not continue until you have found the faulty wiring or component.

Turn S1 to the BATTERY CHECK position. The meter will show 120 mA if the batteries are good. Now turn S1 to the ON position. The meter may flicker (capacitor charging), but should return to nearly zero (less than two mA). Press the key; the meter should register no change. Release the key, and turn S1 to OFF.

Insert Q1 and Q2 in the transistor sockets. Turn on S1. When the key is pressed there should be a current of a few mA (3 to 10). With the key held down, see if a signal can be heard in a receiver. If not, watch the meter carefully while you slowly rotate C1. At some point, there should be a noticeable flicker in the meter current. Set C1 to a slightly lower capacitance from the point where the flicker occurs, and again listen for the signal. A short pickup wire from the receiver to a point in the vicinity of the oscillator may be necessary.

After you hear a signal in the receiver adjust C1 for maximum signal strength. Then key the transmitter rapidly. Adjust C1 (if necessary) to give clean keying. When this has been done, release the key and turn S2 to the PHONE position. There should be a continuous signal heard in the receiver, just as if the key were being held down. Note the current reading. Turn off the power and insert the CA3020 in the 12-pin IC socket. Turn S1 to ON and again note the current shown on the meter. It should be increased by about 15 mA as compared with the previous reading. This increase is the resting current of the IC.

Plug a mic into the mic jack. With test leads and clips (or by temporarily soldered leads) connect headphones or a small transistor earpiece across the 22-ohm resistor (R20). There should be no signal or whistle heard in the phones. Then turn the MIC

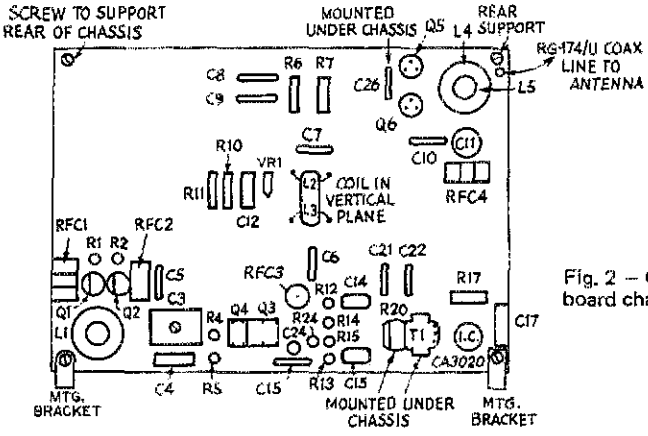


Fig. 2 — Component layout of the "perf" board chassis.

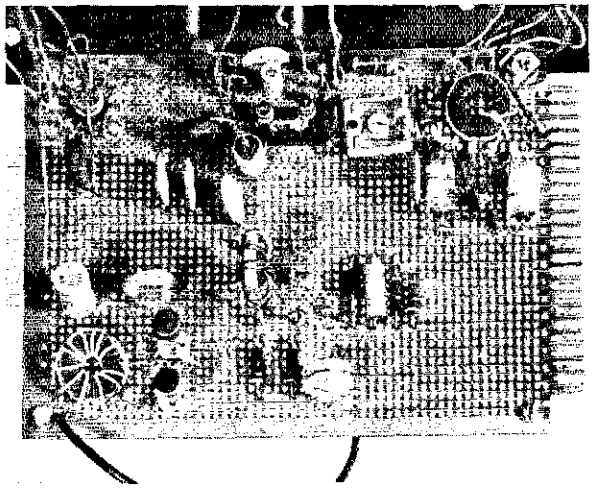
GAIN control, R16, slowly clockwise while whistling into the mic. The whistle should be heard clearly as the gain is increased and should be uncomfortably loud at the highest setting. As the gain increases, the circuit may start to howl if there is too much coupling between the phones and the mic.

Plug in the two mixer transistors, Q3, Q4. Put S2 in the CW position, then turn S1 to ON. The meter should show a current of approximately 12 mA. Put S2 in the PHONE position.

Tune in the carrier on your receiver (ssb position) and set the gain for a low rf and audio level. Slowly advance the MIC GAIN control (R16) while speaking or whistling in the mic. If an acoustic howl starts, reduce the gain and turn the mic so as to get minimum coupling with the speaker or phones. You should hear a clear sideband signal in the receiver but probably with quite a bit of carrier. This will be balanced out later.

If there appears to be feedback not related to coupling between speaker and mic, see the notes above on dressing wires. The wire to pin 1 of the integrated circuit is particularly sensitive. Connect the antenna lead of the transmitter to a 50-ohm load. Two 2-watt, 100-ohm composition resistors connected in parallel will do very well. Some means of measuring output power is necessary and if a standing-wave-ratio indicator for low power is available, it should be connected between the transmitter and the load. The 'Millimatch' described in recent editions of *The Radio Amateur's Handbook* was used here.

The next step is to check the final amplifier. Plug in each transistor separately and remove it before checking the other one. The idling current for each transistor should be between 2 and 5 mA. The difference between the two idling currents should not be more than 1 mA.



Close-up view of the transmitter chassis.

The final adjustment is that of nulling out the carrier. Tune the receiver to the operating frequency. Adjust C3 until minimum signal is heard in the receiver. If the signal quality is acceptable, this will complete the tests.

The best DX with this little transmitter so far, has been approximately 240 miles (700-mW input). While other stations may not line up to work you, once you catch the QRP fever this won't bother you a bit! QST

W7ZOI Keyer *(Continued from page 25)*

character is initiated. Therefore, the builder should position the switches so that the push button of each just touches the paddle arm.

The switches used in this model were purloined from W1SL's carefully sequestered goodie trove (he was caught with his guard down). Since these switches are of surplus origin the brand and model number is not known. The units were extricated from a rocker-type switch assembly. Almost any microswitch with push-button actuators will work well in this application, so check the flea markets and surplus catalogs for a low-cost source of supply.

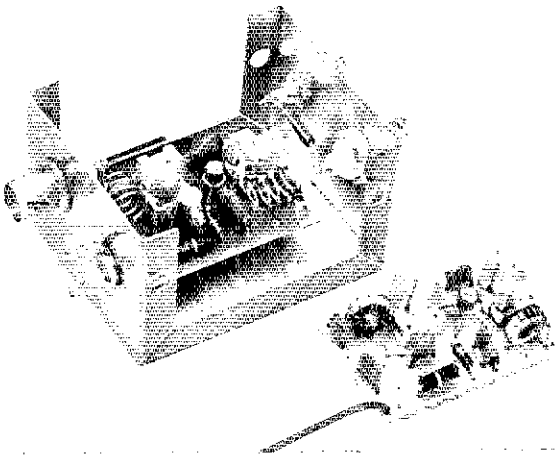
Summary Remarks

A piece of 1/16-inch-thick aluminum stock was bent into a U-shaped channel to form the chassis for this keyer. Perforated aluminum sheeting serves as a top cover, though solid aluminum might be a wiser choice if one wants to keep dust and moisture from getting into the innards of the assembly. Small L-shaped brackets (two) are bolted on the chassis to permit affixing the cover by means of No. 6 sheet-metal screws.

Many enjoyable hours of cw operation have resulted from the building of this hip-pocket-size keyer. On future QRP trips to the islands in the Caribbean it will no longer be necessary for the writer to engage in nail gnawing while worrying about the possibility of the primary keyer (built into the QRP transceiver used for such junkets) failing *(irreparablils)*. If it should happen, the unit described here can be patched in and used. Solid-state components are not likely to be found in the electrical stores on most islands in the West Indies, so redundant equipment is worth considering. Thus, if one plans to take two of everything needed for the portable station, all pieces should be made as lightweight and compact as possible. This keyer qualifies in that regard.

Adhesive-backed rubber feet are used on the bottom of the chassis to prevent the unit from sliding about on the operating table when in use. Those with a "kW fist" may have to place a book or other heavy object atop the keyer to keep it from wandering. QST

MOSFET Preamplifiers for 10, 6, or 2 Meters



Two versions of the preamplifier. The one in the box is for 2-meter use. Toroids are used in the six-meter version (right) and in the ten-meter preamplifier (not shown). Input is at the right on both units. The extra rf choke and feedthrough capacitor on the right end of the Minibox are for decoupling a crystal-current metering circuit that is part of a 2304-MHz mixer.

EACH TIME a manufacturer announces a new solid-state device that has a reasonable noise figure and equally reasonable price, a spate of designs for the use of the device is sure to follow. A case in point is the RCA 40673 dual-gate MOSFET. Designs for using this device as a mixer or as a preamplifier abound, many of them excellent, some mediocre, and a few are downright flops for one reason or another.

When it comes to simplicity, small size, good performance, low cost, and flexibility, a design sent in recently by Jerry, W4CAH[1] certainly deserves to be in the front row. This writer connected a two-meter version of the preamplifier to a Motorola fm receiver strip. The improvement in reception of weak signals was outstanding. Surprisingly enough, the intermodulation from nearby repeaters did not increase in direct proportion to the improvement in overall reception. Make no mistake, however, the selectivity necessary to improve a repeater installation is not there with this circuit. Other designs using helical resonators are far more desirable in such instances.[2]

Where the preamplifier really shines is in pepping up the performance of some of the older ten-meter receivers that many have pressed into service for reception of Oscar signals. A six-meter version is also very useful for any of the modes of communication available on that band.

All of the information necessary to construct the W4CAH preamplifier is supplied herewith. The pc board may be mounted in almost any small enclosure. Two models were constructed in the ARRL lab, using widely available Miniboxes for a housing. Another was built by the writer at home and, just to see if it would fit, placed inside the metal can from an old "bathtub" capacitor.

As mentioned in the notes that Jerry sent with a sample board, the voltage dropping resistor, R4, and the Zener diode, VR1, may be of the value necessary to obtain 9 to 12 V dc for operation of

[1] Gerald C. Jenkins, 774 Twin Branch Dr., Birmingham, AL 35226.

[2] DeMaw, "A 2-Meter Preamplifier for Repeaters," *QST* for July, 1972, p. 18. See also Chapter 11 of *FM and Repeaters for the Radio Amateur*, ARRL.

Table I

	28 MHz	*50 MHz*	*144 MHz*
L1	17 turns No. 28 enam. on Amidon T-50-6 core. Tap at 6 turns from ground end	12 turns No. 26 enam. on Amidon T-37-10 core. Tap at 5 turns from ground end.	5 turns No. 20 tinned 1/2-inch ID × 1/2-inch long. Tap at 2 turns from ground end.
L2	Same as L1, without tap.	Same as L1, without tap.	4 turns No. 20 tinned like L1, without tap.
C1, C4,	15 to 60-pF ceramic trimmer. Erie 538-002F.	1.8- to 16.7-pF air variable. E. F. Johnson 189-506-005.	1.5- to 11.6-pF air variable. E. F. Johnson 189-504-005.

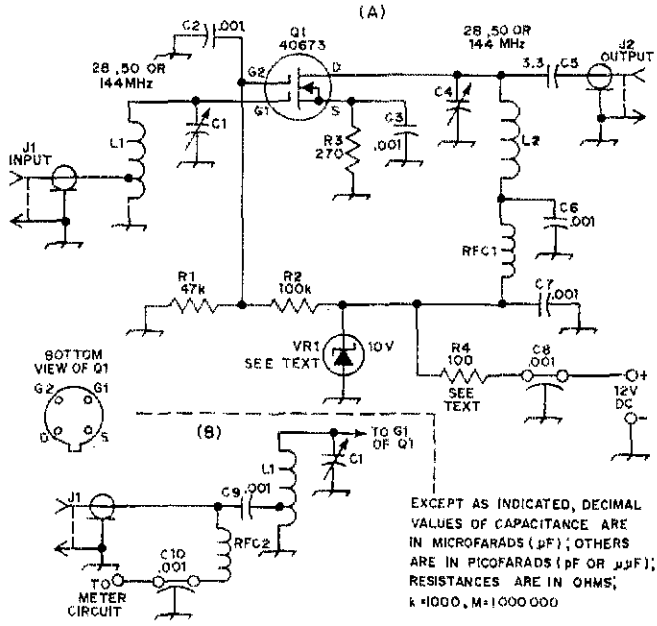


Fig. 1 — Schematic diagram for the preamplifier. Part designations not listed below are for pc board placement purposes. Alternative input circuit for use with microwave diode mixer is shown at B.
C1, C4 — See Table I.
C2, C3, C6, C7, C9 — Disk ceramic.
J1, J2 — Coaxial connectors. Phono-type, BNC or SO-239 acceptable.
L1, L2 — See Table I.
R4 — 100 ohms or higher, 1/2 watt or greater dissipation. See text.
RFC1 — 3 turns No. 28 enam. on ferrite bead. A 220-ohm, 1/2-watt resistor may be substituted.
RFC2 — 33 μH, iron-core inductor. Millen J300-33 or J.W. Miller 70F335A1.

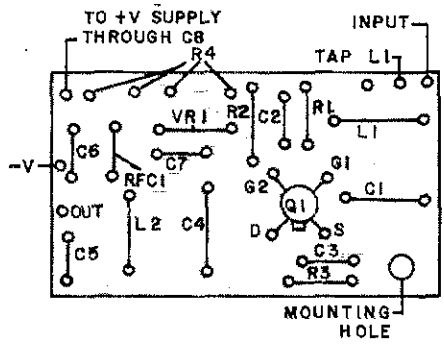


Fig. 2 — Full-scale layout and parts placement guide for the pc board. Foil side shown.

the unit. By increasing the resistance and dissipation rating of R4, the preamplifier may be operated from the 150- to 200-V supply found in many tube-type receivers.

The layout of the board is so simple that it is hardly worth the effort of making a negative for the photo-etch process. A Kepro resist-marking pen was used with success on several boards. Another approach – and one recommended by this writer – is to cover the copper with masking tape, transfer the pattern with carbon paper, then cut away the tape to expose the part to be etched. On small, simple boards the masking-tape method is hard to beat.

Construction is not tricky or difficult. It should take only a few minutes to complete the unit after the board is prepared. The board is fastened in the enclosure by means of one metal standoff post and a No. 4 screw and nut. Input and output connectors are not critical; phono-type jacks may be used in the interest of low cost.

Adjustment is so easy that it almost needs no description. After connecting the amplifier to a receiver, simply tune the input (C1) and the output (C4) for maximum indication on a weak signal. One possible area of concern might be that the toroids used in the ten- and six-meter versions are not always uniform in permeability, as purchased from various suppliers. However, it is an easy matter to add capacitance or remove a turn as required to make the circuits resonate at the correct frequency. – *WISL*

Strays

My mother arrived for a visit just at traffic net time, and she did the actual checking-in while I operated the rig because a friend of hers was NCS. The NCS, of course, asked if there was any traffic, and Mom said, "Oh no, the driving was very pleasant." – *WA1DJC*

Part II of this paper, published in QST *for June, 1973, treated the design approach and circuits used by the author in building the mixer, predriver, driver, PA and internal VFO modules. This is the concluding installment of the article. A circuit description is given for the frequency-counter mixer, 24-hour clock and power-supply sections.*

Detailed information concerning transmitter construction, layout, tuneup and modification of the SB-303 receiver is offered as part of a by-mail package which also contains the pc-board layout data. This packet is available for $1.50 from ARRL Hq. Please include a 8-1/2 X 11-1/2-inch s.a.s.e. with your order.

A Medium-Power HF SSB CW Transmitter

PART III

BY TIMOTHY P. HULICK,* W9MIJ/4

Frequency-Counter Mixer Board (Board 8)

WHILE TUNING ACROSS a band the operator wants his frequency counter to follow without having to wait for an update. For this reason, the counter-mixer method was chosen for this transmitter as opposed to the up-down method used in most commercially built frequency counters.

U801 and U802 in Fig. 10 function much the same way as U301 and U302 in the transmitter mixer except, of course, the BFO transmitter frequency (3395 kHz) is injected into the first mixer instead of ssb or cw. This makes possible a frequency readout at all times. The frequency-counter mixer circuit is similar to the one described by MacLeish, Pattison, and Hejhall.[5] Three CA3001 ICs follow the second mixer and provide the necessary pulse amplitude to trigger the first counter IC to give an accurate count up through 10 meters. The mixed output is available at K to be fed to the counter. An auxiliary low-level input is provided at M should one desire to measure the frequency of some other equipment. Normally M is not used. The transmitter frequency-counter mixer board is powered by +12 volts.

Frequency Counter/24-Hour Clock Board (Board 9)

The circuit of Fig. 11 is essentially the same as that described by MacLeish.[6] He does an outstanding job of taking the reader by the hand and leading him through the logic of the digital circuitry involved. The reader is encouraged to study his article for a comprehensive look at how counters work.

Any neon readout tube may be used with the SN7441 readout driver IC. This transmitter uses the Raytheon 8422. NE-2 neon lamps make ideal decimal points.

All ICs are available through several surplus outlets.[7] Some dealers also have Nixie tubes at reasonable cost, but unfortunately not the 8422. New, the 8422 costs $18.55. The voltage requirements for the counter are +5 (applied to edge pin 1) and +180 to pin 10.

The 24-hour clock circuitry is contained on the same board as the frequency counter, though it functions independently. The 24-hour clock component designations are common to board 9, but will be referred to as parts of the annex to the counter board. (Board 9A, see Fig. 13).

U930, U932, U934, U936, U938 and U940 provide U929, U931, U933, U935, U937 and U939, respectively, with the cumulative count for binary-to-decimal decoding and ultimate displaying of the summed 1-Hz pulse count. Of course, the clock digits are not strictly decimal since the decimal counter gates (SN7490s) must be configured to reset to zero after a count of 59 is reached, instead of 99 as in the case of the frequency counter. U941 with U1008 on board 10 function as a divide-by-60 circuit so that U940 counts only each 60th positive half of the 60-Hz

* 5257 Locke Lane, Virginia Beach, VA 23462.

[5] MacLeish, Pattison and Hejhall, "The Rec/Counter," *QST* for May, 1971.

[6] MacLeish, "A Frequency Counter for the Amateur Station," *QST* for October, 1970.

[7] See *QST* advertisements.

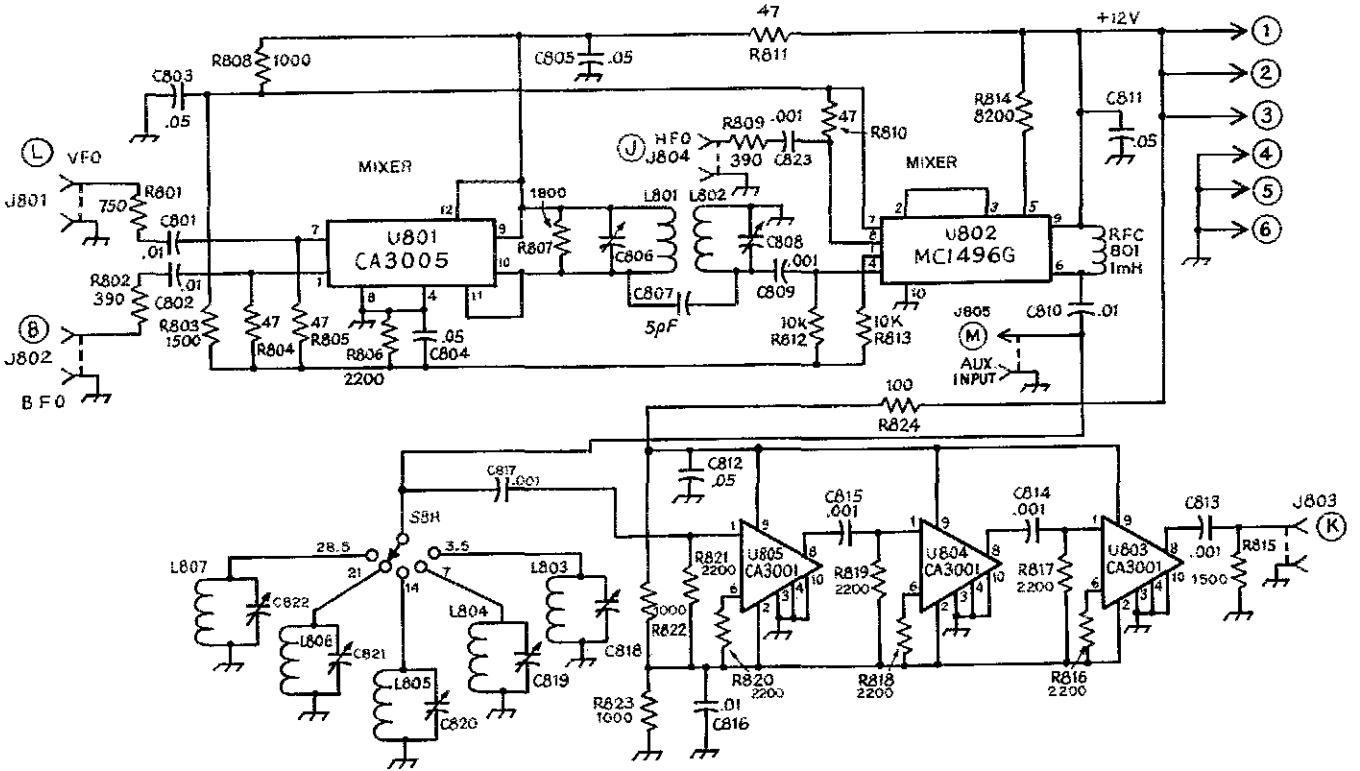


Fig. 10 — Schematic diagram of the counter/mixer circuit. Resistors are 1/4-W composition. Fixed value capacitors are disk ceramic unless otherwise indicated. Numbered components not appearing in the parts list are so identified for pc-board layout purposes. All toroid cores are of Q2 material.

C807, C808 — 50 to 380-pF compression trimmer (Elmenco 465 or equiv.).
C818 — 110- to 550-pF compression trimmer (Elmenco 467 or equiv.).
C819 — 50- to 380-pF compression trimmer (Elmenco 465 or equiv.).
C820 — 55- to 300-pF compression trimmer (Elmenco 427 or equiv.).
C821-C822 — 4- to 40-pF compression trimmer (Elmenco 422 or equiv.).
J801-J805, incl. — Pc board phono jack.
L801, L802 — 14 turns No. 30 enam. wire on CF101 toroid core.
L803 — 17 turns No. 30 enam. on three each (stacked) CF101 toroid core.
L804 — 12 turns No. 30 enam. on three each (stacked) CF101 toroid core.
L805 — 8 turns No. 30 enam. on CF101 toroid core.
L806 — 10 turns No. 30 enam. on CF101 toroid core.
L807 — 7 turns No. 30 enam. on CF101 toroid core.
U801, U803, U804, U805 — RCA integrated circuit.
U802 — Motorola integrated circuit.

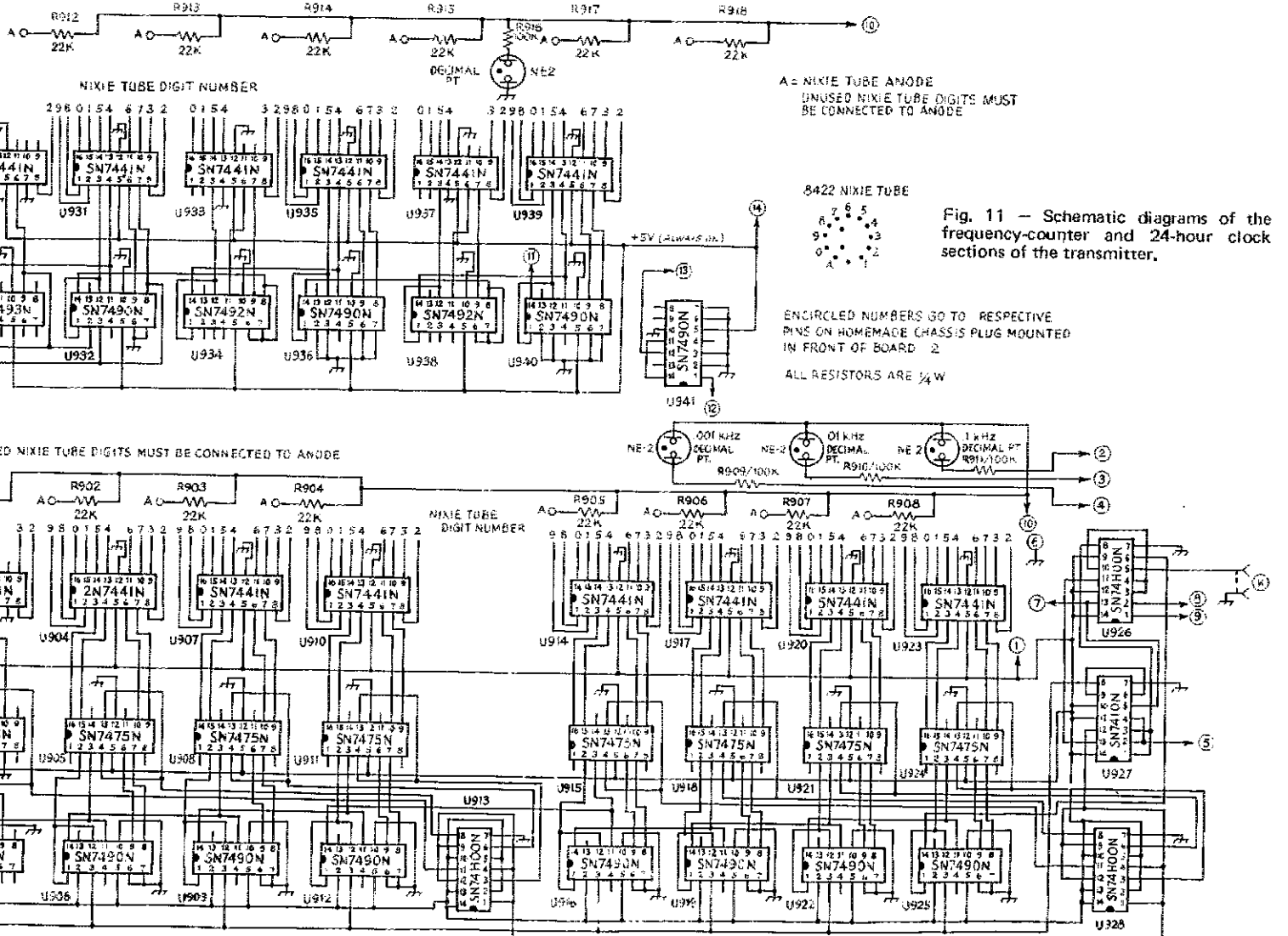
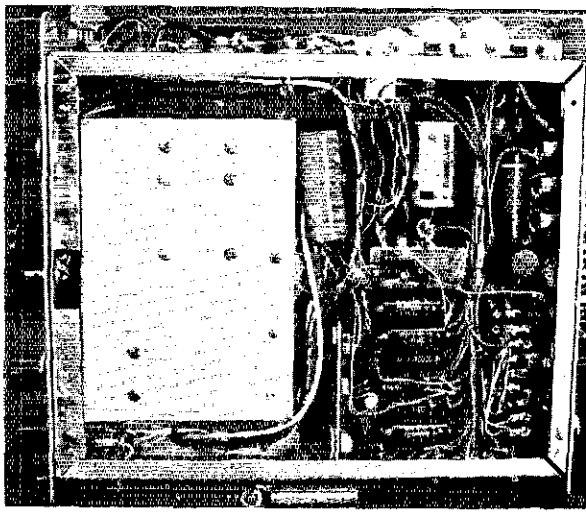


Fig. 11 — Schematic diagrams of the frequency-counter and 24-hour clock sections of the transmitter.



This view of the chassis underside shows board 11 with Q1101, Q1102, and Q1103 flange mounted with the flange bolted to the chassis side. The coax relay is against the chassis rear apron behind the 8-lug terminal strip. K1 is at the top while board 10A is at the center. C9 is shown to the upper left. C9A is at the top center. Q1, Q2, Q3, and Q4 are shown along the left and right sides of the chassis.

line current. Thus, the 24-hour clock is nothing more than a cumulative frequency counter that resets its seconds and tens-of-seconds digits, and minutes and tens of minutes, to zero after a count of 59. The hours and tens-of-hours digits are arranged to reset to zero after a count of 23. Therefore, the maximum count before all digits go to zero is 2359.59.

Line frequency is used as a 60-Hz standard for the 24-hour clock because of its accurate long-term stability. Power companies in the United States compensate a period of high-frequency drift with a corresponding period of low-frequency drift. A crystal oscillator used as a standard would provide excellent short-term accuracy, but would cause the clock to run continuously fast or slow, noticeably so after a month or two.

S6 allows four settings of clock speed: STOP, RUN, SLOW SET, and FAST SET STOP position is necessary in case the desired set time is accidentally passed up. The 24-hour clock count may be stopped until the real time catches up. Operating voltages for the 24-hour clock are +5 and +18Ω. These voltages must be on at all times.

Internal Clock Board (Board 10)

Timing for the frequency counter and fast- and slow-set speeds for the 24-hour clock are obtained from the internal clock of Fig. 12. This circuit has been modified from the original one described by Hoff.[8]

The frequency standard used is a 4000-kHz AT-cut crystal.[9] It costs $9. Drift is extremely low (less than a hertz or two) over a 30-degree temperature range centered around room temperature. Any temperature coefficient inherent in the crystal may be offset by the proper capacitance and temperature coefficient of C1002. Drift is less than three hertz per month as compared to WWV. C1001 is a 1.5- to 7-pF ceramic variable (Centralab CRL-825-EZ).

U1001 is used as a divide-by-four circuit, making available a 1000-kHz square-wave output at G through H by means of calibrate switch S4, to drive direct-coupled amplifiers Q1003 and Q1004. Output from these stages (at 1) is a low-level, essentially 1000-kHz square wave. 1 connects to the receiver antenna terminal through J7. The 15th harmonic of 1000 kHz at J7, when S4 is in the ON position, produces the required 15,000-kHz signal to beat against WWV for frequency-counter calibration.

U1002 through U1007 form a 10^6 frequency divider so that accurate 1-Hz pulses are available at edge pin 7. This pulse output along with the pulse outputs at edge pins 2, 3, 4, 5, 7, 8, and 9 provide the proper timing to gate the decade counters (SN7490s) and display latches (SN7475s). The 24-hour clock fast- and slow-set pulse trains are also available at edge pins 3 and 4. U1008 and R1014 are mounted on a separate board (10A) and produce a continuous pulse train at 10 Hz for further frequency division on the 24-hour clock board.

The primary difference between this circuit and that by Hoff is in the choice of IC decade counters. (His circuit uses two Motorola packages to perform the divide-by-four function of IC1001. He is also interested in producing subharmonics of the 4000-kHz oscillator at 5, 2-1/2 and 1 kHz, which are of no use here.) The internal clock board is powered entirely by +5 volts and runs continuously.

Power Supply — PA Temperature-Compensate Boards (Boards 11 and 12)

The power supply circuit appears in Fig. 13. Seven voltages are required to run the transmitter. Most of the smaller components are mounted on boards 11 and 12, board-mounted components being contained within dashed lines on the drawing. Wires terminated by arrows indicate a long wire run between a board and a chassis-mounted component. Board 11 contains the two +5-volt power supplies (one being on at all times) and the +12-volt circuitry. Board 12 furnishes −5, −8, +28 volts and the PA temperature-compensation network. All board 11 supplies contain Zener diode-controlled, SCR-protected regulators. The SCRs protect the external components from accidental soaring of the supply voltage. The ICs in the counter and 24-hour clock must not be subjected to voltages any higher than 5.5. Should

[8] Hoff, "The Mainline FS-1 Secondary Frequency Standard," *QST* for Nov., 1968.

[9] Available from International Crystal Co., 10 N. Lee St., Oklahoma City, OK 73102.

the regulator transistor short for any reason the SCR will present itself as a dead short across the supply, blowing the series fuse. If less than 5.5 volts is being applied, the SCRs never turn on. T1, CR6, and C4 supply ±9 volts (isolated from chassis ground) for operating an external electronic keyer.

The +28-volt power supply, mostly on board 12, is identical to the one described in footnote 3. Board 12 also contains the PA temperature-compensation circuit. The 2N6093 contains a temperature-sensing diode on the same chip with its anode connected to pin 4 and the cathode internally connected to the emitter. This diode is forward biased by means of voltage divider R1216, R1217, and R1218. (Only the diode of one transistor is used as shown in Fig. 8 of Part II because Q601 and Q602 are mounted on the same heat sink.) The diode voltage drop varies with transistor temperature, causing the differential amplifier (Q1204 and Q1205) to sense and amplify the change. The differential amplifier drives current amplifiers Q1206 and Q1207. Q1207 increases base bias to the PA when the transistors are cold and decreases it when they are hot. This function holds the collector quiescent current constant.

Meter Scaling Resistors

The meter-shunt values for driver and PA collector-current monitoring, and the series resistances used for +12 and +28 voltage measurement, are unique to the 50-μA Calrad meter used. Any instrument with a 50-μA meter movement will suffice. The meter used in this transmitter has an internal resistance of 1000 ohms. If a meter with these characteristics is used, the values of R5, R6, R7, and R8 need not be changed. If necessary, new values may be determined from formulas given in the *Handbook*.

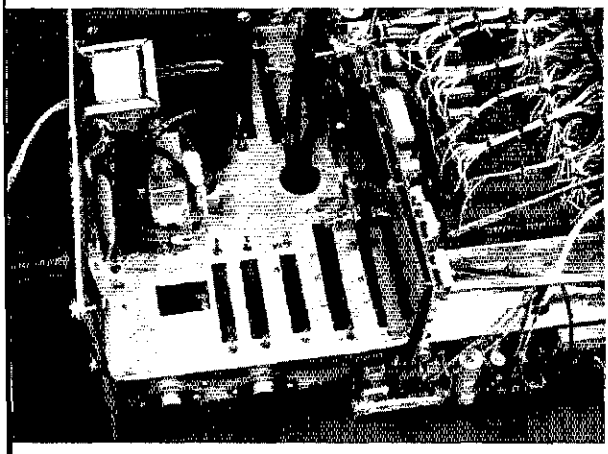
Meter shunts can be constructed from suitable lengths of enamel magnet wire. Consult the wire table in the ARRL *Handbook* for the specific resistance of wire sizes. Series resistors R5 and R6 should not be difficult to obtain in the 1/4-watt 5-percent tolerance-type.

Circuit-Board Construction

It is recommended that fiber glass and not phenolic board material be used throughout, since fiber glass will not warp. All of the plug-in boards require edge pins. Commercially-manufactured connectors seemed to be very expensive and too large. The edge pins used in this transmitter were extracted from Amphenol miniature rectangular connectors of the 126 series. All pins are held in place by tiny C clamps that are easily removed with tweezers and needle-nose pliers. These pins can be extracted without damage. They are gold plated, which assures corrosion-free connections. On opposite ends of the original connector are larger gold plated pins (a male on one end and a female on the other) perfectly suited for the first and last edge pins on a board. They are used as ground pins and board holders.

Rectangular slots are cut into the chassis to accomodate the plug-in boards. No dimensions are given here because the length of the slots may be determined from the circuit board maps and should be slightly longer than the distance between the lowest and highest numbered "hot pins" on a particular board. The extreme ends are ground lands and are not included in this length. The slot widths are not critical, but must be at least slightly wider than the pins themselves. The homemade female chassis-mounted edge-pin sockets are constructed from small rectangular sections of 1/16-inch thick plates of red Plexiglas left over from the display-tube window. Their size must be about 3/4 inch greater in both dimensions than the slots, since they are to be bolted against the underside of the chassis and cover each slot. To locate each female pin, the plastic strips may be placed alongside their respective pc-board mates and drilled half way across their width with a No. 53 drill at a position along the length directly opposite the appropriate foil lands. The pins may then be inserted into the holes and held in place with the tiny C clamps from the original connector.

One of the photographs illustrates the positions of the larger edge pins used at the pc-board



The homemade circuit-board sockets are visible in the foreground on the chassis. The counter mixer board is shown plugged into position. The counter/24-hour clock board is located at the right while the power transformers, T1, T2, and T3 are shown at the left. All runs of RG-174/U to the top side of the chassis to the boards (except board 1) are fed through the large grommet in the center of the chassis. The +28-volt regulator and PA temperature-compensation circuit board is shown on the left side of the chassis. The fan is illustrated to be positioned directly behind the position of the PA board. The rectangular hole in the chassis is directly below the position of the PA heat sink.

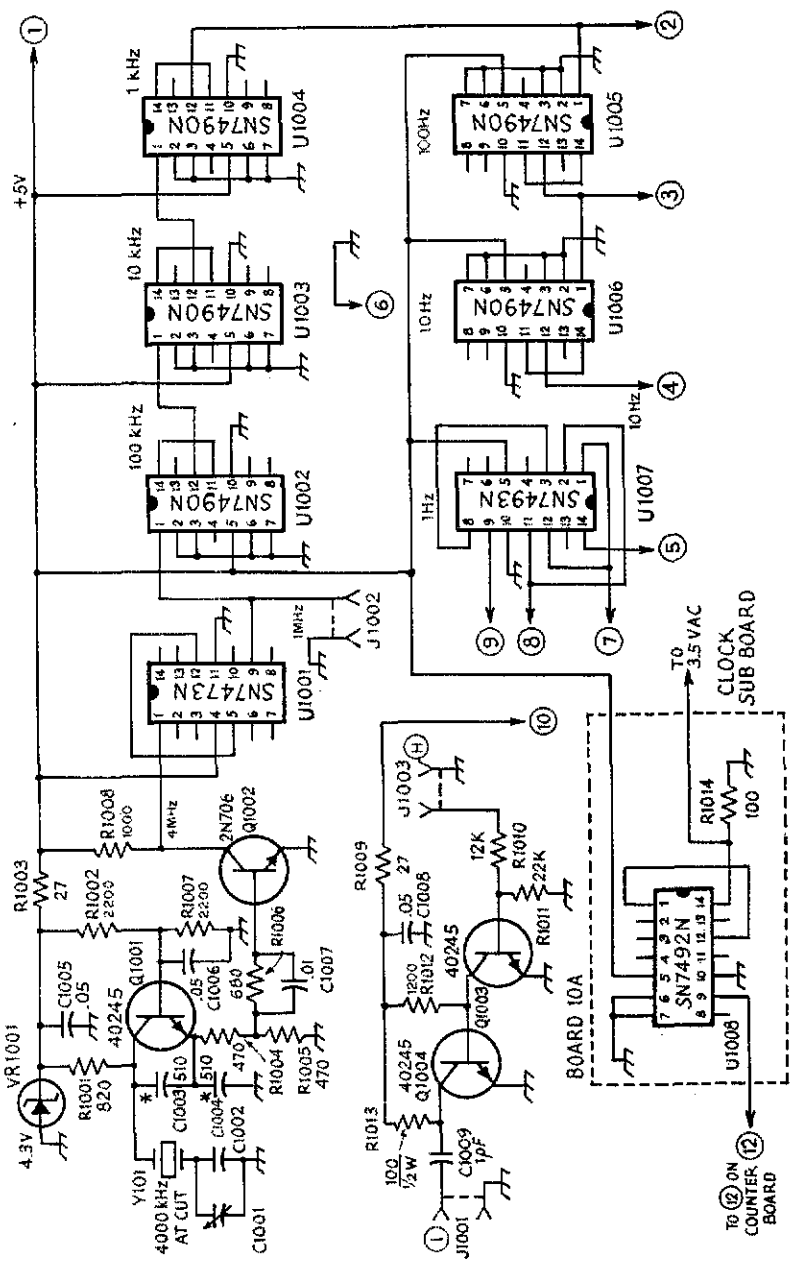
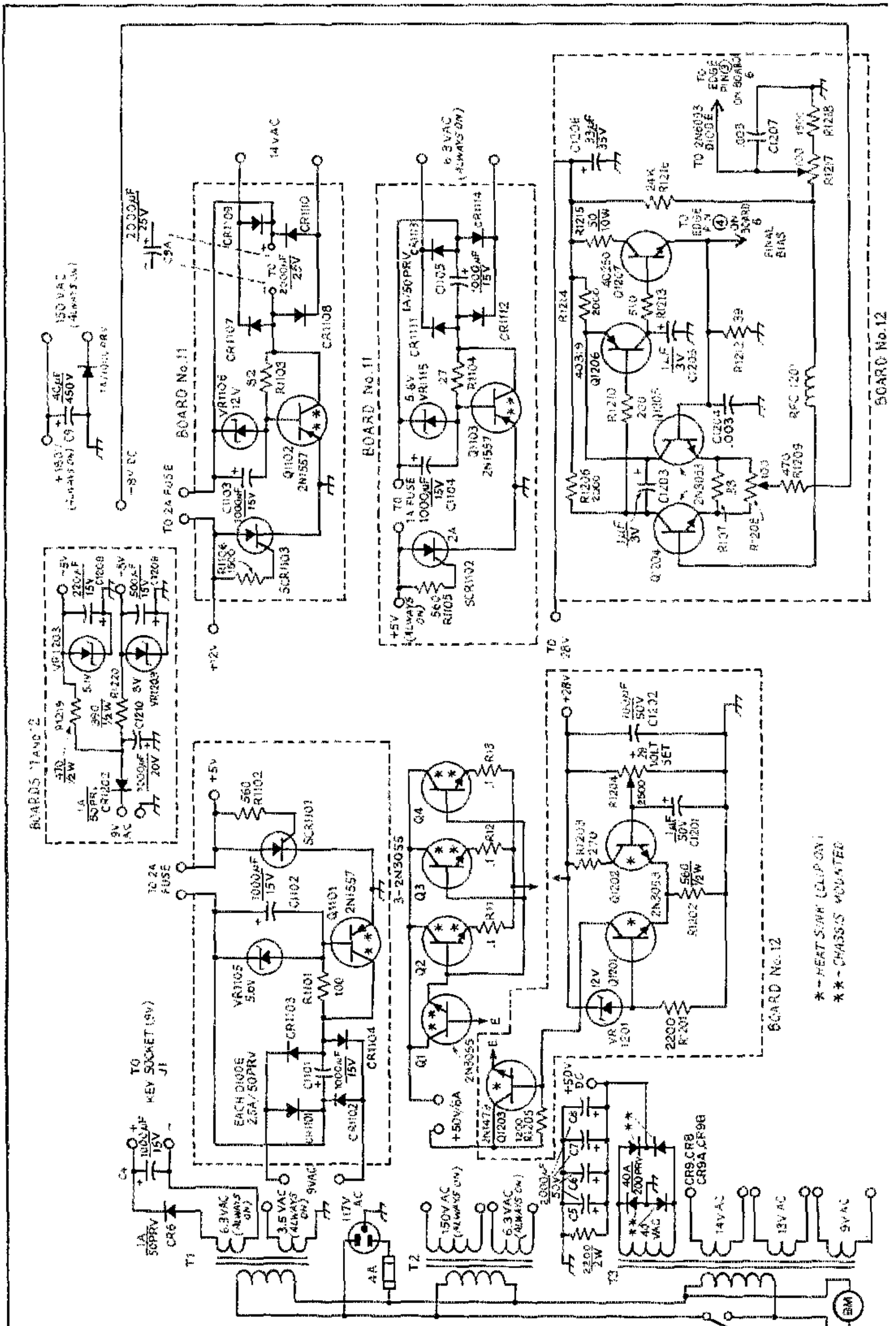


Fig. 12 — Schematic diagram of the internal clock. Numbered components not appearing in the captions are so identified for pc-board layout purposes. Fixed-value resistors are 1/4-W compositions unless otherwise indicated. Fixed-value capacitors are disk ceramic except those marked with *, which are NP0 types. C1001 is an NP9 ceramic trimmer, 1.5 to 7 pF (Centralab CRL-825-EZ or equiv.). C1002 consists of a 22 pF NP0 in parallel with an N750 10-pF capacitor. See text for information on Y101.


BOARD No.11
BOARD No.12
BOARDS 11 AND 12
3-2N3055
* - HEAT SINK (CLIP ON)
** - CHASSIS MOUNTED

corners. This pin type is constructed like a bolt with a nut instead of a C clamp. They serve as ground connections to the chassis for each plug-in board, board holders when plugged in, and as bolts to hold the Plexiglas sockets in place. A No. 20 drill may be used for making the proper size hole in the chassis and Plexiglas at the ends of the chassis-socket rectangular holes, for mounting of these larger pins. Care must be used to line up all pins so that proper mating with the circuit boards occurs.

Before positioning each board alongside its socket, after the socket is mounted on the chassis, it is advantageous to tin the top of each male pin (and the edge pin lands) where the pin is to be installed. All board components should be mounted prior to installing the edge pins so that proper clearances may be realized. When positioning a board having a band-switch wafer, the switch shaft must be inserted through each board, one at a time, to ensure that all wafers line up. When these preparations are completed, the male pins may be inserted – one into each female pin on the chassis. The correct board is then held against the row of pins exactly as it is to remain, and the male pins are soldered to the foils. The pin line-up is then automatic and will mate perfectly each time a board is pulled and then remounted. *Be careful not to solder the male and female pins together accidentally. Solder flows very quickly over gold.*

The power supply and the counter/24-hour clock boards are not edge mounted. Connections to the counter board are made by means of a homemade male-pin plug constructed to correspond exactly to the chassis-mounted female-pin socket located in front of the position of the VOX-sidetone/cw-monitor board. It is made of 1/16-inch thick red Plexiglas that is drilled together with the piece used for the socket. Connections to the board are made by use of a harness of No. 28 teflon-covered wires between the plug and the various points on the board. The larger end pins are used also to provide a good ground connection to the board, and for guidance when inserting the plug. Of course, any 15-pin connector (chassis to cable type) may be used.

Standard phono plugs are used wherever coax is involved and circuit-board type phono sockets are used on the pc boards. There are two types of pc-board phono sockets. One is made to mount on the component side. The other provides for plugging into the foil side of the board. In all cases, those boards lined up one behind the other are in line with a common band-switch shaft and with each output jack, to the board behind it. Therefore, connectors Q, S, and U are mounted for foil-side accessibility and C, P, N, R, T and V must be accessible from the component side. The counter/mixer and predriver boards have unetched boards (shielding) mounted against their foil sides (foil sides away from each other). The shield board is secured to the appropriate circuit board forming a two-board sandwich. This is done by soldering short lengths of stiff solid wire to the ground lands of each after they have been passed through opposite holes in the two boards.

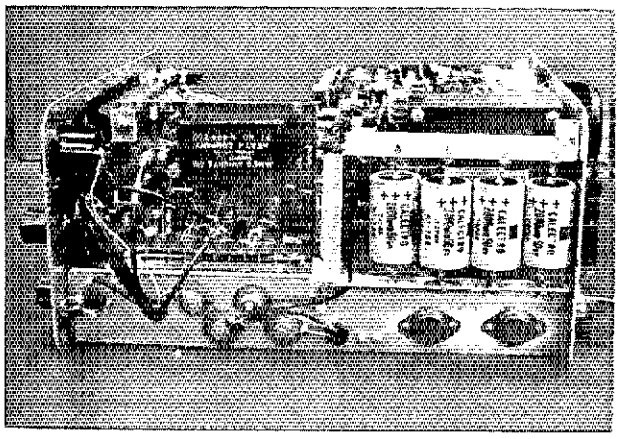
The PA heat sink is fastened to the PA board by means of three 4-40 brass bolts and one-inch-long brass spacers. The PA sub-board has most of the circuitry associated with transistors Q601 and Q602, while the PA board contains the band-switch wafer S8F and G and the associated rf networks. The heat sink is sold by Allied Radio Shack stores and measures 3 × 3-1/4 inches.

The rectangular hole is cut in the chassis below the fan blades. It is directly under one of the rows of PA heat-sink vanes and allows forced air to travel down the vanes to the underside of the chassis to aid in cooling Q1-Q4, Q1101, Q1102 and Q1103. Although the hole is small (about 1 × 1-1/2 inches), all that is necessary is to keep the air moving under the chassis. Q1101 and Q1103 will be warm to the touch.

The driver board also requires a heat sink. The reason for such a large heat sink is that Q501 is sandwiched between two other boards where there is little room for air flow, and it is located some distance from the fan. The larger driver-board heat sink has two rows of air vanes. It is available from Allied Radio Shack. The dimensions are 3-1/4 × 2-1/2 inches. Q501 is fitted into place. The sink is installed after applying silicone grease held tightly against the pc board until it is soldered in place. The sink is installed after applying silicone grease to Q501. The top plate of the KH3415 is then covered with a thin coating of grease and a thin mica wafer. The large driver heat sink is then put against the KH3415 top plate for good thermal contact between the transistor, the KH3415 and the large heat sink. Brass spacers (filed to the right length) and 4-40 hardware clamp the large sink against the KH3415. The driver-board sink protrudes around the right edge (inboard edge) of the predriver board.

The wafer switches on the four boards making up the ganged band switch (two brands) were available in the junk box. The wafer switch

Fig. 13 – Schematic diagram of the power supply used in the W9MLJ transmitter. Capacitors with polarity marked are electrolytic. Fixed-value capacitors are disk ceramic unless otherwise noted. Fixed-value resistors are 1/4-W composition unless indicated otherwise. SCRs are any 2-A, 200-V type. R1208 and R1217 are CTS U-201-R101B units. R1204 is a CRS U-201-R252B. All Zener diodes are 1/2-W rated. RFC1201 has 10 turns of No. 30 enamel wire wound on a CF-101 toroid core. Modification information concerning T1 and T3 is given in the data package offered early in Part III. T2 is a Stancor P8181.



Board 1 is illustrated in its plug-in socket with cables attached. CR8, CR9, CR9A, and CR9B are stud mounted to the left of center on the chassis side while Q3 and Q4 are heat-sink mounted to the chassis side at the right. C5, C6, C7, C8, and R10 are suspended between two angle brackets made from lightweight aluminum angle.

mounting holes are oriented differently on different boards even though the wipers line up. Using other brands of wafer, the positions of the common wiper terminal of a pole must connect to the proper foil lands on the underside of the boards. With the foil maps offered in the by-mail package it may not be possible to do this and permit the rotor of each switch to have its center hole line up with the others. There are two ways to correct for this: either carefully lift the rotating wiper up off the rotor and reposition it properly, or, redesign the foil map in the vicinity of the switch to match the wafers used. The latter method is by far the easiest and safest because it merely involves rotating all switch-associated lands for the correct number of degrees around the switch shaft prior to etching.

The manufacturers of the wafers used by the author are unknown but they are of the 30-degree index type with S8A and B on the same wafer, S8C and J on the same wafer as are S8D and E and S8F and G. These are two-pole, five-position switches. S8H and S8K are the same type except only one pole is used on each. All lugs are soldered to spot lands to make the wafer mounting rigid even though some lugs are not used. S8K mounts on the foil side of the transmitter mixer board with its face positioned toward the foil, and its terminals soldered to lands outboard (farther from the switch shaft) of the S8A and B lands. The S8A and B wafer is mounted exactly parallel to and lined up with S8K on the component side of the board, face away from the board. It is held in place by short lengths of No. 26 bare copper wire, soldered between the switch lugs and the inboard set of foil lands. All other band-switch wafers are mounted on the component side of the circuit boards in the same manner, with the common wiper tabs in the proper position and the shaft holes lined up and rotated to a common setting. A recommended substitute for the junk-box wafers used by the author is the Centralab PA-63 or OAK No. 399073-F. The band-switch index attached to the front panel has no wafers mounted on it, but is necessary for the setting of the positions for each band. A Centralab PA-600 is recommended.

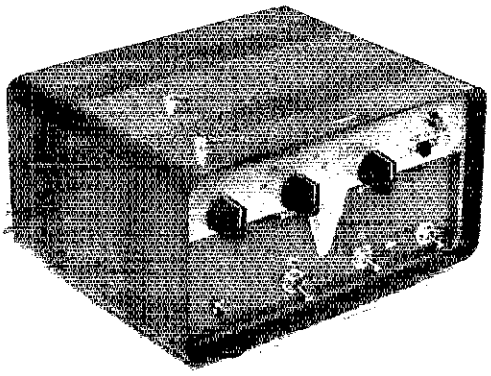
It will be necessary to construct some circuit-board extenders so that each board will be accessible during the alignment. Large male and female gold-plated pins of the type discussed previously may be soldered one type on each end of two 3/16-inch diameter 3-inch long brass tubes. These tubes are available at hobby shops and are normally used in model airplane fuel lines. (They also make ideal spacers when cut to a required length.) The rigid tube, with plug and socket attached, will hold the board in place parallel to, but above the other boards. The edge-pin extenders are simply a female and male pin, one type on each end of a length of hook-up wire approximately four inches long. Each edge pin extender must be connected between the appropriate edge pin and its chassis-mounted mate, one at a time. This procedure of raising one board above the others also exposes the trimmer capacitors on the board directly behind the one elevated, even though it is still mounted in its original position. A short length of coax extender cable should be constructed also.

Sockets were not used for the 41 ICs on the counter/24-hour clock board. This choice turned out to be a big mistake because some of the ICs were bought from surplus distributors, and were defective. Many painful hours were spent unsoldering 14- and 16-pin ICs in the hope of finding one bad chip. Unfortunately, many good ones were destroyed in the unsoldering process. *Sockets are mandatory* if you are to keep your sanity. With sockets, about 30 hours of troubleshooting could have been saved.

The display tube and counter boards are mounted long edge to long edge perpendicular to each other by soldering each one to a common 7-inch-long strip of subminiature angle bracket (brass) available at most hobby shops. A rigid structure (right triangular cross section) is formed between the two boards by completing the geometrical figure with lengths of the same type brass angle bracket. The brackets are secured at both ends by means of solder lugs and are bolted to the boards with 4-40 brass hardware.

Acknowledgements

The author wishes to express his thanks to Mr. John Locke of RCA Semiconductors for his recommendations concerning the PA stage. Gratitude is expressed also to Mr. Bob Padden of the Naval Ship Engineering Center, Norfolk Division, for all photography. QST



Here is the completed keyer T-R switch. The styling is similar to the Drake T-4X.

A Packaged Keyer and T-R Switch

BY DAVE WOOD,* W9AJR

WHILE I LIKE the Heath keyer circuit, I certainly never cared for the style of the enclosure. It just never seemed to fit in with the rest of my operating gear. Also, I was getting tired of standing up and leaning over to make weight and speed adjustments on the top of the keyer. The obvious answer was to repackage the device into a cabinet that fitted my station scheme, plus putting the combination speed and weight control in an accessible spot. About the same time, I was looking for a cw break-in system and decided on a T-R switch from the *Handbook*.[1] My mind was quickly made up; I would repackage the keyer and put the T-R switch in the same enclosure.

The New Enclosure

After some searching, I found the almost perfect cabinet, an LMB box, size CO-4. The reason I say almost perfect was because I had to carefully grind off 1/8 inch from one end of the keyer circuit board to make it fit. I also had to take off about 1/4 inch from the two front spacers to allow installation space for the OFF-OP-TUNE control.

The photographs tell the story better than words. There is one difference between the author's T-R switch and the *Handbook* version. I mounted the power transformer atop the chassis to provide adequate room for the unit in the cabinet.

One other item about the cabinet: I repainted it, using spray-type paint, to fit in with the decor of the rest of my gear. It looks better that way!

* Box 264, Evansville, IN 47701.

[1] *The Radio Amateur's Handbook*, ARRL, 1973 edition, page 361.

QRI Circuit

If you look at the front-panel view carefully, you'll see two switches at the lower right corner, and the label QRI. This is my simple shaping circuit. It permits switching two values of capacitance across the keying line (see Fig. 1). If you are the kind of cw operator who likes a softer sounding signal, this is for you. For my money, most of the signals one hears are too hard and I like a softer sounding note. With my rig the capacitors soften the signal.

One should observe caution when using the QRI system. The soft effect is desirable only under good signal conditions. With speeds up to 25 wpm, I use the 0.1-μF value and the .05-μF capacitor for faster speeds. The higher the speed, the less the capacitance. Otherwise, the signal sounds mushy and it is hard to distinguish between dots and dashes. QST

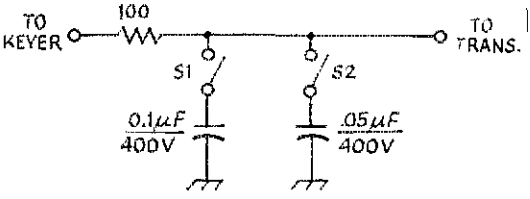
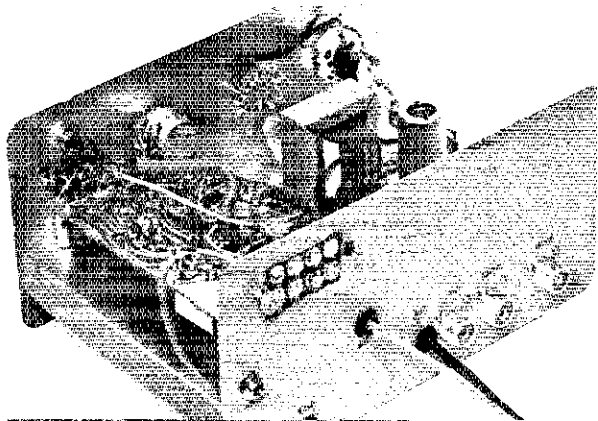


Fig. 1 — Circuit diagram of the QRI circuit. S1 and S2 are single-pole, single-throw toggle switches. C1 and C2 are paper tubular capacitors.



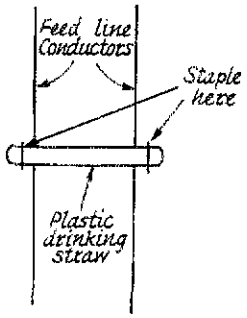
This view from the rear shows how the two units are combined in the enclosure. The T-R switch circuitry is at the right and the keyer is at the left.

Hints and Kinks For the Experimenter

REPAIRING 450-OHM OPEN-WIRE LINE

I have long runs (300 feet or so) of 450-ohm open-wire line running to various antennas. The spacers sometimes let go, and here's a quick, simple way to make on-the-spot repairs.

Cut some plastic drinking straws into pieces approximately 1-1/2 inches long. (Standard plastic spacers are about one inch long.) Take these and a set of cutters and a small stapler with you when you inspect the feed line. If any spacers are missing or broken, cut a 1/4- to 1/2-inch slot in each end



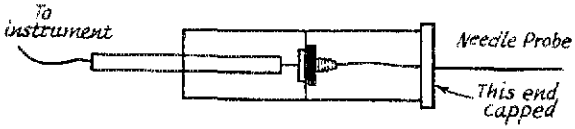
of one of the drinking straw pieces. Place the straw piece between the two conductors and position one conductor in the slot at each end. Use the little stapler to staple the excess straw snugly at each end around the conductor.

These straws, in lengths of 2 inches or less, are strong, and very easy to use. If stapled snugly, they will be almost weatherproof, but if such weatherproofing is necessary for long-term use, it is suggested that some form of liquid sealer be dabbed around the ends of the straws. – *Gary L. Foskett, W1ECH*

TEST PROBE FOR INSULATED WIRE

Recently I had occasion to make voltage checks on a piece of equipment using circuit boards where the conductors connecting to off-board components were not exposed. What was needed was a needle-sharp probe to penetrate the insulation of the wires.

Two pill bottles were drilled to accept a regular probe jack which also holds the bottles together. The junk box produced a probe which was then brought to a needle point on a grind stone and soldered to the lug on the jack. The whole thing is



then assembled and long-nose pliers are used to tighten the nut. The cap is then cemented in place.

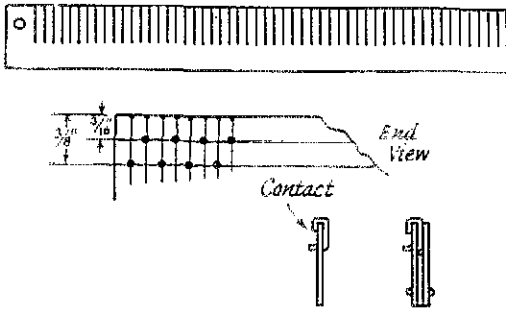
Whenever a sharp probe is needed, the instrument probe (VTVM, scope) is inserted into the open jack end and contact is made by the needle probe. The exposed part of the standard instrument probe is fully protected from accidental contact with bench tools, chassis and more important – the operator. When not in use the needle probe is corked and stored. – *R. H. Abeles, W2LMR*

A SIMPLE ARTICLE-REFERENCE METHOD

If an article in *QST* is of interest to you, write the title on the spine of that issue. Later on, it can be found at a glance rather than having to wade through a few years of back issues. – *Dr. R. L. Morgenstern, WA2EAW*

MODIFICATION OF AN OLD TYPEWRITER FOR KEYBOARD USE

Here is a method for converting an old typewriter for use as a keyboard with an amateur keyer. Other than the typewriter, all that is needed is some copper wire for the contacts (No. 12) and a piece of plastic strip on which to mount them. The latter could be a piece of pc board with the foil removed.



When you turn over any typewriter you will notice that there is a metal spacer that separates the keys and ensures that they move up and down in a straight line. Here the back sides of the keys are all approximately the same height. It occurred to me that if I could make contact here, the keys would travel the same distance for all letters. As the keys are already grounded the letter contacts must be isolated on the contact board.

After removing the foil from the circuit board, take off the key-divider strip from the typewriter and place it on top of the board. Now mark the contact placement. Be sure the two are clamped together firmly for perfect alignment. Also leave

space at both ends of the board for mounting to the typewriter frame. Now mark each keyway on the circuit board. Remove the divider strip and your board should be as shown.

Next draw two lines lengthwise, one 3/16 inch down from the marked edge and another 3/8 inch down. Take a small drill the size of the wire you will use for the contacts, drill alternate holes to give more space for soldering on the contact wires. To keep the wire from slipping out of place over the edge, I used a small three-cornered file and filed a notch in the edge of the board one half the thickness of the wire

Now you are ready to wire in the contacts. Cut a piece of No. 12 copper wire an inch long and bend in a 90-degree angle. Insert it in the hole and bend the wire over the edge of the circuit board in the notch. After wiring all 48 holes, cut off the excess leaving only enough for soldering.

The finished width and length of the board will depend upon the particular typewriter used. It is a good idea to glue another strip over the back of the board for greater strength. Clean off the back of the keys where they make contact and tin them with solder. This completes the modification. — *Jack F. Holt, W9RZI*

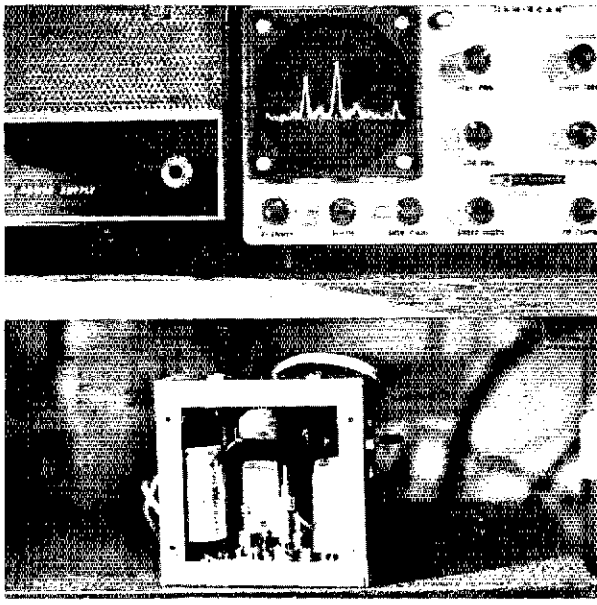
A LOW-COST I-F CONVERTER FOR SURPLUS PANADAPTORS

Contests and band openings in the vhf spectrum can be a challenge and great operating fun. During these events, it is a help to know where the activity is without wasting time tuning the band. With a spectrum analyzer or Panadaptor one can have an idea of band conditions at a quick glance.

There are quite a few surplus Panadaptors in the 25- to 45-dollar class, most of which have a 455-kHz i-f. Unfortunately, most ssb and fm transceivers do not have a 455-kHz i-f. This converter is intended for use with the Swan 250. However, the circuit will work with any i-f simply by changing its local oscillator frequency. The LO frequency is determined by the formula:

$$f_{LO} = f_{i\text{-}f} \pm 455$$

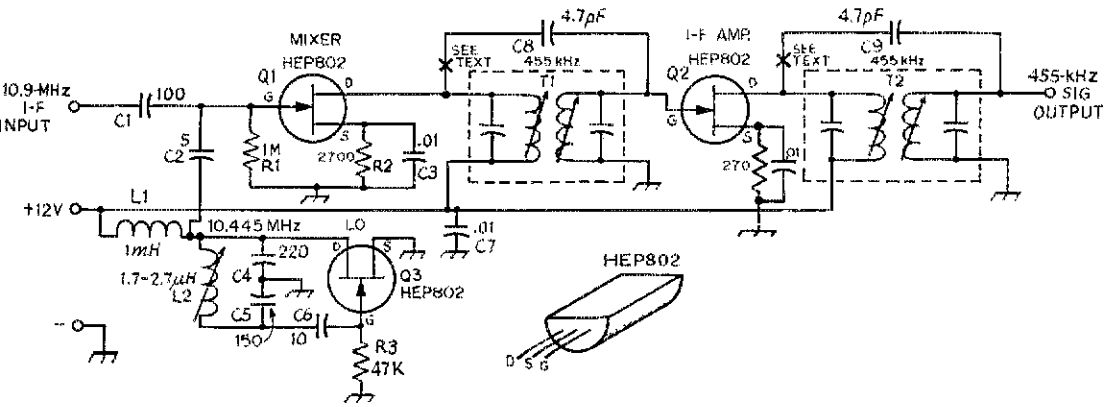
f_{LO} = Local oscillator frequency (kHz)
$f_{i\text{-}f}$ = First i-f in receiver (kHz)



Panadaptor display and converter.

The circuit consists of three stages: oscillator, mixer, and a broad-band amplifier. The 455-kHz amplifier consists of two standard i-f transformers. There are two 4.7-pF capacitors from primary to secondary on T1 and T2. These create an over-coupled stage, thus yielding greater bandwidth. The circuit layout is not particularly critical. However, it is a good idea to isolate the stages from each other to limit spurious responses.

Tune-up is fairly simply. First, a known frequency must be fed into the receiver and the receiver tuned to this frequency. L2 should then be adjusted so that the displayed signal is centered on the screen. Next the 4.7-pF capacitors, C8 and C9 should be disconnected (at point "X") and then T1 and T2 tuned for maximum signal output. Reconnect C8 and C9. Tune the upper slugs of T1 and T2, equalizing signals on the high-frequency side of the display and then tune the lower slugs for the low-frequency side of the display. It will take about three sets of adjustments to obtain a flat response. — *Warren Dyckman, WA2CAC*



PHASE-LOCKED-LOOP CONVERSION OSCILLATOR

Technical Editor, *QST:*

I have recently completed a tunable, band switching, phase-locked conversion oscillator. I started off by constructing the circuit shown in *QST* for March 1970,[1] but even after several months of spare-time experimenting, rebuilding, changing, and so on, I was unable to make the device work properly.

I put the project aside for a while and built a different phase-locked oscillator using mostly tubes. This device was completely successful and took very little effort to build. Later, I decided to have another go at the solid-state PLL by combining the best features of both circuits. Once I made this decision, it took a very short time to meet with success. The only change to the VCO is that the anode of the tuning diode is grounded. To the mixer IC 1 have added a parallel-connected 4700-ohm resistor and a .01-μF capacitor from pin 12 to ground. I had to change the toroids, L8 and L11, from 40 turns to 80 turns. I also changed the phase detector and dc amplifier, adapting information from the RSGB *Handbook*. I would like to impress upon anyone experimenting with this type of circuit that the VFO must be free of harmonics. — *Charles O. Smythies, VE7NP, 3458 Tunnah Rd., Nanaimo, BC, Canada.*

ANTENNA-SEALING COMPOUND

Technical Editor, *QST:*

Please reference June 1973 *QST*, the "New Apparatus" section, Cush-Craft AFM-44D Gain Antenna, p. 45. The article suggested the use of Dow-Corning 732 Silastic Sealant on the connectors for weatherproofing. If the box of this sealant is read, it will be noticed that during the curing process the sealant gives off an acid as a byproduct. Some of this acid is trapped under the sealant, in contact with the "protected" hardware.

Thus, extensive hidden corrosion takes place. Professional antenna installers have discovered this problem (sometimes the hard way) and have learned that this sealant should not be used on antennas. Instead, Dow-Corning 3145 sealant should be used. This sealant is identical in usefulness as an excellent protective sealant for antenna work, but does not possess the detrimental side effects of the 732 sealant. — *Michael A. Baker, Capt., USAF, K8WVZ, Det. 2, 1989 Comm. Sq., APO NY 09401.*

BATTERY ELIMINATORS

Technical Editor, *QST:*

Since the advent of mobile 2-meter fm, the demand for 12-V dc supplies of considerable amperage for home station use and for testing purposes has increased. These can be fairly expensive devices. Many types of 6- or 12-V dc "battery eliminator and chargers" are available. Usually the amperage is quite high, but frequently the device uses only a half wave rectifier, resulting in unwanted hum. The simplest solution is to add a full-wave bridge rectifier to the *output* of the eliminator plus a capacitor for filtering. This means a rectifier is on one leg of the supply in addition to the bridge, and causes no harm. No changes need be made to the supply other than this addition, and you now have a well-rectified and filtered supply quite cheap!

I have used this tactic on a *regulated* supply with a half-wave rectifier, and although the bridge rectifier was connected to the output, the regulation still maintained control! This means that power supplies and battery eliminators formerly discarded as having "too much hum" can readily be salvaged for today's use. The regulated supply is, of course, to be preferred to prevent voltage "yo-yo" when going from transmit to receive, preventing the danger of blowing out receive transistors. The similar tactic of adding on a 3-terminal regulator plus high-current pass transistor for your required or available amperage is another simple external connection to your "battery eliminator" power supply. — *Charles E. Spitz, W4APL, 1420 S. Randolph St., Arlington, VA 22204.*

ON THE WA1BYM MEMORY KEYER

Technical Editor, *QST:*

I've completed the WA1BYM memory keyer, and it works like a charm.[2] It won the "homebrew" prize at the Nortown Radio Club a few months ago. Thanks to *QST* and WA1BYM.

Not shown on the diagram of Fig. 5, but necessary for operation, are connections for U8. Pin 14 should go to +5 V, and pin 7 should go to ground. A 220-ohm resistor can also be put in the collector lead of Q6 if the solid-state output circuit is used, similar to R6 shown in the relay-keyed output. The shift time can be reduced from one second to approximately 0.2 to 0.4 second by changing C4 from 50 μF to 5 or 10 μF, making manual programming easy.

Be sure to provide an adequate heat sink for the regulator, U15, as it gets very hot — *very!* For those who worry a lot, the memory IC runs lukewarm. — *Murray Lampert, VE3FXA, 167 Kennard Ave., Downsview, Ontario M3H 4M8.*

ON THE SIMPLE FREQUENCY COUNTER

Technical Editor, *QST:*

The frequency counter article by W7URZ[3] was very inspiring. It should generate much interest in counters and frequency readouts. I know of four hams who have built or are building counters here in the Birmingham area.

In my version of the above counter, I have further simplified this "simple" counter by generating the blanking and preset pulses digitally — thus eliminating the two single-shots and their associated resistors and capacitors. In so doing, reliability has increased while component count

[1] Fischer, "An Engineer's Ham-Band Receiver," *QST*, March, 1970, p. 11.

[2] Riley, "An IC Keyer with Programmable Erasable Memory," *QST*, February, 1973, p. 26. Also see Feedback, p. 58 of *QST* for April, 1973.

[3] Hagen, "A Simple Frequency Counter for Receivers," *QST* for December, 1972, p. 11.

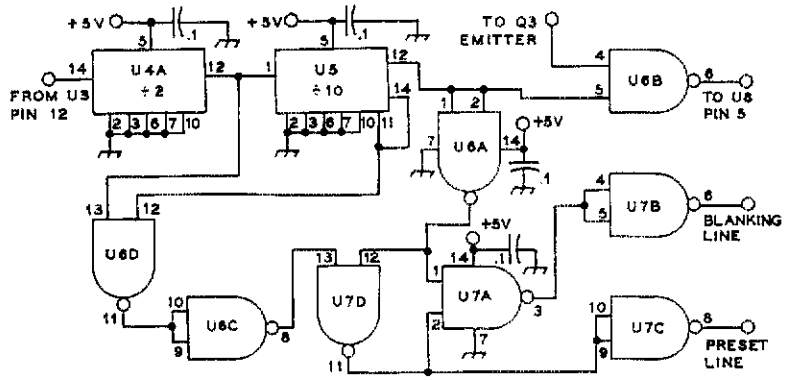


Fig. 1 — Schematic diagram of revised blanking and reset pulse-forming circuit. Capacitances are in microfarads. All ICs are dual-in-line package.

U4, U5 — SN7490N or equivalent decade-counter IC (1 section of U4 unused).
U6, U7 — SN7400N or equivalent quad 2-input positive NAND gate IC.

and cost has decreased. The simplified portion of the circuit is shown in Fig. 1.

Note that full use is made of U6. U7 is changed from a 74121 to a 7400. Also, it is necessary to swap the ÷2 and ÷10 functions of U4 and U5 to obtain the proper pulse sequence. This revision retains the original pulse widths: 10-ms counting, followed by a 9-ms display, which is, in turn, followed by a 1-ms preset pulse. The blanking line is low during counting and preset (reset).

If one wished to go to MAN-1 type LED readout in lieu of the binary readout and used the above revision, a total increase of $9.00 could be expected. This is based on recent Poly Paks advertisements. — *Jerry Jenkins, W4CAH, 774 Twin Branch Dr., Birmingham, AL 35226.*

FEEDBACK

An error appears in the chart of electronics suppliers listed in the July 1973 *QST* parts-procurement article by W1ICP. Milgray Electronics does *not* offer a catalog. Furthermore, they *do* have a minimum billing.

In the article, "A Practical Approach to Two-Meter Frequency Synthesis," Part II in *QST* for July 1973, a wrong resistor value is shown in Fig. 6, page 34. The resistor connected between the base and the collector of Q10, shown as 27 ohms, should be 27 kΩ.

Strays

QST Congratulates . . .

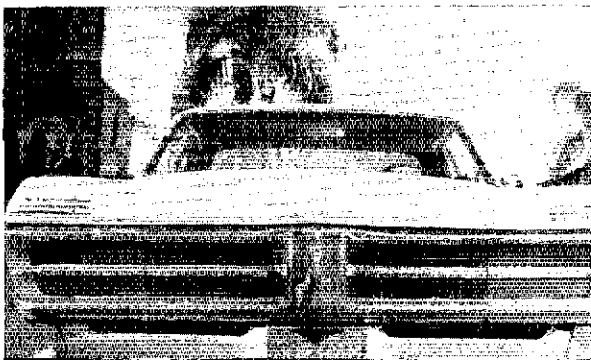
James White, WA1NNC, winner of two of the Kingswood School yearly awards: one in the field of graphics and design, the other for achievements in his hobby area of amateur radio.

Irvin Hershowitz, W3HOZ, named the Outstanding Handicapped Federal Employee of the Year. The aware was presented at a formal ceremony in Washington, D.C. by Mrs. Julie Nixon Eisenhower, representing the President of the United States. One of the accomplishments cited in the presentation was Irvin's design and construction of a 200-watt amateur transceiver specifically modified for operation by a severely handicapped and bedridden friend.

A correspondence course on the Morse code and how to become a radio amateur, on tape cassettes and in French, is now available from Guy Cadieux, VE2BTG, 4585 10th Avenue, Laval West, Laval, Quebec. VE2BTG is also the author of "Comment Devenir Radio Amateur," which was mentioned on page 96 of January 1971 *QST*, and which is used as the text for the above cassette course.

Stolen Equipment

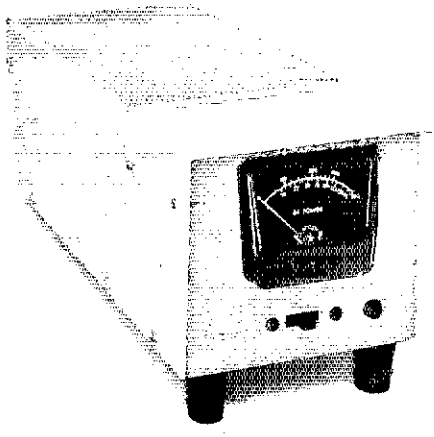
GSB 201 Mark IV Gonset Linear Amplifier, No. 4824 and Central Michigan University equipment tag No. 44089. Stolen from W8JLU weekend of June 22, 1973. (CMU Amateur Electronics Club).



K6RTZ recently spotted the above license plate on a Los Angeles street. But does he have a call? Hummmm . . .

Recent Equipment

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



The Heath HM-2103 RF-Load Wattmeter

THIS NEW MEMBER of the ubiquitous Heath line of amateur radio equipment should be a welcome addition in any ham shack. The HM-2103 is lightweight, compact and attractive. Those who are tired of struggling with separate power meters, cables and dummy loads, each of which may have a different style coaxial cable connector, should be impressed with the HM-2103.

A significant feature of the instrument is the lack of oil for a cooling fluid. This new unit is clean to use because the load resistor is air cooled. No more oil spills in the shack or workshop! Of further interest, the HM-2103 has a built-in warning light which is activated by means of a thermal relay. When the maximum safe upper temperature for the load is reached the light comes on, and remains on until a safe temperature is reached through lowering of the input power to the wattmeter. A separate internal test circuit is included to permit checking the condition of the lamp and battery.

The circuit used in the rf wattmeter is that described by Bruene in *QST* for April, 1959, except the reflected-power position is not used. The normal application of this device is to provide a transmitter load during tune-up, but there are many other uses for the HM-2103. For example, how to answer the proverbial question of whether or not coaxial cable which has been out in the elements for a long period of time is still good. Just set the transmitter to a given power level as indicated by the HM-2103 (with a short piece of cable connected between the two). Then connect the HM-2103 to the end of the cable under question and compare the readings. If the coax is still good, there should be little difference in readings provided the transmitter power level hasn't changed. The actual loss in dB can be computed from the ratio of the two power readings (250 watts will drop to approximately 200 when a cable loss of 1 dB exists.[1]). The portability of the HM-2103 makes this method practical in cases where one end of the transmission line is in an awkward place (such as the top of a tower). The method just outlined is also useful in testing matching networks.

Construction and Performance

Building time for the HM-2103 is one evening. The usual excellence and clarity of the Heath manuals is maintained in the instructions for the HM-2103, and there were no problems in construction.

One of the main features of any good dummy load is its ability to keep the rf energy confined within itself. The HM-2103 is provided with a perforated cover which allows adequate circulation of air for cooling. Tests were performed to see how effective this arrangement was in reducing radiation. With an input of 25 watts (on 28.1 MHz) to the HM-2103, only a very weak signal was heard approximately 500 feet away. The receiving antenna was a two-element delta loop on a 60-foot tower. Comparisons made with a Heath Cantenna and the HM-2103 indicated no discernible difference.

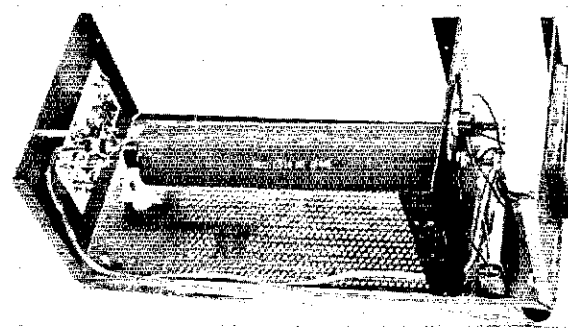
Calibration of the rf wattmeter can be accomplished by the use of another wattmeter, a VTVM, or an internal calibrator. The latter consists of a capacitive voltage divider and a sampling diode. Since this scheme is somewhat frequency

[1] *The Radio Amateur's Handbook*, Chapter 1, any edition.

sensitive, Heath advises that a particular band (7 MHz) has to be used for accurate calibration.

Heath claims the accuracy of the wattmeter is within ±20 watts on the low scale, and ±100 watts on the high scale. The wattmeter was first calibrated using the internal sampling circuit and then compared with our lab wattmeter. A difference of eight watts was noted with a power input of 50 watts. After recalibrating the HM-2103 against the lab wattmeter at the 50-watt level, the maximum difference noted from 0 to 70 watts was three. The latter measurements were made in the 40-meter band. No differences between the two wattmeter readings were noted in the 1.8- and 3.5-MHz range. A difference of one watt occured at 14 and 21 MHz, and four watts at 29 MHz. SWR readings made on the HM-2103 were too low to be measured accurately indicating that the SWR of the load was well below the published specification of 1.2:1.

Obtaining one kilowatt output for any length of time is not as easy as it sounds. To test the load at maximum rating, a hefty amplifier was rounded up that had a continuous-duty rating of two kilowatts input. While erstwhile assistant WA7ISP was enthralled by the color variegations in the 3-1000Z, the writer was rather nervous about the HM-2103's ability to endure with a full-scale indication of 1000 watts showing on its meter face. However, after approximately two and a half minutes elapsed, the warning light came on and the test was concluded. No apparent damage was observed and the unit performed as before, after the warning light went out. In the author's opinion, the HM-2103 should adequately handle *most* amateur applications. – *W1YNC.*



Internal view of the HM-21 showing metering circuits, load resistor, and the pc board containing the power meter.

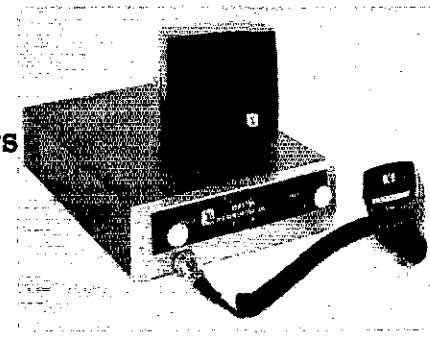
The Heath HM-2103
RF Load Wattmeter

Frequency range: 1.8 to 30 MHz.*
Wattmeter range: 0 to 200 and 0 to 1000 watts.*
Wattmeter accuracy: ±10 percent of full scale reading.*
Load type: Noninductive, solid carbon, 50 ohms.
Connector: Uhf type SO-239.
Dimensions (HWD) and Weight:
6 × 5-3/8 × 13-3/4 inches, four pounds.*

* Measured in the ARRL lab.

QST —— QST —— QST

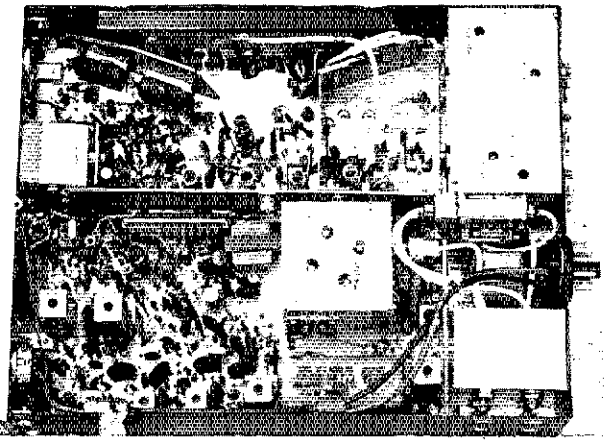
E. F. Johnson Fleetcom 550 and 557 UHF FM Tranceivers



FOR MANY YEARS this writer has been telling amateurs that a practical way to get on uhf fm is to feed the output of a vhf transmitter into a varactor tripler. The practicality of this method is borne out by the Fleetcom 550 and 557 transceivers. These units are basically a vhf receiver with a revised front end and a transmitter that operates near 148 MHz to drive a varactor tripler, providing output in the 420-MHz band.

Amateur repeaters in the 420-MHz band are not in great supply in this part of the country, and it required considerable time to evaluate the equipment in actual use. In fact, most of the time was spent evaluating the system rather than the equipment. The conclusion was that most amateurs (at least here in New England) have a considerable way to go before their uhf repeaters can match the performance of the 146-MHz installations. Then too, the hilly terrain of Connecticut and Massachusetts is not ideal for such tests. However, the Johnson Fleetcom equipment performed admirably.

A proportional temperature-control circuit is mounted around the transmitter crystals and helped maintain frequency stability which, at times, was better than that of the repeater being used. Crystals in the receiver are not in an oven or otherwise protected, but there was no problem with frequency drift.



In this top view of the 557 transceiver, the transmitter portion is at the top. The small box near the front panel is an insulated cover over the temperature control circuit and the crystals. A vhf amplifier stage is mounted along the top wall of the unit. At the top right is the varactor tripler inside a heavy enclosure. Helical resonators for both the transmitter and the receiver are located at the lower right. They can be adjusted through holes in the sidewall of the transceiver.

Electrically, the 550 and 557 are almost identical. The 550 provides an output of 4 watts and the 557 is a bit huskier with 10 watts output. The additional power is obtained in the 557 by placing an amplifier between the output of the vhf exciter and the input to the varactor tripler. This amplifier is tucked into a space along the side of the chassis. This opening appears to have been designed for speaker-mounting purposes. An optional accessory (for the Fleetcom 550 only) is a kit to mount a speaker internally. Normally, both models come with an external speaker in an attractive enclosure that can be positioned for maximum listening comfort.

Helical resonators are used in the transmitter output line to prevent unwanted energy from reaching the antenna. A pair of these high-Q circuits is also placed ahead of the receiver to prevent responses to out-of-band signals. The rf amplifier and mixer stages in the receiver contain bipolar devices; therefore this protection against overload or intermodulation is very desirable.

Mechanically, the Fleetcom units are made to withstand the rigors of mobile use. The frame and outer housing parts are of steel and the front is a heavy, but neatly styled, casting. Both the mounting bracket and the case have a variety of slots and holes that will allow the user to tilt the unit for most convenience.

The helical resonators are quite well made; no problems were encountered because of temperature changes or vibration in these high-Q filters. Antenna switching and transmit/receive voltage switching is performed by separate relays in the transceivers. A built-in voltage regulator provides +9 volts for the oscillator and frequency-multiplier stages in the receivers. The noise-amplifier part of the squelch circuit also obtains power from this regulated source. In the transmit position a relay connects the regulated 9 volts to the oscillator, modulator, buffer, and first doubler stages. — *W1SL*

E. F. Johnson Fleetcom 550 and 557 UHF FM Transceivers

Transmitter power output: Fleetcom 550, 4.2 watts; Fleetcom 557, 11.0 watts *

Transmitter deviation: Adjustable up to 5 kHz.*

Transmitter crystal frequency: Operating frequency divided by 24.

Channel capability: Two.

Receiver sensitivity: Less than 0.5 μV for 20 dB of quieting.*

Squelch sensitivity: Less than 0.5 μV to open.*

Receiver crystal frequency: Operating frequency plus 10.7 MHz, divided by 9.

Power requirements: 13.8 V dc for rated output. Transmitters: 550, 2 A; 557, 3.5 A. Receivers: 350 to 340 mA (includes 50 to 100 mA for temperature control circuit).*

Dimensions (HWD) and Weight: 2-5/8 × 8 × 12-1/4 inches, 7 pounds.*

Price class: Fleetcom 550, $520. Fleetcom 557, $635.

Manufacturer: E. F. Johnson Co., Waseca, MN 56093.

* Measurements made in the ARRL lab.

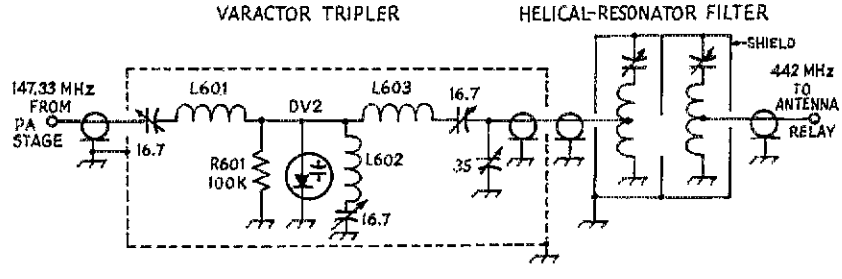
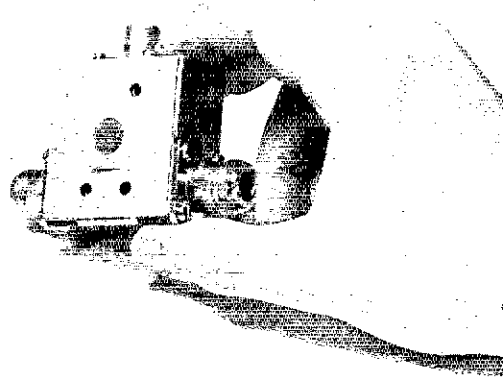


Fig. 1 — The schematic diagram of the varactor tripler and the helical resonators in the Johnson Fleetcom 550 and 557 transceivers. A simpler method of obtaining energy on uhf would be hard to imagine. The use of good output filtering with *any* transmitter is highly recommended.

• New Apparatus

MICROWAVE ASSOCIATES, INC. CIRCULATORS AND ISOLATORS



A recent addition to the vocabulary of some amateurs is the word, "circulator." Many repeater operators have become familiar with the device and the word through an effort to reduce the intermodulation (IM) problems in vhf and uhf repeater installations.

Two devices by Microwave Associates (West) are shown here. The larger unit is a Model XH-419-6Q1, designed to operate in the range from 145 to 154 MHz. The smaller device, Model H-360-450-T, is useful from 400 to 550 MHz. H-360 series circulators are also available for use in the 140- to 180-MHz range. They can be obtained with a built-in rf load, in which case they are called isolators.

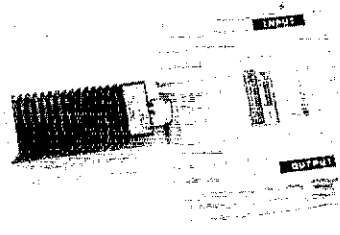
A circulator is a ferro-magnetic device that permits energy to flow in one direction with very little loss, but introduces a great loss to energy going in the opposite direction. Most circulators have three connections or ports, but they can be manufactured with four or more. The usual configuration is with the transmitter connected to port one, the transmission line to port two, and an rf load to port three. Energy from the transmitter flows through the circulator to the transmission line virtually unimpeded. Any reflected energy on the transmission line is shunted off to port three where it is dissipated by the rf dummy load.

The usefulness of a circulator goes far beyond merely protecting the transmitter from a mismatched transmission line. Energy that may be induced in the antenna system from another one nearby will be absorbed by the rf load instead of being allowed to reach the PA stage of the transmitter. Such mixing of external signals with the harmonics of the repeater output frequency is a major cause of IMD where the vhf spectrum is crowded. The addition of a circulator to each repeater will be of great help in alleviating this particular type of pollution. An example of an IMD problem: Repeater A has an output frequency on 146.880 MHz. Its second harmonic occurs at 293.760 MHz. Repeater B, operating line-of-sight from an adjacent location, has an output frequency of 146.790 MHz. The latter signal comes down the transmission line of Repeater A, mixes with the 293.760-MHz energy inside the PA tube(s) of repeater A, and produces a difference frequency of 146.970 MHz. Though the IMD product is generally in the milliwatt range, it can be radiated for several miles, because the repeater is located atop a high land mass or building. If there is a repeater in the area that uses 146.970 MHz as its output frequency, (repeater C) stations near repeater A will hear the IMD product better than they will the desired 146.970-MHz repeater output from repeater C. This is a common problem in areas where several repeaters are located, and there are many numerical combinations that can cause interference to repeater users in a given area. Circulators will help to reduce the level of the IMD product by providing some 25 dB of attenuation to the unwanted signal coming down the feed line to the transmitter PA. Another use for circulators is to enable two or more transmitters to be connected to a common transmission line and antenna.

The H-360 circulators from Microwave Associates have a rating of 100 watts, a typical insertion loss of 0.5 dB, and isolation of 25 to 30 dB. The XH-419 series is rated at 300 watts, insertion loss of 0.3 dB, and typical isolation of 25 dB or more. The unit shown here has a 50-watt rf load, Model 44003, connected to port three.

Price class for the H-360 isolator is $280, and for the XH-419 it is $625. The 50-watt rf dummy load is in the $85 class.

The address for Microwave Associates, Inc. is 999 East Arques Ave., Sunnyvale, CA 94086.—*WISL*



Presentation for the Amateur Service

On July 9, officials of the League made a 40-minute presentation to the Federal Communications Commission, complete with visual aids, outlining the history, present status, and likely future of the amateur radio service. The text is reproduced here. Probing questions from the Commissioners occupied nearly an additional hour. There was general agreement that continued close liaison between the FCC and ARRL at staff level was most important in assisting development of the service.

PRESENTATION OF
THE AMERICAN RADIO RELAY LEAGUE
TO THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.
JULY 9, 1973

Harry J. Dannals, W2TUK, President
John Huntoon, W1RW, General Manager
Robert M. Booth, Jr., W3PS, General Counsel

INTRODUCTION *(Mr. Booth)*

I appear here today not only as General Counsel of the American Radio Relay League, but also as one who became a radio amateur while in high school and as one whose professional life has been built upon the experience gained through amateur radio. I am an active operator and am known throughout the amateur fraternity as W3PS, the call assigned to me by the Commission.

A report to you of recent developments in the Amateur Radio Service and problems confronting amateurs, and a look into the future, is long overdue. The last time the League appeared before the Commission was almost four years ago, on the day Chairman Burch presided over his first meeting.

Amateur radio is as old as radio itself. The very first radio experimenters and inventors were amateurs. Most of the significant developments in radio and electronics over the years have been made by men, and women as well, who were first attracted by amateur radio. Some of the many contributions are documented in a study made by the Stanford Research Institute in 1966.

Following World War I, the United States Government recognized that amateur radio is a most valuable national resource and adopted as a national policy the support and encouragement of amateur radio. At international frequency conferences over the years, the United States has been a most staunch supporter and defender of amateur radio.

Much misunderstanding has arisen over the last few years over the differences between the Amateur Radio Service and the Citizens Radio Service. All too often, the news media have blamed amateurs for the sins and transgressions of the CB operators. Even within the Commission, the services have been compared at times by considering the numbers of licensees and the dollars collected in fees. Our presentation will point up some of the unique aspects of the Amateur Service.

Our principal presentation will be made by the League's President, Harry J. Dannals, W2TUK. Mr. Dannals is a senior electronics engineer with the Sperry-Rand Company at Great Neck, Long Island, and is a Commander in the active reserve of the United States Navy. He serves the League on a strictly volunteer basis without salary, and devotes almost every evening and weekend to League affairs.

The League will celebrate its 60th birthday next year. John Huntoon, W1RW, the League's Secretary and General Manager and the Editor of the League's monthly journal, *QST*, will describe in some detail the League's organization and the many services offered both to the amateurs and to the general public.

We sincerely hope you will have many questions, both during and after our direct presentation.

With this introduction, I present Harry J. Dannals, President of the American Radio Relay League.

I. WHAT IS THE AMATEUR RADIO SERVICE? *(Mr. Dannals)*

We are most pleased at the opportunity to provide some background on the amateur radio service, an appraisal of its present status, and a look into some aspects of the future.

Let me start by using, as a guide, Section 97.1 of the rules – the basis and purpose of the service. The very first challenge to us concerns providing emergency communications.

A half million or more amateurs spread around the world insures that wherever nature may go on a rampage and destroy normal communications links, hams, not only on the scene but elsewhere, are there to step into the breach with emergency powered equipment. This[1] is downtown Managua after the earthquake last December. The first news to the outside world, and pleas for help, came from an amateur station on the city outskirts. Nicaragu-

[1] Footnotes indicate points at which visual aids were projected. When the subject is not apparent from the text, a footnote reference will be given.

an amateurs improvised and adapted equipment for portable work; nearby countries flew in both equipment and amateur operators; a planeload of power generators and additional hams came from the United States. Here[2] in a tent outside the Presidential palace was the command post; the man in the camouflage shirt is Gen. Roger Bermudez, coordinator of the National Emergency Committee – himself a licensed amateur. For several days, a handful of amateurs in Nicaragua were able, with the help of hundreds of hams in the United States and elsewhere, to handle an enormous volume of emergency messages.

Disaster may strike anywhere, as it did in Alaska in 1964, with amateurs providing the first and much of the subsequent communication circuits for relief. The San Fernando Valley was shaken by a quake in 1971; here,[3] amidst some of the rubble, amateurs enrolled in civil defense assist in a damage appraisal. The story is the same in floods and hurricanes – Agnes in 1972 being a recent major example.

While such instances fortunately are rare, personal tragedies occur daily and often find an amateur prepared to help. Picture a crowded multi-lane highway, an error in driver judgment, a crash of steel and a three-car pileup. Other vehicles stop to help, yet no telephone is nearby and the next exit is 9 miles. But one car has call letter license plates and a ham mobile rig, and his quick call to the state police barracks, through a 2-meter FM repeater, brings patrol cars, an ambulance and wreckers, all in minutes. A rare instance? Not at all. Such performances by amateurs have brought words of praise from governors and commissioners of state police.

In recent years, amateurs have increased their ability to provide local public service communication through the use of repeaters in the VHF bands, especially 144 MHz. This part of the spectrum is already saturated in some metropolitan areas, so the amateur allocations at 220 and 420 MHz have assumed a great deal of importance to the future of amateur radio. These repeaters, built and maintained by amateurs at their own expense, make this part of the spectrum useful for work with low-power mobile and hand-held equipment – equipment whose usefulness without repeaters is severely limited. Emergency plans designed around repeaters have been developed for communities throughout the country.

Effective performance by amateurs is not just an accident. It is the result of extensive self-training in communications techniques, in the organized aspects of amateur activity sponsored by the League. Thirty thousand amateurs are enrolled in our Amateur Radio Emergency Corps. An annual test exercise simulates a variety of disasters throughout the country, and permits an appraisal of equipment and operator effectiveness. A second annual event, Field Day,[4] brings out fifteen thousand amateurs, mostly in club groups with emergency power equipment and portable antennas, for a 24-continuous-hours test of capabilities.

Other communications training exercises, which render public services at the same time, include such activities as the Eye Bank Net, boat races, telethons, and Red Cross events.

In addition, radio amateurs provide operational support for such other activities as the Military Affiliate Radio System, the Post Office Net, the Weather Bureau, the Civil Air Patrol, and the Coast Guard Auxiliary.

Again, all of these activities are aimed at enhancing the value of the amateur service to the public as a voluntary, non-commercial communications service.

Section 97.1b pertains to the advancement of the art. Throughout our 70-year history, the mysteries of propagation have fascinated radio amateurs. Indeed, in the 1920s, hams were the first to discover the usefulness of short waves, which were then considered worthless and now account for most radio communication. Later studies were somewhat more formal and disciplined; for example, during the International Geophysical Years of 1957 and 1958,[5] under an ARRL contract with the Air Force, hundreds of amateurs cooperated to study VHF propagation phenomena, including that influenced by sporadic clouds of ionization, reflecting signals to earth over unusual distances. Detailed studies were made; results analyzed and reported in *QST*.

More recently, amateur "Oscar" satellites[6] (OSCAR is an acronym for Orbiting Satellite Carrying Amateur Radio) have opened the way to other explorations, including a recently-observed phenomenon, as yet unexplained, of "reverse Doppler." If confirmed, it will upset a basic theory accepted by scientists for more than 130 years. Oscar satellites have been the basis for high school and college supplementary curricula for training our nation's youth in space science. Group training,[7] such as that at the Talcott Mountain Science Center in Avon, Connecticut, can provide more sophisticated equipment such as this surplus radar dish, for tracking and other experiments with the ham "Oscar."

The Oscar program has, for the first time, brought space communications to a number of countries not yet able to support a ground terminal for commercial satellite links – and brought it on a direct, people-to-people basis.

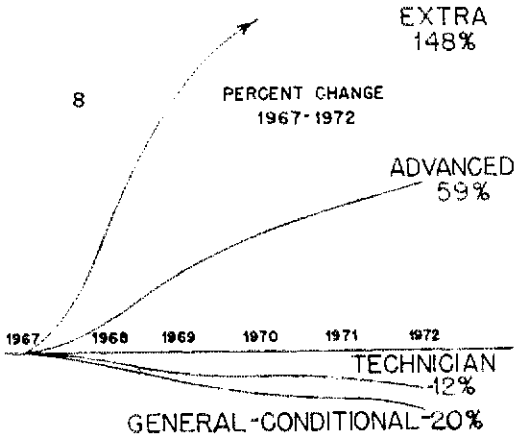
Another technical contribution made recently by amateurs is called slow-scan TV. This was first developed by Copthorne MacDonald (W1GNQ), while a college student at the University of Kentucky, and permits the transmission of a picture of high quality using a band width not exceeding that required for radiotelephone operation. SSTV, as it is called, is now in expanding use by radio amateurs.

And just a week ago, amateurs located at various spots around the world monitored a signal from Africa, where the government of Mauritania issued amateurs a special call sign and operating privileges, to observe propagation conditions during the total eclipse of the sun.

---

[5] Artists's sketch of sporadic-*E* cloud reflection for DX work on 6 meters.

[7] Photo of young amateurs working on radar dish.



Section 97.1c speaks of rules to provide for advancing skills. A shorter name might well be "incentive licensing" – stepping stones in the amateur license structure which offer additional operator privileges after demonstration of additional skills, either in code proficiency or technical knowledge, or both. In 1953, despite our strong protests, your Commission discarded much of the incentive licensing system. A dozen years later, we petitioned for reinstatement, and while the final result in 1967 was a far cry from our proposal, the overall effect has been quite good. This graph[8] illustrates the resulting adjustments in license classes. The Extra Class, of course, skyrocketed, as for the first time its holding granted some specific additional privileges. But, as this chart shows, amateurs in large numbers upgraded to the Advanced Class as well.

As an aside, we think it is important to note the long record amateurs themselves have established for self-motivation in improving both their operating skills and their technical capabilities.

Section 97.1d deals with the expansion of the Amateur Radio Service.

Amateurs have traditionally sought to expand their ranks, largely because of natural enthusiasm for the hobby. Our national association (ARRL) has engaged in such recruiting efforts as the production of a 30-minute film, "The Ham's Wide World," which has been shown to an estimated TV audience of nearly 22 million and general audiences of some 300,000. Other general recruiting activities include working with the Boy Scouts[9] and Boys Clubs, and participation in Scout jamborees, fairs, hobby shows, and the like. However, the greatest promotion for amateur radio comes through the contagious enthusiasm of hams themselves.

The technical competence of amateurs is encouraged through classes in code and theory which are sponsored by many of the 1500 amateur radio clubs throughout the United States, through the training aids program which is administered by the League, through the many technical publications prepared by the ARRL staff, and through hamfest[10] and convention technical meetings. I'd like, incidentally, to thank the Commission for the opportunity amateurs have had on so many occasions to hear and meet FCC staff members at our conventions and hamfests.

A number of surveys through the years, as summarized in the Stanford Research Institute report, show that involvement in amateur radio leads many people into responsible positions in the electronics and communications industries.

Traditionally, and as demonstrated vividly in World Wars I and II, the military have depended upon radio amateurs as a source of trained operators who can readily adapt to military procedures. This is particularly true in the 70s, what with the military no longer training their operations in Morse Code operation but still acknowledging that c.w. is the ultimate back-up means of communication when more sophisticated systems fail. Self-trained amateur radio operators will fill that need.

Section 97.1e speaks of international good will.

The "people-to-people" aspect of amateur radio is unique – nothing else affords the day-in, day-out two-way personal contact between ordinary people around the world, without regard to geographic, social, economic or ideological boundaries. Many amateurs have followed up on-the-air friendships with personal visits in many foreign countries. Yet this great value of amateur radio is relatively unknown – even amateurs themselves take it for granted.

However, some leading amateurs recognize this value. For example, Sir Allen Fairhall (VK2KB), Australian Minister of Defense put it this way: ". . . a communication world in which scientists and tradesmen, doctors and explorers, ranchers and public servants, indeed people across the whole catalogue of human interests, can reach out to serve the great dream of having people really understand each other." John F. Clark (W3GYH), Director, NASA Goddard Space Flight Center: "But to me, the greatest contribution 'ham' radio has made or will make is to true 'people-to-people' communication, across political and geographical boundaries, thereby moving us all a little faster toward tomorrow's unified Planet Earth." Senator Barry Goldwater (K7UGA):[12] "I have found the most rewarding aspect of this service to be the constant friendships that are established through a QSO. If we could get everyone in the world to be amateur operators, we could eliminate a lot of its problems." Clay T. Whitehead (KØBGD), Director, White House Office of Telecommunications Policy:[13] "While diplomats and politicians struggle with official relationships, the world's hams continue to establish good will on a person-to-person basis."

II. WHO ARE RADIO AMATEURS?
(Mr. Huntoon)

I should like to present a few highlights of

[8] Illustrated herein.

[9] Amateurs at a Boy Scout Jamboree ham installation.

[10] Typical hamfest/flea market gathering.

[11] Typical QSL cards.

[12] Station photo, VP2KJ.

[13] Station photo, JA2AJA.

characteristics of the amateur body, partially answering the question, "Who *are* radio amateurs?" and then briefly describe the structure of the American Radio Relay League.

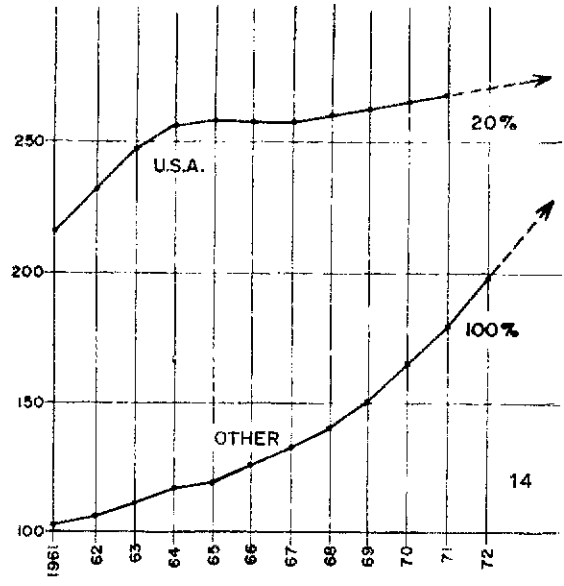
Around the world, there are something over half a million people engaged in amateur radio communication, under license from their national administrations. In ITU regulations, the service is defined as one of "self-training intercommunication and technical investigations." Part 97 of your rules contains the same words. About half the world total of amateurs are in the United States, licensed by your Commission.

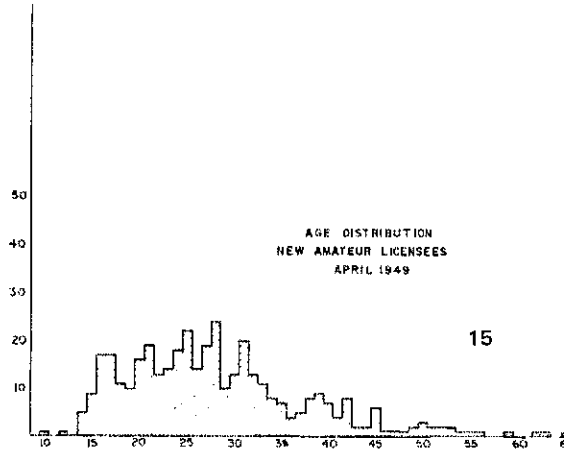
Here[14] is depicted the growth curve of licensed amateurs the past dozen years. The top line shows the trend in your amateur licensees. We believe it is more than coincidence that the curve flattened notably in precisely the same year you instituted license fees — that is, 1964. The lower line shows growth for the same period in the rest of the world. Comparison of the trend here with that in other countries prompts some concern. While we here increased our numbers 20% during that 12-year period, the total in other countries doubled. This is due, we believe, to a gradual change to a more favorable attitude of some administrations, particularly in Europe. More recently, the view overseas has been one of greater recognition of the value of the amateur radio service, of encouragement and assistance, and liberalized regulations. In fact, at the 1971 ITU conference on space communications, the most aggressive supporter of amateur radio was not the United States, as has been customary, but the U.K., and New Zealand. Whatever the reasons, if the present growth trends continue, the two lines will soon cross, and the United States will drop from the top spot. In fact, right at this moment, Japanese amateur radio is growing so fast its members alone will soon overtake ours.

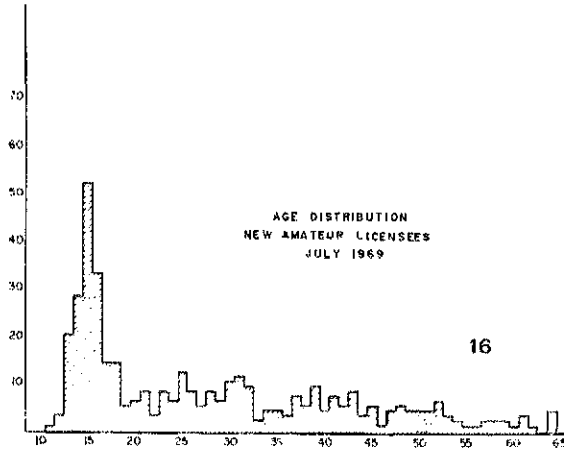
The age distribution of amateur licensees fairly well follows that of the general population. There is no minimum age required of an applicant, so there are amateur licensees from 9 to 90, plus an occasional precocious youngster of 6 or so.

The age of newcomers, however, is of particular interest to the League, since it suggests the future composition of the amateur body. This chart[15] covers a substantial sampling of new FCC licensees in the year 1949. It shows a fairly gradual rise from age 15 upwards, then dropping slowly after age 30, and gradually diminishing as the age gets past about 45. But now please look at this second graph,[16] made from figures just 20 years later - in 1969. Age 15 is the peak, and indeed half of all newcomers to amateur radio today are teenagers or younger. Except for that peak, the input is distributed over a much broader range of ages. The comparison is better shown if we can try an overlay. Certainly the typical new licensee is much younger today than 20 years ago.

Amateur radio knows no bounds of position, race, creed or color. A high-school lad or girl can, most often without realizing it, have intercommunication with a U. S. Senator, or a former FCC







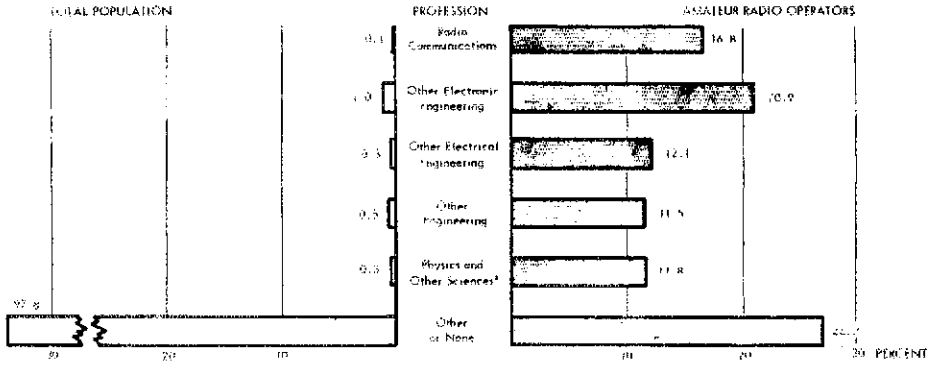
[14-20] Illustrated herein.

Commissioner, or the President of a Central American Republic. In post-World War II Europe, an Air Force sergeant off duty was operating his ham station and chanced to hook up with another amateur at base headquarters. He took the opportunity to complain in rather strong words about the poor performance of the Headquarters in supplying engine parts for replacements he had requested weeks earlier, and was thoroughly critical of the way the Headquarters was being run. The ham at Headquarters promised to look into the matter, and did, with the result that the engine parts were on their way that afternoon. The sergeant did not realize his blunt criticism was directed at the commanding general of the theater – and Curtis LeMay (KØGRL) never told him. Another – when his Royal Highness King Hussein (JY1) of Jordan visited the United States, two of his amateur hosts were Madeline (W2EEO) and Arthur (W2LH) Greenberg.

The League has always believed that U.S. leadership in the field of electronics development and telecommunication is in no small measure due to the federal government policy of encouraging scientific interest among youth through the amateur radio service, and by pretty much letting them follow their own course to goals and objectives.

Each mode of emission permitted amateurs today is practiced to some degree by the amateur body. Single-sideband, perhaps the most efficient practical use of the spectrum for voice communications, occupies a major interest on the high-frequency bands, as indicated by the left column in this chart.[16] C.w. telegraphy is next, also principally on h.f. It is pertinent to note the Office of Telecommunications Policy has stated once again that "it still would be wise to retain a pool of U.S. citizens skilled in cw operations as a resource in reserve. Amateur operators, with their superb record of serving the public interest when needed,

DISTRIBUTION OF SCIENTIFIC AND TECHNICAL PROFESSIONS:
TOTAL POPULATION IN THE UNITED STATES (1960)
VS AMATEUR RADIO OPERATORS (1965)



*Data for total population are for 1962.

KØGRL/ES. Questionnaire. Statistical Abstract of the United States.

17

While there are amateurs from all walks of life, approximately half are involved professionally in one form or another of telecommunication. In many instances – some, I am sure, among your own staff – initial interest in the hobby of amateur radio resulted in the selection of electronics as a career.

This[17] illustrates the results of a survey of occupations of amateurs as concerns scientific and technical areas. While only 2 percent of our total U.S. population is so involved, 73 percent of amateurs find their professional careers in radio communications, electronic or electrical engineering, or some other aspects of physics and science generally.

NASA Astronaut Owen Garriott, one of the Skylab team, has the amateur call sign W5LFL. He has said, "It was with (amateur) equipment used in programs at Stanford University that we first monitored the signals from Sputnik I in 1957, which first stirred my continuing fascination with space activities."

are considered the best means for preserving this skill." We believe amateurs are meeting that challenge.

The two left-hand columns, sideband and cw telegraphy, together total 71% of all amateur activity and show a continuing need for adequate frequency space in the high frequency spectrum. A third, very strong and growing, is vhf and above – i.e., the amateur bands higher than 50 MHz. Much of this is, of course, on 144 MHz (two meters) from the surge of interest in FM and repeaters. In fact, crowding on that band forces greater occupancy of 220 MHz, although activity at 220 is considerably inhibited by uncertainty over the final disposition of the EIA petition and your proposal along those lines. The two other modes shown, of somewhat lesser use, are radioteleprinter and slow-scan TV. There are, of course, other specialized interests such as bouncing a signal off the moon, auroral reflection, tracking of sporadic-E clouds, and the like.

And now, a few words on the ARRL and its organizational structure.

The American Radio Relay League is a membership association of amateur radio operators, primarily from the United States. Its purposes as stated in the Articles of Association are the promotion of interest in amateur radio communication and experimentation; the relaying of messages by radio without charge; the furtherance of the public welfare; the advancement of the art; the fostering and promotion of intercommunication by electronic means for the personal benefit of members and without pecuniary gain; the fostering of education in the field of electronic communications; and the printing and publishing of material necessary or incidental to the above purposes. The League is non-profit and tax-exempt.

The League[19] is governed by a board of sixteen directors, elected by members in fifteen geographical areas or "divisions" in the United States, plus one from Canada. The Board elects a president and other officers. Every officer and director is an unpaid volunteer, serving the League and its members out of personal dedication to the cause of amateur radio. The Board employs a general manager and staff of 70 people at the administrative headquarters offices in Newington, Connecticut.

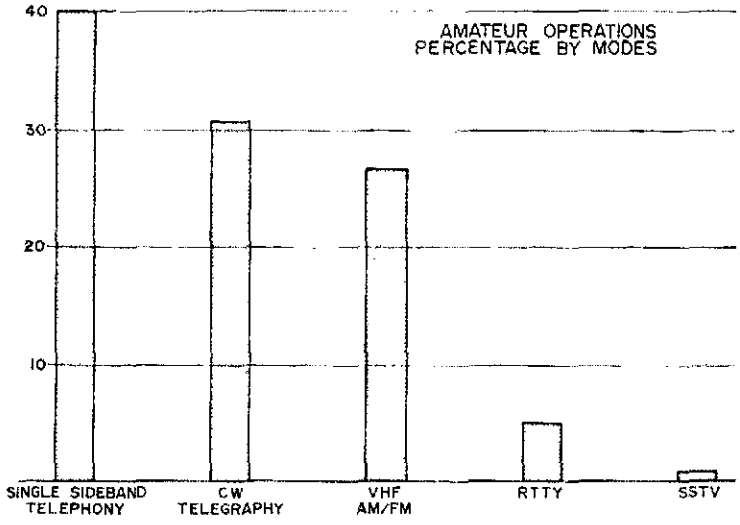
To assist in its formulation of policy, the Board has input from several standing committees, in the important areas of

International Affairs
Plans and Programs
Membership Affairs
Management and Finance
Legal and Regulatory

and there are several membership advisory committees dealing with the specialized areas of

Emergency Communications
Contests
VHF Repeaters
DX (distance communication)

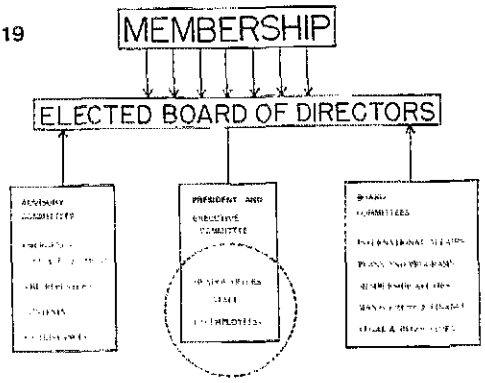
But most important is the basic mechanism for democratic control. Directors, like members of Congress, are elected by constituents – but candidates are also *nominated* by members, so those chosen are really grass roots-representatives. They devote time and energy to ascertaining the needs and desires of members in their areas, and bring these views into focus twice yearly at regular Board meetings, and in the interim through communication with the officers, Executive Committee, and staff. It is pertinent to note that some $70,000 of League funds was expended in 1972 to cover meeting and traveling expenses of officers and directors – mostly on weekends, I should add, from their personal time – to ensure that League policies and actions truly reflect the views of the great majority of our members. That block at the top of the chart is both the heart and the root of the entire operation. The membership total is 107,000, the highest in League history, and still growing.



18

A major activity of ARRL is its far-flung field organization,[20] primarily devoted to Section 97.1a of your rules, as Mr. Dannals has indicated, particularly in providing a voluntary non-commercial communications service. Canada and the U.S. are divided into 74 geographical areas called sections, with state and province boundary lines for the most part, but with some sub-divisions in heavily populated areas such as New York and California.

Each section has a communications manager, elected by members in the area, and a section emergency coordinator, appointed by the SCM especially to encourage and supervise amateur self-training and preparation for disaster communications. A National Emergency Coordinator at the headquarters coordinates this activity on a national basis, and maintains liaison with the Red Cross, Defense Communications Preparedness Agency, your own National Industry Advisory Committee, and the like. General amateur activity is encouraged on an organized basis through various station



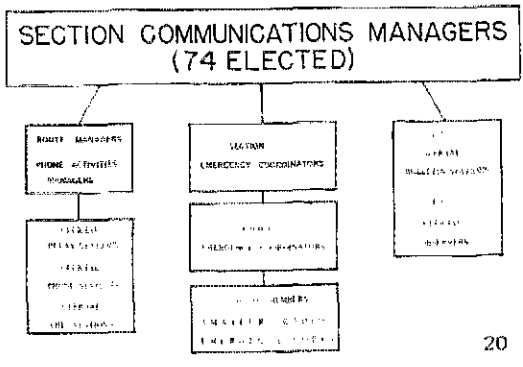
appointments to those demonstrating the necessary skills as leaders and participants.

More than 5,000 such elected and appointed amateurs form the nucleus of organized amateur radio, purely on a volunteer basis. The total number of amateurs registered with the ARRL Amateur Radio Emergency Corps as ready to serve in disaster communications is over 30,000.

The amateur has always taken pride in the fact that he has largely been able to police his own service, with minimal load being placed on the monitoring and enforcement branches of the Commission, as a result. Some 500 appointees as Official Observer[21] spend a good bit of their time "cruising" the amateur bands, noting discrepancies and reporting them by radio or postcard to the offender, hopefully in the early stages of possible malfunction before the matter becomes serious enough to be noticed by FCC monitors. Your fiscal 1972 annual report shows a total of 1,566 notices of rules violations sent to amateurs. Our annual report for the year 1972 shows a total of 6,642 sent out by these ARRL observers. I believe this is a rough indication of the workload your staff has been saved by amateur volunteer efforts – that is, by catching discrepancies while they are minor and before they are serious enough to come to official attention.

Time has permitted touching only a few highlights. We hope there will be further discussion in a question period. At this time, Mr. Dannals has some additional material to present.

[21] Facsimile of OO notice.



III. WHERE DO WE GO FROM HERE?
(Mr. Dannals)

What we have tried to do is to present a relevant overview of the Amateur Radio Service and radio amateurs as this picture relates to the Commission's mandate now and in the future.

We have pointed out some trends as we see them developing. We know, however, from past experience and history that there is no way to "crystal ball" the future of the Amateur Radio Service.

There are some things about the future that we *do* know. We know there will be more amateurs[22] – here in the United States and around the world. The technology will be more sophisticated. Amateur interests and activities – and their capabilities, will be even more diversified and complex. We will need more frequencies in order to fulfill those capabilities as a national resource. At the same time, worldwide communications technology and electronics needs are undoubtedly going to increase the pressure on the available spectrum space – especially in the developing countries.

These things require no crystal ball. Obviously we of the Amateur Radio Service must plan and prepare for the future. This obligation in all of its ramifications is a paramount concern among the leadership of the ARRL. The Chief of your Amateur and Citizens Division put it very well in a recent speech:

"In order to flourish, Amateur Radio must have some idea of where it is going and what it will do along the way. There probably is no ultimate goal which even the wisest among us can foresee, because things change rapidly and we must change with them or lose contact with the world around us. Because there is no other heavy-weight champion of Amateur Radio among the nations of the world, it probably means that we are also talking about the future of Amateur Radio worldwide."

We are in complete accord with that view.

What are some of the challenges facing us? Among the major ones:

At the next World Administrative Radio Conference, now tentatively scheduled for some time between 1978 and 1980, the whole question of frequency allocation will be reassessed, deliberated and, in some fashion, resolved. There is a great need to mobilize understanding and support for amateur radio as a national and international resource among the governments to be represented.[23] Each of those governments, of course – no matter how small or unsophisticated – has one vote as we do. And not all are supporters of amateur radio today.

A committee with Merle Glunt as chairman and including A. Prose Walker and Frank Williams from the FCC, plus the League's Assistant General Manager, has been meeting regularly here in Wash-

[22] More stations, i.e., YLs.
[23] IARU conference (Region I) in session.

ington to develop our government's position. These have been hard-working, productive sessions based on real teamwork. The Committee is an excellent example of our mutual dedication to our country's leadership responsibility – and the need to mobilize the best resources available to us. The FCC has the major role and stake in this as our government's official spokesman and as its regulatory agency. The League has a valuable function as the national organization of radio amateurs and as headquarters society for the International Amateur Radio Union. We offer a great deal of knowledge, experience and expertise to draw upon.

This is important because the challenges facing us are simply too vast and too complex for any individual or body to handle by itself. Again, Mr. Walker expressed it very well in the same speech I quoted earlier:

"I would always be among the first to say that no one individual, organization or government agency should have the right to be the sole arbiter of anything. It would not be good for Amateur Radio if such a situation existed."

ARRL and the FCC have a long, enviable history of effective and productive cooperation. They have long shared common goals and objectives, a mutual determination to provide for and encourage a maximum contribution by radio amateurs in the public and national interest.

That sharing of goals and dedication is as true today as it has ever been.

We believe, as do those members of the FCC staff involved in planning for the future of amateur radio, that this process involves as a first step some very careful judgments as to where the service is headed and how its great traditional value can best be maintained and enhanced not just by regulation but by leadership, direction and encouragement as well.

We also believe that an essential element in such planning is flexibility. None of us – however skilled, however knowledgeable, however dedicated – can possibly anticipate each need, every opportunity, every technical development that lies in the future.

We can see a little bit of the way ahead in space technology and communications applications for amateur radio. A great deal of planning and development has already gone into that program. Action is expected at the League's meeting of the Board of Directors later this month which we hope will lead to the establishment of an Amateur Satellite Foundation to provide the expanded funding necessary for the space program.

We have embarked on a joint project with NASA to encourage the use of OSCAR[24] satellites as an opportunity for direct classroom participation in space communications in conjunction with school curricula in physics, mathematics and the social sciences.

The Amateur Radio Service has grown and made its great contributions to electronics technology and to the communications arts unfettered by rules and regulations. To a great extent, rules have, until recent years, been a recognition of the changes that have already occurred in amateur technical and operating patterns, rather than being an attempt to mold those patterns. Gifted amateurs have been free, so long as they have not impinged upon others, to experiment and to innovate. Restricting them can only hamper their capabilities in the future – their contributions both to the art and to public service – their value as a national resource.

There is no question but what a service as large and as visible as the Amateur Radio Service needs a body of rules which will guard against those kinds of operation which would create harmful interference to other services. On the other hand, because of the free-wheeling aspect of amateur radio, and the natural enthusiasms of its practitioners, there is always that possibility that rule making will become so restrictive as to dampen the inquisitiveness of amateurs in devising new ways to make greater use of their spectrum assignments.

This is not to say that regulatory planning should not also be flexible and responsive to changing needs and circumstances. Of course, it should. But let us not in the process so direct our attention to upgrading the Service that we redefine it as an exclusive body of narrowly dedicated, wealthy electronics specialists. Nor should we forget the strong tradition of self-discipline and responsibility in the amateur service and so attempt to control the few inept or irresponsible that we hamstring the great majority of capable, dedicated amateurs. Regulation is an essential tool in maintaining the strength and value of the amateur service, but its over-zealous use will surely be as counter-productive as the unfortunate international efforts at social and economic state planning that we in America so deplore.

History has surely demonstrated beyond any reasonable doubt that over-regulation has never produced a dynamic, creative or viable human endeavor. The arts and the sciences have only flourished in relatively free societies. For more than half a century, the Amateur Radio Service has been a classic example of that principle.

That, Members of the Commission, is our message and our plea. QST

[24] Artist's color drawing of Oscar.

Solid-State Amplifier

(Continued from page 23)

Bibliography

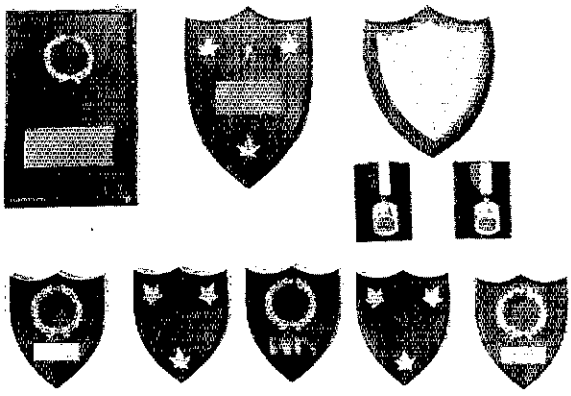
1) Pappenfus, Bruene and Schoenike, *Single Sideband Principals and Circuits*, McGraw-Hill.

2) Orr *Radio Handbook*, 19th Edition, Editors and Engineers, H.W. Sams & Co.

3) Schnelling, *Soft Ferrites*, Life Books Ltd., England.

4) Cernec, Manon, Schultz, *100-Watt Linear Solid-State Power Amplifier*, Application Note CT-113-71, TRW Semiconductor.

5) Manon, *High-Performance Linear Power Amplifier*, Application Note CT-122-71, TRW Semiconductor. QST



13th RTTY DX Sweepstakes

1) The contest commences at 0200 GMT Sat. Oct. 13 and ends at 0200 GMT Mon. Oct. 15, 1973. The total contest period is 48 hours but no more than 30 (thirty) hours of operation is permitted. Time spent in listening counts as operating time. The non-operating period can be taken at any time during the test but summary of times on and off must be included in the score sheet.

2) The contest will be conducted on the 3.5, 7, 14, 21 and 28 MHz amateur bands.

3) Use the ARRL Country list, except that KL7, KH6 and VO are to be considered as separate countries.

4) The message is to consist of a message number, time in GMT, zone and country.

5) All two-way RTTY contacts with stations in one's own zone will receive two points. All two-way RTTY contacts with stations outside one's own zone will receive points listed in the Zone Chart (see page 54, Sept. 1969 *QST*). Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if different band is used for each contact.

6) 100 bonus points will be added for every VE and VO station contacted. Bonus points to be added to total score at end.

7) Entries will be classified as either single operator stations or multioperator stations with one transmitter. Individual operators of multi-operated stations may submit their logs singly and compete as single operators instead of submitting a group log, if desired.

8) A multiplier of one is given for each country worked including one's own on each band, e.g. If one country is worked on 3 bands, 3 multipliers are given.

9) CARTG log sheets are available for s.a.e. or IRC s. Separate pages will be used for each band. Information contained will be band, exchange numbers, times in GMT, station calls, zones, countries, exchange points and power. Logs must be received not later than December 1, 1973. Send them to: Canadian Amateur Radio Teletype Group, 85 Fifeshire Road, Willowdale, Ontario, Canada. M2L 2G9

10) To score, the total exchange points multiplied by number of countries worked, multiplied by number of continents (maximum 6). Finally bonus points added.

Ten plaques will be sponsored by the C.A.R.T.G., the *RTTY Journal*, and A Group Member. Other awards include the following. High U.S.A. Score – Gold Medallion and Ribbon by *RTTY Journal*. High Canadian Score, Gold Medallion and Ribbon – Canadian Director's Award. Worked Most Canadian Stations. Silver Medallion and Ribbon – *A Canadian Amateur*. High Score for Green RTTYer (No participation in previous RTTY test) – Sidney Burnett Memorial Plaque. High Score for 10 meter operation, Silver Medallion and Ribbon – *RTTY Journal*. Most two-way 80 meter contacts, Silver Medallion and Ribbon – C.A.R.T.G. SWL printer high score, plaque – C.A.R.T.G. High score using low power (under 100 watts), Silver Medallion and Ribbon – *RTTY Journal*. High score for multi-operated stations, plaque – C.A.R.T.G. Certificates for top scores in each U.S.A. and Canadian District and each country.

QST

Strays

I would like to get in touch with . . .

. . . anyone interested in forming an elementary Chinese language net. WA6MZJ.

. . . former Ohio hams interested in starting a West Coast Buckeye Net on 40 meter ssb. W6DOR.

. . . hams who collect call letter license plates. WN2HTJ.

. . . hams who are professional city planners interested in forming an informal net. W2YWC.

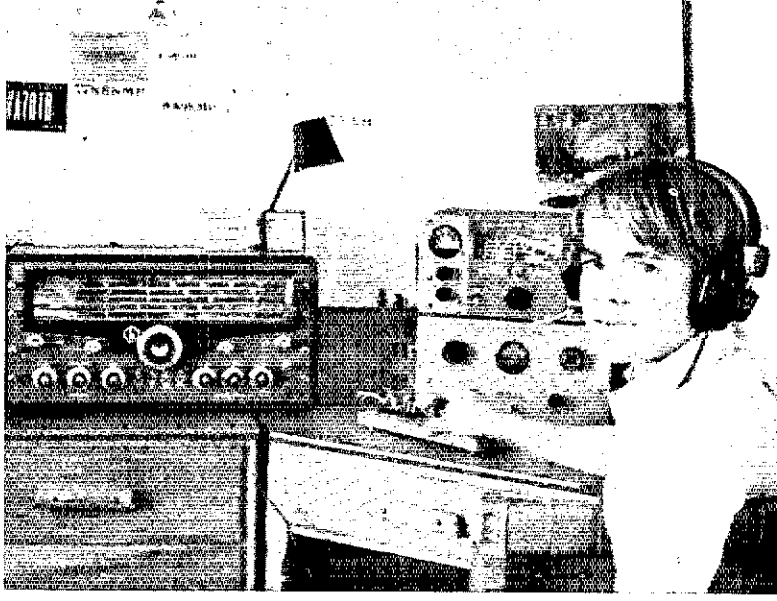
. . . anyone interested in ecology, organic food and nutrition who would like to start a net. WA7UHE/6, 11157 Chimineas Avenue, Northridge, CA 91324.

. . . many radio amateur operators in the United States to make friends through radio and by mail. The Green Club, Z.C.591 I-25, Shinonome, Sakai, Osaka, Japan. JH3BCZ, Club Manager.

. . . anyone interested in forming a MAFTY (Mid-Atlantic Federation of Temple Youth) or NFTY (National Federation of Temple Youth) net. WA3OXL.

. . . airline employees interested in starting an interline radio club. WAØTJT.

Results, Novice Roundup



WN4AQG

REPORTED BY RICK NISWANDER,* WA1PID/WA8VRB

DURING EARLY FEBRUARY, in various parts of the U.S.A., homework went undone, dishes piled up in the sink, snow remained unshoveled and bleary-eyed people walked the streets. Were some segments of the populace on a giant drunken spree? Heavens, no! Those were just some of the effects of the annual Novice Roundup held February 3-11. You have read (and possibly experienced) some of the results – here are the others. . . .

Returns were down this year. We received 378 Novice, 107 non-Novice and 21 check logs for a total of 506. But competition was just as fierce as ever. Take a look at the races for first place in Alabama, Ohio and San Joaquin Valley. Washington presented a real photo-finish with the top 6 separated by a scant 4029 points. Sections were well represented. There were 62 this year including rare ones like Maine, Vermont, Hawaii (3 entries!), Alaska, Nevada and both North and South Dakota. Thanks to all who got on for the NR from those hard-to-get spots.

Top Novice this year was WN4TVU, who narrowly squeaked past the number 2 man WN9LMT. Special congratulations are due to WH6IBT, who led the Pacific Division. . .a difficult task from his remote Hawaiian location.

Many participants made mention of the CQing by non-Novice operators. This practice is not, as some said, against the NR rules, but a guideline is given asking non-Novices to refrain from calling CQ. Although Novices are now allowed to use VFOs, this suggestion still seems to be a good one for two reasons – this is a contest *for* Novices, not higher class licensees; and Novices must still abide by the 75-watt maximum limitation, a figure far under the power limitations of others. If nothing else, WN9IUQ seems to have an excellent reason for continuing with the practice of the past. He says: "Non-Novices – please don't call CQ NR. . .it gets crowded enough as it is."

If you have any suggestions that might make the NR better, drop a note to the Contest Advisory Committee (W1BGD,chairman, W2EIF, W3BQV, K4BAI, K5TSR, W6DQX, K7NHV, WA9AUM, WØHP, VE2NV and KH6IJ). They would be happy to receive your comments.

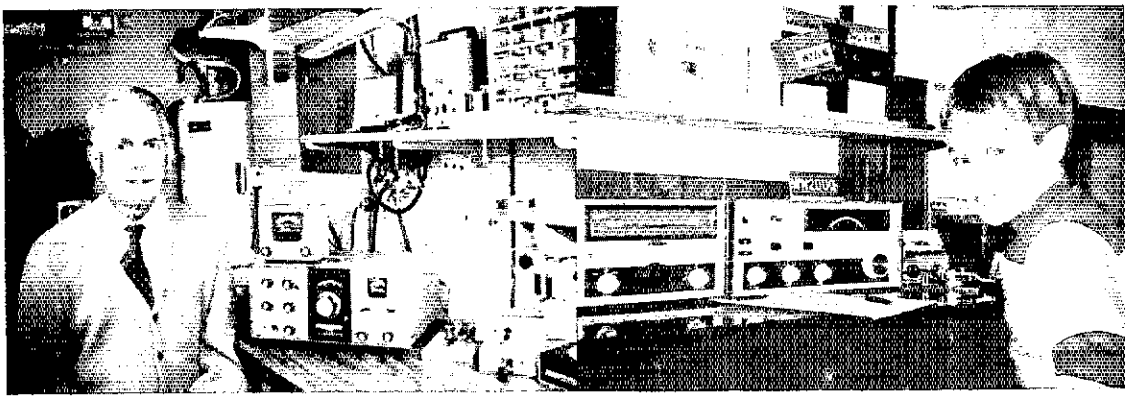
Awards are scheduled for a September 15 mailing.

*Asst. Communications Mgr., ARRL.

Soapbox

Would have liked to put in more hours but my employer didn't see it that way. – (WN2FBU). Never knew pandemonium could be so much fun. How long before the ringing in my ears stops? – (WNØGGD). When I used to read the soapbox comments about rig breakdowns I took it with a grain of salt because there are always so many. Well, this was my first contest and sure enough, my homebrew VFO tried to kill itself right in the middle of the NR. Why is that? – (WN5GZH). Thanks a million for sponsoring this contest. It was certainly a great way to wind up my Novice career.

Hawaii is sometimes a difficult section to obtain during a contest. A Hawaiian Novice is even more difficult to come by but WH6HPP made his presence known to the tune of 175 two-ways.



The young and young at heart. Left, WN6PGX. Covert used a mini-beam and vertical from his Santa Barbara QTH to obtain 290 QSOs. Right, WN2DUQ. Peter found the QRM heavy, making QSOs difficult to come by. Quite an experience for an 11-year-old.

– (WN4UCC). Some WNs had a combination of signal, fist and savvy that clearly indicated the need for a no-redshirting rule. – (W1ERW). The QSL aftermath to date is 33 cards. Most of them say PSE, PSE, PSE QSL with tear stains all over them. Makes me feel wanted. – (WA9RJI). Fantastic! You have created another contest nut! – (WNØICG). My regular rig was not working so a friend loaned me an Argonaut 5 watter. Found QRP is great and works well in a contest. – (WN9IDU). The NR was fantastic. The most interesting and educational experience of all my ham activities. – (WN4ABY). This was my first NR since 15 years ago. I was surprised at the caliber of today's Novices. – (WØHAW/6). Too bad the NR only takes place once a year. – (WN2BFG). I know I have no chance at a certificate, but had a good time. That's what it's all about anyway. – (WNØGGH). The NR is a great way to spend time recovering from an appendix operation. – (WN3TOS). How come it took me 'till the last day of the contest to figure out that my low pass filter's cutoff frequency was too low? – (WN6TLV). I wish some of the Novices would discover 10 meters. Who knows, they might find life there yet. – (WN1QOG). Plenty of professional-sounding Novices. – (WA4YDR). Next contest time the telephone, doorbell and television all go. – (WN6RXI). Had to take a 15-minute break after working a PJ8 on 80 meters. Then a KP4 called. – (WN9GOA). Novices may be the lowest class of license holders, but not the dumbest. The operating procedure and sound of clean sigs shows me what a bit of smarts, and the ARRL Operating Manual, can do for a Novice in a high speed contest. – (WN7TYY). People were tromping on telegraphic tongues constantly and contacts were hard to make. – (WNØHGG). All that QRM gave me headaches but it was fun. – (WB8NTY). This contest is worth letting my Novice ticket expire and getting another so I can have two more cracks at it. – (WNØDYV). Thanks to all the non-Novices who helped make the NR a great one this year. – (WNØIWL). Looks like we will have a lot a fine operators up-coming, especially in other contests. – (K3KNL). I haven't used so many pages in my log since getting my ticket. – (WN2HKY). My biggest surprise was hearing a few of my Novice associates who, in January were still at the 5-7 wpm level, suddenly spring up and send and copy 15-20 wpm with no effort at all. I must be sure to seek out this miraculous method of cw code proficiency. – (WN8NAF).

Last year we included a picture of the XYL of WA9AUM in the NR writeup. Last year WA9AUM and W9LVH participated in Field Day. So, it stands to reason that we should include a picture of the XYL of W9LVH – WN9HGN (left). Nancy snagged 421 other participants for a 2nd place showing in Illinois. Back for his second year in the NR is WN4UCC (right) from Georgia. Charlie placed 6th in last year's fray but rig and time troubles kept his score down this time around.

U.S.A.

1

Connecticut

WN1QMF 21,842-316- 7-30
WN1QHS 14,076-276-51-30
WN1RHI 9342-163-54-
WN1RHS 6248-132-44-18
WN1QJV 2356- 56-31-10
WN1QKV 1975- 69-25-19
WN1QHA 1455- 87-15-25
WN1QLP 1326- 63-17- 5
WN1QPS 1200- 60-20- 9
WN1PKS 320- 17-10- 2
WN1PAV 108- 12- 9-18
WA1PHF (WN1OST, opr.) 49- 7- 7- 2

Eastern Massachusetts

WN1QKD 15,281-249-59-17
WN1RFF 10,528-188-56-
WN1PGY 7134-164-41-29
WN1QGX 3075- 83-25-
WN1RGA 1740- 45-29-12
WN1RGJ 882- 42-21-
WN1RFD 544- 32-17- 7

Maine

WN1QIK 1118- 43-26-21

New Hampshire

WN1RGT 7497-147-51-15
WN1RGU 6627-141-47-14
WN1PNC 594- 33-18- 9
WN1QQL 12- 4- 3- 2

Rhode Island

WN1POJ 26,474-414-61-28
WN1QOT 16,066-262-58-29
WN1QAW 11,550-216-50-30
WN1RFI 9823-209-47-28
WN1QOG 7208-212-34-28

Vermont

WN1PHN 8640-192-45-22

Western Massachusetts

WN1PZM 37,240-465-76-25
WN1PPX 2210- 65-34-12
WN1QHR/1 481- 37-13- 7

2

Eastern New York

WN2EOO 21,504-321-64-24
WN2COS 13,747-233-59-
WN2FQT 9585-203-45-25
WN2FBR 8843-219-37-13
WN2KJT 8798-166-53-13
WN3RTV/2 8330-150-49-22
WN2BEO 6644-141-44-27
WN2FUH 5360-124-40-17
WN2FHF 4400-110-40-13
WN2FBU 4216-124-34-10
WN2GSW 3724- 98-38-15
WN2BWB 2244- 68-33-11
WN2HRK 221- 17-13-

N.Y.C.-L.I.

WN2CJN 33,530-449-70-29
WN2FIG 8736-152-48-30
WN2DUQ 7315-133-55-22
WN2GXW 5734-107-47-15
WN2CUZ 3135- 80-33-
WN2FHO 2813- 77-29-23
WN2DUO 2059- 71-28-
WN2JJD 1892- 86-22-12
WN2AIC 1281- 46-21-17
WN2FPT 1197- 47-21-
WN2FFF 495- 33-15-17
WN2DUH 297- 27-11-
WN2DBD 231- 21-11- 6
WN2HKY 198- 18-11-

Northern New Jersey

WN2DVE 32,010-485-66-29
WN2IYY/2 26,130-402-65-28
WN2FTQ 15,480-238-60-27
WN2HQN 13,980-223-60-30
WN2BFG 13,585-209-65-20
WN2HPY 10,350-207-50-18
WN2DWB 5270-135-34- 8
WN2ABV 3640- 91-40-10
WN2DWT 3402-116-27-12
WN2CWS 1647- 61-27- 6
WN2HQF 1536- 64-24- 6

Southern New Jersey

WN2FQS 19,840-320-62-29
WN2LBO 14,616-227-58-30
WN2EQX 7150-143-50-14
WN2FXO 3906- 93-42-13
WN2GMQ 2825-113-25-17
WN2LAL 2490- 83-30-13

Western New York

WN2FHX 31,040-485-64-30
WN2TWX 12,740-245-49-11
WN2JLM 7003-129-47-15
WN2TLP 3128- 92-34-
WN2EXY 432- 27-16- 2
WN2FJC 280- 20-14-15

3

Delaware

WN3ILG 17,732-286-62-20
WN3TFP 8602-172-46-21

Eastern Pennsylvania

WN3QNX 24,512-373-64-16
WN3TMP 10,812-194-53-22
WN3STJ 9010-170-53-30
WN3RHX 8084-162-47-16
WN3SFC 7500-140-50-22
WN3RNF 2352- 88-24- 4
WN3SFF 180- 15-12-

Maryland-D.C.

WN3QGT 30,600-450-68-17
WN3RCI 24,640-327-70-
WN3SES 12,660-196-60-28
WN3TRR 2720- 55-34-21
WN3TGI 1725- 69-25- 7
WN3TOS 1175- 47-25- 8

Western Pennsylvania

WN3SJM 52,341-702-73-30
WN3QNT 37,740-530-68-30
WN3SZX 21,780-459-45-15
WN3UCZ 19,020-317-60-20
WN3SXB 13,620-212-60-13
WN3SSU 11,660-255-44-23
WN3TTS 8037-156-47-27
WN3TYA 3528- 84-42- 9
WN3SOJ 3072- 96-32- 9
WN3TVP 780- 39-20-12
WN3TIQ 660- 60-11-28
WN3RJW (+WN3SCP) 6660-185-36-17

4

Alabama

WN4UNM 16,461-264-59-26
WN4ZQF 16,343-267-59-28
WN4BLO 13,260-206-60-26

Georgia

WN4TVU 61,512-679-88-22
WN4ABY 21,252-322-66-22
WN4BZU 18,666-296-61-19
WN4ZAK 18,349-296-59-
WN4UCC 15,500-235-62-11
WN4AKU 13,585-247-55-29
WN4CTL 2987-103-29-28

Kentucky

WN4AQG 36,186-474-74-30
WN4ZMM 15,400-265-55-24
WN4ZPO 7003-149-47-14
WN4YQY 6528-136-48-30
WN4ZKW 2520- 72-35-12
WN4VBG 1917- 61-27-14
WN4YFY 1904- 68-28- 8

North Carolina

WN4ZIN 28,288-406-68-29
WN4WDR 16,380-260-63-20
WN4CBF 15,198-283-51-30
WN4WFU 9792-192-51-21
WN4AZL 5240-121-40-
WN4BEH 2263- 73-31- 9
WN4AZK 1104- 46-24- 7

Northern Florida

WN4AWH 20,493-282-69-25
WN4ARF 5220-116-45-12
WN4ADQ 3876- 82-38-10
WN4BYS 720- 36-20-19

South Carolina

WN4BJY 20,224-296-64-28
WN4VGZ 16,646-272-58-21
WN4CSD 9169-163-53-24

Southern Florida

WN4ATP 24,357-343-69-29
WN4UPW 11,880-216-55-25
WN4ASJ 56- 8- 7- 4

Tennessee

WN4ZQN 18,212-299-58-
WN4BEO 16,218-308-51-16
WN4UPO 12,656-226-56-

Virginia

WN4ZNQ 23,858-302-79-29
WN3SAU/4 21,960-295-72-20
WN4YHD 14,994-294-51-14
WN4BZG 11,070-246-45-25
WN4BJX 8232-147-56-
WN4AOU 6731-127-53-13
WN4CHQ 1210- 55-22-
WN4CLJ 760- 30-19-13
WN4ZRU/4 81- 9- 9- 1
WB4VNP (WN4s CUU ZCF) 91- 13- 7- 3

5

Arkansas

WN9JTM/5 36,162-441-82-30
WN5HDW 6048-144-42-15
WN5GDM 4264- 94-41-21
WN5GPA 2754- 71-34-16
WN5HNE 592- 27-16- 9

Louisiana

WN5ENH 23,936-364-64-16
WN5HOT 17,424-249-66-30
WN5EVF 13,050-241-50-19
WN4WXF/5 9306-188-47-29
WN5IIC 234- 18-13- 5

Mississippi

WN5IVY 24,000-365-64-26
WN5HYR 8692-164-53-16
WN5HEA 6752-422-16-26
WN5EMT 1458- 54-27- 8

New Mexico

WN5GWH 12,948-249-52-26
WN5HJC 5896-134-44-

Northern Texas

WN5HII 41,749-483-83-28
WN5EUC 34,930-489-70-25
WN5GZH 31,021-463-67-30
WN5HPN 19,860-321-60-29
WN5IFH 11,050-221-50-15

Oklahoma

WN5FRP 14,364-252-57-15
WN5GZQ 9516-183-52-28

Southern Texas

WN5GIV 39,192-568-69-21
WN5GFE 14,762-242-61-
WN5FWP 12,444-229-51-30
WN5HOD 9150-173-50-23
WN5GJD 1798- 62-29-
WN5EBA 740- 22-15- 8
WN5HZE (+WN5EYG) 48,960-546-85-30

6

East Bay

WN6ION 25,212-382-66-22
WN6RZX 21,231-322-63-25
WN6KAH 14,884-234-61-20
WN6RRG 8996-173-52-18

Los Angeles

WN6RFX 45,000-600-75-
WN6PEA 18,084-259-66-29
WN6UEW 15,982-262-61-20
WN6UDA 9828-189-52-29
WN6TLV 9558-157-54-15
WN6SMS 8112-198-39-20
WN6OYD 6681-121-51-13
WN6SEP 3300-100-33-
WN6SWY 2775- 60-37-12
WN6UCC 2496- 78-32- 8
WN6LOQ 1350- 50-27-10

Orange

WN6UGT 23,316-402-58-
WN6TPM 17,700-295-60-19
WN6TIX 1035- 45-23-16
WN6UGH 688- 43-16-

Santa Barbara

WN6PGX 19,720-290-68-30
WN6NQV 14,042-213-59-30
WN6STR 11,460-176-60-27
WN6TPQ 2424- 86-24-16

Santa Clara Valley

WN6OSS 28,096-424-64-30
WN6NKM 14,632-228-59-28
WN6IUX 10,945-179-55-19
WN6TYD 2415-105-21-

San Diego

WN6PNW 15,190-245-62-12
WN6UIY 2812- 76-37-27

San Francisco

WN6OKG 19,116-304-59-28
WN6ITN 1029- 49-21-30

San Joaquin Valley

WN6RXI 29,962-422-71-30
WN6IVU/6 29,110-385-71-28
WN6SIU 26,703-387-69-29
WN6NSW 24,640-375-64-28
WN8MZD/6 2784- 87-32-13

Sacramento Valley

WN6USM 15,540-239-60-23
WN6RDA 10,192-181-52-26

Hawaii

WH6IBT 36,244-533-68-24
WH6HPP 8925-175-51-16
WH6HMI 480- 30-16-10

7

Arizona

WN7TZH 9717-237-41-11

Idaho

WN7UAK 39,121-551-71-28

Nevada

WN7TYY 4995-115-37-18

Oregon

WN7TDZ 29,880-390-72-16
WN7STI 6525-145-45-21
WN7TGM 2187- 81-27-
WN7TWP 689- 53-13- 9

Washington

WN7TOU 15,105-255-57-30
WN7UQV 13,542-222-61-28
WN7RCC 13,452-208-59-29
WN7SWS 13,090-238-55-26
WN7TMD 12,825-225-57-28
WN7RNX 11,076-203-52-23
WN7TYZ 5546-118-47-28
WN7TOY 3255- 93-35-21
WN7SIY 3168- 99-32-
WN7UTV 2088- 72-29-13
WN7SAF 2013- 61-33- 9
WN7TRI 2008- 62-29-18
WN7TUZ 999- 37-27- 5
WN7UPA (+WN7UTV) 1798- 62-29-16
W7DK (WN7s TVE UOS UQV UQZ Loretta Chudy)

Alaska

WL7HKA 315- 21-15- 7

8

Michigan

WN8NDC 38,088-532-69-28
WN8MTT 31,317-429-73-27
WN8KZV 25,382-343-74-27
WN8NGJ 18,704-334-56-27
WN8LUC 16,176-322-48-26
WN8JHY 15,840-220-72-25
WN8MYX 12,508-192-59-28
WN8MIW 10,050-201-50-13
WN8NTK 8800-185-44-25
WN8NOE 6981-179-39-24
WN8NVD 6400-150-40-30
WN8NPS 5400-120-45- 6
WN8NCD 4865-139-35-14
WN8NWC 3210-107-30-17
WN8NAE 2185- 75-23- 8
WN8MBY 1848- 88-21-12
WN8MSY 1728- 72-24-25
WN8MQO 816- 48-17-16
WN8JPD 275- 25-11- 6

Ohio

WN8MQD 34,188-462-74-23
WN8LFO 33,976-533-62-28
WN8JUI 33,634-502-67-22
WN8NXR 22,260-371-60-23
WN8LWU 21,831-363-57-25
WN8OBK 17,822-251-67-30
WN8MMF 12,663-201-63-20
WN8NDX 9933-216-43-18
WN8KYS 9016-184-49-
WN8NDV 9009-216-39-30
WN8NGO 8424-206-39-16
WN8KQI 5024-142-32-15
WN8OBW 2656- 83-32-21
WN8LEM 1600- 64-25- 7
WN8KDQ 943- 31-23- 9
WN8IYR 920- 46-20-16
WN8NAF 612- 34-18-12
WN8MQR 363- 18-11- 5

West Virginia

WN8LGF	21,167-332-61-22
WN8MZI	11,319-216-49-25
WN8NGP	10,824-246-44-24
WN8MKJ	8460-188-45-26
WN8MHL	5617-137-41-16
WN8MKL	2600- 90-26- 8

9

Illinois

WN9KLB	34,575-461-75-30
WN9HGN	29,739-423-69-24
WN9KGH	17,918-289-62-26
WN9KZQ	12,528-232-54-27
WN9GKK	9828-182-54-12
WN9KQW	6480-134-45-21
WN9GRW	3196- 74-34-11
WN9JUL	1062-118- 9-10
WN9LHP	1050- 40-21- 6
WN9IUO	840- 35-24-15
WN9KHN	442- 34-13-
WN9KUS	345- 23-15- 7
WN9KQE	130- 13-10- 4
WN9JVR	100- 10-10-23
WB9JFU (WN9s KJO LHT LIE LNH LNY LNZ)	405- 27-15- 9

Indiana

WN9LMT	59,241-651-91-25
WN9HWV	33,048-486-68-27
WN9GOA	30,525-397-75-30
WN9KRK	18,104-292-62-19
WN9GMC	16,440-274-60-29
WN9IOB	12,342-232-51-22
WN9IUQ	11,928-203-56-29
WN9HVH	8164-137-52-22
WN9IVR	6811-129-49-19
WN9KST	5676-132-43-13
WN9KDW	1728- 49-27-24
WN9IVR	360- 24-15- 4

Wisconsin

WN9IFH	35,466-514-69-21
WN9LSR	27,755-427-65-
WN9KSK	26,100-435-30-30
WN9ISM	16,640-295-52-17
WN9JWO/9	14,213-233-61-16
WN9JBP	9990-175-54-25
WN9IPY	8288-148-56-21
WN9HUQ	6408-168-36-11
WN9KMQ	4992-113-39-23
WN9IIH	3300-101-33-25
WN9JPI	3230- 85-34-22
WN9JLI	3081- 79-39-20
WN9ICH	3024- 84-36-14
WN9IDO	714- 41-14- 9
WN9KFL	378- 27-14-12
WN9JHZ	330- 22-15-13

Ø

Colorado

WN5GOU/Ø	3978-102-39-14
WNØIWL	1377- 51-27- 8

Iowa

WNØEXM	18,000-280-60-20
WNØGUF	14,112-224-63-30
WNØCG	9333-173-51-23
WNØHLY	8160-160-48-26
WNØGVW	3610- 85-38- 8
WNØLNA	1258- 54-17- 8
WNØFFM	1170- 78-15-
WNØGUU	825- 55-15-10
WNØHXC	720- 36-20-10
WNØHLV	30- 6- 5- 3

Kansas

WNØGVR	32,702-379-83-27
WNØGQL	21,252-308-69-23
WNØJFJ	21,060-299-65-30
WNØIAU	5106-111-46-
WNØICK	2871- 87-33-
WNØHGG	735- 35-21-11

Minnesota

WNØGPR	33,615-390-83-30
WNØHFT	6923-161-43-28
WNØFET	3913- 91-43-14

Missouri

WNØDYV	46,209-598-73-25
WNØGYR	18,632-259-68-29
WNØFIY	12,220-235-52-28
WNØGGD	11,210-190-59-28
WNØGCI	6292-143-44-14
WNØHPF	4536-108-42-20
WNØGOP	4140- 92-45-12
WNØEOI	3960- 90-44- 6
WNØICI	2916- 81-36- 7
WNØEQV	765- 30-17- 3
WNØGGH	377- 14-13- 5
WNØEYE	200- 20-10- 5

Nebraska

WNØGTJ	42,280-594-70-30
WNØGOB	26,128-368-71-28
WNØHYE	21,204-372-57-30
WNØFTK	2640- 70-33- 7
WNØHWY	154- 7- 7-

North Dakota

WNØHEC	15,822-293-54-30
WNØIWC	13,140-219-60-27
WNØHMS	2850- 75-38-20

South Dakota

WNØHHM	5289-123-43-26

Non-Novices

WB9GFC 41,405, WB2RJJ 24,800, WB5EEY 22,072, K9WOY 20,760, K8CVJ 18,180, W3ARK 17,748, W2FVS 17,325, WA2DMK 17,220, WB4FSG 17,160, WA8FKJ/4 16,762, WA9RJI 16,072, K1ZND 16,066, K8SWW 15,120, WA3PWL/Ø 13,780, K4ADT 13,452, K4BAI 13,400, W9LHG/Ø 12,711, WA6LVV 12,040, WB9GSS 11,550, WBØDYU 11,310, WØTIV 10,788, WA6GGK 10,716, WA1PHJ 10,212, WA2LOI 10,150, W3BQN/mm,Region 2 10,149, WA3HIL/VE3 9741, K5PXV 9690, WBØBPH 9504, K3KNL 9486, W6OEO 9282, WB8NTY 9118, KV4GQ/W5 8424, W2ECW 8319, VE7CBV 7889, WA2GMD 7686, WA3RMC 7339, WA6AYD 7285, WB5DXG 6909, W4YZC 6815, WB4URW 6578, WA9WIF 6528, W4KFC 6345, W4YOK 6345, K1IUS 6272, K2SBW 6048, W2RPZ 6000, WAØATY 5474, W6NJU 5456, WA2DRC 5214, WA1LMJ 5160, WA3QIA 5104, WØHAW/6 4816, WA6MQS 4800, WA4YDR 4641, WB6HTK 4500, VE3JT 4494, WA5CAC 4444, W8VUV 4352, WA1PAZ 4290, WA1PTK 4223, WB4WHE/4 4134, WA3RGH 3876, WA2DLV 3811, VE7BBL 3731, WA7QKX 3666, W5TID 3627, W3FCI 3503, WB5BHN 3420, WB4RUA 3332, WA3RKH 3198, WA6HAD 3080, W6KYA 2870, WA5ROU 2618, WB2YGK 2552, WAØWOV 2523, VE7DT 2418, WAØNMA 2336, WA1JSD 2146, K7GGD 1836, WB2OLQ 1725, WA7NOH 1679, VE3ERM 1534, W1FXY 1534, W4DR 1449, WA1MCY 1392, WB2DCS 1364, KL7HER 1210, W9LVH 1166, W1GNB 1140, K4ZGB/5 1007, VE3DNR 900, WB4TNC 900, WA6QEW 861, WA5ACA/5 846, WØKK 836, WA6DBX 595, WB9DVQ 574, WB2FVT 396, WA7IOF 330, WBØHZL 175, WA7QAR 119, WB8HIB 105, K7UWT 90, WA9ZAZ 63. (Multioperator) WN8LVT (+WB8NYZ) 16,308, WN9JDF (+WB9IWF) 5440. (DX) GM5AXO 520.

Check Logs

VO1KE, W1ECH, W1EJI, W1ERW, W1TM, WA1MKP, K2CQR, WA2LHA, WA2MGH, WB2GUI., WB2MAN, WN2HSG, W3JJD, K4EJQ, WA9NBU/5, WB8DSG, WA9AUM, WØEFX, WØEGV, WA1RLU/Ø, WNØHKX. QST

Strays

Old friends from high school days recently held a welcome home party for Fred, VK9FH, during a brief visit to his hometown of Rochester, Minnesota. In 1933, Carl Frank, WØCOS, helped high school students Don Johnson and Jerry Stover get their first ham tickets. They, in turn, persuaded another xstudent, Fred Hargesheimer, to get his ticket. Also helping was Bill Hornseth, WØGLE. Last fall, Don, now WØKHI of Minneapolis, and Jerry, now W5KZN of Dallas, met in Rochester with Bill and Carl to welcome Fred, now VK9FH, home for a visit from New Guinea. Left to right are Bill, Fred, Don, Jerry and Carl.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* W1NJM

EMP

EVER HEAR OF IT? Most likely few amateurs ever have. It stands for Electromagnetic Pulse, and is a phenomenon which results from a nuclear burst – one which has been common knowledge in the scientific world for some years, but until fairly recently cloaked in secrecy at official levels. Basically, EMP has an effect similar to lightning, but it is not the same thing. Lightning is static electricity caused by friction, whereas EMP is an electromagnetic pulse caused by sudden release of nuclear energy. Unlike lightning, which is very local in nature, EMP can have the effect of lightning striking simultaneously everywhere within a given radius of the burst, the extent depending on burst intensity and height. The EMP effect of a high altitude burst can extend thousands of miles beyond any of its other effects, possibly causing burnouts in unprotected communications equipment over such an area.

Most amateur communications equipment is not sufficiently protected against EMP to prevent burnout, especially equipment with transistors on the antenna side. This includes most receivers and many low-powered transmitters, especially vhf hand-carried and mobile units. While the likelihood of enemy attack seems to have diminished, the possibility still exists. A few high-yield (megaton-range) high altitude bursts, preceding a saturation attack, could wreak havoc on our communications, both wire and radio, by virtually knocking out all facilities lacking adequate protective measures. It could also blow fuses and pop circuit breakers even where protective devices have been installed, causing at least temporary operational upset.

*Communications Manager, ARRL.

Most readers, being amateurs and therefore endowed with more than an average amount of technical curiosity and interest, may want to know how EMP is produced, what causes it. Such technical discussion is beyond the scope of this column, but detailed technical discussion of the phenomenology is contained in a Technical Report produced in May, 1971, entitled "EMP Protection for Emergency Operating Centers," bearing the number TR-61A. Your local or state CD probably has a copy, along with a number of other EMP Technical Reports. We are indebted to WB6RPK, East Bay SEC, for our copy of TR-61A, to DCPA Communications & Operations in Washington, D.C. for copies of TR-61B and TR-61C, which go further into detail on protective measures.

Basically, however, protection against EMP is very similar to lightning protection. The nuclear burst causes expanding and collapsing electromagnetic fields, resulting in induction of high charges in all conductors – wire lines, antennas and feedlines, even steel rails. Such charges could be several times the intensity of an average lightning bolt, depending on the "yield" of the weapon. EMP could wipe out much of our communications, especially our amateur communication just when it is most needed. It's something to think about in our preparedness efforts, even though you may not think an enemy attack is likely. It's *possible*, and just as probable as, for example, an earthquake. But an earthquake does not make a conscious effort to destroy our communications beforehand. An enemy about to attack does.

Any piece of radio equipment using an antenna over four feet long is subject to burnout by EMP. The simplest and most elementary protection is to disconnect all antennas from your equipment when

W9IQW is standing between symbols of two of his interests. In addition to sporting two-wheel activities, he has been an amateur for 41 years, an A-1 Operator, holder of CP-35 and 45 WPM from Connecticut Wireless Assn. High Speed Test. He's also a former ORS, RM and OO. Where's the mobile antenna?

not in use, and ground them, especially your transistorized gear. But of course this isn't possible when you're on the air, and ordinary lightning arrestors aren't sufficient to provide adequate EMP protection for sensitive transistor input or output circuits, or other semi-conductor devices. These circuits should be heavily shielded and the shields grounded to a solid earth ground (e.g., a copper cold-water pipe). Spark-gap type arrestors should be installed in the antenna line and in coax lines connecting the various components of the system. Even mobiles could be affected; keep those handy-talkies *with squeegee antennas available, usually* they can work into local repeaters when your home station or mobile burns out from EMP.

And speaking of repeaters! Nothing is more susceptible to EMP (and lightning too, for that matter) than a repeater, and the ultimate in protection is required. We hope you repeater operators aren't leaving your mountain-top and building-top repeaters unprotected, even where natural electrical disturbances are rare. If you are, EMP will surely knock you out.

So there you have it, a threat to communications that most of us never knew existed, until the fairly recent declassification. The above is but the barest elementary discussion, but if we are to maintain our potential for providing emergency communication in the event of enemy attack, we should be concerned about it. — *WINJM.*

Public Service Diary

■ At about 1800Z on March 11, K9GBB/mobile was stalled near Kentucky Lake (KY) without phone service. WB9EAY responded to her call on Midcars by contacting friends near K9GBB who jump-started her car. - (WB9EAY, *Radio Watch*)

■ On March 11 at approximately 2330Z, WB8GEG/mobile reported a traffic accident in Lansing, MI, to Midcars. WB9EAY alerted police who arrived at the scene within 10 minutes. - (WB9EAY, *Radio Watch*)

■ While listening to Midcars at 2234Z on April 2, WB9GMV heard a station calling with emergency traffic. WA9BXB needed to notify a Palos Park, IL, hospital that he was enroute with an injured child. Information was relayed by WB9GMV to Service Control WAØYZO. - (WB9GMV, *Radio Watch*)

■ On Apr. 16 at about 1630Z, WØRUK/mobile called into Midcars to report a highway accident in East Lansing, MI. K4DLA helped relay and WB8GEG called police who arrived in two minutes. *(Radio Watch)*

■ A blizzard forced W7DXQ/mobile and his wife to camp (with their trailer) 30 miles south of Bozeman, MT on Apr. 19. W7DXQ contacted WA7DCF who relayed W7DXQ's situation to his son in Bozeman. Later, W7DXQ sent a message to his son via the Montana Phone Net asking for tire chains. His son arrived the following day with supplies. - (W7DXQ)

■ A tornado hit the Hayden and Dallas area north of Birmingham, AL, on May 23. At 1710 CDT, by request of Red Cross, W4CUE had been activated sending weather bulletins. W4ATX, WA4AWS and WB4EJI were dispatched to the disaster area, surveying damage and assistance needs. The WB4QEX and Navy MARS repeaters were used. W4CUE secured at 0127 CDT, May 24. - (W4WLF Chief Radio Comm., AL Div., ARC)

■ Heeding tornado warnings, the Birmingham Amateur Radio Emergency Service was on duty at 1100, May 27, and the Birmingham ARC began operations at the Red Cross Communications Center. By 1300 amateurs were reporting tor-

What better way to provide communications for a canoe race than to operate aboard ship? That's how the Massillon ARC assisted during the Canal Fulton Canoe Races in Ohio May 19-20. Aboard the *St. Helena II* - W8NP/8 are: W8VYU, WB8HHP and K8HSQ. For the landlubbers there's the four-wheel approach with W8VYU (left) and K8HSQ.

Public Service Honor Roll June 1973

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, as reported to their SCM. 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)*	
Max. Pts.	*10*	*10*	*12*	*12*	*12*	*20*	*3*	–	*5*	*Totals*
K4TXJ	10	10	12		12	20			5	69
WA3PXA	10	10	12	12	12	4	3		5	68
WA3QOZ	10	10	12	12	12	4		3	5	68
WB4SVH	10	10	12	12	12	6			5	67
WA5NYY	10	10	12	12	12	1			5	62
WA1MSK	10	10	12	12	12				5	61
WA2CLB	10	10	12	12	12				5	61
W2RQF	10	10	12		12	12			5	61
WB5AMN	5	10		9	12	20			5	61
WB5ELY	10	10	12	12	12	5				61
W7OCX	10	10	12	12	12				5	61
WA3OLG	10	10	12	12	12		3			59
WA3RCI	10	10	12	12	12	3				59
WA1QZH	10	10	12	12	12	2				58
W5GHP	10	10	12	9	12				5	58
K3DCB	10	10	12	12	12	1				57
WB8IAD	10	10	12	12	12	1				57
WBØHBM	10	10	12	12	12	1				57
WB2AEH	10	10	12	12	12					56
WB2CHY	10	10	12	12	12					56
WA2CNE	10	10	12	12	12					56
WB2OYV	10	10	12	12	12					56
WA3DUM	10	10	12	12	12					56
WB4UIH	10	10	12	12	12					56
WB4WHK	10	10	6	12	12				5	55
WB5EIN	10	10	12	6	12				5	55
WA1LIR	10	10	12	12	9					53
K3KAJ	10	8	12	12	9					51
WA7QAR	10	10	12	3	12	3				50
WBØCZR	10	10	12	6	12					50
WB2EEX	10	10	12	12					5	49
K4UNW	10	10	12		12				5	49
WA6TVA	10	10	3	12	9				5	49
W7GHT	10	10	12		12				5	49
K7QUF	10	10	12		12				5	49
VE3FQZ	10	10	12	12					5	49
WAØMLE	10	6	12	3	12				5	48
WB2NOM	10	10	12	3	12					47
WA6DEI	10	10	12	3	12					47
K8MLO	10	10	6	9	12					47
KØBJX	10	10	12	3	12					47
KØMRI	10	8	12		12				5	47
WB2FWW/8	10	7	12		12				5	46
K2VGD	10	10	12	12			1			45
W8GLC	10	6	12		12				5	45
WA8UPI	2	10		12	12	4			5	45
WA9EED	10	3	12		12		3		5	45
KØBAD/4	10	6	12	6	6				5	45

WA2AYC	44	W5RB	39	WB8KXV	34	
W2OE	44	WB8NCD	39	WB9EHL	34	
K3OIO	44	WØHJ	39	W9EWH	34	
WB4FDT	44	VE3AWE	39	K9HDP	34	
WB4GHD	44	VE3DPO	39	W9KRR	34	
WB4OMG	44	VE3EWD	39	W9MUC	34	
WB4VYU	44	VE3GFN	39	W9QLW	34	
WB5DLW	44	WA1HYN	38	VE3DVE	34	
K5YTA	44	W3FCS	38	VE3EHF	34	
WA5ZZA	44	WA3LYS	38	W2MTA	33	
WA9QVT/4	44	W6AUC	38	WNØGVR	33	
WBØHSZ	44	WB9HLG	38	WA3ATQ	32	
WAØYDJ/4	44	WA1PHJ	37	WA3RBI	32	
VE3GJG	44	WB5EDS	37	WB6AKR	32	
VP3SB	44	WØWYX	36	W6DEF	32	
WA4JQS	43	WA2UOO	35	K6NCG	32	
K4FCZ	42	WA3MQP	35	WB6PGK	32	
K4IAF	42	WB4WXX	35	W7AXT	32	
WA5VBM	42	W5VZO/4	35	W7BQ	32	
W7WAH/5	41	W1CE	34	WA7MEL	32	
WØMA	41	W1EJI	34	W7QGP	32	
WB4EKJ	40	W2FIR/5	34	WB8JGW	32	
WB4RUA	40	WA3IIV	34	WB8MJI	32	
WA7JQS	40	WA3QJA	34	WB8NRC	32	
WB9FOT	40	W3YA	34	VE3FRG	32	
WA1OWO	39	WB4KSE	34	K4KNP	31	
K1SXF	39	W4UQ	34	WAØFMD	31	
W1UBG	39	W4ZJY	34	W3LOS	30	
WB2LZN	39	WB5FML	34	K3MVO	30	
W2RUF	39	W6RFF	34	WA3NAZ	30	
WB2UFG	39	W6YBV	34	K4YZU	30	
W3NEM	39	WB8AYC	34	WNØFSL	30	
		WB8KKI	34			

*Denotes multioperator station.

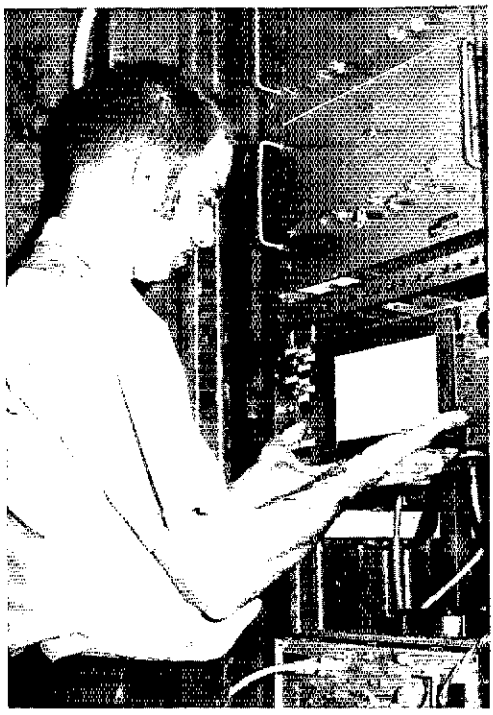
Category Key. (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (7) Making BPL, 3 points regardless of 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.

nadoes. WB4ZKA was dispatched to Jefferson Co. e.d. EOC. Within minutes of a touchdown in Bessemer, W4s AXL EFF, K4s AMQ AYF OIV and WB4EII were getting damage surveys and requesting help, thus enabling Red Cross to dispatch proper assistance at once. By 1845, amateurs were reporting funnels forming over Birmingham, then North Birmingham. K4TQR set up at the Center Point Sheriff's office providing first communications back to their office. W4AYK, a physician, was requested on 2 meters to establish an emergency field hospital in Center Point. At 1910, W4WLF was sent to open a shelter at a Center Point church. Another storm ripped through several smaller communities to the south of Birmingham. Shelters and hospitals without radio equipment were manned by amateurs as were isolated communities. Over 40 amateurs were involved. - (W4WLF)

■ Heavy rain in Columbus, OH, on June 12 caused flooding which necessitated relief operations. The EOC was manned from early evening until 0400 the following morning aiding Red Cross and supporting e.d. rescue units. High water the following day continued the need for amateur support. Eight RACES and 13 AREC members participated. - (W8IJE, RO Columbus and Franklin Co.)

■ Late in the evening on June 18, a boat with two aboard went over a dam on the Ohio River. Boats manned by rescue officials and AREC members searched 60 miles of shoreline and W4OYI and W4EWM flew an air search without success. Enroute to the scene an auto accident was discovered and the sheriff dispatched. The search continued the following day and the bodies were recovered. - (W4CID, SCM KY)

The 1973 ARRL Net Directory, listing almost 600 public service nets registered by June 1, is now available. This year the directory has been produced in booklet form, similar to the Repeater Directory. To receive your copy by first class mail, please send Hq. an addressed envelope (6 1/2" X 9 1/2" or larger) with 24 cents U.S. postage.



K5LTK is shown here checking the installation at the Houston (TX) Radio Repeater Club/c.d. repeater, WR5AAA. Since receiving the new WR call in May, three severe weather watches and over 1000 messages, including summons for police, ambulances, help for stranded motorists, etc., have been handled through the repeater.

■ Severe rainstorms on the evening of June 19 prompted activation of Franklin Co. (OH) c.d. station, W8THV, and the 2-meter AREC net which ascertained the availibility of 25 members. On a high hill, WA8ZTV set up as remote NCS, while K8IIF and WA8VVP provided mobile communications for c.d. units. By midnight, most amateurs were released. W8KJM manned the c.d. station and later moved to the Red Cross station; WA8ZTV provided a portable station where needed. In early morning, W8KJM and WA8ZTV provided communications to coordinate evacuation of a motel and the Wonderland subdivision. With continued rain on June 20, RO W8IJE called EC W8ERD requesting hand-talkie units and 6 amateurs responded. Operations ceased in mid-afternoon, 29 amateurs having participated. - (W8ERD, EC Central OH)

■ While starting the generator for Field Day (June 23) at their Griffith Park site, W6LPJ's hand slipped and hit bare cable, throwing him to the ground. The cables were quickly grabbed from his hands and WB6JXX began mouth-to-mouth resuscitation and W6LPJ's wife began chest massage. WA6FIB called on WestCARS, WA6SNE began assisting in calling a rescue unit, and WA6QQL raced to a telephone. By the time the rescue unit arrived, W6LPJ had regained consciousness. - *(W6SD Carrier)*

■ On June 23, WA5TMC was enroute to a Field Day site in Holly Springs (MS) National Forest when he spotted a forest fire. A 2-meter call raised WB5HKK who relayed the details to K5YPV. The Forestry Service was notified by phone and the fire was extinguished. - (W5NCB, SCM MS)

■ During a simulated disaster drill in conjunction with several hospitals in the Peekskill-Tarrytown area (NY), one hospital developed a need for blood for real surgical emergencies. Participating amateurs ascertained the blood bank inventories of the other hospitals and arranged transport of the required blood from two of the hospitals. The transporting helicopter was briefed of the needed mission while in flight. - (WN2IAM, Dir. Emerg. Dept., Phelps Memorial Hospital)

■ At 2015 June 25, WB8DVY observed a car crash into a concrete wall and called Cincinnati (OH) Police via the WB8CRS autopatch repeater. Police arrived in three minutes. - (WA8JXM, EC Hamilton Co.)

■ At about 1800 CST on June 29, WA4VZE/mobile was on a deserted highway near Birmingham, AL, when he spotted the victims of a hit-and-run accident, two of them being injured. WA4VZE called K4UMD on 2 meters and K4UMD called the Sheriff's office. While awaiting assistance, WA4VZE gave first aid. A deputy arrived at about 1815. - (K4AOZ)

■ During the flooding in parts of VT, NH and ME from July 2 to 7, the Medicare Net was active handling emergency traffic, weather reports and road conditions. The following took part: W1s BTF CCM GJY JAK JB MYD RIZ UV. Emergency power was available, but not needed. - (W1JB)

■ On July 3, WA8ULW notified K8RXM of a tornado near Cincinnati, OH. K8RXM alerted AREC members via the WB8CRS, WB8NON and K8SCH repeaters and an AREC net was opened on 2 meters by WB8IPV. AREC members surveyed the area and spotted a telephone pole blocking part of a road heavily traveled by spectators. Authorities were notified. AREC members further assisted by arranging for an additional supply of flares. - (WA8COA, SEC OH)

■ While mobile in Birmingham, AL, at 0930 CST, July 6, WA4GGN witnessed a car hitting a woman and child. Contact was made with K4s REL UMD via the WB4QEX repeater. K4REL alerted police who arrived within a few minutes. - (K4AOZ)

■ Attempts to deliver a message to an elderly lady who had a severe hearing loss, were unsuccessful by commercial means. However, on July 6 a message was relayed and delivered by amateur radio. The message was originated at 1500Z by WA4USB, passed to WA5VBM, then to WA5NSJ and on to W5DX. W5DX called W5KR who hand-carried the delivery and WA4USB was advised. Nets involved were: Intercontinental Traffic Net, 7290 Traffic Net, Texas Traffic Net and International Mission Radio Association Net. - (WA5VBM)

■ On July 8, WB4OVH came upon a bad accident near Bessemer, AL. He called WB4ZAG on the WB4QEX repeater and police and ambulance were notified. Assistance arrived within 10 minutes. - (K4AOZ)

■ While amateurs were furnishing communications for an air show in Lake Charles, LA, on July 8, one of the planes in the show crashed. WA5RKD was the first to be able to report to the tower and to the Navy that the pilot was uninjured. W5SKW was instrumental in keeping sightseers away from the burning wreckage. - (ARC of Southwest LA)

■ On July 15, WA9WCP spotted three boys mugging an older man in Oak Park, IL. He contacted W9KHD on the CFAR repeater who called police to the area. Meanwhile, WA9WCP attempted to chase the hoodlums, then returned to the scene to assist the victim and transport him to a nearby hospital. - (WB9EJV)

■ At 1635 PDT on June 20, EC W7IEU was notified by c.d. of a gravel pit cave-in at Edmonds, WA, which had trapped a boy and 4 rescue workers. Communications were needed to the rescue area. W7IEU arrived at c.d. at 1655 and established a link to W7ZFX. K7ENR was dispatched to the scene but arrived just as the rescue was successfully completed. - (W7IEU, EC/RO Snohomish Co.)

■ During the threat of flooding in Western MA, beginning June 30 the Western Massachusetts Emergency Net and the WA1KHC and K1FFK repeaters were on a standby-alert basis. Close liaison was maintained between the net and the repeaters. On July 1 some river level observations were made. Standby activity continued until late July 2 and WA1KHC ended standby status at 0800 July 3. Thirty-five amateurs were involved. - (WA1DNB, SEC WMass)

■ Numerous accounts of special public service activities have been received during the past several months. Unfortunately space has not permitted detailing these reports. A sketch of the special activities follows, arranged by month of occurrence:

January. Seven amateurs lent communications support for a parade in Riverside, CA, on Jan. 20 - (W6KIJ). The Mt. Baker ARC furnished communications at 4 checkpoints for a Whatcom Co. (WA) car rally on June 20 - (K7VNI, EC).

March. On Mar. 3 and 10, 18 amateurs assisted Boy Scouts in "Good Turn Day for Goodwill Industries" in Duval Co., FL - (WA4VZF, EC). Fourteen amateurs were involved with manning checkpoints for a March of Dimes Walkathon in Ft. Walton Beach, FL, on March 3 - (WB4CWG). Another March of Dimes Walkathon was held in Oklahoma City, OK, on Mar. 17, involving 9 amateurs - (WA5FSN, SEC OK). In Cincinnati, OH, 30 amateurs assisted in coordination of a St. Patricks Day Parade, Mar. 18 - (WA8COA, EC). On Mar. 31, 9 members of the Mt. Baker ARC furnished communications among 8 checkpoints of the March of Dimes Walkalot in Bellingham, WA - (K7VNI, EC). On the same day, 22 members of the Dallas ARC provided March of Dimes a similar service in Dallas, TX, in the "Miles for Children" Walk - (WA5ZNZ).

April. In Oklahoma City, OK, about 30 amateurs helped collect for the American Cancer Society on April 5. The Kansas Zone 4 AREC 2-Meter Net aided in the March of Dimes Walkathon in Topeka on Apr. 23 - (KØJMF, SEC). On Apr. 28, 10 amateurs joined in the Yakima, WA, city-wide litter clean-up campaign - (K7VAS, EC). A similar project took place in Fort Walton Beach, FL, with 8 amateurs participating - (W4RKH, SCM) About 15 members of the Tampa Bay Repeater Assn. helped Boy Scouts in their parade on Apr. 28 in Plant City, FL - (WB4TUP, EC). A March of Dimes Walkathon was held in Everett, WA, on Apr. 28 with 10 amateurs assisting - (W7IEU, EC). The Bays Mountain RC and Kingsport ARC helped ease the traffic and parking problems at the Bays Mountain Park (KY) Spring Festival, Apr. 28-29 - (W4PID). Also on Apr. 28, the Albany Repeater Society provided communications for the Community Organization for Drug Abuse Control Walk-A-Mile project in Albany, GA, with 7 members taking part - (K4GCR). On Apr. 29, 9 members of the San Antonio Repeater Organization assisted in an auto association's time trials in D'Hanis, TX - (WB5CIT). Thirty-one amateurs aided in the Central Ohio March of Dimes Walkathon on Apr. 29 - (WA8ZTV). On Apr. 29, the Michigan City (IN) ARC repeater was used in conjunction with the Ride-A-Bike Day to aid retarded children - (K9IYV).

May. Some 30 members of the Ottawa ARC and the Ottawa Valley Mobile Radio Club assisted the May 5 Miles for Millions Walk in Ottawa, ON - (VE3DV, SCM). The Tampa Bay Repeater Assn. provided communications for a Bike Hike held May 5 in Tampa, FL - (WB4TUP, EC). On May 5, members of the Tri-State College ARC participated in the Steuben Co., IN, March of Dimes Walkathon - (WB9CNE). In Flint, MI, on May 6, a March of Dimes Walkathon was held with 12 amateurs lending support - (WA8WQU, EC). Danielson-Putnam (CT) area amateurs participated in the Quinabaug Valley Assn. for Retarded Children Walkathon on May 6 - (WA1HYN, EC). On May 6, members of the OH-KY-IN VHF Radio Society provided communications for the March of Dimes Health Hike in Northern Hamilton Co., OH - (WA8COA, SEC). In Alliance, OH, on May 6, 9 amateurs were involved in the Charity Walk - (WA8ETX, RO/Asst, SCM). A clean-up in Kettering, and a parade in Miamisburg, OH, were aided by 23 amateurs on May 12 - (W8KKF,

Amateurs in the Fox Valley area near Aurora, IL, have found that use of 2-meter fm through a local repeater works fine in linking checkpoints for the annual Mid-America Canoe Race held June 3. Eighteen amateurs participated in this year's event. The four pictured here are (left to right): WB9AAX, WA9AYJ, WB9DNI and K9EUI.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for June Traffic

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	254	997	904	59	2214
KØONK	162	493	469	12	1136
WØWYX	56	474	226	350	1105
W8CUL	86	526	492	31	1095
W1PLX	68	329	249	21	667
W4VR	148	256	219	15	638
WA3IYS	41	300	265	20	626
WA3QOZ	43	271	174	60	548
W6RSY	52	278	190	28	548
WA9FED	23	294	164	25	506
W3EML	17	286	196	1	500

More-Than-One Operator Station

WA8ZDF/4	7	250	501	243	1001

BPL for 100 or more originations-plus-deliveries

WB9IHL	143	WA3PXA	120	WA3OLG	103
WAØAUX	141	WA4JQS	113	WNØGVR	102
W1BFY	138	W4BAZ	110	WNØFSL	100
WA3SWF	134	WN8MKL	109	WNØGVR(May)128	
WB4ZMK	123	K4SCL	105	W4WCG(Apr.)121	
WA9WNH	122	W2OE	103	WN9IHH(May)114	
K6UYK	121			WN9IHH(Apr.)106	

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: KØBAD/4, WBØFMN, KØPTV/4.

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.

RO/AEC). During the weekend of May 18-20, the Howard Co. RC set up a station at a Boy Scout Camporee in Ellicott City, MD, since telephones were not available - (WA3SWS). RACES, AREC and various club members joined in assisting parade officials in El Paso, TX, on May 19 - (K5UYH, EC). Thirteen amateurs helped coordinate a parade in Danielson, CT, on May 19 - (WA1HYN, EC). A Memorial Day parade was held in Ecorse and Melvindale, MI, on May 20, with 6 amateurs assisting - (WB8IFD, EC). AREC members lent supportive communications for the Cystic Fibrosis Drive in Southwestern OH, on May 20 - (WA8COA, SEC). Four checkpoints and the finish line of a car rally between Scarborough and Ballantrae, ON, were manned by amateurs - (VE3GFN, EC).

June. In Owensboro, KY, 16 amateurs assisted in an air show on June 10 - (W4CID, SCM). On June 14-16, amateurs were stationed in all course-safety boats and maintained links with Coast Guard and FAA during boat races on the Ohio River - (W4CID, SCM).

July. Parade communications were furnished by 12 amateurs for the Redwood City, CA, Independence Day Parade - (W6DEF, EC). Amateurs of the c.d. agencies and the Connecticut Yankee RC provided communications for traffic control during the July 4th parade in Columbia, CT - (W1HHR, SEC).

■ Thirty-four SEC reports were received by deadline, representing 11,655 AREC members. That's a big dip from the number of reports of June '72 when 40 SEC reported 12,065 members. We're missing reports from some of the regulars. Sections whose SEC did report for June are: Alta, BC, Colo, Conn, EBay, ENY, EMass, Kans, Mich, Miss, Mo, Nebr, Nev, NFla, NTex, Ohio, Okla, Org, Oreg, SV, SDgo, SJV, SCV, Sask, SDak, SFla, STex, Tenn, Utah, Va, Wash, WMass, WNY, WPa.

Traffic Talk

■ Do you support *your* section net? Almost all of the 74 ARRL sections have at least one section net; in some cases an ssb net, in other cases a cw net and often both. (Some of the more populous areas have several section nets working closely with each other.) Chances are good that your section has a section net which will benefit from your participation. If you live, for example, in Kentucky, support the Kentucky section nets; that's where your services are most needed, rather than in neighboring sections. If traffic is destined for your area, it should be routed through *your* section net, to you. Sure it's nice to be friendly and get around to various nets to "chat with the boys," but we hope that the main function of all section nets is public service (i.e. traffic handling and emergency preparedness). It is sad to see a potentially good section net fold or run at less than full efficiency only to discover that a few of the skilled operators who live in that section ignore *their* section net and participate in one outside their section.

■ A recent Twelfth Region Net bulletin cites a philosophy which has probably been evident to many traffic handlers at one time or another. Believing that traffic handling is dying out and there was nothing to show for his efforts, one of the newer traffickers wrote to TWN manager WØLRN indicating that he was losing interest in net operation. "How can you handle traffic with Oscar 6, VHF activity, DX, ragchewing and contests going on?" We extract Bud's reply: "As I see it, the rewards in regular traffic net participation are mostly personal. The fun of increasing one's operating skills and efficiency – I really get a thrill when I send a book of 22 at 30 WPM and *all* I ever hear from the receiving station is 'QSL TNX' several minutes later! I feel great when I take seven in a row at 25 WPM and don't need a single fill. The fraternalism we have on a regularly scheduled traffic net runs deep – it gets in your blood. When I can dig a weak signal out of the Rice Crispies of the summertime QRN, and QSL a CK 24 message in five minutes, I get more satisfaction than working a weak DX station and getting only the promise of a card. Providing a relay for a weak station under RTTY and the QRM of a contest, when the rest of the net stations can't even tell he is in there, is as self-gratifying as winning the first call in a DX pileup. The 'fallout' of all this activity is the establishment of the 'trained pool of operators' who can work together in a systematic way during times of communications emergencies."

■ *Procedural points,* The precedence, a non-optional part of a message preamble, is the tip-off as to the relative importance of the message which follows. Listed in order of urgency (and order of handling), the precedences are:

EMERGENCY - Any message having life and death urgency to any person or group of persons. In a disaster situation, this includes official messages of welfare agencies, requesting supplies, materials or instructions vital to relief of a stricken populance in an emergency area. Spell out EMERGENCY on cw. If in doubt, do not use it.

PRIORITY - Important messages having a specific time limit. Emergency-related traffic not covered above, such as death or injury notice,

personal or official, falls into this category. Priority is usually associated with traffic being originated *in* a disaster area. Use abbreviation P on cw.

INQUIRY - Inquiries as to the health or welfare of someone in a disaster area; usually associated with traffic being originated *outside* a disaster area. Inquiry precedence may also be used when inquiring as to the health or welfare in a non-disaster situation if the inquiry is more than of a routine nature. Inquiry is abbreviated Q on cw.

ROUTINE - Most traffic in normal times will bear this designation. Routine is abbreviated R on cw.

■ *National Traffic System.* K2KIR reports that June was a bum month for conditions, traffic and representation on EAN. Other than that . . . Poor band conditions made passing traffic coast to coast very difficult at times on CTN. Thanks to K2KTK for fine job carrying along 2RN during W2FR's absence. D2RN certificates have been issued to WA2s CLB EUO ICU TRK, WB2s FJE FNK NOM OYV VND. Summer slump has really hit 3RN sez W3NEM. WB4GHD has earned a 4RN certificate. D4RN certificates were issued to W4WCG and WB4UIH in June. Vacations have caused a few vacancies on RN7. WA9EED says that it appears that some ops have burned themselves out on traffic handling; it isn't easy when only a few guys are doing most of the work. WØHI has issued TEN certificates to WBØs CZR DBG HBM. The following have received TWN certificates: W2TPV/Ø, K5MAT, W7s IQU OCX, WØs IW LQ OOY, KØOTH, WBØs AXW HSZ.

June Reports

Net	*Sessions*	*Traffic*	*Rate*	*Avg.*	*%Rep.*
EAN	30	1072	.949	35.7	95.0
CAN	30	812	.666	27.1	96.6
CTN	27	205	.133	7.6	49.7
1RN	60	338	.294	5.6	88.0
2RN	60	312	.488	5.2	99.3
D2RN	24	53	.177	2.2	60.0
3RN	60	500	.400	8.3	95.8
D3RN	30	145	.293	4.8	93.3
4RN	39	299	.296	7.5	61.9
D4RN	13	25	.122	1.9	25.3
RN5	60	572	.290	9.5	92.2
RN6	60	483	.380	8.1	100.0
RN7	59	268	.308	4.5	53.4
8RN	52	257	.271	4.9	72.2
D8RN	12	10	.104	.8	16.7
9RN	60	317	.373	5.3	90.0
TEN	60	365	.369	6.1	84.6
WCN	59	147	.205	2.5	87.7
TWN	57	219	.170	3.8	64.3
TCC Eastern	106[1]	512			
TCC Central	82[1]	366			
TCC Pacific	111[1]	552			
Sections[2]	3038	10372			
Summary	*4003*	*18751*	*EAN*	*4.7*	–
Record	*3242*	*23817*	*1.149*	*15.9*	–

[1] TCC functions not counted as net sessions.

[2] Section and local nets reporting (100): APSN (AB), MTN (MB), APN (Mar), CM GBN ODN OPN OQN (ON), WQ-V/UHF (PQ), AENB AEND AENM (AL), AEN HARC (AZ), OZK (AR), IEN NCN NEN SCN (CA), BEN CN CPN NVHFTN (CT), EAST FMTN FPTN GN NFPN QFTN TPTN VEN (FL), GSN (GA), IMN (ID,MT), ILN (IL), TLCN (IA), KPN KSBN KWN QKS QKS-SS (KS), KSN KYN MKPN (KY), LAN LTN (LA), SGN (ME), MDCTN MDD (MD-DC), EMN EM2MN WMN WMPN (MA), MSPN PAW (MN), MTN (MS), JC2AN MON MoSSB MSN WEN (MO), MTN (MT), NHVTN (NH,VT), NJN NJPN NJSN (NJ), NLI NYCLI-VHF-TEN NYS (NY), CNCTN THEN (NC), BNR COAREC(10) OSSBN (OH), OLZ OPEN SSZ (OK), AREC BSN OSN (OR), EPA GCRN KSSN PTTN WPA (PA), TN TNN (TN), TEX TEX-SS TTN (TX), BUN (UT), VFN VRN VSBN (VA), NSN WSN (WA), WVPN (WV), BEN BWX WIN WSBN (WI).

Transcontinental Corps

W3EML reports another month with low TCC totals. Several functions complete but QRU. In May, TCC-Pacific certificates were issued to W5RE, W6s BGF EOT IPW MLF VNQ VZT, WA6DEI, W7s BQ EM GHT KZ PI, WØLQ.

Area	*Functions*	*%Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	119	88.3	1350	512
Central	90	91.1	864	366
Pacific	117	92.5	1104	552
Summary	*326*	*90.6*	*3318*	*1430*

The RCC roster (June): Eastern Area (W3EML, Dir.) - W1s BJG EH NJM QYY W2s FR GKZ, WA2s CNE UWA, W3EML, K3s CB MVO, WA3OGM, W4s SQQ UQ, K4s FAC KNP, WB4s OMG SGV, W8s PMJ VDA/4, K8KMQ, WA8PIM. Central Area (KØAEM, Dir.) - W4OGG, K4BSS/4, WB4s KPE YCV, W5s GHP MI QU SBM TNT, WB5FDP. W7WAH/5, W9CXY, WA9EED, WØs HI ZHN, KØDDA. Pacific Area (K5MAT, Dir.) - W5RE, K5MAT, W6s BGF EOT IPW ISC MLF RSY VNQ VZT, WA6DEI, WB6s AKR VKV, W7s BQ DZX EM GHT KZ PI, K7s NHL QFG, WØLQ, KØQTH, WBØAXW.

Independent Net Reports (June)

Net	*Sessions*	*Traffic*	*Check-ins*
Hit & Bounce Slow	17	56	129
Clearing House	25	226	407
75-Meter ISSB	30	245	914
7290 Traffic	42	557	1621
IMRA	47	567	1508
Ohio Valley Teenage	29	90	233
Mike Farad	25	45	181
North American Traffic	26	395	542
20-Meter ISSB	21	1589	375
40-Meter Side Band	24	2469	212
Northeast Traffic	30	205	214

Strays

The Buncombe County Amateur Radio Club of Asheville, N. C. has two unusual members; their treasurer, W4DPF, has the first name of *Cash* and member WN4*CUP* is named Charles Tin *Coffee*! —*W4WXZ*

– • • • –

The Federation of Eastern Massachusetts Amateur Radio Associations are now requesting nominations for the "Ham of the Year" award for 1973. Only amateurs in the 1st call district are eligible and the amateur selected will be the top "good neighbor" among hams, the one who has performed an outstanding public service.

Anyone may nominate an amateur radio operator for the honor. Winner of the award will be chosen for the amateur activity which brings the greatest benefit to an individual or group and for the amount of ingenuity and personal sacrifice displayed in performing the service.

Nominating letters should include the candidate's name, address, call letters and a complete description of the service performed. Letters must be received by the Chairman of the FEMARA Awards Committee, 28 Forest Ave., Swampscott, Mass. 01907 by September 1, 1973.

The winner will be presented with a plaque and a cash award at the ARRL New England Convention, Dunfey's Hyannis, Cap Cod on September 29, 1973.

Correspondence From Members-

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

THE ATTACK ON 220

● No need has been established for the Class E CRS. Only when Class D has been purged of the non-essential and illegal communications so prevalent today will it be possible to assess objectively the requirements of the legitimate user in terms of the channel allocations presently available. It is not inconceivable that limitation of the 27-MHz band to legitimate users, coupled with the decline in solar activity (thereby eliminating interference due to "skip") will show the present Class D allocations to be sufficient for the public's needs over the next 5 years or so. If, at the end of this period, additional frequencies are required to support the communications requirements of the general public, expansion of the CRS frequency allocations would be warranted. – *Theodore J. Cohen, W4UMF, Alexandria, VA*

● Now that the 220-MHz amateur band is beginning to come into anything approaching widespread use, now that there is an allocation program for fm repeater use on that band, now that interest in "220" is at its highest level yet . . . NOW is when FCC proposes to take a fifth of that band away from us.

The removal of the *highest* megahertz of the band from amateur service, after restricting repeater use to the segment above 222 MHz, is a major blow against repeater operation on that band, which is 220's greatest potential. Surely, this is not fair. And the Texas Plan would be virtually eliminated by this proposal, since all but two repeater inputs are on the segment from 224 to 225 MHz. – *Arthur B. Reis, III, WA8AWJ, Howell, MI*

● Since moving to Tucson in January 1973, I have logged over 400 radiotelephone contacts on 11 meters. Only *two* (2) were contacts between stations using call signs and proper procedures and conducting business. The remaining contacts were of a hobby nature between such stations as "Snoopy," "Desert Rat," "Cactus Flower," etc., using linear amplifiers with several hundred watts capability and variable frequency oscillators.

The overcrowding of the Class D band is the result of the incredible volume of illegal operation on that band. A logical course of action would be to enforce the existing regulations with a vengeance. After the band has been "cleaned up," then survey the legal users of the band as to their spectrum needs. Certainly such an obvious use of systems analysis should not slip past the Commission. – *Joseph A. Schlatter, Jr., K4FPT/7, Tucson AZ*

● The Commission, with its limited budget, is doing an admirable job, but is not sufficiently staffed to monitor the existing Citizens Radio Service and legally stop the many violations. How do they propose to handle a second monster? The answer is obvious. They won't, and with all these additional violators how can the many technically competent operators continue to hold the Commission in esteem? – *Melville M. Zemek, W5IK, Dallas, TX*

● There is no doubt that the first thing that will occur in the E band will be the modifying of transmitters both in frequency and power, with the illegal move into the ham band. Every bad act by these undisciplined mobs will reflect adversely upon legitimate amateurs. The only one to benefit will be the manufacturers of equipment. This is not a responsibility of the FCC. – *Frederick G. Suffield, Sherman Oaks, CA*

● The League is the only strong voice we have in the Government. But we must support it if this voice is to be heard. I appeal to every amateur, whether League member or no, to write the Commission and let them know where we stand, not only on this issue, but the whole policy of restrictive regulation. If you take pride in being called a ham, in the skills you have acquired, the type of people you represent and the privileges you have, don't let this proposal go unnoticed. It is not that hard to write a letter. I'm writing one now and it doesn't hurt a bit. – *Roy G. Clay, III, WB5HVS, President, Benjamin Franklin High School Radio Club, New Orleans, LA*

● *EIA asked FCC to set aside two MHz of the* 220 band for CB, despite the fact that this band is internationally allocated in Region 2 to amateur and radiolocation services. We may suspect, with some justification, that EIA and its members have milked the 27 MHz market dry – and now want to build another cow. – *K8CSG, Carascope*

● Yesterday afternoon on 27 MHz I was unable to complete an important conversation from my car (KCY-8179) to my home over a distance of less than three miles. Skip interference from "the Red Baron" and some of his friends was the reason. I have held commercial and/or amateur operator licenses since 1943. I was brought up to have the greatest respect for FCC rules and regulations, and a healthy respect – even a bit of fear – for the enforcement role of the FCC.

My respect for the FCC rules and regulations is undiminished, but something approaching contempt has replaced respect for the FCC's ability to carry out its obligation to enforce those rules and regulations. – *Edward E. Nicholas, Jr., WB4TJJ, Falls Church, VA*

● Do I hear resounding echos from the Watergate hearings, or is my imagination deceiving me? Is this CB problem so great, that a division of the Federal Government is afraid to stand by their laws and enforce them? We have CB operators in our neighborhood who are violating all of the laws pertaining to this band, such as illegal antennas, running a kW, no call signs given, calling out of their area so they can get a DX card from some distant country, not filtering their transmitters, and interfering with TV, radio, phonographs, tape

recorders and last but not least, the telephone lines. You mean to tell me that these individuals are going to be allowed more frequencies to continue their violations? Giving these individuals more frequencies is not going to solve the problem, on the contrary, it is going to increase them. – *Lee F. Champagne, K8BAU, St. Joseph, MI*

● I have been licensed for three years – not a long time, but sufficient to become proud of my operating technique and the self-policing done by amateur operators. I once considered CB, but after seeing the flagrant disregard for the rules and the childish manner in which communications were attempted, I quickly changed my mind. I've never regretted the change of heart. – *John A. Niolon, WB4PJY, Hueytown, AL*

● We have an operational repeater on 220 (WR9ABH) and have approximately 30 users. We have made a considerable investment on equipment for this frequency band and do not wish to see it given away as another play-toy to those who are either too lazy or technically imcompetent to make the effort of obtaining an amateur license. – *James R. Romain, WB9HWS, Tres., WAFAR Club, Western Springs, IL*

● Before the FCC takes spectrum from other services it should investigate using spectrum already allocated to the Citizens Radio Service more effectively. There is no reason to believe that operators on the proposed Class E service would behave any differently than those using the present 27-MHz allocation. In the light of the operating practices seen too frequently in the Class D allocation, the restrictions on operation near the borders of the United States and in other areas would not be effective. – *William G. Bloethe, WAØSEQ, Des Moines, IA*

● Why not award WAS to those "people"? I know they are trying mighty hard in my neck of the woods! – *Robert A. Grasmann, WB2CJN, Lake Ronkonkoma, NY*

● I also hold a CB license, and see both sides at work. Most amateur operators police themselves, keep logs, keep within their assigned bands, keep their power levels within the limits set, and abide by all rules of the FCC. On the other hand, many CBers seem intent on breaking FCC laws, such as running higher power than the 5-watt input limit, building unlawfully high antennas with the intent of working more than their 150-mile range limit, using VFO equipment and working outside their 23 channels, even making up their own call signs.

If the above abuses were stopped, the legitimate, licensed CB operators could use the present allocated bands as intended by the FCC and there would be no need for more channels.

The FCC must increase its manpower to handle the present 23 channels before granting more channels to CBers. If you cannot enforce the existing laws, you will create another quagmire of illicit bootleggers.

I believe the amateur radio operators should be the ones to be rewarded with the band increase, not a decrease. – *John V. Smith, W4ACG, KDR-7410, St. Petersburg, FL*

● In view of past performance by Citizen Band operators, it is extremely unlikely that they would abide by any restrictions placed on their operation. – *James H. Barrows, W7BCT, President, Cascade Radio Club, Everett, WA*

● The FCC's latest attempt to rob us of more spectrum space is outrageous. It really frosts me that the hams, who are intelligent, law-following, concerned, public-service minded individuals, might have to give up vhf space to those idiot-minded flagrantly law-breaking CBers.

I hope we can at least get 11 meters back!

Thanks much – and please fight hard for our valuable space! – *Richard Ferranti, WA6NCX, Santa Clara, CA*

● While shopping at Walker Radio Supply in Medford today, I watched as the salesman sold a Citzens Band set to a customer. He gave a very good explanation of how the controls worked and then said that the green number nine was the emergency channel; "Just call for the 'Brush Ape' or 'Buzz Saw' and help will be on the way." Is this the way that the largest radio supply store in Southern Oregon sells CB sets? Perhaps the amateurs should go bootleg too and then we could get more band width to play on. This seems to be the result the CB operators have gained. Now the FCC wants to give them 40 channels in the 224 MHz region for more unlicensed radios to operate. – *Lloyd M. Miles, WA7NEQ, KNC-0791, Medford, OR*

● It would appear that our reward for "upgrading" via incentive licensing is going to be the phasing out of amateur radio. If we combine the probable loss of 220-225 MHz with restrictive repeater rulings, greater difficulty of Novice exams and incentive licensing, a pattern emerges. It would also appear that the reward for flagrant violation of the law on 11 meters is greater than for our hard work and effort. I have only to guess that their 850,000 has a stronger lobby than our 300,000 so that even the fact that a large percentage of the CB population openly violates the law while only a very small percentage of the hams indulge in any such activity means nothing.

I desperately hope that we will take this one all the way through the courts if necessary. I don't see how the FCC's powers can include rewarding defiance at the law while further restricting a service which has been self-monitoring and of great use. I would also propose that the ARRL attempt to get legislation introduced in Congress that would protect the Amateur Radio Service from bureaucrats with "mixed up minds." – *William A. Farone, Ph.D., W2DYS, Teaneck NJ*

● Now that my suspicions about all those new "channelized" 220 rigs have been confirmed, what are the chances of having the 27 MHz noise shut off by the FCC? I have listened to that band for quite some time hoping to hear even one set of call letters – and all I hear are the people with the big linears and names like "Scarecrow," "The Alarm Clock," "Pick 'um up Truck," etc. This can only be a source of embarassment to the FCC as I'm sure that the 11-meter skip doesn't stop at our borders. Could the ARRL sponsor a petition to close the 11-meter band, since policing the illegal power people seems to be impossible, and perhaps re-open it as a ham band again? The equipment manufacturers should really go for the idea because it would be a big shot in the arm for the sales of the new 220 rigs. Even the legitimate CB users should welcome it as they would be able to get their traffic through without skip interference. – *Robert M. Getsla, WN6WHT, San Jose, CA*

IARU 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

AMATEUR RADIO IN THE USSR

I. Demyanov, UW3ID, General Secretary of the *Krenkel Central Radio Club of the USSR*, has kindly provided the following information on amateur radio in the USSR.

Anyone who is at least 16 years old and is a citizen of the USSR can become a radio operator. Amateur radio stations are divided into three classes depending upon the qualifications of the operator. In the high-frequency bands, the power and emission privileges are as follows:

Band (MHz)	*Class 1*	*Class 2*	*Class 3*
3.5-3.65	200 cw	40 cw	10 cw
7.0-7.1	200 cw	40 cw	10 cw
14.0-14.35	200 cw	40 cw	—
21.0-21.45	200 cw	—	—
28.0-29.7	200 cw	40 cw	10 cw
3.6-3.65	200 ph.	10 ph.	—
7.04-7.1	200 ph.	—	—
14.11-14.35	200 ph.	—	—
21.15-21.45	200 ph.	—	—
28.2-29.7	200 ph.	40 ph.	10 ph.

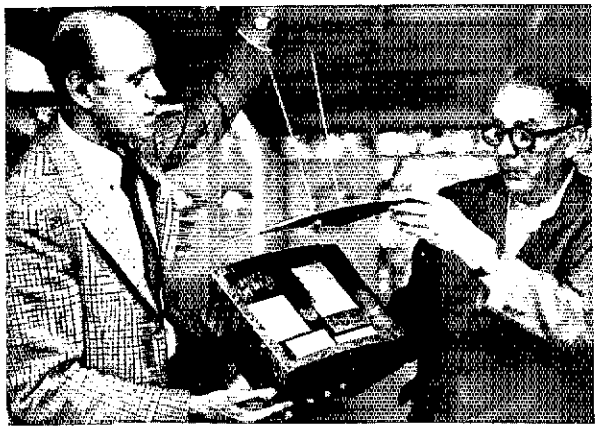
According to UW3ID in a letter to WA6NDA, radio operators in the USSR can converse on the air on any theme relating to radio operating and ham radio "sport." Other subjects are avoided in conversation only because this leads to lengthy discussions of incidentals, creating interference and prohibiting other operators from transmitting. In overseas contacts, lack of a common language often limits even ordinary conversation concerning radio operating.

REGION II CONFERENCE

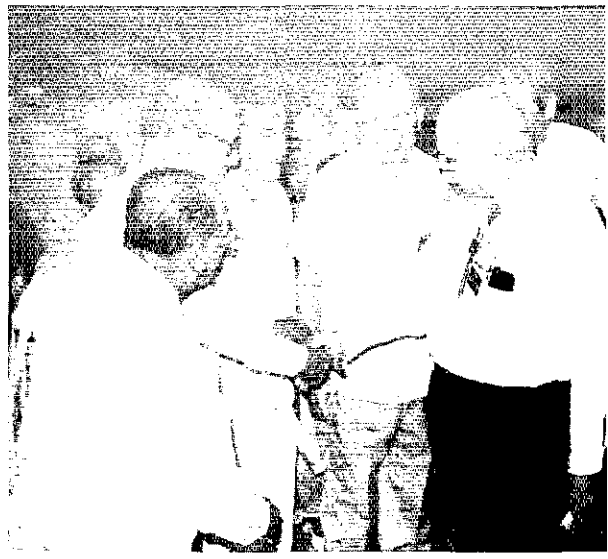
The fourth triennial conference of the *Union Interamericana de Radioaficionados - IARU Region II* was held at Santiago, Chile, during the week of April 9-13, 1973. Represented at this conference were fourteen national amateur radio societies in the Americas, nine in person and five by proxy: Argentina, Bermuda, Bolivia, Canada, Chile, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, the U.S., and Venezuela.

Considerable attention was given to recommendations relating to emergency communication, largely as a result of the Managua earthquake. The conference expressed support for special frequencies to be designated for emergencies; the development of National Emergency Nets where none presently exist; a plan to secure equipment for emergency use; a manual on emergency communication, to be prepared by Panama; and an Inter-American Field Day.

Study was given to the question of proper use of the amateur bands, especially as regards adherence to band and mode assignments and to third party traffic regulations. Member societies in Region II were requested to inform their amateurs about the need to utilize bands better in handling third-party traffic; limit traffic to areas where



At a space exhibition held last summer in Rattvik, Sweden, some 40,000 visitors had the opportunity to see the prototype of Oscar 1, the first amateur radio satellite. Here, SM4GL and exhibition general manager Mr. Stura Axen show what's inside the satellite. Also representing amateur radio at the exhibition was special station SK4XA, which was on the air on all hf bands.



The 41st national convention of the *Liga Mexicana de Radio Experimentadores* was held May 24-27 at Tuxtla Gutierrez, Mexico. Shown here shaking hands with *ARRL* Director W6KW is Governor of the State of Chiapas, Dr. Manual Velasco S. Looking on are (l-r) convention chairman XE3V, Luis Valencia of the Dept. of Communications in Mexico City, retiring *LMRE* president, XE1SH, and (behind W6KW) new president XE1EEF.

treaties exist; restrict use of phone patches to emergency situations; and, insofar as practical, to handle traffic away from U.S. phone segments. A study of the problem of illicit traffic was recommended.

With an eye to increasing knowledge of IARU and its activities among individual amateurs, it was recommended that an article be prepared by IARU Headquarters for publication in *QST*, preferably with input from each of the three regional organizations.

The Executive Committee was expanded from six to seven members. XE1CCP, OA4AV, and VE3CJ were reelected to the offices of President, Secretary, and Treasurer, respectively. W2TUK was elected Vice President, and CE3ABZ, HP1ND, and YV5BPG were elected Members. The new Executive Committee was pictured on page 93, July *QST*.

Site of the next conference will be the United States, coinciding with the 1976 bicentennial celebrations.

DX OPERATING NOTES

Reciprocal Operating

United States reciprocal operating agreements exist only with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Fiji, Finland, France,* Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Jamaica, Kuwait, Luxembourg, Monaco, Netherlands,* New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom,* Uruguay, and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write *ARRL* headquarters for details.

Canada has reciprocity with: Belgium, Brazil, Dominica, Dominican Republic, Ecuador, France, Germany, Guatemala, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Panama, Peru, Portugal, Senegal, Sweden, Switzerland, U.S., Uruguay, Venezuela, and Commonwealth countries.

Third-Party Restrictions

Messages and other communications – and then only if not important enough to justify use of the regular international communications facilities – may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries.** Argentina, Barbados (only U.S. stations /8P), Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Guatemala, Guyana, Haiti, Honduras, Israel, Jordan, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR JY LU OA PT PY TG TI VE VO W or K/8P XE XP YN YS YV ZP 4X 4Z 8R and 9Y4. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, Dominican Republic, El Salvador, Honduras, Israel, Mexico, Peru, Trinidad & Tobago, U.S., and Venezuela. Permissible prefixes are: CE CP HI HR K OA TI W XE YS YV 4X 4Z and 9Y4.

DX Restrictions

Amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) Conference.

The Director General of the Posts and Telegraphs Department of Vietnam has notified the ITU that there is no objection to communications between amateur stations in other countries and XV5AC. However, communication with other amateur stations in Vietnam (XV or 3W8) is forbidden. Canadian amateurs may not communicate with Cyprus (except 5B4), Gabon, Iraq, Pakistan, Turkey, Khmer Republic (except XU1AA), Vietnam, Libya, and Yemen. Prefixes to be avoided by Canadians include AP TA TR8 XU XV YI 3W8 4W 5A. QST

*Agreement includes overseas entities.

**By special agreements, third-party traffic is also permissible with amateurs in Australia and the Federal Republic of Germany for traffic regarding amateur satellites, with 4U1ITU, and with personnel of Project Hope in Jamaica.

Happenings of the Month

Board Meeting Action:

Foundation, 220-225 MHz, Repeaters Share Spotlight

- *Director, Advisory Committee Nominations Open*
- *Canadian DOC Survey Results*
- *Board Meeting, EC Minutes*

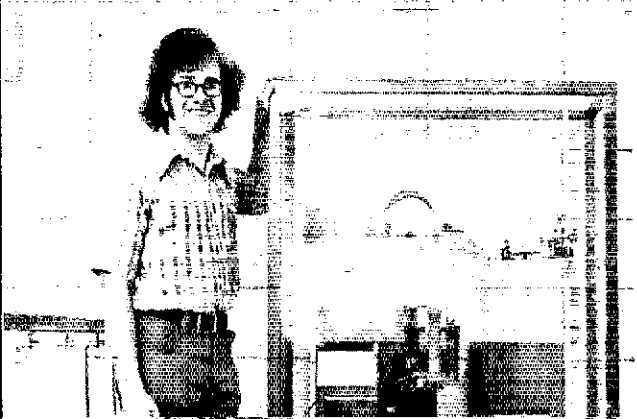
The ARRL Board of Directors – sort of a "representative town meeting" on a national scale – held its second meeting of the year on July 19-20, 1973, at the new Holiday Inn in Hartford. Informal action began Monday the 16th when the first of the officers and directors began arriving from Canada and all over the United States (they are all unpaid volunteers) and ended Sunday the 22nd, when the last one departed. Committee meetings, sessions with consultants, caucusing, inspections of headquarters facilities, and staff-Board chats preceded and followed the formal sessions, summarized below. Complete minutes are further back in this department.

Three issues vie for the honor of "most important" – **the fight to preserve the entire 220-225 MHz band**, the **establishment of a foundation** to raise additional funds, primarily for **satellite projects**, and the **need for further rule-making in the repeater field**, to undo overly-restrictive rules and interpretations affecting monitoring and control procedures, power requirements, station licensing, system configuration changes, interference problems, antenna installations and linking & crossband operation, as voted at Minute 16. Here the Board had the benefit of information collected by the Repeater Advisory Committee and the Hq. staff.

As to the 220-MHz matter, the "Committee of the Whole" rolled up its sleeves and devoted more than two-and-a-half hours to Docket 19759, developing a "game plan" for all-out defense of the band. Only the "tip of the iceberg" shows in Minutes 17-18: the Board felt that details of strategy should not be unduly publicized at present. (Several additional hours were spent by an ad hoc committee on instructions to the staff and on the language of the motion which was adopted.) The Board will be **calling on all members of the League for help in fighting Class E CB.** The editorial in the August issue, and "Correspondence from Members," this issue, are also pertinent.

A League entity to which bequests and contributions could be made for special programs in amateur radio has been talked about for several years, particularly since the termination of the Building Fund drive in 1967. The idea matured into action at this meeting with the **creation of the ARRL Foundation, Inc.**; the naming of a temporary Board of Directors, (the members of the Management and Finance Committee); machinery for selection of a regular Board in January 1974; and assignment of its first priority, to encourage and assure continuation of amateur radio space activities (Minutes 8 and 24). Even more solid support for space: the Board allocated **$38,000 for the design and construction of Oscar 7**, hopefully to be in orbit by February of next year (Minute 39). Early launch is considered necessary in support of the ARRL/NASA plan for space education in schools. **W1AW is to be equipped for wire remote control of the Oscar command transmitter** at Talcott Mountain (Minute 15, 45).

Another issue – which in other times might easily have qualified for the lead – was FCC Docket 19723, a notice of **inquiry into the Radio**



Robert L. Mapou, WA3QDH, arranged for this exhibit at the Prince George's (Maryland) County Library during amateur radio week, June 17-23. Materials for the exhibit were loaned by Ed Redington, W4ZM, Ed Holten and Ed Kennedy, W3GPI.

Public relations for amateur radio is everyone's job, since the opportunities come to each of us. The Burlington Wenoca Radio Club (North Carolina) took good advantage of an opportunity to display amateur radio for 2,000 employees of Western Electric's local plant. Seated: W4IZI; standing from left: K4CX, WB4AYQ, W4LAG, K4EIA, WB4WTI, WB4SGB, K4CDI and W4PRN.

Amateur Civil Emergency Service. An ad hoc committee of League members involved in emergency work – WA4PBG, K5SVD, W6INI and WØPB – had already been appointed by the president to study the docket. The results of its work and that of an outside firm under contract to the government, Systems Development Corporation, will be the basis for the League filing in the RACES inquiry (Minute 46).

Additional staff personnel were authorized to implement **preparation for an eventual ITU frequency conference,** expected in the 1978-1980 period (Minute 6); the Board had earlier heard extensive reports on preparations for such a conference, prepared by the International Affairs Committee, and on actions already in progress, by the officers. A grant was made for **refurbishing station 4U1ITU** at the International Amateur Radio Club in Geneva, (Minute 41).

In operating matters, final approval was given and rules adopted for the Emergency **Communications Advisory Committee** (Minute 11). **Elimination of the separate phone certificate for DXCC was postponed** for one year to enable further assessment of membership opinion by the DX Advisory Committee (Minute 21).

On matters related to staff operations, the Board directed a **study of office space** at Headquarters, to see whether the present building could accommodate offices for the president and treasurer (Minute 10). A **vote will be taken among Hq. employees** to see whether they wish to be covered by the Federal Social Security program in addition to the present pension plan (Minute 13). The Handbook **publication date will be moved up,** effective with the 1973 edition, so that it will be available during the Christmas season (Minute 12).

Subjects assigned for committee study include expansion of space in *QST* for technical articles, the use of facsimile on all amateur bands, an expanded public relations program nationally and through section appointments, and a license expiration service. The second 1974 meeting of the Board will be held July 17-18 in New York City, in connection with the ARRL National Convention (Minute 20).

Minutes appear at the end of this department.

CANADIAN QUESTIONNAIRE

As a result of changes in the United States amateur radiotelephone suballocations, the Canadian Department of Communications has been studying VE/VO suballocations. One part of the study was a questionnaire sent to all licensees, with these results:

Preference for 75 and 40 meter phone allocations: 3725-4000 kHz (existing), 1839; 3700-4000 kHz, 1753; 3675-4000 kHz, 547; 3650-4000 kHz, 1247; 7150-7300 kHz (existing), 1976; 7125-7300 kHz, 971; 7100-7300 kHz, 1191; 7075-7300 kHz, 1121. Station set up for operation: yes, 5142; no, 374.

Preference by mode: cw, 3737; phone, 4327; RTTY, 171; other, 36.

Preference by band: 160 m., 108; 80 m., 4324; 40 m., 3369; 20 m., 3864; 15 m., 2400; 10 m., 1982; other, 1521.

Membership: ARRL Canadian Division, 2612; provincial organizations affiliated with Canadian Amateur Radio Federation, 1911; Saskatchewan Amateur Radio League, 235; Radio Amateur du/of Quebec, Inc., 562; none of these, 1738.

Recognize as representing your views to DOC: ARRL Canadian Division, 2489; CARF, 2286; SARL, 97; RAQI, 466.

Age breakdowns were: under 25, 426; 26-35, 892; 36-45, 995; over 46, 2948.

Questionnaires were sent to 13,030 licensees, of which 5637 responded by the June 15 deadline, 43.3% of the total; 65% of those responding held Advanced Amateur certificates of proficiency.

AMATEUR RADIO WEEKS

Connecticut Governor Thomas Meskill proclaimed the week of June 24-30 as Amateur Radio Week. Key points in his Official Statement were amateur message traffic overseas, emergency communications and highway calls, e.g. to the State Police about an accident.

The Mayors of San Fernando, California, and Englewood, New Jersey, proclaimed amateur radio weeks June 18-23, tied in with ARRL Field Day.

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1974-1975 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
Newington, Conn. 06111

We, the undersigned Full Members of the ARRL residing in the . . . . . Division, hereby nominate . . . . . as a candidate for director; and we also nominate . . . . . as a candidate for vice-director; from this division for the 1974-1975 term.

(Name Call City Zip Date)

The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by noon EDST of the 20th day of September, 1973. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates for both director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 8 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are — *Atlantic:* Harry A. McConaghy, W3SW and Jesse Bieberman, W3KT; *Canada:* Noel B. Eaton, VE3CJ and A. George Spencer, VE2MS; *Dakota:* Larry J. Shima, WØPAN and Edward C. Gray, WAØCPX; *Delta:* Max Arnold, W4WHN and Franklin Cassen, W4WBK; *Great Lakes:* Alban A. Michel, W8WC and Richard A. Egbert, W8ETU; *Midwest:* Ralph V. Anderson, KØNL and Paul Grauer, WØFIR; *Pacific:* J. A. Doc Gmelin, W6ZRJ and Albert E. Gaetano, W6VZT; *Southeastern:* Larry E. Price, W4DQD and C. James Roux, K4THA.

Full Members are urged to take the initiative and to file nominating petitions immediately.

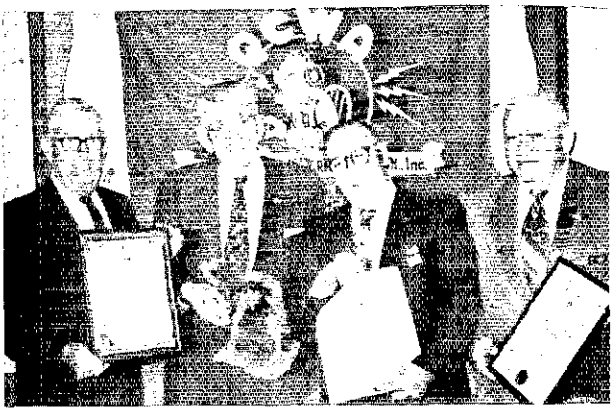
For the Board of Directors:

July 1, 1973
JOHN HUNTOON, W1RW
Secretary

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOC but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current *QST* address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern, but your *QST* goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.



Ed Trombley, W8CAM (left center) hit the jackpot when the Michigan Chapter, QCWA, had its annual meeting. He received four separate awards from fellow amateurs, honoring both his services to the chapter (currently as treasurer) and his work handling traffic for servicemen. Helping him hold the loot are: (left to right) Ed Prested, W8IDC, secretary; Vern Sherman, W8MX; and Bill Forbey, K8IGQ. *(Photo via W8ZBT)*

ADVISORY COMMITTEE NOMINATIONS

One of the many ways in which members help steer the course of the League is through advisory committees in specialized fields – presently contests, VHF repeaters, DX, and Emergency Communications. There is a maximum of eleven members in each group, and initial appointments of terms up to three years are authorized. The full rules may be found as an addendum to the Articles of Association and By-Laws, edition of February 1, 1973. (Copy on request to members; a stamped, self-addressed envelope of standard business size would be appreciated with the letters "AABL" on it.)

Candidates for committee membership may be nominated at any time by three sponsors, each of whom is a Full Member of ARRL. Each candidate must have been a League member for a minimum of two years; licensed as a Technician or higher for three or more; and currently and consistently active and qualified in the specialty area of the field served by the advisory committee.

This is a call for nominations; convenient forms may be obtained by writing the secretary at ARRL Hq. The President, in consultation with the committee chairman and liaison members, on or about November 1 of each year, will select replacements for members whose terms are expiring, or shall reappoint them for a subsequent term as appropriate. A file of eligible nominees will be maintained for use as a source of replacements.

A member's initial term of office will be either for two or three years as designated by the President, with approximately one-half the initial members having two-year terms. Members may be reappointed for no more than two consecutive two-year terms, but are again eligible for appointment to committee membership after a lapse of one year.

The incumbents, with date of expiration of current term, are:

Contest Advisory Committee

Peter Chamalian, W1BGD, Chairman, 52 Chestnut Ct., Cromwell, CT 06416; January 1, 1974
Joseph R. Kilgore, W2EIF, 5 Sunnybrook Ct., Stratford, NJ 08084; January 1, 1974
Eugene Zimmerman, W3BQV, 33 Brighton Dr., Gaithersburg, MD 20760; January 1, 1975
John T. Laney, III, K4BAI, Box 421, Columbus, GA 31902; January 1, 1975
William H. Parry, K5TSR, 4343 Bright Sun Dr., San Antonio, TX 78217; January 1, 1974
Philip J. Goetz, W6DQX, Box 5491, Los Angeles, CA 90055; January 1, 1974
Albert K. Francisco, K7NHV, Box 4412, Pocatello, ID 83201; January 1, 1975
Fred T. Deziel, WØHP, 2417 W. 112th St., Bloomington, MN 55431; January 1, 1975
Katashi Nose, KH6IJ, 4207 Huanui St., Honolulu, HI 96816; January 1, 1975
Director Liaison – Larry Shima, WØPAN, 11417 Goodrich Rd., S. Bloomington, MN 55437
Hq. Liaison – Ellen White, W1YL

DX Advisory Committee

Ted M. Marks, WA2FQG, Chairman, 924A Village Dr. W., North Brunswick, NJ 08902; January 1, 1974
John H. Thompson, W1BIH, P.O. Box 1, Torrington, CT 06791; January 1, 1974
Layfield L. Lamb, W3BWZ, 5805 Alan Dr., Clinton, MD 20735; January 1, 1975
William F. Christian, K4IKR, 2800 Cave Ave. NW Huntsville, AL 35810; January 1, 1975

Here is another "bootleg" amateur license plate from Ontario, belonging to Brock Morgan, VE3OI.

Amateurs in London, Ontario, feel that the DOC decision last year to drop the age limit for ham licenses in Canada was wise: they're proud of Brian Wong, VE3GRC, a 13-year-old, who pounds brass on the hf bands and is active on both a-m and fm phone on the very highs.

Robert E. Shank, W5AO, 105 E. Porter St., Jackson, MS 39202; January 1, 1975
Robert B. Vallio, W6RGG, 18655 Sheffield Rd., Castro Valley, CA 94546; January 1, 1975
Norman G. Ray, W7LFA, 14005 – 132nd Ave. NE, Kirkland, WA 98033; January 1, 1975
J. O. Baumgardner, W8BF, 20470 Lorain Rd., Fairview Park, OH 44126; January 1, 1974
Robert E. Baird, W9NN, P.O. Box 498, Plover, WI 54467; January 1, 1974
Clyde F. Norton, WØELA, 14 Westwood Cir., Minnetonka, MN 55343; January 1, 1975
Director Liaison – Robert York Chapman, W1QV, 28 South Rd., Groton, CT 06340
Hq. Liaison – Robert White, W1CW

VHF Repeater Advisory Committee

Howard L. Lester, W2ODC, Chairman, 8 Bath St., Box 6, Alplaus, NY 12008; January 1, 1975
Richard G. Bromley, K1ABR, 12 High View Dr., RFD 5, Cranston, RI 02920; January 1, 1975
Raymond G. Hendrickson, W3DTN, 1419 Larch Rd., Severn, MD 21144; January 1, 1974
William C. Parris, K4GHR, RFD 6, Box 605, Salisbury, NC 28144; January 1, 1975
George F. Munsch, W5VPQ, 11314 Janet Lee Dr., San Antonio, TX 78230; January 1, 1975
Charles R. Flanagan, W6OLD, 6427 West 83rd St., Los Angeles, CA 90045; January 1, 1975
Jon Marcinko, W7FHZ, 26501 – 18th Pl. S, Kent, WA 98031; January 1, 1974
George R. Cryder, W8LGL, 15 N. Franklin St., Delaware, OH 43015; January 1, 1976
Gilbert J. Kowols, W9BUB, 216 Belle Plaine Ave., Park Ridge, IL 60068; January 1, 1975
Director Liaison – Roy L. Albright, W6EYB, 107 Rosemary, San Antonio, TX 78209
Hq. Liaison – Lewis G. McCoy, W1HCP

Emergency Communications Advisory Committee

Nominations for staffing this new group have already been submitted in response to earlier *QST* invitations, and announcement of appointments is imminent. However, additional nominations of qualified people are welcomed at any time, for use in filling any vacancies or at expiration of terms, and are hereby solicited.

REQUESTS FOR RULEMAKING

In the May and June issues, we ran lists of recent petitions to FCC for rulemaking. Here are some further additions:

RM-2187, filed May 7, 1973 by Ronald D. Nebeker, WA7HCQ, seeks amendment of Section 97.51 (a)(5) to permit "1x3" callsigns for the Extra Class licensees lacking the 25 years required for "1x2" calls (ARRL's petition, RM-1597 on the same subject was filed in April 1970; RM-1677 by WA2GGX and RM-2133 by WA6GLD are similar).

RM-2219, filed June 28 by Joe C. Hallford, Jr., W5BQZ, asks that Technicians receive Novice A-1 privileges (RMs 1016, 1454, 1456, 1516, 1521, 1526, 1535, 1568, 1602, 1724, 2043, 2149 and 2166 all deal generally with this idea).

RM-2211, filed by Paul H. Bock, Jr., K4MSG, on May 15, was later withdrawn by him because of the great number of petitions on file dealing with Technician Class privileges.

A total of 52 petitions directly affecting the amateur service are awaiting action at FCC, not counting those for which a Notice of Proposed Rulemaking or a Notice of Inquiry have been issued. The editorial in the July issue of *QST* dealt further with this subject.

FLORIDA FORBIDS HEADSETS FOR DRIVERS

We have received a copy of Florida House Bill number 194, thanks to Joe Saunders, K4GNP. The bill reads:

"No person shall operate a motor vehicle while wearing a headset, headphone or other listening device other than a hearing aid or instrument for the improvement of defective human hearing. However, this act shall not apply to any law enforcement officer equipped with any communication device necessary in performing his assigned duties." It became effective April 27, 1973. We have no background information on why the bill was enacted.

Governor William A. Egan of Alaska hands a copy of his proclamation for amateur radio week June 17-23 to Walter M. Gregg, secretary-treasurer of the Juneau Amateur Radio Club. The paper mentioned Oscar, the Alaskan and Nicaraguan earthquakes and Field Day in its kind words about amateur radio.

MINUTES OF THE 1973 SECOND MEETING OF THE ARRL BOARD OF DIRECTORS

July 19-20, 1973

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Holiday Inn, Hartford, Connecticut, on July 19, 1973. The meeting was called to order at 9:31 A.M., with President Harry J. Dannals, W2TUK, in the Chair, and the following directors present:

Roy L. Albright, W5EYB, West Gulf Division
Ralph V. Anderson, KØNL, Midwest Division
Max Arnold, W4WHN, Delta Division
Robert York Chapman, W1QV, New England Div.
Victor C. Clark, W4KFC, Roanoke Division
Charles M. Cotterell, WØSIN, Rocky Mt. Div.
Noel B. Eaton, VE3CJ, Canadian Division
Richard A. Egbert, W8ETU, Great Lakes Div(Acting)
J. A. Gmelin, W6ZRJ, Pacific Division
John R. Griggs, W6KW, Southwestern Division
Philip E. Haller, W9HPG, Central Division
Harry A. McConaghy, W3SW, Atlantic Division
Larry E. Price, W4DQD, Southeastern Division
Larry J. Shima, WØPAN, Dakota Division
Robert B. Thurston, W7PGY, Northwestern Div.
Stan Zak, K2SJO, Hudson Division

Also in attendance, as members of the Board without vote, were Charles G. Compton, WØBUO, First Vice President; Robert W. Denniston, WØDX Vice President; R. O. Best, W5QKF, Vice President; and John Huntoon, W1RW, General Manager. Also in attendance, at the invitation of the Board as non-participating observers were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; Edmond A. Metzger, W9PRN, Central; Franklin Cassen, W4WBK, Delta; George Diehl, W2IHA, Hudson; Paul Grauer, WAØLLC, Midwest; John C. Sullivan, W1HHR, New England; L. Phil Wicker, W4ACY, Roanoke; C. James Roux, K4THA, Southeastern. There were also present Honorary Vice Presidents F. E. Handy, W1BDI, and Carl L. Smith, WØBWJ; Treasurer David H. Houghton; General Counsel Robert M. Booth, Jr., W3PS; Assistant General Manager Richard L. Baldwin, W1RU; Communications Manager George Hart, W1NJM; Senior Assistant Secretary Perry F. Williams, W1UED; *QST* Technical Editor Doug DeMaw, W1CER, and Public Relations Consultant Don Waters.

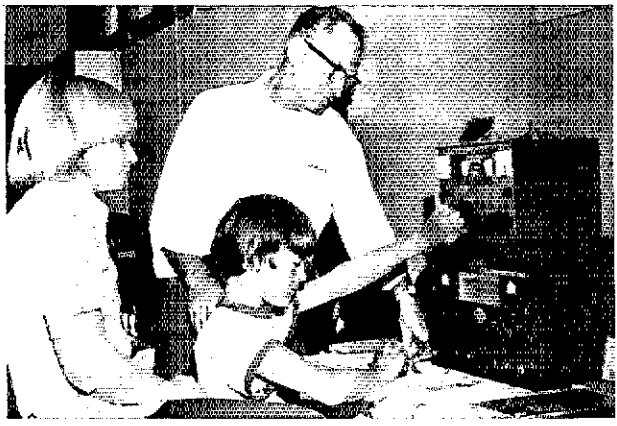
2) On motion of Mr. Thurston, seconded by Mr. Gmelin, unanimously VOTED that the minutes of the 1973 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

3) At this point extensive oral reports were offered by the officers of the League, during the course of which the Board was in recess from 10:40 to 11:00 A.M., for luncheon from 12:40 to 1:33 P.M., and from 3:25 to 3:45 P.M.

4) Mr. Eaton, as Chairman, presented the report of the International Affairs Committee; Mr. Griggs, as Chairman, presented the report of the Plans and Programs Committee; Mr. Arnold, as Chairman, presented the report of the Membership Affairs Committee; Mr. Shima, as Chairman, reported for the Management and Finance Committee; Mr. Gmelin, as Chairman, read the report of the Legal and Regulatory Committee; Mr. Dannals, as Chairman, reported for the Ad Hoc Committee on Space Communications.

5) As liaison directors, Mr. Albright presented a report for the VHF Repeater Advisory Committee; Mr. Shima reported for the Contest Advisory Committee; and Mr. Chapman for the DX

John Watson, W4GD, left, received a special award from Mid-South Amateur Radio Association in appreciation for his service to the Memphis club and recognizing his 50 years as an amateur. Harry Simpson, W4SCF, made the presentation. *(Tnx, WB4VIA, for the photo)*



The Niobrara Valley Amateur Radio Club took part in the hobby show at Ainsworth, Nebraska, this spring. Here, Alan Lovegrove, WNØIHV operates equipment loaned by Tom Bejot, WNØHRG. Jud Rose, WNØIHU (left) and Merritt Plantz, WAØHFH look on. *(Photo via KØOAL)*

Advisory Committee. Mr. Clark reported for Amsat, and Mr. Gmelin for Oscar.

6) On motion of Mr. Albright, seconded by Mr. Clark, after discussion, unanimously VOTED that the General Manager is authorized to establish **additional full time staff positions** to implement the League's program in the field of frequency planning and international affairs.

7) On motion of Mr. Cotterell, seconded by Mr. McConaghy, unanimously VOTED that the Plans and Programs Committee be directed to continue to study those items assigned to it by the January 1973 Board meeting, namely Minutes 15, 55 and 60 of that meeting.

8) On motion of Mr. Chapman, seconded by Mr. Shima, after extended discussion, the following resolution was unanimously ADOPTED:

WHEREAS, an organization dedicated exclusively to the pursuit of innovative charitable, educational and scientific programs related to the purposes of the ARRL will enhance the future of amateur radio; and

WHEREAS, Many extremely knowledgeable and qualified individuals who are not eligible to serve as officers or directors of the ARRL will be afforded the opportunity to utilize their talents for the ultimate benefit of the charitable, educational and scientific objectives of the ARRL; and

WHEREAS, the Management and Finance Committee has reason to believe that a new entity devoted exclusively to innovative programs related to amateur radio will attract substantial financial support from various individuals other than members of the ARRL; and

WHEREAS, a foundation corporation would insulate foundation assets from the liabilities and obligations of the ARRL; NOW THEREFORE BE IT RESOLVED:

1) that the Management and Finance Committee of the ARRL is empowered to do all acts necessary to establish an organization to be known as **The ARRL Foundation, Inc.** as a nonstock corporation in the State of Connecticut. The Foundation shall have no members. It shall be governed by a Board of Directors elected by the Board of Directors of the ARRL with the requirement that a majority of the Board of Directors of the Foundation be Directors of the ARRL. The initial Board of Directors shall consist of the three members of the Management and Finance Committee of the ARRL, and they shall serve until the next meeting of the Board of Directors of the ARRL which is scheduled for January 20, 1974.

2) that The ARRL Foundation, Inc. shall seek an Internal Revenue Service determination that it is an organization described in section 501(c)(3) of the Internal Revenue Code which is not a private foundation because it is an "affiliated" organization as described in section 509 (a) (3) of the Internal Revenue Code.

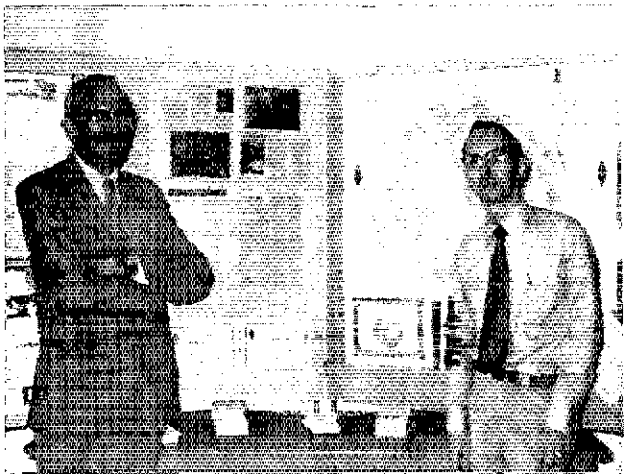
9) The Board was in recess for dinner from 5:18 to 8:05 P.M.

10) On motion of Mr. Griggs, seconded by Mr. Thurston, after discussion, unanimously VOTED that the Board does hereby instruct and direct the General Manager to study ways and means of better utilizing the present **space available in the Headquarters building** and to move or relocate the various departments accordingly with the aim of establishing an **office location for the League President and Treasurer.**

11) On motion of Mr. Arnold, seconded by Mr. Chapman, unanimously VOTED to establish the **Emergency Communications Advisory Committee,** in accordance with documentation in the report of the Membership Affairs Committee.

12) On motion of Mr. Arnold, seconded by Mr. Thurston, unanimously VOTEDthat the General Manager take all necessary steps to insure that future issues of the ARRL *Handbook* commencing with the 1975 issue, be in the hands of distributors **prior to the Christmas season.**

13) At this point, on request, Headquarters personnel except the General Manager departed



The Town Hall, Hempstead, New York, is scene of this display on amateur radio, organized by NYC-LI SCM Fred Brunjes, K2DGI (right) and Nassau County emergency coordinator Richard P. Amy, W2ELK.

Jim Collinsworth, WB2EDT, ARRL emergency coordinator for Rochester, New York, was named "Radio Amateur of the Year" at the Western NY Hamfest and VHF Conference May 12, in recognition of his work following Hurricane Agnes last year. Here is Jim in action (left) with Herm deMonstoy, WA2ADZ.

from the meeting. Moved, by Mr. Price, seconded by Mr. Shima, that the General Manager is directed to hold an election, as provided by law, among the eligible Headquarters employees to determine their desire to participate in the Federal **Social Security program**, as an augmentation to the existing pension plan. Further, the Board authorizes the General Manager to pay the employer's payroll tax on behalf of eligible Headquarters employees if a requisite number of employees should elect to participate. After extended discussion, moved, by Mr. Anderson, that the matter be laid on the table; but there was no second, so the motion to table was lost. The question then being on the original motion, the same was ADOPTED. Mr. Anderson requested to be recorded as abstaining. At this point, Headquarters personnel returned to the meeting.

14) Moved, by Mr. Anderson, seconded by Mr. Gmelin, that the General Manager is instructed to establish a **license expiration renewal notification service** system at ARRL Headquarters. After discussion, moved, by Mr. Clark, seconded by Mr. Price, that the subject be referred to the Membership Affairs Committee for study; there were 8 votes in favor and 8 opposed; the Chair voted in the affirmative, so the motion to refer was ADOPTED.

15) Moved, by Mr. Clark, seconded by Mr. Arnold, that the General Manager is instructed to implement the establishment of a telephone-line **remote control link to the Oscar command** transmitter located at Talcott Mountain, to enable transmission of satellite commands originating from the W1AW operating quarters; arrangements should be finalized within the next 30 days. After discussion, on motion of Mr. Chapman, seconded by Mr. Price, VOTED, 8 in favor to 5 opposed, that the matter is laid on the table.

16) On motion of Mr. Albright, seconded by Mr. McConaghy, after discussion, unanimously VOTED (Canadian Director Eaton abstaining) that, careful consideration having been given to the recommendations of the ARRL VHF Repeater Advisory Committee regarding operation under current amateur regulations, the General Counsel is directed to petition the FCC for **repeater rules changes** based on those recommendations pertaining to the following general areas of concern:

a) Monitoring and control procedures.
b) Power requirements.
c) Station licensing.
d) System configuration changes.
e) Interference problems.
f) Antenna installations.
g) Linking and crossband operation.

17) On motion of Mr. Gmelin, seconded by Mr. Arnold, unanimously VOTED, at 9:09 P.M., that the Board does now resolve itself into a Committee of the Whole for the purpose of discussion and action in the matter of Docket 19759, the proposed **220-MHz Class E Citizens Band**. As a Committee of the Whole, the Board was in recess at 10:30 P.M., reconvening at 9:30 A.M. on July 20, with all persons hereinbefore mentioned in attendance except Mr. Bieberman, who was obliged to return to his home; and was in recess again from 10:40 to 10:55 A.M. The Committee arose at 11:00 A.M. and reported to the Board.

18) Whereupon, on motion of Mr. Gmelin, seconded by Mr. Thurston, unanimously VOTED to accept the report of the Committee of the Whole. In implementation thereof, on motion of Mr. Gmelin, seconded by Mr. Price, unanimously VOTED that in accordance with instructions formulated by the Board of Directors at this meeting, the President and General Manager are directed to pursue a vigorous program having as its objective the **retention of existing amateur privileges** in the 220-225 MHz frequency band (Docket 19759), employing all resources available and utilizing legislative and judicial channels as necessary.

19) Moved, by Mr. Egbert, seconded by Mr. Shima, that the Section Communications Managers receive **Directors' Letters** and other Headquarters mailings now provided to assistant directors for dissemination of information among the mem-

June 17-23 was Amateur Radio Week in New Jersey. At the signing, seated, from left: WA2UOO; State Senator and Acting Governor Alfred N. Beadleston; WB2BCY. Standing: W2YPZ, W2SVV, W2CVW. *(John A. Leone photograph)*

The March 1973 *QST* article, "The W2FMI Ground-Mounted Short Vertical" won the Cover Plaque award for its author, Jerry Sevick, W2FMI (center). Making the presentation is Hudson Division Director K2SJO. Others, from left: W2CQH, vice director W2IHA, and WA2SFF (far right).

bership. But, after discussion, on motion of Mr. Gmelin, seconded by Mr. Price, unanimously VOTED that the subject is referred to the Membership Affairs Committee for study.

20) Moved, by Mr. Zak, seconded by Mr. Anderson, that the July 1974 ARRL Board meeting be held in New York City to coincide with the ARRL National Convention to be held at that time. After discussion, moved, by Mr. Gmelin, seconded by Mr. Price, to lay the matter on the table; but the motion to table was rejected. Moved, by Mr. Price, seconded by Mr. McConaghy, to amend the motion by striking the text and substituting therefor: "that the July 1974 meeting of the Board be advanced one day in order to permit the Board to attend the ARRL National Convention in New York City, sponsored by the Hudson Amateur Radio Council." After further discussion, moved, by Mr. Anderson, to amend the amendment by striking all after "in order to" – but there was no second, so the motion to amend by deletion was lost. The vote on the first amendment was 8 votes in favor to 8 opposed; the Chair voted in the negative, so the amendment was rejected. The question then being on the original motion of Mr. Zak, the same was ADOPTED. On further motion of Mr. Zak, seconded by Mr. Anderson, unanimously VOTED that the second 1974 meeting of the ARRL Board of Directors be called for New York City on July 17-18, 1974.

21) Moved, by Mr. Haller, seconded by Mr. Griggs, that the proposed discontinuance of the phone DXCC award be postponed for a period of one year to enable further assessment of membership opinion by the DX Advisory Committee. After extended discussion, on a roll call vote, the motion was ADOPTED, 13 votes in favor to 3 opposed. All the directors voted in favor except Messrs. Albright, Chapman and Shima, who voted opposed.

22) On motion of Mr. Chapman, seconded by Mr. Shima, unanimously VOTED that the Board authorize the Management and Finance Committee to continue study on Minute 33 of the January 1973 Board meeting.

23) On motion of Mr. Gmelin, seconded by Mr. Thurston, after discussion, unanimously VOTED (Canadian Director Eaton abstaining) that the General Counsel is instructed to write a formal comment to the Federal Communications Commission requesting early action on those items in RM-1535 not already acted upon, e.g., Technician privileges in 29.5 to 29.7 MHz, and dual holding of Novice and Technician license.

24) On motion of Mr. Clark, seconded by Mr. Gmelin, after discussion, unanimously VOTED that it is the sense of this Board that the efforts and activities of the ARRL Foundation are to be directed, as the first order of business, toward the securing and disbursing of funds to encourage and assure continuation of amateur radio space activities.

25) On motion of Mr. Price, seconded by Mr. Shima, after discussion, VOTED that the General Manager is directed to provide a packet of appropriate information concerning U.S. amateur operating practices and ARRL organizational matters to each foreign amateur receiving reciprocal operating privileges in the United States.

26) On motion of Mr. Griggs, seconded by Mr. Zak, unanimously VOTED (Canadian Director Eaton abstaining) that the Board of Directors does hereby go on record as being in support of the objectives of House bill H. R. 3516, a bill to require the incorporation of interference filters in home entertainment equipment, and instructs the General Manager to inaugurate a program in the pages of *QST* to develop popular support for the measure.

27) The Board was in recess for luncheon from 12:25 to 1:30 P.M.

28) Moved, by Mr. Albright, seconded by Mr. Griggs, that because of numerous favorable comments from the field concerning the fine technical articles published in recent months, and requests for additional information of like caliber, the General Manager is requested to increase the amount of space in QST devoted to technical-type articles, increasing the number of pages if necessary. After extended discussion, on motion of Mr. Gmelin, seconded by Mr. Chapman, VOTED to refer the subject to the Membership Affairs Committee for study; Mr. Albright requested to be recorded as voting opposed to referral.

29), Moved, by Mr. Haller, seconded by Mr. McConaghy, that the Membership Affairs Committee investigate the practicality of revising the division boundaries or of weighting directors' voting to bring a closer balance in representation of members; but, after extended discussion, the motion was rejected, 6 votes in favor to 9 opposed.

30) On motion of Mr. Clark, seconded by Mr. McConaghy, unanimously VOTED that the General Manager is authorized to advance funds not exceeding a total of $38,000 prior to February 28, 1974, for the express purpose of assisting amateur radio organizations engaged in preparation of amateur satellite equipment now scheduled for orbiting during early 1974; such funds allocations to be preceded by consultation with the Amateur Satellite Service Committee, and actual use of the

funds to be fully and periodically reported to the ARRL Board of Directors through its Management and Finance Committee.

31) Moved, by Mr. Arnold, seconded by Mr. Zak, that an affiliated club may option to retain $5.00 of a member's Life Membership application when said payment is made in a lump sum; but, after discussion, the motion was rejected, 5 votes in favor to 9 opposed.

32) Moved, by Mr. Zak, seconded by Mr. Griggs, that the General Manager establish by January 1, 1974, the appointment of a Publicity Manager (PM) in each ARRL section whose prime responsibility will be to coordinate local section publicity; such appointments will be made by the Division Director for a two-year period and the call of the appointee published in the Stations Activities column in *QST*. After discussion, on motion of Mr. Gmelin, seconded by Mr. Price, VOTED that the subject is referred to the Plans and Programs Committee for study.

33) On motion of Mr. Chapman, seconded by Mr. McConaghy, the following resolution was unanimously ADOPTED:

WHEREAS, John Murray Powell, W1QIS, has served the American Radio Relay League since 1950 at the Hiram Percy Maxim Memorial Station; and

WHEREAS, he has thus been the able representative of ARRL to thousands who have made contact with the station and other thousands who have visited it; and

WHEREAS, he has now retired from active service to the League,

NOW THEREFORE BE IT RESOLVED, that the Board of Directors of the American Radio Relay League in meeting assembled does thank John Murray Powell, W1QIS, for his faithful service and extend best wishes in retirement.

34) On motion of Mr. Gmelin, seconded by Mr. Clark, unanimously VOTED that the General Manager, in cooperation with the Plans and Programs Committee and the Public Relations Consultant, conduct a study into the desirability and feasibility of preparing a newsletter for periodic dissemination of pertinent information on amateur radio affairs to Government agencies and press media, reporting the results thereof to the Board of Directors at its January 1974 meeting.

35) On motion of Mr. Clark, seconded by Mr. McConaghy, after discussion, unanimously VOTED that the Plans and Programs Committee explore and prepare recommendations concerning the feasibility of developing a vigorous nationwide public relations program to educate the public at large, local and state officials, state legislatures and our national Congress regarding the history, purpose and contributions of the amateur radio service.

36) Moved, by Mr. Price, seconded by Mr. Cotterell, that the League establish an office facility in the Washington, D.C., area, operated under supervision of the President, for the purpose of expediting information on amateur radio matters to and from various agencies; the Management and Finance Committee to assist in developing operational and funding procedures. After extended discussion, moved, by Mr. Albright, seconded by Mr. Anderson, to amend the motion by adding the words, "at such time as the President feels necessary." Moved, by Mr. Arnold, seconded by Mr. Anderson, to lay the matter on the table; the result was 8 votes in favor to 8 opposed; the Chair voted in the affirmative, so the matter was laid on the table.

37) The Board was in recess from 3:00 P.M. to 3:18 P.M.

38) On motion of Mr. Griggs, seconded by Mr. Zak, after discussion, the Board of Directors does hereby order and instruct the President and General Manager to bring to the attention of United Press International and other press services, the careless and incorrect reporting often transmitted over their wire services to newspaper and similar publications throughout the nation, designating amateur radio operators as offenders when in fact operators of another service are involved.

39) On motion of Mr. Albright, seconded by Mr. McConaghy, the following resolution was unanimously ADOPTED:

WHEREAS, Edward P. Tilton, W1HDQ, has retired from full-time service as VHF editor of *QST* and Editor of the *VHF Manual*, after a professional association of more than 33 years; and

WHEREAS, his dedication to the "World Above 50 Mcs" has earned him the nickname "Mr. VHF"; and

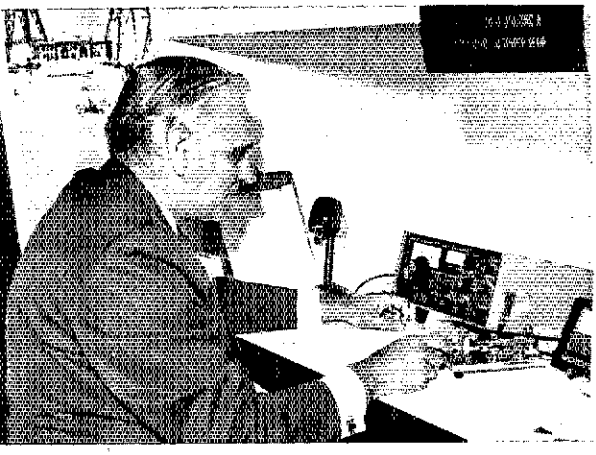
WHEREAS, he continues to serve the League as a consultant on the very high frequencies and as a speaker at amateur functions;

NOW THEREFORE BE IT RESOLVED that the Board of Directors in meeting assembled does hereby express to Edward P. Tilton, W1HDQ, its sincere thanks for his fidelity and devotion and its best wishes in retirement.

40) On motion of Mr. McConaghy, seconded by Mr. Clark, unanimously VOTED that in light of gaps in Headquarters records for earlier years, the Membership Affairs Committee study alternate measures for establishing proof of membership tenure for 50-year membership award applicants and to prepare appropriate recommendations to the Board of Directors at its January 1974 meeting.

41) On motion of Mr. Eaton, seconded by Mr. Denniston, after discussion, unanimously VOTED

The Macon County (Missouri) Amateur Radio Club recently presented a set of League publications to the Macon Public Library. Pictured are (from left) Librarian Parker Stokes; MCARC President Waldo Fugate, WAØPVE and publicity chairman Dale Bagley, WBØELJ.



Robert H. Mitchell, W9DD (ex-W5FL), in June was elected national president of the Armed Forces Communications and Electronics Association, whose headquarters is in Falls Church, Virginia. In the business world, Bob is president of Memcor Division and corporate vice president of its parent company, E-Systems, Incorporated (formerly LTV Electrosystems). Here he operates K4NAA/3 at AFCEA's convention in the Sheraton-Park Hotel, Washington.

that the sum of $1200 be authorized to cover expenses of refurbishing the station installation at 4U1ITU of the International Amateur Radio Club, at ITU Headquarters in Geneva, Switzerland.

42) On motion of Mr. Shima, seconded by Mr. Arnold, after discussion, unanimously VOTED that effective 1 October 1973, the mileage reimbursement rate for ARRL is changed to 12¢ per mile.

43) On motion of Mr. Zak, seconded by Mr. Shima, unanimously VOTED (Canadian Director Eaton abstaining) that the Legal and Regulatory Committee study the desirability of allowing the use of facsimile (F4 & A4) on all amateur bands.

44) Moved, by Mr. Chapman, seconded by Mr. McConaghy, that the American Radio Relay League, Incorporated, petition the FCC to award and authorize any amateur radio operator, who has held a General Class or higher license for 50 years, honorary extra class operator's privileges; the proof of 50 years of amateur service would be with the applicant. After discussion, on motion of Mr. Price, seconded by Mr. Shima, unanimously VOTED that the subject is referred to the Legal and Regulatory Committee for study.

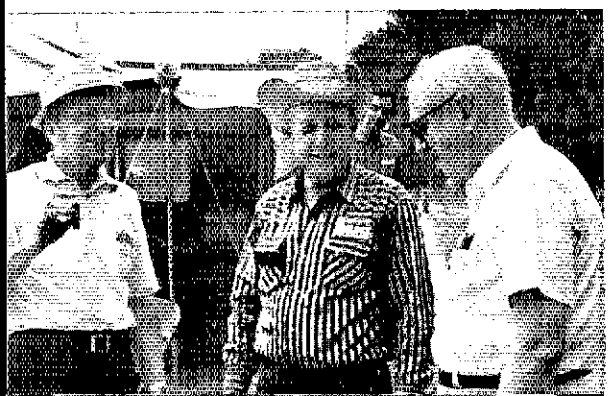
45) On motion of Mr. Clark, seconded by Mr. Gmelin, unanimously VOTED to take from the table his motion concerning remote control installation for the Talcott Mountain Science Center. The question then being on said motion, the same was unanimously ADOPTED.

46) On motion of Mr. Griggs, seconded by Mr. Clark, unanimously VOTED that the Board now engage in informal discussion concerning FCC Docket 19723 concerning the Radio Amateur Civil Emergency Service. Extended informal discussion followed. Whereupon, on motion of Mr. Griggs, seconded by Mr. McConaghy, unanimously VOTED (Canadian Director Eaton abstaining) that the General Counsel file comment of the League in FCC Docket 19723, taking into consideration the results of the study conducted by the Systems Development Corporation and the conclusions of a special ad hoc committee appointed by President Dannals to study the aforesaid docket, consisting of WA4PBG (Chairman), K5SVD, W6INI, and WØPB. At this point, Mr. Sullivan departed the meeting.

47) Moved, by Mr. Albright, seconded by Mr. Cotterell, that the Legal and Regulatory Committee study the desirability of establishing a procedure to evaluate petitions to FCC and prepare recommendations to the Board concerning determination of the ARRL position with respect to such petitions, the committee to report its conclusions at the January 1974 Board meeting. After extended discussion, on motion of Mr. Clark, seconded by Mr. Shima, unanimously VOTED to amend the motion by striking the text and substituting therefor: "That the Legal and Regulatory Committee study and make appropriate recommendations concerning the system currently employed to screen, review and evaluate petitions to FCC which may affect the amateur radio service." The question then being on the motion as amended, the same was unanimously ADOPTED.

48) The Board was in recess for dinner from 5:40 P.M. to 8:03 P.M.

49) Moved, by Mr. McConaghy, that the last paragraph of the Board's resolution issued 18 January 1973, be amended to include, in addition to President Dannals and Secretary/General Manager Huntoon, the name of Robert M. Booth, Jr., General Counsel, as a member of the negotiating



America's most prestigious Field Day site has to be The Mall in Washington, D.C., once again occupied by the Department of State Amateur Radio Club station, W3DOS/3. Undersecretary of State William J. Porter, K1YPE, right — who made headlines as head of the U.S. delegation to the Paris peace talks (during which time he operated FØADL) and earlier was ambassador to Korea and deputy ambassador to Viet Nam — chats with club president John Swafford, W4HU (left) and vice president Max Shimp, WA3PPP.

A large contingent of QCWA members from New York City, many licensed for more than fifty years, posed at W1AW on May 9. From left: W2BW, W2AUF, W2PF, W2AFS (rear), W2CQI, W2ASI, W2CF, W2GUJ, W2FZ (front), W2ALS, W2AIM, W2CVF and W2PV.

team; but there was no second, so the motion was lost.

50) At this point the Board informally discussed various matters, including headquarters personnel travel, and the Department of Communications questionnaire, during the course of which Vice Director Cassen temporarily occupied the Delta Division chair while Director Arnold was called from the meeting.

51) There being no further business, on motion of Mr. Compton, seconded by Mr. Haller, unanimously VOTED at 10:15 P.M., that the Board does now adjourn, *sine die.*

52) (Total time in session, as a Board 14 hours, 47 minutes; as a Committee of the Whole, 2 hours, 36 minutes; total direct appropriations $39,200.00.)

Respectfully submitted:
JOHN HUNTOON, W1RW
Secretary

Minutes of

EXECUTIVE COMMITTEE MEETING

No. 346 July 18, 1973

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters office of the League in Newington, Connecticut, at 2:05 p.m., July 18, 1973. Present: President Harry J. Dannals, in the Chair; First Vice President Charles G. Compton, WØBUO; Directors Victor C. Clark, W4KFC, Noel B. Eaton, VE3CJ, John R. Griggs, W6KW, and Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. Also present were a number of directors and vice-directors of the League.

On motion of Mr. Eaton, unanimously VOTED to approve the holding of Southeastern Division Convention in Miami, Florida, January 19-20, 1974; a Delta Division Convention in Lafayette, Louisiana, March 1-3, 1974; a Great Lakes Division Convention in Muskegon, Michigan, March 22-23, 1974; a Canadian Division Convention in Calgary, Alta., August 1-4, 1975; and an Atlantic Division Convention in Philadelphia, Pennsylvania, July 24-25, 1976.

On motion of Mr. Clark, affiliation was unanimously GRANTED to the following societies:

Alma Amateur Radio Society, Alma, Arkansas; Amateur Radio Club of Evanston Township High School, Evanston, Illinois; Amateur Radio Club of The University of Texas, Austin, Texas; Buckhannon Amateur Radio Club, Buckhannon, West Virginia; Colorado Contest Conspiracy, Aurora, Colorado; Crawford County Amateur Radio Club, New Washington, Ohio; Electronics Museum Amateur Radio Club of Foothills College, Los Altos, CA.; Evanston Township High School Amateur Radio Club, Evanston, Illinois; Georgetown University Amateur Radio Station, Washington, D.C.; Gordon Bell School Amateur Radio Club, Winnipeg, Manitoba; Gulf Coast Amateur Radio Club, Inc., New Port Richey, Florida; Hualapai Amateur Radio Club, Kingman, Arizona; Huntsville High School Amateur Radio Club, Huntsville, Alabama; Iskra, Inc., Madison, Indiana; The John Brown University Amateur Radio Club, Siloam Springs, Arkansas; Kent County Repeater Association, Grand Rapids, Michigan; Kentucky Mountains Amateur Radio Club, Hazard, Kentucky; The Last Mountain Amateur Radio Club, Bulyea, Saskatchewan; Magic Valley Chapter – Idaho Society of Radio Amateurs, Inc., Kimberly, ID; Prince Georges Wireless Association, Hyattsville, Maryland; Radio Explorer Post 51 (BSA), Rye, New York; Richmond Amateur Telecommunications Society (R.A.T.S.), Richmond, Virginia; Sarasota County RACES Association, Balston Spa, New York; Springhill Amateur Radio Club, Springhill, Louisiana; Steelworkers Amateur Radio Association, Weirton, West Virginia; Ten-J Amateur Radio Club, Kansas City, Missouri; Tri-Lakes Amateur Radio Club, Branson, Missouri; University of Alabama in Huntsville Amateur Radio Association, Huntsville, Alabama; Wireless Institute of the Northeast (W.I.N.), Fair Lawn, New Jersey; Yankee Radio Club, Inc., Fairfield, Maine.

On motion of Mr. Thurston, unanimously VOTED to grant Life Membership to the following applicants:

Stephen R. Alpert, W1GGN; Julius J. Altman, W2MDM; Gilbert F. Anderson, W7BHY; P. Bruce Barber, KL7GRP; Gordon Bello, WA1JWQ; Stephen M. Bench, W9MUC; Thomas W. Birt, WA9-

Washington State picked September 9-16 for its amateur radio week. Joining Governor Daniel J. Evans for the signing were, from left: W7JWJ; WA7BBJ; SCM W7QGP; W7PWP and K7BBO. The statement mentions emergency communications, development of the art, international good will, RACES and assistance to the Red Cross as accomplishments of amateurs.

SXU; Alan Bloom, WA3JSU; Stephen M. Blust, WA5UID; William J. B. Bond; William D. Bowen, W5QEZ; B. J. Brannan, Jr., WB5CUE; James A. Brashear, Jr., WB4EKJ; William F. Brenner, W3NID; Robert W. Brocklehurst, WA1MYH; Sherwood Broome, W4SMD; Robert A. Bruner, WB4TAJ; Herman M. Burney, WB4LMI; Michael John Bullough, VE8YI/G4CXX; Robert J. Carpenter, W3OTC; James P. Christian, WA6SHO; George A. Clement, Jr., WA4DKZ; Robert B. Cooper, W8AQA; J. P. Corrigan, KH6GQW/WØQBW; Emory A. Cox, WØMA; Gary F. Cox, WA7LGN; Don F. Curry, W5HVT; Lawrence F. Cygan, WA9WXN; Pedro Del Compare, LU1CAE/W2; Orv J. Dalton, K6UEY; Frank Dannals, W2DRL; M. F. "Doug" DeMaw, W1CER/W8HHS; Clifford Lee Devall, WN6SJN; William J. English, W7LHI/WA7KZT; Anthony R. Faiola, W3DNH/W2GBS; Roland M. Fennimore, WB4JAI; Walter E. Fiscus, Jr., WA4JCS; Paul A. Freeland, W9FF; John W. Gallagher, K4GXY; Paul S. Germscheid, WAØWRG; John B. J. Glanzman, W3MAF; Steven D. Glazer, WB2ERM; Michael J. Gooding; Daniel Goodman, WA9QJW; Herbert E. Goodman, W6GQC; Robert W. Graham, VE3EXS; Roger J. Greenburg, W1ABJ; Paul Greenfeld, WN3UTQ; Fred M. Griffee, W41YB; Eugene E. Hagedorn, WA9CLW; Frederic J. Hammond, WA6JXH; Takao Hashimoto, JA1RRU; Dean B. Haworth, KØVFN; Cline L. Hendrickson, WA7TMR; H. L. Horn, WØYJM; Henry L. Howell, W4ZHL; Robert C. Hulme, VE3DNG; Guy A. Hunt, K3EPW; Joseph E. Jennings, KØDMN; Albert M. Johnston, Jr., WØMKU; Delma O. Jones, W5QEO; Mark Jones, WB5FIS; Mark D. Johns, WAØRGV; Robert B. Keeney, WØGEU; Richard L. King, K5PFL; Robert J. Klote, WN7PUL; Floyd A. Koontz, WA2WVL; I. Kramarchuk, WA8MHK; David Lambert, WA1JSD; Eugene D. Lampley, WA9LNS; Raymond C. Lang, WAØZXV; James J. Larkin, WB2LOP; Albert C. Lauer, K4AWV; Robert J. Leo, WA6BXD; Cyril Morris Lewis, VE2QJ; Daniel P. Lorusso, W3HCX; Keith R. Mack, WB5BIC; Gordon A. Mackay, W7GSM; J. Crawford B. MacKeand, WA2ZVX/G4ARR; Robert J. MacNab, W2GWA; Charles B. Martin, WA5FMZ; Joseph P. Martorelli, WA2TCE/WA6BUV; Robert W. Mausteller, WA2MRZ; Noel McKeown, WA3BXN; James C. McLaughlin, W8TBZ; Thomas F. McMullen, Jr., W1SL; Ed Mehnert, W3JZJ; Elvin W. Miller, W9LAB; Ira G. Miller, WA8JFD; Sister Jeanne Francis Minner; Elmo M. Moist, Jr., K8QKT; Hein Moritz, WB9AWC; Michael D. Mosbacher, K1DUG/WA3SSJ; Frank R. Mossack, W4YPO; Charles B. Muecke, Jr., WA9PZV; John A. Murray, W3BAG; James E. Nicholson, Jr., K4RJA/W4FZP; Frank R. Nutter, W1KKT; Gunnar F. Ohlson, K9WTS; Jimmy L. Oldaker, K7OLO; Clifford E. Ormston, W8YMB; Howard F. Osburn, WA8RQB; Kurt B. Pauer, W2BQF; William K. Penhallegon, Jr., W4STX; Philippe H. Perreault, W8EKR; Donald E. Perry, WA6FFR; Jay H. Petersen; Joseph L. Pontek, K8HKM; Raymond J. Poulin, W3UT; Grant Powell, K8BCI; Marc A. Pressman, WB4DRB; Lowell G. Price, WB8BPZ; Timothy Prince, WA8TYF; George Proudfoot, WA3QER; Glenn R. Rattmann, W6MAR; McKinley Robinson, Jr., WA4HGX; William Stayton Roemer, K3CUU; Karl G. Roersma, K8UNZ; Paul E. Rokoff, WB2VLM; Alfred E. Ross, WB5DAE; J. Wesley Sammis, W2YRW; John Samuels, WA5ATW; John H. Sanders, WB4ANX; Benjamin F. Saylor, K6TG; Llewellyn Scearce, W8TKE; Richard A. Schaak, K7GGD/W7HSC; Richard E. Schmidt, KØFLQ; William A. Schueller, W8UUM; Otto L. Schuler, K3SMB; Richard T. Schweizer, Jr., WB2PCF; A. K. Scrivens, VE3LJ; Richard L. Scott, W8FDN; Ferrell B. Shanks; Frank E. Shaug, K1ZIE; Joseph R. Sims, W2RRP; Kent A. Sinram, WBØBOR; Eric A. J. Smith, VE4MK; Robert C. Smith, K4FKV; William C. Spencer, III, K7HPO; William Charles Spenn, WA5QVD; Frederic K. Spies, W5HF; Harry E. Spitzkopf, W3KCM; David G. Stocky, K4KE; Rudolph H. Strothmann, WA9RKI; Eugene Sussli, WA6NVU; Nicholas D. Swan, WB8ERN; Dennis W. Swofford; Lynn C. Tamblyn, WA9KRF; James E. Taylor; Alexander M. Thompson, III, K9ETU; Stephen L. Tracy, K4PQF; Larry L. Turner, W8KER; Roy Udolf, W2OLC; Thomas J. Ulaszek; Louis F. Vigh; Robert A. Voss, WB4WVC; Robert A. Wachtel, WA5TPY; F.S. Wardwell, WA1GFH; Leonard J. Weber, WA2KRB; Ross W. Weber, WAØSHA; Harvey I. Weiner, W1BMY; Bruce R. Wesley, WA7KZP; James B. Wilson, WA5BRB; Richard M. Winter, K7JKY; Robert C. Workman, WA4ZZN; A. George Young, W4KQP.

On motion of Mr. Compton, unanimously VOTED that Lorraine S. Evans is authorized to sign, on behalf of the Treasurer, checks drawn on League depositories, vice Kathie Root, resigned.

There being no further business, the Committee adjourned, at 2:35 p.m.

Respectfully submitted
JOHN HUNTOON, W1RW
Secretary

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

H o w :

Elmer *n*: a radio amateur with Ham Spirit to share

We turn briefly from QSB-battered DX bands to more "fathers of amateur radio" recently brought to our attention in correspondence resulting from earlier traffic on the matter. WBØBHE remarks that he has yet to encounter a fellow ham unwilling to help worthy aspirants. Let's keep it that way! And let's salute those outstanding helpers who are not only willing but who so effectively devote themselves to the task. . . .

I've been meaning to drop you a line about my own Elmer ever since the subject came up (page 91, March 1971 *QST*). Back when I was a high school sophomore given to sophomoric ideas a friend and I decided to construct a landline telegraph between our homes courtesy Ma Bell from whose trash cans I'd been scavenging wire and other discarded goodies. Mother B. also had available, of all things, a pre-existing set of poles on which we planned to string our line. By the time I had accumulated the necessary mile of wire our fathers vetoed the idea, and mine recommended that communication alternatives be discussed with WØRUF. At length out of Glenn's patient tutoring came KNØs GYK GYM and GYT. Some twelve years later the three of us are still in occasional contact. Thanks also go to WØDFK for advice in overcoming frustrations of our early Novice careers — TVI, uncooperative homebrew gear, infinite SWRs, etc. I guess every active ham remembers his Elmer(s) kindly but surely none with more fondness than I. (KØGYK/4) . . . Hope you'll publish my thanks to another great Elmer, W6NHX. Doug steered me out of criminal life as a CBer. I'm also grateful to W6KQI, K6AWO and WB6WDS for generous help in launching my ham career. (WN6SMS) . . . My own Elmers seem legion, dating back to 1938 and W9AMT in Indiana. Next came WB2s BBW OZW and W4NMU. WB2BBW provided the most assistance, teaching me the theory and helping considerably with my old Viking II. As he drew me into hamming I got him sufficiently interested in Scouting to see him become an assistant district commissioner. As scoutmaster of Troop 135, Franklin Lakes, New Jersey, I'm now happy to have become Elmer for six future radio amateurs. (WA2MVQ) . . . Looking back over seven joyous months as WB3TLS I realize that others deserve much of the credit, particularly two Elmers. One is my dad, WA3EOL, the other a very patient and helpful neighbor, K3ZTT. And I can't omit ARRL, its publications, and the code practice of good old W1AW. (WA3TLS) . . . The help of one or more experienced amateurs is an extremely important factor in one's early ham years. I was lucky enough to have several licensed friends and relatives. WB4NKD and W3NS, my uncles, started me off and supplied my first receiver, an HA350. I also thank W4VOL, WA4BGM, WB4NNO and ex-WN4SEU for their aid, as well as Albemarle (Virginia) Amateur Radio Club's code classes. Last but not least must come my parents for putting up with the whole thing. Dedicated experienced hams, upcoming young ones like me, and organizations of hamdom led by the League will keep amateur radio alive and strong. (WN4DGW) . . . Elmers? I wouldn't be on the air if it weren't for the literature of ARRL and the encouragement of many of its fine members. Many thanks and 73 to all! (WN2GOJ) . . . W3BRB, a truly exemplary amateur, introduced me to ham radio. Many other licensees in the Erie area also appreciate John's countless hours of instruction on theory, building, etc. As a cofounder of Presque Isle A.R.C. W3BRB helps motivate many a local toward upgrading his license in addition to the numerous newcomers he has "Elmered." Assistance to some troubled Novice always means more to John than a missed rare one on 20. If ever an Elmer of the Year should be

*c/o ARRL, 225 Main St., Newington, CT 06111.

UA6XH's summer place in the central Caucasus has picturesque perspective. Yuri likes to work 20 meters from this spectacular QTH of the Month. *(Photo via W8NB)*

selected I would recommend W3BRB. (WN3RVZ) . . . We've enjoyed your series on Elmers and thought we'd tell you about ours, a fine amateur whose patience never wavers. Every Friday night we take up much of W6QHQ's time with an infinite variety of questions about this wonderful hobby. We don't know how we would have gotten our tickets without the help and kindness of Mr. Taylor. (WA6AJS, WB6COS, WN6s HQB PWI TBO) . . . About a year ago a friend and I decided to become radio amateurs. After some reading and code practice we luckily met W9HSN who contributed an ARC5 receiver and later administered our exams. Though very busy running his farm, raising a family and occupied with other activities, W9HSN always finds time to help fellow hams with antenna troubles, equipment difficulties and any other problems that come along. At least half a dozen DePauw college students also are indebted to Bob for assistance in qualifying them to operate W9YJ. W9HSN is a real Elmer we'll never forget. (WN9s KVQ KVZ) . . . WAØWBJ spent many nights teaching me code, WNØGQP helped with theory and WNØBYV did his part, too, all members of our Parkway West (Missouri) A.R.C. With the continued aid of such fine Elmers and ARRL I'll be upgrading my license quite soon, I'm sure. (WNØJGF)

Self-defense could be a possible factor in some Elmeric performances. WN2AOF explains, "I neglectfully let my K2ALL ticket lapse but fortunately found K2OJD to help in a determined comeback toward Technician status. My first Elmer goes back to 1936 when Mr. VHF himself, W1HDQ, helped me become W1JLC. As his next-door neighbor I used to cream poor Ed's DX with a homemade *rushbox*."

Now what about *your* Elmer(s)? Remember?

† † †

W h o :

It seems like only yesterday that a frantic country-hungry throng was following every 14-MHz dot and dash from Danny Weil, VP2VB/mm, solo sailor DXtraordinary and master of that gallant world-roving speck called *Yasme*. We're glad to have an updated answer to the oft-asked question "Say, where's Danny now? . . .

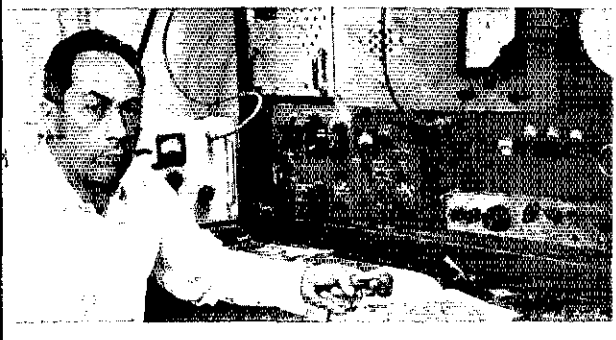
> I would like to borrow your pages to pass on my thanks to those many hams who wrote get-well cards and letters during my recent accident. For the uninformed, I was atop a twenty-foot ladder and got stuck with a 220-volt hot wire. My reaction, needless to say, was to give out a large yelp and descend the fastest way, which is to say, without the use of rungs. The trip down caused me little concern. It was the sudden stop on concrete that caused the damage. Other than breaking my arm in three places and cracking my pelvis I was in perfect shape.
>
> It is now three months since the incident. From what the doctors tell me I should be fit to pound a key in the next three or four years, give or take a year or so. It has been my sentiment for many years that it is far safer at sea than it is ashore, even including shipwrecks. So, for those who want a safe and carefree life, I recommend DXpeditioning in a small boat. My best wishes to all DXers – may they get plenty of new countries. – *Danny Weil, ex-VP2VB/mm, 719 Finale, San Antonio, Texas, 78216*

Yes, isn't that just like a seasoned old salt to foil every terror of Davy Jones, then run afoul of Murphy the Landlubber? Danny will be bouncing back, we're sure, but meanwhile you ought to let him hear from you. Especially if you're one of the multitude whose DX hours he brightened not so long ago.

† † †

W h e r e :

NORTH AMERICA – "QSLers of the Month" show up in mail from "How's" correspondents Ws 1OPJ 1RML 7TE ØNDX, WAs 1OFP 2SHR 6CPP, WBs 2ZEC 6VFF, WN2s EOO FHO and VE7BAF who applaud CE2RF, CP1FY, CR4BS, DK2DX, EA9EJ, F6s BJR BZH KBD, FL8HM, HC1FM, EA1s CQ DX, LX1BW, PY1DUB, SP8s FIX KJY, SV1GA, TJ1BG, TU2DO, UAØFAU, VPs 7CQ 8NI, VQ9HCS, VS6FB, XT2AA, YS2OB, ZD8AB, ZLs IQW 3LF, ZM4HB, 5W1AU, 5Z4NM, 6W8s AL BJ FB, 6Y5ED, 7X2MD and 9G1HE, as well as QSL agents Ws 1AM 3HNK 6KNH, Ks 3AFO 4SKI 4WQS, WAs 1HAA 2DHF 6AHF, VE3FCL, DJ3YU and SM3DXS for exceptional pasteboard punctuality. Any commendables we overlooked? . . . As of this July 1 am no longer QSL *manager for YN1MG/HT1MG. Mike has* returned to KØVVR. (WA5GFS) . . . The first five hundred QSLs received for our Sint Maarten PJ7ARI-PJ7VF operation were answered by mid-April. (PJ2VD) . . . I manage QSLing for ZF1s KR RR and CT2BG but not for ZF1FOC. Cards for the latter missent to me are relayed to him. (WA2BCK) . . . I'm turning in my VO2AB call for a VE1 version. Anyone still needing my Labrador QSL for contacts between July of '71 and July, 1972, should submit another card with International Reply Coupon or Canadian-stamped self-addressed envelope to my current New Bruns-



UL7JA remains among the more audible Kazakh DXers these sunspotless days. Zolly often can be found around 14,225 kHz at 0100-0300 GMT. *(Photo via W8NB)*

9F3USA/P1 entered some 1500 eager logs during Kagnew Station (Etheopia) Amateur Radio Club's mid-May foray to Dahlik island. WA5s TKC (ET3USF) and IEX parry a pile-up at left with a pair of HW101s, a long-wire and a 14AVQ grounded in the Red Sea. WA1LRP (KP4DKX) also attended. More than 100 countries were contacted in a sixty-hour session featured by a family of baboons protesting generator noise and sharks nibbling at the base of the vertical. That's schooner *Fidella*, rugged transportation from Massawa, aboard which the gang enjoyed 500 pounds of fine fishing along the way. KSARC intends a Dahlik encore before long.

wick address. Note, however, that I'm unable to confirm QSOs with the VO2AB pirate(s) who occasionally appeared, especially during contests, and I was inactive after July of '72. (ex-VO2AB) . . . Halp! These parenthesized brethren desire directions to QSLs from holdouts listed: (W1OPJ) PZ9AB, VP2VW, YN1CX, 8P6BU; (W1RML) EP2JA, VS6BS, YA2BD; (W7FSE) 3D6AP; (WA2SHR) JW5CI, OX3YY, 5R8AA; (WA9VCK) AP5HQ, IS1BDO, KX6DC, TY1ABE, UQ2KDZ, VP2s DAO SG, 9M2BD, 9Q5EK, all mostly vintage '69; (WB4URW) FG7XZ; (WN2EOO) CO6AH GM3s AAW LLP, HC2HB, I1RSQ, LUs 1DOW 6EF, SM3EJV, YU3TKL; (WN2FHO) F6CAS, I1CNO, YU3TXW; and (VE7BAF) FK8KAA. Any 'alp? . . . I'm still available as a potential QSL aide to harried ops at the DX end. My new address is 103 Kiltie Dr., New Hope, Pennsylvania, 18938. (WN3VAW) . . . I think hamdom owes a thank-you to that great gang of world-wide SWLs who comb the ham bands. Many hardened ham DXers may no longer welcome their reception reports but I value carefully prepared info such as that offered by JA7-1931, SP-37212 and UAØ-15347. (VE7BAF)

EUROPE – PAØs may continue signing the PA25 prefix this month and special station PA25JR also will be activated in conjunction with Queen Juliana's silver anniversary as head of state. (VERON) . . . The prefix 4K replaces the ambiguous UA/p tag formerly used by Russian antarctic amateurs. I've been back on the DX prowl some eight months now and all cards received via bureau from the U.S.S.R. have been PSE QSL models. When some TNX QSL types come through I'll know it's working both ways. (VO1KE) . . . Is the Box 88 QSL situation improving? I'm now receiving Russian cards via bureau in six to nine months including some from rarer Asian regions. (W1RML) . . . UA1ZAG, who does his hamming from Murmansk, delivered his QSL to me personally while his ship was anchored at Chicago. (W9IT) . . . I commenced QSLing for OY3H and VP9AS as of this July. (W3HNK) . . . Still no word from the ZA1AB who was active last year giving my old WØDAK call as QSL info. I do handle cards for 4Zs 4DZ and 2SDZ, though. (W7TE) . . . Yanks and Canadians needing my GM5AXO cards should apply via WA4UAZ, others via ARRL's Fourland Bureau branch or via RSBG. QSLing of all 5300 contacts should soon be concluded. (WA4UAZ) . . . Anyone still needing QSLs for my operation as SVØWH from April, 1971, to July of this year please apply via my new Maryland address. (WB4QPG/3)

SOUTH AMERICA – Speaking for the Bolivian U.S. embassy ham gang, we do QSL and are happy to do so. Those requiring our confirmations in a hurry should include s.a.s.e with their cards. We have APO privileges and air mail takes only a few days to reach the States. If no s.a.s.e. is enclosed I usually QSL via W3KT. In fourteen months I've issued more than three thousand. If yours hasn't arrived after a reasonable period first check your local bureau input, then reapply. While on the subject, nothing is more frustrating than receipt of QSLs bearing local time, especially for contest work. Only GMT, please! (CP1JV) . . . I don't seem to have much QSL luck with the Latin America types who pass out P.O. box numbers for their QSL QTHs. (WA6CPP) . . . HK4AJF's QSOs with U.S. stations after the first of this year may be confirmed through me. (WB9ACR) . . . I no longer manage QSLs for HK7BDA. (WA2GMD) . . . PY8ZAI, a missionary priest at Curusi some 600 miles up the Amazon, wants to QSL all who desire cards but has limited financial resources. S.a.s.e. with Brazilian stamps will ensure reply. (W8EFW) . . . Chilean amateurs of at least ten-year tenure may use the XQ prefix, suffixes unchanged. (DXNS)

ASIA – For recent XU1AA operations you can QSL operator Jack via Box 59, Phnom Penh, operators Ted and Vong via 9M2IR. (LIDXA) . . . . A4XFE's Stateside QSOs are said to be confirmed through WB2ZMK. (DXNS) . . . OK1AQW wants it known that JTØAE QSLs go out from Czechoslovakia via bureaus, no international Reply Coupons needed. Patience! (WØIUB) . . . UAØFAU's impressive card is a refreshing change from the usual state-generated U.S.S.R. QSLs. (VE7BAF) . . . In the event some still need confirmation of QSOs with TA2EM in 1968-'70 I have his logs available. (W7TE)

AFRICA – I have always QSLd 100 percent direct or via bureaus but it is certain that some mail

to and from Dakar has been lost. Anyone who still needs my card should send another via F5LF only. Incidentally, too many QSLs are always received without year of QSO, proper date, correct time, and GMT. This makes trouble for any DXer who has thousands of QSOs logged. (6W8AL) . . . By the first of June, according to OH2BW, QSLs for DXpeditionary calls OH2BH/6W8, OH2MM/6W8, TZ2MM, ZD3s X Y and 5T5BH had all been cleared. (WCDXB) . . . TL8LI QSLing will be brought up to date by Andre from his present 9Q5LI location. His intention is to confirm every contact. (DXNS)

OCEANIA – We hear that VR6TC is running low on QSL stock so we're preparing another supply for Tom. (SCDXC) . . . VK9ZC (VK4TU) indicates that the VK4 prefix no longer will be used for such remote islands as his Willis QTH. (WCDXB) . . . Now let's check individual recommendations that flutter from the "How's" mailbag but remember that each specification is necessarily neither "official," complete nor accurate. Just *might* do the job, though. . . .

A2CSR, Box 39, Gaberone, Botswana
EA6CB, Box 24, Palma, Majorca, Balearic Islands
F9UW, C. Bazillous, 208 Av. Pasteur, Roque Brune, F-06, Cap Martin, France
FC2CG, Box 76, Bastia, Corsica, France
FO8BU, P.O. Box 959, Papeete, Tahiti
FO8DY, P.O. Box 85, Papeete, Tahiti
FO8DZ, P.O. Box 433, Papeete, Tahiti
FY7AM, E. Assard, 82 Rue Lt. Bekcer, 97300, Cayenne, Fr. Guiana
FY7AO, P. Perrouin, Box 455, 97310, Kourou, Fr. Guiana
GM5s AUU AUV (to SM6s DHU BZV)
HBØAWQ, P.O. Box 14949, Vaduz, Liechtenstein
HC1FM, P. Morales, Quito NASA, Dept. of State, Washington, DC 20521
HK1AMW/W2/W3 (via W3KT)
HS3AIG, J. Corson, FEC-WARIN, APO, San Francisco, CA 96304
IIDFB, Box 349, USA StratCom Sig Spt Agcy, APO, New York, NY 09019
JA1s CKH/C21 MCU/C21 (via JAØCUV)
JA1OCA/C21 (to JA1OCA)
JE1CKA/C21 (via JAØCUV)
JTØs AE AG (via QKs 1AIA or 3YAO)
JY6BM, Box 644, Amman, Jordan
JY6FC, P.O. Box 11020, Amman, Jordan (or via K6AQV)
JY6s KAI KGO KKL KKU KSJ KST, P.O. Box 30, Alkarak, Jordan
JY6UMM, Box 13016, Amman, Jordan
JY9EL, Box 5089, Amman, Jordan
K4VMA/VP7, Autec, Box 47, FPO, New York, NY 09559
KX6LA, Box 196, APO, San Francisco, CA 96555
LA4C (via LA4DM or NRRL)
MP4BJT, D. Roberts, P.O. Box 116, Manama, Bahrain Island
TU2BA, P.O. Box 1727, Abidjan, I.C.R.
TU2ED, P.O. Box 1712, Abidjan, I.C.R.
UR2FQ, P.O. Box 73, Viljandi, Estonian S.S.R., U.S.S.R.
VE3RCMP, Telecomm. Br., Commissioner RCMP, 1200 Alta Vista Dr., Ottawa, Ontario, Canada
VK9KE-VK4KE-VQ8CX-9J2TF, c/o A. Whitmore, 7 Fair Isle Dr., Glendale, Nuneaton, Warks, England
ex-VO2AB, F. Greenleaves, 28 Enterprise St., Apt. 2, Moncton, New Brunswick Canada
VP2VBU, P.O. Box 212, Roadtown, Tortola, B.V.I.
W3VMB/VE8 (via W3KT)
W5ZIS/YV1, L. Weathers, c/o Halliburton Co., P.O. Box 698, Maracaibo, Venezuela
WA8RGJ/VE8 (to WA8RGJ)
WA9CTS/KM6, D. Drumstra, Box 19, FPO, San Francisco, CA 96614
WA9MZU/VQ9 (to WA9MZU)
YA1ED, Box 5, Kabul, Afghanistan
YB7AAU, W. Miller, P.O. Box 47, Balikpapan, East Borneo, Indonesia
YN1MG-HT1MG (to KØVVR)
ZF1EP, Dr. L. Persons, P.O. Box 471, Grand Cayman, Caymans
ZK1s A1TA (via W6KNH)
4K1D (via CRC, attn. UVØIP)
5U7BB, J. Gruson, P.O. Box 309, Niamey, Niger
5W1AN, Box 1147, Apia, Western Samoa

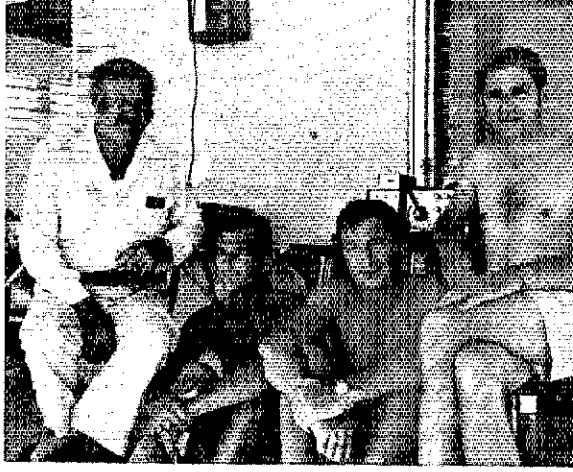
AX4FE (see text)
C31FO (via G3YYC)
C31GX (via G4BIA)
CN8BO (via W4GKF)
CT2BG (via WA2BCK)
DJ7MG/OHØ (to DJ7MG)
DT2QO (via DM2ATD)
ELØQ (via LA9GG)
ELØT (via I5DOF)
EP2PR (via W4BBP)
ET3USF (to WA5TKC)
FCØAHY (via OK1AHV)
GB3MKB (via GI6YM)
GD3GMH (via GW3NWV)
GD8GG/p (to G8GG)
ex-GM5AXO (see text)
HK4AJF (see text)
HK7BDA (see text)
IT57PUG (to IT1PUG)
KBØCU (via WB6IKI)
KF4DT (via W4OZF)
KJ6DI (via K4RHU)
OHØAM (to OH2NB)
ex-ON8UL (via W4EJP)
OY3H (via W3HNK)
PA25JR (see text)
PA9US (via PAØRTN)
PYØZAA (to PY1DVG)
SPØPNC (via SP4ETO)
TL8LI (to Q5LI)
VK9ZC (via VK3AH)
VP2AZA (via G3ALM)
VP5BN (via DL9UI)
VP5DD (to K8PKN)
VP9AS (via W3HNK)
VR1AC (via WB6IKI)
VR4AR (via ZL3JO)
VS5WW (to W9IGW)
VU2ANI (via K6TWT)
WØAW/VK9 (to WØAW)
XQ3AA (see text)
XU1AA (see text)
YA1RYS (to PAØRYS)
ZD8RW (via G8BXU)
ZF1JN (to K6JAN)
3V8BD (via DJ4DW)
5T5EEI (to W4FCU)
5T5ES (to K5HAY)
5T5KPO (to WA7UHR)
5T5LO (via K9KXA)
5W1AR (via WA7LFD)
5X5FS (via DL9IL)
6W8AL (via F5LF)
7Q7DW (via G3AWY)
9M2KA (via JA1CUM)
9V1RF (via W2GHK)
9X5SP (via DL8OA)

For the preceding glossary you're indebted to Ws ICW IEII IOPJ 1YL 4WFL 7EM 7TE 8EFW ØNDX, K1ZND, WAs 2SHR 4UAZ 5GFS 6CPP, WB4URW, VE7BAF, VO1KE, Columbus Amateur Radio Association *CARAscope* (WØZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, N. 72T, England), International Short-Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club's *Bulletin* No. 500 (JA3GZN), Long Island DX Association *DX Bulletin* (K2KGB), Newark News Radio Club *Bulletin* (M. Witkowski, Rt., 5, Box 167, Stevens Point, WI 34481), North Texas *DX News* (W5SZ), Northern California DX Club *DXer* (Box 608, Menlo Park, CA 94025), Southern California DX Club *Bulletin* (W6EJJ), VERON's *DXpress* (PAØs INA TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Got an item or two for the QTH pot?

† † †

Whence:

We'll attend to the short-skip circuit this time, as space allows, first calling attention to the 21st annual W9-DXCC conclave due to DXplode in Chicago on the 29th of this month. Socializing DXers will find the promised program better than ever. Every ARRL DX Century Club member is invited to rush attendance inquirires to chairman W9ZTD. . . . Gloria, CM2CB, claims to be the only YL cw enthusiast in Cuba. Found her on 7028 kHz at 2200 GMT. There's plenty of cw DX to be worked above 7025 kHz. (K2YFE) . . . My gripe of the month: W/K/VEs who finish cw QSOs with DX zero-beat, then crank out CQ DX without QSY. (W1JUB) . . . I thank VE1AIH, W2YD, K2OJD, WN2AOF and their families for fine ham hospitality during my visit their way in May. (FP8CT) . . . My new QTH at Chesterfield Inlet is not much different from my old cold Coral Harbour location. (VE8PI) . . . Got a rare chance to try daytime DX during the week while recovering from a cataract operation. Conditions not



PJ7ARI-PJ7VD, a popular DXpeditionary enterprise by (left to right) VP2VV/FS7, PJ2s CB ARI and VD earlier this year, dispensed almost two thousand Sint Maarten DXCC credits on 10 through 160 meters.

too good, of course, but 15 and 20 cw remain interesting. (W8EFW) . . . Scarboro (Ontario) A.R.C. sponsors a Canadian County Century Club Award available world wide to hams who contact a specified assortment of VE/VOs after January 1, 1973. There's also a special sheepskin available to Canadians only. Non-VEs ship s.a.e. plus IRCs to VE3WE for full details. (VE3AUR) . . . Managed my WAC and 30/22 worked/confirmed countries in my first six Novice months. A QSO with KL7HCN/Ø in Minot clinched my WAS. (WN3RVZ) . . . Had some good contacts on our new 10-meter Novice subband. Started out on 40, then switched to 15 where I collected about twenty countries and 42 states in three months. Eighty next! (WA3TLS) . . . DX isn't easy when you're apparently the last rockbound Novice in the world. (WN9IWY) . . . I'm on 14,020-kHz cw daily around noon GMT trying the Stateside end of things. (HK1AMW/W2/W3) . . . Any Alaskans and Hawaiians care to help a Brooklyn Two's WAS project? (WB2FIG) . . . I'll be operating KZ5NG for the next year or so, then out of the Navy for return to WA4UAZ. While in Scotland I collected 5300 QSOs with 180 countries and all states. (ex-GM5AXO) . . . Hollywood (Florida) A.R.C. tried a mini-DXpedition to the Dry Tortugas in June as KF4DT. (W4OZF) . . . We signed PJ7VL's Globe Chief and 51J4. (PJ2s ARI VD) . . . Enjoy 599s from Europe on 40 with a 25-ft.-high dipole. I plan a balloon semivertical for 1.8 MHz DX this season. (WB4URW) . . . Blitzing 40 and 80 with my ARC5s after turning in my old WN2FQN call. (WN3VAW) . . . I tried 28 MHz for PJ9BN, WP4DPW and several eastern states. Had a 45-w.p.m. code speed in the Coast Guard twenty years ago and have it pushed back up to about 35 after a year on the air with a 2NT, 2BQ and dipoles. (WN6RXI) . . . Twenty cw still gets hot as a pistol, breaking wide open to Europe of an evening, then developing a polar pipeline to Asiatic Russian goodies. (WA2TRK) . . . VE8NN joins VE8s FD and HH as the only YLs in their entire call area. (W3WRE) . . . How about more tips for beginners in your pages? I'm sure many a newcomer could be frightened away by his first wild pile-up. I have an HW101 going on 15, 20 and 40. (ZF1SB) . . . An August wedding thwarts my DX career but I should be eligible for more DXpeditioning by 1976, I think. (WA9RAT) . . . Much fun passing out Mississippi to the growing Novice bunch on 28 MHz where I quickly caught twelve states and six 10/10 numbers. On 15 I've worked/confirmed 27/19 countries with an HW101 and three-element rotary. (WN6HVY) . . . Reached 115/107 and DXCC in my first year with this call. An Argonaut provides fresh sport. QRP makes you aware of the importance of *timing*. (WBØCGJ) . . . WNs 20VS 3SFC 4YJN and 9IHR were 10-meter firsts for me. Ten's alive and well in Florida! (WN4VZF) . . . Fifteen and 10 grow poorer for the long haul up north but 14 MHz remains a blessing. Just hooked FB8ZB, YJ8DE and 9M2LN on 20. (K4WLS/KL7) . . . Up to 116/95 with my HW101 and 14AVQ. A new HY7 will supply QRP kicks. (K8TRF) . . . Too bad more DX stations don't hit the 80-meter Novice slot. KZ5NG and ZL3JC really go after WNs on 15. (WN2EOO) . . . I may try another Caribbean DXpeditionary swing next month. (W3HNK) . . . Cw operators sending too slow for conditions and using excessvie identification sure gum up a DX contest. (K9UCR) . . . Great-circle-bearing charts for nearly 3500 cities are available. S.a.s.e. for details, please, if interested. (WB5CBC) . . . My new 18AVT and barefoot 350 sure do their stuff toward the south Pacific. (W7JJY) . . . Fifty/thirty in my first nine Novice months. (WN5HII) . . . 8P6BU is an avid collector of WN cards on 15 meters, a band still fine for DX if you have plenty of patience. I recently caught CE5BB, OA4AHO, WP4s DOY DQP, ZL1BIB and ZP5HQ there. (WN2NRY) . . . Fifteen's been good to me, too, during my first five months on the air: CT1SX, DK5QK, IØIX, KG6AAY, KP4WF, KZ5s AYN NG, LUs ISH 3EX, W5ZIŠ/YV1, WN4ZYF/KV4, YU1OBY, ZM2GH, lots of JAs, KH6s and KL7s. (WN6UFW) . . . Right, Novices still don't need beams for DX on 15. CX2XA, JA2FQ, JH1s WDN WIX, KH6HJE, KL7GSC, WH6IBT and a YV1 came back to my little 30-ft.-high dipole. (WN7THP) . . . Seven Atlanta DXers including myself are readying a contest splash from Curacao next month. (W4GIW) . . . Spotted this while browsing in a 1946 *QST*: In establishing postwar DXCC "if for some reason less than 100 countries show up within the next few years it may be necessary to reduce the 75-or-more figure to a lower one to get stations to qualify for listing." Hi! (VO1KE) . . . The 21-MHz DX pipeline to Japan is still open here. Worked more than 300 JAs in the past year. (WN6OSS) . . . Yes, 15 is good for JAs from Sixland, especially in late afternoons. Early evenings find 20 infested by interesting Russians now and then. (WA6DHM) . . . KV4FZ, W4BRB and others around the 1.8-MHz hundred-country mark urge more 160-meter activity by Oceania types. (W1BB) . . . K6WR hit the century mark on both 7 and 3.5 MHz, always tough going out west. Our California Awards Nos 227 through 233 went to ZL1TB, UWØIQ, JA2HNP, KS6DY, DJ2VZ, PAØVO and VK6RU in that order. (NCDXC) . . . KC4USP, 21,300 kHz around 1700 GMT, should be available from Anvers isle for a few more months. (VERON) . . . WA3HRV and PY1DVG gathered 1015 contacts on 10 through 160 meters during their June Trindade trimph as PYØZAA and ZVØXG. (DXNS) . . . K5QHS, with wanderlust and wherewithall, wants suggestions in the way of DXpeditionary targets. (WCDXB) . . . Those four- or five-kHz-spaced RTTY gargles emanating from Moscow and Havana on 20 and 40 meters are being looked into by ARRL, FCC, etc. (LIDXA)

† † †

Hamfest Calendar

Florida – The Platinum Coast Amateur Radio Society's 8th Annual Melbourne Hamfest is September 8, 9 at the air-conditioned Melbourne Civic Auditorium. Hours 9 AM - 4 PM. Advance registration $1; door $1.50. Parking for 2,000 cars free, 25,000 sq. ft. swap area. For the children a full length Walt Disney movie, a fishing derby, Novice symposium, radio controlled boats and airplanes and a left footed code contest. Saturday buffet banquet, guest speaker, dancing following.

Florida – The Tampa Bay Area Hamfest is Saturday and Sunday October 6, 7 at 8 AM, at the Electrical Building, Florida State Fairgrounds, on North Blvd. 2 Blocks N. of Kennedy Blvd. Tampa. Area clubs are sponsors.

Georgia – The Northwest Georgia Amateur Radio Club and Repeater Assoc. Annual Hamfest is Sunday, October 7 at the Coosa Valley Fair Grounds in Rome. Everyone invited. Gates open at 9 AM.

Illinois – The Peoria Area Amateur Radio Club, Inc. 16th Annual Hamfest is Sunday, September 16 at the Exposition Gardens, northwest edge of Peoria. Lunch available. Activities for the entire family. Saturday night is the banquet and the campsite opening. Free coffee and donuts 9-9:30 AM. Free swap session, eyeball QSO, parking, contests, cartoons for the kiddies. Advance registration $1.50; $2 at the gate. Write: Wendell McWilliams, WB9DVJ, Box 1, Rome, IL 61562.

Indiana – The Grant County Amateur Radio Club's Hamfest is September 30 at the 4-H Fairgrounds, Marion. Admission $1, XYL $.50, children under 12 free. Flea market, free bingo, camping and food available. Technical sessions: *W9INX Repeater Group, W9BUQ Central Division.* Distributors and vendors welcome. Call-in frequency 146.94 Simplex, call W9EBN/9. Write: Howard Pence, 524 S. Washington, Montpelier, IN 47359.

Massachusetts – The Massasoit Amateur Radio Asso. Annual Auction is September 15 at 7:30 PM at the American Legion Hall. Talk-in on 50.40 MHz and 146.94 MHz. Write: Albert Jones, WA1OEY, Parsonage St., Apt. 10, Marshfield, MA 02050.

Massachusetts – The Sharon Amateur Radio Asso.'s auction is September 16 at 1 PM at the Sharon Community Center. Free refreshments. Write: David Sirkin, 18 Gorwin Dr., Sharon, MA 02067.

Massachusetts – The New England County Hunters Fall Mini-Convention is September 29-30 in conjunction with the ARRL New England *Division Convention at Hyannis. Contact WA1LZS* for details.

Michigan – The L'anse Creuse Amateur Radio Club's 1st Annual Swap n' Shop is Sunday, September 16, at Rosso Memorial Hall, 38255 L'anse Creuse Rd., Mt. Clemens, MI. Plenty of food and parking, tickets $1; tables $1. For info. call 313-731-4998.

Michigan – The Adrian Amateur Radio Club, Inc., Fall Hamfest is Sunday, October 14 from 8 AM to 3 PM, at the Lenawee County Fairgrounds, Dean St. in Adrian. Talk-in frequencies are 1812, 3935 kHz; 52.525, 146.46, 146.52, and 146.94 MHz. All buyers, sellers and visitors welcome. Plenty of refreshments. Cost $1 advance; $1.50 at the gate. Table sized 8 ft. $1.50 per half. Pre-paid tickets held until 10 AM. Write: Adrian Amateur Radio Club, P. O. Box 26, Adrian, MI 49221.

Missouri – Annual P.H.D. Amateur Radio Auction is Saturday, September 29, at 3930 N. E. Antioch Rd., Kansas City, MO. Auction starts at 7 PM. Swap tables available.

New Jersey – South Jersey Radio Asso.'s Hamfest celebrates its 25th annual event, Sunday, September 9 at the beautiful Molia Farm, Malaga. Displays of electronic equipment, swap n' shop, games and swimming. Bring a picnic or purchase hamburgers, hot dogs and soft drinks. K2AA/2 transmitting on 3.930 MHz, 145.2 MHz and 50.3 MHz for mobile talk-in. Advance Tickets $2 for family. Write: Bill Brandberg (W2BBN), 322 *Lakeview Ave., Haddonfield, NJ 08033.* (Make checks payable to South Jersey Radio Asso.) At door $3. Open at 11 AM.

New York – The 1973 Hamburg International Hamfest is Saturday, September 15 at the Erie County Fairgrounds in Hamburg. Giant flea market, technical forums, awards, organization meetings, women's programs, code contest, FM Hospitality Room, dealers and manufacturers' displays. Some of the programs include: Gus Browning, W4BPD, with a slide program of past DXpeditions and information of future trips. Gil Boelke, W2EUP, who designed the GLB synthesizer program is for the vhf-fm gang. Food available. Come bring the family. Recreational vehicle parking with hook-up for $2.50 for the entire weekend. Regency Motel available if request received by September 1. Admission $2.50 at gate, $2 advance, $1 for flea market. Children under 12 free. Write: Lin Brownell, WB2HCL, 210 Buffalo St., Hamburg, NY 14075.

Ohio – The 36th Annual Cincinnati Stag Hamfest is Sunday, September 16 at Stricker's Grove on State Rt. 128, one mile west of Ross (Venice). Check local area map for location. Lots of food, flea market, contests, and model aircraft flying. $7 covers everything. Write: Jim Wellman, W8HSI, 725 Stout Ave., Wyoming, OH 45215.

Pennsylvania – The 18th Annual Hamfest of South Central Pennsylvania Radio Clubs is September 3 at Elicker's Grove just off U.S. Rt. 30 near Thomasville, Pa. Area clubs are participating.

Pennsylvania – The Mount Airy VHF Radio Club, Inc. Annual Pack Rat Hamarama is Sunday October 7 at the Warwick Fire Co., Jamison, on Rt. 263 north of Philadelphia. Giant flea market, auction, and amateur television demonstration. Festivities begin at 10 AM. Auction at 3 PM. Food concession on premises. Registration $1, flea market tables or tailgate sales, $2. Talk-in on 146.52 and 52.525. Write: Dave Zimmerman at 520 Centennial Rd., Warminster, PA 18974.

Texas – The Texas Traffic Net Fish Fry is September 29, 30 at Dave's Resort, Rt. 1, Box 28, Morgan, TX 76671. Reservations – cabins with 3 double beds plus cooking facilities, and bath, $15. Limited space, first-come-first served. Room for self-contained campers, pool, fishing and boat rental. For info. send a legal sized envelope with 16 cents postage to: W5AYX, J. W. Roach, Rt. 5, Box 1360, Waco, TX 76705.

Washington – The Walla Walla Valley Radio Amateur Club's 27th Annual all family picnic and hamfest is September 23 at the Milton-Freewater, Oregon Community Building. Swap n' Shop, contests, homebrew, MINOW bazaar, and antique radio displays. Free registration, coffee and punch furnished, potluck lunch at 12:30 Sunday. Saturday is fun night. Talk-in 3960 and 146.760. Write: Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, WA 99362.

ROANOKE DIVISION CONVENTION

Reston, Virginia **September 14-16, 1973**

The Northern Virginia Amateur Radio Council, comprising representation from 14 area clubs, invites you to attend the 1973 ARRL Roanoke Division Convention at the Sheraton Inn and International Conference Center, Reston, Va. on September 14-16, 1973. Friday afternoon and evening will feature an ARRL Technical Symposium – an innovation being presented for the first time, the theme is "Space Communications." Symposium admission is free with convention pre-registrations or $1 at the door.

Another outstanding feature will be the Naval Research Laboratory exhibit; oriented toward amateur radio and commemorating their 50th anniversary.

Various groups and organizations will have displays, exhibits and sessions – such as Amsat, DX, SSTV, Moon Bounce, FCC, fm, ARPSC contests and nets. Many of these will have special breakfasts or luncheons. The main banquet Saturday night will be followed by the traditional "Wouff Hong" ceremony at midnight.

League officials who will attend and participate in the ARRL Forum include the President, Harry Dannals, W2TUK; John Huntoon, W1RW; and Lewis G. McCoy, W1ICP.

A flea market will be open all day Saturday in one of the main parking lots of the center. An extensive program is planned for the ladies, including Helen Monks with her "Trash to Treasures" and a presentation by the Wellington Diamond people.

Licensed YLs will have a hospitality room, special meetings and a Sunday morning brunch and forum. ARRL's three fine movies, "This is Ham Radio," "Hams Wide World," and "The Talcott Mountain Science Center," as well as the Canadian film "Fine Business," will be shown. There will defintely be something for everyone.

All convention activities will be at the attractive new Sheraton Inn and International Conference Center at Reston, Virginia (near Dulles International Airport) 12 miles from the Washington, D.C. Capitol Beltway (I-495).

General registration includes all activities and sessions. Separate tickets for the Technical Symposium may be purchased if desired. Ladies may register for either general registration or for the ladies program.

Advance registrations: General registrations – $3, Banquet only – $12, Ladies only – $3, Ladies program and luncheon – $6, Technical Symposium only – $1. Register now and qualify for the "Early Bird" award. Address – K4MD, Box 7388, Warrenton, Va. 22186.

NEW ENGLAND DIVISION CONVENTION

Hyannis, Massachusetts **September 29-30, 1973**

The ARRL New England Convention will be held September 29-30 at Dunfey's Hyannis Resort, Hyannis, Massachusetts on Cape Cod, sponsored by the Federation of Eastern Massachusetts Amateur Radio Associations.

COMING ARRL CONVENTIONS

September 14-16 – Roanoke Division, Reston, Virginia.
September 29-30 – New England Division, Hyannis, Massachusetts.
October 5-6-7 – Midwest Division, Lincoln, Nebraska.
October 6-7 – Tennessee State, Memphis.
October 13-14 – Pacific Division, Santa Cruz, California.
October 20-21 – Southwestern Division, Los Angeles, California.
January 19-20 – Southeastern Division, Miami, Florida.
March 1-3 – Delta Division, Lafayette, Louisiana.
March 23-24 – Great Lakes Division, Muskegon, Michigan.
July 18-21 – NATIONAL, New York, N.Y.

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.

The resort location will allow the entire family to attend and enjoy swimming, tennis, boating, golf, saunas, a Roman bath, etc. and children 18 and under can sleep with their parents at no extra charge. There will be an informal cocktail party and buffet supper Friday evening the 28th for early birds and the main convention commences at 10 AM Saturday. Features will include a giant flea market, fm repeater demonstrations and seminars, vhf programs, SSTV, High Speed Videography demonstrations, ARRL Forum, Amsat/Oscar, MARS, NEDXCC, manufacturer's exhibits, WRONE, QSL bureau, QCWA, OOTC, IMRA plus YL programs that include: a fashion show around the pool, flower arrangements, physical fitness show, bus tour of Hyannis, wine tasting party and a YL luncheon. Saturday night there will be a prime rib roast beef banquet which will include dinner music, dancing, presentation of the Ham of the Year award, and a Broadway show starring the eight Winged Victory Singers from New York. A special event this year will be a three-transmitter hidden transmitter hunt on two meters. Bring your handi-talkie! A large contingent of ARRL staff members and officials, led by President Harry J. Dannals, W2TUK, will be on hand to meet conventioneers and the ARRL booth will be in full operation Saturday and Sunday. Early bird registration is $3 ($4 at the door) and banquet and show tickets are $10.50 including tax and tip and may be obtained from W1ZQQ, 17 Barnes Avenue, East Boston, Mass. 02128. Include a s.a.s.e. and make checks payable to: F.E.M.A.R.A. Upon receipt of your order the ticket chairman will include a special discount hotel reservations envelope. Hams that did not receive a preconvention mailer may obtain one from W1VRK, 28 Forest Avenue, Swampscott, Ma. 01907.

MIDWEST DIVISION CONVENTION

Lincoln, Nebraska **October 5-6-7, 1973**

The Lincoln Amateur Radio Club, Inc. invites you to attend the ARRL Midwest Division Convention at the Villager Convention Center in Lincoln, Nebraska on October 5-6-7, 1973. Activities begin Friday evening with YLRL and QCWA meetings. There will also be ample opportunities for "Eyeball QSOs" with early arrivals. Highlights of Saturday's program include manufacturers displays, technical sessions, MARS and DX meetings and an ARRL Forum with President Harry J. Dannals, W2TUK, Midwest Division Director "Andy" Anderson, KØNL, and other League officials. George Hart, W1NJM, ARRL Communications Manager, will head a session on public service and amateur radio. Broadcast satellite communication will be the topic of A. James Abel, the National Association of Broadcasters "Man of the Year," who was the networks representative at last year's satellite communications conference in Geneva. Fm and repeaters will be K9STH/5's theme, WØLTE will deal with antenna matters and W2JE will discuss QCWA affairs. There will be a Wouff Hong initiation. The main speaker at the Saturday evening banquet will be A. Prose Walker, W4BW, Chief, Amateur and Citizens Division, FCC.

Special features on Sunday will be the swap shop/flea market and hidden transmitter hunts. The YLs will have a hospitality room open throughout the convention and an interesting program of activities has been planned for the ladies, including those not registered for the convention. A block of 120 rooms has been set aside at the Villager for those attending the convention. Doubles are $21 and singles $15 per night. For reservations write to the Villager Convention Center, 52nd and "O" Streets, Lincoln, Nebraska 68510. There are several other motels located within five blocks of the convention site. Advance registration – convention $6.50, banquet $5.50. Confirm with Jerry Bennett, WØWKP, P.O. Box 5006, Lincoln, Nebraska 68505. Make checks payable to the Lincoln Amateur Radio Club.

TENNESSEE STATE CONVENTION

Memphis **October 6-7, 1973**

The 1973 ARRL Tennessee State Convention will be held at the State Technical Institute in Memphis on October 6-7 under the sponsorship of the Mid-South Amateur Radio Association. Informal dutch treat dinners are planned for Saturday evening at the Hungry Fisherman Restaurant across the street from the convention site. There will be displays, MARS meetings, a flea market. Vice-President Compton, WØBUO, and other League officials will conduct an ARRL Forum. Robert M. Myers, W1FBY, *QST* Assistant Technical Editor, will talk about the preparation of technical articles for publication in *QST*. Special entertainment is planned for the ladies.

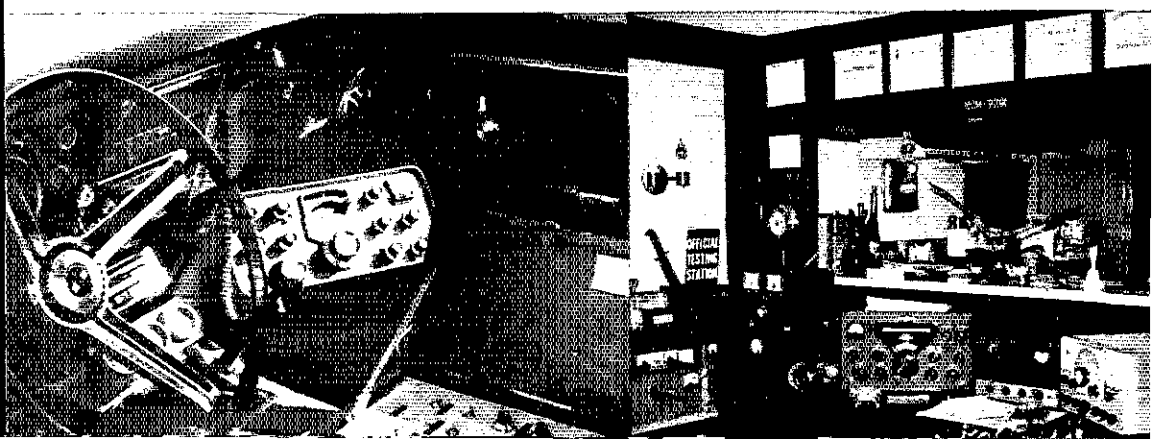
The State Technical Institute is conveniently located on Interstate 40 at Exit 11. The Welcome Inn Motel, located across from the Institute, offers discounts to amateurs who make advance registrations. Their phone number is (901) 388-1300. Admission is free. QST

Strays

The man responsible for issuing call letter license plates to amateurs in Mississippi is named J.C. Sparks. – *W5GSF*

Here is WAØTJT's answer to the space problem in his '68 Camaro. Besides the SB-101 there is a stereo installation. Both units are controlled from the box in the lower right hand corner of the picture. But where does the YL sit, Keith?

Although not as cramped for space as WAØTJT is with his mobile setup, WN3SSU makes good use of available room in his mobile home to make an attractive station layout. The unit on the floor on the left of the desk is a homebrew linear with a pair of 813s in grounded grid. On top of the linear is a homebrew antenna coupler.



50 Years Ago this month

September, 1923

. . . A second national convention is scheduled this month in Chicago, at the famous Edgewater Beach Hotel. No equipment exhibits, says the sponsoring Chicago Radio Traffic Association; this is to be four days of friendship, fellowship and technical discussions.

. . . "Best dimensions" for amateur antennas show four parallel wires on 9-foot spreaders, 330 feet long (for 100 meters), with a downlead of four wires in a cage 6 inches across. That required some big towers and guys – a typical dead-man anchor was an 8-foot railroad tie embedded in concrete and then sunk several feet in the ground! And then there is the counterpoise . . .

. . . Assisting hams in exploration of shorter wave-lengths, the Bureau of Standards is transmitting standard frequency signals on schedule, so that we may calibrate our wavemeters all the way down to 150 meters!

. . . Don Mix at WNP on the *Bowdoin*, off the coast of Greenland, is working 1s and 2s easily, and hearing 'em as distant as California. The reputation of 6s for outstanding signals is further enhanced by a report that 6KA, in the Transpacific tests, was louder in New Zealand than the Navy stations in Hawaii!

. . . "Who's who" includes descriptions of a couple of outstanding DX stations whose ops are still ardent and expert in the field today – 5KC and 8GZ.

25 years ago

September, 1948

. . . Conventions are the order of the day here, too; Milwaukee is to be the scene of the fifth ARRL National.

. . . "Don't ask FCC," cautions the editorial. Too many instances of late where a ham wants to split hairs and pushes for an official ruling; some complicated legal fact gets in the way and the FCC reply is restrictive. (Sound familiar?)

. . . Outstanding emergency communications performance by amateurs is reported in the Columbia River flood from a broken dike. First word, and most relief coordination, came through ham circuits.

. . . Mobile operation, previously restricted to vhf, is newly authorized for all amateur bands – in Canada and the U.S. simultaneously. Notification is required only when you'll be away from the home location more than 48 hours. W3NL (now KØNL) has a timely dissertation on various aspects of 10-meter mobile, drawing on experiences of the Washington Mobile Radio Club.

. . . Monitoring for clean signals gets an assist from VE3QV's sidetone generator operated by a few milliwatts of the cw transmitter's output; and a built-in monitor scope for checking modulation, by WØJET.

. . . W6SAI shows us how to add an 85-kc. i.f. amplifier to a 75-A for the additional selectivity of triple conversion. – *W1RW*

Strays

I would like to get in touch with . . .

. . . Anyone interested in establishing a military active duty net. – *K8AIT*

Explaining amateur radio to a group of young visitors and their teacher is Hall of Science Amateur Radio Club vice-president, Jack Dubinsky, W2LVR. A retired captain of the New York City Fire Department, Jack puts in many hours each week at the club's station, WB2JSM, operating and explaining our hobby to visitors of all ages. Located in the Hall of Science of the City of New York in Queens, the club conducts classes for beginners and also for those wishing to upgrade to higher class tickets.

After seeing the photo of W6GCM with his collection of ARRL membership certificates (Stray, page 34, April *QST*) W7OS sent us this picture of himself holding a total of 41 membership certificates.

OSCAR NEWS

W3TMZ Works All States via Oscar!

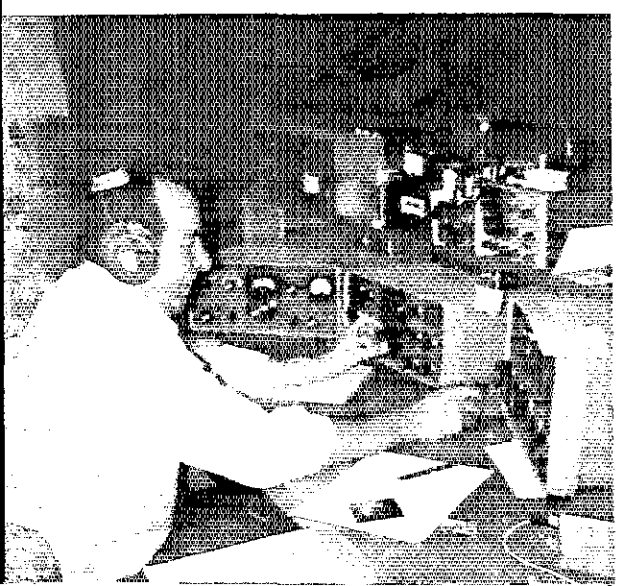
On July 7, 1973, during orbit 3312 of Oscar 6's lifetime, Jack Colson, W3TMZ, of Mt. Airy, Maryland, worked KH6HLK to complete the first WAS via amateur satellite. Jack's Hawaii contact was the culmination of nearly seven months of Oscar activity, during which there were few stations in the U.S. to work through the satellite whose first contacts didn't include W3TMZ! Jack's fifty QSLs entitle him to the special Amsat trophy for satellite WAS.

W3TMZ's accomplishment highlights the widespread interest in the satellite program among amateurs. The list of stations using Oscar has constantly been changing throughout the satellite's lifetime; states such as Kentucky, Louisiana, and West Virginia, which had no activity at the onset, are now represented by several stations. One of the most striking features of the Oscar 6 activity has been the acceptance of its challenges by longtime high-frequency DXers, even more than by vhf men.

Speaking of DX . . .

. . . Two countries which would gladden the heart of any hf DXer were active via Oscar during the month of July: the DXpedition to Tongareva, ZK1TA, made at least two contacts (with W6OAL and WA6GUY) and MP4BJP, Bahrain, was put on the air by WB4WPP, who reports three early QSOs. MP4BJP will be active for some time, perhaps by SSTV if authorization can be obtained.

Longtime DXer and contester W3TMZ claims he was "a couple of months late" in getting involved with Oscar 6, but despite this and the handicap of his East Coast location (making KH6 a *real* challenge!) he has put together the first Worked All States via amateur satellite. Congratulations, Jack!



OSCAR 6 TWO-WAYS

	Stations worked	*States*	*Countries*
G3JVL	182	7	33
JA9BOH	68	1	6
PAØWLB	179	—	27
SM2EKV	27	2	15
VE3HD	210	39	16
K1HTV	487	47	37
K2KNV	313	46	26
WB2VKZ	272	45	24
K2ZRO	148	39	14
W3BWU	92	33	10
W3TMZ	392	50	30
K4MSG	48	23	3
WB4RUA	155	42	13
W6OAL	700*	40	—
W7ZC	206*	30	—
DJ6RD/W9	176	41	11

* total contacts

One application of satellite technology which is getting quite a bit of attention in telecommunication circles these days is in the maritime service. Through satellites, ships can maintain constant communication regardless of weather or propagation. The concept of a maritime mobile *satellite station is being put on trial via Oscar 6* from August 1 to September 25 by OZ7DX, aboard the scientific research vessel *Dana* in the waters off Greenland. OZ7DX/MM is running 70 watts to a two-element crossed yagi with an uplink frequency of 145.942 MHz. — *K1ZND*

Recent Satellite DX Achievement Award Winners

W2GN G3JVL SM2EKV K8GMR WØWMP DC6ZQ VE3QB K8MYN HG5AIR W1NU K2BZT.

Certificates have been issued to 117 stations in 19 countries and 5 continents.

Strays

Didja know that Oscar 6 "active" XE1RY lives in Satellite City, Mexico?

— • • • —

Dear someone . . .

There must be someone in the New Bedford area who is going for his WAC award in the worst way.

Seems that someone stole those three letters off the back window of my car where I display my call.

Which, of course, leaves me with a *real* OT call: 1DJ. — *WA1DJC*

QST for

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

1973 YLISSB Convention

NOT A NET but a system, the members of the YL International Single Sidebanders met at their annual convention from June 15 through 19, for five very full days of activity in Minneapolis, Minnesota. From the Friday afternoon gathering for registration in the hospitality room, through the farewell breakfast, it was a meeting of system members who came to not only meet each other, but to find ways to improve their operating.

There were different seminars planned each day to discuss the various aspects of YLISSB. It was problems of network operation, the propagation peculiarities of the various bands, the "slings and arrows" encountered by the net control stations. It was a DX meeting on the trials and tribulations of a QSL manager, ironing out procedures for DX contacts during operating sessions, stressing their credo that YLISSB is people working with people and not just a new way to catch DX, and a special emphasis on the courtesy that is so vital to maintain a good image of amateur radio. It was membership, and regulations, and rules, and certificates, all discussed and handled in the five days of seminars.

It was a convention of friendship. Of informal get togethers in little groups in the halls, and the hospitality room. It was old friends and acquaintances meeting again, and it was newcomers there for the first time. It was representation from all ten call areas in this country, as well as DX from Angola, Mexico, the Virgin Islands, and Canada.

It was hospitality with the international touch in the planning of luncheon and dinner menus from a chuck wagon barbecue through gourmet meals ending with a French style banquet, and very special *hors d'oeuvres* in the hospitality room.

It was ARRL speakers on the problems of amateur radio in the communications world, and the heritage of YL operators. It was ecumenical services under the guidance of Rev. Jim, and Father Paul.

The YLISSB began as a YL group when V. Maryee, K4ICA, and four YLs got together to work DX women. As the system grew, more and more OMs became interested in their activity, and finally they were admitted to the club with one exception in the regulations that only a YL can hold the office of president.

It is now a world-wide club of almost 9000 members of all ages located in 300 countries, and representing all continents. One of the claims of the club is that the sun never sets on YLISSB because of the broad scope of the organization. While the system is organized on an international scale, the primary reason for the organization is to offer assistance and be available for emergency operation. This plan of service has proved itself often in securing serum needed in Kenya, medical traffic into South America, locating a pacemaker for a doctor in Ecuador, the search for a rare type of blood, relaying directions and advice, as well as activity in disaster service.

There are almost 30 different types of certificates that have been conceived and offered to keep the membership interested and on frequency so that they are available when and if an emergency requiring their assistance should occur, for, says Betty, K7UXN, "our ability to make ourselves available to help other people is the justification for our existence."

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

MINOW Net 19th Anniversary meeting at Coeur d'Alene, Idaho. Front row l-r: Freida, K7PVG; Joan, WA7BDD; Rosella, W7ULK; Beth, W7NJS; Bobbi, K7RAM. Back row l-r; Verda, K7UBC; Jessie, K7TWQ; June, WA7FRM; Kathi, WA7PUX; Gwen, W7NOB; Ethel, W7WLX; Bernice, WA7TPU; Bea, W7HHH; Lucille, WA7JFC. *(Photo courtesy K7UBC)*

Jessie Billon, WA6OET, past president of YLISSB with DX member KV4BW meeting at the 1973 YLISSB Convention.

The 1973 YLISSB convention was a sing-along; OMs and YLs from all over the country, and half way around the world; a trip to a summer theater; serious meetings and friendship all woven together in the warm hospitality of WØUUE, and the host committee.

1973 CLARA Day

CLARA, Canada's nation-wide YL club announces that the annual CLARA Day will be held Sunday, September 16, 1973, beginning 1600 GMT.

The club members will be operating on two main frequencies; 14.160 MHz and 14.280 MHz. Anyone who is interested in contacts with club members to qualify for the CLARA certificate through this activity should write Cathy Hrischenko, VE3GJH, 30 Lisburn Crescent, Willowdale, Ontario, Canada.

CLARA Convention Planned

The Canadian Ladies' Amateur Radio Association has announced plans for the CLARA Convention to be held in Calgary, Alberta, in 1975. This will be the first all-Canada Convention of YL operators since the organization of the CLARA club.

ARRL Roanoke Division Convention YL Plans

The Roanoke Division ARRL Convention to be held in Reston, Virginia, September 14, 15, and 16, has scheduled an extensive program for the women who will be attending. The wives of amateurs will have a special luncheon, as well as activities geared to the interests of the women who do not care to attend the technical meetings.

WAYLARC is sponsoring a hospitality room, special meetings, a Sunday Brunch, and a YL Forum as a part of the activities for the women amateur radio operators who will be at the convention. See you there.

Canadian YLISSB member "Bubbles" Timlick, VE4ST.

1973 YLRL Anniversary Contest Rules

Cw – Start:	October 17, 1973	1800 GMT
End:	October 18, 1973	1800 GMT
Phone – Start:	November 1, 1973	1800 GMT
End:	November 2, 1973	1800 GMT

Eligibility: All licensed women operators throughout the world are invited to participate. YLRL members only are eligible for the cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs do not count. Contacts on nets do not count.

Operation: All bands may be used. Cross band operation is not permitted. Only one contact with each station will be counted in each contest.

Procedure: Call "CQ YL."

Exchange: Station worked, QSO number, RS, or RST, ARRL Section or Country. Entries in log should show time, band, date, transmitter, and power. *Logs must be signed.*

Scoring: A. Phone and cw will be scored as separate contests. Submit separate logs for each contest.

B. All YLs located within an ARRL Section score one (1) point for each QSO with another station located within an ARRL Section. Score two (2) points for each contact with a station not located within an ARRL Section (i.e., DX). Definition of DX: All stations not located within an ARRL Section. DX YLs will score two (2) points for each contact with a station located within an ARRL Section. Score one (1) point for each contact with another DX station. (Note: please know your ARRL Section. A list may be found on page 6 of *QST*, or send SASE to the YLRL contest chairman for a list.) Multiply number of contact points by total number of different ARRL Sections and/or countries worked.

C. Contestants running 150 watts or less dc input at all times may multiply results of (B) by 1.25 (low power multiplier).

D. Ssb contestants running 150 watts PEP, or less at all times may use the low power multiplier (results of (B) by 1.25).

Awards: Highest cw score: Gold Cup (YLRL member only anywhere in the world).

WA2BAV, Eva Pataki, with OM George, WB2AQC, and their daughter.

Highest Phone score: Gold Cup (YLRL member only anywhere in the world).

First, second, and third place cw and phone scores (not combined) and highest cw and phone log in each district and country will receive a certificate.

Corcoran Award: Highest combined cw, and phone scores. (YLRL members only within an ARRL district.)

DX Only: Highest combined cw and phone scores from North and Central America, including the Greater and Lesser Antilles, will receive a YLAP Hager Plaque for YLRL members only. Highest combined score from any other part of the world will receive a duplicate award.

Logs: Copies of all logs must show claimed score, be signed by the operator, be postmarked not later than November 18, 1973, and be received no later than December 15, 1973 by the contest chairman. Please check logs carefully. Be sure they are complete. No logs will be returned. Remember that this is the busy holiday mail season and mail may be slow. Mail copies of log to: Eila B. Russell, WA8EBS, 4348 W. 223rd Street, Fairview Park, Ohio, 44126 U.S.A.

1974 YLRC-LA Officers

The YLRC of Los Angeles elected the following women to serve as officers for the year 1973-74: President, Esther Gardner, WA6UBU; Vice President, Mary Savage, W6VDP; Recording Secretary, Violet Barrett, W6CBA; Corresponding Secretary, Ros Fishman, WA6LRW; Treasurer, Betty Brown, WA6KQC.

Installation ceremonies were conducted at the June meeting by Myrtle Cunningham, WA6ISY, past president of the club, and at present 1973 Secretary of YLRL. Charms were presented to YLRC officers. The YLRC-LA meets the second Saturday of the month, and all licensed women amateur radio operators are welcome.

1974 Chix-on-Six Installation

Chix-on-Six, Ohio's VHF YL net and club, installed the following women to serve as officers for the coming year: President, Elaine Simon, WA8QFL; Vice President, Carol Iams, W8WRJ; Secretary, Dot Baumgardner, WA8IJW; Treasurer, Carol Petlowany, K8TFR; Historian, Helen Baber, W8EFB; Certificate Custodian, Margie Blose, K8ZEV; Publicity Chairman, Sue Jenkins, WA8OZB; NCS Chairman, Kay Arey, WB8IBU.

Installation was in charge of Eila B. Russell, WA8EBS, 1973 YLRL Vice President, at a dinner meeting on July 10, 1973. Chix-on-Six is active in stimulating activity and interest of YLs in amateur radio, public service on the net, and assisting women who wish to become amateur radio operators.

Eva Pataki, WA2BAV

Amateur radio is very much like the line of the song "You takes your choice," and Eva is busy choosing many of the facets that are offered to the licensed operator for she is active in cw, ssb, and SSTV.

A member of YLRL and ARRL, Eva passed her General Class exam in 1971, and two months later qualified as Advanced Class, not long after receiving her American Citizenship.

In 1971, Eva, and OM, George, WB2AQC, went on a West African DXpedition which resulted in over 9,000 contacts while they were visiting 11 countries: Mauritania, Senegal, Gambia, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Dahomey, Niger, and Cameroon. Eva's operation in Gambia, and Dahomey was the first time that a YL operated from those countries. Other than the joint DXpedition with her husband, Eva has more than 60 countries, meeting amateurs everywhere.

The family interest in radio extended across the Atlantic, when Eva's father, Steve, recently passed his test in Romania.

WB2BAV can be found looking for new countries for her DXCC, or just casually rag-chewing in any of her favorite forms of emission.

Feedback

The comment attributed to WA9MZS in the "soap box" extracts on the YL-OM contest in *QST*, July 1973, "YL News and Views" should have been credited to another OM, W9NLF. QST

Lisa Knight, WB5GTO, passed her General Class exam at the age of 11, and is active on 40 meters most of the time. She is the daughter of WA5CTP.

CONDUCTED BY BILL SMITH,* W7JNK

More on the 10-6 Game

EXCEPT FOR limitations inherent in the U.S. licensing system, perhaps the best way to anticipate 50-MHz E_s openings would be to monitor the 28-MHz band for *E*-propagated signals. The two bands may sound much alike at the peak hours of a good E_s session, but careful observation will show significant differences.

Openings are somewhat more frequent, longer, and more diverse on the lower band. On a good E_s day, when the maximum usable frequency rises rapidly, the two bands may appear to come alive almost simultaneously. In fact, as mentioned last month, there may be occasions when skip signals are heard first on 50 MHz, though this is believed to be the result of lack of 10-meter activity in the right places. In general, a long time lag between the first reception of skip signals on 10 and 6 means a rather poor opening in prospect for the higher band. When the muf shoots up quickly, it probably will go well up into the vhf spectrum (possibility of a 2-meter opening) and both 10 and 6 will enjoy a long session. The likelihood of 50-MHz skip without any on 28 seems remote, though if anyone sees hard evidence to the contrary we'd be glad to have details.

To play the 10-6 game to best advantage requires a good receiver and antenna for the lower band. When both bands are wide open, anything will do, but we want ability to hear the first (weak) signals on 28 MHz. Less-than-optimum antennas, particularly, can cost you valuable observing time. A directive array that rotates with the 6-meter beam is desirable. A vertical for 10 is probably the next best thing. Nulls in the patterns of fixed horizontal dipoles or long-wire antennas are almost certain to prevent reception of some valuable clue signals.

Ten-meter hams, like vhf operators, too often wait to hear activity before doing any transmitting, so continuously operating beacon stations are very useful, especially in areas of low amateur population density. Known 10-meter beacons were listed in June *QST*, p. 77. Of those given, only VE3TEN, 28.175 MHz, Ottawa, is of much interest to 50-MHz operators. Since the beacon table was published, another beacon has come on the air, at a point which provides a unique opportunity for E_s observation. VP9BA, Bermuda, 28.165 MHz, is on about the same latitude as Savannah, Ga., and within E_s range of at least one-third of the United States. As the first signal ever to allow observation of E_s propagation farther east than the East Coast activity centers, it should give us a fine chance to try the Mel Wilson method of tracking E_s clouds, before they move in from over the Atlantic. Some careful reading of Mel's now-classic 2-part *QST* article[1] should be a prelude to serious use of VP9BA. Both stations mentioned above run continuous signal, with fsk identification at approximately one-minute intervals. They run moderate power and have vertical antennas.

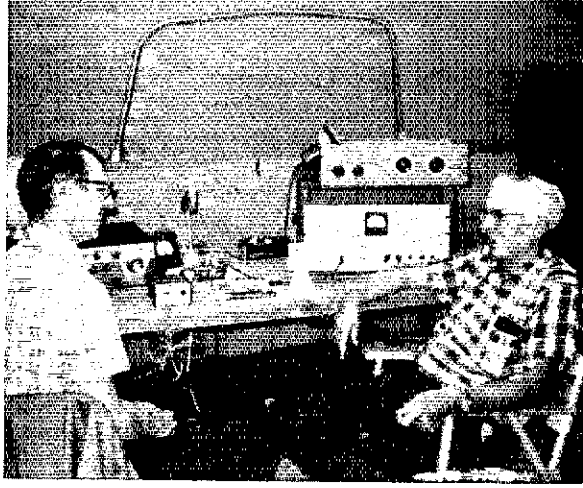
And don't forget W1AW. The Headquarters Station schedule is in every issue of *QST*. Their simultaneous transmissions (28.08 and 50.08, cw, and 28.59 and 50.19, phone), available for many hours every day, offer interesting comparisons of the two bands. They're on 145.488, too, for 6-2 checks.

What can a 10-meter beacon in Bermuda tell a 6-meter operator in Connecticut? Events of Sunday, July 15, offer some indication. At 1500 GMT that day, VP9BA was peaking S-9 at W1HDQ. (I may have missed an earlier peak; see below.) No other 10-meter skip signals were audible, though Southern Florida stations had been in earlier, and were heard well again later. (Two E_s clouds moving inland?) No skip was heard on 6 until about 1600, when 8P6EN broke through, working several 1s, 2s, and 3. This was the first time 8P6EN has worked the Northeast on 6 in 1973. Florida stations were in on 6 intermittently later in the day.

The writer began regular checking for VP9BA July 7, and the beacon has been heard practically every day since, through late July. It may appear as early as 1100 GMT, though usually about an hour later, soon after which it builds up to high levels most mornings. It holds strong for a few minutes to half an hour, and then subsides to just audible. About this time Florida comes alive on 10. VP9BA may go through several of these phases in the course of a day, and when it does, 10 is usually good for E_s work around the country most of the day. If the skip to the south shortens up, or is "all over the place" on 10, 6-meter men are likely to be starting a good day.

Being at home nearly every day has given this old E_s hound time to compare 6 and 10 to a degree far beyond previous experience. Between June 13 and July 23, the two bands were watched closely for E_s propagation on 32 days. On 30 of these there was E_s activity on 10, and on 22 days we heard 6-meter skip activity. There were no instances of 6 being open and 10 dead. The dates of no 6-meter activity when 10 was alive were nearly all toward the end of the observation period, well

*Send reports and correspondence to Bill Smith, W7JNK, ARRL, 225 Main St., Newington, CT 06111.



Some states have been harder than others to get on the air for Oscar 6. In the case of Nebraska, it took a visit by W9OII to the Omaha QTH of WØEMS to get the station set up for satellite work! Here, between passes W9OII and WØEMS review the situation in the tent which was set up in Frank's backyard especially for the Oscar equipment.

down the slope toward the end of the sporadic-*E* season for this summer.

Coast-to-coast multiple-hop propagation was observed three evenings on 10, usually as the band was nearing the end of its day, when nothing other than signal-hop signals were heard on 6. The higher band turned the tables on the lower the night of July 9. At around 2150 EST, W7FN, Mercer Island, Wash., was worked on 6-meter cw (10 watts at W1HDQ!) and was in for about a half hour. No signals west of Omaha and Kansas City were heard on 10 in this period, or later. – *W1HDQ*

OVS and Operating News

50 MHz is where the action has been through the summer. The usual argument about the overall conditions this summer compared to summers past continues, and while it appears there were not as many openings this summer as during the past two, the duration and multi-hop has certainly been interesting. Around the U.S., this is what has been reported. WA1DFL, Revere, Mass., says, "Had some fairly good openings, but no where as good as last year." Then Steven adds he worked two new states, Colorado and New Mexico, in June while listing June 2, 5, 7, 10, 11, 13, 18, 24, 25, 27, 29 and 30 as productive days, with aurora on June 10 and multi-hop *E* June 27 and 29, to the West Coast. WA1FSZ, N.H., also worked the June 10 aurora and several *E* sessions. WA1IFE, Waltham, Mass., worked single-hop *E* June 6 and 27, mostly 4s, 8s, 9s and ϕs.

WA5VJB, Grand Prairie, Texas, running 20 watts, a-m phone, says June 4 was an exceptional date, with multi-hop and very short skip workable for over six hours. WA5ZLJ, El Paso, has been using cw to good advantage and says it's too bad more six-meter operators don't use the mode. WA6JRA, near Los Angeles agrees. Sam has 50 MHz WAS on ssb and 49 states worked on cw only! WØOPN, after two years off the air, is on 6 from Portales, N.M. June 21 he worked KL7AIZ, without another signal heard on the band. WØOPN/5 is nearing 45 states worked with 20 watts of ssb. He finds New Mexico nearly as much in demand as his native Delaware, where he signed K3RBU for ten years.

W6DPD, Fresno, reports several June *E* openings noting June 6 and 11 as multi-hop days for the East Coast. W6YKS, Stockton, lists *E* propagation on thirteen June days, with eight of those days producing multi-hop to the East; June 5, 10 and 29 being the best three.

K7ZCB, Oregon, says June was very interesting; highlighted, no doubt, by his contact on the 25th with WA3QPX, Delaware, topping off a day-long *E* session which covered most of the U.S. New York state was workable for more than two solid hours with the opening ending to WA7EKB/KL7, location not given. On July 2, Dave briefly heard the KH6EQI beacon at 2200 GMT.

W8UCI had similar success. During the first week of June, Gerry worked all states except Delaware, Alaska and Hawaii. He says, "While the total number of openings was far fewer than in many previous years, the quality can only be stated as super good. June 7 was the best multi-hop opening I have ever heard between this area and the West Coast." The opening lasted at least ten hours! K8TUT, Athens, Ohio, caught eleven days of June *E* including multi-hop to the West Coast on the 5th, 6th, 7th and 23rd. At Patriot, Ohio, K8UNV agrees with Bill's observations, saying he now stands at 48 worked, needing KL7 and KH6. Phil says, "My observation of 6 meters this year is that the openings are long and signals strong. Last year was good and this year is just as good." WB8BOK, Ashland, Ohio, reports six meters has been "super terrific." Doyle backs that with 45 states worked, including such as Idaho, Nevada, Utah and Wyoming. June 6 and 9 were two of the better openings noted by WB8BOK.

In North Dakota, KØALL has made many happy with his activity. Between May 25 and June 23 he confirmed contacts with the contiguous 48 states, needing only (?) Alaska and Hawaii for a quick WAS. Ron is now turning his attention toward 144 MHz and is ready for schedules. Write to him at 1437 N. University Drive, Fargo ND 58102. WAØVJF, near Kansas City, reports logging the KH6EQI beacon at 1730 GMT June 5 for five minutes. At 2000 KP4DKE came through with the strongest signal Jon has heard from Puerto Rico. Contacts later the same day spread from Florida to California. The opening June 10 netted 84 contest contacts in three hours thanks to a combination of *E* and aurora. Jon has 48 states worked, also lacking the big two. He has also been doing a bit of TV DXing, enjoying the Spanish language version of "Love American Style" broadcast by XEFB, channel 3, in Monterrey on June 4. WBØFVL, Minnesota, has seven states worked on two-way fax, the latest being K7OFT, Washington, on June 6.

144 MHz *E* must have been worked sometime this summer, but no reports have been received to date. There has been too much fm broadcast DX and channel 7 and 9 *E* reported by fm and TV DXers to miss, but I'd guess that most of the

certain 2-meter *E* was worked by our repeater friends. However, here is a sampling of what was going on prior to the late July through mid-August meteor period.

WA1FFO, Conn., completed a 3CX1500A7 amplifier for continued assaults on the moon. K2DNR, N.Y., says he is active again on six and two and has completed a new 100-watt rig for 220. WA2UDT, N.J., has a new 3N140 converter and says tropo conditions throughout June were above normal. Bill's ham activities have been cut somewhat short because of college and pending marriage. Lance, WA3GPL/WA1JXN, was married July 21 and has taken employment in Cleveland with General Electric. From that location he will resume activity on 144 and 432.

K4MSG, who had been active from Avon, N.C., is now Chief Engineer for WSSV at Petersburg, Va., and has acquired equipment suitable for 3.3 GHz moonbounce. Paul wonders if someone would be interested in a joint project. After being off 144 MHz for nine years, W4LNG has returned active in Atlanta, Gerogia. Ruddy is seeking meteor and tropo schedules. Welcome back! Shelby, WB8DMD, better knwon as W4WNH, writes from Clio, Michigan he will entertain meteor schedules, while he continues Oscar work. K8HWW, near Detroit, stands at 32 states worked on 144, and 10 on 220 MHz, the latest addition being W1DC/1, N.H., worked during the contest aurora June 10. Clem offers weekend schedules on 220.

Also during the June contest, VE3FKX, Rexdale, Ontario, caught his 17th state on 144, K1ABR in Rhode Island. Rolf is also active on 432 with a 4CX250B final.

432 and Up finds some interesting work being done. K2YCO, Rochester, N.Y., has added two new states to his growing 1296 list. Chuck worked WA1MUG, Mt. Greylock, Mass., during the June contest, and WA9HUV, near Chicago, a 525-mile path, July 7. The initial report of the contact came from WA9HUV who says the 525-mile haul is his best 1296 DX to date. Norm says 1296 activity is needed in Ohio, after W8DGF became inactive. Tropo conditions were still good July 8 and Norm had two 432 contacts with K2UYH, while other Chicago-area stations seemed unaware the band was open. Norm has been doing more work on a 432/1296 feed for dish antennas and has passed along the information. We will make use of it next month. In the meantime, Norm has some observations I know will bring response to my mailbox. I will quote Norm.

"I'm sure you've had static from some of the uhfers, like myself, who in no way can put together EME gear because of limited real estate, local ordinances, ornery neighbors, power poles, wires, huge trees and the like, and who therefore feel that to include EME with tropo is unfair in regards to the states worked boxes. What do other readers say about this?" Norm, I've had little input along these lines over the past seven years; not enough to cause action. What *is* the readership feeling?

At about the same time WA9HUV and K2YCO were working on 1296, Bob, W5KHT, Oklahoma City, was watching long-haul uhf TV DX. On July 7, between 0730 and 0915 CDT, Bob logged Buffalo, N.Y., channel 29, at 1150 miles, and Detroit's channel 50, plus a number of others over shorter paths. That evening, between 2000 and 2130 CDT, Bob logged channel 29 in Traverse City, Michigan, over a 1000-mile path. Undoubtedly 432 and 1296 were open over the same paths, but no activity on these bands was noted although W5ORH, Oklahoma City, was on 432. Note for the past several years there has been long-haul tropo from the midwest to the east.

WØs LER and EYE each added one state to their 432 totals by exchanging 599 reports July 3 over a 703-mile Minneapolis-to-Boulder path. And in the Far West, WA6EXV had June 432 contacts with W6FZJ over that difficult path. WA6EXV has mostly debugged, as of late June, the prototype 2304 MHz beacon transmitter planned for a future Oscar and hopes to complete a flight model by October, instead of the original April, 1974 date.

Flash ...

California-Hawaii Bridged on 146 and 432 MHz

It was probably inevitable, ever since the first 144-MHz QSO between KH6UK and W6NLZ more than 16 years ago, that there would someday be a major opening on this path of more than 2500 miles. When it finally happened, at about 2100 GMT, July 28, it was fm repeaters that spread the word. From early reports it is believed that most of the contacts were made through the KH6EQN repeater, with West Coast stations using 146.16 MHz to get into it. The repeater output is 146.76 MHz. K6DYD, San Diego, one of the fortunate ones to make it, called the undersigned by telephone midway through the wild session. We understand, from K6JYO, who called the following day, that K6DYD eventually was able to establish two-way fm communication without using the repeater, though details are lacking as this is hurriedly written.

Eventually tests on cw and ssb between home stations were started, and several contacts were made with both modes. K6QEH, Fullerton, and WA6JRA, Orange, CA, are known to have worked KH6GRU, Ewa Beach, Oahu, the only station on that island reported to this writer thus far as having gotten across direct. At least one station, WB6RAL, is reported to have made a 146.94 simplex fm QSO. Stations as far north as Santa Maria (above Santa Barbara) are reported to have been in on the fun, but details will have to wait until more reports are in. The opening is said to have lasted about three hours.

Somewhat overshadowed by the events reported above, but still of major significance, is the first success on the schedules kept on 432 MHz by W6FZJ, San Jose, and KH6BZF, since early June. These tests, with liaison on 14 MHz, begin on 432 MHz at 0400 GMT daily. The 432 try continues to 0415, and then they change to 222 MHz. AT 0415, July 27, faint signals were heard each way on 432 MHz, though little copy was achieved. By means of the 20-meter link, prearranged tests were made that identified the signals as being genuine. The skeds will continue, and well-equipped 432- or 222-MHz stations are invited to take part.

Of more than ordinary interest is the fact that the site of W6FZJ, unlike the escarpment location of W6NLZ, is down behind a ridge more than 3000 feet high, with the Pacific on the far side. W6FZJ uses his 128-element collinear EME array on 432 MHz. KH6BZF has an array of four modified WØEYE Yagis.

Our thanks to K6DYD, K6JYO, W6FZJ and KH6BZF for phoning the undersigned to pass information along in time for this quick report, prepared after the normal *QST* deadline. A more complete story will, we hope, be available for October *QST*. — *W1HDQ*

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.

ASST. COMMS. MGRS.: *DXCC*, R. L. WHITE, W1CW; *Hq. Station*, C. R. BENDER, W1WPR; *Contests*, F. D. NISWANDER, WA1PID; *Public Service*, W. C. MANN, WA1FCM.

Contest Operating and QRM. After almost every contest we get a few letters from noncontesters complaining about the QRM generated by the contest and making proposals all the way from abolishing all contests, contesters and the organization(s) that sponsor(s) them to relegating contests into a relatively small portion of each band. The aftermath of Field Day (during which time we write) is particularly bad in this respect.

Readers of this column (if any) will be mostly pro contest, and so we want to mention that while such letters get considerate, if not sympathetic replies, the "right" of contesters to operate in their favorite activity is defended as just as sacred and inviolate as the right of rag-chewers, DXers or whomever to pursue their favorite amateur on-the-air activities. The fact is that the matter of "rights" does not enter into it. The problem is, rather, the *de facto* deprivation of noncontesters of the ability to conduct their usual operating in their usual spots on their usual bands.

Well, nobody has prior right to use of any frequency in any amaateur band. Even if you're on there first, this does not necessarily make you legally immune from QRM. Only if you deliberately (i.e., willfully or maliciously) cause interference can you be picked up by FCC; accidental or incidental QRM is not illegal.

And most QRM caused by contests is entirely accidental. There is no willful or malicious intent. But it is annoying, when you start getting ready for your Sunday morning schedule on 20 phone with your friend 2000 miles away, to discover that the frequency you customarily use is inundated by a squirming, snarling mass of howling signals trying to accomplish what, to you, makes no sense at all. So, comes the complaint. Most of those complaining are good ARRL members, just as you are, and if they prefer not to take part in the most popular and perhaps the most beneficial of all ARRL operating activities, that's their privilege.

Actual operating experience on FD, however, does not really justify their claims that there are no places left for casual ragchewing or DXing. The major contest activity takes place in the general class portion of the band, and on most bands even this is concentrated in a particular portion. All Extra Class segments are just about clear of contest and Advanced Class segments are mostly so. So upgrade, OM, and you won't be affected. Even if you must operate in the general class segments, you will usually find non-contest breathing room – at the upper end of 75, 40 and 20, and plenty of room on 15, 10 and the vhf bands.

But those who are in the contest should observe certain ethics, too. You shouldn't just crawl indiscriminately over each other and any casual stations. Admittedly, in a crowded contest it's difficult, sometimes impossible, to avoid doing so. But there are ways in which the "mess" aspect can

DXCC Notes

Reference is made to the DXCC Note which appeared in the March 1973 issue of *QST* (re the discontinuance of the phone DXCC).

Minute 21 of the ARRL Board of Directors meeting in July (see this issue) directs Headquarters to postpone the discontinuance of the Phone DXCC for one year for the purpose of further study and evaluation. To aid in this effort, you're again asked to communicate your views to your DX Advisory Committee (see addresses this issue).

New A-1 Operators

K1BJE K2UFM W3PYF WA5KQD
WB6VKV K9MTE

ARRL Gen. Mgr. W1RW (left) pins new Life Member W4WXZ, SCM of North Carolina. Looking on approvingly is Roanoke Div. Dir. W4KFC. *(Photo by former SCM W4PED.)*

W1AW SPRING-SUMMER SCHEDULE
(April 29—October 28)

(The specific frequencies shown below are approximate and 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 28, July 4, and September 3 and 6.

Times/Days *GMT*	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	← CW BULLETIN[1] →					
0020-0100[4]	.....	.....	3.7 Nov.[5]	14.080	14.080	7.15 Nov.[5]	14.080
0100	OSCAR[10]	← *PHONE BULLETIN*[2] →					
0105-0130[4]	.....	.....	3.990	50.190	145.588	1.820	21.390
0130	← CODE PRACTICE[1] (35-15 wpm TThSat, 5-25 wpm MWFSn) DETAILS BELOW →						
0230-0300[4]	.....	.....	3.580	.....	1.805	.....	3.580
0300	RTTY BULL.[3]	.....	← RTTY BULLETIN[3] →				
0330	PHONE BULL.[3]	.....	← PHONE BULLETIN[2] →				
0335-0400[4]	.....	.....	7.290	3.990	7.290	3.990	7.290
0400	CW BULL.[1]	.....	← CW BULLETIN[1] →				
0420-0500[4]	.....	.....	3.7 Nov.[5]	7.080	3.990	7.15 Nov.[5]	3.580
1240	.....	← OSCAR[9] →					.....
1300	.....	CODE PRACTICE[1] (5-25 wpm MWF, 35-15 wpm TTh) DETAILS BELOW					.....
1700-1800	.....	21/28cw[7]	21/28ssb[6]	21/28cw[7]	21/28ssb[6]	21/28cw[7]	.....
1800	.....	← OSCAR[9] →					.....
1900-2000	.....	7.080	7.290	14.095 RTTY	7.290	7.080	.....
2000-2030	OSCAR[11]	21/28ssb[6]	21/28cw[7]	21/28ssb[6]	21/28cw[7]	21/28ssb[6]	.....
2030	.....	.....	CW BULL.[1]	.....	CW BULL.[1]	.....	.....
2100-2130	.....	7.15 Nov.[5]	21.1 Nov.[5]	7.15 Nov.[5]	21.1 Nov.[5]	7.15 Nov.[5]	.....
2130	.....	.....	RTTY BULL.[3]	.....	RTTY BULL.[3]	.....	.....
2200	.....	CPN[6]	7.095[4] RTTY	3.625 RTTY	14.095[4] RTTY	CPN[6]	.....
2300	.....	.....	CN[6]	RTTY BULL.[3]	CN[6]	.....	.....
2330	← CODE PRACTICE (10-13-15 wpm) DETAILS BELOW →						

[1] CW Bulletins (18 wpm) and code practice on 1.805, 3.580, 7.080, 14.080, 21.080, 28.080, 50.080 and 145.588 MHz.
[2] Phone Bulletins on 1.820, 3.990, 7.290, 14.290, 21.390, 28.590, 50.190 and 145.588 MHz.
[3] RTTY Bulletins, on 3.625, 7.095, 14.095, 21.095, and 28.095 MHz. Bulletins repeated when time permits.
[4] Starting time approximate, following conclusion of bulletin or code practice.
[5] W1AW will tune the indicated bands for Novice calls, returning the call on the frequency on which called.
[6] Participation in section traffic nets.
[7] Operation will be on one of the following frequencies: 21.02, 21.08, 21.1, 28.02, 28.08, 28.1 MHz.
[8] Operation will be on one of the following frequencies: 21.260, 21.390, 28.590 MHz.
[9] When an OSCAR satellite is in orbit, daily updated orbital data is sent at 18 WPM on cw frequencies.
[10] OSCAR orbital data for the coming week, on RTTY frequencies.
[11] OSCAR orbital data for the coming week, on cw frequencies.

W1AW CODE PRACTICE

W1AW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.58 7.08 14.08 21.08 28.08 50.08 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 SnTThS 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 improve your fist by sending in step with W1AW (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:

Sep. 10:	It Seems to Us
Sep. 13:	Correspondence
Sep. 19:	League Lines
Oct. 2:	ARPS
Oct. 5:	World Above
Oct. 8:	YL News

---

be *kept to a minimum. Most contest participants* do not have the "gotta win" compulsion and are willing to take the time to be courteous. But how to do it, when contestants are piled four deep to the kilohertz?

Well, try observing the following voluntary rules:

1) Insofar as possible, observe the general rule of "listen first." If the frequency is occupied, at least move slightly to one side before transmitting.

2) *Unless you're running high power, call often,* CQ seldom. Low-power (i.e., weak) CQs waste time and clutter the band. If your CQ is answered only once in every three tries, you are wasting time and causing QRM. The best method for the average contester is to "rove." Start at, say, the low end of the contest-occupied segment. Call any eligibles (i.e., in contest and not already worked) heard CQing, trade exchanges if they answer, then keep tuning. Keep tuning anyway! If you come upon a

This handsome aggregation smapped by W4PED at the Roanoke Div. May LO meeting included from left to right: WA4PBG VA SEC, WA8NDY WVA SEC, WA4ECJ SC SEC, W4KFC Dir., W4ACY Vice Dir., WB4CBJ SC SCM, W8JM WVA SCM, W4WXZ NC SCM, K4GR VA SCM.

(relatively) clear spot, camp on it and call a CQ contest. If you get an answer, stay there and "milk" the spot; as you finish each contact, indicate you are standing by for another (by using proper ending signal). When the channel is "dry," start roving again, calling anyone CQing, taking advantage of any clear spots to call your CQ. If you're putting out a strong signal, you'll probably run "strings" of contacts on your CQ channel, but don't neglect calling other stations. Conversely, if your signal is mediocre or less, you'll do more calling, but don't neglect CQing when or if you find that clear channel.

3) If you zero on a CQer and call CQ yourself when you discover you've already worked him, you're a lid, OM. Worse than that, you're a louse!

4) Indicate frequently that you're in the contest, and don't call other stations unless they do so. Nothing irks a noncontester more than to have a contester call him at breakneck speed and demand an exchange. Don't call "CQ CQ CQ CQ CQ CQ CQ Contest," call "CQ Contest CQ Contest CQ Contest, etc." (Use the contest name (or cw abbreviation), of course, not the word "Contest").

5) Use the ARRL ending signals *properly*. (Few contesters do!) When you call someone, stand by with "Over" or $\overline{AR}$, not "Go" or K. This tells the tuner-acrosser that you have not just called CQ or ended a contact and are ready for another one; thus, he won't call you and cause you QRM (you hope). If you get such a call that blots out your contact, someone has goofed; you because you didn't use the proper signal, or he because he didn't understand it. At the end of a CQ, it's "Go" or K. If you've given your exchange and want his, it's "Go only" or $\overline{KN}$. If you're completing an exchange and are ready for other calls, it's "clear and go" or $\overline{SK}$ K. A few variations are acceptable. What is not acceptable is giving the wrong impression to the tuner-acrosser, causing him to transmit and cause needless QRM.

6) The real hot-shot contester may sound as though he's falling all over himself, but he's actually doing what long experience has indicated will win – working fast and efficiently and pushing his contacts along. But you others – those who are not hot-shots and those who only *think* they are – take it easy. A deliberate, moderate pace is best, until you have those years of experience, or unless you have the kind of nimble brain to handle a rapid pace (this eliminates the writer!). Going faster than you are capable of going causes errors, dupes, omissions, perhaps resulting in *disqualification*. The criteria for the latter don't leave much leeway.

7) Although you may be out to win, this is no excuse for running roughshod over fellow contesters or casuals trying to conduct regular QSOs. The time to be courteous is always. If you lose your manners to win, you are not winning. You only think you are. – *WINJM*.

FMT Update

In 81 previous tries we didn't goof once on W6RQ. However, Murphy was on *our* side in the May FMT (results p. 117 July) and we did Al in. Instead of .8 ppm he should appear in his usual place, on the Honor Roll.

Note too that WB5IOG's results are a neat 8 ppm, not as the incorrect report indicated (68.2).

Rules for the September 9 FMT appear in Operating Events, August issue.

5-BAND AWARDS

(Updating the August 1973 listing.)

5BDXCC: (Starting with number 265), YU1BCD W9SFR W8VHY WA2BLV K1NOL SMØCCE.

5BWAS: (Starting with number 152), KH6GKD W1NU KØDEQ WA4ULL W2GUH.

DX CENTURY CLUB AWARDS

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through June 30, 1973.

Honor Roll

DL3RK	320/343	W6CYV	319/343	G3AAE	317/342	WA2RLQ	316/323	K2DCA	314/337	DL7BA	312/335
G5VT	320/346	W6KZL	319/341	G6TA	317/338	W3DJZ	316/329	K2PXX	314/325	G2FYT	312/330
G8KS	320/344	W6NJU	319/339	HB9TL	317/339	W4MCM	316/333	K4YYL	314/321	JA1MIN	312/316
GW3AHN	320/345	W6PT	319/342	K11XG	317/330	W4ML	316/342	K5AAD	314/323	JA4BJO	312/319
HB9J	320/350	W6ZO	319/346	K2TQC	317/330	W4SSU	316/330	K6EV	314/322	JA8ADQ	312/318
HB9MO	320/344	W7AOB	319/337	K4EZ	317/330	W5GJ	316/329	K6KII	314/332	K1YZW	312/317
K2BK	320/340	W7KH	319/348	K4KQ	317/343	W5GO	316/335	K6NA	314/341	K2OEA	312/334
K2BZT	320/343	W7MB	319/349	K6DC	317/339	W5HE	316/323	KP4RK	314/330	K4HJE	312/314
LU6DJX	320/350	W8EWS	319/349	K6RQ	317/333	W5PM	316/335	OH2BH	314/322	K4ID	312/321
OE1ER	320/348	W8JBI	319/344	K9KYF	317/331	W5PWW	316/333	OH2QV	314/325	K4IKR	312/318
VE2NV	320/344	W8LKH	319/344	K9LUI	317/330	W5QKZ	316/330	ON4DM	314/339	K4MZU	312/319
W1BIH	320/349	W8NGO	319/342	LA7Y	317/345	W6ABA	316/325	PY2BKO	314/321	K6AHV	312/322
W1HX	320/346	W9DWQ	319/338	LU4DMG	317/339	W6EL	316/325	VE2WA	314/331	K7ADL	312/323
W2AGW	320/350	W9LNM	319/348	OH2NB	317/344	W6HOC	316/335	VE5RU	314/332	KØEZH	312/320
W2BXA	320/350	W9NDA	319/349	W1CBZ	317/338	W6ID	316/341	W2AYJ	314/339	KØUKN	312/319
W2CTO	320/346	WØDU	319/347	W1FZ	317/342	W6KG	316/334	W2NO	314/324	OH5UQ	312/320
W2DXX	320/332	WØKF	319/342	W1GYE	317/338	W6LN	316/342	W2PV	314/322	OK3MM	312/333
W2HTI	320/342	DJ2BW	318/341	W1HH	317/334	W6REH	316/328	WA2DIG	314/329	ON4QI	312/323
W2NUT	320/342	DL1JW	318/336	W1JNV	317/340	W6SQP	316/337	WA2HOK	314/322	SM6CKS	312/315
W2OKM	320/344	DL6EN	318/339	W2BMK	317/335	W6TA	316/335	W4CKB	314/329	VE1VR	312/318
W2RGV	320/342	DL7AA	318/346	W2DOD	317/341	WA6GLD	316/323	W4EEE	314/337	W2IOT	312/318
W2SSC	320/342	G2BOZ	318/342	W2FZY	317/336	W7ADS	316/340	W4MR	314/339	W2PN	312/320
W2TP	320/335	GI3IVJ	318/339	W2GKZ	317/325	W7JG	316/330	W5EGK	314/338	W2UVE	312/336
W3KT	320/349	IT1TAI	318/340	W2LV	317/342	W7OF	316/339	W5GR	314/340	WB2CKS	312/319
W3LMO	320/339	JA1BK	318/332	W2PDB	317/334	W8CUT	316/329	W5HJA	314/330	WB2FMK	312/320
W3MP	320/348	K3BW	318/338	W2SAW	317/340	W8DMD	316/343	W5KBU	314/337	W3BWZ	312/314
W4AIT	320/349	K6AN	318/345	W2WMG	317/334	W8KBT	316/335	W5MMD	314/339	W3ECR	312/334
W4EX	320/350	K6EC	318/338	W2ZX	317/341	W8MB	316/333	W5TIZ	314/333	W4BFR	312/327
W4GXB	320/347	K6LGF	318/336	W3GAU	317/346	W8ONA	316/338	W5UKK	314/334	W4HOS	312/320
W4VPD	320/343	K7GCM	318/332	W4JDR	317/338	W9FKC	316/342	W5WZQ	314/334	W5FT	312/336
W6AM	320/351	K8IKB	318/335	W4LYV	317/343	W9JUV	316/341	W6DZ	314/332	W5OGS	312/334
W7PHO	320/344	K8LSG	318/334	W5GC	317/332	W9QQN	316/323	W6EUF	314/320	W6DOD	312/317
W8BF	320/347	K8RTW	318/335	W5KTW	317/326	WØBFB	316/340	W6KZS	314/322	W6FRS	312/324
W8RT	320/342	ON4NC	318/345	W5OLG	317/344	WØGKL	316/335	W6WX	314/327	W6FOZ	312/336
W8DAW	320/350	W1BAN	318/337	W6FZJ	317/328	ZL3IS	316/335	W7BA	314/330	W6KNH	312/315
W8GZ	320/349	W1MV	318/341	W6GPB	317/344	DJØKQ	315/322	W8KIA	314/344	W6OMF	312/331
W8MPW	320/344	W2CR	318/341	W6ISQ	317/330	G3HCT	315/332	W8LY	314/334	W6YMV	312/324
W8PHZ	320/341	W2FXA	318/337	W6RKP	317/337	GI3JJM	315/333	YV5BNW	314/317	W8BVF	312/320
W9BG	320/351	W2GLF	318/336	W6ZM	317/333	HKMG	315/321	YV5BOA	314/321	W9AMU	312/333
WØBW	320/347	W2MJ	318/336	WB6OOP	317/328	IT1ZGY	315/334	F3AT	313/331	W9HJ	312/328
WØELA	320/349	W2YY	318/332	W7CMO	317/333	K2YLM	315/321	F9RM	313/329	W9MQK	312/330
4X4DK	320/344	WA2RAU	318/325	W8CT	317/327	K2YXY	315/328	G6XL	313/334	W9YFV	312/342
DL1KB	319/344	W3AFM	318/334	W8EVZ	317/326	K4PDV	315/334	JA1ADN	313/326	WØBMQ	312/331
DL9OH	319/336	W3EVW	318/345	W8JIN	317/348	K4TJL	315/330	JA1AG	313/332	YV5AIP	312/327
G3FKM	319/342	W3GRS	318/336	W8KIT	317/329	K6QH	315/321	JA3UI	313/328	DD1CG	311/313
G3FXB	319/342	W3LMA	318/346	W8UAS	317/343	K6WR	315/327	K4TWF	313/325	DL3OH	311/314
G4MJ	319/342	W3NKM	318/341	W9GIL	317/340	K8OHG	315/326	K6GA	313/329	G3HDA	311/329
I1ZL	319/336	W3RNQ	318/342	W9RCJ	317/335	K9BGM	315/321	K8DYZ	313/320	G3JEC	311/316
IØAMU	319/343	W4BJ	318/336	W9RKP	317/340	PY2CQ	315/322	K9WTS	313/321	JA4ZA	311/319
K2FL	319/341	W4DQS	318/331	W9SFR	317/338	PY2SO	315/322	PY1HX	313/336	K4UZY	311/316
K2LWR	319/338	W4NJF	318/327	WØCJZ	317/327	W2BHM	315/335	PY4AP	313/318	K4ICK	311/329
K4LNM	319/339	W5PQA	318/342	WØLWG	317/333	W2CYS	315/343	W1BPW	313/328	K5QHS	311/314
PAØFX	319/345	W5QK	318/335	ZS6LW	317/336	W2RDD	315/335	W2BQM	313/332	K6KA	311/314
W1AX	319/348	W6ANN	318/343	4X4JU	317/338	W2WZ	315/344	W2JT	313/338	K6VVA	311/326
W1AZY	319/339	W6BZE	318/344	CR6BX	316/338	WB2HXD	315/322	W2MS	313/337	K8EHD	311/318
W1CKA	319/335	W6CHV	318/342	DJ5DA	316/323	W4IC	315/326	W2OK	313/322	OH2LA	311/329
W1CLX	319/348	W6EPZ	318/345	DJ7ZG	316/323	W4IF	315/333	W4BOY	313/334	PAØLOU	311/331
W1DK	319/342	W6HX	318/347	DL7FN	316/337	W5FFW	315/338	W4TM	313/341	SM7ANB	311/326
W1GKK	319/350	W6KTE	318/325	K1SHN	316/326	W5IO	315/341	W4ZXI	313/317	UA1CK	311/322
W1HZ	319/343	W6OSU	318/336	K2UYU	316/334	WA5EFL	315/322	WA4WIP	313/319	VE3CFG	311/331
W1NU	319/340	W6TZD	318/344	K4JC	316/326	W6RGG	315/322	W5HJT	313/326	VE3MJ	311/317
W2AO	319/342	W6WWQ	318/341	K4MQG	316/324	W6UOV	315/335	W5HDS	313/335	VK3KB	311/340
W2BOK	319/342	W8OK	318/335	K6CH	316/341	W7AC	315/345	W6AFI	313/327	W1RLQ	311/325
W2CP	319/331	W8QJR	318/341	K6OJ	316/343	W7QPK	315/326	W6CAE	313/339	W2EXH	311/323
W2JVU	319/346	W8WZ	318/346	K6OW	316/329	W8ARH	315/324	W6CUF	313/321	W2HH	311/316
W2QHH	319/346	W8ZCQ	318/338	K6YRA	316/323	W8EV	315/339	W6DZZ	313/341	W2LAX	311/334
W2QM	319/340	W9GFF	318/336	K8ONV	316/331	W8KPL	315/338	W6HVN	313/321	W2ZGB	311/332
W3CGS	319/344	W9HB	318/338	K9ECE	316/331	W9WYB	315/335	W6KUT	313/339	WA2ELS	311/321
W3WGH	319/340	W9HUZ	318/343	LU5AQ	316/337	WØBN	315/327	WA6EPQ	313/324	W3HTF	311/323
W4BYU	319/343	W9ILW	318/330	OK1ADM	316/327	WØNVZ	315/323	WA6MWG	313/320	W4AVY	311/329
W4LRN	319/337	WØAIH	318/339	PY2CK	316/345	XE1AE	315/330	W7QK	313/333	W4VMS	311/319
W4OM	319/347	WØMLY	318/340	PY2PA	316/323	YV5AB	315/339	W9QLD	313/322	W5NUT	311/330
W4OPM	319/340	WØNK	318/346	SM3BIZ	316/339	YV5ANF	315/319	W9TKD	313/329	W6BSY	311/333
W4PLL	319/340	WØPGI	318/340	VK4QM	316/345	DL3BK	314/333	W9TKV	313/335	W6JKJ	311/322
W4QCW	319/341	WØQGI	318/340	W1DGJ	316/326	DL7HU	314/329	WØAUB	313/327	W6UOQ	311/330
W5ABY	319/342	WØSYK	318/342	W1GL	316/325	G3DO	314/342	WØBK	313/328	W7ENW	311/341
W5AO	319/343	ZL1HY	318/348	W2GQN	316/323	HB9KB	314/334	YS1O	313/335	WØNLY	311/332
W5KC	319/348	CE3AG	317/346	W2GT	316/341	I8KDB	314/334	YU2DX	313/316	YV5AHR	311/320
W5MMK	319/346	DL1HH	317/332	W2HO	316/338	JA1DM	314/335	YV5BPJ	313/321	ZS6YO	311/326
W5UX	319/340	DL1IN	317/339	W2PCJ	316/339	JA2JW	314/331	DJØPN	312/319	5Z4KL	311/313
W6CUQ	319/349	G2BVN	317/341	W2ZTV	316/323			DL1BO	312/335		

Radiotelephone

W2BXA	320/348	W8MPW	318/333	HB9J	316/342	YV5AB	315/339	LU9DAH	313/331	W5HF	312/316
W2HTI	320/341	W8QJR	318/341	HB9TL	316/337	YV5ANF	315/319	ØE1ME	313/332	W5PQA	312/332
W2RGV	320/340	W9ILW	318/330	K6LGF	316/331	ZL1HY	315/344	OK1ADM	313/320	W6CHV	312/331
W4EX	320/348	W9NDA	318/344	ON4DM	316/341	I8KDR	314/334	SM3BIZ	313/335	W6YMV	312/323
W6AM	320/349	DL6EN	317/335	PY2PA	316/323	K2BZT	314/330	VE5RU	313/330	W7CMO	312/321
W8BF	320/347	G3FKM	317/338	W2ZTV	316/322	K4JC	314/320	W1CLX	313/333	W8UAS	312/335
W8BT	320/342	G6TA	317/337	W3DJZ	316/326	K6WR	314/326	W2PV	313/321	W9JT	312/318
W8GZ	320/349	K1IXG	317/330	W4NJF	316/324	K6YRA	314/321	W2WMG	313/323	YV5AIP	312/327
4X4DK	320/344	K2FL	317/330	W4PDL	316/332	KP4CL	314/323	W3AZD	313/322	YV5BPJ	312/320
5Z4ERR	320/347	K9KYF	317/332	W6REH	316/324	PY2PC	314/319	W3RIS	313/344	DL7HU	311/325
DL9OH	319/336	K9LUI	317/330	W6RKP	316/331	SM5BCO	314/330	WA4WIP	313/319	EA7ID	311/329
G5VT	319/345	LU4DMG	317/339	W9DWQ	316/325	W2FGD	314/321	W5SZ	313/318	G3JEC	311/316
G8KS	319/339	PAØHBO	317/339	WØGAA	316/325	W4EEE	314/337	W7SGN	313/325	I6FLD	311/325
IØAMU	319/343	PY2CK	317/345	DJ7ZG	315/322	W5IO	314/339	W8EVZ	313/321	IT9GAI	311/314
W1JFG	319/340	W1BAN	317/335	DL1IN	315/336	WA5EFL	314/321	W9SFR	313/326	OZ3SK	311/322
W2TP	319/331	W1ONK	317/339	K2YLM	315/321	W6BAF	314/330	YV5BBU	313/319	OZ7FG	311/331
W4QCW	319/337	W2OKM	317/339	K4TJL	315/330	W6EUF	314/319	CR6BX	312/330	PY4TK	311/333
W6GVM	319/346	W2ZX	317/341	K9ECE	315/329	W6KTE	314/321	DJ2RW	312/328	W2EXH	311/321
W7PHO	319/343	W4OM	317/339	ON4DH	315/337	W9RNX	314/337	I8AA	312/317	W2JT	311/331
WØBW	319/340	W5GC	317/332	SM5CZY	315/324	WØGKL	314/332	K2IRK	312/320	W2ODO	311/323
DJ2YI	318/339	W5JWM	317/334	VE3QA	315/336	YV5BNW	314/317	K4HJE	312/314	WA2HOK	311/319
GI3IVJ	318/337	W5LZW	317/330	VK5MS	315/340	F9RM	313/329	PY2CYK	312/316	W5KBU	311/333
K8RTW	318/333	W6NJU	317/331	W1DGJ	315/325	G3DO	313/340	VE3MR	312/322	W6TA	311/323
TI2HP	318/346	W6ZM	317/328	W3KT	315/339	I1KMG	313/319	W2GKZ	312/319	W7ADS	311/332
W2GLF	318/337	W9LNM	317/334	W4SKO	315/335	IØZV	313/327	W2GQN	312/319	W8JIN	311/332
W2YY	318/327	W9NZM	317/327	W6EL	315/323	IT9JT	313/316	W2LV	312/330	W9HB	311/329
WA2RAU	318/325	WØCM	317/340	W7QPK	315/325	JA1BK	313/325	W2QK	312/320	WØMX	311/325
W3NKM	318/340	ZP5CF	317/338	WA8AJI	315/322	K4HEF	313/328	WA2EOQ	312/319	YV5AHR	311/320
W3WGH	318/333	ZS6LW	317/335	W9WHM	315/338	K4YYL	313/318	W3GRS	312/322	ZS6YQ	311/324
		4X4JU	317/334	XE1AE	315/330	K5JEA	313/330	W4UWC	312/321		

New Members

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings – *June 1-30, 1973*

JA1BRK	314	JW7FD	146	DK3NU	120	DJ8CR	107	JA2JSF	104	K4HQU	101	VP2LAW	100
PY2WH	306	WB2PFV	139	DJ6JB	117	SM7BYU	107	K4GTQ	104	K8BHG	101	WA1JLV	100
K5CIT/KH6	229	JA2JAB	136	JA6SVP	114	WA2YHK	106	WØJKF	104	WB2EXK	101	WB4RJG	100
DJØYD	225	GM3UU	133	VK2BAN	112	K9WKW	105	DL1PB	103	WB4ORS	101	WB4VUP	100
JA3EMU	215	DL8UO	126	DK3UG	111	SM6CSB	105	DM4ZWL	103	WB6NSJ	101	WA5ACA	100
WB6EHT	158	PY3CEN	126	VE1AAW	110	ZS5OV	105	W9TCU	102	WB9FKL	101	WB8IJI	100
				DM2ARA	108	JA1HLP	104	WAØWOA	102				

PY2WH	306	JA1FDU	232	JA2JAB	136	DK3NU	117	JA6SVP	110	OK2BLI	104	WB4ORS	101
W9OHH	284	K5CIT/KH6	227	I3GLT	135	DK6KA	117	I3VER	109	JH1OTN	103	WA1HBM	100
K6MOO	258	DJØYD	195	YA1AH	132	VE4GL	116	W7HNL	108	JA2JSF	103	WA1JLV	100
JA1BRK	249	WB6EHT	156	EL8DI	126	DK3GY	115	K6MQT	107	CT2AZ	102	WB4JMG	100
W4CRW	242	KØALL	148	YV5IZ	126	HI8LC	110	DA2QW	105	DA1JP	102	WA6GFH	100
DL9VS	239	K9MMH	143	DL8UO	122	I2PTQ	110	VE3BNV	105	F6BTQ	101	9Y4RB	100

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.

F9GL	320	WA4FDR	305	JA2AH	270	WA2CCF	240	WB9CBY	200	WA1HAA	160	OK2BLI	140
JA1BN	320	W6GMF	305	K4CKA	270	W3YX	240	EL2BZ	180	F3VN/W2	160	WA3DMH	140
W6OF	320	W6AI	300	KP4DLW	270	WA3GJZ	240	F5TI	180	WB2JBI	160	WA3QFG	140
W5LZZ	315	W8SRK	300	LA6GF	270	HB9AOU	220	K3AMI	180	WB2OKQ	160	W4TZX	140
WB2VAE	310	F8CW	290	WA2BLV	270	KH6HIF	220	KØALL	180	W5VZU	160	WA5DOS	140
WB2YQH	310	JA3AAW	290	WA9VGY	270	OZ1AJ	220	KØKLH	180	WB5BLF	160	WB6ZPO	140
W8DX	310	W4UF	290	DL1KS	260	W3ZBW/4	220	WØYVA/4	180	W8GIO	160	G3PYM	120
W8ROC	310	W5LUJ	290	KP4DJE	260	WØJS	220	WB4FOD	180	WA9RJI	160	JA1VE	120
JA3GZN	305	CT2AK	280	SM7ASN	260	DJ4FT	200	WA7JCB	180	5W1AU	160	K1LWJ	120
K1DRN	305	W4CRW	280	K9LIH	250	JA1NPV	200	WAØOTF	180	DL7JY	140	K4PR	120
K6ZIF	305	W4WSF	280	SP3DOI	250	W4HU	200	HB9ACM	160	I1SBU	140	VE3BIZ	120
VE3DBT	305	W5ZWX	280	W2DT	250	WA5WQF	200	K9MMH	160	JA3AUQ	140	VE3DFL	120
VE3DLC	305	JA1FDU	270	EA2CR	240	WA8ASV	200	OH2BMG	160	K1CSB	140	WA1NHZ	120
VE3GMT	305	JA2ACC	270	W1AB	240	WA9YEY	200	OK3BH	160	K9UQN	140	W6RQZ	120
W2CNQ	305											WA7KEF	120

GI3JIM	325	K1DRN	305	JA1BN	280	K7PXI	260	DJ4FT	200	PY4AKL	180	W6PSQ	160
W1HX	325	W1SEB	305	PY1BJ	280	W4WSF	260	DJØUJ	200	WA2EJS	180	WA6LEN	160
ZS5JM	325	W2CNQ	305	W2IOO	280	DK3LP	250	DL2IX	200	WB4FOD	180	WA7JCB	160
F9GL	315	W6QOG	305	CR4BS	270	KP4DJE	250	EA3SA	200	W5KXQ	180	W8PNC	160
W2YYL	315	W8ROC	305	JA2AH	270	LA6GF	250	K9BTU	200	WA8GPX	180	5W1AU	160
W5LZ	315	DJ1CG	300	W1JNV	270	K3RPY	240	W3AXW	200	WA9YEW	180	9Y4MM	160
W6MBD	315	JA3GZN	300	W2GT	270	K9LIH	240	W3YX	200	CE8AO	160	JA1NPV	140
W6RGG	315	WA2HSU	300	W2SNI	270	W2EV	240	WA5WQF	200	CP1DN	160	W4TZX	140
WØPGI	315	W4EEO	300	W4UF	270	W2UBJ	240	W7BRU	200	ON5JE	160	WA5DOS	140
I8YRK	310	WA5IEV	300	WA4FDR	270	WA2CCF	240	WA8ASV	200	OZ3TH	160	WB5BLF	140
K3UZY	310	DJØPN	290	W6TTS	270	CN8CG	220	DJ2QZ	180	W3MDO	160	W6MFC	140
K5QHS	310	K6TXR	290	JA2ACC	260	I3DAB	220	G3YBH	180	W4GKF	160	K6SI	120
PY2DYI	310	PY1WJ	290	K1INO	260	OZ1AJ	220	JA7ZF	180	W5KXQ	160	VE3EFX	120
W6PTS	310	W2JLH	290	K4CKA	260	WB4PXW	220	K2GBC	180	W6CFG	160	W7GYP	120
JA2JW	305												

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 5 by 8 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,WN1 – Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

W2,K2,WA2,WB2,WN2[1] – North Jersey DX Assn. P.O. Box 505, Ridgewood, NJ 07451.

W3,K3,WA3,WN3[1] – Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.

W4,K4 – North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.

WA4,WB4,WN4 – J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.

W5,K5,WA5,WB5,WN5[1] – ARRL W5 QSL Bureau, Box 1690, Sherman TX 75090.

W6,K6,WA6,WB6,WN6 – 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,WN8 – 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.

W0 – Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, IA 50169.

K0,WA0,WB0,WN0 – Dr. Phillip D. Rowley, K0ZFL, Route 1, Box 455, Alamosa, CO 81101.

KP4,WP4[1] – Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.

KV4 – Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, VI 00820.

KZ5 – Lee DuPre, KZ5OD, Box 407, Balboa, CZ. Box 407, Balboa, CZ.

KH6,WH6[1] – John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.

KL7,WL7 – Alaska QSL Bureau, Star Route Box 65, Wasilla, AK 99687.

VE1 – L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS.

VE2 – A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal 301, PQ.

VE3 – R. H. Buckley, VE3UW, 20 Almont Road, Downsview, ON.

VE4 – D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg R3N 0E8, MB.

VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK. S4S 5E5.

VE6 – D. C. Davidson, VE6TK, 1108 Trafford Dr. NW, Calgary 47, AB.

VE7 – H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC.

VE8 – Yellowknife Centennial Radio Club, P.O. Box 1944, Yellowknife, NWT, Canada.

VO1 – Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.

VO2[1] – 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 4 1/4 by 9 1/2 inch or No. 10 business envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the "IARU NEWS" section of the June and December issues of *QST*.

Marconi Commemoration

Marconi made the first trans-Atlantic transmission of a radio message 70 years ago from his station "CC" on Cape Cod. Last January, this fete was commemorated by a special-event amateur radio station, WC1MAR, operating from the original site. Four transmitters using this call were on the air beginning on January 13, concluding with the transmission at 0256 hours GMT, Friday, January 19, the exact 70th anniversary, of the original message sent by Marconi. In addition to QSL cards, WC1MAR is sending special certificates to those who copied this message and submitted their copy to WC1MAR via W1HWM.

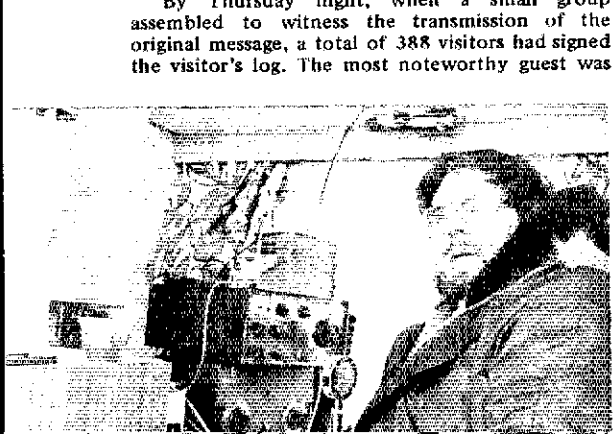
Fortunately for the WC1MAR group, snow, low temperatures, and gales such as Marconi had experienced, never materialized. The weather had become unseasonably warm and mild. The news coverage by radio, TV, and newspapers was superb and brought out a surprisingly great number of visitors. Someone always took time to explain the operation to each group – an objective was to honor Marconi's achievement and to expose amateur radio to public view.

By Thursday night, when a small group assembled to witness the transmission of the original message, a total of 388 visitors had signed the visitor's log. The most noteworthy guest was James Wilson, an operator of the old Marconi station in 1912, and possibly the only one left!

Since the Marconi site is several miles away from commercial power, just as it was in 1903, it was necessary that generator power be used. It was found that the two generators produced not only 60 Hz power but also an ignition noise level of about S4 in the receivers. Hence, ability to detect weak signals was rather poor. The generators also proved to be a constant source of trouble. There was hardly a piece of equipment that escaped damage from voltage surges as high as 165 volts!

Despite the frantic efforts to get on the air, the troublesome generators, lack of sleep and infrequent meals, all concerned feel that the project was worthwhile. The Middlesex Amateur Radio Club and Murphy's Marauders provided the core of the operation, but it would not have been successful without the generosity of the good people of Cape Cod who provided a trailer and much of the operating gear as well as many delicious meals.

Not much is left of the old Marconi station. The station was dismantled in 1921, and since then the wind and sea have eroded the sand cliff so badly that over half of the station's foundations have fallen into the ocean. All that remains today is the concrete foundation of the transmitter room and the base of one of the four towers. Attempts have been made by the Cape Cod National Seashore to stop the erosion. We hope they are successful because at the recent rate of erosion not many more years will pass before the last vestiges of the first international radio station in the U.S. will disappear into the sea. – *W1HWM*



W8JWO is shown at one of the WC1MAR operating positions at the original Marconi site on Cape Cod.

Operating Events ..... *de WIYL*

SEPTEMBER

6 ***W6OWP Qualifying Run*** (W6ZRJ, alternate) 10-35 wpm at 0400 GMT on 3590/7090 kHz. This is 2100 PDST the night of September 5. Please note that dates are always shown at least two months in advance and times are always the same local "clock time," i.e. 9 PM local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid and send to ARRL for grading.

8-9 ***VHF QSO Party***, p. 63 August.

8-16 ***Washington State Amateur Radio Week.*** Out of state hams must contact 10 Washington hams, and in-state hams must contact 30 other Washington hams during this period. Send list of stations contacted, their locations, dates of contact, your name, call, address and an s.a.s.e. legal size envelope to: Puget Sound Council of ARCs, 12308 80th Avenue East, Puyallup, WA 98371.

8-21 ***Malta Special Activity Period***, p. 117 August.

9 ***Frequency Measuring Test***, p. 117 August.

12 ***WIAW Qualifying Run*** (10-35 wpm at 0130 GMT) on 1,805 3,580 7,080 14,080 21,080 28,080 50,080 and 145,588 MHz. This is 2130 EDST (9:30 PM EDST) the night of September 11. 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 complete mailing address.

15-16 ***VHF Space Net Contest, Scandinavian Activity Contest (SAC)*** cw, p. 117 August.

15-17 ***Washington State QSO Party***, p. 117 August. ***Pennsylvania QSO Party*** (16th annual) sponsored by the Nittany Amateur Radio Club, from 2300Z Sept. 15 through 0200Z Sept. 17. PA stations send QSO no., RS(T) and county; all others use ARRL section for location. Logs must show date/time in GMT, QSO no., station, RS(T), counties (for non-PA), ARRL sections (for PA), band/mode. PA stations score 3 points per out-of-state QSO and 1 point per PA QSO multiplied by the total no. of ARRL sections worked. Non-PA stations score 1 point per PA QSO multiplied by the total no. of different PA counties worked. Try phone on the even GMT hours 20 kHz from the top of each phone band cw 72.5 kHz from the low end of each cw band. The same station may be worked on different bands/modes. Multiops a separate category. Appropriate awards. Postmark deadline for entries is October 15. Send to Nittany ARC, Inc., P. O. Box 60, State College, PA 16801.

17 ***High Speed Code[tt] Test,*** sponsored by the Connecticut Wireless Assn. Speeds of 40, 45, 50, 55 and 60 wpm, five minutes of plain language at each in that order. Copy one minute consecutively solid at any speed to qualify for a certificate. All are welcome, even those who have qualified before. W1NJM will transmit simultaneously on 3636 and 7085 kHz (approx.). Other transmitting stations, if any, will be announced during the call-up starting at 0115 GMT. Important instructions at 0130 GMT, be sure to copy (at 25 wpm). First test transmission (40 wpm) starts exactly at 0150 GMT, followed by other speeds at 10-minute intervals. Send s.a.s.e. to W1NJM with copy, before Sept. 30. Honor system. *Those without honor please do not send copy!* Please note, Sept. 17 at 0130 GMT is Sept. 16 by local times.

19-21 ***YLRL Howdy Days***, p. 119 July.

22-23 ***VE/W Contest***, p. 62 August. ***SAC phone***, p. 117 August.

25 ***WIAW Morning Qualifying Run*** 1300 GMT (this is 9 am EDST). Same frequencies and details as under the September 12 listing.

29-Oct. 1 ***Delta QSO Party***, p. 117 August.

OCTOBER

3 ***W6OWP Qualifying Run.***

6-7 ***California QSO Party*** sponsored by the North Hills RC (K6IS) from 1800Z Oct. 6 through 0600Z Oct. 7 and 1500Z Oct. 7 through 0300Z Oct. 8. Use all bands cw/ssb. The same station may be worked only once per band per mode. Send QSO no., RS(T) and QTH (county for Calif. stations and ARRL section or DX country for others). Calif. stations may work each other. Contacts between stations outside California have no value. Each contact worth a point. Multiply total QSO points by total Calif. counties worked (or total ARRL sections including those in Calif.) and DX countries worked. Frequencies: cw 3560 7060 14060 21060 28060, ssb 3880 3980 7280 14280 21280 21380 28480, novice 3725 7125 21125 28125. All logs must show date/time, band, mode, exchanges. Logs cannot be returned. Be sure your call is on each page. A summary must be included with each entry. List counties, ARRL sections, DX countries. Show breakdown of QSOs per band and scoring (on this page). Include your name, call and address in large block letters. Appropriate awards. Entries must be postmarked not later than Nov. 7 to be eligible for awards. Send entries to John Minke W6KYA, 6230 Rio Bonito Dr., Carmichael, CA 95608. Include a size 10 s.a.s.e. for results. All comments will be appreciated. ***Missouri QSO Party***, sponsored by the St. Louis ARC, from 2300Z-2300Z Oct. 6-7. This is a special 10th anniversary party. Efforts will include several mobile operations passing through hard to get MO counties, plus fixed operations from many counties. Exchange QSO no., RS(T) and QTH. County for MO, state/province or country for others. Mobile MO stations will start with no. 1 in each county activitated. Logs of over 50 QSOs will require check sheets. The same station may be worked once per band/mode. Mobile MO stations are considered to be a different station when they change counties. MO stations may work each other (MO counts as a state for mult.). Hawaii and Alaska count as states only, USA and Canada do not count as countries. Score 1 point per QSO. MO stations use sum of states, provinces, countries for mult. Others use MO counties (a maximum of 115). Mobile MO stations use total QSO points from all counties activated times sum of states, provinces and countries. Frequencies: cw 1815 3560 7060 14060 21060 28060, phone 1815 3960 7260 14260 14290 21290 21360 28560, vhf 50,110 144,090 144,110 145,110. Appropriate awards, a special 10th anniversary plaque to high overall scorer. Mailing deadline Dec. 1. Send to Warren Bergmann, W$TDR, 842 Tuxedo Blvd., Webster Groves, MO 63119. Enclose an s.a.s.e. for a list of the winners. ***New Mexico QSO Party***, sponsored by the Los Alamos ARC, 2200Z Oct. 6 to 0100Z Oct. 7, 0200-0600 and 1800-2200Z Oct. 7. Frequencies, cw 65 kHz up from the bottom, phone near the edge between general and advanced, novice near the middle of each band. Stations outside NM are asked to refrain from calling CQ Contest near these spots. Exchange serial, RS(T), and county (for NM) or state, province or country for non-NM stations. Stations may be contacted only once on each band (and again if a county has changed). NM stations may work each other. Score 1 point per QSO. For NM stations the mult. is the sum of states, provinces, countries and NM counties. For non-NM, the multiplier is the number of NM counties. Appropriate awards. Full log data, including exchanges, should be sent to Bill Wageman, K5MAT, 35 San Juan, Los Alamos, NM 87544 by Nov. 1. Include s.a.s.e. for awards and/or copies of the results. ***CQ-WE Contest*** hf, limited to Western Electric and Bell Laboratories employees. For operating times, rules, logs, etc., contact your local coordinator.

11 ***W1AW Qualifying Run.***

13-14 ***CD Party***, phone. This is a quarterly event for League appointees and officials who are notified separately by bulletin. Check with your SCM (p. 6) to see if you can qualify for an appointment. ***CARTG RTTY SS***, see this issue. **RSGB 21/28 MHz** Telephony, single-operator only, from 0700Z Oct. 13 to 1900ZOct. 14; work only British Isles stations. Each contact will score 5 points. In addition, a bonus of 50 points may be claimed for the first contact on each band with the following prefixes: G 2 3 4 5 6 8, GC 2 3 4 5 6 8, GD 2 3 4 5 6 8, GM 2 3 4 5 6 8, GW 2 3 4 5 6 8. Submit separate check list showing bonus points claimed on each band. Only 1 QSO per band, no crossband. Mark (but do not count) dupes, exchange report plus serial starting with 001, submit separate log sheets for each band and include the usual declaration. Continental certificates. Postmark entries to arrive no later than Dec. 10 and send to RSGB HF Contests Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey, England.

13-15 ***Massachusetts QSO Party***, ninth annual, sponsored by the M.I.T. Radio Society, W1MX, from 2300Z Oct. 13 to 0500Z Oct. 15. A station may be worked once per band; cw and phone are considered separate bands. No crossband or contact made through repeaters are permitted. Note, however, that contacts made through Oscar 6 *are* permitted and encouraged. Mass. stations may work any stations (including other Mass. stations). Stations outside of Mass. work Mass. stations only. Exchange QSO no., RS(T), county (for Mass.) or state or VE province (or DXCC country) for others. Scoring: count one point for each complete exchange. Outside stations multiply total QSO points by the no. of different Mass. counties plus states (not including Mass.) and VE provinces worked as multiplier. Note: DX may be worked for QSO points but does not count for multipliers. Suggested freqs.: phone 3900 7260 14280 21350 28600, cw 3530 7030 14030 21030 28030. Try phone on

the even GMT hours; be sure to look for Novice activity. Appropriate awards will be issued. Please send logs before Nov. 15, 1973 to: Mass. QSO Party, Attn. WA1JZC, M.I.T. Radio Society, W1MX, Box 558, 3 Ames St., Cambridge, MA 02139. An s.a.s.e. *enclosed with your log will be appreciated to expedite a late Jan.* mailing of results/awards.

17-18 *YL Anniversary Party*, cw, starts 1800Z Oct. 17 and ends 1800Z Oct. 18. All licensed women operators throughout the world are invited to participate. YLRL members only are eligible for the cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs will not count. Call CQ YL. All bands may be used, crossband not permitted. Only one contact with each station may be counted. Exchange QSO no., RS(T) and ARRL section or *country. Entries in* the log must show date, time, transmitter and power. Logs must be signed. CW and phone are separate contests. Submit separate logs for each (phone takes place Nov. 1-2). To score: All YLs within an ARRL section score 1 point for each QSO with another station in *an ARRL section. Score 2 points for each contact with a station not* within an ARRL section (i.e. DX). Definition of DX: All stations not located within an ARRL section. DX YLs score 2 points for each contact with a station in an ARRL section and 1 point for a contact with another DX station. (section lists available from YLRL v.p.upon receipt of an s.a.s.e. Multiply no. of contact points by the total no. of ARRL sections and/or countries worked. Contestants running 150 watts or less dc input (at all times) may multiply result by 1.25. Ssb contestants running 350 watts p.e.p. or less at all times use the low power multiplier (1.25). High cw score gets gold cup (YLRL member only, anywhere in the world), high phone ditto. Additional certificate awards. Corcoran Award for high combined cw and phone from YLRL member only within an ARRL District). For DX, high combined cw and phone from No. and Central America (including the Greater and Lesser Antilles) will receive the YLAP Hager Plaque (YLRL members only). Highest combined score from any other part of the world will receive a duplicate award. Copies of logs must show claimed score, contain a signature and be postmarked no later than Nov. 18, 1973, be received no later than December 15, 1973 or they will be disqualified. No logs will be returned. Mail to Fila D. Russell, WA8FBS, 4348 West 223rd Street, Fairview Park, Ohio 44116.

20-21 *RSGB 7 MHz DX Contest* cw single operator, from 1800Z Oct. 20 to 1800Z Oct. 21 (phone Nov. 3-4). Work only G GC GD GI GM GW, contacts with stations using GB prefixes will not score bonus points. Exchange report plus serial starting with 001. Each contact between a British Isles station and a station in No. America counts *15* points, British Isles and EU 5 points, British Isles and S.A., Asia or Africa 25 points and British Isles with Oceania 50 points. A bonus of 50 Oceania 50 points. A bonus of 50 must be posted to arrive no later than Dec. 17 for the cw contest or Dec. 31 for phone. Send to RSGB HF Contests Committee c/o J. Bazley, G3HCT, Brooklands, Ullenhall, weekend. Send to RSGB HF Contests Committee c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, Warwickshire, England. *North Carolina QSO Party*, sponsored by the Brightleaf ARC from 1800Z Oct. 20 to 0600Z Oct. 21 and 1300Z Oct. 11 to 0200Z Oct. 22. Each station may be worked once per band/mode and again if operated portable or mobile and with each county change. Exchange QSO no., RS(T) and QTH (county for NC, state, province or country for others). NC stations score 2 points for out-of-state contacts and 1 point with other NC stations. *Multiply points by the no. of states and VE provinces* worked. Others score 2 points per NC QSO multiplied by the no. of NC counties worked (maximum of 100). Frequencies (all plus/minus 10 kHz): cw 3575 7090 14070 21090 28090, phone 3810 3900 7290 14290 21310 28510, novices 3710 7110 21110 28110. *Try phone on the even GMT hours.* (VHF, your choice on the 50/144 MHz bands.) Contacts through repeaters count for contest score, but not towards the BARC VHF certificates. Appropriate awards. Logs go to Charlie Wells, K4SKI, Route 8, Box 414, Greenville, NC 27834. Mail before Nov. 25.

27-28 *CQ WW, phone.*

29 *Special W1AW Evening Qualifying Run.*

NOVEMBER

1-2 *YL Anniversary Party phone.*

3-4 *RSGB 7 MHz DX Contest phone.*

10 *Frequency Measuring Contest.*

10-11 *SS phone. Ex-G Contest.* *Dec. 8-9, 160-Meter Contest.*

17-18 *SS cw.* *Dec. 31, Straight-Key Night.*

24-25 *CQ WW, cw.*

DST

Silent Keys

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

W1AJA, George J. Etter, Stoughton, MA
W1DPW, Theodore P. Jones, Maynard, MA
K1DVI, Chester A. Parker, Clinton, MA
W1FIJ, Edwin S. Parker, Sebec Village, ME
Ex-W1IBH, William H. Gould, Fairfield, CT
W1JAO, Clifford H. Robinson, Portland, CT
WA1LUJ, Lawrence J. Cunningham, Harrisville, RI
W1TEJ, William V. West, Norwich, CT
K1ZXH, Kenneth B. Spaulding, Stamford, CT
W2BGT, S. Castner Risley, Atlantic City, NJ
W2ECO, Charles L. Fickbohm, Mount Morris, NY
W2SM, Charles Fisher, Pennsville, NJ
K2UOG, Roger M. Mayne, Tonawanda, NY
W3GWM, Raymond T. Weir, Washington, DC
W3HDZ, Alfred J. Freitag, Baltimore, MD
WA3IXJ, Carl Starr, Warren, PA
W3PT, Francis J. Liesman, Reading, PA
WB4CFI, Roger B. Stricklin, Memphis, TN
WB4CIN, William Bossie, Newport, NC
K4ELF, Frank J. Sholock, Sr., Falls Church, VA
W4KDK, Dominic Mastro, Portsmouth, VA
WA4URV, Julie S. Kemker, Memphis, TN
W5DKB, Frank J. Hanus, Jr., Huntsville, AR
WA5DSK, Thomas J. Kennedy, LaMarque, TX
K5RNS, Homer P. Wallace, Sr., Bedias, TX
W5TIJ, Verne E. Shirar, Houston, TX
WA5TMJ, Victor H. Sladecek, Granger, TX
Ex-W6AKC, Allan G. Phelps, Santa Maria, CA
WB6CPP, Harold R. Hobson, Bishop, CA
W6EAY, Eric Firth, Los Angeles, CA
W6KH, Owen L. McMichael, Long Beach, CA
WN6LNO, Edward G. Stein, Garden Grove, CA
WB6SZQ, Leon T. Gadbois II, Redondo Beach, CA
W6TVT, Earl V. Goodwin, Pasadena, CA
W6WLV, Harold R. Littlefield, Jr., Santa Rosa, CA
W7IQM, Frank C. Gilbert, Sun City, AZ
W7QMK, John J. Patton, Medford, OR
W7SP, Leonard F. Zimmerman, Salt Lake City, UT
W7TC, George E. Perry, Seattle, WA
W7ULP, Oliver P. Shook, Prescott, AZ
K8CQY, Richard D. Snow, Willowick, OH
WA8CTF, Howard K. McMartin, Milford, MI
W8EGP, Ralph W. Hayes, Covington, OH
WA8FIF, Richard M. Nevins, Detroit, MI
K8GQG, Raymond W. Nyquist, Grandville, MI
W8LRC, Charles H. Hamenstafer, Detroit, MI
W8RJ, Nelson C. Lewis, Cincinnati, OH
K8THC, Herbert S. Slade, Ironwood, MI
K8VAN, Robert W. Leach, Yale, MI
Ex-W8VEE, Robert L. Uher, Cleveland, OH
W8VKV, Robert W. MacGregor, Cedarville, OH
WN9MBL, Gary W. Garber, Speedway, IN
K9UOD, Donald K. Szatkowski, Sr., Bloomington, IN
W9ZYP, Ernest H. Dvorachek, Belleville, IL
K0AAO, Adolph J. Roiseland, South St. Paul, MN
WA0BIJ, Leo Wiegand, Petersburg, NE
W0IF, Jacob C. Hack, Sr., Kansas City, MO
W0TV, Cecil R. Wood, Colorado Springs, CO
W0UC, Louis L. Brent, St. Louis, MO
W0WWV, Benny W. Carl, Hastings, NE
W0WYL, Raymond Millison, Grant City, MO
W0ZJF, Burdette F. Kennedy, Falls City, NE
VE3BIR, William H. Ledger, Renfrew, ON
G3NMR, Maurice Margolis, Ilford, Essex, England
G4IN, Frank V. Hall, Northamptonshire, England
G8TD, William H. Dyson, Nelson, Lancs, England

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/SEC, Roger E. Cole, W3DKX — PAM: WA3GSM. RM: W3EEB. Delaware nets: Del. Traffic Net, M-F 3905 kHz, 2230 local time; Del. Emergency Phone Net, Sat. 3905 kHz 2200; Del. Two Meter Net, Mon. 145.26 MHz (A.M.)2330. K3NCL in Germany on a business/pleasure trip. WA3GLG recovering from eye surgery. WA3OYA has received a Printing and Publishing Industry Scholarship to the Rochester Institute of Technology. K3VWP has returned from a tour of Israel and W3DKX is back from travels in the Bahamas and Fla. The New Castle County Planning Board continues work on amateur antenna legislation. WA3HGV and W3CZS became Silent Keys. PSHR: K3KAJ 61, WA3DUM 56. Del. Nets — DTN: QNI 147, QTC 28/28. DEPN: QNI 58, QTC 30/30. Traffic WA3DUM 103, K3KAJ 64, WA3GSM 61, W3EEB 44, W3DKX 15.

EASTERN PENNSYLVANIA — SCM, George S. Van Dyke, Jr., W3HK — SEC: W3FBF. RMs: W3EML, WA3AFI, K3MVO, K3PIE, W3CDB. PAMs: K3BHU, WA3PLP. OBS reports from WA3QOZ, W3CL, W3ID, WA3AFI. OVS reports from W3CL, W3ID, W3ZRR, WA3KFZ. OO reports from W3MFY, K3LWQ, K3RDT, W3KCM, W3CL. BPLs: W3CUL, W3VR, W3EML and WA3QLG. PSHR: WA3QLG, K3DCB, K3OIO, WA3QOZ, WA3MQP, WA3ATQ and K3MVO. Net reports still are lagging, mark the calendar.

Net	Freq.(kHz)	Time	QNI	QTC	RM/PAM
PTTN	3610	6:30 P Dy	59	28	WA3AFI
EPA	3610	7:00 P Dy	370	448	K3PIE
PFN	3960	5:30 P M-F	445	464	K3BHU
PTTN May	3610	6:30 P Dy	92	36	WA3AFI
PFN May	3960	5:30 P M-F	535	639	K3BHU

WA3AFI RM for PTTN is looking for a replacement, business is eating into his time. Anyone interested contact Bill for a change of command. Bill has done an excellent job and we express our appreciation for all the work he has done for PTTN and EPA. FD messages were received from the following: WA3RAC/3 14 members, 4 AREC; W3NNL/3 4 members, 2 AREC; W3AI/3 60 members, 9 AREC; W3SL/3 30 members, 20 AREC; K3SSC/3 25 members, 6 AREC; K3MTK/3 25 members, 5 AREC. We have a new Novice in Cornwells Hts., WN3UMJ who is eagerly working to upgrade his license, good luck! New officers for Mt. Airy VHF ARC (The Pack Rats) are W3FQD, pres.; WA3AXV, vice-pres.; K3GAS, treas.; WA3DJF, rec. secy.; W3SAO, corr. secy.; K1SSF, WA3NGK, W3YXF and K3KMN, dir. Watch for the Pack Rats HAMARAMA on Sun. Oct. 7 in Jameason, Pa. WA3QLG reports he has just finished up his WAS and WAC now going for DXCC!. SEC W3FBF is again in WA1KHP running the ham classes at camp for the summer. W3CUL, W3VR and W3EML our big guns are still in there. W3EML reports he is slowly getting back to normal. WA3ATQ in the Poconos became the FD site for WA3FJY/3. W3WRE was speaker at the YLSSB convention in Minn. WA3CKA reports 10 meters is the place for openings. WN3VAW got his call just in time for FD. Hope all had a safe and fun vacation. Traffic: (June) W3CUL 2214, W3VR 638, WA3QOZ 548, W3EML 500, WA3ATQ 164, WA3QLG 149, K3DCB 134, WA3MQP 108, WA3PZO 106, K3OIO 103, K3BR 101, K3MVO 88, WA3IYC 55, K3BHU 48, W3MFY 26, W3ADE 22, W3VAP 20, W3HK 18, W3OY 15, WA2NLP/3 10, W3CL 8, W3KCM 7, W3WRE 6, WA3CKA 5, W3VA 5, W3CBH 4, WA3CFU 4, WA3RKH 3, WA3AFI 2, WA3BJQ 2, W3ID 2, K3KNL 2, K3KTH 2, WA1DJC/3 1, W3BUR 1, W3EU 1, W3FBF 1, W3LC 1, K3LWQ 1. (May) K3BR 76, K3BHU 68, WA3AFI 20, W3BNR 3, W3ID 1. (Apr.) K3BR 104.

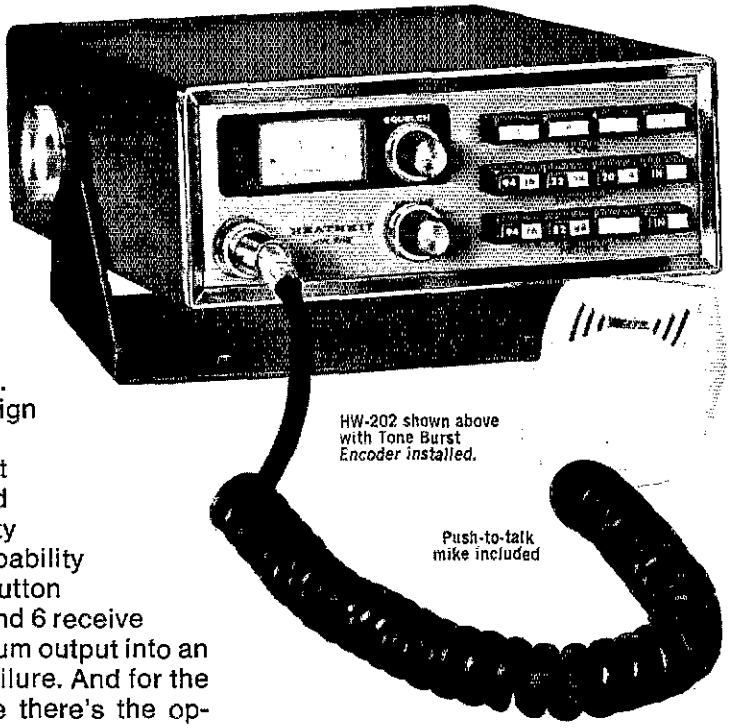
MARYLAND-DISTRICT OF COLUMBIA — SCM, Karl R. Medrow, W3FA — SEC: K3LFD. RM: W3QU. PAM: K3TNM. NCM: W3LDD. W3QU nominates W3EEB, WA3IYS and WA3QIA as top brass for June. W3LDD lists W3ADQ and WA3IIV as MEPN toppers with W3LDD and WA3GXN as others. Field Day messages were received from W3PGA, WA3JZR, K3AW, K3IVO, WA3NYU, WA3NSZ, W3IN and W3VD. WA3QDH off to France as FØAQG for a vacation. MDD met 57 times, QNI average 8.3, QTC 242. MEPN met 22 times, average QNI 26.8, QTC 67 with 82 informals. MDCTN met 17 times with average QNI of 16.5 and 59 messages. W3EFZ retired and moved to Cape Coral, Fla. Aug. 1. K3GZK has joined the retirees. W3BHE reports he took 2nd for Md., in the last W/VE test, and that WN8POO is a new one in the Cumberland mountains. WA3NUL sponsored a section award for Amateur Radio Week with WA3EOP and XYL WN3TUD doing the paperwork. WA3LNW sends her report by radio. WA3SWS had big plans for 2 meters in July. More 2-meter men are WA3IYS and W3FCS. WA3IIV and WA3GXN are off to Canada in their Airstreams. W3ADQ is an old Buzzard on the old Buzzards Net. WA3MSW says for June — Big Deal! K3TNM reports new capability on 20/15/10 with the new tri-bander. Look out DX. WA3EHK about got it wrapped up at the U of Md. WA3SQQ busy constructing with such as HW7 and full break-in with Ten Tec mods. WA3PIG says the job market is in bad shape. W3QU is still having a ball with Oscar 6 and 2 in general. WA3AFQ going automatic for CD, next the SS. W3CDQ is temporarily without her sked. WN3UUR and W3CUE are about to start a new radio club. WA3FYZ has a "folded Unipole" for 20 meters and says it is okay as a vertical. WA3MJF was impressed with WS3SKY pile ups. W3ZNW says it looks like the summer slump is on him. WA3RCI opines it's work 10 hours a day 6 days a week and Field Day. W3EOV trimmed those trees for experimental antennas. WA3RJS reports K3HDO/3 his first Field Day and the mast broke during dismantling. W3IPT busy with a 2-meter linear. WA3RBI soon ready with a solid state RTTY key board, and uncertain at the moment if Field Day was much fun! WA3HEN says hubby K3TBD followed her right into the General ranks. W3FCI does his sojourn in Maine with a 2-meter rig naturally. WA3TBD is looking for OBS on 2 meters and not finding any. Traffic: (June) WA3IYS 626, WA3SWS 141, W3QU 140, WA3RBI 110, WA3QIA 102, W3FA 99, WA3RCI 92, WA3PJG 72, W3FCS 58, WA3IIV 51, WA3AFQ 48, K3TNM 40, WA3SQQ 36, WN3UUR 25, W3EOV 17, K3GZK 15, WA3QDH 15, W3ADQ 13, WA3MJF 13, WA3FYZ 11, WA3EHK 7, WA3MSW 7, W3FCI 2, WA3HEN 2, WA3LNW 2, WA3RJS 2, W3ZNW 2. (May) K3GZK 20, WA3EHK 17.

SOUTHERN NEW JERSEY — SCM, Charles E. Travers, W2YPZ— PAMs: WB2FJE, WA2TRK. NJPON: WB2FJE reports 30 traffic, 67 stations, 4 sessions. Field Day is now history. This is a good time OMs to reflect a bit between showers on the activities of the past year. First of all have you submitted continuing activity, regular reports and maintenance of ARRL membership as prerequisitge to annual endorsement? These you remember are the bases for any appointment! If not this is a good time to justify your appointment in your own mind and do something about it. A recent OPS appointment is WB2FNK. Recent endorsements are WB2VEJ, and W2ORS. The June 1973 "Crosstalk" of GCARC is a very comprehensive publication. Commendation is due those responsible for this excellent publication. Submit information concerning your club's program. Let others know of your successes. Kindly submit material by the 5th of the month to insure publication. This could very well be an item high on the agenda for future club activity. Keep the fraternity informed. Traffic: WB2VEJ 160, WA2TRK 76, W2ZQ 29, WB2FJE 14, W2YPZ 6, W2CDZ 5, W2ZI 4, W2IU 3, K2PWK 1.

WESTERN NEW YORK — Scm, Richard M. Pitzeruse, K2KTK — Asst. SCM: Rudy Ehrhardt, W2PVI. SEC: W2CFP. A reminder — if you send your traffic reports over the air please send them to W2PVI. If by mail send them to K2KTK. Same

More 2-Meter Action for your money-- Heath has it!

Build the Heathkit "202" Series and run with the best money can buy — at a fraction of the cost.



HW-202 shown above with Tone Burst *Encoder installed.*

Push-to-talk mike included

Start with the HW-202 2-Meter FM Transceiver. It's an all solid-state design that you can build and completely align without special instruments. And this compact little beauty gives you 36 channel capability with independent pushbutton selection of 6 transmit and 6 receive crystals. 10 watts minimum output into an infinite VSWR without failure. And for the ultimate in convenience there's the optional tone burst encoder for front panel selection of four presettable tones. The HW-202 kit includes two crystals for set-up and alignment and simplex operation on 146.94; push-to-talk mike; 12-volt hook-up cable; heavy duty clips for use with temporary battery; antenna coax jack; gimbal bracket, and mobile mounting plate.

Kit HW-202, 11 lbs, mailable **179.95***

Kit HWA-202-2, Tone Burst Encoder, 1 lb. **24.95***

Kit HWA-202-1, AC Power Supply, 7 lbs. **29.95***

Kit HWA-202-3, Mobile 2-Meter Antenna, 2 lbs. **17.95***

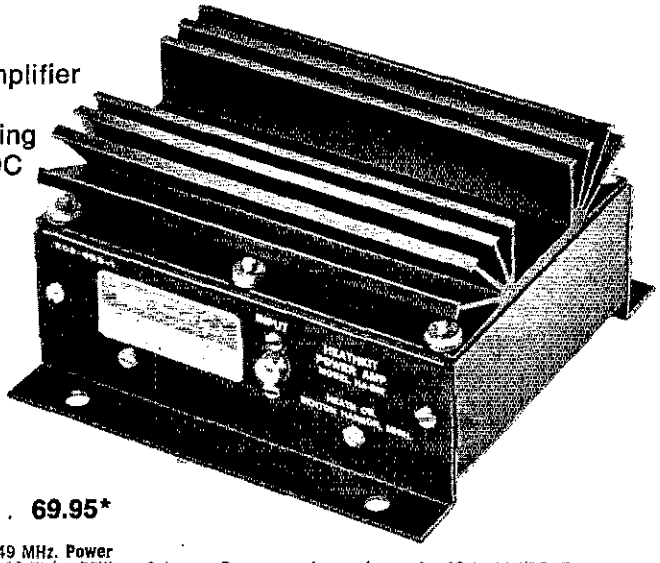
Kit HWA-202-4, Fixed Station 2-Meter Antenna, 4 lbs. **15.95***

HW-202 SPECIFICATIONS — RECEIVER — Sensitivity: 12 dB SINAD* (or 15 dB of quieting) at .5μV or less. **Squelch threshold:** 3 μV or less. **Audio output:** 2 W at less than 10% total harmonic distortion (THD). **Operating frequency stability:** Better than ±.0015%. **Image rejection:** Greater than 55 dB. **Spurious rejection:** Greater than 60 dB. **IF rejection:** Greater than 75 dB. **First IF frequency:** 10.7 MHz ±2 kHz. **Second IF frequency:** 455 kHz (adjustable). **Receiver bandwidth:** 22 kHz nominal. **De-emphasis:** −6 dB per octave from 300 to 3000 Hz nominal. *Modulation acceptance: 7.5 kHz minimum.* **TRANSMITTER — Power output:** 10 watts minimum. **Spurious output:** Below −45 dB from carrier. **Stability:** Better than ±.0015%. **Oscillator frequency:** 6MHz, approximately. **Multiplier factor:** X 24. **Modulation:** Phase, adjustable 0-7.5 kHz, with instantaneous limiting. **Duty cycle:** 100% with ∞ VSWR. **High VSWR shutdown:** None. **GENERAL — Speaker impedance:** 4 ohms. **Operating frequency range:** 143.9 to 148.3 MHz. **Current consumption: Receive** (squelched): Less than 200 mA. Transmitter: Less than 2.2 amperes. **Operating temperature range:** −10° to 122° F (−30° to +50° C). **Operating voltage range:** 12.6 to 16.0 VDC (13.8 VDC *nominal*). ***Dimensions:*** *2¾" H x 8¼" W x 9⅞" D.*

*SINAD = $\frac{\text{Signal + noise + distortion}}{\text{Noise + distortion}}$

...and here's 40 watts out for your 10 watts in

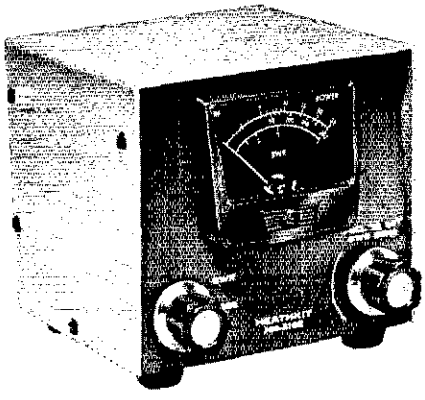
The Heathkit HA-202 2-Meter Amplifier works with any 2-meter exciter delivering 5-15 watts, while pulling a meager 7 amps from any 12 VDC system. No additional power supplies are required. All solid-state components mount on a single circuit board for easy two-evening assembly. Manual shows exact alignment procedures using a VOM or VTVM. Connecting cable and antenna cable are included.



Kit HA-202, 4 lbs. **69.95***

HA-202 SPECIFICATIONS — **Frequency range:** 143-149 MHz. **Power output:** 20W @ 5 W in, 30W @ 7.5W in, 40W @ 10 W in, 50W @ 15 W in. **Power input (rf drive):** 5 to 15W. **Input/output impedance:** 50 ohms, nominal. **Input VSWR:** 1.5:1 max. **Load VSWR:** 3:1 max. **Power supply requirements:** 12 to 16 VDC, 7 amps max. **Operating temperature range:** −30° F. to +140° F. **Dimensions:** 3" H x 4¼" W x 5½" D.

...then there's this perfect 2-meter tune-up tool



The Heathkit VHF/SWR Bridge tests transmitter output in power ranges of 1 to 25 watts and 10 to 250 watts ±10% of full scale. 50 ohm nominal impedance permits placement in transmission line permanently with little or no loss. Built-in SWR bridge for tuning 2-meter antenna for proper match, has less than 10-watt sensitivity.

Kit HM-2102, 4 lbs. **29.95***

HM-2102 SPECIFICATIONS — **Frequency range:** 50 MHz to 160 MHz. **Wattmeter accuracy:** ±10% of full-scale reading.* **Power capability:** To 250 W. **SWR sensitivity:** Less than 10 W. **Impedance:** 50 ohms nominal. **SWR bridge:** Continuous to 250 W. **Connectors:** UHF type SO 239. **Dimensions:** 5¼" W, 5¼" H and 6½" D, assembled as one unit.

*Using a 50 Ω noninductive load.

See them at your Heathkit Electronic Center — or fill out coupon for FREE Heathkit catalog

HEATHKIT ELECTRONIC CENTERS — ARIZ.: Phoenix; CALIF.: Anaheim, El Cerrito, Los Angeles, Pomona, Redwood City, San Diego (La Mesa), Woodland Hills; COLO.: Denver; CONN.: Hartford (Avon); FLA.: Miami (Hialeah); GA.: Atlanta; ILL.: Chicago, Downers Grove; IND.: Indianapolis; KANSAS: Kansas City (Mission); MD.: Baltimore, Rockville; MASS.: Boston (Wellesley); MICH.: Detroit; MINN.: Minneapolis (Hopkins); MO.: St. Louis; N.J.: Fair Lawn; N.Y.: Buffalo (Amherst), New York City, Jericho; L.I.: Rochester; OHIO: Cincinnati (Woodlawn), Cleveland; PA.: Philadelphia, Pittsburgh; R.I.: Providence (Warwick); TEXAS: Dallas, Houston; WASH.: Seattle; WIS.: Milwaukee.

HEATH
Schlumberger

HEATH COMPANY, Dept. 9-9
Benton Harbor, Michigan 49022

☐ Please send FREE Heathkit Catalog.

Enclosed is $_____, plus shipping

☐ Please send model(s) _____

Name _____

Address _____

City _____ State _____ Zip _____

*Mail order prices; F.O.B. factory AM-286R

applies to PSHR totals. W2RUT finds unusually high thunderstorm activity at his QTH curtailing some of his activity. Many FD messages received indicating a rather good turnout this year. One NOT received was the one I myself sent from W2FR/2 — wonder what happened to it? Do you know who your EC is? If not contact W2CFP to find out. Don't forget the Hamburg International Hamfest on Sept. 15. K2LDT repeater now is WR2ABU. WA2UWS now is WR2ABO. The Tompkins County Radio Club has been issued WR2ABD. K2IBG, WB2WHB and WB2DHR are formulating moon-bounce plans. Very sorry to report the passing of WA2NRT, son of W2PGB and grandson of W2FH. WN2QYQ is working 40 and 80 and is almost ready for her General without too much help from her OM WA2CEA. K2DPT retires and now finds mored time to fill log books. ESS handled 98 messages with 393 check-ins for June. WB2EEX will be missed by the ESS gang and others as he QSYs to Alaska. NYS handled 225 messages with 545 check-ins. Traffic activities sagging badly this summer. EC K2DNN reports the installation of permanent amateur antennas on Elmira hospitals, fire departments and schools. Congrats to WA2TDW on earning his ESS certificate. BPL this month to W2OE. Traffic with * indicating PSHR: W2OE* 331, W2RUF* 215, WA2AYC* 173, WB2ADW 153, W2MTA* 87, W2RQF* 64, K2UIR 54, WB2EEX* 47, WA4PDM/2 44, W2MSM 38, WA2LUF 29, WB2VND 29, WA2PUU 24, W2EAF 22, K2KTK 22, K2OFV 19, WB2LKK 16, K2RTQ 15, WA2ABL 11, K2IMI 10, WB2JNW 10, WA2MPC 10, WA2SMQ 9, WA2JEQ 8, W2PVI 8, W2RUT 4, WA2AIV 3.

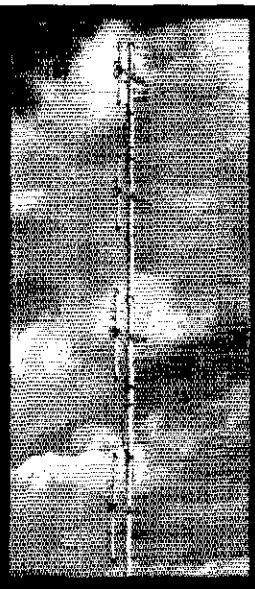
WESTERN PENNSYLVANIA — SCM, Robert E. Gawryla, W3NEM — SEC: W3KPJ. PAM: K3ZNP. RMs: W3KUN, W3LOS, WA3PXA. WPA CW Net meets daily on 3585 kHz at 7:00 P.M. KSSN meets daily on 3585 kHz at 6:30 P.M. Both local time. The WPA CW Net gang and the WPA ECs plus the KSSN group will have their annual business meeting and family picnic get together on Sept. 9 at Cook Forest State Park. Contact W3LOS for complete details and directions. The 16th Annual Penna. QSO Party sponsored by the Nittany ARC scheduled for Sept. 15-16. See elsewhere in QST this month for complete details. It is with deep regret that we record the Silent Key of W3LKZ. RAE (Radio Assn. of Erie) is still having a ball with their regularly scheduled hidden transmitter hunt. Clubs interested in some good ideas drop a line to WA3HSR. It seems he has some FB ideas for the Huntee! W3SN and W3AQY are 25-year continuous members of RAE. WA3LJW has upgraded from General to Advanced Class. The Nittany ARC completed its tenth year as communications control of the July 4th Firemen's Parade in State College, Penna., one of the largest parades in Central Penna. Indiana County ARC has the following new officers for the coming year: W3CTR, pres.; K3VMS, vice-pres.; K3JSV, secy-treas.; K3JDU and K3SPI, dir. PSHR for June are WA3PXA 68, W3NEM 39, W3YA 34, W3LOS 30, WA3NAZ 30. KSSN had 23 sessions, 95 stations QNI and 51 messages handled during June. WPA 30 sessions, 325 stations QNI, 218 messages handled. WA3PXA and WA3SWF made BPL for the month. Traffic: WA3PXA 360, WA3SWF 318, W3YA 195, 105, K3HCT 51, W3LOS 51, WA3EJO 34, WA3QQR 33, WA3IYA 32, K3ZNP 26, W3MJ 20, WA3LDA 18, K3SMB 18, W3IDO 16, W3KUN 16, K3VQV 16, W3SN 5, W3ATQ 4, K3SJN 1, W3NEM 105.

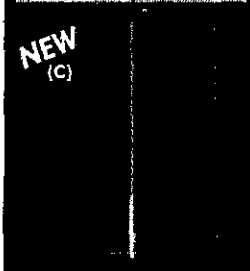
CENTRAL DIVISION

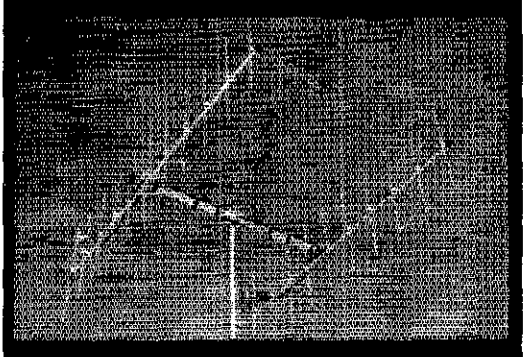
ILLINOIS — SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES. RM: W9MUC. PAMs: WA9CCP and W9PDI (vhf). Cook County EC: W9HPG.

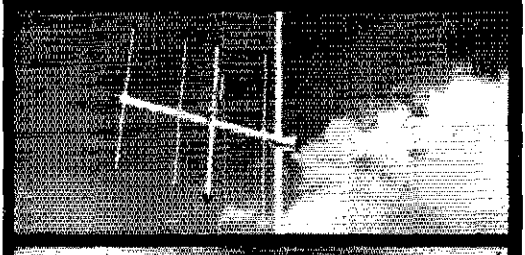
Net	Freq.	GMT/Days	Tfc.
IEN	3940	1400 Su	8
ILN	3690	2330 Dy 0400 Dy	250
NCPN	3915	1300 M-S 1800	283
Ill PON	3915	1430	402
Ill PON	145.5	0200 MWF	8
Ill PON	50.28	0200 M	0
ILNN	3720	0000 Dy	144

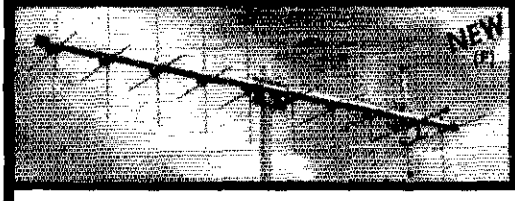
WB9HEG and WB9GSS would like to have more Novices check into the Ill. Novice Net daily on 3720 kHz. This is a net to help Novices improve their code speed and message handling. W1ICP of ARRL staff and John Johnston of the FCC staff together with Director W9HPG and Vice-Director W9PRN were representing the League at the EXPO '73 Convention of the Chicago FM Club.











Cush Craft

2 METER ANTENNAS FM

NEW FROM THE WORLD'S LEADING MANUFACTURER OF VHF/UHF COMMUNICATION ANTENNAS

(A) FM GAIN RINGO: The most popular — high performance, half-wave FM antennas. Give peak gain, and efficiency, instant assembly and installation.

AR-2	100 watts	135-175 MHz		$12.50
AR-25	500 watts	135-175 MHz		17.50
AR-220	100 watts	220-225 MHz		12.50
AR-450	100 watts	420-470 MHz		12.50
AR-6	100 watts	50-54	MHz	18.50

(B) 4 POLE: A four dipole gain array with mounting booms and coax harness 52 ohm feed, 360° or 180° pattern.

AFM-4D	1000 watts	146-148 MHz		$42.50
AFM-24D	1000 watts	220-225 MHz		40.50
AFM-44D	1000 watts	435-450 MHz		38.50

(C) FM MOBILE: IMPROVED Fiberglass ⅝ wave mobile antenna with new molded base and quick grip trunk mount. Superior strength, power handling and performance.

AM-147	146-175 MHz mobile	$26.95

(D) POWER PACK: A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

A147-22	1000 watts	146-148	MHz	$49.50

(E) 4-6-11 ELEMENT YAGIS: The standard of comparison in VHF/UHF communications, now cut for 2 meter FM and vertical polarization. 4 & 6 Element models can be tower side mounted.

A147-4	1000 watts	146-148	MHz	$ 9.95
A147-11	1000 watts	146-148	MHz	17.95
A220-11	1000 watts	220-225	MHz	15.95
A449-6	1000 watts	440-450	MHz	10.95
A449-11	1000 watts	440-450	MHz	13.95

(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	1000 watts	145 & 147	MHz	$39.50

IN STOCK WITH YOUR LOCAL DISTRIBUTOR

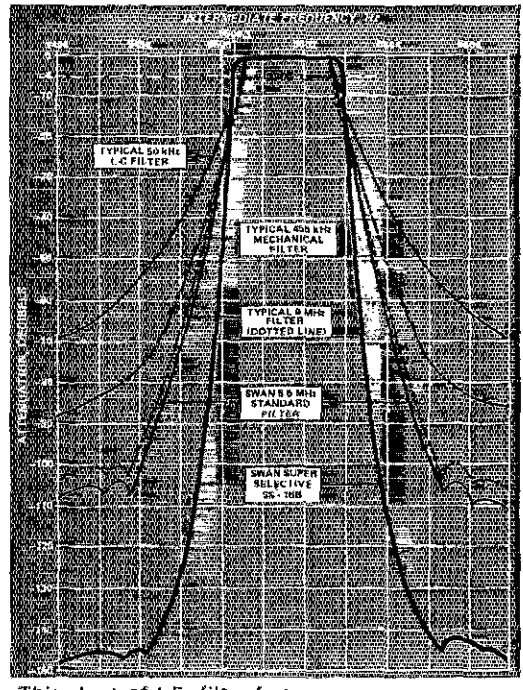
Cush Craft CORPORATION

621 HAYWARD STREET
MANCHESTER, N.H. 03103

IT'S A FACT:

NATURAL VOICE QUALITY **AND** SUPERIOR SELECTIVITY

SWAN GIVES YOU BOTH!



This chart of I.F. filter frequency response curves graphically shows another reason why SWAN ELECTRONICS is leading the way in amateur radio equipment.

Selectivity of the intermediate frequency filter is the key to receiver performance. I.F. filters determine: Audio frequency bandwidth — directly affecting voice quality — *SWAN's Best;* Shape factor — directly affecting QRM — *SWAN's Best;* and, Ultimate rejection — directly affecting channel separation from unwanted strong local stations — Again, *SWAN's Best!*

CHECK THESE FACTS:	Audio Frequency Bandwidth @ 6 db down	Shape Factor (Ratio: 60 db to 6 db down)	Ultimate Rejection
SWAN Super Selective SS-16B	2700 Hertz	1.28	-145 db
SWAN Standard Crystal	2700 Hertz	1.7	-104 db
Typical Crystal	2100 Hertz	1.8	-100 db
Typical Mechanical	2100 Hertz	2.5	-80 db
Typical LC	2100 Hertz	4.0	-70 db

Only SWAN ELECTRONICS gives the truest voice fidelity in amateur radio . . . PLUS . . . the exceptional selectivity of precision crystal lattice filters. The selectivity of any SWAN transceiver, transmitter or receiver is in a class apart — superior to any competition. However for the very best, order your SWAN unit with the optional SS-16B installed for just $60 more.

SS-16B kits are available at $79.95 to upgrade SWAN models 160X, 260, 270, 270B, 350C, 500C, 500CX, 600R, 600R Custom, 700CX, SS-15 and SS-200.

HELP REDUCE SOUND-POLLUTION – BUY SWAN

SWAN ELECTRONICS

A Subsidiary of Cubic Corporation

305 Airport Road, Oceanside, CA 92054

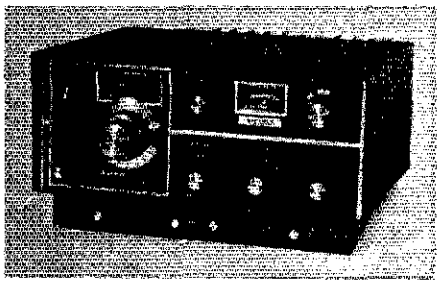
Telephone (714) 757-7525

THE BEST PRACTICAL DEVELOPMENTS IN AMATEUR RADIO

IT'S A FACT:

"You CAN Have ACCURATE AUTOMATIC TUNING... without conventional tuning headaches!"

Select any band from 3 to 30 MHz and SWAN's fully solid-state transceivers are instantly tuned! Operator tuning adjustments are not required!



Hams have been asking: "How can you transmit without tuning?" . . . "Even if I buy the idea of broadband tuning, won't I lose power or something when I switch from one band to another?" . . . "What's sacrificed to get it?" . . . "What's the tradeoff?"

It seems the fact of "automatic-transmitter-tuning," here, alive and kicking," is too hard to believe." SWAN appreciates this skepticism. The fact, however, remains – a new era for Ham radio is really here. There are no tradeoffs. *Nothing* is lost. SWAN *HAS* advanced amateur communications – *Dramatically!*

Briefly: Full power and constant output impedance is maintained on all bands. All tuning circuits have separate bandpass filters, factory adjusted for each band, thus eliminating "tweeking" as bands are switched. Simultaneous switching of lowpass filters greatly reduces harmonic radiation. Transmitter distortion byproducts are down approximately 30 db or better. Unwanted sideband is suppressed more than 50 db. Carrier suppression is greater than 60 db. Image rejection ranges from a minimum of 55 db down at 30 MHz to better than 75 db down at 3 MHz. Front end overload, distortion, and cross-modulation is minimized.

More often than not, conventional transmitters present a high risk of mistuning, due to requirements of critical adjustments. SWAN has eliminated this worriesome tuning task in the new, fully solid-state, transceivers now available.

In addition, you get: Selectable sideband. 10 MHz WWV receive. CW with semi-CW break-in and monitor. Infinite VSWR protection. 1.7 Shape Factor. 2.7 MHz bandwidth. Receiver sensitivity is less than 0.5 microvolts at 50 ohms impedance for a signal + N/N ratio of 10 db. I.F. derived AGC. 25 kHz calibrator. Built-in VOX gain. Noise blanker with variable threshold control. Anti-trip and delay controls. All controls in front, within easy reach. Operate directly from 12V DC without an additional power supply for mobile operation.

SS-15 and SS-200 FULLY SOLID-STATE . . . AUTOMATIC TUNING . . . TRANSCEIVERS. Designed and manufactured by SWAN ELECTRONICS in Oceanside, California, U.S.A.

SEE THESE UNIQUE TRANSCEIVERS AT AUTHORIZED SWAN DEALERS or ORDER DIRECT FROM

SWAN ELECTRONICS
A Subsidiary of Cubic Corporation
305 Airport Road, Oceanside, CA 92054
Telephone (714) 757-7525

SS-15 (15 Watts P.E.P.)	$579.00
SS-200 (200 Watts P.E.P.)	$779.00

OPTIONAL ACCESSORIES INCLUDE:

PS-10 (115V AC Power Supply for SS-15)	$ 89.00
PS-20 (115V AC Power Supply for SS-200)	$139.00
SS-208 (External VFO)	$159.00
SS-16B (Super Selective Filter)	$ 79.95
SWAN 610X (Crystal Controlled Oscillator)	$ 53.95

THE BEST PRACTICAL DEVELOPMENTS IN AMATEUR RADIO

W9LNQ received the A-1 operator certificate. K9YBC/HC8GG gave a talk on DXpedition to Galapagos Islands for the June meeting of the Chicago Suburban Radio Assn. Their new vice-pres. is W9IQE and treas. is W9PBJ. W9ZND, K9KVI, WA9OCK, W9TKR, W9LUH are new officers of the Waukegan VHF Society. Their repeater call is WA9LIV. WA9MZS is available to give Novice and Tech. exams in the Northern suburbs of Chicago. Call him at 8041 N. Hamlin in Skokie. WB9GQM, WA9TKD, WA9JBD, WA9ZXT, WA9ZCK, K9WEN, K9IZE, W9ERI, WB9ELP, WA9SQK, K9IEY, K4EOU, WA9GUU, WB9EXT and WA9IJM of the Shawnee Amateur Radio Assn., W9RMN handled the Cerebral Palsy campaign and brought in many contributions. WB9HAD now on the air with an SB-220. Headquarters now has a supply of Life Member decals, mailed to LMs. Send an SASE if you would like more. Our sympathy to the family and friends of W9LWZ who recently passed away in Clinton. Red was one of the pioneers on 160 back in the 30s. WB9JFU the club station of Jefferson High School has a new 50-ft. tower and TA-33 jr. beam. New officers of the Tri-Town Radio Amateurs Club are K9AOA, WN9MDV, WA9HQQ and W9FHW. W9ILH, ex-SCM of Ill. is now a member of the Old Old Timers Club (40 years of continuous amateur licensing). K9HLH, WA9NKQ and K9RZP helped to erect W9FBB's new tower. WB9FHL is the BPL recipient for June. Traffic: WA9VGW 407, K9MWA 251, W9NXG 246, WB9FHL 222, W9IXV 123, W9KRR 120, W9AES 112, W9MUC 102, WA9LDC 98, WB9GSS 78, W9LNQ 77, W9OYL 74, WB9JPS 72, K9AVQ 61, WB9HEG 55, W9KR 46, K9JTD 40, WN9KZO 30, W9PRN 20, WB9ELP 8, WA9OBP 1.

INDIANA — SCM, William C. Johnson, W9BUQ — SEC: WA9YXA. RMs: WB9LHI, W9HRY, WB9KVN. PAMs: WB9FOT, (vhf) W9HWR, W9PMT.

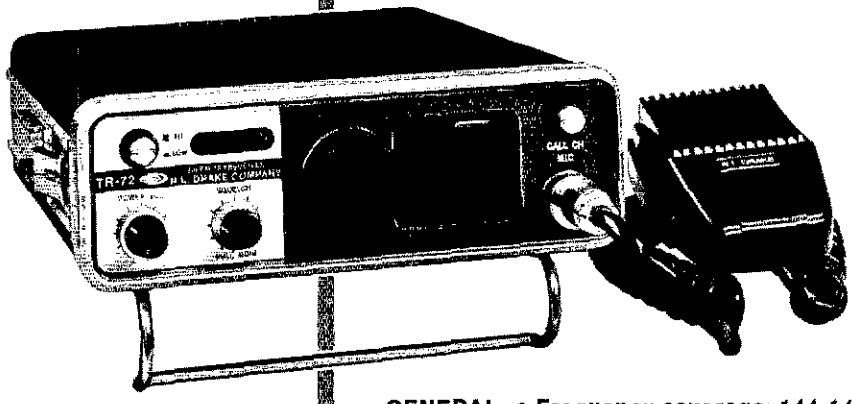
Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
IFTN	3910	1330-2300 Dy 2130 M-S	505	WB9FOT
QIN	3656	0100-0400 Dy	245	WB9LHI
IPON	3910	1300-2130 Su 2000 S	14	WB9AHJ
IPON CW	3712	0100 Dy	18	WB9KVN
IPON VHF	50.7	0100 M-W-Th	27	WA9ULH
IPON SSB	50.2	0200 Dy	68	W9MHZ
Hoosier VHF			2	W9PMT

With deep regret I report the passing of W9JYP and W9SJM. WN9IHH BPL both Apr. and May. A new net (MWNN) Midwest Novice Net reports May 7 sessions, QNI 18, QTC 35. WN9JOV passed his General. WA9CEX became a father in Apr. with a healthy baby girl. WN9IHH received his Code Proficiency endorsement sticker for 30 wpm. Lake County ARC officers are WB9CAC, pres.; WB9JOV, vice-pres.; WB9AJT, treas.; WB9HCN, secy. W9UIF/WB4KOM racked up most spacewalk hours of all the astronauts. W9BUQ was in Cincinnati at the OMIK ARA annual convention June 22 to 24. The XYL fell and broke her leg so for the next 8 weeks I will not be on the band very much. Speakers for the Indianapolis RC fall schedule: Sept. 14 is Mr. D.H. Horner, mgr. of sales for R.L. Drake Co.; Sept. 28, Phillip E. Haller, W9HPG, Director, Central Division. All are invited to attend the two meetings at 8:00 PM CDT. WA9ABI new EC for Adams Co. Grant Co. ARC Hamfest Sept. 30, 1973 at 4-H Fair ground, Marion, Ind. IRCC meeting at Indianapolis Red Cross ARC Oct. 7, 1973. Hoosier Hill Hamfest at Spring Mill State Park Oct. 14, 1973. QIN Honor Roll: WA9EED, W9EI, K9HPD, K9HYV, WB9LHI. Op for the month K9HYV. BPLs: WA9EED, WA9WNH. Traffic: (June) WA9EED 506, W9FWH 244, K9FZX 185, WA9WNH 174, WB9FOT 164, K9HDP 148, WB9KVN 114, W9EI 96, K9HYV 90, W9BUQ 77, WA9OHX 77, W9QLW 76, WB9AHJ 58, WB9CAC 57, K9CBY 50, K9RWQ 46, W9PMT 36, W9UEM 35, K9RPZ 30, K9JQY 22, W9DZC 18, W9KWB 17, WB9BAP 15, K9DIY 14, WA9TJS 12, K9EQT 11, WA9AXF 10, W9UOZ 8, K9CTJ 7, WA9ULH 7, W9DKP 6, W9LG 6, W9HWR 4, WB9BEE 3, WA9OKK 3, W9RTH 2. (May) WN9IHH 259, K9YSL 10, W9AQW 1. (Apr.) WN9IHH 185.

WISCONSIN — SCM, Joseph A. Taylor, W9OMT — SEC: W9NGT. PAMs: K9FHI, WA9OAY, WA9QKP. RMs: W9UCR, K9LGU, K9KSA. Net statistics: WSBN QNI 967, QTC 117. WIN Latge QNI 155, QTC 74. WIN Early QNI 215, QTC 71. BWN QNI 468, QTC 328/288. The July QST column carried a report of a new group of Novices in the Portage area. They started out with a group of 29 people and came out with 16 new calls. A special thanks to K9MIF, who acted as chief instructor and also to W9BCC, WB9DSX, W9NNS, W9NYS, WA9CSC and K9WVM who also served as instructors. A fine group effort which every

NEW DRAKE TR-72

2-Meter FM Transceiver



- 23 Channels
- Superior Selectivity
- Completely Solid State

$320.00

Including dynamic microphone, DC power cord, mobile mount and desk mount brackets, microphone hanger, auxiliary connector, and external speaker plug

GENERAL: • **Frequency coverage:** 144-148 MHz • **23 channels,** 2 supplied (.52/.52 and .34/.94) • **Completely solid state** • **Current drain:** Rcv 0.4 A, Xmit 2.7 A (Hi power) or 1.2 A (Lo power) • **Voltage required:** 13.8 VDC • **Antenna impedance:** 50 ohms • **Frequency adjusting trimmers** on every crystal • **Size:** 7 1/16"W x 2 3/8"H x 9 7/16"D (18 x 6 x 24 cm) • **Weight:** 5½ lbs. (2.5 kg).

TRANSMITTER: • **RF output power:** 10 W min. (Hi power) or 1 W (Lo power) at 13.8 VDC • **Frequency deviation:** adjustable to ±15 kHz max., factory set to ±6.5 kHz • **Automatic VSWR protection**

RECEIVER: • **Crystal-controlled, double conversion superhet** • **Sensitivity:** Less than .35μV for 20 dB quieting • **Selectivity:** 20 kHz at -6 dB (±30 kHz and adjacent channel rejection at least 80 dB down) • **Audio output:** 1 W • **Audio output impedance:** 8 ohms • **Modulation acceptance:** ±7 kHz • **Image rejection:** -65 dB • **Intermodulation and other spurious responses:** at least 70 dB down.

DRAKE®

AC-10 POWER SUPPLY
for 115 VAC operation
$39.95

For complete details contact:

R. L. DRAKE COMPANY

540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 Telex: 288-017

AMATEUR ELECTRONIC SUPPLY USED GEAR

★ 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 !

ALLIED RADIO
- A-2516 Receiver $ 89
- A-2515 Receiver 59

AMECO
- CN-50 (14–18) $ 29
- CN-144 (7–11) 29
- PV-144 Preamp 9
- PS-1 AC supply 9
- CLB 6m mob. conv. 15
- TX-62 VHF Xmtr 75

BTI
- Linear Amps RF-2000/PS-2000 Table model $469
- LK-2000 469

CENTRAL ELECT
- 20A Exciter(table) $ 69
- QT-1 Anti-trip 6
- BC-458 VFO/10m 39

CLEGG/ SQUIRES-SANDERS
- 22'er 2m AM Xcvr $139
- 66'er 6m Xcvr 119
- 99'er 6m Xcvr 59
- Thor 6 (RF only) 85
- 417 AC sup/mod. 65
- 418 DC sup/mod. 35
- Zeus VHF Xmtr 275
- Interceptor Rec 225
- Allbander HF tuner 75
- 22'er FM series 25 2m FM Xcvr 225
- 22'er Mk II 2m AM 225

COLLINS
- 75A-2 Receiver $199
- 75A-4 (ser. #513) 325
- 75A-4 (ser. #765) 325
- 75A-4 (ser. #1713) 349
- 75A-4 (ser. #2061) 375
- 75A-4 (ser. #2081) 375
- 75A-4 (ser. #2146) 375
- 75A-4 (ser. #2343) 375
- 75A-4 (ser. #2652) 375
- 75A-4 (ser. #3314) 395
- 75A-4 (ser. #3535) 395
- 75S-1 Receiver 325
- R-388 Receiver 275
- R-390 Receiver 695
- 32S-1 Transmitter 349
- 312B-4 Speaker 19
- KWM-1 Transceiver 239
- 516F-1 AC supply 75
- 516F-2 AC supply 115

COMDEL
- CPS-11 sp. process $89

R L DRAKE
- 2B Receiver $189
- 2BQ spkr/Q-mult. 25
- 2BS Speaker 9
- 2C Receiver 189
- 2CS Speaker 9
- 2CQ spkr/Q-mult. 29
- 2NT Transmitter 109
- SPR-4 Receiver 395
- R-4 Receiver 275
- R-4A Receiver 289
- R-4B Receiver 339
- MS-3 Speaker 12
- MS-4 Speaker 15
- SC-6 6m conv. 59
- TR-3 Transceiver 349
- AC-3 AC supply 65
- DC-3 DC supply 85
- TR-4 Transceiver 425
- TR-4/noise blanker 485
- AC-4 AC supply 75
- RV-4 Remote VFO 69
- DC-4 DC supply 95
- T-4X Transmitter 299
- T-4XB Transmitter 375
- TR-4C Transceiver 489
- TV-100-LP low-pass 4
- ML-2 2m FM Xcvr 219
- AA-22 2m FM Amp 99

DYCOM
- 500-C 2m FM Amp $ 39
- 500-E 2m FM Amp 49

EICO
- 720 Transmitter $ 49
- 753 SSB Xcvr 119
- 751 AC supply 49
- 752 DC supply 49
- 717 Keyer 49

GLOBE/GALAXY/WRL
- Hibander 62 (as-is) $ 50
- 6-2 VFO 34
- G-300 DC supply 29
- VX-1 VOX 9
- Galaxy V Xcvr 239
- Galaxy V Mk II 259
- Galaxy V Mk III 279
- AC-35 AC supply 65
- AC-400 AC supply 75
- RV-1 Remote VFO 49
- VX-35 VOX 9
- SC-35 Speaker 12
- CAL-250 25 kHz cal. 19
- NOX-1 Novice adapt. 12
- 2000 Linear/supply 275
- AC 384A 69
- AC supply for rejector 4
- GT-550 Xcvr 329
- GT-550A Xcvr 389
- RV-550 VFO 59
- Duo-Power 300 69
- SC-550 19
- AC-210 AC DC supply-booster 19

GONSET
- Comm II 6m $ 75
- Comm IIB 6m 88
- Comm III 2m 99
- Comm IV 2m 149
- Comm IV 6m 119
- 2-6m VFO III 39
- GSB-100 Transmitter 169
- GC-105 2m Xcvr 119

HALLICRAFTERS
- S-38A Receiver $ 39
- SX-42 Receiver 99
- SX-71 Receiver 109
- S-108 Receiver 79
- SX-76 Receiver 119
- SX-101 Mk I Rec 125
- SX-101 Mk III Rec 149
- SX-101A Receiver 189
- S-106 Receiver 39
- SX-110 Receiver 49
- SX-111 Receiver 139
- SX-117 Receiver 189
- SX-130 Receiver 139
- R-46A Speaker 9
- R-46 Speaker 9
- R-46B Speaker 9
- HT-32 Transmitter 209
- HT-32A Transmitter 225
- HT-37 Transmitter 189
- HT-40 Transmitter 59
- HT-41 Linear 175
- HT-44 Transmitter 169
- HT-46 Transmitter 219
- SR-150 Transceiver 275
- SR-160 Transceiver 169
- PS-150-120 AC sup. 75
- PS-150-12 DC supply 69
- MR-150 Rack 19
- SR-400 Xcvr 499
- P-500AC AC supply 89
- P-500DC DC supply 95
- SR-2000 Xcvr 975
- FPM-300 Xcvr 429
- HA-6 Transverter 89
- SR-42 2m Xcvr 89
- SR-46 6m Xcvr 79
- HA-26 2–6m VFO 39
- HA-1 Keyer 59
- HA-5 VFO 49
- HA-16 VOX 12

HAMMARLUND
- HQ-100A Receiver $139
- HQ-110 Receiver 109
- HQ-110C Receiver 119
- HQ-110A Receiver 149
- HQ-110AC Receiver 159
- HQ-170 Receiver 149
- HQ-170C Receiver 159
- HQ-170AC Receiver 199
- HQ-170C with noise immunizer 199
- S-100 Speaker 9
- HX-50 Transmitter 175

HEATHKIT
- GR-54 Receiver $ 59
- GR-64 Receiver 39
- GR-78 Receiver 99
- HR-10 Receiver 49
- HR-10B Receiver 59
- HR-20 Receiver 69
- RX-1 Receiver 139
- SB-300 Receiver 209
- SB-301 Receiver 229
- SB-310 Receiver 229
- XC-6 6m converter 25
- SB-303 Receiver 289
- SB-600 Speaker 15
- HD-10 Keyer 29
- DX-20 Transmitter 29
- DX-35 Transmitter 35
- DX-40 Transmitter 39
- DX-60 Transmitter 59
- DX-100 Transmitter 89
- SB-10 SSB adaptor 75
- HX-10 Transmitter 189
- HW-10 6m Xcvr 119
- HX-20 Transmitter 119
- HW-20 2m Xcvr 129
- HW-12 75m Xcvr 75
- HW-12A 75m Xcvr 85
- HW-32 20m Xcvr 75
- HW-32A 20m Xcvr 85
- HW-16 Transceiver 99
- HW-101 Xcvr 269
- SB-100 Xcvr 325
- SB-610 Signal mon. 69
- SB-620 Scanalyzer 119
- HG-10 VFO 29
- HG-10B VFO 34
- HW-29 (Sixer) 34
- HW-30 (Twoer) 39
- VHF-1 (Seneca) 99
- HP-13 DC supply 49
- HP-23 AC supply 49
- HP-23A AC supply 54
- HRA-10-1 calibrator 8
- HO-13 Hamscan 69
- GD-125 Q-multiplier 15
- SB-650 freq. counter 169
- HW-17 2m Xcvr 125
- HWA-17-1 DC supply 9

JOHNSON
- Challenger $ 54
- Navigator 79
- Ranger I 89
- Ranger II 139
- Valiant I 139
- Valiant II 189
- Invader 200 225
- Invader 2000 475
- 6N2 VHF Xmtr 89
- Phone Patch 19
- 100kc Calibrator 9

KENWOOD
- TS-511S Xcvr $299
- PS-511S AC supply 79
- VFO-5 Remote VFO 79
- R-599 Receiver 249
- CC-29 2m Conv. 19
- CC-69 6m Conv. 19

KNIGHT
- R-100 Receiver $ 59
- R-100A Receiver 69
- X-10 calibrator 8
- T-150A Xmtr 69

(continued)
- V-44 VFO 19
- TR-106 6m Xcvr 59
- V-107 VHF VFO 19
- TR-108 2m Xcvr 79
- G-30 GDO 12

LAFAYETTE
- HE-45B Xcvr $ 75
- KT-320 Receiver 59
- HA-225 Receiver 79
- HA-250 Linear 69
- HB-502 AC supply 19

MILLEN
- 90651 GDO $ 49

MOSLEY
- CM-1 Receiver $ 99

NATIONAL
- NC-98 Receiver $ 89
- NC-109 Receiver 99
- NC-155 Receiver 119
- NC-183 Receiver 75
- NC-190 Receiver 139
- NC-270 Receiver 125
- NC-300 Receiver 129
- HRO-50-T1 Receiver 125
- XCU-300 calibrator 12
- NCX-3 Transceiver 169
- NCX-5 Transceiver 329
- NCX-5 Mk II Xcvr 359
- NXCA AC supply 75
- NCXD DC supply 75
- NCX-B AC supply 75
- 200 Transceiver 239
- AC-200 AC supply 69
- NCX-500 Xcvr 259

POLYTRONICS
- PC-2 2m Xcvr $129
- PC-62 6–2m Xcvr 169

RME
- DB-23 Preselector $ 29
- 4350A Receiver 109
- 6900 Receiver 189

REALISTIC
- DX-150A Receiver $ 89

REGENCY
- HR-2A 2m FM Xcvr $169
- HR-6 6m FM Xcvr 179
- HR-212 2m FMXcvr 199

ROBYN
- Digital 500 Xcvr $495

SBE
- SB-33 Transceiver $189
- SB-34 Transceiver 279
- SB-2MIC Mike 9
- SB-144 2m FM 199

SIGNAL/ONE
- CX-7 Xcvr (10-day warranty) w/ optional standard & deluxe CW filter installed $1195

SINGER
- PR-1 Panadaptor $ 89

STANDARD
- SR-C 826M 2m FM $225
- SR-C 146 2m FM hand-held 179

SWAN
- SW-240 Xcvr $169
- 400 Transceiver 169
- 406 VFO 49
- 420 VFO 69
- VX-1 VFO 12
- 117B AC supply 59
- 412 DC supply 75
- VHF-150 2m Amp 199
- 350 Xcvr (late) 289
- 512 DC supply 75
- 250-C 6m Xcvr 349
- 500 Transceiver 349
- 500C Transceiver 369
- 117XC AC supply 85
- 14-117 DC supply 95
- 500kHz xtal calib. 9
- NS-1 noise silencer 24
- VX-2 VOX 19
- 210 6m VFO 69
- 510X MARS osc. 39
- Mark II Linear 469
- NB-500 blanker 49

TAPETONE
- XC-50 (14–18) $ 29

TEMPO
- Tempo ONE Xcvr $289
- DC-1 DC supply 75
- FMA- 25w 2m FM 219
- ACA AC supply 34
- 502 2m FM Amp 79

TEN-TEC
- 250 AC supply $ 39
- 210 AC supply 19
- AC-4 SWR bridge 12
- AC-5 ant. tuner 6
- TX-100 Xmtr 99
- 405 Linear Amp 109
- PM-2B Transceiver 49
- 215 microphone 12
- KR-5 Keyer 24
- PM-2A Transceiver 39
- PM-3 Transceiver 49

VARITRONICS
- HT-2 Mk 2 2m FM walkie-talkie $119
- IC-2F 2m FM Xcvr 169
- IC-3P AC supply 79
- FM-20BM AC supply amp 59
- PA-50A 2m FM amp 69
- FDFM-2A 2m FM Transceiver 89

WATERS
- 361 Codax Keyer $ 49
- 3002 Universal Hybrid Coupler 49

YAESU
- FTDX-400 Xcvr $395
- FV-400S VFO 75
- FTDX-570 Xcvr 449
- SP-401 spkr. console 12

K W ELECTRONICS
- KW-202 Receiver $349
- SK-1 Speaker 19
- KW-204 Xmtr 349

9-1-73

NEW EQUIPMENT SPECIALS & CLOSEOUTS

Due to the low prices and limited quantities of the merchandise listed below all prices are for "Payment in Full With Order — No Trade"

CLEGG	reg.	NOW
22'er FM series 25	$284	$269
22'er Mk II AM	289	269
FM-27B New Demo	479	379
FM-21 220Mc FM Xcvr	299	199

COLLINS	reg.	NOW
75S-3B Rec.-New display	$1101	$880
32S-3 Xmtr-New display	1330	1064
351D-2 mob.mt -New display	337	137

R. L. DRAKE	reg.	NOW
L-4B Linear-New Display	$825	$649
TC-6 6m xmt. converter	278	248
CC-1 Converter console	49	49
CPS-1 Power supply	20	19
SCC-1 VHF calibrator	27	26
C-4 Console - New display	395	325

ETO	reg.	NOW
PA-70V Linear w 160m	$1875	$1275

EICO	reg.	NOW
751 AC supply - kit	$ 79	$ 49
751 AC supply - wired	109	79
752 DC supply - kit	79	49
752 DC supply - wired	109	69

GALAXY	reg.	NOW
RB-550A Rotor & control box	$229	$179
R-530 Receiver — NEW	895	795
R-530 Rec. — New Display	895	745
GT-550A New Display	595	450

GONSET	reg.	NOW
GSB-201 Mk IV Linear	$660	$360

HENRY	reg.	NOW
2K ULTRA — New Display	$845	$745
3KA — New Display	1080	980

HY-GAIN	reg.	NOW
HB252 stacked 2m Halos	$ 26	$ 9
HB254 4 stacked 2m Halos	54	19
400 Rotor	229	189
TH-6DXX torn carton (repaired)	189	159
14-AVQ torn carton (repaired)	55	45

KENWOOD	reg.	NOW
R-599 Receiver	$349	$319
T-599 Transmitter	395	359
CC-29 2m converter	31	29
CC-69 6m converter	31	29

LINEAR SYSTEMS (ADCOM)	reg.	NOW
350-6 6v DC supply	$125	$ 15

MOSLEY	reg.	NOW
CL-33 shipped to customer in error	$151	$129

PENWOOD	reg.	NOW
100E-24H 24-hour clock	$ 16	$ 12

REGENCY	reg.	NOW
HR-2A 2m FM Transceiver	$229	$179
TMR-4H 4 ch. Scanner	139	[illegible]

ROSS & WHITE	reg	NOW
FM-144-10J 2m FM Xcvr with tone encoder	$329	$229

SBE	reg.	NOW
SB-36 Transceiver — New	$969	$699
SB-SV Scanvision Monitor and Camera — New	899	599
SB-144 2m FM - new display	259	199
SB-450 450Mc FM Xcvr	349	299
SB-2MIC Mike (dynamic)	16	12

STANDARD	reg.	NOW
SR-C826MA New Display	$398	$27[illegible]
SR-C14U — New Display	5[illegible]	4[illegible]
SRC-146A hand-held — Demo	289	23[illegible]

SWAN	reg.	NEW
fm-2X 2m FM Transceiver	$299	$229

The following SWAN items are all New Display (factory warranty)

600R Receiver	$439	$33[illegible]
600R CUSTOM Receiver	545	445
600R CUSTOM SS16B	599	499
600R CUSTOM SS16B CW filt.	629	52[illegible]
600T Transmitter	569	52[illegible]

NOTE The above Swan items may be purchased on a Swan Credit Card

VARITRONICS	reg.	NOW
PA 50A 2m FM Amp. (*)	$129	$ 7[illegible]
FDFM-25 (mod. for MARS)	310	9[illegible]
FM-20BM Base Amp supply	225	4[illegible]
FM-20M Mobile Amp	150	4[illegible]

* = with 90-day AES warranty

WATERS	reg.	NOW
346 Neuverter 6 - 2 conv.	$125	$ [illegible]

BROWNING	reg.	NOW
Golden Eagle Mk III AM CB Base Station (Rec. & xmtr)	$495	$3[illegible]

REGENCY CB	reg.	NOW
Imperial 23 ch. 110& 12v	$299	$1[illegible]

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

IMPORTANT! — Please Be Sure to send all Mail Orders and Inquiries to our Milwaukee store, whose address is shown above. The following Branch stores are set up to handle Walk-in business only.

17929 Euclid Ave.: Cleveland, Ohio Phone (216) 486–7330

621 Commonwealth Ave.: Orlando, Florida Phone (305) 894–3238

AMATEUR ELECTRONIC SUPPLY

is the Best Place to purchase your new

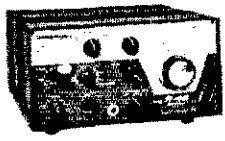
DRAKE *gear for the following reasons*

TR-72 2m FM Xcvr, 12vdc, 23 ch.	$299.95
TR-22 Portable 2m FM Xcvr	219.95
AA-22 Rec./Xmtr. Amplifier	149.95
MMK-22 Mobile Mount	9.95
AA-10 10 watt 2 meter Amplifier	49.95
AC-10 supply for TR-22/AA-10 TR-72	39.95
Extra crystals for TR-22, TR-72 each	5.00
DSR-1 Digitally synthesized Receiver	2195.00
Rack panel adaptor for DSR-1	125.00
2C Receiver	$295.00
2AC Calibrator for 2C	18.75
2CS Speaker for 2C	22.00
2CQ Speaker/Q-multiplier for 2C	49.00
2NB Noise Blanker for 2C	26.95
R-4C Receiver	499.95
4NB Noise Blanker	65.00
Filters: 250, 500 cycle; 1.5, 6.0 kHz	50.00
MS-4 Speaker for TR-4C, R-4C, SW-4A	22.00
TR-4C Transceiver for 80-10 Meters	599.95
34PNB Noise Blanker	100.00
RV-4C Remote VFO for TR-4C	110.00
FF-1 Crystal cont. adapt. for TR-4C	46.95
AC-4 AC supply for TR-4C, T-4X	99.95
DC-4 12vdc Supply for TR-4C	125.00
MMK-3 Mobile Mounting kit for TR-4C	6.95
MC-4 Mobile Console for TR-4C	69.00
2NT CW Transmitter	175.00
T-4XC SSB Transmitter	530.00
L-4B Linear Amplifier	825.00
MN-4 Antenna Match Network	99.00
MN-2000 Antenna Match Network	195.00
W-4 RF Wattmeter (2-30 Mc)	61.95
WV-4 RF Wattmeter (20-200 Mc)	73.50
C-4 Station Control Console	395.00
SW-4A AM Shortwave Receiver (tube)	335.00
AL-4 Loop Antenna – BC Band	29.00
AN-5 Short Wave outdoor antenna	8.80
TV-42-LP 100w Low-pass Filter	8.95
TV-1000-LP 1000w Low-pass Filter	18.75
TV-300HP High-pass Filter	6.95
LN-4 Line Filter, 120v, 5 amp	8.00
Crystals for 2C, R-4C, SW-4A, T-4XC	5.00
Fixed-Frequency Crystals	7.50
729SRD Microphone with plug	19.95
SPR-4 Programable Receiver	579.00
ACCESSORIES FOR SPR-4	
SNB Noise Blanker	$ 65.00
DC-PC DC Power Cord	5.00
TA-4 Transceive adaptor for SPR-4	25.00
SCC-4 Crystal Calibrator	20.00
RY-4 Teletype adaptor	10.00
DIAL Crystal Selector - plain	2.35
CRYSTAL KITS FOR SPR-4	
Aeronautical Overseas – 7 crystals	$ 32.00
Amateur Bands – 6 crystals	27.00
Citizens Band – one crystal	5.00
Marine Bands – 11 crystals	49.00
MARS – 5 crystals	22.00
Teletype Commercial – 4 crystals	18.00
Time & Freq. Std. WWV – 5 crystals	22.00

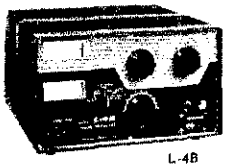
TR-72

TR-22

Order Today
Direct from this Ad



R-4C



L-4B

your BANKAMERICARD welcome

- TOP TRADES for your good clean equipment
- STAY-ON-THE-AIR PLAN – Enables you to keep your trade-ins until your new gear arrives – Lose no operating time!
- PERSONAL SERVICE from fellow hams who understand your problems.
- SAME DAY SERVICE on most Orders and Inquiries from our Centrally Located Modern Facilities
- Top Notch Service Department
- LARGE COMPLETE STOCK means Fast Deliveries. United Parcel Service available to most parts of the country. – UPS Blue label (AIR) to the West Coast.
- GECC Revolving Charge Plan. Only 10% Down. LOW Monthly Payments – for Example: $10 a month finances up to $300; $20 up to $610. Write for complete information and credit application.

SAVE up to $100.

If you purchase any of the new Merchandise listed below at the Regular Price and Without a Trade-in, you may take the "Bonus" Credit indicated below toward the purchase of other merchandise (such as power supplies, antennas, towers, microphones, crystals, linears, accessories, etc.)

TR-22 2m FM	$10 Bonus	SPR-4 Receiver	$40 Bonus
TR-72 2m FM	$20 Bonus	TR-4C Xcvr	$50 Bonus
R-4C Receiver	$40 Bonus	C-4 Console	$40 Bonus
T-4XC Xmtr	$40 Bonus	L-4B Linear	$100 Bonus

SIX EZ-WAYS TO PURCHASE
1. CASH
2. C.O.D. (20% DEPOSIT)
3. MASTER CHARGE
4. BANK AMERICARD
5. AMERICAN EXPRESS
6. GECC REVOLVING CHARGE

master charge THE INTERBANK CARD

Ray Grenier, K9KHW
Mgr. Mail Order Sales

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

IMPORTANT! – Please Be Sure to send all Mail Orders and Inquiries to our Milwaukee store, whose address is shown above. The following Branch stores are set up to handle Walk-in business only.

17929 Euclid Avenue; Cleveland Ohio Phone (216) 486–7330
621 Commonwealth Ave.; Orlando, Florida Phone (305) 894–3238

To: AMATEUR ELECTRONIC SUPPLY
4828 W. Fond du Lac Ave. Milwaukee, Wis. 53216

I am interested in the following new equipment:

I have the following to trade (what's your deal?)

Ship me:

I Enclose $ ____ I will pay balance (if any):

☐ COD (20% Deposit) ☐ GECC Revolving Charge Plan
☐ Master Charge* ☐ BankAmericard ☐ American Express

Account Number:

Expiration DATE ____ *Master Charge Interbank number ____ (4 digits)

Name:

Address:

City & State:

☐ Send used gear list

area in the section would be proud to emulate. If you know of anyone in the Waukesha area who needs help obtaining a license, the Waukesha County Technical Institute have courses in amateur radio. Field Day was the big activity of the month. Your SCM received reports from 16 different Field Day groups. The Green Bay, Manitowoc and Neenah Menasha groups had a little three corner challenge going with the loser buying beverages at the picnic in Aug. The WNA picnic was a good time for all and the cw boys regained the crown in the annual baseball game. Congrats to K9OXY for a new personal DX record of 1008 miles on 144 MHz, and to K9LGU new RM assuming duties as net mgr. of the late session of WIN. KH6IAC's XYL and harmonic were home visiting in the Dresser area. The OM is looking for Wisc. homeland QSOs. K9AJY/WA6IDQ just returned from Calif. and active on RTTY. Traffic: W9CXY 342, K9FHI 70, W9AYK 58, WB9ABF 57, W9UCR 51, K9LGY 48, WA9OAY 34, W9KRO 25, K9KSA 23, WA9BZU 21.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Harold L. Sheets, WØDM — SEC: WAØAYL. OBS: KØPVG/Ø. RM: WAØMLE. OO: WØBF. Two FD groups reported activities: The Bismarck Radio Club had 11 operators and 500 watts auxiliary power at the lake. The Three Rivers Club were again at Ft. Abercombie this year with good attendance and contacts. Some members of the Forx Club went to Icelandic Park. WØRTK/Ø was on and ended up as NCS for the PON Net. New Novices are WNØJML, WNØKFD and WNØKSC. WBØFDT helped WØGFE with his tower and came up with some goodies for a new linear. He acquired a band spanner whip and is working mobile. WBØAUB spent some time in the hospital. WAØMND recovering from surgery. WSBIV a new call in Fargo working in the Veteran's Administration. Welcome! WA7BWU/Ø is a newcomer to Minot. WAØMLE again made the PSHR. KØFRP on leave from the Navy operated with the Three Rivers Club at Ft. Abercombie on FD. He is mobile with an SB-101 and Hustler antenna. WAØOVT/Ø put in a good cw sig running 2 watts on his way to the Peace Garden.

Net	kHz	Sess.	CDT/Days	QNI	QTC	Mgr.
Goose River	1990	4	0900 S	54	0	WØCDO
RACES	3996.5	21	1830 M-F	413	35	WBØATJ WAØSUF
PON	3996.5	13	0900 S 1830 S-S	219	9	WAØSJB

Traffic: WAØMLE 85, WAØSUF 54, WØDM 20, WBØBMG 8, WØMXF 8, WAØJPT 5, WØCDO 2.

SOUTH DAKOTA — SCM, Ed Gray, WAØCPX — The following clubs reported FD activity to your SCM: Huron ARC, Prairie Dog ARC of Vermillion/Yankton, Hub City ARC of Aberdeen, Clear Lake Amateurs, Mitchell ARC and Signal Hill ARC of the Northern Black Hills. WBØEKL has received his General Class ticket. John is already active on ht as well as two meters. A number of amateurs in the state have been making over 250 mile contacts on two meters when tropospheric bending conditions are optimum. Net reports: Early Morning Net — 350 QNI and 24 QTC; Early Evening Net — 343 QNI and 6 QTC; Late Evening Net — 814 QNI and 28 QTC. The NJQ and CW Net also are active. Traffic: WØHOJ 120, WAØUEN 80, WAØROK 51, WØIG 30, WØMZI 24, WØCLS 16.

DELTA DIVISION

LOUISIANA — Acting SCM, Louis A. Muhleisen, Jr., WB5AEH — SEC: K5SVD. RM: W5GHP. PAM: WA5NYY. VHF PAM: WA5KND. Field Day has come and gone. Some clubs are already planning for next year. Hopefully they will be able to avoid Murphy, and win the coveted La. Field Day trophy. However from reports received thus far, the 1973 version of Field Day was by far the best effort. Many clubs scored higher than in any previous year. The ARCSWLa for the fifth straight year furnished communications for the annual YMBC air show in Lake Charles. The air show, while a huge success, was marred by the loss of the No. 5 Blue Angel. WA5RKD and W5SKW were the 3rd and 4th vehicles on the crash site. WA5RKD was the first to be able to report to the tower and to the Navy that the pilot of the aircraft had ejected safely. W5SKW, while on the opposite side of the burning F-4-J was instrumental in keeping sightseers from getting to close to the burning wreckage until authorities could arrive. Congrats to the ARCSWLa for a job well done. LARC is hoping to put a repeater into service soon. The JARC in cooperation with other ARCs in the New Orleans area will sponsor a New Orleans hamfest to be held at the Metairie

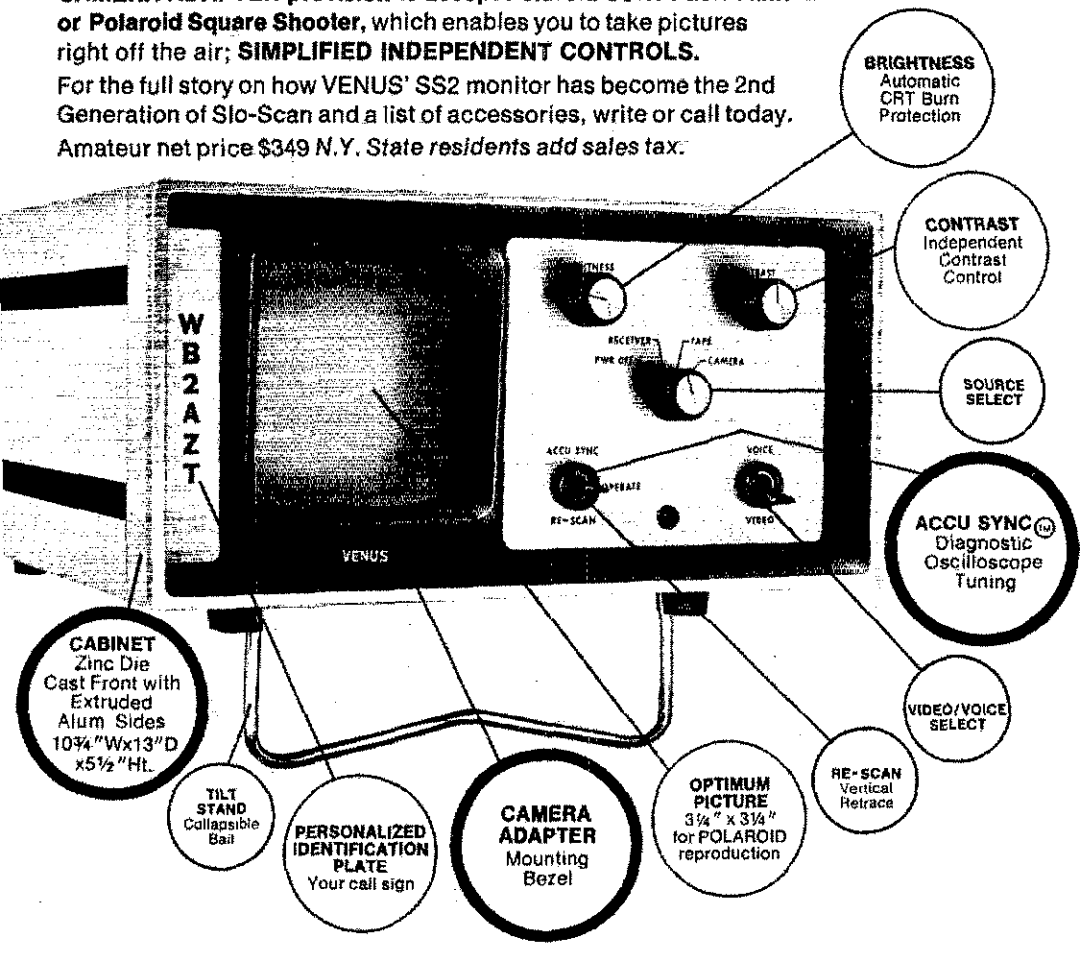
2nd generation slo-scan

Venus Scientific brings ten years of space-age technology development to the production of the latest breakthrough in HAM Equipment... the SS2 Slo-Scan Monitor. The following unique features of the SS2 have been designed to offer the HAM operator the maximum functional performance in SSTV.

These advances include: **ACCU SYNC,**© a diagnostic and tuning aid which converts the SS2 Monitor to an oscilloscope by the flip of a switch that monitors incoming and outgoing video; **LED SWEEP INDICATORS,** go-no-go lights for ease of servicing; **CAMERA ADAPTER provision to accept Polaroid Color Pack Camera or Polaroid Square Shooter,** which enables you to take pictures right off the air; **SIMPLIFIED INDEPENDENT CONTROLS.**

For the full story on how VENUS' SS2 monitor has become the 2nd Generation of Slo-Scan and a list of accessories, write or call today.

Amateur net price $349 *N.Y. State residents add sales tax.*



Venus Scientific Inc.

The company that put high voltage on the moon, now brings you expanding amateur radio technology.

399 Smith Street
Farmingdale, N.Y. 11735
Phone 516-293-4100
TWX 510-224-6492

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

playground on Oct. 7. Contact WA5WEY for furthe information. Talk in will be by W5GAD on 3950 kHz, and on th 34-94 repeater. Traffic: W5GHP 192, W5MI 118, WA5ZZA 6 WA5NYY 45, WA5QVN 26, WA5WBZ 7, W5EA 6, W5CEZ WB5IDV 1.

MISSISSIPPI — SCM, Walker Coffey, W5NCB — Ass SCM: Gene McGahey, WA5JWD. SEC: WA5FLL. PAMs W5JHS, WA5KEY. RMs: WA5YZW, WB5EIN. Stations i Miss. continue to increase traffic growth, handling 11,50 messages in 1972. Welcome to new hams: WN5JMY, WN5JWX WN5JWZ. WA5TMC is building an HW-101. WN5FGC passe Advanced. WB5GRI passed General. K5YPR has new 20 wpr CP certificate. Congrats to K5VVM now Starkville Aldermar New officers Monroe ARC: WB5GUD, pres.; W5DAT vice-pres.; WB5GRI, secy.-treas. Ripley Repeater Assn. has 1 members. WA5CAC back home from Saigon and handlin traffic. Field Day activities were great.

Net	Freq.	Time(Z)/Dys	QNI	QTC	Mgr.
MTN	3665	2345 Dy	182	173	WA5YZ
MNN	3733	2400 MWF	78	63	WB5EI
GCSBN	3925	2330 Dy	—	—	W5JH
CGCHN	3935	0100 Dy	1286	134	WA5VV
MSPON	3970	2345 MS	312	22	WA0GV
MSBN	3987.5	0015 Dy	734	60	WB5BU

Traffic: WB5DLW 155, WB5FML 155, W5SBM 152, WB5EI 140, W5NCB 73, WA5YZW 72, W5EDT 66, K5YTA 5 WA5THM/5 35, WA0GVO/5 22, WB5BKM 14, W5BW WB5DCY 6, WB5CKK 2, WB5HKK 2, K5YPV 2, WA5TMC

TENNESSEE — SCM, O.D. Keaton, WA4GLS — SEC WB4DYJ. PAMs: W4PFP, K4MQI, WA4EWW, WA4NE RM: W4ZJY.

Net	Freq.	Sess.	Time(Z)/Dys	QNI	QTC	Mgr.
TPN	3980	30	1145 M-F 1300 SSuH	1561	39	W4PFP
TSSBN	3980	27	2330 M-S	1271	52	K4MQI
ETPN	3980	23	1040 M-F	583	24	WA4EW
TCN	3980	5	0100 Th	42	1	W4CYL
TPON	3980	4	2330 Su	141	11	WB4BH
TN	3635	30	2300 Dy	205	100	WB4YC
TNN	7135	27	2300 Dy	67	14	WB4NI
ETVHFN	50.7	13	2300 MWF	142	0	W4SGI
ETVHFN	146.2	10	2300 TTh	35	0	WB4DZ
ETTMN	28.7	8	0100 W&F	32	0	WB4NF
MTTMN	28.8	7	0100 T&Th	43	0	W4EAY
KVHFN	50.7	4	0000 T	19	0	WB4MP
ACARECN	146.28 146.88	4	0000 M	53	0	WA4BX

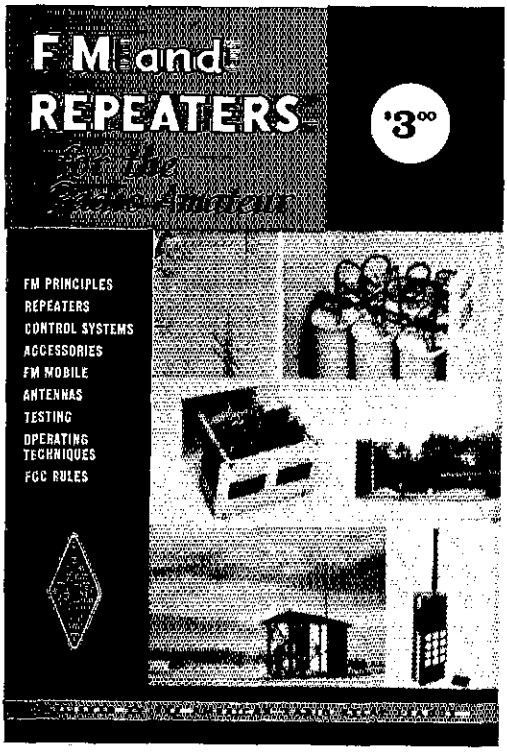
May CW Net Honor Roll: K4CNY, WB4NIR, WB4DJU, W4ZJ and WB4VIX. (Apr.) WB4NIR, W4ZJY, WB4YCV, K4CNY WB4BUE, WB4VIX and WB4DJU. The CW Net "Operator o The Year Award" was earned by WB4YCV. The TNN awar earned by WN4YDY. The TNN QNI award earned b WN4YDY. Officers of the Pickwick Amateur Radio Club ar WA4LAX, pres.; WB4PRF, vice-pres.; WA4WHX, secy.-treas. WA4HGN, act. mgr.; WA4TPA, trustee. TN certificates hav been given to WA4FZT, WB4VIX and K4ON for their fine wor in the net. W4ZJY is now a member of the Old Timers Club Traffic: K4CNY 180, WB 4YCV 98, WB4NIR 63, WA4GLS 56 W4ZJY 53, WB4ANX 37, WB4DJU 26, WB4MPJ 26, W4RU 16, K4VVE 16, W4SGI 14, K4SJV 14, WB4DYJ 12, WB4WH 11, WN4AVD 8, K4SXD 7, WB4UZD 2.

GREAT LAKES DIVISION

KENTUCKY — SCM, Ted H. Huddle, W4CID — SE WA4GHQ. Endorsements: K4QCQ and WB4NHO as ORS W4OTP as PAM; K4UDZ as EC. BPLs for June: W4BA WA4IQS and WB4ZMK.

Net	QNI	QTC	Net	QNI	QT
KTN	847	164	KNTN	111	10
KYN	248	273	KPON	79	2
MKPN	518	47			

The summer blahs are beginning to affect our traffic totals bot individually and nets. Originate! Don't forget to reapply for yo call letter license plates. The deadline is Oct. 31 and forms a available from the county clerks or the DMV in Frankfort. Th



This book is a *must* for the fm buff as well as the operator just breaking into fm and repeaters. Everything is covered! Fourteen chapters include: mobile installation, transmitters, receivers and antennas for mobile and base, and fm test equipment. Special sections treat alignment and troubleshooting gear as well as repeater technical problems and cures. Club organization, repeater location planning, and operating under the new regulations are all covered. If you operate fm or are just becoming interested, you cannot afford to be without this book.

Available at your dealer's or postpaid from ARRL. **$3.00** in U.S.A. **$3.50** elsewhere.

The **AMERICAN RADIO RELAY LEAGUE, INC.**

NEWINGTON, CONN., U.S.A. 06111

Owensboro tribe is all tuckered out with two boat races and one emergency search being handled during June. WB4AUN has just purchased a new QTH which just happens to be the highest point in Jefferson County. K4TXJ aided an accident scene in Louisville using 2 meters. Traffic: WA4JQS 259, W4BAZ 247, WB4ZMK 174, K4UNW 167, WB4EOR 121, WA4VZZ 111, K4TXJ 76, WN4YQS 73, W4CID 69, WA4GHQ 41, K4YZU 38, WB4AUN 31, WA4AVV 26, K4AVX 18, W4CDA 17, WA4FAF 16, WA4ANN 14, W4FLG 13, K4LOL 11, WA6KTN/4 8, WA4UMR 8, WB4ZSA 8, WB4DNZ 7, WB4GCV 4, WB4FOT 3.

MICHIGAN — SCM, Ivory J. Olinghouse, W8ZBT — SEC: W8MPD. RMs: W8IYA, W8WVL, W8RTN, K8KMQ, W8GLC. PAMs: W8GVS, WA8KHB, WB8HQS. VHF/PAMs: K8AEM, WA8WVV.

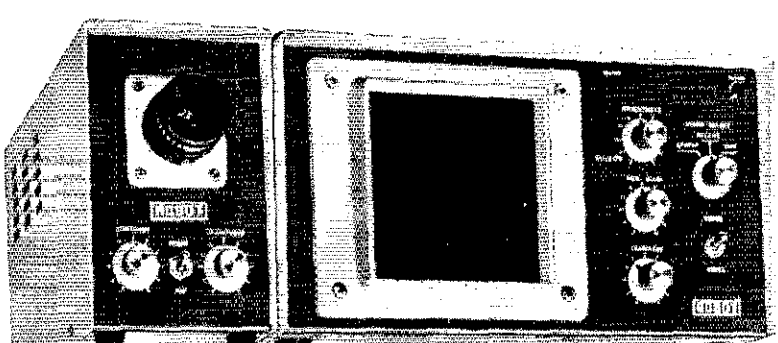
Net	Freq.	Time/Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2200 Dy	603	267	59	W8IYA
WSBN	3935	2300 Dy	553	97	30	W8GVS
BR/ MEN	3930	2130 S-F	687	69	25	WA8KHB
UPEN	3920	2130 Dy	428	51	30	WB8HQS
GLETN	3932	0130 Dy	813	163	30	WB8AXI
PON	3985	1500 Dy	932	394	30	K8LNE
PON/ CW	3645	2300 M-S	136	30	27	VE3DPO
Mi.6M	50.7	2300 M-S	157	19	23	WA8VXE
Mi.Nov.	3720	2130 Dy	135	48	24	WB8JAD

K8ZWR reports the SW Mi. 6-meter weather net held 4 drills with 32 QNI. The SW Mi. 2-meter net had 8 sessions with 88 QNI, QTC 2, W8CVQ and WA8WVV as NCS. W8LRC and ex-W8LJZ have joined Silent Keys. W8FMO is the new treas. for MCRC. W8OW keeping busy these days on PON, BR, Wolverine, Great Lakes E&T and 6M Traffic Nets. Field Day went very good in Mich. — 12 messages were sent to the SCM. W8QBE is a good teacher, his class turned out 5 — WN8OHH, WN8PGE, WN8PGG, WN8QFW and WN8PJW. WN8PPB, WN8POZ are new Novices in the Lansing area. WN8PTM is new in Grand Rapids. The Lansing Outboard Club sponsored boat races and CMARC furnished communication; participating were WB4VVA/8, K8ILF, WA8QCS, WA8DLI, K8HKM, W8THZ and WA8ILY. W8KHY now has a 64-ft. self supporting tower. WA8MOA has a 5-ft. dish for 432 MHz. CR6CA has been visiting hams in the Battle Creek area. From the amount of news and reports the vacation period is well started. Traffic: WA8WZF 370, K8KMQ 214, K8DYI 206, WB8JAD 180, K8LNE 177, W8GLC 134, W8IYA 112, WB8ITT 107, W8ZBT 106, K3SJL/8 83, WA8ENW 80, W8OW 67, W8IBX 65, WB8FBG 56, W8UFS 51, W8MO 48, WB8BYB 47, WB8MJI 47, W8NOH 46, K8WRJ 46, WB8EEU 45, W8IUC 45, WB8HQS 43, K8JED 41, WB8IMI 37, W8GVS 35, W8OKW 32, WB8DJS 30, WA8OJI 28, WA8FXR 27, WB8NCD 27, W8TZZ 27, WB8HPZ 22, W8VXM 20, K8IHA 18, K8RNP 18, WB8HIB 17, WA8RXI 16, W8FZL 14, WB8IFD 13, W8VIZ 13, K8TYN 12, W8DCN 11, K8TIY 11, WB8APN 10, WB8DKQ 10, WB8AXI 9, WB8EUN 9, W8IXJ 9, W8ACW 8, K8GXV 8, WB8BJY 7, W8EU 7, WB8IJI 7, WA8WVV 7, W8QBE 6, K8SDA 6, WA8PDN 5, K8ACO 4, W8HKL 4, WA8CUP 3, K8AEM 2, WB8DRT 2.

OHIO — SCM, William E. Clausen, W8IMI — Asst. SCM: Kenneth L. Simpson, WA8ETX. SEC: WA8COA. RM: WA8WAK. PAM: K8UBK. VHF PAM: WA8ADU.

Net	QNI	QTC	Sess.	Freq.	Time(Z)	Mgr.
OSSBTN	2072	1083	81	3972.5	1430/2000/ 2245	K8UBK
BN	442	314	60	3577	2300/0200	WA8WAK
O6MtrN	517	78	30	50.16	0100	WA8ADU
OSN				3577	2225	WA8WAK
BN RTTY	100	26	30	3605	2200	K8NCV
BN Novice				3730	2300	WN8NDV

New appointees: W8GRT, EC Northwest Ohio; WB8BOK, EC Ashland Co.; WB8FWF, EC Sandusky and Seneca Co. Renewals: W8NAL, ORS; WA8DWL, OBS/OPS. The Ohio Novice Net, on 3740 at 2230Z, had 23 QNI and 12 QTC. The Findlay Hamfest is Sept. 9 at Palisade Park and the Cincinnati Stag Hamfest is Sept. 16 at Stricker's Grove at Ross (Venice). Plan to attend the Seventh Annual 8th Region ARPSC Conference at Cincinnati on Sept. 15. WA8COA has full information and says there may be a warm-up session the night before. This conference is for all public service minded hams, especially ECs and other leaders. OVS WA8KPN says the June



This is Robot's new improved SSTV EQUIPMENT

VITH NEW FEATURES THAT MAKE ' EASIER TO TRANSMIT AND ECEIVE BETTER PICTURES, ET AT NO CHANGE IN PRICE.

he new Robot Model 80A Camera and Model 0A Monitor remain essentially the same com-ete SSTV equipment as our earlier models, it have new features added to give more ac-irate operator adjustment and flexibility of peration, yet as you'll notice, our low prices main the same.

e new Model 80A Camera offers four ditional features:

A BLACK AND WHITE REVERSAL SWITCH which enables you to transmit a positive or negative image, for complete flexibility in choice of figure, background appearance.

QUARTER, HALF AND FULL FRAME SELECTOR for variety in SSTV format and rate. Permits 2, 4, or 8 second transmissions, depending on whether ¼, ½ or full image area is used.

BRIGHTNESS AND CONTRAST CONTROLS for hands-on, direct-coupled operator control of picture brightness and contrast. Allows adjustment for highlighting difficult or hard-to-get portions of subject matter.

FAST SCAN OUTPUT for instant view of camera picture on Robot Model 60 or 61 Viewfinder, or oscilloscope with adapter.

The improved Model 70A Monitor has:

1. A NEW TUNING INDICATOR for accurate tuning of your receiver for best slow scan signals.
2. AUXILIARY DEMODULATED SSTV OUTPUT for external tuning meter or oscilloscope monitoring of SSTV signal swing.
3. PULL-ON BRIGHTNESS KNOB for repeatable setting of brightness control. Operator can now turn monitor on and off without altering control setting.
4. Same complete SSTV switching and interconnecting circuitry for simple integration of Robot SSTV into any amateur station.

SAME LOW PRICES:

ROBOT MODEL 70A MONITOR	**$295.**
ROBOT MODEL 80A CAMERA	**$295.**
25mm f1.9 CAMERA LENS	**$ 25.**
25mm f1.4 CAMERA LENS	**$ 37.**
Macro CAMERA LENS (Pictured)	**$ 54.**
ROBOT MODEL 60 VIEWFINDER	**$249.**
ROBOT MODEL 61 VIEWFINDER	**$239.**
MODEL 11 VIEWING HOOD	**$ 25.**

CALIBRATION TAPES Cassette $4, Reel $3.

All Robot equipment carries a one-year warranty.

ORDER ANY OF THE ABOVE EQUIPMENT DIRECT FROM THE ROBOT FACTORY. Four easy ways to purchase: Cash, C.O.D., Master Charge, Bank-Americard.

ROBOT

ROBOT RESEARCH INC. 7591 Convoy Court-San Diego-Calif. 92111-U.S.A. Phone 714 279-0488

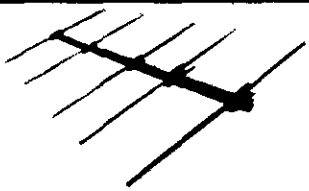
VHF QSO Party had the best conditions in years; good ground wave, scatter, aurora and sporadic E. ORS W3JZJ/8 and XYL WN8ONN left for three years in Italy and an 13 ticket. The Apricot Net provided communications for Cleveland's Flag Day Parade. K8ONA is hosting a new ham radio interview program Sun. at 3:30 P.M. on Cleveland's WELW-FM. W8OMY has a new weekly ham radio column in the Columbus Dispatch (Fri.). Central Ohio AREC, with assistance from Ross-Pike Co. AREC and Southwest Ohio AREC, provided 80 operators in mobiles, at portable stations and in a helicopter for the TOSRV, a 210 mile bicycle tour with 3000 riders. W8OUU presented an artificial resuscitation program and demonstration at the Greater Cincinnati ARA meeting. W8BFT spoke on marine communications at the Westpark Radiops meeting. Cleveland's WR8ABC has a new publication with WB8JYR as editor. All clubs reported successful FD operations and fine weather but Murphy reportedly made numerous visits. SEC WA8COA and I enjoyed our visit with the newly organized Knox County AREC group. It is time for your club to prepare for the Oct. 13 meeting of the Ohio Council of ARCs — all clubs are invited to participate. Contact W8OUU for full information. Congratulations to WB8KXV on his Advanced ticket and to OVS WB8BOK who now has 45 states on six meters. EC K8ONV reports that more than 50 hams participated in the relief effort following the tornado at Willard. They came from many northern Ohio communities including Toledo, Oak Harbor, Akron, Cuyahoga Falls, Mansfield and Galion. Another fine achievement for ham radio public service! Traffic: W8CUT 1095, WA8YLW 246, W8MGA 203, W8PMJ 167, K8MLO 151, W8SUS 143, WA8HGH 112, WB8AYC 108, K8UBK 108, WA8WAK 106, WA2ASM/8 104, WB8IGW 103, W8MOK 99, W8ENI 94, WB8KKI 94, W8JD 90, WB8HUP 88, WB8NRC 73, WA8DWL 68, WA8VWH 66, WB8BZX 65, WB8KXV 65, WA8SED 64, WA8MCR 62, WB8MLH 61, WB2FWW/8 60, WB8EEZ 53, WB8KEO 47, WA8SSI 45, W8LT 41, WB8HWE 34, WA8MAZ 34, W8QZK 33, WA8UPI 32, W8GVX 30, W8OE 30, WA8ADU 29, W8DDG 27, W8FGD 22, WA8MIH 22, W8ARW 20, W8LZE 20, WA8ZYE 20, W8BHL 19, WA8MHO 19, WA8KPN 18, K8CKY 16, WB8KZD 16, W8WEG 14, WB8DEF 12, W8GOE 12, K8BYR 10, K8JDI 10, WB8KVU 10, WB8GGR 8, WB8AKW 7, K8BNL 5, WN8MYA 5, W8NAL 5, WA8ZNC 4, WB8AYM 3, WA8BCX 3, WB8CLF 3, W8ETU 3, K8DHJ 2, WA8FSX 2.

HUDSON DIVISION

EASTERN NEW YORK SCM, Graham G. Berry, K2SJN — Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2URP. RMs: WA2FBI, WB2IXW and K2DN for RTTY. See past columns for daily nets. Hudson Division PR Net growing each month — sign your club in on 2nd and 4th Sun. on 3.925 MHz at 2200Z for mutual help discussions — working FB for other clubs. Novices: get your feet wet in traffic handling on Westchester County Novice Net Tue. and Sun. 2330Z on 3.725 MHz. Congrats to all who made possible the improvement in AREC score for the last SET — among the top ten in the country with a 77% higher score (no wonder W2URP has that cat-that-ate-the-canary look!). Much discussion around the section about the proposal to make ENY mean what it says! Let your Director K2SJO know how you feel about adding on some of the rest of the Eastern Counties above Albany to the section. Lots of traffic coming out of Camp Idylwold in Schroon Lake (WNY Section) to ENY nets from WA4PDM/2, serving at the Camp for his seventh year; that's real "public service" to be proud of! Some derogatory comments on new Novice FCC exams; let Hq have your opinion pro and con for eventual discussion with FCC. All appointees note your continuance as a CD appointee requires active ARRL Membership; had to drop a couple lately, and don't want to lose any more because you forgot to renew. Nice to have received so many Field Day messages even though your SCM went into hiding in the boon docks, the traffic reached in good order. WN2RVZ a new Novice in Hyde Park. Welcome aboard. W2URP raised tower and beams for 20-6-2 at summer location as WB2IWE, WB2BWE pres. of Taft RC as new school term starts. WB2HZY recent vistor to England, as was WB2WWD. New directors at Westchester ARA W2AMI, W2RP, WA2TNC, WA2UIJ and W2CFU. Officers (in usual order) W2KFB, WB2ZMK, W2CZA and WA2GKB. W2CDQ showed his East Africa slides to Ladies Night at Albany ARA. Does your club use "home talent" for meetings? Good idea. Once again, all clubs check your mailing list to be certain SCM's name appears to insure column coverage; remember time lag of two months "kills" most dated items. Traffic: (June) WA2CNE 365, W2GPF 90, WA2LIK 82, W2URP 40, K2SJN 35, WA2EAH 31, WA2RFP 12, WB2BWE 9. (May) K2DM 47, K2UYK 43.

WILSON ELECTRONICS

W7GVA designed MONO & DUO BAND BEAMS



QUALITY MONO & DUO BAND BEAMS AT LOW PRICES

Wilson Electronics offer a complete line of Mono & Duo Band Beams. With our purchasing power on large quantities of aluminum and low overhead, we can give you a rugged heavy duty top quality beam for a much lower price than any other manufacturer.

NEW IMPROVED WIDE SPACED 40, 20, 15 & 10 METER BEAMS

All W7GVA beam elements are constructed of the finest aluminum available, 6063T832 and 6061-T6 both top quality alloys.

All Wilson Electronics beams have a 3" O.D. boom made of top grade aluminum 6063-T6.

All our beams come complete with adjustable reactance tuned gamma match network which can handle 4 KW plus on CW and SSB.

WILSON MONO BAND BEAMS

Model No.		
M340	3 ELE. 40 METER BEAM (full size)	$420.00
	Boom length 38.5 ft. 3" OD .200 wall to .065. (w/re-enforcing kit)	$498.75
M240	2 ELE. 40 METER BEAM (full size)	$225.75
	Boom length 16 ft. 3" OD .065 wall. (w/re-enforcing kit)	$278.25
M720	7 ELE. 20 METER BEAM	$409.45
	Boom length 58.5 ft. 3" OD .200 wall to .065 wall. (w/re-enforcing kit)	$431.55
M620	6 ELE. 20 METER BEAM	$314.95
	Boom length 50 ft. 3" OD .200 wall to .065 wall. (w/re-enforcing kit)	$333.90
M520	5 ELE. 20 METER BEAM	$178.45
	Boom length 40 ft. 3" OD .065 wall. (w/re-enforcing kit)	$194.25
M420	4 ELE. 20 METER BEAM	$146.95
	Boom length 30 ft. 3" OD .065 wall. (w/re-enforcing kit)	$159.60
M320	3 ELE. 20 METER BEAM	$ 99.95
	Boom length 20 ft. 3" OD .050 wall. (w/re-enforcing kit)	$108.95
M715	7 ELE. 15 METER BEAM — — Boom length 40 ft. 3" OD .065 wall	$224.95
M615	6 ELE. 15 METER BEAM — — Boom length 32 ft. 3" OD .065 wall	$146.95
M415	4 ELE. 15 METER BEAM — — Boom length 20 ft. 3" OD .065 wall	$ 94.45
M810	8 ELE. 10 METER BEAM — — Boom length 40 ft. 3" OD .065 wall	$178.45
M510	5 ELE. 10 METER BEAM — — Boom length 20 ft. 3" OD .065 wall	$ 94.45

WILSON DUO BAND BEAMS

DB62	6 ELE. 20 & 2 ELE. 40 INTERLACED BEAM	$498.75
	Boom length 50 ft. 3" OD .200 wall to .065 wall. (w/re-enforcing kit)	$570.15
DB52	5 ELE. 20 & 2 ELE. 40 INTERLACED BEAM	$393.75
	Boom length 40 ft. 3" OD .200 wall to .065 wall. w/re-enforcing kit)	$460.95
DB54	5 ELE. 20 & 4 ELE. 15 INTERLACED BEAM	$241.45
	Boom length 40 ft. 3"OD .065 wall. (w/re-enforcing kit)	$257.25
DB43	4 ELE. 20 & 3 ELE. 15 INTERLACED BEAM	$188.95
	Boom length 30 ft. 3"OD .065 wall. (w/re-enforcing kit)	$201.60
DB32	3 ELE. 20 & 2 ELE. 15 INTERLACED BEAM	$115.45
	Boom length 20 ft. 3" OD .050 wall. (w/re-enforcing kit)	$124.95
DB76	7 ELE. 15 & 6 ELE. 10 INTERLACED BEAM	$251.95
	Boom length 40 ft. 3" OD .065 wall.	
DB65	6 ELE. 15 & 5 ELE. 10 INTERLACED BEAM	$230.95
	Boom length 32 ft. 3" OD .065 wall.	
DB44	4 ELE. 15 & 3 ELE. 10 INTERLACED BEAM	$115.45
	Boom length 20 ft. 3" OD .065 wall	

NEW NOW AVAILABLE

DB67	7 ELE. 20 6 ELE. 15 $551.25; (w/re-enforcing kit)	$572.25
M52046	5 ELE. 20 on an extra heavy duty 46' boom. (includes re-enforced element)	$288.75

If not available from your dealer write direct to factory for catalog or information and fast service. All prices F.O.B. factory. Wilson beams are available at the following dealers:

HENRY RADIO STORES	LOS ANGELES, CALIFORNIA
AMATEUR ELECTRONIC SUPPLY	MILWAUKEE, WISCONSIN
HAM RADIO OUTLET	BURLINGAME, CALIFORNIA
HARRISON RADIO	LONG ISLAND, NEW YORK

WILSON ELECTRONICS

P. O. BOX 116 (702) 451-5791 PITTMAN, NEVADA 89044

NEW YORK CITY AND LONG ISLAND — SCM, Fred J. Brunjes, K2DGI — Asst. SCM: John H. Smale, WB2CHY. SEC: K2HTX. RM: WR2LZN. PAM: WA2UWA. VHF PAM: WB2RQF. The following are major AREC/RACES nets; join one!

Bronx	28.64	50.35 MHz	146.17	MHz
Kings	28.64 MHz	50.35 MHz	146.26	MHz
Richmond			146.88	fm
New York	29.5 MHz	50.48 MHz	145.62	MHz
Queens	29.5 MHz	50.20 MHz	145.62	MHz
Nassau	28.72 MHz		146.10	MHz
Suffolk(West)	28.73 MHz (Hunt.)	50.46 MHz	145.59	MHz
	28.65 MHz Smith.)		147.21	fm
Suffolk(East)			146.88	fm

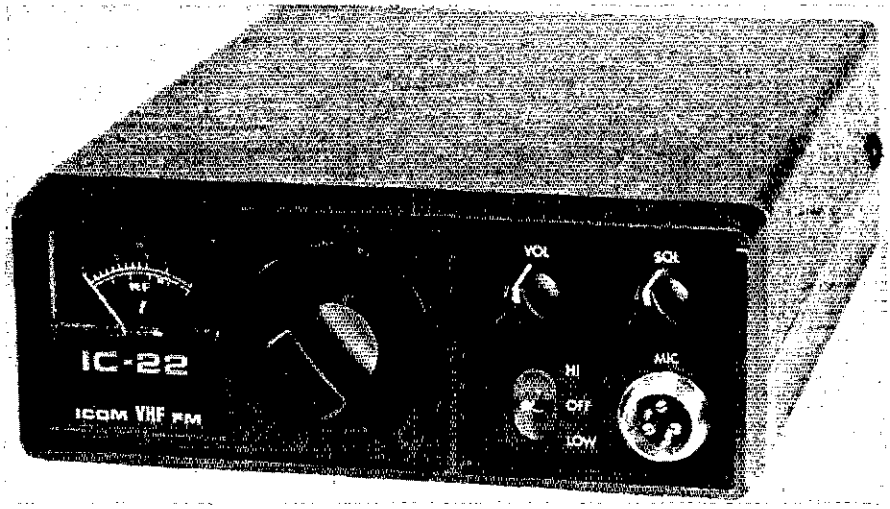
Note: Net times between 2000 and 2100 local, Mon. The summer months bring the usual slow activity reports around the section as this months column reflects. The first annual inter-section Softball game is now history. This annual Hudson Division event was inaugurated at the annual NLI Picnic in July. From the interest, it looks like a winner to create a fine Division activity to enhance amateur radio communications among its members. Speaking of activities, as witnessed by fraternal brothers of W2EW, Henry Koch, as they celebrated 50 years of League membership and as many years to amateur radio at the QTH of K2DGI, League pres. W2TUK, presented the ARRL 50 year pin as Division Director K2SJO, and SCM K2DGI along with Hanks many friends bore witness to the occasion. Congratulations Hank! W2EW also was presented a Certificate of Merit for his long interest in furthering traffic nets and activities in the NYC-LI section. The Grumman Amateur Radio Club has back issues of QST (1935 up) for the asking. If you are interested, contact K2UAT. W7ILX (K2AAS) is up to his ears in activity out Las Vegas way. He sends regards to all, and looks for NLI amateurs on 15 meters. It appears he retired to ham radio! The Radio Society of Greater Brooklyn has an open meeting on 21.43 MHz at 2100 local time. Contact WB2ONZ for information regarding this new and very expanding club in the area. W2LMJ of CBS Radio Club has retired to the wilds of Fla. K2VGD is proving 10 meters is not a dead band with cw and ssb contacts at the slightest opening. About this time of year the 29.6 fm boys are starting their regular winter skip contacts on this "dead" band. WA2PLI is burning up the air waves these days with a new HW-101 which survived the "smoke test." WA2CLB, WA2CXY, WB2OYV, WB2YTP with support from the Larkfield RC demonstrated an amateur station at the annual "Commack Day" in Commack. The station operators were surprised how uninformed the public is between "CB" and "Ham Radio." What are you doing to inform the public of amateur radio? Traffic: WB2LZN 204, W2EC 114, WB2LGA 60, WB2OYV 50, WA2CLB 48, WB2CHY 41, K2JFE 39, K2VGD 30, WB2DAR 29, WB2WFJ 19, WA2PMW 18, WA2KXE 11, WA2PLI 11, WB2UFG 11, W2DBQ 10, WB2FIG 10, W2PF 9, WB2EKK 8, K2FV 5, WA2VXN 5, W2EW 4.

NORTHERN NEW JERSEY — SCM, John M. Crovelli WA2UOO — SEC: K2KDQ. RM: W2ZEP. PAMs: K2KDQ and WA2FVH

Net	kHz	Sess.	Time/Days	QNI	Tfc.	Mgr.
NJN	3695	30	7:00 PM Dy	397	128	W2ZEP
NJN	3695	30	10:00 PM Dy	253	85	W2ZEP
NJSN	3730	13	8:15 PM Dy	29	8	WA2NKK
NJPN	3950	30	6:00 PM M-S	592	103	WA2FVH
NJPON	3930	4	6:00 PM Su	67		WB2FJE

New appointments: WB2HSD as EC for Edison and vicinity WA2FXX as ORS; WA2SHT as ORS and OPS. Endorsements WA2CCF as EC; WB2NOM, WA2EUX, WB2AEH, WA2BAN as ORSs; WB2YPQ as OBS; WA2HMH as OVS. WB2MEE and the Bergenfield ARA will conduct a Novice Class at the Riverdel H.S. Evening School, Riveredge beginning in Oct. WA2GSP was portable KH6 in Honolulu for the past 2 years. K2ZFI traveling to Mich. while WA2EXX spending some time in Upstate NY. WN2QDW is a new ham in Washington Twp. WA2DVE has a new Drake line. WN2RPO and WN2RID have passed their Novice exams with the help of TCRA. WB2CFB upgraded to Advanced. W2NVA is now W2NR and has a new FTDX-401 WA2CWS has picked up a Swan. WA2ATO has erected a two-element 40-meter beam. WB2HGV holding OBS skeds on 2 and 15 fone. WA2UDT has a new 2-meter converter. W2CU traveling and giving technical talks on q uad antennas in Denve and Calif. K2AGJ made DXCC on cw. WB2CST has the new Kenwood Twins and a Johnson KW matchbox. W2WO

GRAB HOLD Of ... the IC-22



22 channels of pure pleasure for only $289

● TEN crystals . . . (now that *alone* is going to save you about $40.00) . . . easy to hold noise canceling dynamic mike . . . a quick disconnect mobile mount . . . battery saving HI (10 watts)/Lo (1 watt) power option. ● Your IC-22 will have a receiver that just *won't quit* with a super hot mosfet front end, 5 helical resonators (you can forget about inter-mod), and a large speaker that will punch out plenty of audio for the car. ● You'll also be on frequency with trimmer caps on both trans. and rcv. on all 22 channels. . . . with a discriminator output jack in the back to let you get on and stay on freq. ● PLUS the '22' is one good lookin' compact rig that you will be proud to put in your car—(the XYL won't mind it either)—with soft green back lighting on the front panel and a light to silently let you know you are getting out . . . and a second light to let you know there is an incoming signal (even though you may have the volume down). ● There is much, much more to tell you about the IC-22, but suffice it to say, the IC-22, with all of its unique features and performance record at $289.00, has got to be one of the best all-around values available on two meters today!

— SEE THE IC-22 AT YOUR LOCAL DEALER —

Distributed by:

ICOM

Dealer inquiries invited.

ICOM WEST
1251 - 170th St. N.E.
Bellevue, Wash. 98008
(206) 641-0554

ADIRONDACK RADIO SUPPLY
185 West Main Street
Amsterdam, N.Y. 12010

ICOM EAST
Div ACS, Inc.
Box 331
Richardson, Tex. 75080
(214) 235-0479

recovering from hospital stay. WA2RYD back on the air after repairing his SB102. WA2ONT/2 is in Brick Twp. for the summer. The East Brunswick ARC repeater WR2ABC soon to be operational on 450 MHz. WB2UCS building a control head for his Motorola rig. WA2SRQ and WA2UOO both sporting new 40-ft. towers and two-element triband quads. The Waldwick Emergency Net is on 9 PM EDT Tue. on 21117 MHz. Mgr. WA2EXX reports WN2ELF, WN2QEG, WN2QGT, WN2HUL, WN2QEK, WN2OVE and WN2FGU are active participants. New Providence now meeting at the New Providence library the second Mon. of the month at 8 PM. An Amateur Symposium on the coming World Administrative Radio Conference will be held Oct. 9 at Murray Hill. New Providence ARA handling the arrangements. W2CVW, WA2DHR and WA2UOO played important roles in the proclamation of Amateur Radio Week June 17-23 by Acting Governor Alfred N. Beadelston. GSARA was the co-sponsoring club. WA2UOO patiently waiting for a new Drake C-line and for reports from ALL appointees. WA2SHT has a new TR-4. WB2AKU active on 2 meters. WB2AEH was portable in Va. on Field Day. WB2YXY operating walkie-talkie mobile on the morning commuter train. Traffic: (June) WB2AEH 112, W2ZEP 111, WB2NOM 68, WB2FWW 60, WB2RJJ 52, WA2UOO 47, K2OQJ 29, WA2SHT 26, K2ZFI 26, WA2SRQ 25, WA2FVH 20, WB2UCS 13, WA2CCF 11, W2CU 8, WA2QJU 8, WA2EXX/2 7, WB2CST 5, WB2AKU 1. (May) WA2RYD 243, WA2FVH 32, W2CU 26, W2CVW 6.

MIDWEST DIVISION

IOWA — SCM, Al Culbert, KØYVU — SEC: KØCLI. The Great River ARC at Dubuque has received the repeater call WRØABD, this is the first repeater call in the section which has been issued to my knowledge. The Des Moines Radio Amateur Assn. sponsored a real fine hamfest/swapfest June 17 at the Iowa State Fairgrounds, security of course was courtesy of KØYPV. The Cedar Valley ARC of Cedar Rapids sponsored a display during Amateur Radio Week at the Linndale Plaza, and really hit the publicity jackpot with TV and newspaper coverage. Let's see a few other groups put on their thinking caps and get some positive publicity for the amateur community. Murphy struck the Cedar Rapids FD site as the beam and 40-ft. tower toppled, luckily prides were the most serious injuries inflicted. WAØDYZ is sporting a new SB-220/SB-102 combo. KØLUZ moving from Sumner to Chariton where he will be a music instructor. WA3PWL/Ø has found that traffic handling can be almost as fun as contesting. WNØKDG is a new Novice in Eldon. KØLVB now has a new TR-4C mobile, maybe we will be able to hear from him again. WA7TZO (ex-WAØOTE) showed up at the North Iowa ARC FD site just long enough to shanghai some slave labor to assist in removing his tri-bander.

Net	QNI	QTC
Iowa 75 meter (noon)	1380	70
Iowa 75 meter (eve)	862	45

Traffic: WAØAUX 194, KØDDA 173, WAØTAQ 73, WAØVZH 53, WØMOQ 50, WØLCX 41, WØWSV 39, WBØDBG 19, KØYVU 19, KØLUZ 14, WBØAVW 11, WØBW 9, WAØZVF 8, WBØBPH 7, WBØFEW 6, WA3PWL/Ø 4, WAØQBC 2.

KANSAS — SCM, Robert M. Summers, KØBXF — SEC: KØJMF. RM: KØMRI. PAMs: WØGCJ, WBØBCL. VHF PAM: WAØTRO. Field Day is over without any mishaps. May Net results: QKS : QNI 610, QTC 250, sessions 62. YLN: 16/7/5. QKS-SS: 226/389/31. KEC: 63/3/5. All others got lost in the shuffle of papers when the QTH was hit by a severe storm which caused severe damage. Net reports for June— KWN: QNI 422, QTC 85. (May) 551/186. Mid-States Mobile Monitor Service QNI 1577 serving 129 mobiles, 63 calls or patches and 79 QTC. (May) QNI 1584, 115 mobiles, 126 calls and patches with 53 QTC handled. May YL Net QNI 16, QTC 17 in 5 sessions.

Net	Freq	Sess.	Time(Z)/Dys	QNI	QTC	Mgr.
QKS	3610	60	0100 0400	543	153	KØMRI
QKS-SS	3735	30	0200	134	159	WØGCJ
KSBN	3920	26	0030	649	74	WØGCJ
KPN	3920	16	1245 MWF 1400 Su	177	16	WØGCJ
YLN†		4		6	0	WNØGQL
KSPON		—		780	63	WAØZTW

†QNF til Sept. The AREC group has been carrying on despite the elements, KØJMF reporting 477 active amateurs participating. We still need some volunteers for EC spots. Only 9 zones reporting this month with 393 QNI and 26 QTC in 53 sessions. Traffic: (June)WNØFSL 201, WØHI 194, WNØGVR 148, KØMRI

400% MORE SSB OUTPUT

WITH A MAGNUM SIX

A QUALITY RF SPEECH PROCESSOR

Collins 325/KWM	$139.95
Heath SB100/HW100/SB400	139.95
Drake TR4/TR4C	159.95
Drake T4X/T4XB/C	154.95
Yaesu FT101	139.95
Yaesu FTdx 400/401/560/570.	144.95
Kenwood T-599/TS-511	139.95

To Order: Specify model. Add $2 for shipping in U.S.

- The human voice is a "raspy" signal with high peaks and long, low valleys. If used to modulate an SSB transmitter directly, the low power of the valleys limits the average power output to 12-15% of the transmitter's PEP rating. Operating above this level, the peaks overdrive the transmitter, cause band splatter and poor quality.
- MAGNUM SIX is the first successful RF speech clipper available. Installed in the IF strip, it "mows" the peaks and discards the clipping harmonics without distorting the voice. This allows the level of the valleys (the average power) to be raised up to 6 db. Astounding signal strength improvements — 1 to 1.5 "S" units — have been reported! Some have even reported improved voice quality!!! The ARRL handbook confirms that RF speech clipping is clearly the best way to increase SSB talk power.
- MAGNUM SIX operates like a "time scavenger". Average power is increased merely by causing transmission to occur at slightly below, but never over, rated values more of the time. By increasing the duty cycle, MAGNUM SIX pushes the average output from 12-15% PEP "way up" to 50-60% PEP. Operationally this is impressive because of the clean 6 db signal strength improvement. Equipment-wise this is roughly equivalent to operating at continuous AM, or a little below continuous keyed CW ratings. Tube lives are thus not shortened below rated values. On the other hand, they'll no longer be "loafing" on SSB either. So why not

PUT YOUR TRANSMITTER TO WORK FOR THE FIRST TIME IN ITS LIFE. A MAGNUM SIX CAN ADD MORE POWER TO YOUR STATION PER $ THAN ANY OTHER DEVICE: LINEAR, ANTENNA OR OTHER SPEECH PROCESSOR.

Brochure available on request. Dealer inquiries invited.

A Division of Bitcil Systems Inc.

Communication Technology Group
31218 Pacific Highway South
Federal Way, Washington 98002

139, WB0HBM 112, W0FIR 96, W0CHJ 76, WN0HTR 61, WN0GQL 49, WB0CZR 43, K0KU 40, WA0ZTW 38, WA0SCW/0 34, WB0BIY 26, W0PB 25, K0BXF 24, K0JMF 24, W0RBO 15, W0FCL 12, WN0HTH 12, W0MA 12, WA0SEV 7, WA0OWH 6, W0NYG 4, WA0KDP 2, WA0OWH 2. (May) WN0GVR 235, W0FIR 122, W0PB 49, WN0HTF 33.

MISSOURI — SCM, Larry S. Phillips, K0VVH — Asst. SCM: Clifford Chamney, K0BIX. SEC: K0HNE. New appointments: WA0IIK as EC; K0PCK as PAM. Appointments renewed: K0BIX as EC; K0LCB as OVS; K0SGJ as OBS/OPS.

Net	Freq.	Sess.	Time(Z)/Dys	QNI	QTC	Mgr.
MOSSB	3963	26	2300 M-S	912	35	K0PCK
MON	3585	30	0000 Dy	147	72	W0BV
MON2	3585	30	0245 Dy	103	53	W0BV
PHD	50.45	4	0130 T	57	11	WA0KUH
JC2AN	146.28/.88	4	0330 T	39	0	WA0RVT
WEN	28.6	4	0130 M	21	2	WA5KBH
MSN	3703	9	0030 M-S	16	4	W0OVJ

Am happy to report that your SCM has his new beam in the air. With deep regret I report ex-WA0LLO as a Silent Key. Congratulations to new Technician WB0KCA and new Novices WN9MQD/0, WN0KIC, WN0KVK, WN0KXM. Congratulations to WB0AAE on his new rig. Welcome to new amateur at Mountain Grove WB0IUN. Sorry to report W0FOE in the hospital. Received several Field Day messages and am glad to see that the Missouri amateurs were out in full swing in the annual event. Traffic: K0ONK 1136, W0BV 137, K0BLX 74, K0VVH 59, W0OUD 53, WA0FMD 49, K0PCK 28, WB0FQM 25, WB0CKI 21, WA0VBG 18, W0EPI 16, W0GBJ 11, WA0ETV 4, W0RTW 3, W0CBL 1, WEEQ 1.

NEBRASKA — SCM, V. A. Cashon, K0OAL — Asst. SCM: Velma Sayer, WA0GHZ. SEC: K0ODF. Appointment: WA0OHO EC. Endorsements: K0ODF SEC; W0DOU EC.

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NEB I	3700	0000 Dy	90	22	WA0GHZ
NSN I	3982	0030 Dy	807	22	WA0LOY
NEB II	3700	0245 Dy	79	12	WA0GHZ
NMN	3982	1230 Dy	1240	46	WA0JUF
WNN	3950	1300 M-S	489	20	W0NIK
AREC	3982	1330 Su	156	2	W0IRZ
CHN	3980	1730 Dy	1080	62	WA0GHZ
SHN	3950	1830 M-S	195	5	W0DJO
NAN	3980	2000 M-F	62	4	WA0AUX
NSN II	3982	2330 Dy	1010	28	WA0LOY

Speedy recovery to W0LOD, WA0IXD and XYLs of W0s LRK, DMY and LJO. DEN has changed name to NAN-Nebr. Afternoon Net. FD messages were received from W0WRY/0, WA0VMT/0, K0SOQ/0, W0FLO/0 and W0WLO. W0WWV and W0ZJF have joined Silent Keys. Welcome back to W0JDJ. WB0DIU now operating Galaxy 3. W0MW attended Rocky Mountain Division Convention. W0DMQ mobiling to Canada. Lincoln ARC applied for WT0NRB for use at State Fair. Ak-Sar-Ben RC participation in May Multiple Sclerosis Drive was successful. Box Butte Co. 2-meter AREC Net Apr.-May-June QNI 50, QTC 2. Don't forget Midwest Division Convention in Lincoln Oct. 5-6-7. Traffic: (June) WA0QEX 33, WA0CBJ 30, W0HOP 30, W0SGA 27, W0FQB 22, W0AFG 19, W0VYX 18, W0DMY 16, WA0YGZ 15, WA0GHZ 14, W0NIK 14, WA0PCC 11, WA0SCP 11, W0RJA 9, K0IFN 8, WA0OQX 8, K0SFA 8, W0DJO 7, WA0HWR 7, W0GEQ 6, K0ODF 6, K0HNT 4, WA0HQQ 4, W0HTA 4, WA0LOY 4, W0WKP 4, WB0CNK 3, WA0EEI 3, WA0JKN 3, K0OAL 3, K0DGW 2, W0HBS 2, K0SDG 2, W0MW 2, W0FOW 1, WA0JUF 1, K0PTK 1, K0WPF 1. (May) W0AFG 23, K0MUF 2.

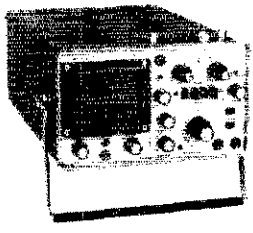
NEW ENGLAND DIVISION

CONNECTICUT — SCM, John McNassor, W1GVT — SEC: W1HHR. RM: K1EIR. PAM: K1YGS. VHF PAM: K1SXF.

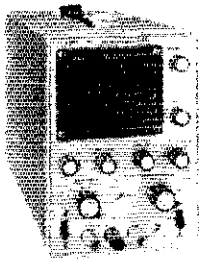
Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1900 Dy 2200	60	526	366
CPN	3965	1800 M-S 1000 Su	30	495	250
VHF 2	145.98	2200 M-S	21	44	27
VHF 6	50.6	2100 M-S	21	84	6

get more out of your rig with LEADER

TEST INSTRUMENTS

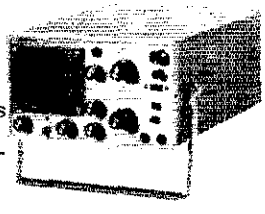


LBO-302 — 3" SOLID STATE DUAL TRACE SCOPE
Solid state. Pushbuttons for trig, auto sweep & "free run". 10mVp-p/div to 5Vp-p/div vert. sens., 9 steps. 10MHz b'width. 1μs/div to 0.2μs/div. (5XMag.), 17 steps, sweep. Sep. or simul. display of ch 1 & 2. Conquers the test bench squeeze.
$699.95



LBO-310 — 3" SOLID STATE GENERAL SERVICE SCOPE
Compact! Lightweight . . . with bright display, extra sharp focus. AC/DC coupled vert. & h'z't'l inputs. Monitors waveforms to 100MHz, direct conn. Sweep range to 100 KHz, 4 steps, cont. adjust. Use in multiples to view sep. phenomena simul.
$199.95

LBO-301 — 3" PORTABLE TRIGGERED SCOPE
Unmatched solid state sensitivity. DC - 7MHz b'width. Vert. & h'z't'l calib. 0.2μs (5XMag.) to 50ms/div, 15 steps sweep time. Compact. Easy to use h'z't'l panel. Services computer circuits to color TV.
$449.95



LDM-815 TRANSISTORIZED DIP METER
A great RF tester. Bat'y operated, portable. For easy rapid checks in 1.5 to 250MHz range. Large 310° dial, 6 plug-in coils, earphone incl. Use to adjust wave traps, align receivers or find parasitic oscillations. **$89.95**

"Put us to the test"

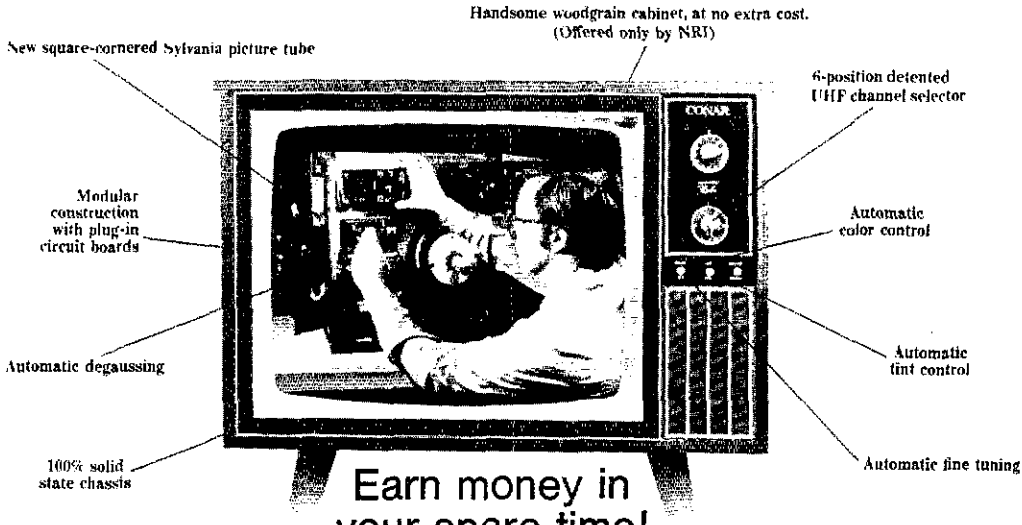
LEADER INSTRUMENTS CORP
151 Dupont Street Plainview, L.I., N.Y. 11803 (516) 822-9300

High QNI: CN — W1KV, W1CTI and W1BYW. CPN — W1BFY, WA1QZH, K1SXF and W1YGS. SEC W1HHR requests ECs to plan a major Fall Training Activity now — use your own imagination and report results. Director W1QV is computing results of his latest poll — be sure you and your club did not overlook his fine Questionnair — please return! Highlight of June activities was Field Day. Thanks for the many FD messages. Note now your suggestions for improvement next year! Fall brings an increase in club activity. Check for active local EC in your area and please provide traffic outlets in your town. Assign members to cw and phone nets. New officers Taft School ARC: WB2BWE, pres.; WN1OST, vice-pres. East Granby HS ARC: WN1QNF, pres.; WN1RGH, vice-pres.; WN1QML, treas. Club delegation to ARRL Convention in Hyannis! New CPN Roster from PAM K1YGS to all members. WA1PHJ Net Mgr. EA Slow-Speed Net on 3726 at 2330Z. Also QNI 3733 at 4:30 PM.W1DGL NCS for Bristol AREC 10- and 6-meter nets. *Semi-annual OO Bulletin is MUST reading for all OOs. 28/88* ICRC Picnic held at K1QID QTH. W1WEE still the outstand[illegible] OVS/OBS in our section! K1SXF nursing a severe hand injury. W1MPW home from hospital. Congratulations to: W1BFY June BPL and WN1SEO new Novice! Traffic: W1BFY 332, WA1LIR 212, WA1QZH 201, W1EFW 176, W1EJI 162, W1CTI 138, WA1PHJ 105, K1SXF 69, W1MPW 66, WA1FCM 56, W1KV 53, W1GVT 48, K1YGS 45, WA1NLD 40, WA1HYN 34, K1EPW 31, WA1PHF 30, WA1KID 23, WA1QMI 19, W1AW 18, W1QV 13, W1DQJ 10, W1CUH 6, WA1PPD 3, W1HHR 1.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, W1ALP — SEC W1AOG received reports from ECs W1BAB, W1UJF, K1NFW, K1ZUP; WA1s DXT, OWQ, QEK, NRT. W1AJA is a Silent Key. W1s ASI, CSN, JVZ have retired. W4KT/1 back in W. Chatham. I received many FD messages. K1MJS in Dorchester, WA1ALH in Malden. WN1SFV is a YL. W1EKG went to the YL ISSB Convention in Minn. K1CLM *looking for a 51J-4 with filters. WN1ROG is on 15, 40 and 80 cw.* K1ZZY has Collins 32S1 and 75S1 in transceive. K1JNO has a HW-100. WN1RFF passed General Class exam. W1SMO in Navy MARS. W1NF worked ZLs, PYs. K1TVY is on 2-meter fm. W1NJL operated FD from W3IN/3 in Md. Quannapowitt Radio Assn. had their 25th anniversary banquet, new officers were installed, W1QV, W1ALP and XYLs were also there. The newly formed Middlesex Falls Repeater Assn. K1CKS, pres.; W1HOM, vice-pres.; W1s HX, BMH, FRX, BHD, K1SQP, advisory board; W1BHD, sec.-trustee. This a local club around WR1AAA Skunk Hollow Repeater. W1PEX made BPL. WA1DJC now at King's College, Wilkes-Barre, Penna. WN1RFD in many nets has 46 for WAS. K1WKS in Weather Net and now retired. WA1HHK again active. W1AAR almost got caught in flood in Vt. and NH. K1YKT has been traveling in *South America the past 6 months, was on at OA4CBU in ARRL* DX tests. WA1NNT on at home in Boston & mobile. K1BJZ still active in MARS. W1EIH interested in OO work. WA1IFE worked DX on 6. WA1DFL got 2 new states on 6, N.M. and Colo. making 43. New officers of Framingham RC: WA1MZC, pres.; WA1MTI, vice-pres.; WN1PYF, secy.; K1UUM, treas.; W1ERI, dir. K1DZG went to VO1-Land. Endorsements: WA1MSK as OPS/ORS/OVS; WA1DEC/DED as OPS; K1YKT as ORS; WA1MHJ as OBS/OPS; W1RM, K1DZG as ECs; K1BJZ as OBS. Middlesex ARC Pi Net looking for check-ins, Wed. at 8 PM on 28.68 MHz; will take traffic in and out of the Boston area.

Net	Freq.	Time/Days	QNI	QTC	Mgr.
EM2MN	145.8	2000 M-F	104	79	WA1OW[illegible]
NEEPN	3945	0830 Su	106	10	K1EPL
6MCBN	50.85	1930 M-F	13		K1OKE
EMN	3660	1900/ 2200 Dy	300	169	WA1MSI

High QNIs on EMN: WA1s MSK, MXV, NRT, OML, OTF, OAM; W1BVL worked LUSHFI on 160 cw. Whitman ARC new officers: K1TZC, pres.; K1HTN, vice-pres.; K1BZD, secy.; K1UMP, treas.; WA1AXK, WA1HIH, WA1OFR, WA1DDN, dir.; WA1QJC, WA1DYU, WA1PWX, jr. board. Capeway RC met at K1HGT's. WA1PLN has his General. WA1IEB moving to Braintree. New repeatrer calls: WA1KHB now WR1ABJ; WA1KHH WR1AAH; WA1QIZ WR1AAI; K1UHU WIABN; K1AIU WR1ABB. Traffic: (June) W1PEX 667, WA1MSK 229, WA1OWQ 129, W1CE 114, W1UX 71, WA1DJC 70, WA1IGL 50, WA1MXV 49, WN1RFD 40, K1WKS 19, WA1IFE 18, WA1MYK 17, W1AOG 16, W1DOM 13, WA1PGY 10, WA1NKE 9, WA1HHK 7, K1LCQ 5, W1AAR 4, WN1RFF 3, WA1EYY 2, WA1FNM 2. (May) WA1MXV 38, WA1OLV 7,



Earn money in your spare time!

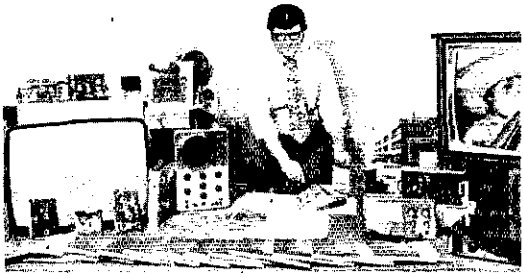
Learn Color TV Servicing as you build NRI's NEW 25" DIAGONAL SOLID STATE COLOR TV FOR HOME TRAINING

You'll learn faster and easier with this exclusive NRI set . . . built from the circuits up specifically for NRI's Color TV Servicing Course

With the big demand for men who can service television and radio sets, you can turn your spare time into money by learning this valuable skill. Now NRI can make it even easier for you . . . with the exclusive 25" diagonal picture tube, solid chassis, color TV set that you build yourself with NRI's TV-Radio Servicing Course.

Learning at home is easy

the simplified NRI way. Texts are "bite-size" and fully-illustrated, leading you step by step to a thorough knowledge of electronics. In addition to the 25" diagonal color TV set, you receive a wide-band service type oscilloscope, a color bar crosshatch generator . . . along with other valuable equipment you will use to perform experiments, introduce and correct defects into circuits, and make repairs on your own and others' sets.



Train with the leader—NRI

The same innovations which have helped NRI train thousands of men like yourself at home are now available to you. Rush the coupon for a free full-color catalog which spells out the NRI "discovery" method of learning in Color TV Servicing, Communications, Industrial Electronics, and even Auto Mechanics. There's no obligation. *No salesman will call.*

APPROVED UNDER GI BILL
If you have served since January 31, 1955, or are in service, check GI line in the coupon.

MAIL FOR FREE NRI CATALOG

NRI TRAINING 19-093
3939 Wisconsin Ave., Washington, D.C. 20016

Please send me your *new* catalog. I have checked the field of most interest to me. *No salesman will call.*

- ☐ TV-Radio Servicing (with color)
- ☐ Advanced Color TV
- ☐ Complete Communications Electronics
- ☐ FCC License
- ☐ Aircraft Electronics
- ☐ Mobile Communications
- ☐ Marine Electronics
- ☐ Amateur Radio
- ☐ Computer Electronics
- ☐ Electronics Technology
- ☐ Basic Electronics
- ☐ Basic Data Processing and Computer Programming
- ☐ Automotive Mechanics
- ☐ Appliance Servicing
- ☐ Air Conditioning, Refrigeration, & Heating
- ☐ **Check here for facts on GI Bill**

Name_____ Age_____
(PLEASE PRINT)
Address_____
City_____ State_____ Zip_____

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL

MAINE — SCM, Peter E. Sterling, K1TEV — SEC: K1CLF. PAM: K1GUP. RM: W1BJG. WA1GRA and his XYL celebrated their 50th Wedding Anniversary. The QCWA annual meeting was held at Portsmouth N.H. K1RTV and XYL attended. K4RO/1 and W1MPP the Century Kids are again back in New England. W1JKR former mgr. of the Barnyard Net became a Silent Key. The following gals attended the WRONE luncheon May 5, in Peabody, Mass.: K1GSF, W1YPH, K1ADY, K1YJB, W1BBS, K1VEB, K1TVT, WA1NXR. K1CXX is on 2-meter fm. The Northeast Area of Barnyard Net reports 27 sessions, 735 check-ins, 0 traffic for May; (June) the Barnyard Net reports 724 check-ins, 26 sessions, 2 traffic. K1TZH recovering from an operation at his home QTH. New hams in Maine are: WN1RYE, WA1RYG, WN1RYO, WN1RYP, WN1RYQ, WN1RXE, WN1RZV, WN1RWX, WN1RWY, WN1SAZ, WN1SBI, WN1SCQ, WA1SDP, WA1SDQ, WN1SFA, WA1SFZ, WN1SFR, WN1SFS. Congratulations fellows. SCM KH6BZF of Hawaii spent a short time in Maine. K1OYB and K1JKT are now on 2-meter fm. Traffic: (June) W1OTQ/1 5, WA1RDX 1, K1TEV 1. (May) K1GUP 34, WA1RDX 16, K1TEV 10, WA1NKE/1 9, WA1NMW 3.

NEW HAMPSHIRE — SCM, Robert C. Mitchell, W1SWX — SEC: K1RSC. RM: W1UBG. Welcome to new hams YL WA1SDB, WN1SFQ, WN1SDW, WA1SDS and WN1SEU. The Greater Derry contest group made 150 more QSOs than last year in Field Day. W1UBG says that traffic and participation are down on the NHVT Net with only 30 check-ins and 15 traffic in 19 sessions. K1PQV, motorcycle, HW7, battery and dog climbed a 4000 foot mountain for Field Day. WA1JSD says 6 meters has been hot and sounds like 20 at times. W1BYS/K1TXC operated 2-meter fm through the W1ALE repeater during recent stay in the Concord Hospital. WA1FSZ excellent OVS report shows all kinds of vhf activity with more construction projects on tap for the summer. K1ACL, W1GQV, K1PLX, WA2PPS, WA1KOH, WA1QQR, WA1NNB, K1LQR, WB2OFN, WA1RCU, WN1SET, WA1QDU and WA1RBE operated Field Day from Winn Mountain, blowing up only one generator. Don't forget to attend the ARRL Convention this fall. See you all there? Traffic: W1UBG 40, K1PQV 7, W1BYS 5.

RHODE ISLAND — SCM, John E. Johnson, K1AAV — The R.I. Slow Net was started in June by WN1POJ, WA1QOG and WN1RFT. The Net meets Wed. through Sun. at 2230 GMT on 3715 kHz. Speed is 10 wpm and all are welcomed to check in. RI.SN traffic — 10 sessions, 45 QNI, traffic 11. The R.I. Novices are a very active group and are interested in traffic and have started this net. It is hoped that all cw hams will give them some assistance. WN1POJ building a QRP Transmatch and a QRP Powermeter. WN1RFT has a new HG-10B on the air and is working on a 40-meter QRP rig. WA1QOG handled emergency traffic from Vt. during the floods. WN1QAW worked KH6HFJ and was active on FD. Field Day reports were received from the following clubs: Providence Radio Club, Newport Radio Club and ARSNE Club of Rumford. Traffic: WN1POJ 121, WA1QOG 29, WN1QAW 27, WN1RFT 9.

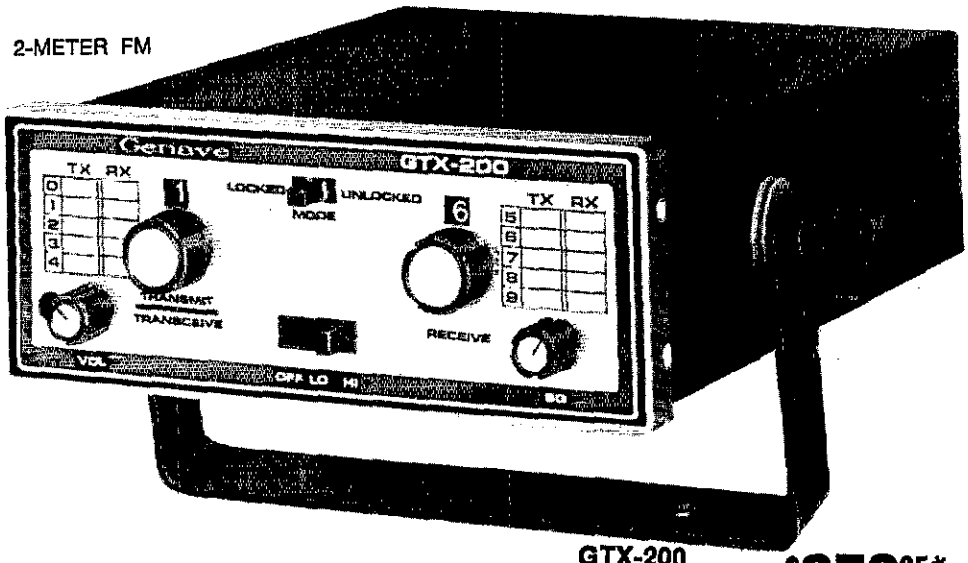
VERMONT — SCM, James H. Viele, W1BRG — SEC: W1VSA.

Net	Freq.	Time(Z)/Dys	QNI	QTC	Mgr.
VTSB	3909	2200 M-S 1130 Su	453	179	W1ZCJ
VTPO	3909	2200 Su	73	41	K1BQB
Carrier	3932	1300 M-S	213	20	W2DSK
Green Mt.	3932	2100 M-S			W1JLZ
Vt.Phone	3932	1330 Su			W1KKM

Welcome to new amateur WN1SKJ. New officers of Carrier Net are W2DSK, pres.; K2BUH, vice-pres.; K1QGX, secy.; W1JLZ, treas. WA2DGZ/1 spent July at camp in Mass. WA1RGS active in Woodstock with HW12 and will operate W1SW, club station at Phillips-Andover, this fall and winter. Vt. Nets meeting at Eureka Barn on June 24 had fine attendance of 120. Traffic: K1BQB 106, WA2DGZ/1 64.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — SEC: WA1DNB. CW RM: W1DVW. 75-Meter PAM: WA1ITL. UHF/VHF PAM: W1KZS. Co. ECs: W1AEL, W1CSF, W1KZS, WA1ORT. With the exception of WA1ITL who was just getting back from summer school, everyone of the above was active in the Flood Alert in West. Mass. Full details of this operation are being sent to ARRL separately in a very complete report by our very efficient SEC WA1DNB. "Note that he was on two of the nets listed, and that our fine CW RM, W1DVW, was on all three for any traffic going out of our section which might best be handled on the CW net." Stations active on

2-METER FM



GTX-200
(30 Watts output power nom., up to 100 channel combinations)
$259.95*

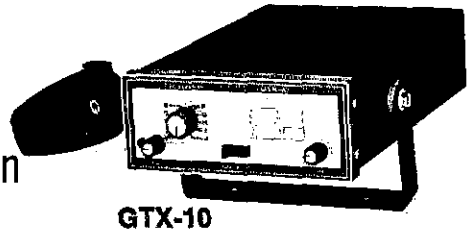
NOW PLAYING:

THE GTX AMATEUR LINE-UP!

featuring:

- American manufacture
- Great factory back-up
- Super clean lay-out
- Handsome front panel
- Booming power output
- Simultaneous Mars Operation

GTX-2
(30 Watts output power nom., accommodates 10 channels)
$249.95*



GTX-10
(10 Watts output power nom., accommodates 10 channels)
$199.95*

Genave

VISIT YOUR LOCAL AMATEUR DEALER AND MEET THESE FINE PERFORMERS IN PERSON!

**Includes 146.94 MHz. Add'l. Crystals $6.50 ea.*

General Aviation Electronics, Inc., 4141 Kingman Drive, Indianapolis, Indiana 46226 — Area 317 - 546-1111

the West. Mass. Emergency Net (3935): W1AEL, W1BBI, W1BVG, W1BVR, WA1DNB, W1DOY, W1DVW, K1EPL, W1GQP, WA1HFY, WA1LGU, K1MAL, WA1MJE, W1NLE, WA1OUZ, W1QKY, W1RO, W1SL, W1TM, W1UEQ, WA1ZNK, WA2IQQ. Active on the WA1KHC Repeater: W1AEL, W1CSF, WA1DNB, W1DVW, W1EBW, K1FNA, K1FUG, W1GQP, WA1IDU, WA1IOU, WA1LGU, WA1MPG, WA1ORT, WA1OZD, WA1PLS, W1ZWZ. On the K1FFK Repeater: W1KZS, W1DVW, K1JVM. There is what organized nets can put on the air when emergency threatens. Parts of our West. Mass. section have very little of this type of activity and we need it!How to act in time of emergency can be learned by being active in any of our nets. If you are not in any of them now, here they are: WMEN 3935 Sun. 8:30 AM; WMN 3562 daily 7:00 PM; WMPN 3935 Mon.-Fri. 4:30 PM. Traffic: W1BVR 85, W1TM 80, W1DVW 61, WA1LNF 41, W1KK 28, WA1OUZ 16, WN1QHR 15, W1BBI 14.

NORTHWESTERN DIVISION

IDAHO — SCM, Donald A. Crisp, W7ZNN — SEC WA7EWV. The IMN meets at 6:30 PDT, week days on 3583 kHz. The FARM Net meets at 7 P.M. PDT each day on 3935 kHz. The Idaho RACES Net meets at 7:15 A.M. week days on 3990.5 kHz. WA7QVP was recently married. WA7EWV built 40-meter phased verticals. W7FBL is building a new full gallon linear. Need a program for your club meeting? If so contact your SCM. FARM Net reports 30 sessions, 1009 check-ins, 37 traffic handled. Idaho PO Net: 13 sessions, 109 check-ins, 20 traffic handled. Traffic: W7GHT 121, WA7BDD 86, W7AXL 80, W7IY 26, W7ZNN 17.

MONTANA — SCM, *Harry A. Roylance, W7RZY* — Asst SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. Good time was had by all at W7OTJ's picnic. Glacier Waterton Hamfest was well attended and enjoyed. Had several nice eyeball QSOs in Helena and Butte along with many QSOs on 2 meters. WA7NWP stopped in while he was in town. Montana *Traffic Net had 807 check-ins, 36 pieces of traffic and 2* sessions. The Idaho-Montana Net held 21 sessions, 97 check-ins with 22 pieces of traffic handled. Traffic: WA7JQS 359, W7LE 17.

OREGON — SCM, Dale T. Justice, K7WWR — SEC *W7HLF. RM: K7GGQ. PAM: K7RQZ. Net reports:* WA7NWV reports for BSN June sessions 60, traffic 133, contacts 167 check-ins 1078. W7FFE reports for the Nuclear Net sessions 4 check-ins 27. K7OUF reports for OSN sessions 30, traffic 86 check-ins 95. WA7RWM reports for AREC Net sessions 30 traffic 2, contacts 36, check-ins 320. Field Day messages were received from *K7CCH/7, W7HJF/7, W7PXL/7* and the Southern Oregon Club. WA7SHP is on RTTY with an AK-1 and an ST-5 W7IIJ has his two meter beam up and the tri-bander is next K7WWR has 2 eleven-element beams on two vertically at 100 feet. New hams in Bend-Redmond area are WN7UOI WN7UXA, WN7UXJ and WN7UXK. Traffic: (June) K7IFG 177 K7OUF 151, K7NTS 143, W7ZB 76, WA7NWV 61, WA7TX 54, W7DAN 26, WA7SHP 22, WA7MOK 21, K7WWR 18 W7LT 9, W7MLJ 9, WA7KRH 5, K7ADR 4. (May) WA7NWV 70.

WASHINGTON — SCM, Mary E. Lewis, W7QGP — SEC W7UWT. RM: W7JWJ. PAM: W7PWP. VHF PAMs: K7BBC K7LRD.

Net	Freq.	Sess.	Time(Z)	QNI	QTC	Mgr.
WSN	3590	30	0145	113	305	K7OZA
NSN	3700	30	0200	180	66	WA7OC
AREC	3930	4	1700 Su	41	3	W7UW
NWSSB	3945	30	0130	793	33	W7SVV
WARTS	3970	30	0100	1132	161	W7QGI
NTN	3970	30	0630	1141	129	W7PWI

Northwest Tech Net is recessed to Sept. 9. WA7KNW, who is blind, is a regular NCS on RN7 and also has a new A-1 operator award. Congrats Dan. W7IEU reports moving into new RACES communications room at the end of July. K7BBO operates satellite station on FD under call W7DK/7, also has a ne 2-meter array 15 over 15 working FB. Club station W7NCW 25t anniversary was celebrated by operating at Cowlitz C Fairgrounds during Longview's 50th anniversary. Good publi response was received. K7YRQ/7 has a new QTH on top of a hi good view and no noise. Field Day was a wet one but a good tu

10% Down Delivers Your Choice of Swan Equipment

on approval of your credit application

That's right! A 1200X linear amplifier for just $26 down; a 270B transceiver at $47 down; the popular 500CX transceiver is yours for only $53 down; or, get that big TB4HA tri-beam antenna you've always wanted for a low down payment of $15! Imagine, you can even join the newest trend in amateur radio with one of Swan's all-new—all-solid-state transceivers for as low as a $58 down payment. Any Swan product can be purchased on credit.

Because we've been servicing credit plans for hams longer than any other amateur radio manufacturer, we know hams have excellent credit ratings. That's why we simplify things. Pick up an application from your Swan dealer or, if you prefer, write us and we'll send you a form and complete information. Your request is processed the day we receive it and a credit card is issued as soon as approval is completed. Then, whether you purchase from a dealer or direct from the factory, you can simply say "Charge it."

With Swan's Revolving Credit Service you can pay-off your account within 25 days of billing and avoid any finance charge or, you can spread your payments over a number of months. 10% is the minimum down payment required and $10 is the minimum monthly payment, depending on your account balance.

An important fact to remember is that this plan is available directly from Swan. We personally, and confidentially, handle the servicing of your purchase from beginning to end. We will not sell your account to some other financing institution.

While you're thinking about it, fill in the coupon and mail it. We'll rush full information and an application to you free of charge.

SWAN ELECTRONICS
A subsidiary of Cubic Corporation

305 Airport Road • Oceanside, CA 92054 • Phone (714) 757-7525

Q973

Mail to: *SWAN ELECTRONICS*, 305 Airport Road – Oceanside, CA 92054

Gentlemen:

I am interested in opening a SWAN Revolving Credit Service account. Please send me full information and an application form.

Name: _____ Call: _____

Address: _____

City: _____ State: _____ Zip: _____

☐ Please include a copy of the latest SWAN Catalog of equipment.

out of clubs and operators. Scores are reported down from '72 Openings exist for qualified OO and EC applicants. Ol *appointees are reminded monthly reporting is a requirement fo* retention of the appointment. If you need help don't h backward ASK. The next seven week ends are booked wit Hamtest and Picnics so I'll see a lot of you personally again thi summer. Traffic: W7PI 170, WA7OCV 74, W7APS 61, W7QG 54, W7DPW 48, W7BQ 42, K7OXL 33, W7AXT 30, WA7KN 27, W7PWP 26, W7BUN 22, W7IEU 17, W7EBU 4, K7VNI 4 W7UWT 3, WA7LQV 2.

PACIFIC DIVISION

HAWAII — SCM, Lee R. Wical, KH6BZF — SEC: KH6BZF RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. SRC KH6FOX. QSL Mgr.: KH6DQ.

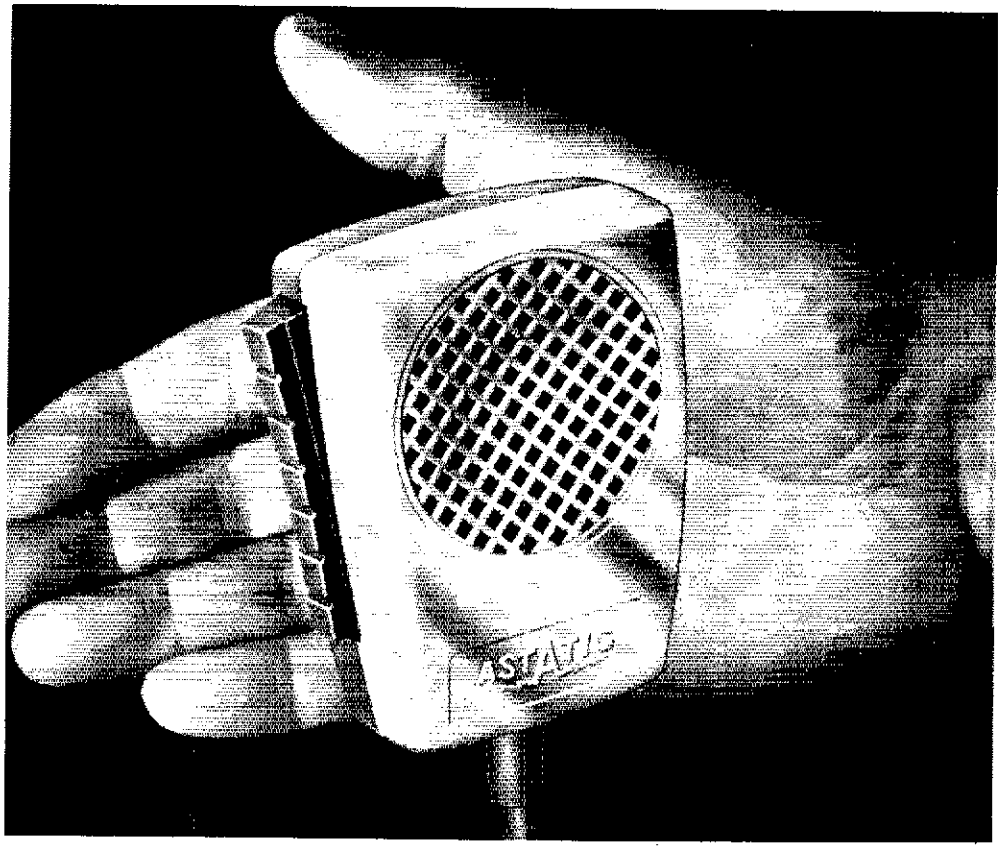
Net	MHz	Time(Z)/Days
Hev Bruddah	21.295	2000 S/Su
Friendly	7.290	2030 All
Confusion(patches)	21.400	0000 All
Pacific Interisland	14.305	0800 All
S.E.Asia	14.320	1230 All
Moonbounce	21.415	2200 S
Marine Corps	21.430	1900 All

Congratulations to Honolulu ARC on a representative of the ALOHA Boy Scouts of America, Explorer Division to explore the possibility of a special interest in amateur radio. Those who were observed at FD were KH6s FAH, HPQ, LG and RS to name a few. KH6GHZ recently returned from the Mainland as dic W0BWJ/KH6. One of these contests, ARRL V.P. Smith will be on from Denver, Honolulu and KL7-Land the same week end!KH6BWT recently returned from a business trip and will soon be off to Fla. In town, KG6JAR who will be /KH6 for a month. Also WA6HCL/KH6, who is at NAVCOMMSTA HONO for active duty. KH6BZF and KH6BWT are into radio astronomy as a result of BZF's moonbounce effort. KH6BZF continues his *432 MHz/220 MHz tropo effort to the West Coast. KH6s BTV,* HLK, IJ and others are still active with Oscar 6. Remember send your monthly reports by the first month to your SCM.

NEVADA — SCM, Harold P. Leary, K7ZOK — SEC: WA7BEU. W7OK is on extended vacation to 4-Land. New repeater call for .18 - .84 is WR7ABD. W7AKE repeater new call is WR7ABB. WA7RPZ with Air Stream group to cool Mont. for the summer. WA7TYY active on WESTCARS and is NCS at times. Don't forget Sierra Hamfest on Aug. 18th in Idlewild Park, Reno. WA7KVV and K7OHX have new H'T220s for 2 *meters. WA7TYY has 47th and 48th states for WAS on 40* meters. There soon will be an OBS and OO in the Las Vegas area. W7ILX is active on AZPON, Golden Bear and CAPON Nets. K7ICW continues most active 6-meter station in Nev. See World Above 50 MHz. On June 5 this writer worked VP2VAI/KP4 for best DX on six this year. Start plans to attend the Pacific Division Convention in Santa Cruz Oct. 13 and 14 Send reports by first of the month. RACES Net 3996.S Mon. at 1900. Traffic: W7ILX 129, WA7TYY 13.

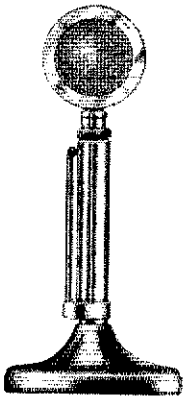
SACRAMENTO VALLEY — SCM, Norman W. Wilson WA6JVD — SEC: W6SMU. *The Berryessa ARK has electec* WB6YCL, pres.; W6SBO, vice-pres.; WB6PGW, secy.; WA6RYO, treas./trustee: W6CMJ, WB6WPH and WB6ZKH dir. WA6IQK is director of the RAMS. WB6MDP put up a vertical for all bands while WA6OWH strung an inverted vee for *40/80 and is trying to get a seven-element 15-meter beam up* WB5ISA/6 is new in our section, compliments of the USAF WA5KUD/6 graduated 1st in his Nav. school class at Mather and is looking for a transfer where he can get a good antenna system erected. WB6NKO reports working all states on 6 meters during June openings. Congrats to WH6DTT who now is on h with a General ticket. The North Hills RC reports doubling their score over last year's Field Day effort. WA6DDB has a homebrev linear compliments her father W4CXG. I hope many of you wil participate in the Calif. QSO Party on Oct. 6,8. This activity i sponsored by the North Hills RC with W6KYA in charge once again. We have an international following *with stations seeking* many of our rare counties. Happy pile ups. Traffic: WA6JVD 10 WA6OWH 2.

SAN FRANCISCO — SCM, Thomas A. Gallagher, W6NU — Asst. SCM: Robert G. Garner, W6EAJ/W6YSK. VHF PAM WA6PYN. W6EAJ is now recovered and safely home at his wate wheel powered station in the boondocks *after a close call on Ju*



YOU KNOW THE FATHER..

NOW SHAKE HANDS WITH THE SON



NEW HAND HELD TRANSISTORIZED MOBILE OR BASE STATION TMD-107

Others try but only Astatic can equal the quality and workmanship of the famous D-104 Microphone. Now Astatic has again matched its own highest achievement in the superlative new, chrome faced TMD-107.

OUTSTANDING FEATURES

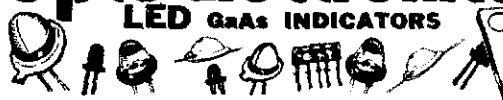
- Field effect type amplifier.
- Smooth press-to-talk switch.
- Unbreakable Cycolac housing.
- 6' coiled cord with strain relief bushing.
- Rugged metal hang up button.
- Recessed gain control prevents accidental changes in gain.
- 7 volt mercury battery.

THE ASTATIC CORPORATION • Conneaut, Ohio 44030 U.S.A.
In Canada: Canadian Astatic Ltd., Scarborough, Metro Toronto, Ontario
Export Sales: Morhan Exporting Corp., 270 Newton Rd., Plainview, New York 11803, U.S.A.

WRITE FOR NAME OF NEAREST ASTATIC DISTRIBUTOR

Opto Electronics

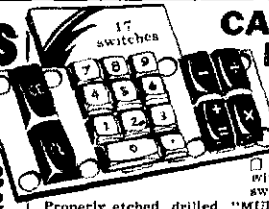
LED GaAs INDICATORS



- ☐ 2-MV1*, Amber, visible jumbo epoxy lens upright $1.00
- ☐ 1-MV2*, TO-18, Dome, green, visible 1.19
- ☐ 3-MV3*, visible, "coax pin pak", red, mini dome lens . . 1.00
- ☐ 1-MV4*, stud, high power, red, 2-watts 3.95
- ☐ 1-MV4H*, stud, high power, hi-dome, red, 2-watts 3.95
- ☐ 2-MV10B, visible, red, clear, dome lens, TO-18 . . . . 1.00
- ☐ 3-MV10C visible, red, diffused, dome lens, TO-18 . . . . 1.00
- ☐ 3-MV50*, axial leads, micro-mini dome, clear, red 1.00
- ☐ 3-MV5012*, visible, red, small dome lens 1.00
- ☐ 2-MV5022*, jumbo red dome, TO-18, visible 1.00
- ☐ 2-MV5020*, jumbo clear doma, TO-18, visible, red . . . 1.00
- ☐ 1-MV5040*, 4-LED red array, with 5-lead pak 1.49
- ☐ 3-MV5054*, visible, red, jumbo dome lens, upright . . . 1.00
- ☐ 2-MV5080*, TO-18, micro-mini, clear dome, red* 1.00
- ☐ 4-MV5082, visible, red, clear flat lens, TO-18 . . . . . 1.00
- ☐ 1-MV5222*, jumbo dome, green, panel snap-in 1.98
- ☐ 1-MV5322*, jumbo dome, GaAsp, panel snap-in Yellow . . 1.98
- ☐ 1-MV9000*, cartridge panel lamp, sealed, red, clear lens 1.49
- ☐ 2-MT-2*, Photo Transistor, light sensor, TO-18 . . . . . 1.00
- ☐ 1-ME-1*, infra-red, parabolic lens, pin type 1.19
- ☐ 2-ME-4*, infra-red, "invisible", TO-18, diff. dome 1.19
- ☐ 2-ME60*, infra-red, "invisible", axial, micro-mini 1.00

OPTO-COUPLERS *Monsanto Equivalent

- ☐ MCA2-30* 1500V Photo Darlington Relay . . $1.00
- ☐ MCD1* 4000V Isolation Photo Transistor 4.95
- ☐ MCD2* 1500V Isolation Photo Diode 1.00
- ☐ MCT1* 4000V Isolation Photo Transistor 4.95
- ☐ MCT2* 1500V Isolation Photo Transistor 1.00
- ☐ MCT2-D* 1500V Isolation Twin Photo Transistor 1.98
- ☐ MCT5-10* 10,000V Isolation Photo Transistor . . 4.95
- ☐ MCT5-25*25,000V Isolation Photo Transistor . . 5.95



CALCULATOR KEYBOARD

☐ **$12.50** 3 for $30

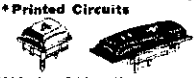
☐ Etched calculator board with holes, as above, less switches . . . . **$2.50 Board**

Properly etched, drilled, "MULTIPLEXED," with proper diodes. Ready to go! Used with our own CAL TECH's A001 chip advertised at $ 9.95 or equal to Cal Tech or Mostek chip. Keyboard uses the new manufactured by OAK, printed-circuit low-profile FEATHER TOUCH switches. 0-to-9 in white with black letters. Decimal white with black dot. CE, CL and the 4 function switches are in blue with white characters. Designed by top maker. Size: 6½ x 4½ x ½". All etched connections link to take a 12-pin edge connector.

OAK FEATHER-TOUCH SWITCHES

*For RTTY *For Unique Panel Switches

*Printed Circuits

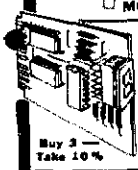


Mfd. by OAK (Ham's note, RTTY, too) data systems, same as used in Keyboard Calculator. SPST. Normally Open, 24V 1 amp contacts Characters and letters easily changed. ⅜" high. Printed circuit.

No.	Sale			
☐	0*	$.69	☐ 9*	.49
☐	1*	.49	☐ CE†	.69
☐	2*	.49	☐ CL†	.69
☐	3*	.49	☐ −†	.69
☐	4*	.49	☐ +, =†	.69
☐	5*	.49	☐ ÷†	.69
☐	6*	.49	☐ ×†	.69
☐	7*	.49	☐ •*	.49

*White top, black numbers. †Blue top, white characters.

☐ **Kit of 17 above switches for keyboard $9.**



LED MITY DIGITS "DCM'S"

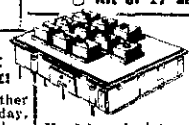
Digital Counting Modules ☐ **9.99**

INCLUDES P.C. EDGE CONNECTOR — FREE!

Kit includes: 3 x 2" printed ckt board, with fingers tool Side-mounting socket, MAN-4 resistors, 7448, 7475, 7490, booklet.

Will outperform any other DCM on the market today, not gaseous, not incandescent, but a device that will READ almost for life. MAN-4, Monsanto equal.

Buy 3 — Take 10%



GENERAL TELEPHONE DATA ENTRY KEYBOARD

Only **$8.88** ☐

Used in calculators, touch-tone, encoding, programming devices. **10 PUSH BUTTONS (0 to 9)** & 2 uncommitted. All switches have 2 separate poles & 6 separate busses — totalling 6 busses & 24 poles. Any combination of which can be used! Size: 3x2½x1".

LITRONICS-MONSANTO-OPCOA LED Readouts

MAN-1

MAN- 2 MAN-3 MAN-4 MAN-5 MAN-8 SLA-7 707

All fit 14-pin IC sockets. 5V 10 to 20 mils. 0-to-9 numerals, plus letters & decimal. With spec sheets.

*Monsanto Equal. **MAN-1 Specs. †36-Diode Array.

Type	Character Size:	Color Display:	Decimal	Driver	Each	Special
☐ MAN-1*	.27	Red	Yes	SN7447	4.50	3 for $12.
☐ MAN-2*	.32†	Red	Yes	2513	8.88	3 for $24.
☐ MAN-3*	.115	Red	Yes	SN7448	2.25	3 for $6.
☐ MAN-3*	.115	Red	No	SN7448	1.49	3 for $3.
☐ MAN-4*	.190	Red	Yes	SN7448	2.95	3 for $8.
☐ MAN-4*	.190	Red	No	SN7448	1.79	3 for $5.
☐ MAN-5*	.27	Green	Yes	SN7447	8.88	3 for $24.
☐ MAN-8*	.27	Yellow	Yes	SN7447	8.88	3 for $24.
☐ LITRONICS 707** (MAN-1)	.33	Red	Yes	SN7447	3.50	3 for $9.
☐ OPCOA ** SLA-7 (MAN-1)	.33	Red	Yes	SN7447	3.50	3 for $9.
☐ OPCOA ** SLA-7 (MAN-1)	.33	Red	No	SN7447	1.95	3 for $5.

HOBBY EXPERIMENTAL "LED" KORNER

- ☐ 5-MAN-3* "The claw", some segments missing, hobby use. $1.00
- ☐ 1-MAN-4* some segments missing, hobby use, readout 1.00
- ☐ 1-SLA-7 Opcoa's MAN-1, 1-segment missing 1.49
- ☐ 1-SLA-7 Opcoa's MAN-1, hobby, some segments missing . . 1.00
- ☐ 10-LED HOBBY SURPRIZE! asst. types, no-test 1.00
- ☐ 5-MONSANTO's Opto Coupler surprise, asst. no-test . . . 1.00
- ☐ 3-PC. KIT, MAN-1, MAN-3, MAN-4, some segments missing 1.49

12-DIGIT 'CALCULATOR CHIP'

☐ CT5001 **$9.95** ☐ 3 for $27.

Similar to Mostek 5001. Outperforms Texas 8-digit TMS1802. A 40-pin DIP. Adds, multiplies, subtracts, and divides. Use with 7-segment readouts, Nixies, and LED's. We include schematics, instructions to build calculator.

$9.95

☐ **CT5002 — Same as above** Operates on 9V battery

☐ **CT5005 — Same as above with MEMORY — $14.95**

NATIONAL EQUALS ON "DIGITAL CLOCK on a CHIP"

Any "Chip" ☐ **$12.88**

Mfrs #	Description	Sale
☐ 5311	28-pin, ceramic, any readout, 6-digits: A-B-D	$12.88
☐ 5312	24-pin, ceramic, any readout, 4-digits: C-D	$12.88
☐ 5313	28-pin, ceramic, any readout, 6-digits: A-C	$12.88
☐ 5314	24-pin, plastic, LED and incandescent readouts, 6-digits: A-B	$12.88

*With Spec Sheet

Code: A—Hold Count. C—1 PPS Output. B—Output Strobe. D—BCD

***Money Back Guarantee!**

☐ **2.95**

☐ **6-DIGIT MAN-3A MUX'D PC BOARD**

Clock DCMs, VTVM, DVM, calculators, multiplexed.

☐ **6-MAN-3A's for above board. $9.90.**

STUD 'TRIACS'

PRV	15 amp	25 amp
50	☐ 1.65	☐ 1.85
100	☐ .85	☐ 1.05
200	☐ 1.25	☐ 1.45
300	☐ 1.45	☐ 1.65
400	☐ 1.85	☐ 1.95
500	☐ 2.35	☐ 2.25
600	☐ —	☐ 2.65

Potter & Brumfield KAP RELAYS

Your choice 2 for $7.50 **$2.98**

☐ 115 VAC 3PDT $2.98
☐ 12 VDC 3PDT 2.98

Excellent for "HAM" use as antenna switching, latching, transmit, receive, etc., and 100's of commercial or industrial uses. Includes plastic dust-cover with diagram and hookup info, 11-pin plug-in base. Contacts movable gold flashed silver, stationary overlay, with silver cadmium oxide movables. All contacts 10 amp 3PDT. Coil data,115VAC 2260 ohms, 17.6 ma. 12 VDC 21 ma. 168 ohms. Size: 2¼" x 1 5/16", Wt. 4 ozs. Center pin missing. Comar Mfg. type equal too.

Terms: add postage **Rated:** net 30
Phone Orders: Wakefield, Mass. (617) 245-3829
Retail: 18 Del Carmine St. Wakefield, Mass. (off Water Street) C.O.D.'S MAY BE PHONED

☐ **15¢ CATALOG** on Fiber Optics, 'ICs', Semi's, Parts

POLY PAKS

P.O. BOX 942M LYNNFIELD, MASS. 01940

1. With no telephone, it was Bob's regular 160 schedule that alerted W6ANR to notify the Humboldt County Sheriff who rushed Bob to the Garberville Hospital. W6ANR, W6KSB and W6LHH have new FT-101s which cover 160. K6HWI is the new EC of San Francisco. How about the other major areas of the section? Our only other EC is in Petaluma. WB6VUS is a new AREC member in S.F. Welcome to K7SDF from Utah, a new resident of the city. WA0SIG/6 operates the Treasure Island club station K6NCG and is a new ORS, OPS and OO. W6GGR is the Humboldt County American Red Cross Disaster Chmn. Tom took some time from building a 200 MHz direct readout pre-scaler to put up a two-element tri-band quad and work some DX. W6NUT has been busy playing amateur carpenter and finishing off his basement before contest season. Traffic: K6NCG 81, WB6JQP 38, W6RNL 9.

SAN JOAQUIN VALLEY — SCM, Ralph Saroyan, W6JPU — K6RAU will be transmitting cw on 3840 kHz at 0h30 AM for beginners. WN6RXI waiting for Advanced license. K6QPE received WAJA award from Japan and also the JA9/88 award from Hokkaido. WB6VRJ is converting a ham scan to use on Swan 350. W6YEP, WB6VRJ, W6OWL and W6GRV were on KMJ for an hour answering questions regarding ham radio. Stockton Radio Club held their FD with 15 hams showing. WN6YDC a new Novice in Stockton. WB6QQF operated WA6ZSN from El Dorado Co. in VHF contest. Stockton Radio Club meets on 2nd Wed. at 8 PM at First Federal Savings. WB6ICL on 2 meters fm. FARC FD was held at Shaver Lake with W6YEP in charge. W6IPC/6 held FD near Tracy with 5 ops. WB6RMZ has worked all 3077 counties. WA6CPP activated several counties for the county hunters. WA6CPP received DXCC. WN6RXI was No. 10 in Novice SS. W6YKS active on 6 meters. WB6PTF operated from Alpine Co. during FD. New officers of FARC are WB6UCQ, pres.; W6YEP, vice-pres.; WB6HVA, secy.; W6DPD, treas. The club meets on the 2nd Fri. in the PGE bldg. in Fresno. WA6EXV working on a 2304 MHz beacon, also very active on 432 MHz with W6FZJ. TARC held their FD at Pierpont Springs, Calif. Traffic: WA6SCE 76, WN6RXI 8, WA6JDB 7.

SANTA CLARA VALLEY — SCM, James A. Hauser, WA6LFA — SEC: WA6RXB. RMs: W6BVB, W6RFF. All NTS operators report conditions have been bad and traffic very light. W6YBV received an ARRL Public Service Award for his work during the Managua Earthquake. Congrats. W6RSY made BPL this month. WB6TYA is Net Control on NCN-2. NCN had 654 QNI, 259 pieces of traffic this month. W6AUC reports the QCWA will hold a breakfast meeting at the Pacific Division Convention in Santa Cruz Oct. 13 and 14. Hope to meet most of you there. Field Day this year seems to have been very active in this section judging from the large number of messages received from participants. WA6PGB has his rotating dipole operating on 40 and WA6SDJ is on 144 MHz now and hoping to be on the lower bands soon. Bulletin Schedules — W6ZRJ each Thur. evening as follows: CW 15-20 wpm 7:30 local 3590 kHz and 7129 kHz, SSB 8:30 local 3815 kHz, RTTY 850 Hz shift 9:00 local 3615 kHz, SCV Nets — NCN NTS daily 7:00 and 8:30 PM local 3630 kHz, SPECS AREC Mon. 7:45 146 MHz, SCV AREC Tue. 8:00 146 MHz, Gorilla AREC Sun. 10:27 PM 146.25 in 146.85 out. Traffic: W6RSY 548, W6YBV 137, W6RFF 121, W6BVB 109, W6NW 88, W6AUC 80, W6DEF 37, WB6TYA 23, WA6HAD 13, W6KZJ 6.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Chuck Brydges, W4WXZ — SEC: W4EVN. PAM: WB4JMG. VHF PAM: K4GHR. RM: WB4ETF. Many stations reported on Field Day operations and activity ran at a good level. K4GHR and WB4RGS had good coverage on FD and our hobby in the Salisbury Sun. Post. Central NC Traffic Net (CNCTN) through WR4AAA had 634 QNI in June with 47 messages passed. The Western NC Traffic Net (WNCTN) through WA4BVW had 94 QNI. WN4CBE reports passing General. Congrats! W4WCG made BPL in Apr. Congrats Bob. K4KH lost antennas in a storm and now is back in business. RARS assisted the Carolina Sailing Regatta using WA4DKZ, WB4ZTF, WB4PMI, W4RUH and gear loaned by K4GCN. WB4DGX and W4FMN. K4GCN had QSY to hospital and worked 2-meter portable in bed! WB4OXT is now mgr. of NCSSBN, 3938 kHz, and reports May QNI at 972 with 46 messages. K4SKI has new 500-CX K4LWZ asks us all to write our congressmen regarding the "TV1 Bill", its HR 3516 and if you don't know about it find out and write. The Cape Fear ARS (Fayetteville) reports antenna renovations and Mayor Lee

$1.49

HIGH POWER TRANSISTOR WITH HEAT SINK 3 for $3

Removed from new equipment! Includes popular 2N174 'doorknob' transistor TO-36, germanium, PNP, 150 watts, VCBO 80V, 15 amps, 40 hfe. For ignition, high power transmitters, etc. Mounted on heat sink 5 x 2½ x 1¼".

'HAM' UHF 400 MC HIGH POWER TRANSISTORS

3 for $10. **$3.95**

Hy RCA or equal 2N3632. NPN, 23 watts, 3 amps, TO-60 case, with stud mtg. VCEV max 85.

1-WATT FLANGELESS TOP HAT ZENERS

5 for $1

Type TK, Metal Case!

Volts	Volts	Volts	Volts
☐ 4.7	☐ 9.1	☐ 13.	☐ 33.
☐ 6.3	☐ 10.	☐ 15.	
☐ 8.2	☐ 12.	☐ 30.	

Lowest Prices

Largest Selection TTL IC's

Brand New "DIP" Packages Order by type number! Spec sheets on request "ONLY"

Buy 3 or more, 10% discount

* Money Back Guarantee Buy 100 — Take 20%

Type	Sale
☐ SN7400	$0.30
☐ SN7401	.30
☐ SN7402	.30
☐ SN7403	.30
☐ SN7404	.35
☐ SN7405	.32
☐ SN7406	.55
☐ SN7407	.55
☐ SN7408	.35
☐ SN7409	.35
☐ SN7410	.30
☐ SN7411	.35
☐ SN7413	.95
☐ SN7415	.55
☐ SN7416	.55
☐ SN7417	.55
☐ SN7420	.30
☐ SN7421	.35
☐ SN7422	.35
☐ SN7426	.37
☐ SN7430	.30
☐ SN7432	.30
☐ SN7437	.60
☐ SN7438	.60
☐ SN7440	.30
☐ SN7441	1.40
☐ SN7442	1.25
☐ SN7443	1.35
☐ SN7444	1.35
☐ SN7445	1.35
☐ SN7446	1.65
☐ SN7447	1.65
☐ SN7448	1.50
☐ SN7450	.35
☐ SN7451	.35
☐ SN7453	.35
☐ SN7454	.50
☐ SN7455	.35
☐ SN7460	.35
☐ SN7464	.50
☐ SN7465	.50
☐ SN7470	.50
☐ SN7472	.50
☐ SN7473	.65
☐ SN7474	.65
☐ SN7475	1.30
☐ SN7476	.75
☐ SN7478	.95
☐ SN7480	.75
☐ SN7481	1.50
☐ SN7482	.95
☐ SN7483	1.50
☐ SN7485	1.41
☐ SN7486	.55
☐ SN7489	3.75
☐ SN7490	1.50
☐ SN7491	1.50
☐ SN7492	1.10
☐ SN7493	1.10
☐ SN7494	1.10
☐ SN7495	1.10
☐ SN7496	1.10
☐ SN74104	.55
☐ SN74105	.55
☐ SN74106	1.25
☐ SN74107	.60
☐ SN74108	1.25
☐ SN74112	1.25
☐ SN74113	1.25
☐ SN74114	1.25
☐ SN74121	.70
☐ SN74122	.75
☐ SN74123	1.20
☐ SN74140	.50
☐ SN74145	1.40
☐ SN74151	1.25
☐ SN74153	1.60
☐ SN74154	2.10
☐ SN74155	1.55
☐ SN74156	1.55
☐ SN74157	1.55
☐ SN74158	1.55
☐ SN74160	1.95
☐ SN74161	1.95
☐ SN74162	1.95
☐ SN74163	1.95
☐ SN74164	2.50
☐ SN74165	3.50
☐ SN74180	1.20
☐ SN74181	4.50
☐ SN74182	1.20
☐ SN74192	1.95
☐ SN74193	1.95
☐ SN74194	1.95
☐ SN74195	1.35
☐ SN74199	2.65
☐ SN74200	9.99

* Factory Marked!

KRONOS $47.

With Cabinet

'TIME STANDARD' CHRONOMETER

Designed by our Scientific Device engineers as the most advanced digital timing device in the consumer "time" field. One radio-and-TV station engineer tells us, "Not a change of a second in 3 months." It is so accurate we use it as our standard. KRONOS KR100 Series, in the new sleek all-purpose walnut-and-black modern design cabinet, enhances any office, home, den, etc. It becomes a "visible-action conversation piece" wherever it is placed. Has modern LSI National Clock Chip, and 8-page brochure chock-full with pictorials and easy-to-understand, step-by-step instructions. This kit is COMPUTER SIMPLIFIED making do-it-yourself easy! Other features include 3 setting controls, 1 hour per second, 1 minute per second, and hold button. Easy-to-change from 12 to 24 hours, 4 to 6 digits, 50 to 60 hz operation. Your choice of different type readout systems: ☐ MAN-3 Type LED, ☐ MAN-1 Type LED (the larger character size), ☐ MAN-4 Type LED, ☐ 7-Segment Nixie Type Tubes. Kit includes POLAROID filter.

Size of cabinet: 6" x 5½" x 6" deep

☐ **KR101** 7-Segment MAN-3 Type LED, 6 Digits $47.00

☐ **KR102** 7-Segment MAN-1 Type LED, 6 Digits $69.95

☐ **KR103** 7-Segment MAN-4 Type LED, 6 Digits $57.00

☐ **KR104** 7-Segment Nixie Type Tubes $47.00

Buy 3 — Take 10% Off

'AUDIO AMP ALLEY'

Buy Any 3 — Take 10%

	Watts	Mfr.	Type	Case	Heat Sink	Sale
☐	1W	Westinghou	WC334	TOS	No	$1.49
☐	2W	National	LM380	DIP	No	$1.95
☐	3-5W	G.E.	PA263	DIP	Yes	$2.95
☐	4W	Texas	SN76024	DIP	Yes	$3.95
☐	5W	SGS	TBA800	DIP	Yes	$4.50
☐	4W	Motorola	MEP9000*	DIP	Yes	$2.95
☐	Dual 1W	Sprague	2277	DIP	Yes	$2.95
☐	—	Fairchild† Dual Stereo Preamp	739	DIP	No	$1.95

*With built-in preamp. All 9-24V, to 8-16 ohms load

LINEAR Op Amps

* FACTORY MARKED — Buy Any 3 PAKS — Take 10% Discount

* FACTORY GUARANTEED FACTORY TESTED

☐	531 Hi slew rate op-amp (TO-5)	$2.50
☐	532 Micro power 741 (TO-5)	2.50
☐	533 Micro power 709 (TO-5)	2.50
☐	536 FET input op amp (TO-5)	3.95
☐	537 Precision 741 (TO-5)	2.50
☐	540 70W pwr driver amp (TO-3)	2.50
☐	550 Precision 723 voltage reg. (DIP)	1.17
☐	555 Timer 2 uSeconds to 1-hr (A)	1.00
☐	556 2 Times faster than 741C	2.50
☐	558 Dual 741 (mini DIP)	1.00
☐	560 Phase lock loops (DIP)	3.25
☐	561 Phase lock loops (DIP)	3.25
☐	562 Phase lock loops (DIP)	3.25
☐	565 Phase lock loops (A)	3.25
☐	566 Function generator (A)	3.25
☐	567 Tone generator (A)	3.25
☐	595 Four quadrant multiplier	3.10
☐	702C Hi-grain, DC amp (TO-5)	.49
☐	703C RF-IF, amp, 14 ckts (TO-5)	1.00
☐	709C Operational amp (A)	.49
☐	709CV Op amp (mini DIP)	.49
☐	710C Differential amp (A)	.49
☐	711C Dual diff. comp (A)	.49
☐	723C Voltage regulator (A)	.95
☐	723 Diff. Video Amp	1.75
☐	741C Frequency compensator 709 (A)	.49
☐	741CV Freq. comp 709 (Mini DIP)	.49
☐	747C Dual 741C (A)	1.25
☐	748C Freq. adj. 741C (A)	.44
☐	748CV Freq. adj. 741C (mini DIP)	.49
☐	753 Gain Block	1.75
☐	709-709 Dual 709C (DIP)	1.00
☐	739-739 Dual stereo preamp	1.95
☐	741-741 Dual 741C (A)	1.00
☐	CA3065 Video Audio sys	1.50

(A) TO-5 or DIP dual in line pak

HIGH VOLT 1AMP

PIV	SALE
☐ 2000*	1.00
☐ 3000	1.35
☐ 4000	1.65
☐ 5000	2.25
☐ 6000	2.96
☐ 8000	3.50
☐ 10000	3.95

NATIONAL 'OP' AMPS

BUY ANY 3 — TAKE 10%

Type	Description	Sale
☐ LM-300	Super 723 V. reg.	$1.49
☐ LM-301	Hi-performance amp	.49
☐ LM-302	Voltage follower	1.49
☐ LM-304	Neg. V. reg.	1.49
☐ LM-305	Pos. V. reg.	1.49
☐ LM-307	Super 741	.59
☐ LM-308	Super gain op amp	1.50
☐ LM-309H	5V 200 mil V. reg.	1.50
☐ LM-309K	5V 1-amp V. reg.*	2.25
☐ LM-311	Comparator	1.50
☐ LM-320	Minus 5V 1-amp V.R.*	2.95
☐ LM-320	Minus 12V 1-amp V.R.*	2.95
☐ LM-320	Minus 15V 1-amp V.R.*	2.95
☐ LM-350	Dual peripheral driver	.59
☐ LM-370	AGC squelch op amp	1.49
☐ LM-371	R-F, I-F, op amp	.69
☐ LM-380	2-watt audio amplifier	1.95

*TO-3 case, — others TO-5

ALLEN BRADLEY 'TRANSISTOR' POTS

Type F, Screwdriver adjust. Any 4 for $1

Ohms			
☐ 75	☐ 7.5K		
☐ 100	☐ 10.0K		
☐ 200	☐ 20.0K		
☐ 250	☐ 25.K		
☐ 500	☐ 50.K		
☐ 750	☐ 75.K		
☐ 1.0K	☐ 100K		
☐ 2.5K	☐ 250K		
☐ 5.0K	☐ 2 Meg		
	☐ 5 Meg		

ALLEN BRADLEY 'MICRO-POTS'

Type G, 1/2" dia. x 1-2" high. Mounts 1/4" hole, with shaft, linear, immersion-proof bushing. 2 for $1

Ohms			
☐ 75	☐ 2.5K		
☐ 100	☐ 5.0K	☐ 25.K	
☐ 500	☐ 7.K	☐ 75.K	
☐ 1.0K	☐ 10.K	☐ 100.K	
☐ 2.0K	☐ 20.K	☐ 5 Meg	

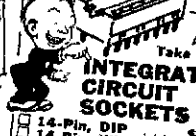
We stock Locknut Bushing & Screwdriver types at same low prices.

"C-MOS" IC CIRCUITS

Type	Sale		
☐ 74C00	$.95		
☐ 74C02	.95		
☐ 74C04	1.15	☐ 74C157	2.50
☐ 74C10	.95	☐ 74C160	3.50
☐ 74C73	1.79	☐ 74C161	3.50
☐ 74C74	1.59	☐ 74C162	3.50
☐ 74C76	1.79	☐ 74C163	3.50

SILICON TUBES

☐ SU4	$1.49
☐ SK4	3.95
☐ SG6	7.95



Buy Any 3 Take 10%

INTEGRATED CIRCUIT SOCKETS

☐ 14-Pin, DIP	$.45
☐ 14-Pin, Wire Wrap	.89
☐ 14-Pin, Side Mount	1.00
☐ 16-Pin, DIP	.50
☐ 16-Pin, Wire Wrap	.99
☐ TO-5, 8 or 10-Pins	.29

LOWEST PRICES EPOXY SILICON RECTIFIERS

*microminiature

PIV	2Amp *	2Amp	3Amp
50	$.06	$.05	$.08
100	.06	.06	.12
200	.07	.07	.15
400	.09	.09	.22
600	.12	.12	.28
800	.15	.15	.39
1000	.18	.18	.45

EPOXY FULL WAVE SILICON BRIDGE RECTIFIERS

PIV	2 Amp	6 Amp
50	$.69	$.88
100	.79	.99
200	.95	1.25
400	1.19	1.50
600	1.35	1.75
800	1.59	1.95
1000	1.79	2.25

Code: 2 amp TO-5 case

6 Amp [illegible] x 3/16 sq

Terms: add postage Rated: net 30

Phone Orders: Wakefield, Mass. (617) 245-3829

Retail: 16-18 Del Carmine St., Wakefield, Mass. (off Water Street) C.O.D.'S MAY BE PHONED

☐ 15¢ CATALOG on Fiber Optics, 'ICs', Semi's, Parts

POLY PAKS

P.O. BOX 942M LYNNFIELD, MASS. 01940

proclaimed June 23,24 Amateur Radio Day to tie in with FD and NC Amateur Radio Week June 17-23) was proclaimed by Gov. Holshouser in Raleigh. W4WSS, one of the first hams I ever knew has joined Silent Keys. Traffic: (June) WAØYDJ/4 237, W4OFO 98, W4WCG 92, K4MC 87, WB4QQM 79, W4WXZ 46, K4VBG 26, W4PCN 16, K4GHR 14, K4EZH 13, WB4UOU 10, WN4CBE 8, WB4HDS 8, WB4VSA 7, WB4CES 5, WA4VNV 3, WA4KWC 2. (May) WAØYDJ/4 220, WN4CBE 24, WB4UBA 11, WA4VNV 11, WB4CES 7, W4VTR 8, WA4KWC 3. (Apr.) W4WCG 180.

VIRGINIA — SCM, Robert J. Slagle, K4GR — Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4PBG. Asst. SEC: WB4FDT. PAM: WB4RZW. RMs: W4HIR, W4SQO, W4SHJ, WB4PNY, K4EBY. I regret to report the passing of K4ELF of Falls Church on June 13. Field Day reports from Alexandria RC, SEVWA, New River Community College ARC, Central Virginia Contest Club, Tidewater ARC, Woodbridge Wireless Association, Richmond ARC. W4WSF reports a lot of skip on 2 fm. Alexandria RC covered the White Water Canoe Races in the upper Potomac. June VSBN QNI 919, QTC 224; VRN QNI 77, QTC 25. WB4KIT had fine trip in VE3-Land. WB4RDV had hf down last half of month for FD. None of the voices heard from K4JM on FD was his. K4GMH has invented a used TTY paper rewinder (so you can use both sides). NOVARC convention plans for the big Convention at Reston on Sept. 14-16 progressing well. Director, W4KFC was everywhere as usual; will have attended semi-annual Board meeting by this time. W4DMs activity limited to skeds with dad. W5VZO/4 is night schooling and activity down. W4MK reports conditions too bad for operating. WB4FDT started to work for FCC this month. W4YZC says not to give up on 28 MHz — good short skip openings lately. Note VSBN shifted to 3947 kHz. K4JKK back and active. W4THV lost linear and had to redo. W8VDA/4 had a busy month. WB4DRC should now be on the air. Welcome to K4GQS new to Springfield from Raleigh, N.C. W4UO should be back from a month in Mich. TARC's report sounds like they had more of a ball than a Field Day. WA4QEL got married and spent one day of his honeymoon at FCC going from Conditional to Advanced. Counties WA4WQG 3055, W4JUJ 2853. W4SQQ lost somebody's satellite — says things are touchy. Traffic: (June) WB4PNY 432, K4KNP 229, WB4SGV 151, W8VDA/4 141, W4SQQ 131, W4UQ 123, K4IAF 103, WB4FDT 98, WB4RZW 74, W5VZO/4 66, K4EBY 35, W4KFC 35, K4GR 34, WA4PBG 34, WB4RDV 31, W4TE 24, W4YZC 23, WB4KIT 21, K4GMH 16, W4TZC 16, K4JM 15, W4MK 7, W4LQO 5, WB4GMC 4, K4IKP 4, W4KX 3, WA4WQG 3, W4THV 2. (May) W4HIR 126, K4GTS 7, WA4QEL 1. (Apr.) K4GTS 2.

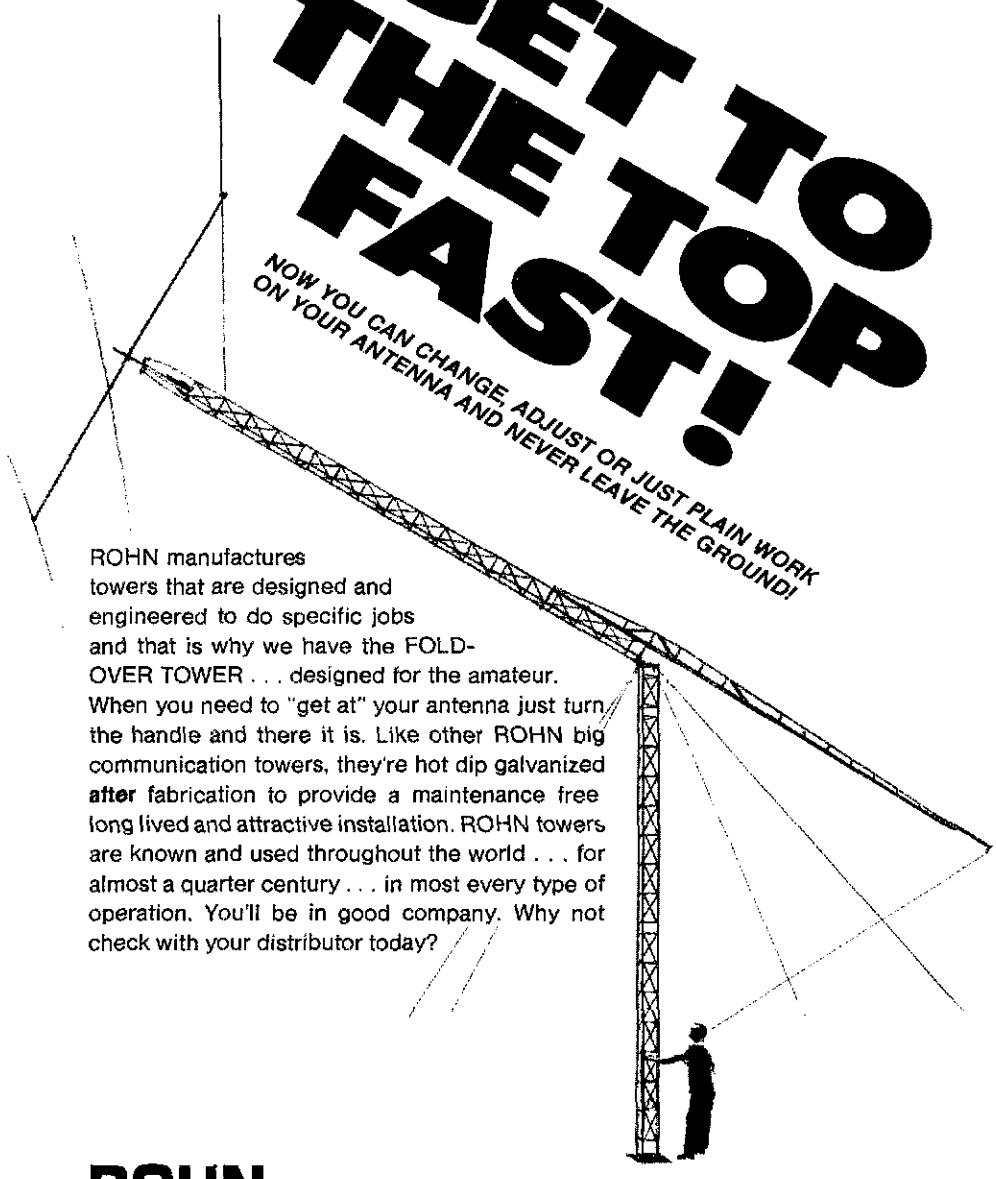
WEST VIRGINIA — SCM, Donald B. Morris, W8JM — SEC: WA8NDY. RM: WB8BBG. PAMs: W8DUW, K8CHW, W8IYD. CW Net Mgr.: W8HZA. Phone Net Mgr.: WB8DQX. Attending the 15th Annual State ARRL Convention at Jackson's Mill and a Morris family reunion were WB8FER, WB8FEQ and WB8GDY, West Va., and WA9YKM of Ind. W8MWI now WB4JUI in Va. WA8UQY and K8TNY, a two-man team made 500 contacts on Field Day. I regret to report the passing of WB8IHZ, father of WA8UUY. WB8IHZ received his Novice at age 60 and just upgraded his license before his passing. Kanawha ARC came through with 1510 contacts in FD. W8HZA new RM and CW Net Mgr. WB8DQX new OPS and Phone Net Mgr. W8GWR received the Outstanding Amateur Award at Jackson's Mill. Kanawha ARC was presented a cup for winning the 1972 FD. WA8YCD, WB8LAI, W8AEC and K8WMX won major prizes at the State Convention. WN8QDP new Novice in Burnsville. I regret to report the passing of K8DZU. Bob was a charter member of the State Radio Council and had recently moved to Fla. W5RJL, formerly W8VMP, attended the State Convention. Congratulations to W8DUV and her staff for an "outstanding" State ARRL Convention. Phone Net 29 sessions, 214 stations, 90 messages; CW Net 22 sessions, 36 stations, 7 messages. Traffic: WN8MKL 129, WB8BMV 31, W8HZA 20, WRJWX 18, K8QEW 18, WA8YCD 18, W8JM 8, W8AEC 5, W8DUV 5, WA8NDY 5, W8GDP 3, WB8IAX 3, WB8AKQ 2, WB8CYB 2, WA8LFW 2, WA8OKG 2, WA8POS 2, W8CKX 1, WB8EKG 1, WA8HSW 1, K8ZDY 1, WA8ZNH 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Clyde O. Penney, WAØHLQ - SEC: KØFLQ. RM: KØOTH. PAMs: KØCNV, WAØWYP, WAØYGQ. Newly elected pres. of the Pikes Peak Radio Amateur Assn. is WØCNY, who will fill out the unexpired term of W2TPV/Ø, who has been transferred out of the area. The newly elected

GET TO THE TOP FAST!

NOW YOU CAN CHANGE, ADJUST OR JUST PLAIN WORK ON YOUR ANTENNA AND NEVER LEAVE THE GROUND!



ROHN manufactures towers that are designed and engineered to do specific jobs and that is why we have the FOLD-OVER TOWER . . . designed for the amateur. When you need to "get at" your antenna just turn the handle and there it is. Like other ROHN big communication towers, they're hot dip galvanized **after** fabrication to provide a maintenance free long lived and attractive installation. ROHN towers are known and used throughout the world . . . for almost a quarter century . . . in most every type of operation. You'll be in good company. Why not check with your distributor today?

ROHN® **MANUFACTURING**

DIVISION OF UNARCO

P.O. Box 2000 / Peoria, Ill. 61601

vice-chmn. is W0GCH, who will fill the unexpired term of W0LDV, also transferred out of the area. Congratulations and best wishes for a successful term in their respective offices. Congratulations to the RADOPS organization of the El Jebel Shrine in Denver for their fine work in handling communications in connection with the Shrine Spring Ceremonial in Denver on June 2. Their quick and efficient emergency communications work was instrumental in securing prompt aid and assistance for a fellow shriner who collapsed with a heart attack during the ceremony. Net traffic for June: Columbine QNI 827, QTC 60, informals 164, 23 sessions. Traffic: (June) W0WYX 1105, K0OTH 145, W0LQ 94, WB0HSZ 89, W0IW 55, W0SIN 45, W0NZL 27, WA0ZPP 24, WA0NFO 20, WA0TMA 20, W0JRW 19, WB0CCB 18, K0SPR 15, W0NFW 13, WA0YED 11, W0GAQ 7, W0LAE 7. (May) WB0HCK 143, WA0NFO 12.

NEW MEXICO - SCM, Edward Hart, Jr., W5RE - RM: W5UH. PAM: W5MYM. NMN meets daily 3570 at 1845 MDST. NMRRN meets Mon. through Fri. 3940 at 1800 MDST with the NM P. O. net on the same frequency and time on Sat. and Sun. The NM breakfast club net meets on this frequency at 0730 MDST. Two repeaters have been licensed in New Mexico under the new regulations - WR5ABG 16/76 in Las Cruces and WR5ABH 22/82 in Albuquerque. Traffic: W5MYM 113, W5UH 82, W5HM 63, K5KPS 61, W5RE 34, WA5OHI 27, W5BRV 26, K5DAB 21, W5PDY 21, WA5BLI 8, WA5MIY 7, W5TLK 6.

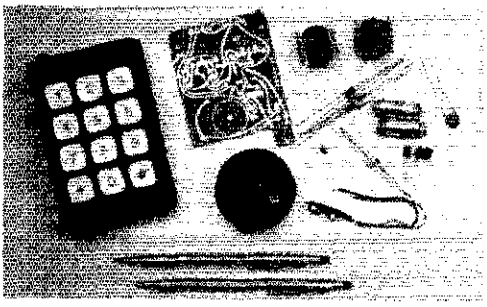
UTAH — SCM, John H. Sampson, Jr., W7OCX — SEC: W7GPN. RM: W7UTM. BUN meets daily at 1830 GMT on 7272 kHz. 836 check-ins, 53 messages. UCN meets daily at 0130 GMT on 3575 kHz. WN7VNY is the new mgr. of the Utah Novice Net. WA7QAR and WA7GQD have traded rigs and are installing new antennas. WA7OXZ AND WA7MEL report recent openings on 6 meters. Ex-KL7FPM, now WA7LBQ has new nursing job in Monticello. WA7BSG filed a few 1W reports and has given exams to new Novices at the Univ. of Utah RC. Weber County amateurs assisted the local civil defense in support of an emergency test on June 4. The Ogden repeater application for license now in the hands of the FCC. W7DKB has built a revised ultramatch and reports highly successful results. Seen at the Rocky Mountain Division Convention at Cheyenne, Wyo. were W7EU and XYL W7GIM; W7EM and XYL W7VTJ; W7OCX, W7GPN, W7IQU, W7RQT and W7VSS. W7IQU and W7OCX received TWN certificates awarded during convention banquet. The Daylight Region Net at 1900 GMT on 7230 kHz needs more active support from the Utah section. WA7PDU is the only active ham in Kanab, in Kane Co. Traffic: K7HLR 97, W7EM 67, WA7OAU 67, W7OCX 54, W7UTM 45, WA7MEL 41, W7DKB 40, WA7QAR 20, WA7PDU 18, W7HKC 10, WA7HCO 8, W7IQU 8, W7FYR 6, W7GPN 2.

WYOMING — SCM, Wayne M. Moore, W7CQL — SEC: K7NQX. PAMs: W7TZK, K7YUG. OBSs: K7NQX, W7SDA, WA7FHA, K7YUG. Nets: Pony Express Sun. at 0800 on 3920; YO daily at 1830 on 3597; 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. A new one on from the town of Clark-WA7KML. Listen for K7IKO who will be maritime mobile on his way to and from New Zealand. Another new one in Cody is WN7UIH. WA7MCX has moved to Boise, Idaho, K7TAQ vacationing in Ore. W7SDA had a very nice extended vacation on the west coast. The Division Convention is over for another year and if you missed it, you missed a lot of very good activities, fellowship and a good time. The Cheyenne group with K7NQX did another very good job. Traffic: W7SDA 227, W7TZK 200, K7VWA 143, WA7HAB 19.

SOUTHEASTERN DIVISION

ALABAMA — SCM, James A. Brashear, Jr., WB4EKJ — SEC: W4DGH. PAM: WB4WAI. RM: W4HFU. WN4ZQF passed the General; brother, WN4EVY passed the Novice and "ZQF" Sr. passed the Advanced Class exams — congrats to each of them. Really glad to hear W4SLJ, WA4AJA and WB4UHC QNI AENB. WA4AJA also checks in on AEND. WB4MVM reports a new ham at his QTH; son, WN4FBA — congrats to WN4FBA and to W4MVM, I understand via the Mobile ARC Newsletter that he is in the process of receiving his 25-year ARRL pin. K4JK operated a "fun" FD and on the last FMT he got 25 ppm — how about that? K4UMD reports handling some emergency calls to report auto accidents via 2 meters and the land line. He attended the Birmingham ARC FD site and had a good time. WB4SVH reports the Tuscaloosa ARC made it through FD without a tornado. The Huntsville ARC had a few (?)

KEY YOUR REPEATER OR DIAL THROUGH ON A PHONE PATCH FROM YOUR MOBILE RIG . . . . . .



WITH OUR TOUCH TONE* GENERATOR KIT.

- Generates standard Touch Tone* frequencies
- Uses standard 9 V. battery
- Operates through internal speaker, external speaker or wired directly into your microphone circuit
- Only 2-3/4" X 4-1/4" X 1-3/8" - 8 ounces
- Attractive textured molded plastic case
- Assembles in 45 minutes
- Calibrates in 60 seconds (with frequency counter)

$33.95 KIT **$53.95 ASSEMBLED AND TESTED**

Add $1.00 for postage and handling in U.S.A., $3.00 foreign. Allow 2 weeks for delivery.
SEND CHECK OR MONEY ORDER (NO C.O.D.'s) TO:

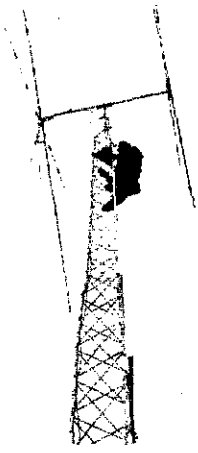
Interface Technology, Inc.
P.O. Box 24565, St. Louis, Missouri 63141

*Touch Tone is a registered trademark of the Bell System
(Missouri residents add 3% state sales tax)

UNIVERSAL TOWERS

FREE STANDING ALUMINUM TOWER

MOST POPULAR HAM TOWER EVER MADE!



REQUEST
NEW CATALOG
OF
TOWERS &
ANTENNAS

Midwest Ham Headquarters
For Over 34 Years
HAMS! Write For Free Catalog and Wholesale Prices!

ELECTRONIC DISTRIBUTORS, INC.
1960 Peck Muskegon, MI 49441
Tel: 616-726-3196

MOTOROLA 2 METER POWER AMPLIFIER

Up To 1,000 Watts (1KW)!

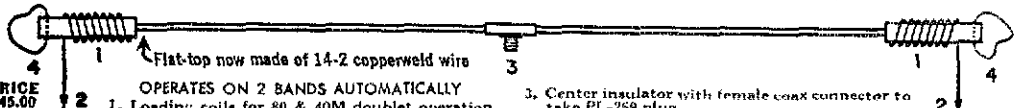
Brand New In Original Factory Cartons!

This is a completely self-contained power amplifier designed specifically to increase the power output of low power transmitters. Ready to go! No modifications required! Rated 250 watts out, CONTINUOUS DUTY! Can be easily modified for up to 1,000 watts (Details supplied with each unit.). Fully metered, with antenna change over relay, blower motor. No external keying circuits required. Amplifier keys automatically. Just hook a piece of co-ax from your low power base or handi talkie and push the mike button! Unit measures only 26" H, 20" W, 16" D. Original cost: $2,100.00, our price, brand new in original factory sealed cartons with manual is only $375.00 FOB Trenton, Michigan. Limited quantity, don't miss out!

Freq. range .....136 MHz to 174 MHz
Amplifier tubes .....pair of 4X150A's
Input excitation .....2 watts to 15 watts
Power output .....250 watts to 1000 watts*
Type of operation .....Class C, push-pull
Input/output impedance: .....50 ohms
A.C. power: .....115 or 230 vac

NEWSOME ELECTRONICS • P. O. Box 176-T • Trenton, Michigan 48183
(our store hours are by appointment only)

LRL-70 ANTENNA 70' LONG, 80 & 40 M • Power rating 2 Kw. P.E.P. or over



PRICE $45.00 In Cont. USA. ppd.

OPERATES ON 2 BANDS AUTOMATICALLY
1. Loading coils for 80 & 40M doublet operation
2. Adjustable ends to set 80 meter resonance SWR 1.5:1 or less at resonant frequencies
3. Center insulator with female coax connector to take PL-259 plug
4. Fittings on insulators to tie on rope
Use RG-8/U feeder

LATTIN RADIO LABORATORIES • Box 44 • Owensboro, Kentucky 42301

problems getting FD started on Sat. afternoon, but everything finally worked as it should. WA4WED has a 50-ft. tower up. Good luck to K4BSK who started work in Charlotte, N.C. WB4KSL will be in charge of a traffic booth sponsored by the Huntsville ARC at the Northeast Alabama State Fair in Sept. — thanks to the Jay-Cees for providing the space and assisting in other ways to help make the booth a success. WB4LTT recently gave an interesting talk at a Huntsville ARC meeting on "VHF operations in the Northeast USA." Traffic:WB4EKJ 158, WB4SVH 116, K4AOZ 69, WB4KSL 39, WB4JMH 25, WN4ZQF 14, WA4AJA 5, K4HJM 1.

GEORGIA — SCM, Ray LaRue, W4BYG — Asst. SCM/RM: John H. Boston, III, WB4RUA. SEC: WA4VWV.

Net	Freq.	Time(Z)	QNI	QTC	Mgr.
GSN	3595	0000/0300/ 1150	615	179	WB4RUA
GaSSB	3975	0100			K4VNV
GTN	3718	2300			WB4TVU

Appointments: WB4DYQ OBS; WB4UIH ORS. Field Day set ups were Atlanta RC, W4DOC; Columbus RC, W4CVY/4; Confederate Signal Corps, W4VTA/4; Ga Tech RC, W4AQL/4; NE Ga ARC (Athens); Warner Robins ARC, K4AAK/4; WB4MWC and WB4UIH; WB4SUG and friends. WB4RUA, WB4WXX and WB4UIH earned PSHR for June. If you qualify for PSHR, send me a report each month with your activities report. CSC had a great Field Day with about 35 operators, 4-50-ft. towers/beams and worked through Oscar Six. A first for all there! The Albany repeater has been moved to a 400-ft. tower and QSY to 146.22/82. The Albany 2-Meter Net meets Wed. 146.94 and 2100 EDT. South Atlanta now has the Airport Repeater WR4ABN 147.63/03 (open). See W4REI for further details. W4VRO and WB4ZGO have new FM27Bs on 2. K4ADI has a new TA-33. WB4ZGA has new SB 220 and beam. W4BGH now on RTTY. WB4BZY's XYL now WB4FGG. Albany RC holding radio classes at the Junior College. Great! How about some others doing the same thing? Traffic: WB4RUA 90, WB4UIH 79, WB4WXX 74, W4CZN 42, WN4CTL 36, W4BYG 31, W4AMB 28, WA4NMU 21, WA4RAV 21, K4BAI 20, W4JM 16, WA4LLI 11.

NORTHERN FLORIDA — SCM, Frank M. Butler, Jr., W4RKH — FD reports received from Pensacola, Panama City, Jacksonville, Orange Park, Orlando and Inverness. New FAST Net Mgr. is K4WKY. Jacksonville: WA4CGX/mm returned from 6 months at sea and is running patches from WB4KLU. WB4JWW is asst. EC. GN recognized W4YPX as "Gator of the Month." Daytona Beach: WB4LMN and WB4WTL enter FTU this Fall. WB4PVB is on 2-meter fm. W4FZV and WB4ESH traveling this summer. Orlando: WB4WHK renewed OPS. WB4VVF designed and built a new keyer. Ocala: A code and theory class was conducted at the college. WA4SYD and WN4YUE have a new jr. op. K4FCZ received SSB WAC certificate. Gainesville: W4TKE vacationed in NW Fla. Starke: WB4OMG and WA4NIJ are working on 450 MHz fm gear. Tallahassee: WB4ZQC is QFN rep. for NEPN; he also earned TPTN Certificate. WB4PNJ chasing DX on 20-meter cw. Fort Walton: NW Fla. FM Assn. received new call — WR4ABZ (formerly WB4KLT). W4BVE was hospitalized in Birmingham several days. K4IUH is a new OO. WA4BPE earned FAST Net Certificate. WB4UVI and WB9GUY/4 are new on 2-meter fm. K4UBR and WB4MHG demonstrated ham radio at FWB Boys' Club, to mark Amateur Radio Week. A code and theory class also is planned. WA9QVT/4 took NCS job on NFPN. WN3SSR/4 active on QFTN. Pensacola: The FFARA used ham radio to capture a car thief during Field Day. WA4NAP/mm works 2-meter fm from the USS Lexington. WA4BMW and WA4BVO are studying effects of tilting a 6-meter beam for better DX. Traffic: (June) WA8ZDE/4 1001 WA9QVT/4 241, K4BSS/4 142, WB4WHK 134, W4SDR 98, K#BAD/4 89, K4FCZ 76, WB4OMG 65, WB4VYU 57, WA4BPE 55, WB4ZQC 51, WA4IZM 49, W4RKH 45, WA4NAP 38, WA4FJA 32, K4IZT 32, W4NGR/4 30, WB4NJI 27, WA4EYU 23, WA4BGW 18, WB4SKJ 18, W4DFP 15, K4CVO 12, W4LDM 12, WA4NRP 12, WA4VZF 11, K4EZE 10, W4IKB 8, WB4NHH 8, K4RNS 7, WB4VAP 5, WB4DXN 4, WB4PNJ 4, K4FLV 3, WB4BYJ 1, W4IA 1. (May) WA4BGW 48.

SOUTHERN FLORIDA — SCM, John F. Porter, W4KGJ — Asst. SCM: Woodrow Huddleston, K4SCL. SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4FAC CW and K4EBE RTTY. PAM: W4OGX. K4SCL made BPL. WB4GHD made PSHR. New FAST Net Mgr. is K4WKY. Best of luck to you Mike. WB4TRI,

WB4CPZ and WA4EDW received FAST Net Certificates in June. New OPS appointment is W4MML. WB4ZYZ has his new Advanced Class ticket. Tampa Repeater now has Autopatch. A revised up to date Fla. FM repeater directory was published in Aug. issue of Florida Skip. Copies available. The Tampa Hamfest Oct. 6 and 7 is sponsored by five local clubs. It should be a big one. Dade County AREC is publishing first of its kind, a twenty page manual for all members to use as a guideline. Copies may be obtained free upon request to WA4QLC, Miami. *Following Radio Clubs reported as active on Field Day — Ft.* Myers, Brandon, SIRA Miami, Indian River, W. Palm Beach, South Miami, Lake County, Dade County ARPSC and Hollywood. The Hollywood ARC set up special event station KF4DT during Fla. Amateur Radio Week on Dry Tortugas. The project was spearheaded and QSL cards to W4OZF. The West Palm Beach ARC was hit three times by lightning during FD. One hit got the antenna on WA4HXZ mobile. Palm Beach EC WB4RLU is setting up County wide AREC hurricane net. The South Miami FD activities was featured twice on Channel 10 (Miami) "Weekend Scene." Nice going fellows. That is the kind of publicity we can use more of. WA4ASJ really giving his new General Class ticket a real workout. Fla. Nets reporting FMTN QNI 577, QTC 214; GN QNI 259, QTC 235; TPTN QNI 246, QTC 117; FAST QNI 959, QTC 283; FPTN QNI 447, QTC 90. QFN incomplete this month. The Platinum Coast ARS 8th Annual Hamfest will be Sept. 8 and 9. Meetings for ARRL, RACES, SERA, MARS, QCWA and Floradoras will take place. Hope to see you all there. Please remember the new deadline for traffic reports is now the 5th. Anything after this date will be held over until the next month. Section news items are also welcomed each month. What is your club or net doing? Traffic: (June) WB4AIW 471, K4SCL 404, WB4GHD 225, WA4SCK 206, WA4IJH 129, K4WKY 126, WB4HJW 80, W4DVO 52, W8BZY/4 47, W4EH 46, WB4UNV 44, W4BM 43, K4BLM 35, K4NE 32, WA4HDH 26, W4DQS 25, WB4WYX 25, WB4AID 22, K4QG 22, WB4IER 15, WA4ASJ 13, W4NTE 13, WN4ZZB 13, WA4CJM 10, W4DDW 10, W4KGJ 8, WB4CPZ 7, W4GDK 7, W4OGX 7, W4LK 6, WB4SMA 4. (May) K4WKY 101, W4UNV 97, W4IYT 38, K4EBE 9, K4IWT 4.

SOUTHWESTERN DIVISION

ARIZONA — SCM, Gary M. Hamman, W7CAF — PAM: WA7JCK. RM: K7NHL. Reports indicate that those who participated in Field Day had a great time and Murphy's Law did not strike too badly. Preliminary estimates of number of contacts for several of the clubs are as follows:

Call	*Club Name*	*Xmtrs*	*Ops.*	*QSOs*
W7GV/7	Old Pueblo ARC	4	25	1,324
W7IO/7	Arizona ARC	3	22	1,383
WA7LAZ/7	Hualapai ARC	2	6	250

New licensees in Kingman are WN7WAZ and WN7WBA. One of the first repeater licenses in Ariz. is WR7ABH, near Benson, operating 146.28/.88 MHz. W7CWY moved to Maine and *W7RG planning to move to Calif. W7DTL has accepted a new* job in Minn. Section Net awards were earned by K7EMM, WA7KQE, K6MLU, K7NTG and W7UQQ. K7NHL qualified for the PSHR. Traffic: K7NHL 167, K7NTG 75, W7PG 55, W7DQS 36, W7UQQ 26, W7CAF 20, K7MTZ 15, WA7JCK 13, K7NMQ 13, K7HGH 10, K7ZMA 9, WA7KQE 8, K7GLA 3, WA7TZO 3, WB0HZE/7 1.

LOS ANGELES — SCM, Eugene H. Violino, W6INH — SEC: WA6QZY. RMs: W6LYY, WB6ZVC. By the time this is printed the Field Day problems will be over. W6CF reports he has been very active with 150 watts and now feels its time to build a linear. WB6UIA and W6WIS active in club affairs, also home brewing. W6USY will be in KH6-Land for a month. W6NJU has had to resign his Vice-Director post because of job transfer. Please don't forget to write your congressman regarding HR Bill 3516 requiring set manufacturers to improve set design to eliminate TVI. W6DOW has new antenna farm Tristo CZ-54 with th-3 Mk-3, Ham-M on top of that five-element six meter beam and finally at the 70-ft. level are two eleven-element vertically-stacked 2-meter vagis. The Ramona RC has set the first Sat. night of each month for T-Hunts. WA6VLF, WB6IQD and K6ZTQ are on with desk FAX machines 2-meter am use. A total of sixteen stations sent FD reports which were forwarded to Hq. Field Days are not without danger — W6LPI became involved with contact to the generator output on Field Day and thanks to WA6QQL and WB6JXX, WA6FIB things turned out OK. WA6ZKI having *trouble with his Drake. W6HUJ moving to new QTH and hope to*

have better antenna site for greater activity on SCN. Marina ARC has 3 new Extra Class members and three ARRL Life Members. Novices who are interested in traffic and emergency nets should listen Sat. 9 AM on 3730 kHz. Net mgr. is WA6YWS. This net is good training for traffic handling and emergency procedures. K6UYK received his Forty-Year membership pin from ARRL — joined when he was twelve years old. Thanks to Ted for his origination of traffic for SCN. The SOWP group had a get together at Brothertons Restaurant with 58 members attending. Among the speakers were W6CF, W6MLZ and W6PZY. With Ray Meyers and Dr. Hess speaking and spinning yarns everyone was kept in a very good mood. Traffic: W6INH 230, K6UYK 181, WA6BCO 170, W6LYY 103, WB6OYN 70, WB6ZVC 62, W6IDN 40, WA6ZKI 18, W6NKE 14, W6OAW 12, W6OEO 11, WB6KGK 9, W6USY 8, K6CL 4, WB6YIZ 3, W6DGH 2, W6IVC 2.

ORANGE — SCM, William L. Weise, W6CPB — Asst. SCM: Richard Birbeck, K6CID. SEC: WA6TVA. PAM: K6YCL. RMs: WB6AKR, W6BNX. Field Day over — GREAT. The hot weather took its toll. Band openings were surprisingly good. Attention Novices: Do you want to learn traffic handling, increase your code speed? If so, check in Sat. mornings on 3730 kHz at 9 AM local time, or contact WA6YWS for details. Experienced traffic operators will teach you proper procedures at your code speed. Riverside County ARA just completed a 4 month licensing course. New Novices from the class are WN6s WHL, WKV, WKX, WQJ, WQK, WQL, WQM, WQR, WQS, WTP and WUE. Congrats to all and the instructors K6OY, K6GMF, WA6OWD and WB5AYK/6. Desert RATS will not meet again until Sept. W6QBD reports all 2-meter repeaters in Midwest were in operation during his trip in June. W6BUK attended MTN roundup at Arnold, enjoyed having many eyeball QSOs. KH6BF was guest operator at W6FB in June. WB6AKR has been appointed Asst. Mgr. PAN by W6BNX. K6GMI appointed OPS in June has been busy. In May and June Hal received RN6 and Old Timers Club certificates, a Public Service Award from ARRL, and Post Office Net operator of the month for May and June.congrats Hal. Many of the clubs in the Orange section are receiving information on new Novice and Technician licensees. Here is your opportunity to, not only increase your membership, but to assist these newcomers with their problems. Please lend a helping hand to these new licensees. Traffic: K6GMI 192, WB6AKR 109, W6ISC 105, WA6YWS 29, W6WRJ 22, WA6TVA 19, W6CPB 17, WB6VTK 16, W6QBD 5, W6OKX 4.

SAN DIEGO — SCM, Paul C. Thompson, W6SRS — Asst. SCM: Art Smith, W6INI. SEC: W6GBF. The election for SCM in this section is being completed. The results will be available shortly. Due to some confusion in regard to the filing dates for ballots, they were mailed later than normal. The July club meetings were devoted to this year's FD activities. Club turnouts for the event were very good. El Cajon topped the section with over 45 members participating. K6DS is providing information in regards to the Oscar flyover programs. Area hams continue to participate in earth studies being conducted by SKYLAB. For details contact W6FVF. Stations checking into NTS/SCN locally are WA6AMK, W6BGF, WA6HQH, WA6IIK, WB6LJO, W6LRU, WB6PVH, WB6VKV. WB6CFT is NCS for AREC CW net on 3770 kHz Sun. 10:30 AM. The July AREC breakfast program was provided by WA6EHD from the San Diego Fire Dept. Plans for the Southwestern Division Convention in San Diego for 1974 are progressing with K6BWT acting chmn. Remember the 1973 S/W Division Convention on Oct. 22. Plan to attend and register early. K6CAQ and K6PD are opening a new radio store here in San Diego. New Novice license classes have started at the EOC under leadership of WA6RBP and WA6BJM. PSHR: W6BGF 43. Traffic: W6BGF 129, W6VNQ 125, WA6AMK 117.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DEI — SEC: W6JTA. RM: W6UJ. PAM: K6EVQ. New officers of the Estero Radio Club are W6JTA, pres.; K6ELO, vice-pres.; WB6PGK, secy.-treas.; K6TOE and WA6GOR MAL. WB6HTK received his CP-25 code proficiency award. WA6MBZ has been handling some RN6 traffic skeds. Section attendees at the MTN Roundup in Arnold, CA were K6EVQ, WB6DHW, WB6MXM, WB6DXY, WB6PGK, WB6LCO. WB6MXM received a beautiful hand crafted 2 kw antenna tuner. WB6PGK received the Carpenter award for handling most traffic last year. WA6PFF busy with navy MARS traffic. W6OAL sending Amsat Oscar bulletins via Oscar 6 satellite. WA6LLI moved to NH. Field Day was well attended by members of the Mike and Key (WA6VBU), Satellite (W6AB), Estero (W6JTA), Poinsettia (WA6BWM), Canejo Valley (W6HE), and Santa Barbara (W6LUC) RCs. Explorer post 2955 (public service communica-

tions) was also out in force (K6VIE). The Poinsettia ARC Field Day was a presentation of amateur radio to the people and officials from Ventura complete with satellite demonstration by W6OAL. A couple of Japanese hams even dropped in to operate and add international flair to the affair. WB6PGK and WA6DEI *again made* PSHR. How about seeing some new calls in this activity column. Send me your report each month for inclusion. Its your column. WB6AUH the editor of Worldradio newspaper spoke at the Santa Barbara ARC on the subject "Amateur Radio-Mindless Fun or Meaningful Activity." Think about it. *What do you do to support amateur radio. Traffic:* WA6MBZ 93, WB6PGK 92, WA6DEI 54, W6JTA 48, WB6MXM 14, WA6PFF 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.E. Harrison, W5LR — Asst. SCM: Frank A. Sewell, WSIZU. SEC: K5QKM. RM: W5QU. Our SCM, W5LR, is on a well earned vacation along with his pretty XYL. WB5AMN turns in good report for ITN. June check-ins 1295, 130 QTC, W5SHN, EC Cherokee County 45 ham nets, 61 Army MARS. Congrats Soupy, W5NW doing well on 160 — 49 DX contacts, celebrating 50 years on the air June 16 by operating 24 hours, 10 through 160 meters. Thanks to W5LGY for invites to N.E.T.E.N. party at Quitman June 24. Sorry to report injuries to K5GNG, XYL of K5ENL. Note: Swapfest PARC Amarillo Sept. 15-16, 1973. WB5GRZ soon to be on 2-meter fm. WA5VJW first place winner YL-OM Contest. Most area clubs giving FB report on recent Field Day. We need ECs in many counties; please check yours, if you don't have one, get one, just drop line to W5LR or this station K5QKM, bet you come up with something. Look for W5ARV NM next couple months cw, ssb along West African Coast. Thanks to EC WA5RQS for report of *Public Service, page 85 July QST, we sincerely implore all* amateurs to make such reports to any of the following: ARRL direct, your SCM, SEC, or EC. We amateurs are the only ones that the public can rely upon in case of such disasters. The Public Service Diary is a very interesting part of QST. NET Emergency Net held 4 practice sessions 46 check-ins, 3 NC. *The Dallas 6M* Club, K5MEI pres. is going very well. Keep up the good work. K5AKY and his XYL K5DFT are quite active ARECs on 6 and 2. Lets all send W5QU suggestion time and place for TEX picnic. Traffic: (June) WA5NSJ 108, W5TI 76, K5OWV 44, K5QKM 28, WA5QGE 22, *W5LR 20, WSIZU 19, W5SHN 16, WB5BFX 9,* W5QGZ 8, W5YK 8, W5GSN 6, W5SOQ 5. (May) WA5NSJ 31, W5SHN 15, W5AYX 10, W5YK 4, WB5BFX 3.

OKLAHOMA — SCM, Cecil C. Cash, W5PML — Asst. SCM/SEC: Leonard R. Hollar, WA5FSN. RM: W5RB. Asst. RM: WB5EEY. PAMs: W5MFX, WB5CWX and K5DLE. June was a busy month with the VHF Contest and Field Day. If you missed going out and testing your emergency gear you missed a great treat and chance to improve your operating skills for emergency and public service communications. Considering that Field Day is a very important event, the SEC and I visited a combination of 8 Field Day setups ranging from Enid and Oklahoma City on the west, Bartlesville north, Muskogee east, and Lawton south. Each group visited had May QST on hand and usually open at page 80. W5SUG reports a great time on 2-meter mobile while on vacation to the west; said he worked 180 miles through the Albuquerque repeater WA5PSV which is 65 miles from the city on 10000 ft. Mt. Taylor. Traffic: W5RB 89, WB5ELG 46, WB5EEY 42, WA5ZOO 30, W5FKL 29, W2FIR/5 23, W5MFX 23, W5PML 16, WA5FSN 13, K5ZDB 10, WB5AZS 9, W5SUG 7.

SOUTHERN TEXAS — SCM, Arthur Ross, W5KR — SEC: WA5YXS. PAM: W5HWY. RM: W5ABQ. ORS W7WAH/5 trying to increase activity on Travis Co. AREC Net, also planning activity on 6 meters. OPS WA5VBM received Public Service Award for Managua earthquake efforts; also honorary lifetime membership in Tyler Chapter QCWA. K1ONW/5 is new ORS with long list of awards earned up nawth; just passed Extra Class and has new antenna farm with TVI problem on 80. New ORS appointees are brothers WA5ZBN and WB5IOG. EC W5TFW WA5UVD, WSAPX, W5FED, WB5BMB, WA5HGH made up select ED group. OPS WA5CBT had nice vacation to Calif. WB5CTT has new Hy-Gain 5BDQ antenna and balun for cw. RM W5ABQ says traffic has hit summer doldrums. WA5VJW and hubby WA5VJX suffered severe damage to gear and household equipment when lightning struck. W5NNK and W5WR working on RTTY. K5PRC has many words of thanks for 2-meter gang who helped him out of mud hole. WB5FRO reports Kingsville ARC has several Novices ready for General. WN5TTP has joined 7-day weekenders. K5KNZ, W5GEL and W5YAO helped a

Corpus Christi on Galveston-Corpus yacht race. EC W5YCK reports new spouse, Margaret, with 3 new harmonics. OO W5RIY may move to Dallas (W5LR note). EC W5ICL, W5QEY, W5SON, WA5AUZ, W5DIK, WA5GYQ, K5RZB, K5VXP drove 600 miles from Orange Co. for grand ED! OBS WA5AUB reports FCC confirmed repeater license via phone but WR5 call unknown; he and OPS WB5EDS graduated 24 from code and theory class. CCARC FD publicity chmn. W5JOK and activity chmn. WN5HHT report all had grand time. W5QO back on the air and up to neck in QSP. K5YHX says WB5IUT went from Novice to Advanced in 3 months; WA5JVO has new CS7A; K5QVW has new SB200. HARC News (Houston) has a dandy new contributor: Mr. Zilch; he gets everyone told with humor.

Net	Sess.	QNI	QTC
Texas Traffic(TTN)	30	1295	130
Texas CW(TEX)	59	514	278
7290 Traffic	42	1621	557
Texas Slow Speed(TEX SS)	8	34	13

Traffic: WA5YXS 353, WA5EJN 284, W5TQP 175, W5ABQ 165, WB5CUR 152, W7WAH/5 115, WA5VBM 105, WB5BWV 103, K1ONW/5 97, K5HZR 71, W5HWY 62, W5KLV 55, WB5EDS 54, WB5AMN 53, WB5DBK 45, WA5ZBN 43, WA5TJL 41, W5TFW 39, W5BGE 32, WA5JFZ 28, WA5YEA 28, WA5ZBJ 28, W5JVR 27, WA5ZBK 25, WB5IOG 20, K5HVI 19, W5TST 17, W5UKN 14, WB5GVO 13, WB5CIT 2, WA5CBT 1, K5RVF 1.

CANADIAN DIVISION

ALBERTA— SCM, Don Sutherland, VE6FK — Asst. SCM: Mrs. Donez Booth, VE6YL. SEC: VE6XC. Thanks to the retiring members of the ARLA executive and best wishes for a successful year to the new. We are fortunate to have VE6BB continue as editor and publisher of VE6. K9DQU chmn. of the Chicago Council of Radio Clubs is visiting Calgary. Congrats to VE6AZL on receiving his Advanced Class ticket. CARA FD group, headed by VE6AMU, was quite successful despite high winds. VE6DE/6 made quite a score in the single transmitter class. VE6XC reports that the ATN and EMO nets are recessed for the summer. Best wishes to newly-weds VE6AIK and VE6ANE. VE6MJs interest and fine showing in the EMT continues. Traffic: VE6FS 23, VE6WN 15, VE6VS 8, VE6FK 7, VE6YW 6, VE6AXH 5, VE6EO 4, VE6ABV 1, VE6AOZ 1.

BRITISH COLUMBIA — SCM, H.E. Savage, VE7FB — Vancouver Island Picnic was well attended and the BCARA held their monthly meeting also at picnic and they announced that Ham-Com '73 is being canceled. New EC VE7BKW for the Kootenays. The "Log" official news of Penticton ARC by VE7DB reports a very active club. East Kootenay ARC new officers: VE7HWY, pres.; VE7AIT, vice-pres.; VE7DKJ, secy. VE7BOZ PR for our net on 3755 now is VE4DF in Flin Flon and we are looking for a PR man. BCEN VE7QO Net Mgr. is pleased with the new members checking in. Traffic: VE7MW 24, VE7BLO 10, VE7SE 4, VE7IT 4.

MANITOBA — SCM, Steve Fink, VE4FQ — Summer still managed to see lots of activity. The Peace Garden Hamfest, which included a TEN Net meeting, was a big success, and it kicked off Amateur Radio Week in Manitoba July 8-14. The Winnipeg Repeater Society held its first bash at Stonewall June 27. Field Day reports were received from VE4HS/4 and VE4QD/4. A Peace Garden Award is now available; for details contact W0FNZ. Late June and early July saw lots of two meter openings, providing fun for the fm boys. Both the Winnipeg repeater and the Brandon repeater operate on 146.46 in and 146.94 MHz out. We welcome VE4WX to the ham ranks in Pinawa. MEPN: 30 sessions, 532 QTC, 26 QNI. VE4JA kept the records for vacationing VE4CR. Any comments for this column are always welcomed. Traffic: VE4RO 62, VE4JA 12, VE4CR 10, VE4LN 6, VE4WT 6, VE4FO 4, VE4NE 4, VE4OW 4, VE4FQ 3, VE4XN 3, VE4DQ 2, VE4MK 2, VE4PA 2.

MARITIME — SCM, W. D. Jones, VE1AMR — RMs: VO1CA, C1IARB. PAMs: VE1YO, VO1FX. Field Day this year in the Maritimes did not seem to have the participation we have seen in the past years. Field Day messages were received from VE1FO/1, VE1XY/1 and VE1WN. VE1EV/1 operated but a shortage of operators was evident. It is with great pleasure I report that VE1ER has been awarded the "Canada Medal" for his proficiency in many fields including music, mechanics and electronics. Traffic: VE1AMR 76, C1IARB 71, VE1ZH 32, VE1AWP 10, VE1AYJ 3.

CQ de W2KUW

WANTED FOR CASH

HP612, ARC 51's, Eimac/Varian Tubes 618T3 T/R, 304TL tubes, 490T Antenna Tuners, Collins 51RV 51S1 51V4 51Y4 51Z4 621A 728 860E SG2 479 618M, or any other Collins item.

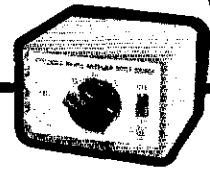
Fall Specials For Sale

Collins 618T Transceiver	$895.00
Tektronics 105	45.00
Tektronics 180A	65.00
Tektronics 181	35.00
Tektronics 531A	295.00
Tektronics 535A	495.00
Tektronics 536	250.00
Tektronics 555	495.00
Tektronics 575	495.00
Tektronics 585A	695.00
Tektronics CA plug-in	95.00
HP185B with dual trace	195.00
Boonton BRC 250A RX meter	350.00
Collins 75S3 receiver	385.00
Collins CP Crystal Pack	185.00
R390A excellent, overhauled .... special	545.00
NCL-2000 linear Amp., overhauled	325.00
HQ170C receiver, overhauled	150.00
GR716C capacitance bridge	295.00
Wayne Kerr rf bridge B601	350.00
Wayne Kerr vhf bridge (5 MHz up) B801	350.00
Wayne Kerr Bridge source/detector S161/R161	295.00 each

(This is a partial listing of hundreds of test items available. Write for specific requirements)
We will buy for cash any tube, transceiver, receiver, or test gear at 5% over prevailing market price.

The Ted Dames Company
308 Hickory Street Arlington, N.J. 07032
(201) 998-4246 Nites (201) 998-6475

what is an antenna noise bridge?



Antenna Noise Bridge (an-ten-a noiz brij), n. Omega-t's name for a specialized testing device that checks your antenna system for resonant frequency and coaxial impedance.

Obtain maximum efficiency by determining the resonant frequency for any type of antenna with the solid state, self-contained Antenna Noise Bridge...
Two models...TE7-01 for 1-100 MHz range, $29.95...the TE7-02 for 1-300 MHz range, $39.95.

Sold through amateur radio dealers or direct from the factory.

omega-t systems incorporated

320 TERRACE VILLAGE • RICHARDSON, TEXAS 75080 • (214) 231-5121

CRYSTAL BARGAINS

Depend on . . .

JAN

We supply crystals from 16KHz to 100MHz. Over 6 million crystals in stock.

SPECIAL

Crystals for most amateur 2-Meter F.M. Transceivers:

$3.75 Each

Inquire about quantity prices. Order direct. Send check or money order.

For first class mail add 15¢ per crystal...for airmail add 20¢ ea.

DIVISION OF BOB WHAN & SON ELECTRONICS, INC.

2400 Crystal Dr.
Fort Myers
Florida 33901
(813) 936-2397

Send 10¢ for new catalog with oscillator circuits and lists of thousands of frequencies in stock.

SPECIALS! CRYSTALS FOR:

Frequency Standards	
100 KHz (HC13/U)	$4.50
1000 KHz (HC6/U)	4.50
Almost All CB Sets, Trans. or Rec. (CB Synthesizer Crystal on request)	2.50
Any Amateur Band in FT-243	1.50
(Except 80 meters)	4 for 5.00
80 Meter Range in FT-243	2.50
Color TV 3579.545 KHz (wire leads)	1.80
	4 for 5.00

PHASE TWO

BASE MOUNTED SILICON HIGH VOLTAGE RECTIFIERS

FEATURES

- Rectified ouput current of 1.0 amperes at 55°C.
- Voltage types from 5000 to 10,000 volts.
- Rugged construction featuring the use of non-cavity glassivated diode elements with all diode inter-connections welded.
- Value engineered over the similar numbered JEDEC types.
- Capable of meeting the requirements of MIL-S-19500/418 (except for 1~ surge).
- Available in 1-99 quantities either off the shelf or within 2 weeks.

BASIC RATINGS

TYPE NO.	PRV V peak	Io(Tc=55°C) A av	I surge (1 ~, ½sw) A peak	PRICING $ 1 - 99
RC5477	5000	1.0	50	5.70
RC5478	6000	1.0	50	6.40
RC5479	7000	1.0	50	7.00
RC5480	8000	1.0	50	7.70
RC5481	10,000	1.0	50	8.50

FOR MORE INFORMATION CONTACT:

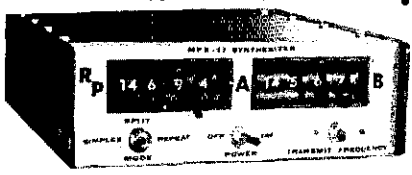
RECTIFIER COMPONENTS CORP.
1112 LOUSONS ROAD, UNION, N.J. 07083 TEL: (201) 687-5410

ONTARIO — SCM, H.H. Shepherd, VE3DV — Net Mgrs.: ECN VE3AWE; OQN VE3GFN; GBN VE3DPO ; OPN VE3EWD; ODN VE3FQZ; Champlain Miniet VE3AGN. The VE/W Contest occurs Sept.22,23, which is a very pleasant way to improve your operating ability and at the same time help the VE2 organizers of one of the few purely Canadian run contests. For *the OOs it will be the FMT on Sept. 9. Remember OOs must* qualify their ratings not less than twice a year! SET 73 results, which appeared in June QST, were a big disappointment to the SCM and SEC. ECs either did not exercise their groups or if they did, forgot to let the SEC know about it. ECs also did not provide enough traffic to keep the NTS nets listed above very busy. Your SCM enjoyed meeting the gang at the RSO Convention in Kingston during Aug. Congratulations to the Kingston ARC for such a fine job as hosts. The objectives of the Ont. Daytime (ODN) Morning Session are very simple. Provide an opportunity for Whitecaners, Handicapped and retired amabeurs to obtain code practice and net procedure training at a slow rate of speed. Unfortunately, most of these amateurs use the Canadian HW12 which covers only 3750 to 4000 kHz, and it may be necessary to run the 1500 GMT session in the Phone Band. VE3FQZ, ODN Mgr. apologizes for this but asks for your cooperation. VE3RAB is helping Burlington celebrate its 100th Anniversary. Traffic: VE3EHF 129, VE3SB 115, VE3DPO 101, VE3FQZ 100, VE3GJG 85, VE3AWE 81, VE3GFN 76, VE3FRG 59, VE3DVE 18, VE3DU 15, VE3FGV 13, VE3ASZ 9, VE3VD 5.

QUEBEC — SCM, Joe Unsworth, VE2ALE — SEC: VE2BDM. QSL Mgr.: VE2IJ. The New Unimetrics VHF mobile being used in the Montreal area by VE2s DM, XX, ABF, ALE. VE2ALA now VE3HA1 and VE2BQN VE3HAH. Look for VE2AIR/W0 on 3.660 MHz at 0130 GMT. VE2ASP DX hound via AJ. VE2ABJ built homebrew digital frequency counter. VE2DAH planning a club station at (UQTR) Univ. Que. Three Rivers. VE2AKM and XYL tripped down to the coast of Maine and spent a week end with VE2s GK, BR, CJ, at Lake Louisa. VE2DR contemplating changing the FT-DX 400 for the Heath SB-102 unit. VE2HI back in town after enjoyable trip overseas. La Assn. Radio-Amateur de la Mauricie projette de celebrer le 50 e Anniversaire de sa fondation en octobre prochain. Visitors to *VE2-Land: VP2AZ, WIHPR, VE1AOZ, VE1AG, VE1YV and* VE7BJ. VE2BMQ now has equipment to measure frequency with accuracy of one part in one hundred billion. VE2DR mentions that HF conditions are poor and that the QR net controllers are also having trouble with conditions. There was no QR Net Swap Net during July and Aug. The Montreal Radio Amateur Club, by the time this is in print, will have held their Montreal Area Hamfest Aug. 5 and the PL net operators Picnic July 18 at the Long Sault Parc. VE6IV still in the Montreal area. PSHR: *VE2APT 26. Traffic: VE2ALH 73, VE2EC 28, VE2DR 23,* VE2ALE 19, VE2APT 11.

SASKATCHEWAN — SCM, Percy A. Crosthwaite, VE5RP — The Annual Hamfest was held at the Fish and Game League, Saskatoon with approximately 125 amateurs present for the SARL, ARRL, AREC and SEL meetings. Regina's Club under the coordination of VE5WA won the Field Day trophy. Some of the boys who helped to make it a success were VE5DO, VE5TO, VE5TP, VE5XU, VE5DA, VE5HI, VE5KE, VE5QU, VE5WF. The Saskatoon Club had young talent and will be set for next year. Under the leadership of VE5VC, were VE5GL, VE5FF, VE5KR, VE5HE, VE5SV, VE5QL, VE5RC, VE5PK, VE5VK, VE5YW, VE5ZW, VE5GZ, VE5YV, VE5QL. VE5GL wishes to thank Manitoba for handling traffic into Sask. phone net since our NTS and TEN net will be off for summer months only. Traffic: VE5GL 26, VE5HE 24, VE5HP 16, VE5KZ 12, VE5BO 10, VE5UK 6, VE5BD 4, VE5OW 2, VE5QO 2, VE5SM 2.

SUPER CRYSTAL
THE NEW DELUXE DIGITAL
SYNTHESIZER!! FROM RP



MFA-22 DUAL VERSION
Also Available MFA-2 SINGLE VERSION

- **Transmit and Receive Operation:** All units have both Simplex and Repeater Modes
- **Accurate Frequency Control:** .0005% accuracy
- **Stable Low Drift Outputs:** 20 Hz per degree C typical
- **Full 2 Meter Band Coverage:** 144.00 to 147.99 MHz, in 10KC steps
- **Fast Acting Circuit:** 0.15 second typical settling time
- **Low Impedance (50 ohm) Outputs:** Allow long cable runs for mobiles
- **Low Spurious Output Level:** similar to crystal output

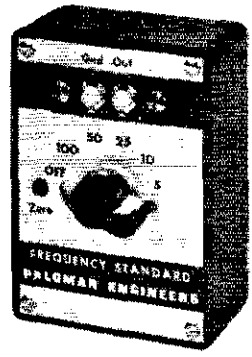
• PRICES

MFA-22	$275.00
MFA-2	$210.00
Shipping	$3.00

RP Electronics
Box 1201 Q
Champaign, IL 61820

SEND FOR FREE DETAILS

FREQUENCY STANDARD



Only $32.50 *(less batteries)* *POSTPAID USA*

- *Precision crystal*
- *Fully guaranteed*
- *Markers at 100, 50, 25, 10 or 5 kHz selected by front panel switch.*
- *Zero adjust sets to WWV. Exclusive circuit suppresses unwanted markers.*
- *Compact rugged design. Attractive, completely self contained.*
- *Send for free brochure.*

PALOMAR ENGINEERS
BOX 455, ESCONDIDO, CA 92025

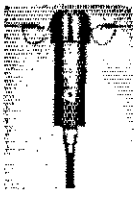
GROTH-Type
COUNTS & DISPLAYS YOUR TURNS

- *99.99 Turns*
- *One Hole Panel Mount*
- *Handy Logging Area*
- *Spinner Handle Available*

PRICES

Case: 2x4"; shaft ¼"x3"
Model TC2: Skirt 2½"; Knob 1⅝"
Model TC3: Skirt 3"; Knob 2⅛"

R. H. BAUMAN SALES
P.O. Box 122, Itasca, Ill. 60143



THE "HI-Q-BALUN"

- For Dipoles—Yagis—Inverted V—Doublet
- Puts Power in Antenna
- Full Legal Power 3-40 MC.
- Small—Light—Weather-proof
- 1:1 Impedance Ratio—Conx Fitting
- Takes Place of Center Insulator
- Built-in Lightning Arrester
- Helps Eliminate TVI
- Fully guaranteed

$9.95 PPD U.S.A

VANGORDEN ENGINEERING
Box 513, Brielle, N.J. 08730

F.C.C. EXAM MANUAL

PASS FCC EXAMS! Memorize, study —"1973 Tests-Answers" for FCC First and Second class Radio-telephone licenses. Newly revised multiple-choice questions and diagrams cover all areas tested in FCC exams.—plus—"Self-Study Ability Test." $9.95 postpaid.

COMMAND PRODUCTIONS
RADIO ENGINEERING DIVISION
P.O. BOX 26348-T
SAN FRANCISCO, CALIF. 94126

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 50-073
Washington, D.C. 20016
Please send me information on Amateur Radio training.
Name _____ Age _____
Address _____
City _____ State _____ Zip _____
ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL

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 judgement, 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 zipcode, 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 QST *are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

QCWA 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 10543.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P.O.Box 73, West CoramNY 11727.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Rosemary Willis, 9276 Borden Ave., Sun Valley CA 91352.

AN invitation NYC area hams and SWLs are invited to attend NY Radio Club meetings — 2nd Monday of every month, Williams Club, 24 E. 39th St., near Madison Ave., at 8 PM — New members welcome. Interesting programs.

CAPE Cod's fabulous Hyannis! N.E. ARRL Convention September 29 and 30. Flea market, seminars, fm, SSTV, NEDXCC, AMsat, YL trips, 2 pools, golf, beaches, sailing. Early bird registration $3. W1ZQQ, 17 Barnes Ave., East Boston, MA 02128.

FOUNDATION for Amateur Radio annual hamfest Sunday 21 October 1973 at Gaithersburg Maryland Fairgrounds.

FINDLAY annual hamfest, Riverside Park, Findlay Ohio, Sunday Sept. 9. Advance donation tickets $1 from C. Foltz W8UN -W.Hobart, Findlay OH 45840

ROCHESTER NY 1974 WNY hamfest dates are May 17 and 18. Exhibitors: space reservations now being accepted. WNY Hamfest, Box 1388, Rochester NY 14603.

CINCINNATI Hamfest: The 36th annual hamfest will be held Sunday, September 16, 1973, at the all new Stricker's Grove on State route 128, one mile west of Ross (Venice) Ohio. Check local area map for location. Lots of food, flea market, contests, and model aircraft flying. $7 covers everything. For further information, contact Jim Wellman, W8HSI, 725 Stout Ave., Wyoming OH 45315.

MEMPHIS area hamfests, Sunday October 7, at State Technical Institute, conveniently located on Interstate 40 at Exit 11. Tennessee Section ARRL Convention in conjunction. ARRL Forum, MARS meetings, Flea Market, XYL entertainment, informal group dinners Saturday night. Talk-in on 34-94 and 3980. All your friends will be there!

QSLs777 Largest variety!!! Samples 35c. DeLuxe 50c. Religious 35c. (deductable). Sakkers, W8DED, Box 218, Holland MI 49423.

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.50. 1000, $16.25. Also unusual non-picture designs. Generous sample pack 30c Half pound of samples 60c. Raum'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 20c. Harry Sims, 3227 Missouri Ave. St. Louis MO. 63118.

QSLs 300 for $4.65, samples dime, W9SKR, Ingleside IL 60041

QSLs "Brownie," W3CJI, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

DELUXE QSLs, Petty, W2HAZ, PO Box 5237, Trenton NJ 08638, Samples 10c.

3-D QSLs — Hallmark of discriminating operators. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

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 43691.

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. 2 for $1, 7 for $3. prepaid and guaranteed. Tepabco Box 198T Gallatin TN 37066.

QSLs, multicolor glossy; choose Globe, Eagle or straight key. Report form on back, 100 - $5.50, QSL cards not personalized, 100 — $2. Rusprint, Box 1575, North Kansas City MO 64116

QSLs. Second to none. Same day service. Samples 25c. Ray, K7HLR, Box 331, Clearfield UT 84015.

QSL's 300 for $4.95! Samples 15c, Colourcard Box 326 Topanga CA 90290

QSLs — Dime or your present card brings samples. Alkanprint, Box 3494, Scottsdale AZ 85257.

RUBBER stamps, $1.75 includes postage. NJ residents add tax. Clints Radio, W2UDO, 32 Cumberland Ave. Verona NJ 07044.

QSLs catalog. Samples 35c. Ritz Print Shop, 5810 Detroit Ave, Cleveland OH 44102

200 TWO color QSLs $5.20, stamp for samples. Mark, WB6NKO, 2534 El Tonas Way, Carmichael CA 95608.

C. Fritz didn't sell out, didn't retire! Still printing better QSLs! Samples 25c deductible. Box 1684, Scottsdale AZ 85252.

CALL letters engraved in walnut, rosewood, teak, white or black plastic, Select color, Self-sticking, 2" X 8" 1/16" — $1.49 each, three for $3.50, postpaid. Gold or silver finished desk holder, $2.25 each extra, many colors, styles. Brochure 50c refundable on purchase. SKYCO Box 1232H, Rockville MD 20850.

SEE you at ARRL Mid-West Division Convention, October 5-6-7, Lincoln NB WØCVU.

ROANOKE Division Convention — Sept. 14-16, 1973, Reston, Va. (near Dulles Airport). Unusual wide interest programs and sessions. Write K4MD, Box 7388, Warrenton VA 22186.

PEORIA Hamfest September 16, Peoria, Illinois, same place as last year. For further details see September issue of QST, Hamfest Calendar. Banquet Saturday, Sept. 15, at V. Junction — $5.50 per person. Cocktail hour 5:30 to 6:30, dinner 6:30. Two motels within walking distance. Reservation deadline Sept. 3, cancellation Sept. 10, 150 maximum, so get these reservations in early. Hamfest tickets $1.50 advance. For these write Wendell McWilliams, WB9DVJ, Box 1, Rome, Illinois 61562. For Banquet reservations write Larry Pearsall, W9FDV, 2224 W. Herold Avenue, Peoria IL 61604.

CANADIANS: NCS-3 (AC and DC supplies); excellent. Roto-brake 400 rotator; unused. Heath GD-1-B grid-dip meter. HD-15 phone patch. DX-40. TA-33 Jr. D. Weiner, VE2DCW, 3480 McTavish, Montreal, P.Q. (514) 392-8942.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

CALL Toll-free: (800) 327-7799. Ask for Bob Hoffman (Jaro Electronics Corp.) We buy all types of tubes. Top prices paid for Varian, Eimac, Amperex. Address: 412, 27th Street, Orlando FL 32806. In Florida call collect (305) 843-9551.

WANTED: An opportunity to quote your ham needs. 34 years a ham gear dealer. Collins, Drake, Galaxy, Tempo, Kenwood, Ten-Tec, Hy-Gain, 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. Heliarc welded aluminum. Al's Antennas, 1339 So. Washington St., Kennewick WA 99336

VERY in-ter-est-ing! Next 6 big issues $1. "The Ham Trader," Sycamore IL 60178

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando FL 32806

TELETYPEWRITER parts, gears, tape, supplies, toroids, tuning forks. Sase list. Typetronics, Box 8873, Fort Lauderdale FL 33319. W4NYF. Wanted: parts, late machines.

WANTED: CE 200E, HQ 180AX, state condition and your lowest price. John Waskowitz, 35-30 73 St, Jackson Hts NY 11372.

DAH-Ditter Electronic keyer — Self-completing, ac supply, sidetone oscillator, speaker, 5 to 40 wpm, many other features, wired — $44.95. M & M Electronics, 6835 Sunnybrook, NE., Atlanta GA 30328.

WIRELESS sets, parts, catalogs, bought, traded. Laverty, 2815 Geneva Street, R.D.1, Egg Harbor NJ 08215.

GREENE Center Insulators, with or without balun. A tough number to beat. Free flier. Kaufman Industries, Box 8170, Reeds Ferry NJ 03054.

NOVICES: Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, PO Box 6015, Norfolk VA 23508.

WANTED: tubes, transistors, equipment, what have you? Bernard Goldstein, W2MNP, Box 257, Canal Station, New York NY 10013

STUDYING for FCC amateur exams? Try Post-Check. Original, expertly devised, multiple-choice questions and diagrams covering all areas tested over in FCC exams. Keyed answers with explanations. IBM sheets for self-testing. Each classification complete for that class. Advanced class — $4.50; Extra class — $4.75. General class newly written in line with new FCC examinations and including new section over Rules and Regulations available September 1 — $5. New Novice available in September. Write for price. First class mailing included; air mail 25c extra per copy. Send check or money order to Post-Check, P.O. Box 3564, Urbandale, Des Moines IA 50322.

OFFER $10 for Radio News June 1919, Electrical Experimenter May 1915. Wayne Nelson, Concord NC 28025.

JEHOVAH's Witnesses who are amateurs write Bob Ellis WA4UQQ, 160 Lagoon Rd. SE, Winter Haven FL 33880 or call (813) 293-3595.

HAM Hawaii. Maui oceanfront three bedroom two bath luxury penthouse apartment for rent by week or month completely furnished plus Yaesu, TH6DXX and automobile. K6OE, Box 218, Carmel Valley CA 93924.

MANUALS for most ham gear made last 25 years. Send sase for quote. W0JJK, Hobby Industry, Box 864, Council Bluffs IA 51501.

MOBILE ignition shielding gives more range, no noise. Kits and custom systems. Literature. Estes Engineering, 543-A West 184th, Gardena CA 90248.

WESTERN Union Desk-Fax Telefax transceiver manual: Complete theory of operation, adjustments, lubrication, preventive maintenance, troubleshooting, parts list. Includes all schematics and mechanical parts drawings. $3.80 postpaid. Bill Johnston, 1808 Pomona Drive, Las Cruces NM 88001.

CASH for ssb gear (working or repairable). State condition and price in first letter. Elvin Miller, Box 869, Marion IN 46952.

SELL Hallicrafters FPM-300. New. Retiree completely discouraged in learning code. I quit. Cashiers check — $525 UPS prepaid takes. Billy Parker, Route 1, Big Rock TN 37023.

GONSET Communicator III, 2 meters — $100; Gonset 3063 2-meter power amplifier — $75, package — $150; Motorola P-33BAC with Ni-Cads 94/94 34/94 — $125; Heath HX-20 — $110; HR-20 — $75; HP-20 — $25; HP-10 — $35; Hustler 80-10 mobile antennas mast mount — $35, package — $245, you pay shipping. W5PNY, 2506-A 35th St., Los Alamos NM 87544.

WANTED: Gordon rotator also 75S3B. For sale collectors item — unmodified original ssb G.E. YRS-1 with ins, book — $100. W9EWB, Walt Kohlhagen, 818 Oakley Ave., Elgin IL 60120.

WANTED: Pre 1930 radio/wireless parts, tubes, magazines, books, literature, Amateur, broadcast or longwave receivers — transmitters. Tesla and Oudin coils. Western Electric loudspeakers, headsets, tubes, amplifiers. Telephone and telegraph equipment. Will Nangle, 761 North 29th St., Milwaukee WI 53208.

HY-Gain 18AVQ vertical, 80-10 meters, only one year old, like new, half new price: $35 plus shipping. C. Counselman, 123 Radcliffe Rd., Belmont MA 02178.

GALAXY GT550A w/ac supply only 6 hours use w/new warranty — $499; Comcraft CTR-144 less than 30 hours use w/warranty card — $325; and 40 & 80 meter Cliff Dweller wks. F.B. — $125. First money order or bank cashiers check will prepay the freight to you in USA. Wm. Ogg, 2706 Portobello Drive, Torrance CA 90505.

SELL: Heathkit HW-100 and HP-23A power supply — $325. Also DX-150A receiver — $75. All in good shape with manuals. Going to college. David Rone, WB4RLB, Box 728, McMinnville TN 37110. Phone (615) 473-3587.

CASH or trade for old ratio receivers, magazines, books, handbooks, catalogs and parts. Erv Rasmussee, 164 Lowell, Redwood City CA 94062.

SIGNAL/One, Alpha Seventy, new and used. Also Collins, Tempo, Kenwood, Hallicrafters, Drake, Regency, HyGain, Mosley, etc. A real ham store with complete service department, one of the few left. Write or call Douglas Electronics, W5GEL, 1118 South Staples Street, Corpus Christi TX 78404.

STANDARD 146-A still in factory carton with warranty card, battery pack stubby antenna incl. — $248. W4OAQ, Box 17222, Nashville TN 37217. (615) 834-8999.

WANTED: Teletype No. 33, receivers 51J3, R-388, 51J4, R-390A, cash or trade for other equipment. We pay freight. Alltronics-Howard Co. Box 19, Boston MA 02101. (617) 0048.

YAESU transceiver owners — present and prospective. Join the international Fox-Tango Club. Send business size sase or IRC for information and sample newsletter. Milt Lewens, WA2AOQ, 3977-F Sedgwick Ave., Bronx NY 10463.

SELL 71 ft. heavy-duty free-standing Tristad tower. Power winch, perfect condx. W6ABN, 101 N. Ladera Vista, Fullerton CA 92631. (714) 871-0975.

QUAD kit — $12, kit contains beamless spider mount, precut, tuned wire elements for 15 meters and instructions. Spider mount alone — $9. WAC, 404 Saunders Rd., S.W., Huntsville AL 35802.

SWAN 500 CX-SS 16 filter — $460; 117XC — $89; 508 VFO — $95; VX-1 — $19. All like new. Swan 55B autotune mobile antenna — $85. Brand new. HX50A, all modifications — $250, brand new. Dumont 960 vhf 60-watt mobile — $100, brand new. Hammarlund HFM-30 vhf mobile — $50. Sase for test equipment list. W2ERV, 87 Bernice Drive, Freehold NJ 07728. (201) 431-2367.

RTTY one 28ASR, one 28RO, and one R390A rcvr. Many extras, spare parts, schematics, and manuals. Dave Nixon/K3ZNJ, 16101 Roblynn Court, Laurel MD 20810.

WANTED: tiltover tower, 204-BA antenna or similar, tribander, rotator. Also Drake separate rcvr and tx. K3DOX.

ALIGNMENT service for receiver, transmitter. WA8SNF. (216) 745-7819.

WANT ship's Chronometer or Navigational watch for shack. Ted Denton, 3279 Ledgewood Drive, Hollywood CA 90068.

RADIO control systems, model airplane, accessories, big savings. Discount catalog — $1. Like to trade? We need ham gear, senf for our catalog today — $1. Hobby Barn, P.O. Box 17856, Tucson AZ 85710.

FOR SALE: CQ-QST-R/9, etc. 1926 foreword. Some complete years. Make offer. W5BKU, 633 Stardust Lane, Richardson TX 75080.

It's Collins KWM2, it's better than new, send the dough, then you'll know, if you want the best, you can't do it for less. $595. W0BNF.

SELL: Heath SB-100, SB-600, HP-23 — $275; TO Keyer, paddle — $80; Heath Apache — $100; HQ110A — $100. Art Brostrup, 42 Harrison Terrace, Rochester NY 14617. (716) 544-4321.

GLADDING 25 2m fm ac supply. W1FDA, Shelburne VT 05482. (802) 985-2843.

HELP! New College Radio Club desperately needs donations of equipment. Please contact American University ARC, Box 132, American University, Washington DC 20016.

HW-7 absolute mint cond. with power supply — $75. WN6WWU, 337 W. Raymond St., Compton CA 90220.

SELL: Hallicrafters SX-140, HT-40, HA5 VFO. Manuals, Novice xtals — $225. WA5JVL, 2517 Metaine Court, Metaine LA 70002.

SELL: Swan 500 with 117-X-C power supply and 410 ext. VFO. In use by me till June 17 — $350. FOB Jupiter Fla. Bill Asbury, WB4GYZ, Waterway Rd., Jupiter FL. 33458. Tel. (305) 746-3372.

DESK-FAX telefax trasnceivers: Several extra machines, $14 each, shipping collect. Bill Johnston, 1808 Pomona Drive, Las Cruces NM 88001.

COLLINS 75S3B, mint condition, with 2.1 kHz mechanical filter — $550. Will consider trade for Collins R390-A in the same condition. You pay U.P.S. K1OJQ, 96 Alton Rd., Quincy MA 02169. (617) 773-4421.

TRANSMITTERS: Eimac AF-67, 160-10 m, VFO-controlled, power supply — $50; also Globe Scout, 80-10 m, crystals, nuke — $25. WB4OTQ, 817 Stanfield Dr., Charlotte NC 28210.

WILL swap Heathkit Deluxe Metal Locator for HW7 or Ten-Tec transceiver. Ken Hand, WN2EVF, Bridgehampton NY 11932.

DRAKE R4B, mint condition — $345. Delivered, first cashier's check takes it. Stan, WB2QQX, 15 Murtledale Rd., Scarsdale NY 10583. Tel. (814) 723-6050.

SELL: 75S-3B, covered filters; 32S-3, Round; 516F-2; 75S-3, 2.1/.2; 32S-1, ac; plug-in processor; W-4 wattmeter; Waters compreamp; KR-40 keyer, R. Nevers, 2100 Stanley, New Britain CT 06053. (203) 224-4581.

MAKE offer! Hammarlund station. HX-50A (with 160) and HQ170A-VHF. Both excellent! George D. Jones, 25 Willard Street, Melrose MA 02176.

MUST sell, getting married, Yaesu FTDX560, under guarantee, mint condition, highest offer over $425; Knight T-150. Dale Drohse, WA0TUC, 444 S. Western, Sioux Falls SD 57104.

LOCAL only — Swan 500C, 117SCPS, VOX, PTT mic. 100 kc calibrator, muffin fan, 20 m dipole, coax, manual -- $380. W2MHL. (201) 261-9449.

COLLINS 75S3B receiver, 32S-3 transmitter, 516F2 supply, 30L-1 linear. Excellent condition. Priced $1600 for package or will quote separately. Bill Swearingen, W5UJ, Box 669, Austin TX 78767.

BEAM — HyGain 203BA, two-years old. Monoband 20 m ($130 new). Balun. Pickup. Swap toward 2 m gear. W2NXS. Box 4006, Jersey City NJ 07304.

CRYSTALS airmailed? general purpose, MARS — Novice, active FT-243, all frequencies minimum five, 40 m 15 m, 10 m — 99c each, 80 m — $1.59 — Cover bands inexpensively — rock solid. Less than five, 80 m — $1.75 other $1.50. Novice — with VFO or no — four bands — eight crystal package just inside bands for QSO or band limits — $9.95. General purpose: FT-243 .01% 32 pF. 3500-8600 kilocycles $1.90, (five $1.75), (nets, ten same $1.45), 1700-3499, 8601-13000 fundamentals, 10,000-30,000 overtones $2.95. Add 50c each for .005%, 75c for HC-6/u above 2000. Airmail 15c crystal, 1st-cl 10c. Free listing. Bob Woods, WØLPS, "Since 1933" C-W Crystals, Marshfield MO 65706.

HW22-A new — $95, includes HS24 speaker HRA10-1 100 kc calibrator GH12A mike HP23A — $40; HP13A — $50; Drake 2-C — $165; R4B, T4XB MS4, AC4 — $900; HT41 linear 1000 dc — $175; 2-meter Swan 1210A — $300; Briggs & Stratton 1100 watt ac portable generator 24-hour on unit — $125. Mike Boger, 2413 N. Star, Stillwater OK 74074. Call (405) 372-8878.

NEED Globe Scout and manual. State condition and price. WB4GKI, Rob Huckaby, Ga. Tech Box 36261, Atlanta GA30332.

SELL: HQ170, spk'r/manual — $135; Waters Load No. 334 1 kW max, — $65; Ameco TX86 s/ps 103 — $60; Johnson T/R — $10; 20 amp variac — $18. U ship. W4WXE, 17511 N.W. 47 Ave., Opa Locka FL 33054.

FOR SALE: Heath SB-301, SB-401, SB-630, SB-600, w/all cables — $450, exc. cond. David Wells, 4145 Gregory St., Oakland CA 94619.

70-ft Rohn 25-tiltover tower with Ham-M and 10 ft. hi-strength Telrex Torque tube. Sell for cash plus assistance is disassemgling. Monoband 4-element 15 m quad now installed on tower; will sell quad separately or with tower. M.J. Fein, W2AH, 84 Riberedge, One David Lane, Yonders NY 10701. (914) 375-0808.

EICO 720 90-watt cw transmitter — $45, mint. Excellent Novice rig. WB9FDR, 2841 N. 117 St., Milwaukee WI 53222.

VHF, uhf, microwave, receivers, transmitters, converters, parts and test equipment, free catalog. Pastermack Enterprises, 9562 Dumbreck Drive, Huntington Beach CA 92646.

DRAKE 2B receiver, homebrew, 60-watt transmitter with crystals for all Novice bands, top operating condition, dipole antenna with coax cable, key, instruction books — $200. Harold Glenzel, 237 Prospect Street, Hingham MA 02043. Phone (617) 749-3305.

TRADE sell 6 m beam, crank-up tower, Ham-M rotor, Johnson Matchstick. Want mobile gear — 2 m, HW-12A etc., remote-tune antenna, Ten-Tec, etc. SSB QRP. WA1NNT. (617) 262-1296.

TRADE-Sell NCX-5 MK II, a-c/dc supplies, for HT34B/SX115 or similar combination or $450. WA4ERD, 1420 Garvey, Louisville KY 40216.

FOR SALE: CIE first-class course with answers cost $400, Sell $75; DX60B with many xtals $50. Vail, 29 Prospect, Amityville NY 11701.

CLEGG-2-meter fm27B, no crystals to buy — power supply inc. — $475, firm. Larry Tyrrell, RD No. 1, Cobleskill NY 12043. (518) 234-3869.

DRAKE TR4, AC4, MS4 — $450; National HRO60 — $110. Kenneth Bishop, 5 Sunnyslope Drive, Middletown CT 06457.

FOR SALE: Collins 75A-1 receiver — $125. W2RCN, S. Strauss, 5335 203rd St., Bayside NY 11364.

FOR SALE: Heath Marauder, just reconditioned — $150; Hammarlund Super Pro — $100. WN2JLK, 46 Mills Rd., StonyBrook NY 11790. (516) 1095.

CONTACT us for new or reconditioned Kenwood, Tempo-One, Drake, Collins, 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

---

100 kHz crystals, octal base — $2.50 postpaid. Net Stinnette, W4AYV, Tavares FL 32778.

TEKTRONIX oscilloscope, 535A with dual-trace, triggered and delayed sweep — $585 or best offer. G. Daly, 33 Walnut, Mill Valley CA 94109. (415) 6642.

HALLICRAFTERS linear power amplifier, model LA-500 and power supply, model P-500, both new — $75 each. Larry Hall, 16438 N.E. 29th Street, Bellevue WA 98008.

HALLICRAFTER HR46A with VFO and built-in a-c and dc power supplies, excellent condition — $100. FOB RR2, Box 67A, Worthington IN 47471, W9DIW.

FOR SALE: or trade Yaesu FTDX560 with cw filter, speaker, mike, and 11 meters — $400, or trade for SB102 or other xcvr capable of going mobile. WB0ALF, Joe Duerbusch, 2031C Merolliswalk, Saint Louis MO 63136 (314) 869-0514.

YAESU FTDX100; similar to FT101. Just factory overhauled; mint. Brochure for s.a.s.e — $375. FOB. W6RQM.

JOHNSON Invader 200 — $185; Heath SB200 linear — $170; Heath 12 V vibrator power supply — $9; Auto-Mate K5/50 electronic keyer with El-Key Paddle — $25, Johnson 250-39 TR switch — $19. Will deliver heavy gear within 100 miles. WB6GYT, 2380 Waverley, Palo Alto CA94301.

NEW Heath HW-16 transceiver complete. Write Neal R. Coyle, Route 1, Mechanicsburg IL 62545.

WANTED: TS-511 or similar xcvr. Also have equipment for sale or trade. WN5IBE, 313 Skyforest, San Antonio TX 78232.

NC-303 receiver, beautiful condition, with XCU-300 calibrator and manual — $200. Will send by bus freight collect. Tim Dolan, 1439 5th Avenue, Charleston WV 25312. (304) 342-3567.

SB-300, ssb/cw filters, manual. I ship — $210. WB8MYX, Fountain MI 49410.

POSTPAID! All mint condition. Factory aligned Heath SB-102 w/cw filter and speaker — Heath HP-23A power supply — Astatic D104 w/UG8 stand-Vibroplex "original" bug — Also, new, never used CDE AR-22R rotor w/control box, Gotham 15 m-20 m quad, and 100' Belden 8214 foam coax. Package deal only — Get whole works postpaid for $548 or best offer. Contact me for on-the-air demonstration. Bill, WB4LIS, 3032 Boxwood Drive, Montgomery AL 36111.

REGENCY HR-2, fully narrowbanded, concentric switch, 12 xmt & 12 rcv, total 23 xtals, 600 kHz splits .10 thru .37 plus .52 & .94 simplex; with mike, bracket, manuals, plugs; price — $175, incl. shipping. Tom Donohoe, W2NJS, 45 Gramercy Park, New York NY 10010. (212) 673-3458. Have 27-B.

YAESU FTDX560 transceiver, 500 watts on cw, 560 watts PEP on ssb, includes 600 hertz cw filter, self-contained power supply. Excellent condition — $375; HyGain 18 AVT/WB vertical 5-band antenna — $40. William R. Lowry, 31 Midwell Road, Wethersfield CT 06109. Tel (203) 529-2785.

TECH Manuals — $6.50 each: R-390/URR, R-389/URR, R-220/URR, TT-63A/FGC. Hundreds more. S. Consalvo, 7218 Roanne Drive, Washington DC 20021.

HY-Gain TH-2 — $50; Hy-Gain 3-el. 2-meter — $7.95. W6RQZ, 1330 Curtis, Berkeley CA 94702. (415) 526-7345.

HEATH HW-7 QRP — $60; CWF-2 cw filter — $10. WØDKX/4, 2941 Kedron, Winston-Salem NC 27106.

DX'ers — Dig them out of the mud. Low noise Dual-gate MOSFET preamplifier. Nominal 20 dB gain, 10-30 MHz, in cabinet, DC-100 — $39.95; Dynacomm, 1183 Wall Road, Webster NY 14580.

KWS1 serial 1442, new 4CX250B's and new spares — $395; NC303 — $160; NC300 — $125, both with xtal calib. and matching speakers. Ameco 2 mtr conv. for either — $25, W4ITD, Taber, 1230 S.E. 9th Ave., Pompano Beach FL 33060. (305) 781-5387.

R19 receiver 118/148 md used — $15 or R508 same freq. w/sq. used — $16.50; BB403 Nicad batteries 1.2 V4AH unusd$1.95 — 10/$17.50; UG201/U BNC F/N male .69c ea. or 10/$5. Arrow Sales, 7049 W. Archer, Chicago IL 60638. Add ship. chgs.

TV tubes (no picture tubes) collecting shelf dust, 50% off net or best offer lot 120. List available. Kirkman, 5800 L. Lincoln, Nebr. 68510.

FOR SALE: new TV wall and cabinet mask for Heathkit GR-22A TV. R. L. Perry, WØSJT, 2498 South Broadway, Grand Junction CO 81501.

IBM electric typewriter, Model B, good condition, elite type. Financing law school, K3MNJ, 3361 Langdon St., Phila. 19152.

WANTED!! Drake RV-6 VFO for TR-6. Sell or swap: ssb receiving Conv. CV-591A/VRR i-f input 225-1500 kHz units used, complete, unchecked with manuals — $35, plus shipping. K8HWW, 33727 Brownlea, Sterling Hts MI 38077.

SSTV, monitor tubes, 5 to 12-inch. Yokes, focus magnets, 500 mil rf ammeters. S.a.s.e. info. Lotz, W5HCO, 750 Florida Blvd, New Orleans LA 70124.

FOR SALE or trade: Collins R-390A with CV-591A ssb converter, completely reconditioned with all cables. A fantastic receiver — $795. Postpaid anywhere in U.S.A. or trade for 30S1 linear. KH6HSW, 91-926 Akaholo St., Ewa Beach HI 96706.

VIKING-500 — $65; new tubes, needs power transformer. New 4-250A — $25. W1KO, 211 Circuit, Hanover MA 02339.

NEAR new Kenwood R-599, S-599, T-599 with optional 6 and 2-meter converters. Have all original manuals, cartons and some spares — $655. Woodie Weiss, K1UAS, 27 Miles Standish Drive, Marlboro MA 01752.

SWAN 500 CX, 117XC PS, VOX, Drake W-4 wattmeter, Astatic D-10 dynamic mike with UG-2 stand. Drake TV 1000 LP filter, must sell as complete package for $550. I will pay shipping. WB5BEZ, Jerry Weldon, 9251 Savanna, Shreveport LA 71108.

FOR SALE: Drake 2B receiver and Q multiplier — $169; Heath SB400 — $270; and IG57A sweep generator — $139 or will trade for CO1015 ignition analyzer. Will pack, you pay shipping charges. W2EDX, 36 Winchip Road, Summit NJ 07901.

HT-32B, mint — $210; HA2-HA6 pwr supply, new, HT-41, mint — $160. Edwin S. Kloss, KITUQ, 36 Diane Lane, Forestville CT 06010.

YAESU FTDX100, 6-band transceiver, built in ac-dc supply, Clarifier, 120 watts, PEP, VOX, crystal calibrator — $350. Richard Crouch, 131 Taggart, Nashville TN 37205. (615) 352-5350.

HALLICARAFTER SX-100 general coverage receiver — $100, 2-meter Gonset Communicator II — $65. K6POU, 2712 Kinney Dr., Walnut Creek CA 994595. (415) 934-2962.

PALOMAR electronic keyer factory overhaul, no memory — $35. W6AWG, Shaw, Bolinas CA 94924.

HW101, HP23, factory checked and aligned in warranty — $225. WB8GRH, 11393 Edgewood, Harrison OH 45030.

HOSS trader Ed Moory says he will not be undersold on cash deals! Shop around for your best price and then call or write the HOSS before you buy! new Regency HR-2B two-meter fm transceiver, 15 watts, amateur net — $229; new Gonset 2 kW linear, regular — $660, cash — $339; will allow big trades on new Swan equipment. New Rohn 50 ft. heavy-duty foldover tower, prepaid — $225, new Mosley CL-33 and demo Ham-M rotor — $215. Used equipment: Demo Ham-M — $89; T4-XB — $359; R4-B — $319; TR-4 — $389; mint KWM-2 — $650; 32S-3 — $649; FPM-300 — $475. Moory Electronics Co, P.O. Box 506, DeWitt ARK 72042. Tel. (501) 946-2820.

SWAN 500 transceiver, VOX, Natohing 510 oscillator and 117-volt power speaker unit — all for $350. Heath HW-16 Novice transceiver with several crystals, excellent condition — $55. J. C. Bregar, 3841 Highpoint Dr., Allentown PA 18103. (215) 821-6987.

LIKE new, Kenwood TS-511S transceiver with cw filter, matching power supply and remote VFO. Complete package only — $430. WA6MOW, Tel. (714) 830-9821.

HAMMARLUND HQ-215 receiver, and matching speaker, in brand new and excellent condition. Never used, because owner lost interest in amateur radio. Best offer takes it. Don Carmel Jr., 8 Old Mill Dr., Poughkeepsie NY 12603. (914) 462-4465.

HAMMARLUND HQ-170 receiver · $175, 18-AVQ trap vert. 10-80 meters — $35; both $200. Chuck WA1PCJ, 20 Harrison Ave., Northampton MA 01060.

FOR SALE: Clegg 27B — $375; Clegg a-c power supply — $75, like new. Also Scott 344B Stereomaster — $95 and Ampex No. 830 speakers, pair — $30. Jack Holt, K1VFQ, Woodbury CT 06798. (203) 263-2831.

SELLING out: SB-102 with cw filter, HP-23A p.s. & SB600 spkr — $335; HM-102 pwr. mtr — $24, HDP-21A mic — $18; GH-12 mic — $5; HN-31 dummyload — $6; HyGain Triband beam — $45; HS-34 spkr — $5. $420 takes all. You ship. W. H. Wiley, POB 52, Montara CA 94037. Ph. (415) 728-7136.

HEATHKIT deluxe station. SB-301 receiver (all filters) — $199; SB-401 transmitter (all crystals) — $279; SB-200 linear — $199; SB-610 monitor scope — $79; SB-620 scanalyzer — $99; HM-102 wattmeter — $29. Professionally wired. Absolutely mint. Complete station even less. All cables and manuals. Will deliver *two hundred miles. Shipping extra. W9WAM, Kansas City. (816)* 358-1148.

QST, for sale, 1934, 1936-1949 nicely homebound 1950-1970 unbound. All mint, $80. H. Derr, FOB, 46-04 Marathon Pkwy, Little Neck NY 11362.

MUST sell 40-element 2 m array — four 10-element Sky-Beams. $100 or best offer, 120-feet aluminum coax — $20, Hi-Par halo with bumper mount — $10. WA3GPL. (717) 569-0985.

HENRY 2K-3 amplifier, desk type with power supply — $475. Hy-Gain 204-BA — $80. Both excellent. You pay shipping. Ted. W. Colby, W5FCX, 6260 S. Monaco Way, Englewood CO 80110. Phone (303) 771-9745.

SELL: Brand new Tempo One dc/supply. Paid $110. Will take $95. K8HHZ, August Karvonen, Mass MI 49948.

HAMMARLUND HQ-180AC with noise immunizer, excellent condition, seldom used, full manual — $325. Leo Zucker, K2HGH, 47-43 Francis Lewis Blvd., Bayside NY 11361. (212) 225-9205.

DX-60A and HR10 — $110. Gene Grindstaff, Route 10, Box 285, Apt. 4, Goldsboro NC 27530.

COLLINS 75S3, 32S3/power supply — $850, mint condition. WA8ABU, 2470 Electric, Wyandotte MI 48192.

ANTIQUE receiver, transcontinental ZR-1 neutrodyne, with tubes. Circa 1924. Make offer. W2SHM, RD No. 2, Box 962, Newton NJ 07860. (201) 383-2947.

CHRISTIAN Ham fellowship now organized for Christian hams who wish fellowship with other Christian hams. Request free information on how to witness to other hams. Christian Ham Callbook, $1 donation. For free details write — Christian Ham Fellowship, 5857 Lakeshore Dr., Holland MI 49423.

QST (49-71), misc. equipment for sale. Send s.a.s.e for list. Smukler, 177 White Plains Rd No. 19E, Tarrytown NY 10591.

COMPLETE sellout: Yaesu 570, fully loaded — $575; Drake MN-2000, excellent — $180; Eico 717 electronic keyer with Brown Bros. paddle — $40; new Rohn 25 series foldover tower, 70 ft. — $285; new Mosley CL-33 with Ham-Tator — $220; 200 plus ft. coax RG/U and 120 ft. rotor cable — $40. All excellent condition in original cartons with manuals. Jeff Smith, WA1PCD. Box 238, Oakland RI 02858. (401) 568-4890.

WANTED: Variable inductor with counter dial — Johnson 224, 226, or equal. State price and condition. L. Marko, 70 Beech Terr., Wayne NJ 07470.

WANTED: any condition, Motorola test set, for fm equipment, with or without cables. WB8ERN, Nick Swan, RR2, Ludington MI 49431.

FOR SALE: Collins 75A4, ser. 4603, 500 cycle, 2 kc filters, condition excellent — $350; Collins KWS-1 needs work, spare power transformer — $200, Steward Warner R390A excellent mechanical & electrical — $500. Ling-Tempco Vaught G174H JHF rec, 30TO60, 60 to 260 mgcs, and G186 spectrum display — $350. HP150 oscilloscope Dual-trace plug-in — $200. George H. Rancourt, K1ANX, 78 Williston Ave., Easthampton MA 01029. Tel. (413) 527-4304.

FOR SALE: Last call for radio magazines de W4QC. Send s.a.s.e. for revised list and prices. Mrs. Ted Winstead, Box 365, Elm City NC 27822.

HALLICRAFTERS HT37, excellent condition with manual — $150. Vibroplex Champion key — $8. Frank Furze, RFD No. 2, Newtown CT 06470. (203) 426-0028.

SERVO systems, easy to understand Army training manual. Only $2.25 postpaid. Free list of other books. Jim Cooper, W2BVE, POB73, Paramus NJ 07652.

FOR SALE: HW101 with cw filter — $240; Drake 2B — $150, good condx. K7NHA. (208) 397-4412.

SELL: TenTec Argonaut, 405 linear, 250 p.s., 206 calibrator, microphone for $375, December 1915 for $100. Want: Kenwood T-599. Paul Kluwe, Cedar Lake MI 48812.

WANTED: Three 10-foot sections of Rohn number 6 (six) tower, John, WA2PBN. (201) 889-4575.

FOR SALE: Nice R4 receiver with new epoxy cabinet — $230; Heath SB610 scope — $55; Collins 516E1 12-volt DC supply — $60; Hallicrafters PS-500-DC supply, used only one month — $80; Magnum Six 8F clipper for Heath transceiver, a real bomb — $80, reason, traded my SB102. Will trade all items mentioned above for a good KWM-2 without supply. Jack Yeoman, W8VHY, R.R. No. 4, WAshington C.H. OH 43160. (614) 335-5297.

FOR SALE: Estate W6RNK, TR4 — $380; TV-4 — $90, SB-220 — $350, 12 AVQ — $25, 3 EL ten mtrs — $30, superex earphones — $10, excellent condx. Don Thomas, 1965 La Cuesta, Santa Ana CA 92705. (714) 544-4305.

SELL: NC-155 ham-band 80-6 receiver fb condition — $100; DX-60 with MG-10 VFO — $55; also TA-33 Jr. with AR-22 rotor, K1VKT, 124 Forest St., Winchester MA 01890. (617) 3928.

SCOPES, counters, test equipment, solid state & other computer components, military & industrial surplus — send name on postcard for free "bargain bulletin." Lawrence Instruments, Dept. Q, P.O. Box 744, Sunbury PA 17801.

DRAKE TR-4 transceiver, AC-4 power supply in speaker. Excellent condition $450. K1PNL. Tel. (203) 583-5433. Ernest N. Lefebvre, 226 E. Main Street, Bristol CT 06010.

HALLICRAFTERS twins: HT-46/SX-146 transmitter/receiver 80-10 m cw/ssb — $350; HyGain hytower — $75. FOB E.J. Jones, WA9ZCP, 2451 Lathers Rd., Beloit WI 53511.

QRP PM-2B xcvr. Mint 1 ship — $45. Bob Craig, 3 Hollis Pl., Huntington Station NY 11746.

VARITRONICS FDFM-2SA, 2-meter fm, 10 watts input, 6 channels, crystals for 94/94, 34/94, 58/58, with PS-1500 ac supply and BP-1 battery pack — $150, postpaid in Conus. Ernie Anderson, 800 North 4th East, Mountain Home ID 83647.

HOOSIER Electronics — Your ham headquarters in the heart of the Midwest where only the finest amateur equipment is sold. Individual, personal service by experienced and active hams. Factory-authorized dealers for Clegg, Genave, Regency, Drake, Standard, Hallicrafters, Ten-Tec, Kenwood, Tempo, Midland, Galaxy, Hy-Gain, CushCraft, Mosley, Ham-M, Hustler, plus many more. Orders for in-stock merchandise shipped the same day. Write or call today for our quote and try our personal, friendly Hoosier service. Hoosier Electronics, R.R. 25, Box 403, Terre Haute IN 47802. (812) 894-2397.

SX-101, ssb-a-m, matching spkr. Excellent. Sell for $100. W6DWU, 13666-H Red Hill, Tustin CA 92680. (714) 832-8307.

SALE: FTDX560, Yaesu mike spkr fan, mint condx — $450. Sale: new PT101 fan mobile mount $650; Salopek, 2004 North 61, Phila PA 19151.

COMPLETE maximum power amateur radio station. Collins *KWM-2, 516F-2, 312B-4, Henry 2K3 linear, Ham-M rotator, CD* indicator, 8 cond. cables, lightweight 50 ft. antenna tower, Asahi 33 antennae, 1 mike, 2 new spare S-500Zs, BNW LP filter, all associated coax cables. An outstanding buy for $1,700. Buyer must take down antenna and tower. WA3TLU. Tel. 301-725-3539, 15607 Bounds Ave., Laurel MD 20810.

WANTED: Transmitter, Novice gallon, simple tuning. WN5HSF, 1317 Meadowlark, Deer Park TX 77536.

DISCOUNT prices plus full warranty. SBE144 2 m fm ($259.95 list) — $199.95; Triex MW50 tower — $250.75; MW65 — $331.50; W5I — $386 FOB CAL; W67 ($983.50 L) — $834.50 FOB CAL; Ham-M — $99; TR44 — $59.95; Beldeon 8 wire rotor cable No. 8448 10c/ft.; Mosley CL36 — $149; CL33 — $124; TA33 — $114; MCQ3B — $91; $402 — $143; HyGain TH6DXX — $139; 204BA — $129; 402BA — $135; Belden 8314 RG8 foam 17c/ft.; Motorola HEP170 epoxy diode 2.5 A/100PIV 29c ea.; — $25/100; 1972 Radio Masters — $3.50; quote Clegg FM27B; Genave GTX2; Regency HR212; Midland — $135. Standard 826 mA, 146A; Hardbound technical magazines many types from Petrochemical library — $3/yr; shipping charges collect. Madison Electronics, 1508 McKinney, Houston TX77002. (713) 224-2668.

TH6DXX antenna, Ez-Way WRBS-40' tiltover tower and ground post, Ham-M rotor and cable — $475. D. Reid, W7HAJ, 1902 33rd St., S.E., Auburn WA 98002.

FOR SALE: B&W 6100 — $200; matching LPA-1 amplifier — $125; 75A-2 receiver — $175, all excellent original condition. W3VYY, 133 Morlyn Avenue, Bryn Mawr PA 19010. (215) 525-8849.

WANTED: Ez-Way 40-foot tower, complete Long Island area preferred. W2UVC, 7 Brookhaven Dr., Rocky Point NY 11778.

GONSET III 6 m — $75; Ameco VFO 621 — $30; National NC300 — $100; Johnson Challenger — $40; DX40 — $25; HG10 — $25. Tel. (215) 347-2175. WA3RPQ, RD 4, Box 464, Coatesville PA 19320.

QST Sept. 1957 to Dec. 1972. Make offer. W2PHE, 116 W. 8th St., Oswego NY 13126.

FANTASTIC 2-meter mobile units. Kaar DT-76. All solid-state except final. 180-watts, 6-channel, trunk mount. All cables, head, mobile antenna, manuals, spare parts, $900 takes all 3 units or $335 each. W6ABP, 3054 Dona Marta Dr., Studio City CA 91604. (213) 654-4304.

SELL or trade: NCX-3, ac/dc supplies, mike, calibrator, Hustler antenna, all $295, IBM executive typewriter — $350. Want: camera, Hasselblad, Rolleiflex, Bronica, Mamiya, R4GVW, Box 462, Brewton AL 36426.

CLEGG 22'er in very good condition with mobile mike, xtal — $150, plus shipping. WB2NVZ/1, 343 Main St., Wakefield RI 02879.

SELL: Hallicrafters SX-111 receiver — $130; Eico 720 cw transmitter — $50; Eico 730 modulator-driver — $40. WB8NAG, Box 407, Hubbell MI 49934.

SHACK clean out: An FRR-5007 Navy rcvr with 4-tuning drawers — $15; Vibroplex bug — $15; Heath HM-10A GDO — $15; Simpson 466 Scope (needs pwr transformer) — $10; BC-375/TU-5B tune unit — $2; R-6, 0-600 volt de regulator — $4; 55' telescopic vertical — $8; pwr transformer UTC-S44 — $5; transformer 700 vct, 575 mA and other windings — $5; Navy TCS xmtr, rcvr manual — $5. All equip works, good condx, plus tubes and manuals, except as stated. Purchaser pays shipping. Marvin Emerson, 3730 Rolison Rd., Apt. 14, Redwood City CA 94063.

CLEANING time: National HRO-500 — $1200; Drake TR-4, RV-4, AC-3 — $550; Motorola HT-220, 2-watt, 2 freq., with Nicad, charger, on .94/94 and .34/.94 — $275; Dycomm amplifier — 500D — $65; Regency TML-6, 6-channel 10-band transistorized monitor — $70; TCS surplus transmitter — $20. All excellent. Mel Stoller, K2AOQ, 373 Park Avenue, Rochester NY 14607. (716) 244-2839.

QST 1954 through 1967 excellent condition, plus 1947 plus eighteen assorted issues 1946, 1953 — $115. CQ July 1953 through September 1957 — $25. HP13 — $40, excellent SX71 — $95, or make offers. You pay postage. Hugh Clark, 545 West Vassar, Feresno CA 93705.

FOR SALE: Antique radios, cabinets, parts, tubes. W1PRS, 91 Priest Street, Leominster MA 01453. 53-73307.

WANT magazines: NBS-CRPL-D Radio Science 1965 to date, JCC 70/71/72 and certain PGANE/AES & Siemens Reviews. W3AFM.

ANTIQUE radio collection — Atwater Kent model No. 40 in metal case with books — $35; very old 5-tube set, bus wired in 8 X 9 X 30 mahogany case — $50; Colin B. Kennedy type 281 short-wave, patended 1914, with tube in nice mahogany case — $100; Magnavox model C audio frequencya mpl8fer, circa 1915, mint, very rare — $124. Will pack for shipment, $5 additional each. WA1IWV.

SELL: Heath DX 40 — $40; VF1 VFO — $12; SX-100 — $95; Motorola solid-state Universal a-m auto radio +/— ground — $15, four-element 10-meter beam; 5-watt RCA a-m 10-meter 115 V/12 V transceiver — $20, all in good/excellent condition. K1EGD, 344 Aqueduct Road, Cranston RI 02910. (401) 944-7176.

SELL: SB-100 w/Heath-installed xtal filter, HP-23 — $325; TH6DX — $75; Tennalab 6-el interlaced 15-20 beam — $75; Heath IG-102 signal generator — $20; kW Matchbox w/coupler — $100. Swap some for Drake 2B or later tx. WA3JDZ. (301) 464-2542.

CENTRAL Electronics, 20A with VFO — $65; Gonset Comm. IV converted to fm/a-m — $200; Clegg 66er — $125; Collins 75S1 rcvr — $300; rack mount for Collins 75S1 — $15; Twoer with mobile supply — $30; Hallicrafter VFO — $15; Heath capacity checker — $25. You pay shipping. Harvey Lawrence, 2102 Terriwood Ct., Louisville KY 40223.

FM-27B and Clegg supply, both new. Balz, Route 4, Greer SC 29651. (803) 244-8039.

HALLICRAFTER SX-101A receiver — $140; Hallicrafter SR-42 2-meter transceiver — $99, excellent 300-watt cw transmitter — $50. WB2QAX, John M. O'Neill, 37 Arbor DR., New Hartford NY 13413.

HALLICRAFTER SX146 receiver, all filters, crystals, calibrator and manual, very little use — $135; Clegg 99'r with manual — $45; Hallicrafter HA5 VFO, including 6 and 2 crystals — $40; Hallicrafter accessory filters, crystals, and calibrator, new — $35; Utrad inverter 12 V dc to 110 V a-c 125 W continuous — $18, all good condition. FOB W9LXF, RR 4, Box 66, Rockville IN 47872.

WANTED: Swan TV 2B or 2C 2-meter transverter; Heath SB500 2-meter transverter. Will pay top dollar for good equipment. WA3RSU, Chuck Segraves, 203 W6th Ave., Derry PA. 15627. 694-7801.

CALL letters engraved in wooden plaque 5-3/4 X 16. Walnut finish with gold letters — $5, unfinished — $3, postpaid. WB4BKU, Tony vitolo, 2756 Tanglewood Dr., Snellville GA 30278.

WANTED: Collins 500 hz filter F455FA05 for 75S-3B. WB6VWF, 23 East 69 St., Long Beach CA 90805. (213) 631-1724.

SB-401, SB-301, SB-600, with a-m, cw, xtals, D-104 mike, Vibroplex original bug. All excel. cond — $395. WA2HRW, Woodcrest Drive, East Moriches NY 11940. (516) 878-1540.

COLLINS 75S1, spkr, cw filt. Waters rej. tuning — $225, complete. Apache — $75, SB10 — $35, both — $100. Apache and 75S1 include 160 m mod. Al Dewey, W1GBG, 125 Beach St., Franklin MA 02038.

FOR SALE: Eico 753 xcvr + 751 a-c supply, operable but needs some work — $100. WA8RQU, 34230 Cannon Road, Solon OH 44139.

MOBILE Ops — Write for info on shielded ignition systems and noise suppression components. Summit Enterprises, 36 Winchip Road, Summit NJ 07901.

DRAKE T4 reciter — $190; Hallicrafters SR150 and AC supply — $250; National NCX3 — $120. Philip Schwebler, W9GCG, 4536 N. 50 St., Milwaukee WI 53218.

WANTED: Swan 270B or Swan 500C. Sell: Swan 120 — $75, Swan 1200W — $189, Roger Soares, 2309 Sherry Dr., Yorktown Heights NY 10598. (914) 245=1741.

HALLICRAFTERS SR2000 two-kilowatt transceiver. Just back from Hallicraters service lab, extra pair finals — $825. FOB. Send address for list of my excess gear. Cline, Box 216, Logan UT 84321.

QST's Apr 1923, Sept. & Nov. 1925, April, May & June 1926. From 1927, complete to date, make offer. Ernest C. Mohler, 3115 7th St., Lewiston ID 83501.

WANTED: Facsimile equipment, weather satellite equipment and/or information, early models RTTY machines. Ken DeBrechet, WB6NOV, P.O. Box 1086, Novato CA 94947.

FOR SALE: Bechman, 7361R frequ. cntr — $50; 1 Motorola D33GGV — $60; 1 GE 30W TPL — $100; 1 KAAR 60 W 450-MHz — $75; 1 RCA 30W Loband — $50; 2 Motorola T43GGV — $75 ea.; 2 Motorola V43GGT — $100 ea.; 2 Motorola L43GGB — $125 ea.; 5 Mororola T-pwr heads — $5 ea.; 3 GE prog mics — $5 ea.; 1 Johnson 122 VFO — $15; 2-28V, 3A reg. p/s — $15 ea.; 1 Lambda 0-30V 1A p/s — $25; 1 BC-221 freq. mtr 20-200 MHz — $25; BC-221 rq. mtr, 200 kHz-20 MHz, — $25 ea.; 4 Bird 25 W 400-1000 MHz w/meter shuts — $5 ea.; 14-1000A — $70; 2-4CX 1000A — $100 ea. K0BKD, Dave Marshall, 1117 June St., NE, Albuquerque NM 87112.

WANTED Swan 330 gen. coverage tuner. C.D. Northen, 6205 Darnell, Port Arthur TX 77640.

FOR SALE: Viking Invader xmtr — $130; AN/URR-13 uhf rcvr — $20. FOB Larry Laitinen, 217 Orchard Rd., Felton CA 95018. (408) 335-7549.

QST's various 1927-1946, all 1956-1972, CQ various 1951-1960, 73 magazine 1963-1967, Radio-Radio Craft — Radio News, Short Wave Craft various 1931-1958, Popular Electronics 1959-1965. Make offer. W1DYT. (617) 944-0990.

SALE collection battery and old electric sets — $2000, Send for list. J.E. Miller, Jr., 5369 Youngridge Drive, Pittsburgh PA 15236.

HEATH HW-101, HP-23A, SBA-301-2 filter, HDP-21A microphone. Excellent condition — $300. WB9GGQ, 1228 W. Donald St., South Bend IN 46613.

FOR SALE: Swan Cygnet 270B, E.V. mike 714; crystal osci-MARS; DC14A power supply; Midland SWR Meter. All bought new July '72, now in new condition, cost — $600.35 package deal sale price — $450. Will ship U.P.S. express & ins. collect. Godfrey H. Delcuze, WN5HHH, Rt. 4, Box 443 West Point MS. 39773. Phone (601) 494-5721.

SELL: Eldico 100 series, ssb, cw, a-m rig 3-30 mc, includes rack-mounted xtal xmtr, rcvr, RTTY keyer and antenna tuner. 100 PEP. Factory built. xmtr could be VFO'd S.a.s.e for specs. Prefer to deliver but will ship — $100. Also, link 250 VFS fm xmtr, 500 watts input. Spare 250th. Fully metered in 6' cabinet. Cannot ship. Will deliver in 150 miles — $150. Jim Collins, W5QDO, 1206 Trailwood, Longivew TX 75601.

WANTED: ssb gen/det board, SB-34, state cond-price. WA7SSA, 4838 N. 69 Av. Pbx, AZ 85033.

NEED old QSTs. Write W2HF your needs.

TELETYPE machines by Kleinschmidt. Page printer with power supply, as received from govt — $59.95. Single tables, excellent condition — $19.95. Page printer and reperf combination, as received from govt — $59.95 ea. Double tables, excellent with Chad box and tape compartments for $34.95 ea. Each of the above TT machines cleaned, oiled, and adjusted please add $30 ea. TH-4 converters, transmit and receive on 170 shift — $49.94. Paper winders — $14.95. Freight is collect on all orders. Andy Electronics, Inc., 6431 Springer, Houston TX 77017.

DRAKE T4X, R4A, P.S., MS-4. Mint condition — $550 FOB. K9TZH, J. Fenstermaker, 5401 Old Dover Blvd., Fort Wayne IN 46815.

HEATHKIT SB-401 with crystal pack, SB-301 with cw filter. Both rigs expertly wired — $450 firm. WB4ONS, D. A. Danello, Rt. 2 Box 105, King George VA 22485. (703) 775-4915.

60 years accumulation of 50,000 dollars worth of radio and experimental equipment. World War I, World War II mica transmitting condensers, variable condensers, tubes, meters, etc. What Do You Want? John Stoddard, 4262 N.E. 124th, Seattle WA 98125.

HALLICRAFTERS SB100 cond. good — $100. N. Verna, 184 Harding Dr., New Rochelle NY 10801.

SWAN 270B, mint, best offer, W5KDM.

2 Sell: Heathkit DX-50 transmitter (crystal or voice) and VFO, VF-1, to match — $40, excellent condition. Ed Grag, 2912 Newbury, Berkeley CA 94703.

SELLING Hammarlund Super-Pro SP600JX, very good — $250; Hallicrafters HT-20 — $50; HT23-BAC — $60. Pick up. Bob Novas, 422 Cherokee St., Bethlehem PA 18015.

HAVE the following extra QST's in very nice condition — Febr., May, June 1917 and June, July, Aug., Sept., Oct., Dec. 1919. Will swap any one of these for January 1921 QST and any other for February 1921 QST with both covers in very nice condition. Marcy, 461-3rd Ave., Eau Gallie FL 32937.

GLADDING 2-mtr. fm xtals and matching a-c pwr supply — $175. SX-101 — $95, 609 927-0169. Bill Montag, Apt. G-10 Groveland Ave., Somers Point NJ 08244.

FOR SALE: Drake R4B, ten crystals; T4XB, never used on the lowbands; AC-4, MS-4. All like factory new — $750; TC-6 with SC-6 ,omt — $275; converter console CC-1, CPS-1, SCC-1 — $65. Jim, W1VYB. (617) 922-3850.

HW-7 Heath QRP transceiver with fones, key, 12 V 4.5 aH rechargeable battery — $60. Pickup only. WIDB, 39 Pond Rd., Ridgefield CT 06899. (203) 438-6241.

PT300 with 4-channel factory deck tuned to 34/94, 22/82, 76/76, 94/94 with new Nicad & charger — $350; SB450 with extra crystals — $295. Cliff Fleury, Lewis NY 12950. (518) 873-2054.

MILLEN monitor oscilloscope type 90932 — $39; BC-221 freq. meter, cheap. Inquire J. Kugler, 7 Brookside Drive, Port Washington NY 11050.

Index of Advertisers

Amateur Electronic Supply 114, 120, 126, 154
Amateur License Instruction 162
Amateur Wholesale Electronics 157, 168
American Radio Relay League
F-M Repeater 127
Gateway 124
Handbook 168
Hints & Kinks 150
League Emblem 142
License Manual 130
Log Books 157
Membership 166
Publications 165
VAR 146
Amtech 165
Andy Electronics 165
Antenna King 159
Astatic Corp. 145
ATV Research 168

Bauman Sales 167
Bitcil 135

Collins Radio 2
Command Productions 167
Cush Craft 118

Dames, Ted 160, 163, 166
Drake, R. L. 119, 159
DX Engineering 160

Ehrhorn 9
Eimac . . . . . Cov. IV
Electronic Distributors 153

Fair Radio Sales 155
Foreign Language QSOs 156

Gen-Comm-Co. 154
General Aviation 141
Gotham 155
Gregory Electronics 158

Hal Communication 175
Ham Radio Center 158
Heath Co. 112
Henry Radio . . . . . Cov. II & Cov. III
Hy-Gain 125

Icom 133
Interface Technology Inc. 153
International Crystal Mfg. 7

Jan Crystal 163
Janel Labs 134
Johnson Electronic Sales 156
Justice Association Inc. 168

K. L. Electronics 168
Kirk Electronics 134
KW Electronics 156

LA Electronics 140
Lafayette Radio Elect. Corp. 148
Lattin Radio 153
Leader Instruments Corp. 137
Leeds Radio 160
Link, John 162

Matric 165
MFJ Enterprises 168
Military Electronics 168
Millen Mfg., James 174
Mini-Products 161
Mor-Gain Inc. 166

National Radio Institute 139, 167
Newsome Electronics 154

Olson Electronics 132
Omega-T 163

Palomar Engineers 162, 167
Peregrine, Smith 152
Pickering Radio 158
Polygon Co. 144
Poly Paks 147, 149
Radio Amateur Callbook 136
Rectifier Components, Inc. 163
Robot Research 129
Rohn Mfg. 151
R. P. Electronics 167
Ruggles & Associates, David M. 164

SAROC 166
Savoy Electronics, Inc. 1
Skylane Products 164
Swan Electronics 116, 143, 176

Tam-Ad 164
Trigger Electronics 118

Unadilla Radiation Products 161
Unique Products 155

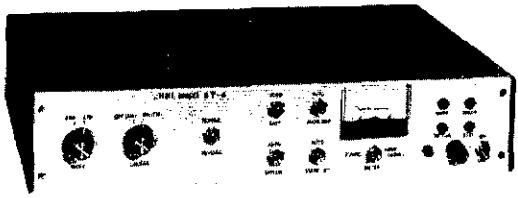
Van Gordon Engineering 167
Van Sickle 160
Venus Scientific Inc. 122, 123
Vintage Radio 128

Weinschenker, M. 138
Wide Band Engineering Co. 164
Wilson Electronics 131, 162
World QSL Bureau 166

Yaesu Musen USA, The 4
Y & C Electronics 156

CW or RTTY, whichever way you go,

HAL HAS TOP QUALITY YOU CAN AFFORD!

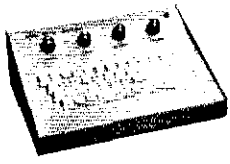


TOP QUALITY RTTY...WITH THE HAL MAINLINE ST-6 TU. Only 7 HAL circuit boards (drilled G10 glass) for all features, plug-in IC sockets, and custom Thordarson transformer for both supplies, 115/230 V, 50-60 Hz. Kit without cabinet, only $135.00; screened, punched cabinet with pre-drilled connector rails, $35.00; boards and complete manual, $19.50; wired and tested units, only $280.00 (with AK-1, $320.00).*

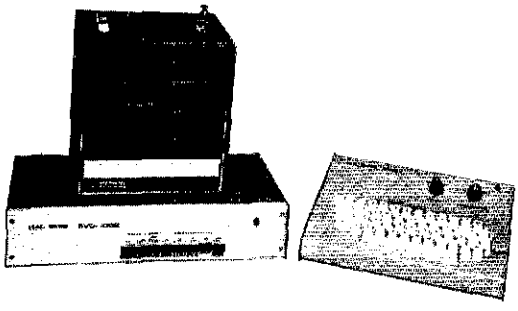
TOP QUALITY...WITH THE HAL 1550 ELECTRONIC KEYER. Designed for easy operation; perfectly timed CW with optional automatic ID for sending call letters, great for DX and RTTY; TTL circuitry, transistor switching for grid block, cathode keying. Handsome rugged crackle cabinet with brushed aluminum panel. With ID, only $90.00; without ID, $65.00.*

OTHER HAL PRODUCTS INCLUDE:

ID-1 Repeater Identifier (wired circuit board)	$ 75.00*
ID-1 (completely assembled in 1½" rack cabinet)	$115.00*
HAL ARRL FM Transmitter Kit	$ 50.00*
W3FFG SSTV Converter Kit	$ 55.00*
Mainline ST-5 TU Kit	$ 50.00*
Mainline AK-1 AFSK Kit	$ 27.50*



TOP QUALITY... WITH THE HAL MKB-1 MORSE KEYBOARD. As easy as typing a letter—you get automatic CW with variable speed and weight, internal audio oscillator with volume and tone controls, internal speaker, and audio output jack. Smooth operation; completely solid-state, TTL circuitry using G10 glass boards, regulated power supplies, and high voltage transistor switch. Optional automatic ID available. Assembled MKB-1, $275.00. In kit form, $175.00. *



NEW FROM HAL—TOP QUALITY RVD-1002 RTTY VIDEO DISPLAY UNIT. Revolutionary approach to amateur RTTY . . . provides visual display of received RTTY signal from any TU, at four speeds (60, 66, 75, and 100 WPM), using a TV receiver modified for video monitoring. Panasonic solid-state TV receiver/monitor, or monitor only, available. RVD-1002, $525.00; Panasonic TV receiver/monitor, $160.00; monitor only, $140.00.*

TOP QUALITY...WITH THE HAL RKB-1 TTY KEYBOARD. Gives you typewriter-easy operation with automatic letter/number shift at four speeds (60, 66, 75, and 100 WPM). Use with RVD-1002 video display system, or insert in loop of any teleprinter, for fast and easy RTTY. Completely solid state, TTL circuitry using G10 glass boards, regulated power supplies, and transistor loop switch. RKB-1 assembled, only $275.00.*

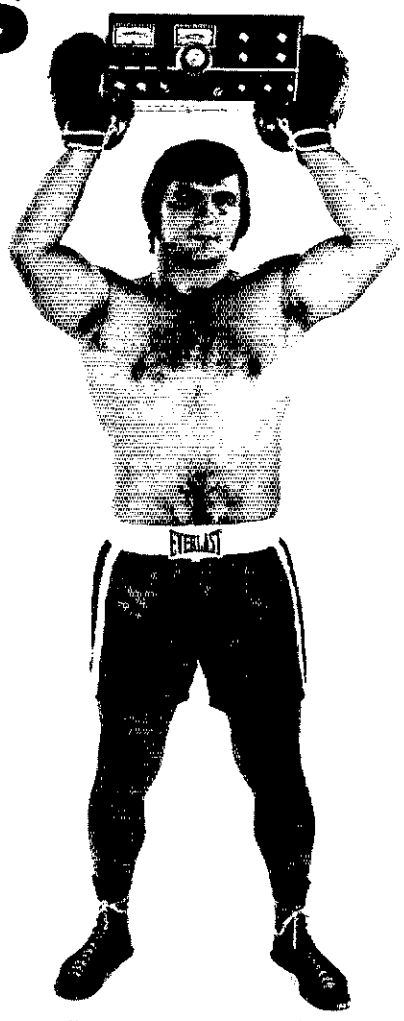
HAL provides a complete line of components, semi-conductors, and IC's to fill practically any construction need. Send 24¢ to cover postage for catalog with info and photos on all HAL products available.

*Above prices do not include shipping costs. Please add 75¢ on parts orders, $2.00 on larger kits. Shipping via UPS whenever possible; therefore, street address required.

HAL COMMUNICATIONS CORP., Box 365 A, Urbana, Illinois 61801

IT'S A FACT:

700 WATTS of SWAN POWER



Explosive strength! SWAN's NEW 700CX CHAMPION Transceiver gives you the dynamic muscle of 700 Watts P.E.P. input. Punch through for more contacts than ever before . . . without an expensive accessory amplifier.

A real winner, the CHAMPION will work all bands as you like it — SSB, CW or AM. Starts every round with amplified Automatic Level Control to increase voice strength, reduce over-modulation flat-topping, and relieve you of critical microphone gain adjustments. Speed contacts with no-nonsense strength and reach that beats all contenders. Experience the smooth, velvet-touch of SWAN's exclusive dual-ratio planetary tuning — no backlash — just pure precision.

Watta style! This champ performs magnificently. Clean readability cuts through QRM for crisp contact, right on the button. Suppresses unwanted sideband down more than 50 db; knocks the carrier down more than 60 db; and, *third order distortion is put down for a count of* about 30 db. Winning audio power output is increased by knocking out more noise with an effective distortion product detector.

Fast attack AGC, with controlled decay, guards against undesirable "pumping" action — exceptional receiver control is maintained. The steep skirts of SWAN's 5.5 MHz I.F. filter fights noise and QRM. Audio response is the best, with no competition, boasting a full 2.7 kHz bandwidth that is essentially flat from 300 to 3000 Hertz.

Get CHAMPION performance on roadwork as well as in the ring at home. Install a SWAN 700CX and you can have a full 700 watts in mobile operation without a linear hogging all the current. Standard SWAN power supplies readily suit your choice of installation.

CHOOSE A WINNER — SWAN's 700CX CHAMPION TRANSCEIVER — IT'S GOTTA LOTTA PUNCH!

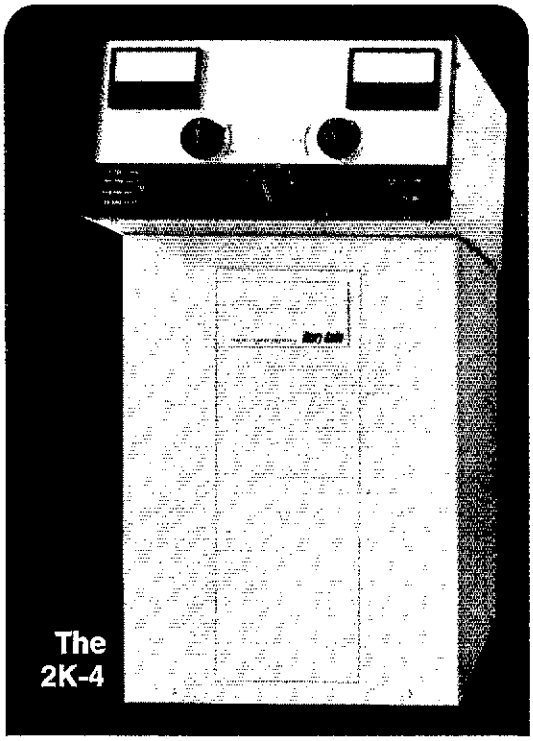
SWAN 700CX CHAMPION Transceiver	$569.95
SWAN 117XC, matching AC power supply with speaker	$109.95
SWAN 14-117, DC power supply	$139.95

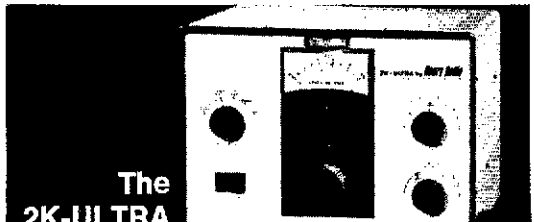
SWAN ELECTRONICS
A Subsidiary of Cubic Corporation
305 Airport Road, Oceanside, CA 92054
Telephone (714) 757-7525

THE BEST PRACTICAL DEVELOPMENTS IN AMATEUR RADIO

From the World's Number One Manufacturer of Amplifiers

The biggest, broadest, finest line of amateur power amplifiers





2K-4 . . . THE "WORKHORSE"

The 2K-4 linear amplifier offers engineering, construction and features second to none, and at a price that makes it the best amplifier value ever offered to the amateur. Constructed with a ruggedness guaranteed to provide a long life of reliable service, its heavy duty components allow it to loaf along even at full legal power. If you want to put that strong clear signal on the air that you've probably heard from other 2K users, now is the time. Move up to the 2K-4. Floor console or desk model . . . $845.00

2K-ULTRA . . . THE "ULTIMATE"

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 loafs along at full legal power without even the sound of a blower. Its anode heat is silently and efficiently conducted to a heat sink through the use of a pair of Eimac 8873 tubes. In fact, all of its components are the very best obtainable. The price . . . $845.00

TEMPO/2001

Small but powerful, reliable but inexpensive, this amplifier is another top value from Henry Radio. Using two 8874 grounded grid triodes from Eimac, the Tempo 2001 offers a full kilowatt of power for SSB operation in an unbelievably compact package (total volume is .8 cu. ft.). The 2001 has a built-in solid state power supply, a built-in antenna relay, and built-in quality to match much more expensive amplifiers. This equipment is totally compatible with the Tempo One as well as most other amateur transceivers. Completely wired and ready for operation, the 2001 includes an internal blower, a relative RF power indicator, and full amateur band coverage from 80-10 meters. $545.00

TEMPO/6N2

The Tempo 6N2 combines most of the fine features of the 2001 for 6 and 2 meter amateur operation. The amplifier uses the same small cabinet, the same modern tubes, the same inherent quality for 2000 watts PEP input on SSB or 1000 watts input on FM or CW. The rig is completely wired in one small package with an internal solid-state power supply, built-in blower, and RF relative power indicator. $595.00

3K-A COMMERCIAL/MILITARY AMPLIFIER

A high quality linear amplifier designed for commercial and military uses. 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 . . . $1080.00

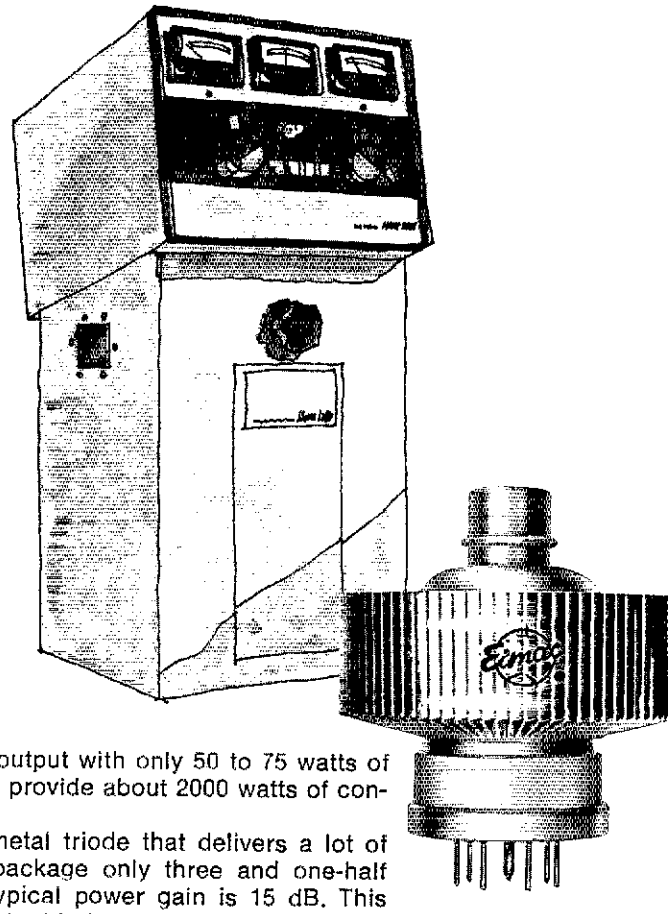
Prices subject to change without notice

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

World's Largest Distributor of Amateur Radio Equipment

EIMAC's rugged 8877 powers Henry Radio's reliable 4K Ultra linear commercial amplifier.



When Henry Radio set out to design a sophisticated linear amplifier for high reliability communications in the high frequency range, they chose EIMAC's high-mu 8877 power triode.

The result is the new 4K Ultra, which operates with 4000 watts input in heavy-duty commercial service. The 4K employs continuous variable capacitive and inductive elements tunable over the 3.0 to 30 MHz range. Optimum input and load conditions are provided for a wide variation in antenna systems. EIMAC's 8877 enables the 4K to deliver over 2500 watts of continuous SSB or CW output with only 50 to 75 watts of drive. For RTTY the 4K will provide about 2000 watts of continuous duty output.

The 8877 is a ceramic-metal triode that delivers a lot of power and linearity in a package only three and one-half inches high. At 30 MHz, typical power gain is 15 dB. This impressive gain is achieved with 3rd order intermodulation products −38 dB below one tone of a two equal-tone drive signal.

With Henry Radio, you know quality counts. And they know you can't do better than EIMAC. For full specifications on the 8877, write to EIMAC Division of Varian, 301 Industrial Way, San Carlos, California 94070. Or contact one of the more than 30 Varian/EIMAC Electron Tube and Device Group Sales Offices throughout the world.

Eimac®
division
varian