QST

devoted entirely to

amateur radio

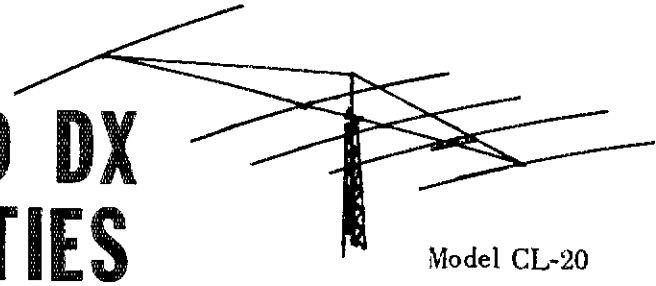
October 1970
75 Cents

OFFICIAL JOURNAL OF THE ARRL

NEW SINGLE-BAND BEAM FROM MOSLEY

The Classic 20

WITH EXPANDED DX CAPABILITIES



Model CL-20

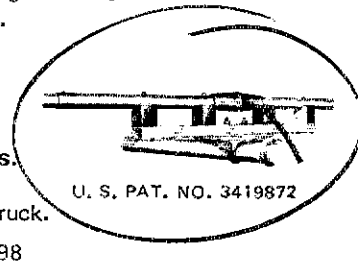
ON 20 METERS

DON'T LIMIT YOURSELF!

When you install a 20 meter beam, there is only one antenna investment you can afford . . . The NEW CLASSIC 20 with expanded DX capabilities, thanks to the new Classic Feed System "Balanced Capacitive Matching." This new array promises to be the most universally accepted amateur beam ever developed for 20 meters.

TAKE A LOOK AT THE VITAL STATISTICS!

- POWER RATED: 1 KW AM/CW; 2 KW P.E.P. SSB input to the final.
- SWR: 1.5/1 or better.
- MATCHING SYSTEM: Balanced Capacitive.
- FEED POINT IMPEDANCE: 52 ohms.
- NUMBER OF ELEMENTS: 5. Aluminum tubing; 6063-T832.
- MAXIMUM ELEMENT LENGTH: 38 ft. 1½ in.
- BOOM LENGTH: 46 ft.
- RECOMMENDED MAST SIZE: 3 in. OD.
- TURNING RADIUS: 28 ft.
- WIND SURFACE: 18.7 sq. ft.
- WIND LOAD (EIA Std. 80 MPH): 364.45 lbs.
- ASSEMBLED WEIGHT: Approx. 139 lbs.
- SHIPPING WEIGHT: Approx. 145 lbs. via truck.



For detailed brochure write . . . Dept. 198

Manufacturing TV Antenna-Accessories
for nearly a Quarter of a Century.
Write for the Free Booklet,
"How to Improve Your TV Picture"
Department 198TV

Mosley Electronics, Inc. 4610 N. LINDBERGH BLVD., BRIDGETON, MO. 63044

gang busters.

new short-wave-receivers from *hallicrafters*. brand new. the SX-133. the SX-122A. exclusively for the sophisticated amateur. the real gang busters.

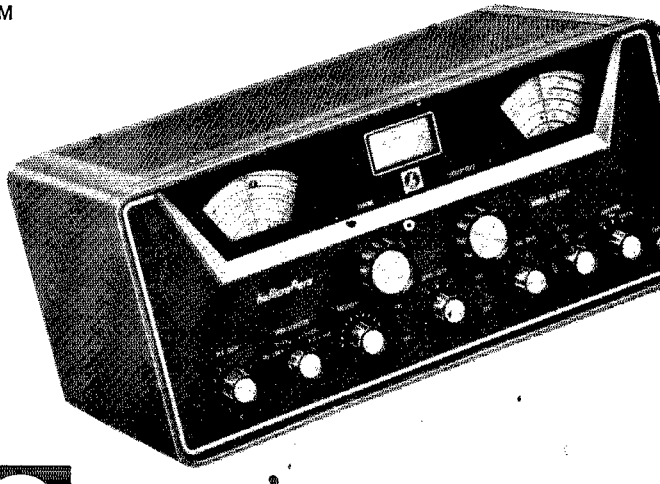
that grand old gang will all be individually monitoring the air waves after trying the new two. so will you. both of the news are loaded. loaded with hallicrafters' engineered, built-in, plus features. see for yourself.

THE SX-133

the SX-133 communications receiver covers standard AM Broadcast and 81 short-wave services between 1.7 and 31.5 MHz. large slide-rule band spread dial is calibrated for the 80, 40, 20, 15, 10, 49, 31, 25, and 19 meter bands. crystal filter, product detector and more. suggested list price $249.95.

THE SX-122A

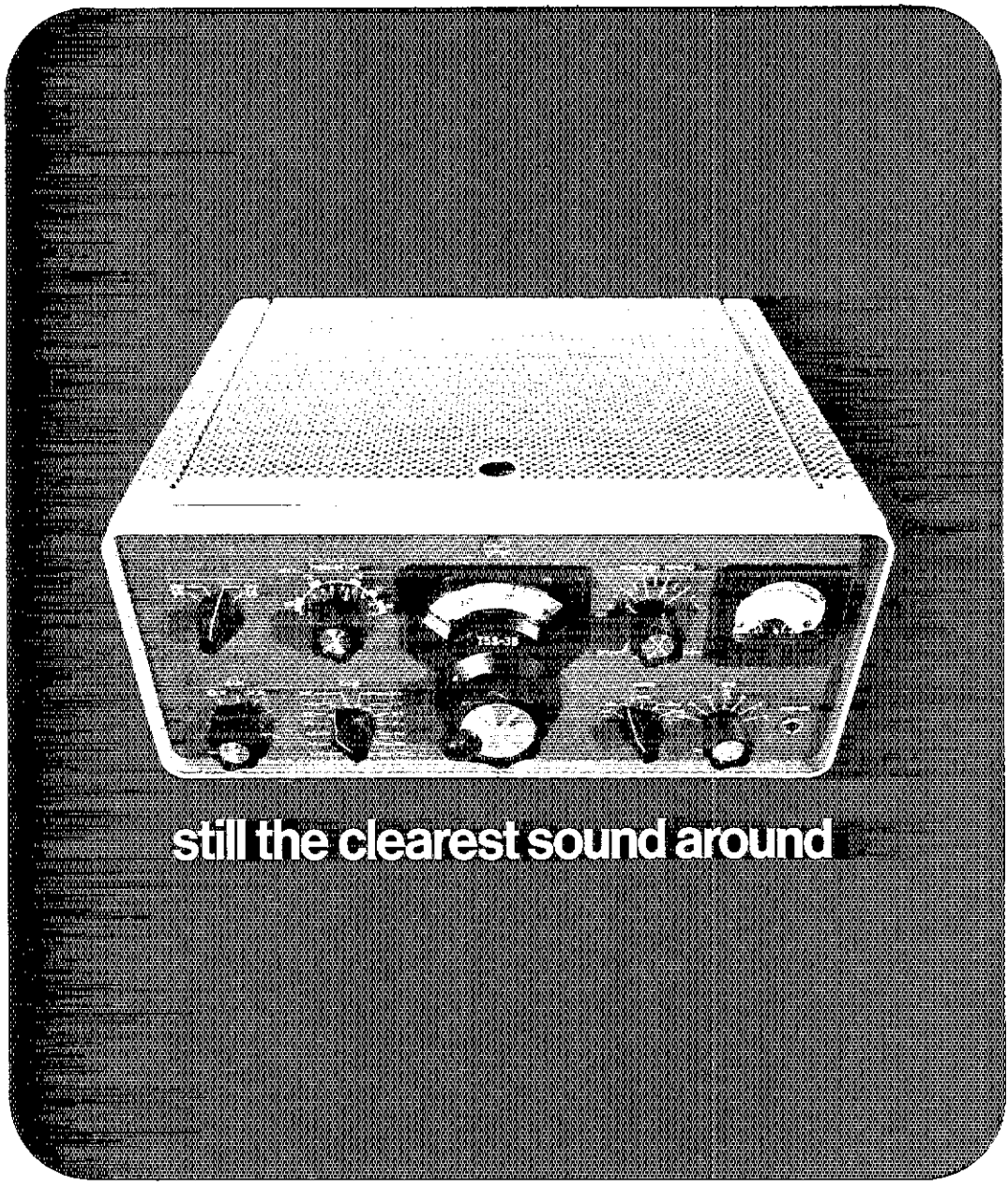
the top of the line SX-122A is an advanced version of the popular SX-122 receiver with dual conversion on all bands providing excellent AM standard broadcast plus 83 short-wave services in the range 540 kHz to 34 MHz. bandspread calibrated for amateur bands. selectable USB/LSB/CW. series noise limiter, antenna trimmer and more. 110/220 VAC. suggested list price $395.



so if you're in the market for the best in general coverage amateur and short-wave receivers, don't miss seeing and trying these new two. meet the gang at your nearest hallicrafters distributor. he just received the new load of gang busters.

the hallicrafters co.
A Subsidiary of Northrop Corporation

600 HICKS ROAD
ROLLING MEADOWS, ILLINOIS 60008



For highest-quality reception in the SSB or CW modes, nothing can match the clean, clear sound of Collins 75S–3B receiver.

The 75S–3B's superior front end design reduces strong-signal blocking, intermodulation, cross-modulation, and spurious responses. Hissing, popping, slapping, and pumping also are reduced. What comes through is the clearest sound in amateur radio.

The 75S–3B is an example of engineering and manufacturing excellence achieved at Collins through use of the C-System, an integrated, computer-controlled system for design and production.

Trade up to the clear sound of the 75S–3B at your Collins distributor.

COLLINS

QST — OCTOBER 1970

VOLUME LIV NUMBER 10

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

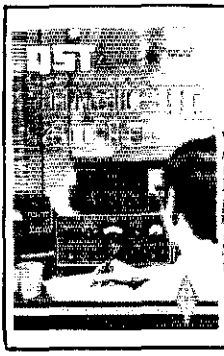
OFFICES

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

Subscription rate $7.50 per year postpaid, U.S. funds, in Canada and U.S.; $8 elsewhere. ARRL Membership, including *QST*, available only to individuals with a bona fide interest in amateur radio: $6.50 per year, U.S. funds, in Canada and U.S.; $7 elsewhere. Single copies, 75 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds.

Second-class postage paid at Hartford, Conn. and at additional mailing offices.

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

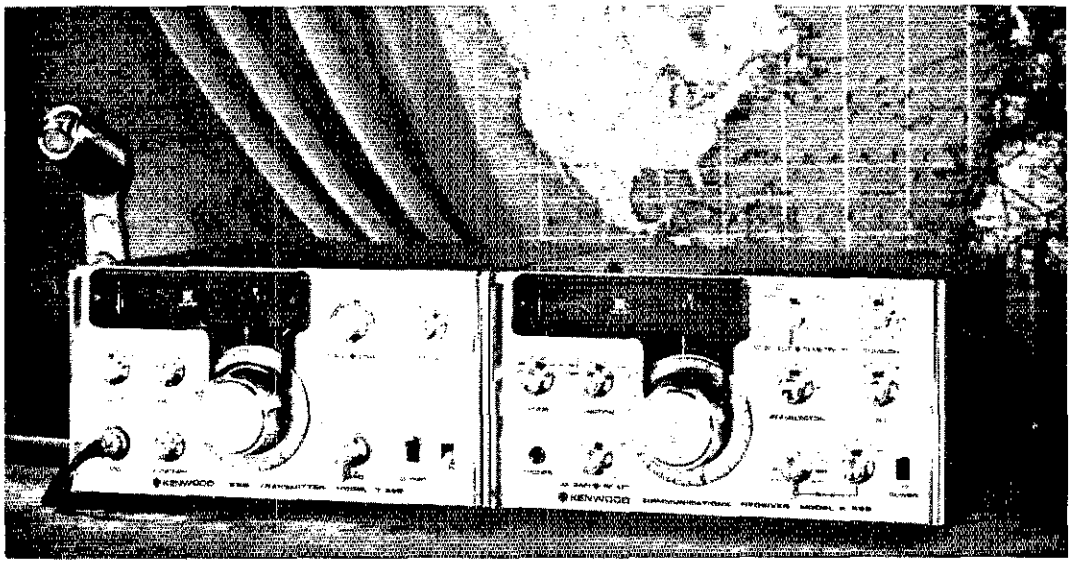


OUR COVER

W1EO's solid-state counter turned in an honor-roll performance in the last ARRL FMT. See page 15 for the details

—CONTENTS—

Once in a decade... a new equipment design to excite the amateur world



HENRY RADIO PROUDLY PRESENTS ITS KENWOOD SOLID STATE RECEIVER AND TRANSMITTER

Never before has there been an amateur receiver and transmitter like the KENWOOD R-599 solid state receiver and T-599 hybrid transmitter. The wait is over — the promise of the transistor has been fulfilled. KENWOOD sets new standards of performance, reliability, flexibility, styling, and value.

The R-599 RECEIVER: 1.8-29.7 MHz • .5 microvolt sensitivity nominal • Dial Readout to ½ kilocycle • Special detectors for SSB, AM, and FM • Transceive operation with T-599 • Built-in 100 kc and 25 kc crystal calibrator • Built-in 500 cycle CW filter • Provision for two meter and six meter coverage with optional accessory self-contained converters • Advanced "Space-Age" styling • Adjustable threshold squelch • The price . . . only $298.00

THE T-599 TRANSMITTER: Clear, stable, selectable side-band, AM and CW • 4-way VFO Flexibility plus Receiver Incremental Tuning (RIT) when used with the R-599 • Amplified ALC • Built-in VOX • Full metering, including cathode current, plate voltage, ALC and relative Power Output • Built-in CW Sidetone monitor and semi-automatic break-in CW • Built-in power supply • Maximum TVI protection • Employs only 3 vacuum tubes • The price . . . only $345.00

Deliveries start in November. Order yours today. Become the proud owner of the world's most technologically advanced amateur Receiver / Exciter combination.

S-599 Speaker . $14.50 • CC-29 2 meter converter . $29.50 • CC-69 6 meter converter . $29.50

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"

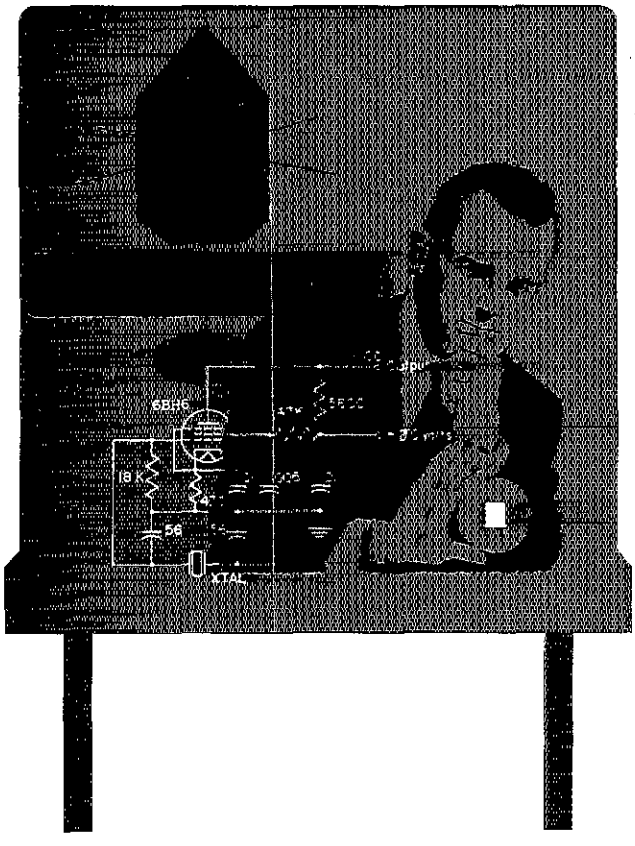
Section Communications Managers of the ARRL

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. Novices may be appointed OVS. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

		ATLANTIC DIVISION		
Delaware	K3NYG	John L. Penrod	RFD 1	Townsend 19734
Eastern Pennsylvania	W3MK	George S. Van Dyke, Jr.	4607 Convent Lane	Philadelphia 19114
Maryland-D.C.	K3LFD	John Munholland	306 Holland Rd.,	Severna Park, Md. 21146
Southern New Jersey	W2YPZ	Charles E. Travers	State Police Drive	Trenton 08625
Western New York	K2ETK	Richard M. Pitzeruse	303 Woodland Rd.	Syracuse 13219
Western Pennsylvania	W3NEM	Robert L. Gawryla	1463 N. Allen St.	State College 16801
		CENTRAL DIVISION		
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9IIQ	William C. Johnson	2838 Hillside Ave.	Indianapolis 46218
Wisconsin	W9NRP	S. M. Pokorny	R. 4, Box 179	Ft. Atkinson 53538
		DAKOTA DIVISION		
Minnesota*	W0BF	Bob Schoening	10040 Brookside Ave.	Bloomington 55431
North Dakota	W0DM	Harold L. Sheets	21 Euclid Ave.	Grand Forks 58201
South Dakota	WA0CPX	Ed Gray	P.O. Box 343	Salem 57058
		DELTA DIVISION		
Arkansas*	WA5VWH	Jimmie N. Lowrey	2818 N. Albert Pike	Fort Smith 72901
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 399	Covington 70433
Mississippi	WA5KEY	Clifton C. Comfort	310 E. Washington St.	Kosciusko 39090
Tennessee	K4RCI	Harry A. Phillips	5200 Oak Meadow Ave.	Memphis 38128
		GREAT LAKES DIVISION		
Kentucky	K4OYI	George S. Wilson, III	3113 Old Cabin Road	Owensboro 42301
Michigan*	W8ZBT	Ivory J. Olinghouse	1227 Rose Dr.	Niles 49120
Ohio	W8EIU	Richard A. Egbert	6479 Red Fox Road	Reynoldsburg 43068
		HUDSON DIVISION		
Eastern New York	K2SJN	Graham G. Berry	50 Parcot Ave.	New Rochelle 10801
N. Y. C. & Long Island	K2DGI	Fred J. Brunjes	22 Ivy Drive	Jericho, L. I. 11753
Northern New Jersey	W2ZZ	Louis J. Amoroso	180 Pleasant Ave.	Bergenfield 07621
		MIDWEST DIVISION		
Iowa	K0VVD	Al Culbert	P.O. Box 306	Charles City 50616
Kansas	K0BXE	Robert M. Summers	9045 North 72nd	Kansas City 66109
Missouri	W0BV	Robert J. Peavler	Route 4	Kirksville 63501
Nebraska	K0OAL	V. A. Cashon	334 Pine St., Box 488	Chadron 69337
		NEW ENGLAND DIVISION		
Connecticut	W1GV1	John J. McNassor	218 Berlin Ave.	Southington 06489
Eastern Massachusetts	W1ALP	Frank U. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine	K1TEV	Peter E. Sterling	39 Latham St.	So. Portland 04106
New Hampshire	K1QES	Donald Morgan	Bayview Drive, P. O. Box 65	Laconia 03246
Rhode Island	K1AAV	John L. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	K1MPN	E. Reginald Murray	5 Hillcrest Drive	Montpelier 05602
Western Massachusetts	W1BVR	Percy C. Noble	P. O. Box 5	Lanesboro, 01237
		NORTHWESTERN DIVISION		
Alaska	KL7AEQ	Albert E. Weber	Box 715	College 99735
Idaho	W7ZNN	Donald A. Crisp	1508 Alder Drive	Lewiston 83501
Montana	W7RZY	Harry A. Roylance	P.O. Box 621	Harlowton 59036
Oregon	K7WVR	Dale T. Justice	1369 N. E. Sunrise Lane	Hillsboro 97124
Washington	W7IWJ	Harry W. Lewis	10552 Sandpoint Way, N. E.	Seattle 98125
		PACIFIC DIVISION		
East Bay	WB6DHH	Paul J. Parker	2236 Whyte Park Ave.	Walnut Creek 94598
Hawaii	KH6BZF	Lee R. Wical	45-611 Luluku Rd.	Kaneohe 96744
Nevada	W7PBV	Leonard M. Norman	652 Utah St.	Boulder City 89005
Sacramento Valley	W6KYA	John F. Minke, III	6230 Rio Bonito Drive	Carmichael 95608
San Francisco	K6SRM	Kenneth S. McTaggart	484- 4th St., E.	Sonoma 95476
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno 93702
Santa Clara Valley	W6VZT	Albert E. Gaetano	115 Adobe Rd.	Los Gatos 95030
		ROANOKE DIVISION		
North Carolina	WA4UQU	Calvin M. Dempsey	1604 West Canal St	Tarboro 27886
South Carolina	WA4EFP	Mrs. Elizabeth Y. Miller	1509 Highland Ave.	Camden 29020
Virginia	K4GR	Robert J. Slagle	3515 – 25th St., N.,	Arlington 22207
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554
		ROCKY MOUNTAIN DIVISION		
Colorado	W0SIN	Charles M. Cotterell	430 South Swadley St.	Lakewood 80228
New Mexico	W5NJU	James R. Prine, D. V. M.	P.O. Box 1128	Los Alamos 87544
Utah	W7QWH	Thomas H. Miller	3148 South 3360 East	Salt Lake City 84109
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601
		SOUTHEASTERN DIVISION		
Alabama	W4WLG	Donald W. Bonner	2208 Rodgers Dr.	Huntsville 35811
Canal Zone*	KZ5DA	Edward K. Johnson	Drawer 942	Fort Clayton
Eastern Florida	W4KGJ	John F. Porter	P.O.Box 7297,Ludlam Branch	Miami 33155
Georgia	WA4WQU	A.J. Garrison	2529 Blueberry Dr.	Augusta 30906
West Indies	KP4CO	Jose Medina-Hernandez	Box 1480	Mayaguez, P. R. 00709
Western Florida	W4RKH	Frank M. Butler, Jr.	323 Elliott Rd., S. E.	Fort Walton Beach 32548
		SOUTHWESTERN DIVISION		
Arizona	W7CAF	Gary M. Hamman	2813 E. Campbell Ave.	Phoenix 85016
Los Angeles	WA6KZI	Harvey O. D. Hetland	2008 Cedar St.	Alhambra 91801
Orange	W6MNY	Jerry L. VerDuft	6372 Cymbal St.	Yorba Linda 92686
San Diego	WA6COE	Richard E. Leffler	5119 Manchester Rd.	San Diego 92115
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court	Thousand Oaks 91360
		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	W5AIR	G. D. Jerry Sears	5634 Eskridge St.	Houston 77023
		CANADIAN DIVISION		
Alberta	VE6FK	Don Sutherland	444-25th Ave., N. E.	Calgary, Alta.
British Columbia	VE7IB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4EI	Keith Witney	1228 Valour Rd.	Winnipeg 17
Maritime	VE1NR	William J. Gillis	Shediac Road, RR 6	Moncton, N. B.
Ontario	VE3DV	Holland H. Shepherd	3016 Cowan Cres.	Ottawa 10
Quebec	VE2ATE	Joe Unsworth	163 Mgr. Bourget	Vaudreuil, P.Q.
Saskatchewan	VE5HP	Gordon C. Pearce	1910 Connaught St.	Regina

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

There Is a Difference In Quartz Crystals



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

WRITE FOR CATALOG

INTERNATIONAL

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

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not 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, W9TSN, 1952–1962
HERBERT HOOVER, JR., W6ZH, 1962–1968

Officers

President . . . . . ROBERT W. DENNISTON,* WØDX
First Vice-President . . . . CHARLES G. COMPTON,* WØBUO
Vice-Presidents . . . . . ROEMER G. BEST, W5GKF
CARL L. SMITH, WØBWJ
Secretary . . . . . JOHN HUNTOON, W1LVQ
Treasurer . . . . . DAVID H. HOUGHTON

* * * * *

Honorary Vice-Presidents . . WAYLAND M. GROVES, W5NW
FRANCIS E. HANDY, W1BDI
GILBERT L. CROSSLEY, W3YA

* * * * *

General Manager . . . . . JOHN HUNTOON,* W1LVQ
Communications Manager . . . . . GEORGE HART, W1NJM
Technical Consultant . . . . . GEORGE GRAMMER, W1DF
Assistant General Manager . . RICHARD L. BALDWIN, W1IKE
Assistant Secretaries . . . . . PERRY F. WILLIAMS, W1UED
WM. I. DUNKERLEY, JR, WA2INB
225 Main St., Newington, Connecticut 06111

* * * * *

General Counsel . . . . . ROBERT M. BOOTH, JR., W3FS
1150 Connecticut Avenue, N. W., Washington, D. C. 20036
Associate Counsel . . . . . ARTHUR K. MEEN, Q.C., VE3RX
Suite 2219, 44 King St. West, Toronto 1, Ontario

DIRECTORS

Canada

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

Atlantic Division

HARRY A. McCONAGHY, ... W3EPC
8708 Fenway Dr., Potomac 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, Ill. 60629
Vice-Director: Edmond A. Metzger W9PRN
1520 South Fourth St., Springfield, Illinois 62703

Dakota Division

LARRY J. SHIMA . . . . . WØPAN
11417 Goodrich Rd. S., Bloomington, Minn. 55431
Vice Director:

Delta Division

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

Great Lakes Division

ALBAN A. MICHEL W8WC
359 Bonham Rd., Cincinnati, Ohio 45215
Vice Director: Curtin L. Skutt, . . . W8FSZ/K8EPT
119 N. Foster St., Lansing, Mich. 48912

Hudson Division

HARRY J. DANNALS* W2TUK
16 Arbor Lane, Dix Hills, N.Y. 11746
Vice Director: Stan Zak K2SJO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

SUMNER H. FOSTER . . . . . WØGQ
2110 Goblin's Gully Dr., S.E., Cedar Rapids, Iowa 52403
Vice-Director: Ralph V. Anderson . . . . . KØNL
528 Montana Ave., Holton, Kansas 66436

New England Division

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

Northwestern Division

ROBERT B. THURSTON* W7PGY
7700 31st Ave., N.E., Seattle, Wash. 98115
Vice-Director: David O. Bennett W7QLE
Box 455, St. Helens, Ore. 97051

Pacific Division

J. A. DOC GMELIN W6ZRJ
10835 Willowbrook Way, Cupertino, Calif. 95014
Vice-Director: Hugh Cassidy WA6AUD
77 Coleman Dr., San Rafael, Calif. 94901

Roanoke Division

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

Rocky Mountain Division

CARL L. SMITH . . . . . WØBWJ
1070 Locust St., Denver, Colo. 80220
Vice-Director: Thomas G. Banks W5HJ
3708 Anderson Ave., SE, Albuquerque, NM 87108

Southeastern Division

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

Southwestern Division

JOHN R. GRIGGS W6KW
8122-B Opal Circle, Huntington Beach, California 92647
Vice-Director: Arnold Dahlman W6UEI
14940 Hartland St., Van Nuys, Calif. 91405

West Gulf Division

ROY L. ALBRIGHT W5EYB
107 Rosemary, San Antonio, Texas 78209
Vice-Director: Lester L. Harbin W5BNG
4515 Calmont, Fort Worth, Texas 76107

* Member Executive Committee

"It Seems to Us..."

WE'VE GOT PROBLEMS

SEVERAL RECENT interpretations of the amateur rules, expressed by FCC in letters responding to amateur inquiries, appear to upset long-accepted views toward permissible activities in the Amateur Radio Service. At the very least, they suggest that a number of projects which we amateurs have undertaken in the public interest for years and years are actually in violation of the Rules Governing Amateur Service! This presents a serious and basic problem for every amateur – and especially for our League as national spokesman.

In one such letter, FCC says:

"Section 97.39 provides that an amateur station license may not be issued to nor for the use of any organization except a bona fide amateur radio organization. This section prohibits the use of any amateur station on behalf of a non-eligible organization and expresses the concept of an amateur radio organization as one that conducts non-profit, non-commercial hobby-type activities. Further, the rule applies to any amateur station transmitting a message on behalf of a non-amateur organization regardless of whether the particular station originated the message or is relaying the message from another amateur station . . . "

Taken literally, this "ruling" pulls the rug out from under many facets of organized amateur radio public service communications. It in effect says that we may no longer handle communications for sports car races, election reporting, March-of-Dimes "telethons," parade coordination, and the like. The American National Red Cross is not an amateur organization; therefore (aside from *bona fide* emergency) we cannot handle a message in their behalf, even as practice or drills. The Eye Bank operation is illegal (FCC has specifically said so!); then so must be the Post Office, missionary, weather and similar nets. Any amateur installation at a fair, hobby show, etc. (unless perhaps one where no admission is charged) would seem to be equally in "violation." The Boy Scouts of America is not an amateur organization; so Jamboree and similar special stations are nixed. And so on and on. *If, that is, we accept what appears to be the Commission's current position.*

The quoted excerpt is not a rule, but an interpretation. It is how the Commission's present staff believes the cited rule should be applied. To our knowledge, except for the past year or so, no such interpretation of the rule (current version adopted in 1937) has ever previously emanated from FCC. Over several decades hundreds of pages have appeared in *QST*, proudly reporting numerous amateur accomplishments in the fields under discussion – similarly in other magazines (ham or public) and newspapers. (Even an FCC Chairman not long ago publicly praised the Eye Bank net!). Can it be argued FCC was looking the other way all these years? Maybe, since the Washington *Star* quoted one official as blaming amateurs for having asked the question: " . . it would be better if they didn't . . "[1]

But we believe no such dodge is necessary to justify the position of amateurs under the present rules, nor do we believe there is any need for seeking amendment (as has been suggested). It seems to us ridiculous, shameful and self-incriminating (aside from being totally unnecessary!) for the League so to petition. We would be admitting having urged and abetted flagrant violation of the rules for decades. For its part, FCC consideration of such a petition would be admitting failure (or unwillingness) to enforce its own rules over a similar period.

The late Paul M. Segal, ex-3EEA, former ARRL General Counsel (and – please note – for a while an assistant counsel with the old Federal Radio Commission itself) published a treatise on amateur message-handling, the conclusion of which read:

> *An amateur operator, at an amateur radio station, may, under the law, accept for transmission, transit, relay or delivery a message of any kind of text, importance or source so long as no money or other valuable consideration is directly or indirectly paid or promised him or charged or accepted by him.*

We believe this is as accurate, as concise and as appropriate a definition as it was when first written, and should remain a basic principle. But meanwhile, we have problems. As this is written, League officials are shortly to meet to discuss an appropriate course of action. We hope that every member – indeed, every amateur – will support the ARRL position to remedy this unfortunate situation.

QST

1 A philosophy thoroughly expounded in "Don't Ask FCC," a September 1948 *QST* editorial.

League Lines . . .

ARRL VP WØBUO asks us to remind Conditionals that they can voluntarily take the examination for General (or higher) Class without risking loss of license if they fail. That's a fair-enough deal. (But it is a different matter if a Conditional is called in by FCC on the basis of a complaint, or suspicion.)

WB2DLF raises the question of insurance on amateur equipment. Our expert tells us there is some protection under the usual homeowner's policies, but in at least four varieties, with varying coverage for "personal effects," especially when these are off the principal property. Complications, too, when the equipment cost approaches that of the major household items. His advice: secure a "floater" listing your gear item by item with stated values; the cost is usually quite modest.

November SS rules changes, adopted on recommendation of the Contest Advisory Committee: elimination of power multiplier, but high- and low-power category listings instead; no message credit; reduction to 15 minutes in time-outs; suggested operating frequencies. See page 58.

Swan Electronics brought out a new piece of gear, the 1011, combining CB and amateur 10-meter capabilities, primarily to promote more CB interest in moving up to ham levels. Howls from amateurs indicated concern over temptation for 10-meter bootlegging (hard to justify, in our opinion; anyone can walk in off the street and buy transmitting gear) whereupon Swan, in what we think was a most cooperative gesture, decided to discontinue the product.

For improved local public relations K8UZ recommends that ham clubs contact service clubs (Kiwanis, Rotary, Lions, etc.) to offer a ham program. He finds an impressive set-up is the ARRL film plus an actual QSO demonstration. Before date commitment, however, make sure you can get a print of the film; Modern Talking Picture Service, our distributor, has offices in about 30 larger cities. Ask Hq. for a list if you can't make contact nearby.

Frustrated at problems in obtaining parts for that gear you've been planning to build? Join the club, but cast your eyes on the next page for some suggestions to help solve the dilemma.

W1AW, in response to wishes of users of the service, will send official bulletins, on cw and RTTY, on the following schedule starting with the switch back to standard time in late October: Tuesdays and Thursdays at 2130Z on cw, and Thursdays at 2230Z on RTTY. In addition to some 18 wpm code practice, this new schedule will make "hot" news available to amateurs worldwide at a somewhat more convenient hour. (Well, more convenient in some parts of the world!).

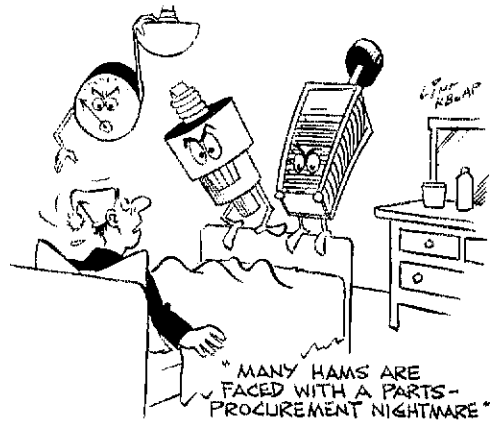
Saying candidates for top amateur grade should possess more than minimum acceptable level of competency, FCC has rejected a petition to drop 20 wpm from the Extra exam.

K1DIR and PI2VD (cw) plus W6RR and KP4AST (voice) as top scorers in the ARRL DX fray will receive commemorative certificates from the English-Speaking Union, this year celebrating its 50th anniversary of promoting worldwide unity and understanding.

Understatement of the month (W2NSD in 73 Magazine): "The ARRL, for all of the good things that it is doing, is not yet perfect." Amen.

The Ham Builder's Nightmare

Or, "Where To Get Those Small Parts?"



BY DOUG DEMAW,* W1CER

A WELL-KNOWN radio personality from the days of yore was prone to say, "Tain't funny, McGee." Aptly, this timeworn cliche relates to the matter of obtaining small components for those construction projects found in the pages of *QST* and other amateur publications. The technical staffers at League headquarters have spent many a sleepless night pondering this problem, only to toss and turn in nocturnal restlessness as visions of meters, tubes, and inductors danced through their hair. Regretfully, the parts procurement situation seems to be going from bad to worse, feeding fuel to the fires of frustration which contribute to the counting of sheep . . . or sine waves.

Some *QST* readers have even accused the ARRL staff of plotting (with a generous spicing of guile) when specifying certain components in an article. Some offered that the parts indicated did not exist at all, or were stashed away in some remote corner of the world where they could not be easily acquired. Happily, that kind of spurious output is without basis, and is far from being true. But, nonetheless, a critical situation does exist, and the ARRL staff is becoming as vexed as are you readers and builders. But, this is no reason to retire that battered old soldering iron and turn to golf or Canasta for a pastime. Parts are still available, but one must learn how and where to find them!

This writer had a few sleepless nights, as did other members of the technical staff, and concluded that it might be worth conducting a poll of the larger supply houses to determine what the present situation is, and what the immediate future holds in store for those amateurs who still prefer to build their own equipment and accessories. The poll was carried out, and the results were encouraging. The chart at the end of this article suggests sources for those needed "goodies," what the minimum billing is for each supply house listed, whether or not a catalog is available, and whether the supplier plans to remain in the small component business.

*Technical Editor

What Part to Use?

It is important that the workshop denizen realize the flexibility that exists when substituting for a given component found in the parts list of an article. Unless the constructor is attempting to make a "carbon copy" of what he sees in the book or magazine, he need not use identical parts. If the circuit calls for, say, a 100-pF miniature variable, and a 140-pF unit happens to be handy, don't be afraid to install it. The worst that can happen is a resultant tuning range in a receiver or transmitter that is somewhat greater than would be possible with the 100-pF capacitor. And if you find that prospect to your displeasure, why not take the long-nose pliers and pull a few plates from the capacitor and bring it down to size? Similarly, a wirewound control can be used in place of a carbon control in many instances, or a mica capacitor can be substituted for a Mylar or tubular paper type. Frequently, a silver-mica capacitor will work as well as (or better than) a disk ceramic. Don't be afraid to make substitutions. After all, the ham operator has long been known as an inveterate experimenter, and that's really the basis of the game. So, if the scrap-parts cache is capable of yielding an item that can be used – even if its size and shape differs from the one shown in *QST* – give it a try.

The Surplus Market

Complaints are received not only about the scarcity of small parts, but with regard to the relatively high cost of many small components. Though the ARRL staff tries to choose the least-expensive route when selecting parts for a project to be published, it is often impossible to come up with a bill of wares that amounts to less $$ than that required to buy a comparable piece of kit or manufactured gear. The manufacturer buys in quantity lots, thus getting his components for considerably less cash outlay than is possible for the single-lot purchaser. This is a fact that all of us must live with if we are to continue to "learn by doing," – and, generally speaking, isn't that really the name of the game?

We can take the edge off the high cost of building by taking advantage of the surplus market.

Some hams seem to have either forgotten about the usefulness and low cost of surplus, or perhaps came into the amateur service too late to realize that such an option is open to them. Admittedly, the larger pieces of WW-II radio equipment would make better boat anchors than ham gear, but many of these portable monsters contain useful meters, switches, panel lamps, variable capacitors, rf chokes, and the like, and such parts can help to build up the workshop larder for present or future projects. And, of course, there are numerous pieces of war surplus that *aren't* so hideous. Much of the airborne equipment that can still be garnered contains a proliferation of glass capacitors, silver micas, miniature variables, and top-rate slug-tuned coil forms (to say nothing of the myriad of small hardware, wire, and nuts and bolts). The writer and some of his ham friends in Michigan once took monumental pride in attempting to build ham equipment without buying a single new part. That kind of competition resulted in much foraging at the surplus stores, and plenty of scrounging from ham friends, but it provided great satisfaction, while safeguarding the family budget.

Of course, surplus is not limited to war materials. There is an abundance of commercial civilian surplus being advertised in magazines these days. For example, IBM and other brands of computer boards are available in copious quantities now, and these boards are laden with state-of-the-art components. Many computer cards contain high-speed switching diodes and transistors (good for hf, vhf, and uhf work), encapsulated rf chokes, 1/4-watt 5-percent resistors, dipped silver-mica capacitors, "trim pots," and glass capacitors. Quite a number of the boards have low-voltage electrolytic capacitors on them, and these are excellent for use in solid-state projects. The 1/4-watt resistors are fine for most transistor equipment that operates at low power level. *QST* projects generally call for 1/2-watt resistors, but this is because the 1/2-watters are less expensive than the smaller units. Don't fail to scan the surplus ads in the ham publications. Computer boards are a real bargain!

Additional Sources

Though the following may seem like a "twice-told tale" don't overlook the value of old TV sets and radios. These junkers are almost always available from some local TV-radio shop, and it is not unusual to have the dealer give you a car load of these "dogs" just to clear out his back room. They're loaded with small parts that are excellent for ham projects. Similarly, many medium- and high-power transmitting tubes can be gotten from nearby commercial stations . . . free! Because most stations carry out a preventive-maintenance program they pull out tubes that still have many hours of use remaining, especially in ICAS service such as is common to amateur operation. Of course we don't recommend that anyone pester the poor broadcaster, but a letter to the chief engineer can often do the trick.

The local junk-car dealer can often provide some useful items, too. Old car radios can be bought at low cost. Most of them are laden with small parts that can be used for experimenting, or the entire radio might be used as the i-f section of a homemade ham receiver (with suitable modifications). If the car has really been crumpled up in good style, chances are that the radio is no longer serviceable. This being the case, some dealers will sell you a basketfull of them for a few cents a pound. The writer has had good luck in getting cast-off radios and TVs from the city dumps of some towns he has lived in. If you don't mind poking around in the rubble, it might be worth making a junket to the dump in your town.

The Import Market

Some of the larger suppliers of electronics parts rely on the foreign manufacturers for their stock of components. Several dealer firms carry a rather complete stock of items for experimenters. The foreign manufacturer has greatly improved the quality of his wares in recent years, and offers parts that are quite suitable for amateur equipment. So be sure to do at least part of your shopping at the import racks of the store in your area. The cost of imported components is often less than for comparable parts made in the USA.

Arm Yourself with Catalogs

Much of the mail answered by the ARRL technical staff deals with matter of recommending a supply house for one item or another. Many readers attempt to buy everything called out on the parts list from the dealers in their home town. This is certainly the most desirable source, when available. But many of the local wholesale stores – *the small dealers at least* – are geared primarily for service to the TV and radio repair business; they cannot be expected to invest their capital in slow-moving inventory items such as transmitting-type variable capacitors, 3-1000Z tubes, and other expensive parts. When it comes to stocking a wide assortment of semiconductors the same philosophy is followed. Since there are literally thousands of transistors, ICs, and diodes being manufactured, and each with different numbering and characteristics, the small dealer can afford to stock only those types that are in demand for TV and radio repair. So when ordering specialty parts it may be prudent to look toward a more practical horizon – the mail-order houses. Call on such firms for those

items that aren't available locally. Each company has its own catalog which lists everything from screws to transmitting tubes. No ham library is complete without a full set of electronics catalogs. If you can't find what you're searching for in one supplier's listing, try another. More often than not you'll come up with what you need by ordering it from the large commercial-market mail-order houses. Also, some of the big catalogs serve as excellent reference files for learning the characteristics and ratings of the many solid-state devices available. In fact, the ARRL staff relies on these large supply houses for much of the material listed in the construction sections of our publications.

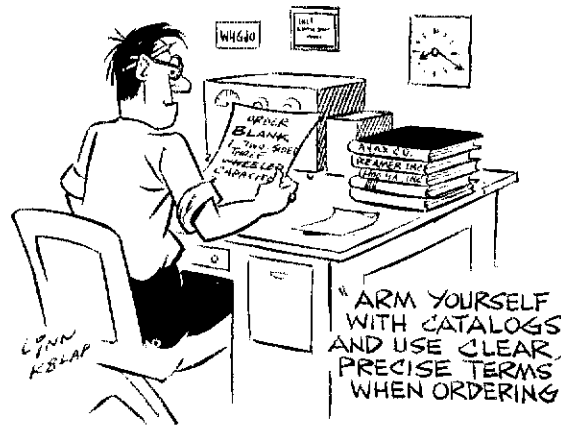
It should be mentioned that many hard-to-get components can be obtained by going to the company distributor in your area. The Yellow Pages of your telephone directory will list the address and phone number of the dealer. For example, many of the semiconductors used in ARRL projects are made by Motorola or RCA. Motorola has its own outlets in many areas, and it is possible to buy the Motorola item you need from that source. If the particular device is not in stock, the dealer can order it for you. We have good luck obtaining certain RCA transistors from the local service agency in our region. The same rule applies when seeking a supplier of plastic materials, aluminum tubing and sheeting, and magnet wire. The Yellow Pages provide the clew needed!

Other Sources of Supply

There are a number of unique items that can be purchased locally for use in home-builder projects. Most towns have at least one hardware or variety discount store. These stores offer a wide assortment of housewares, many of which can be used as chassis. Aluminum cookie sheets are made of medium-gauge stock, are inexpensive, and lend themselves nicely to the making of panels, brackets, and chassis. Similarly, some cake and bread tins are suitable as chassis.

The office-supply department of hardware and discount stores generally has a wide assortment of file boxes and similar enclosures that serve well as equipment cases, and the price is often lower than that for a cabinet of comparable size, which was manufactured especially for the electronics market! Have you ever considered building a portable station in a lunch bucket? It isn't a bad idea!

Antenna materials can usually be purchased locally. The discount and hardware stores carry electrical supplies which are well suited to ham antenna applications. For example, stranded or single-conductor house wiring (usually covered with vinyl-plastic insulation) is available in sizes 14, 12, or 10. This wire is excellent for making dipoles and end-fed wires, and the insulation helps prevent the copper from corroding – a bonus feature. Electric-fence wire is suitable for antenna work, too, and a large roll isn't too costly. These same stores sell insulators and cable clamps which can be used in antenna systems. TV guy wire (aluminum or galvanized iron) should not be overlooked as an inexpensive conductor for antenna systems. Furthermore, many stores sell aluminum tubing for hobbyists and do-it-yourself artists. The vhf man should be aware of the usefulness of this material when it comes to building antennas.



Be sure to take advantage of the swap-shop sessions and flea markets at hamfests, club meetings, and conventions. The best bargains of a lifetime are often found at such affairs. Don't be afraid to do a bit of haggling on the price, for "dickering" is half the fun when purchasing the other fellow's goods.

Some Other Thoughts

It has been suggested that the ARRL provide kits of parts for *QST* and *Handbook* projects. Well, the proposition has been given plenty of thought in recent years, but at least so far the complications make it impractical. We recall also that one magazine publisher tried this for his own articles and discontinued the practice when the experiment apparently failed.

The radio amateur has long been known for his ingenuity and energy. Though the trend in recent years seems to be a lessening of interest in experimenting and building, the spark is still there. The advent of semiconductors has helped to re-kindle that spark, offering a new field in which to experiment. The kit-oriented amateur has recently shown an interest in building *QST* projects that offered circuit-board patterns or prefabricated boards, and this is indeed an encouraging sign. The present fly in the ointment is the matter of parts availability, and we're working toward a practical solution to the problem . . . if, indeed, a solution exists.

Recent efforts to persuade some manufacturers to sell factory-direct in single-lot quantities has met with moderate success. To date, James Millen Co., Hammarlund Mfg. Co., and J.W. Miller Company will sell to amateurs on this basis if the desired small part cannot be obtained from a local authorized distributor. It is suggested that the reader write to these companies and request a catalog and price list before ordering merchandise. Meanwhile, we are hoping to hear from other manufacturers having the amateur interest at heart and willing to set up a similar "*modus operandi.*"

TABLE I

DEALER	*ADDRESS*	*CODE*	*CATALOG*	*MINIMUM BILLING*
Allied Radio Shack	100 N. Western Ave. Chicago, ILL 60680	B, F, G	Free to Reg. Cust. $1. to New Cust.	$5, plus $1 handling on orders under $10.
Allied Electronics	100 N. Western Ave. Chicago, ILL 60680	A, B, G	Free to Reg. Cust. $2 to New Cust.	$5, plus $1 handling on orders under $10.
Amidon Associates	12033 Otsego St. N. Hollywood,CA 91607	C (Toroids, Rods, PC Kits.)	Brochures and price list free.	$3 minimum.
Amateur Electronic Supply	4828 W. Fon Du Lac Ave. Milwaukee, Wis. 53216	B, F	Free	None
Arrow Electronic Supply	900 Rte. 110 Farmingdale, NY 11735	A, B, G	Free	$5. 10% Down, or cash w/order.
Barry Electronics	512 Broadway, NY,NY 10012	B, E, F, G	10 cents	$5.
Burstein-Applebee	3199 Mercier St. Kansas City, Mo. 64111	A, B, E, G	Free	No reply to ARRL poll.
Harrison Radio	8 Barclay St., NY., NY 10007	A, B, G	None	Handling fee of $1 on orders under $10.
Harvey Radio Co., Inc.	2 W. 45th St., NY., NY 10036	A, B, G	None	$5.
Henry Radio	11240 W. Olympic Blvd., Los Angeles, CA 90064	A, B, G	None	None
Lafayette Radio Electronics	111 Jericho Tpk., Syosset, Long Island, NY 11791	A, B, G	Free	50 cent handling on orders under $5.
J. W. Miller Co.	19070 Reyes Ave., Compton, CA 90221	A, C, D	Free	None
Newark Electronics	*500 N. Pulaski Rd., Chicago, ILL 60624*	A, B, G	*May be free.*	*No Reply to ARRL poll.*
Poly Paks	P.O. Box 942M, Lynnfield, MA 01940	C, E, F (Semiconductors)	10 cents	None
Radio Shack Corp. (Tandy Corp.)	730 Commonwealth Ave. Boston, MA 02215	B, E, F, G	Free	No reply to ARRL poll.
Stafford Electronics Corp.	427 S. Benbow Rd., Greensboro, NC	C PC Boards for *QST* Projects & PC materials.	Brochure and price list.	None
World Radio Labs.	3514 W. Broadway, Council Bluffs, IA 51501	B, F, G	Free	50 cents on orders under $5.

This table shows the status of major mail-order distributors recently polled by the ARRL. The code is: (A) Industrial parts, (B) CB and Hi-Fi, (C) Specialty parts, (D) Manufacturer direct sales, (E) Surplus, (F) Limited number of small parts, (G) Ham and/or commercial communications receivers, transmitters, or accessories.

Final Comments

Table I should be useful to the amateur who wishes to build his own equipment. Some suppliers didn't respond to the poll, but are included in the list from separate knowledge. We regret not having complete information about those small-parts dealers, but the information that we are able to give should be helpful. We can have a "Feedback" item later on any we've missed.

In closing we would like to pass along some excellent recommendations given us by Bil Harrison, W2AVA. These suggestions apply to orders placed with any distributor, and if his advice is followed a great *many hardships and frustrations* can be avoided.

1) When ordering by mail, list at least three equivalents you will accept should the part you requested be out of stock.

2) To reduce delay and errors, orders should be legible and have one item per line given — quantity, item, make and stock number, possible equivalents, approximate unit cost, extensions, and total fee for the order.

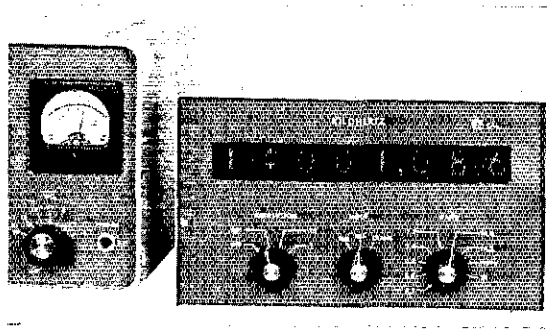
3) Full remittance should accompany order, with ample allowance for transportation, any price increases, and a share-the-handling cost allowance of $1 for orders under $10.

4) The most efficient form of remittance is an open check, marked "Good for up to . . . dollars." When the full total is known the dealer will enter on the check the exact amount, thus saving accounting expense on small parts orders.

5) Needless to say, each order should be made as large as possible. (The high handling expense

(Continued on page 45)

A Frequency Counter for the Amateur Station



Dimensions of the counter cabinet are 9 1/2 x 5 1/4 x 7 1/2 inches. The instrument is connected to the station transmitter and receiver through a total of seven RG-58/U coaxial cables.

BY KENNETH MACLEISH,* W1EO/7

A GROWING NUMBER of radio amateurs are becoming aware of the convenience and accuracy of the digital counter as a frequency-measuring device, and several relatively low-cost counters of the home-brew variety have recently been described.[1-4] A few fortunate amateurs have inherited or otherwise obtained commercial laboratory-type counters and have turned them to amateur uses.

Expensive as they are, currently available laboratory-type counters lack some specialized features that would enhance their usefulness in the amateur station, while incorporating other features that few amateurs would find useful. This article describes a homemade frequency counter which, while not inexpensive, caters specifically to everyday amateur operating needs. If you already own a conventional frequency counter, the features described herein can be added to it inexpensively, and they may give you a lot more mileage from your instrument.

A counter having these special features will, among other things, continuously and automatically perform any of the following functions:

1) On cw, monitor the transmitter frequency under both key-down and key-up conditions.

2) During ssb transmission, monitor the suppressed carrier frequency.

3) During ssb reception, read the frequency of the other station's suppressed carrier, assuming the receiver is properly tuned to the signal.

4) Read directly the frequency of an incoming cw signal without zero-beating or special tuning.

The circuits to be described are designed to go with the frequency-mixing scheme of the Collins S/Line transmitter and receiver; however, the principles used are applicable to most amateur transmitters, receivers, and transceivers.

*740 East Chula Vista Road, Tucson, AR 85718.

1 Skeen, "Low-Cost Precision Frequency Measurement," *QST*, January, 1965.

2 Hall, "Binary-Decimal Counter Readout," Technical Correspondence, *QST*, April, 1968.

3 Simmons, "Digital Counter with Teletype Print-Out," *QST*, August, 1968.

4 Grillo, "A Frequency Counter with Binary-Coded Decimal Readout," *QST*, August, 1969.

Frequency Range and Resolution

As can be seen in the front-view photograph, the frequency in kHz is displayed on eight decimal-readout tubes similar to the well-known Burroughs Corp. "Nixie" tubes. The location of the decimal point is shown by a small neon bulb. The instrument covers the amateur bands from 3.5 to 21.45 MHz in 200-kHz segments corresponding to those tuned by the S/Line equipment. The desired band segment is selected by the band switch at the lower right of the panel, which also has a position for WWV at 15 MHz. (The 21-MHz band is covered by a single band switch position.)

The RESOLUTION selector switch places the decimal point one, two, or three places from the right, giving a display precision of 0.1, .01, or .001 kHz. In the .001-kHz position the displayed frequency is automatically sampled and updated every 1.2 seconds. In the .01-kHz position updating takes place every 0.12 second, and in the 0.1-kHz position the display is updated every .012 second, or about 80 times a second. This last

The author's Honor Roll performance in the ARRL FMT is adequate testimony to the exceptional accuracy of the frequency counter described in this article. The ideas offered here can be applied to commercially-built counters, or to homemade units as well. W1EO's compact, solid-state package is truly representative of the amateur radio state of the art, and this equipment should serve as a useful adjunct to the existing gear in any modern ham station.

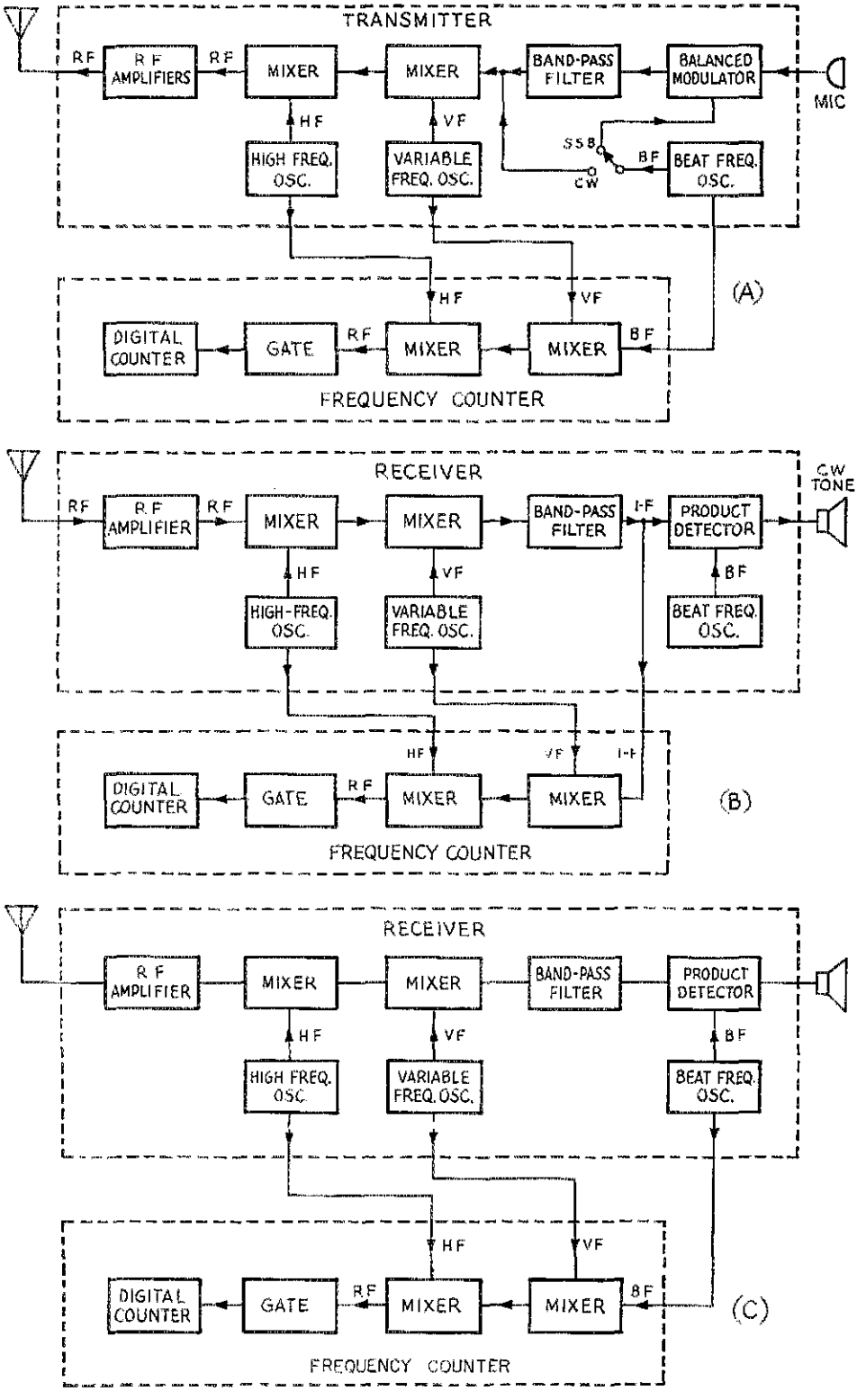


Fig. 1 — (A) Block diagram for TRANS (transmitter) mode. In this mode the counter measures the carrier frequency of the transmitter. (B) SIG (signal) mode. The counter measures the frequency of an incoming cw signal in this mode. (C) REC (receiver) mode. The counter measures the zero-beat frequency of the receiver.

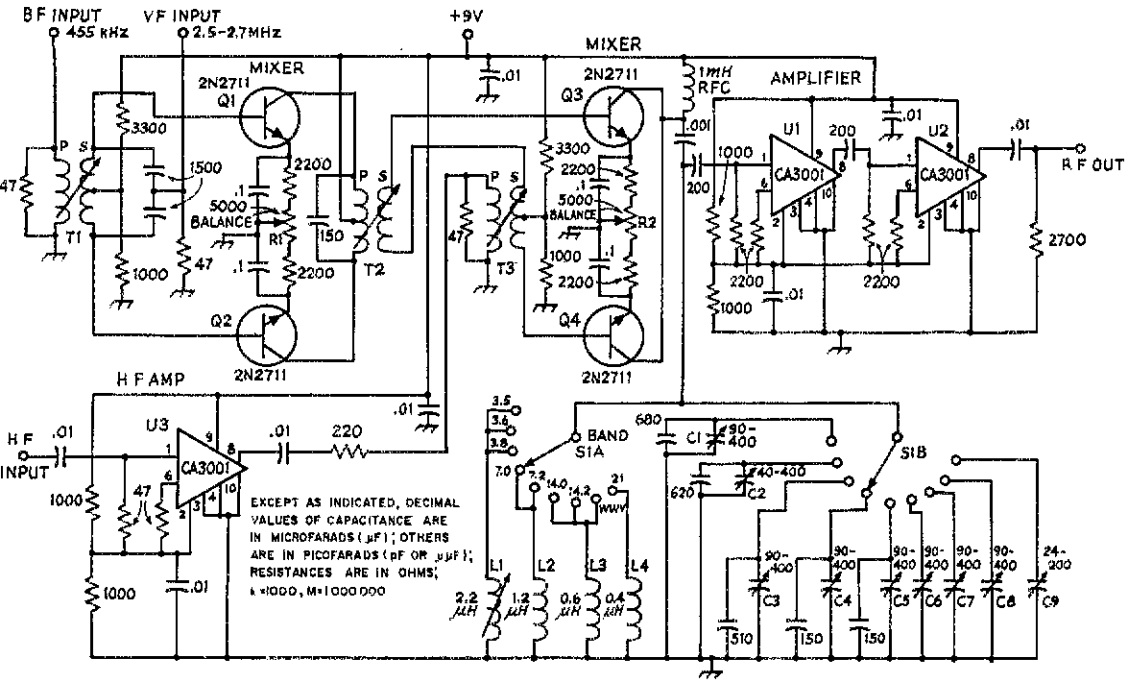


Fig. 2 — Schematic of mixer circuits. Capacitors in tuned circuits are mica; all other capacitors are disc ceramic. Resistors are 1/2 watt. Grounds shown are to the negative terminal of power supply, not to chassis. The bf, vf, and hf signals are brought in on RG-58/U coaxial cables from the input phono jacks, via the mode selector switch. Controls R1 and R2 are adjusted for minimum amplitude modulation in the rf output from the second mixer. Trimmer capacitors are adjusted for maximum rf output at the centers of corresponding frequency ranges. T1, T2, and T3 are all wound with enameled wire on J. W. Miller 41A000CBI forms, single layer per winding, except as noted.

L1-L4, incl. — Single layer of No. 24 enameled wire on J. W. Miller 4500-2 form, number of turns as required for indicated inductance. L2, L3 and L4 have the slugs removed.

T1 — Primary, 35 turns No. 30 enam. wire; secondary, 70 turns No. 32 enam. wire random wound each side of center tap.

T2 — Primary, 40 turns No. 30 enam. wire each side of center tap; secondary, 10 turns No. 30 enam. wire.

T3 — Primary, 11 turns No. 30 enam. wire; secondary, 17 turns No. 32 enam. wire each side of center tap.

R1, R2 — Linear-taper composition control.

S1 — Ceramic rotary, 2 section, 2 pole, 11 position (9 used).

position is useful for measuring the frequency of a rapidly keyed incoming cw signal; also, in this position the counter will alternately display the two frequencies of an incoming fsk signal.

Modes

The MODE switch at the lower center of the panel selects one of three operating modes designated TRANS (for transmitter), SIG (for signal), and REC (for receiver).

In the TRANS mode, the mixer circuits in the frequency counter are connected to the three oscillators in the transmitter which, in combination, determine the carrier frequency. It is important to note that these three oscillators are running continuously, whether or not a carrier is actually being transmitted. Thus in the TRANS mode the counter automatically and continously monitors the transmitter carrier frequency to the nearest Hz even while the key is up (on cw operation). This is a source of considerable comfort when operating near the band's edge!

In the SIG mode the counter circuits are connected to the receiver instead of the transmitter, and the counter responds directly to a signal from a distant station. It is fascinating to watch the counter in this mode. If no signal is audible in the receiver, the indicated frequency varies randomly within the range of the receiver passband as the instrument responds to random noise. The moment a cw carrier appears in the passband (as the receiver is tuned or when someone starts sending) the display suddenly "freezes" at the precise frequency of the incoming signal. Thus, to measure the frequency of a distant cw station the counter is switched to the 0.1-kHz resolution position and the result is obtained without missing a single letter of the transmission. Or, for a more critical appraisal, the counter is switched to .001-kHz resolution and a long dash is requested.

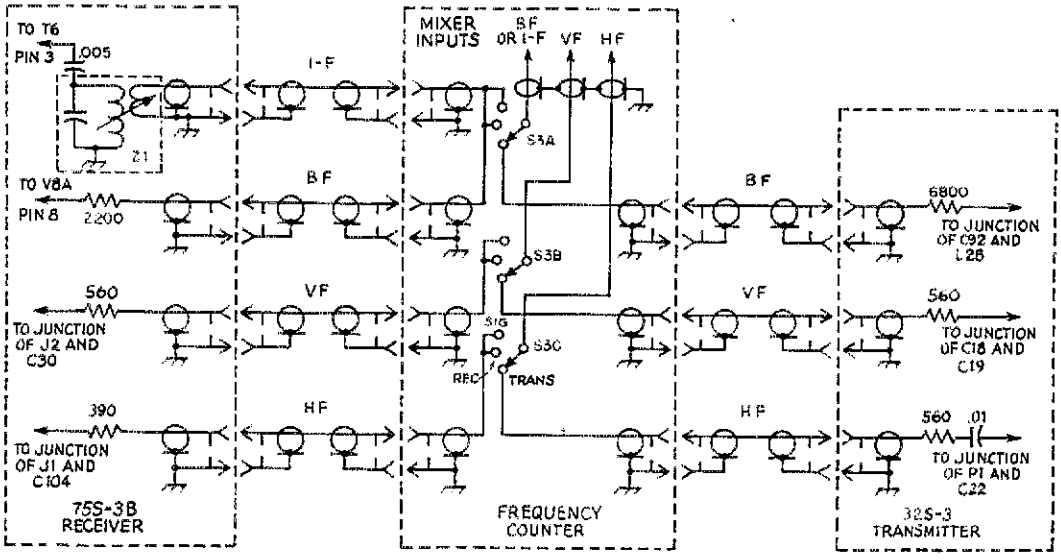


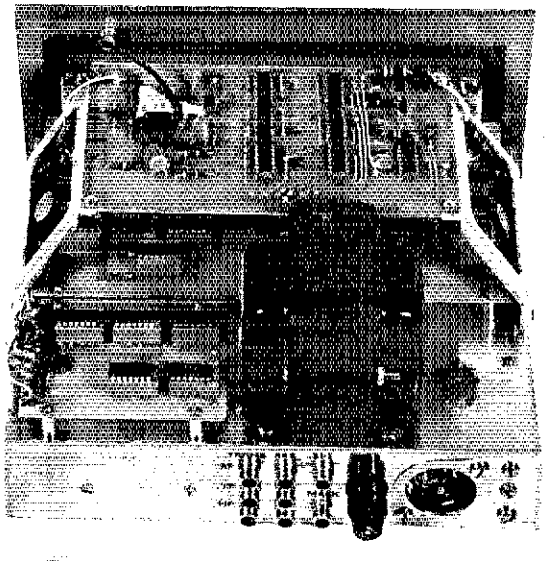
Fig. 3 — Circuits connecting the i-f, bf, vf, and hf voltages in the Collins S/Line equipment to the mixer circuits in the counter. All coaxial leads are made with RG-58/U. Capacitors are 600-volt disk ceramic. Resistors are 1/2 watt, resistance values in ohms (K = 1000). S3 is a 3 pole, 3- position miniature ceramic rotary switch. Assembly Z1 is a transformer that has a 50:1 step-down ratio and is construc ted by adding a secondary winding (5 1/2 turns of No. 32 enam. wire) between the pies of a J. W. Miller No. 6302 2.5-mH rf choke. The tuning capacitance across the primary (approximately 45 pF) is selected to resonate with the primary at 455 kHz.

The frequency can then be read directly to the nearest Hz, and any drift during the long dash can also be noted.

The SIG mode can also be used in calibrating the instrument. For this purpose the 15-MHz carrier of WWV is tuned in, using the receiver's narrow (200-Hz) i-f filter to remove the modulation sidebands. The counter should then register 15000.000 kHz. If it does not, the screwdriver CAL adjustment at the top right of the panel is changed until the reading is exact. This simple, quick procedure can easily be done once a day to insure accuracy. When the instrument is operated continuously, and the shack temperature is kept constant within a few degrees, it is seldom necessary to touch up the calibration by more than 3 Hz. Thus there is reasonable assurance that the measurement accuracy will be on the order of one part in five million, plus or minus one count.

The reaction of the counter to QRM in the SIG mode is rather interesting. If there are two signals present simultaneously in the receiver passband, it selects the stronger signal and completely ignores the weaker one. Therefore there is no difficulty in measuring a signal in the presence of interference that is weaker than the desired signal. If the QRM is stronger than the signal, it is usually possible to use the receiver's narrow i-f filter to isolate the desired signal. Noise or QRN does not seem to affect the readings until the signal is practically buried in the noise.

There remains for discussion the REC mode, which is useful in ssb transceiving and in certain cw measurements. In this mode the frequency counter is connected to the receiver, as in the SIG mode, but the connections are such that the counter reads the frequency the receiver is tuned to, regardless of whether or not any signal is present. More specifically, the counter measures the receiver zero-beat frequency.



Top view with cabinet removed. The phono jacks for the interconnecting cables are on the rear apron of the chassis.

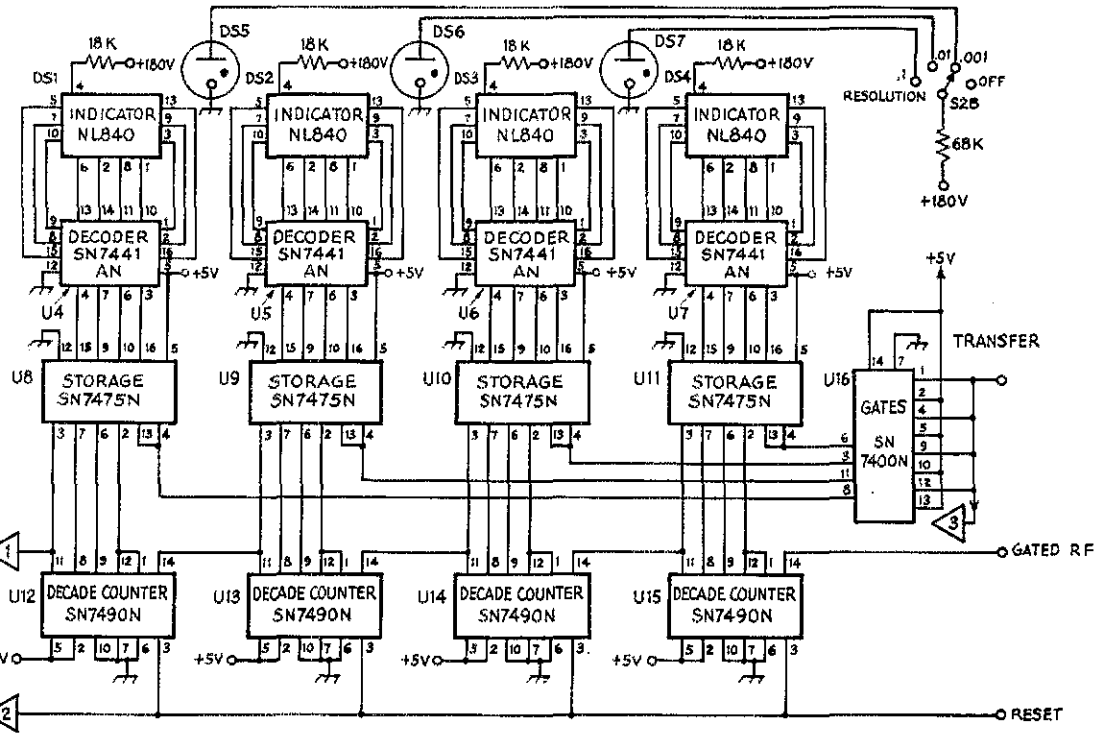


Fig. 4 — Schematic diagram for the last four digits of digital counter. The circuit for the first four digits omits the decimal points, but is otherwise identical. Grounds shown are to the negative terminal of the power supply, not to chassis. Arrows 1, 2 and 3 indicate points connected to circuit for first four digits. Resistors are 1/2 watt composition, resistance values are in ohms (K=1000).

DS1-DS4, incl. — National Electronics NL-840 indicator.

DS5-DS7 — NE-83 neon lamp.

S2 — See Fig. 4.

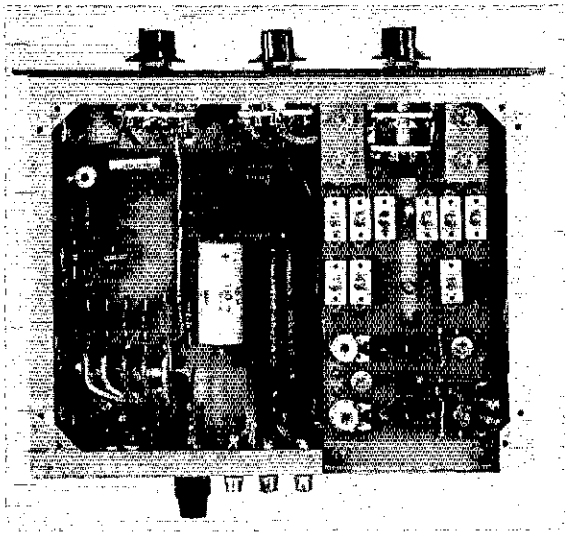
U4-U7, incl. — Texas Instruments SN7441AN BCD-to-decimal decoder/driver.

U8-U11, incl. — Texas Instruments SN7475N bistable latch.

U12-U15, incl. — Texas Instruments SN7490N decade counter.

U16 — Texas Instruments SN7400N quad 2-input NAND gate.

When a ssb signal is accurately tuned in on any receiver, the carrier frequency of that ssb signal (which in good amateur practice is not actually transmitted) is precisely at zero beat with the receiver beat-frequency oscillator. Thus in the REC mode the counter measures the suppressed-carrier frequency of an accurately tuned incoming ssb signal. Moreover, in transceive operation, the oscillators in the receiver control the carrier frequency of the transmitter; hence, during transceive operation the REC mode is also used to monitor the carrier frequency of the transmitter, even though this signal is not (it is hoped) actually being radiated.



Bottom view of the chassis. At the left are the power-supply rectifier and regulator circuits, in the center are the filter capacitors for the power supplies, and at the right is the mixer section.

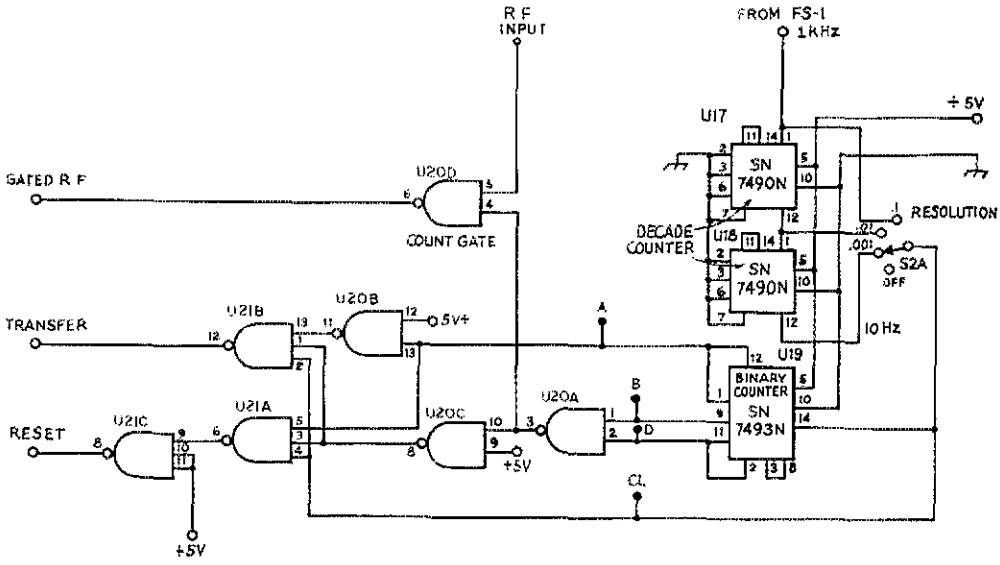


Fig. 5 — Input, transfer and reset gates. Plus 5 volts is applied to pin 14 of the SN7400N and SN7410N. Pin 7 of the same ICs are returned to the power supply negative terminal, as are all other ground connections. Typical waveforms from the test points are shown in Fig. 6.
S2 — Ceramic rotary, 1 or 2 section, 3 pole, 4 position.
U17, U18 — Texas Instruments SN7490N decade counter.
U19 — Texas Instruments SN7493N binary counter
U20 — Texas Instruments SN7400N quad 2-input NAND gate.
U21 — Texas Instruments SN7410N triple 3-input NAND gate.

The other principal use of the REC mode is to get more accurate readings on rapidly keyed incoming cw signals. In the SIG mode a rapidly keyed signal can only be measured in the 0.1-kHz resolution position; this is because the count period must be shorter than the dashes. By using the REC mode instead, one can carefully zero beat the keyed signal in the receiver and then read the counter with full 1-Hz precision. It is not possible to zero beat a keyed signal to 1 Hz by ear alone, but this operation can be carried out with the aid of an oscilloscope.

Principles of Operation

The great utility of this frequency counter results from the use of mixer circuits which operate in the same manner as those in the station transmitter and receiver. Instead of counting the unknown frequency directly, the instrument mixes three input signals to produce a radio frequency, which is counted. In the TRANS mode, the three input signals come from continuously running oscillators in the transmitter; in the SIG and REC modes, the signals come from the receiver. The three modes will be discussed separately, with reference to the block diagrams of Figs. 1A, 1B, and 1C.

Consider first the mixing scheme of the Collins 32S-3 transmitter, which is typical of that used in many amateur exciters. Referring to Fig. 1A, we see that the transmitter operates in essentially the same way on both cw and ssb. A so-called "beat frequency" (bf) signal is generated by the transmitter's beat-frequency oscillator. This frequency is additively mixed with a second frequency (vf) generated by the variable-frequency oscillator. The sum of bf and vf is subtractively mixed with a third frequency (hf) generated by the transmitter's crystal-controlled high-frequency oscillator. The output of the second mixer, when amplified, becomes the radio-frequency (rf) output of the transmitter.

As indicated in Fig. 1A, the bf, vf, and hf signals from the transmitter are fed to the frequency counter where they are mixed in the same way to produce an rf signal of the same frequency as the transmitter output. This rf signal is fed to a gate circuit which is repeatedly "opened" for precisely one second (assuming the counter is operating at .001-kHz resolution). The number of individual radio-frequency cycles that pass through the gate during this one-second interval is equal to the frequency in cycles per second or Hertz. This number is counted and displayed. The result is, of course, in kHz because three places are pointed off with the neon-lamp decimal point.

Now consider Fig. 1B, which applies to the SIG mode. The Collins 75S-3B receiver contains a high-frequency oscillator and a variable-frequency oscillator that operate on the same frequencies as the corresponding oscillators in the 32S-3 transmitter, and they are mixed in the same manner. In the receiver, however, mixing occurs in the reverse order, the rf signal frequency being converted to an intermediate frequency (i-f) having nearly the same

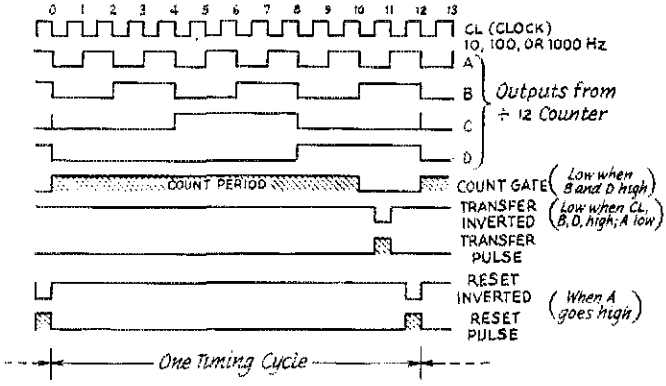


Fig. 6 — Timing diagram. The clock will run at 10 Hz (0.1 second, .001-kHz resolution), 100 Hz (.01 second, .01-kHz resolution), or 1000 Hz (.001second, 0.1-kHz resolution).

frequency as the receiver beat-frequency oscillator. In cw reception the i-f signal is heterodyned (in the product detector) against the beat-frequency signal, resulting in an audible tone. As shown in Fig. 1B, in the SIG mode the counter circuits mix the i-f and the vf signals from the receiver, then mix the result with the hf signal from the 75S-3B. This is the reverse of the conversion process in the receiver; hence the resultant rf frequency in the counter is precisely the same as the frequency of the incoming cw signal. This frequency is counted during repeated one-second intervals, with the result that the counter displays the frequency of the incoming signal. Note that the reading is not affected in the slightest by tuning the receiver, so long as the signal is not tuned out of the passband. Moreover, no manual zero-beat adjustment is required in this mode — the beat-frequency oscillator in the receiver could be disabled completely without affecting the measurement.

One might ask, "Why not dispense with all the mixing and just count the incoming rf?" The answer, of course, is that there are hundreds of signals present simultaneously in the receiving antenna, and there would beno way of isolating the desired one. The system described uses the receiver i-f bandpass filter to isolate a small chunk of the frequency spectrum. The combination of mixers in the receiver and in the counter takes in a broad spectrum of incoming signals and "pushes out" the one wanted.[5]

Finally, consider the REC mode, Fig. 1C. The only difference between this and the SIG mode is that the receiver beat-frequency oscillator is used instead of the i-f signal as one of the inputs to the first mixer in the counter. As stated before, the counter now measures the zero-beat frequency of the receiver regardless of whether or not there is an incoming signal. This is because the process described converts the receiver beat-frequency oscillator signal to an rf signal for measurement (in a manner that is the reverse of the conversion process used in the receiver). But an rf signal frequency that converts to the same frequency as the receiver beat-frequency oscillator is, by definition, the zero-beat frequency of the receiver.

[5] Carpenter, "Accuracy in Frequency Measuring Tests!?" Technical Correspondence, *QST*, September, 1969.

Mixer Circuits

The frequency counter consists of a mixer section, a digital counter, a frequency standard, a count gate, a logic section, and a power supply.

Fig. 2 shows the mixer circuits. These have been designed specifically to match the Collins S/Line equipment.[6] The circuit constants would have to be suitably altered for use with other transmitting and receiving gear.

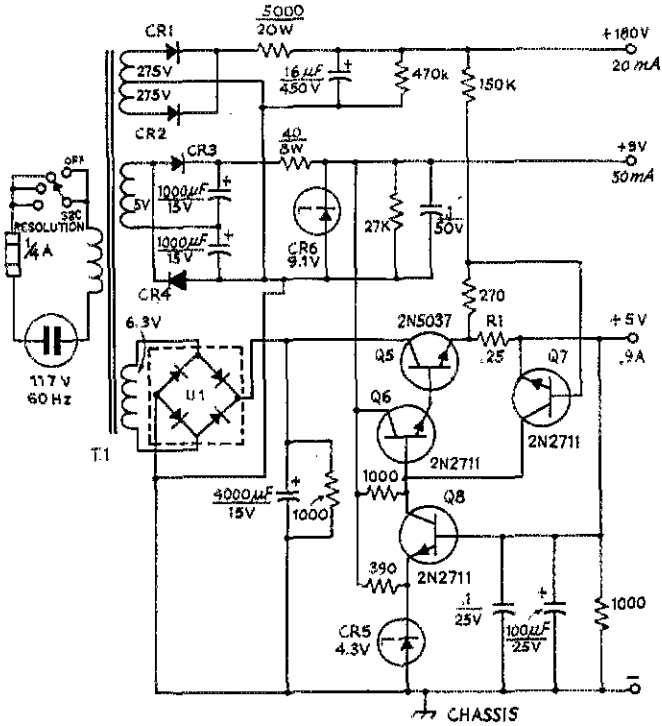
There are two balanced mixers, each using a pair of General Electric 2N2711 silicon npn transistors. The first mixer, at the upper left of Fig. 2, accepts the incoming bf (or i-f) and vf signals and generates the sum frequency in a fixed-tuned load (T2) covering the required frequency band of 2.955 to 3.155 MHz. The hf signal is brought in through a broadband rf amplifier using an RCA CA3001 linear IC. (The principal reason for including this amplifier is to combat a tendency for the output signal of the second mixer to leak back down the hf line to the receiver input and produce oscillation.) The output of this amplifier is fed through T3 to the second mixer, where it is subtractively mixed with the output of the first mixer. The resulting rf output appears at a tuned load which is band switched for frequency ranges corresponding to those of the Collins equipment. This output is passed through a limiter amplifier, using two cascaded CA3001s, which produces a square wave of uniform amplitude for the rf input to the count gate.

From here on, the signal is processed entirely by digital ICs.

Digital Counter

Only the circuit for the last four digits of the digital counter is shown in Fig. 4. The first four digits are identical except for omission of the decimal-point circuits.

[6] In the Collins S/Line, the bf is approximately 455 kHz and the vf is tunable from 2.5 to 2.7 MHz. The hf is equal to 3.155 MHz plus the frequency of the lower edge of the band segment being tuned — for example, 6.655 MHz for the 3.5 - 3.7-MHz segment and 24.555-MHz for the 21.4 - 21.6 MHz segment. The writer has not attempted to extend the mixer design in the counter to include the 28 - 30-MHz band, but the digital counter will follow a 30-MHz signal without difficulty.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); RESISTANCES ARE IN OHMS; k = 1000.

Fig. 7 — Schematic diagram of the power-supply circuits. All capacitance values are in uF. Capacitors with polarity indicated are electrolytic; all others are disk ceramic. Resistors are 1/2 watt except as indicated. The ground shown is the only circuit connection to the chassis.

CR1, CR2 — Silicon diode, 800 PRV, 1A (International Rectifier 5A8).

CR3, CR4 — Silicon diode, 400 PRV, 1A (International Rectifier 5A4-D).

CR5 — Zener 500 milliwatt, 4.3 volts (Motorola 1N5229).

CR6 — Zener16, 500 milliwatt, 9.1 volts (Motorola 1N5239)

R1 — Approximately 9 inches of No. 32 enam. wire on J.W. Miller No. 4500-2 form.

S2 — See Fig 5.

T1 — Power transformer, 120-volt primary, secondary 550 volts CT, 20 mA or more; 5 volts, 2 A; 6.3 volts, 2 A (Stancor PC8403).

U1 — Silicon bridge 1.8 A (International Rectifier 18DB4A).

Details of the connections within the Collins equipment are given in Fig. 3, which also shows the wiring of the MODE switch in the counter.

After passing through the count gate, the rf square wave to be counted (labeled "gated rf") enters at the lower right of Fig. 4 and is fed to pin 14 of a Texas Instruments SN7490N decade counter "chip." From pin 11 of this chip comes an output square wave having one-tenth the frequency of the input signal at pin 14. This output is fed to input pin 14 of a second SN7490N, and so on down the decade-counting chain.

The status of the four flip-flops in each SN7490N is registered on four output pins, numbered 11, 8, 9, and 12. Before the count period begins, a "reset" pulse entering on pin 3 places all four outputs in the low state (near zero volts). At the conclusion of the count, the four outputs contain a pattern of high and low states. If the high state (about 4 volts) represents a 1 and the low state represents a zero, the four outputs together form a 4-digit binary code that is equivalent to a decimal digit from zero to 9. The eight SN7490Ns register the eight decimal digits of the count in this binary-coded decimal form.

Nearly all the rest of Fig. 4 represents the circuits needed to store, translate, and display these digits as a continuous, unflickering decimal readout. For each digit, in addition to the SN7490N decade chip, the counter uses an SN7475N "quadruple bistable latch," an SN7441AN "decoder-driver," and a National Electronics NL-840 readout tube (equivalent to the Nixie). The following discussion refers to these components in reverse order, from top to bottom on the diagram.

The NL-840, which displays decimal digits 0.6 inch high through the window in the front panel, is a neon glow tube having a common anode (pin 4) and ten separate cathodes, one for each of the digits, zero to 9. The anode is energized from 180 volts through a ballast resistor, and one selected cathode is grounded while the rest are allowed to float.

The function of the SN7441AN is to translate from the binary-coded decimal representation produced by the decade chip, to the one-of-ten code needed by the NL-840, and to drive the selected cathode of the NL-840 to ground potential. Thus the SN7441AN has four input pins (4, 7, 6, and 3) and ten output pins.

We would now seem to have everything needed for a decimal display. What, then, does the SN7475N accomplish? Just this: it stores the previous count for display while the decade chip is busy with the current count. Note that the SN7475N has four input pins (3, 7, 6, and 2) and four output pins (15, 9, 10, and 16). During the count period the four inputs, which are connected to the four binary-coded outputs of the SN7490N, are shifting continuously at high speed as the counter progresses from zero to the final count.

But the four outputs hold steady at the previous values until, shortly after the count is finished, a "transfer" pulse is applied to pins 4 and 13. This causes the final count registered by the SN7490N decade chip to transfer across to the output pins of the SN7475N. The decade chip, after being returned to zero by the reset pulse, then proceeds with the next count. Meanwhile the readout tubes provide a steady picture of the most recent count.

The remaining IC chip in Fig. 4 is the SN7400N at the right. This is simply a set of buffer amplifiers for applying the transfer pulse to the SN7475Ns.

At this point a word about costs may be appropriate. The decade counting and display circuits described are representative of current practice for commercial laboratory-type counters. The parts involved account for a major share of the entire cost of the instrument.[7] There are less expensive ways to do the job, but at some loss in operating convenience. For example, the circuitry for the first four digits may be omitted entirely, since frequency can always be obtained to the nearest 10 kHz from the dial calibration of the receiver or transmitter, and the first four digits show only the MHz and the hundreds and tens of kHz. Also, each Nixie tube with its decoder-driver can be replaced by a less expensive circuit using ten separate lamps, plus a decoding matrix and driving transistors. Finally, the SN7475N latches can be omitted if one doesn't mind having the display blur out during each count period; but if this is done the interval between count periods should be lengthened to make the display readable.

Frequency Standard

The frequency standard is the circuit that maintains the count period at precisely the desired value. For this purpose the counter uses the FS-1 unit developed by W6FFC.[8] The circuit diagram is not shown since full information is given in the reference cited. The FS-1 employs an International Crystal AT-cut crystal operating at 4 MHz. The frequency can be adjusted to exactly 4 MHz with a glass piston trimmer which is the screwdriver CAL adjustment on the front panel of the counter. The crystal oscillator is followed by a divider chain whose final output is a 1-kHz square wave; this signal is fed to the control logic circuits.

Count Gate and Control Logic

The logic circuits (Fig. 5) open the count gate for 1 second, close the gate for the next 0.2 second, and provide the transfer pulse and the subsequent reset pulse while the gate is closed. This whole cycle repeats indefinitely and automatically. The resolution switch permits the time base to be speeded up by a factor of 10 (in the .01-kHz position) or 100 (in the 0.1-kHz position) and turns on the proper decimal point in the display. In the following description, .001-kHz resolution is assumed.

Three integrated-circuit chips are connected in a counting chain somewhat like that in the main counter. The first chip, an SN7490N, divides the 1-kHz square wave from the FS-1 frequency standard down to 100 Hz. The second SN7490N further divides the signal to 10 Hz, yielding a train of clock pulses spaced exactly one-tenth second apart. The third chip, an SN7493N, is connected as a divide-by-12 counter to provide a base period of 12 clock pulses, or 1.2 seconds. The first 10 of these 12 pulses establish the 1-second count period, while the remaining 2 give the 0.2-second period between counts.

Fig. 5 also includes seven NAND gates indicated by a rounded box with a little circle at the rounded end. (Actually, these are all contained in two chips, an SN7400N and an SN7410N.) Each of the gates has an output (the connection at the circle) and either two or three inputs. They all act alike – the output is low if and only if all the inputs are high; otherwise the output is high.

One of the NAND gates, U20D, serves as the main count gate, and the others are interconnected in various ways to form wave shapes shown in the timing diagram, Fig. 6.

Rather than go into the timing and logic-circuit diagrams in detail, we will illustrate by considering the formation of the reset pulse, which resets the counter to zero just before the start of each count period. A close study of the diagrams reveals that there is one and only one short interval during the 12-pulse timing cycle when test points A, B, D, and CL are all high at the same time. This occurrence is sensed by a combination of gates U20A, U20C, and U21A, with the result that a low signal appears at pin 6 of U21A during just this short interval. This signal is inverted in gate U21C and becomes the desired reset pulse.

Power Supplies

The digital circuits and the FS-1 frequency standard require 5 volts at a total current of 0.9 ampere. The mixers and the linear integrated circuits operate at 9 volts and 50 mA. A third voltage, 180 volts, is needed for the readout tubes and the decimal points, at a drain of 20 mA. The three power supplies operate from a common 60-Hz power transformer and are shown in Fig. 7. The 5-volt supply is regulated by a circuit using an RCA 2N5037 power transistor as a series regulator, and the 9-volt supply is regulated by a shunt Zener diode. An interesting feature of the 5-volt circuit is that it acts as a voltage-regulated supply for current loads up to about 1.2 amperes, then automatically changes to constant-current operation for heavier loads. Thus, this supply can be subjected to short circuits for an indefinite period without damage to the components – a worthwhile feature since the supply could be shorted by failure of any one of the thousand-odd transistors that it feeds.

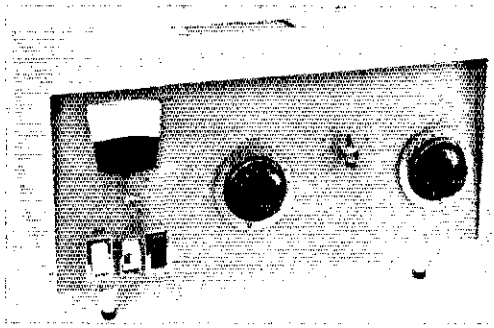
Construction

Before the advent of integrated microcircuits, the circuits described above would have occupied the lion's share of a relay rack, leaving little space,

(Continued on page 43)

[7] Unit prices currently listed by Newark Electronics Corporation are as follows: NL-840, $8.00; SN7441AN, $10.36; SN7475N, $6.56; SN7490N, $7.66. The total for these components is $32.58 per digit.

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



At the lower left are the switches, for relay, ac, and plate, in that order. The meter switch is directly above. The band switch is at the upper right, between the tuning and loading controls. A section of the top of the cabinet is removed and perforated aluminum stock installed to allow air flow.

The "Junker" Amplifier

500 Watts – 80 through 10 Meters

BY LEW MCCOY,* W1ICP

A FEW YEARS BACK we described a low-cost amplifier[1] that used a pair of 572Bs operated in grounded-grid fashion. It was evident from the mail received that this was a popular article. Some of the questions concerned substitution of lower-priced tubes, such as 811As, or 813s. In fact, we still receive queries asking for an amplifier design using such surplus tubes because they remain relatively low in cost. The amplifier described in this article is in answer to these requests.

Three types and combinations of tubes were tried. These included a pair of 811As in parallel, a single 813, and a single 803. The 803 tube is a pentode and is rated for operation up to 20 MHz. We found that the 803 worked well on the 21-MHz band but was quite inefficient on 10 meters. However, the 803 is cheap (surplus), and if the builder isn't too concerned about 10-meter operation the tube is a good buy which helps keep the cost of the amplifier down.

Another reason for designing this amplifier was to see how low the cost could be for a 500- to 600-watt unit. Depending on how good a scrounger you are, and how extensive your junk-box stock is (and not overlooking your own ingenuity), the amplifier should be less than $50. As one can see from the photographs, it is strictly a junk-box special. However, the neophyte builder should keep one thing in mind: the watts that come out of this amplifier are just as useful as the watts out of the most expensive amplifier you can buy. A good example of ways to save money is seen in the pi-network tank coil. Our version cost only a few dollars to make, but a suitable commercial assembly would run close to $30.

No newcomer should be afraid to tackle a construction project such as this. There is nothing particularly critical in building the unit. There *are* certain precautions which should be followed, and we'll point those out, but even a beginner in ham radio can easily duplicate this amplifier, and should be able to save money in the process.

Just so no one will think this amplifier is designed for a Prussian officer, the term "Junker" means junk. *If you are a typical ham you should be able to scrounge many of the parts for this amplifier from spare parts boxes – yours and those of other hams.*

Circuit Details

Fig. 1 shows the circuit of the 813 amplifier. Fig. 2 shows the variations for using a pair of 811As or a single 803. Drive from the exciter is coupled to the filaments of the amplifier by means of a .01-μF capacitor. The filaments are isolated from rf chassis ground by RFC1, a bifilar-wound choke. Whenever the term "bifilar" is used, mail comes in asking what the term means. In this case, the bifilar winding consists of two parallel lengths of wire wound with close-spaced turns on a single ferrite core. Two adjacent end leads connect to the tube filaments. The two remaining leads attach to the filament-voltage source – a center-tapped transformer in this instance. RFC1 is a broad-band choke, offering high impedance to rf energy from 80 through 10 meters; thus the rf drive is not shorted out by the low-impedance of the filament transformer. Z1 is a parasitic suppressor.

The tank circuit consists of plate-tuning capacitor C2, L1 and L2, and C5, the loading

* Novice and Beginner
[1] *QST* February 1966.

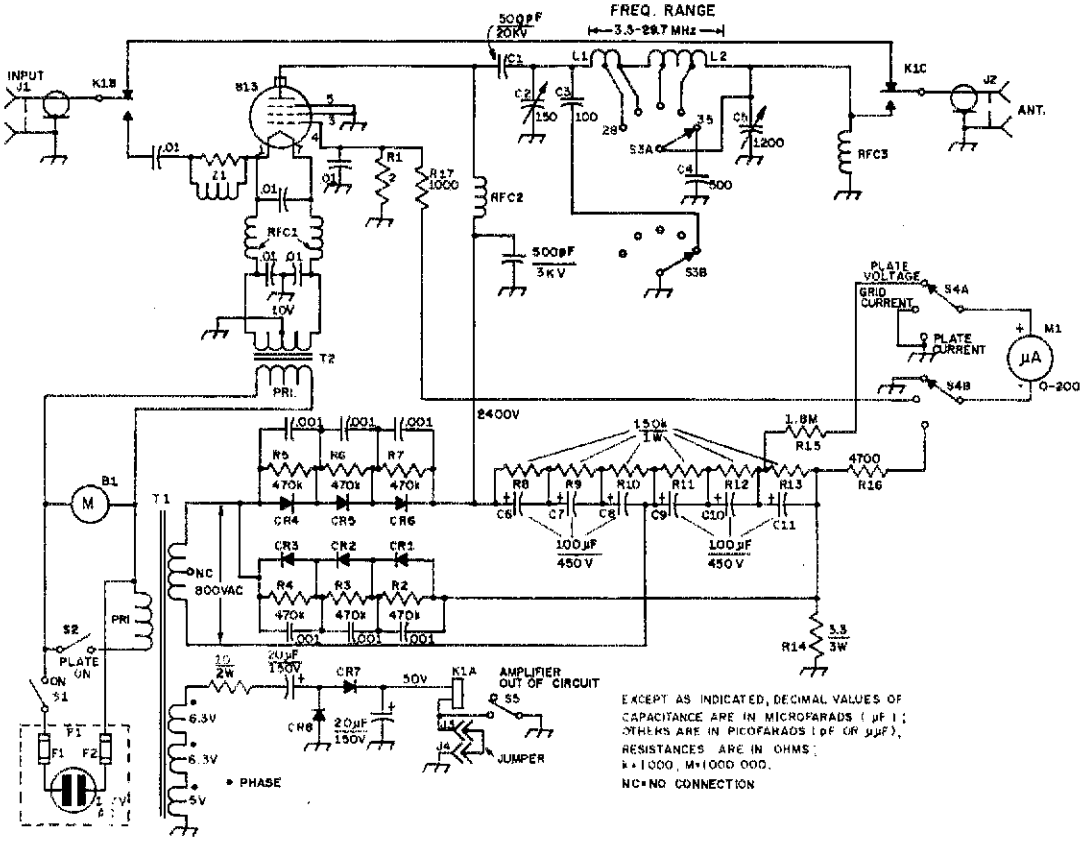


Fig. 1 — Circuit diagram of the 500-watt amplifier. Unless specified, all resistors are one watt composition. All decimal value capacitors are disk ceramic. Labeled components not listed below are for text reference purposes.

B1 — Cooling fan, 117-volt ac motor.
C1 — 500-pF, 20-kV TV-type high-voltage.
C2 — 150-pF variable (E. F. Johnson 154-8, Millen 12515 or equiv.).
C3 — 100-pF mica, transmitting type (see text).
C4 — 500-pF mica, transmitting type, see text.
C5 — 1200-pF variable, trf type, 3-gang, 400-pF per section, stators connected in parallel.
C6-C11, incl — 100-μF, 450-volt electrolytic.
CR1-CR6, incl — 1000-volt piv, 1-ampere diode, see text.
F1, F2 — 10-A fuse.
J1, J2 — Coax chassis fitting, type SO-239.
J3, J4 — Binding post terminals. (jumper can be removed and relay controlled from exciter circuits.)
K1 — Dpdt relay (see text.)
L1 — 10 turns, 2-inch diameter, 1/4-inch copper tubing. Space turns 1/8 inch.
L2 — 15 1/2 turns No. 12 solid wire, 3-inch diameter (see text.) Tap information: Tap points counted from the C5 end of the coil, 40-meter tap 9 3/4 turns; 20-meter tap, 15 turns; 15 meter tap 5 1/4 turns from junction of L1L2; 10-meter tap, 7 1/4 turns from junction of L1L2.
P1 — Fuse-in-plug assembly.
R1 — 2 ohms, 2 watts.
R14 — 3.3 ohms. Three 10 ohm, 1-watt resistors in parallel. jRFC1 — 28 bifilar turns No. 14 Formvar or Nylcad, close-wound on 1/2-inch dia., 7 1/2-inch long ferrite rod (see text.)
RFC2 — 90 μH, 500-mA rf choke (B & W 800 or equiv.).
RFC3 — 2.5 mH rf choke.
S1, S2, S5 — Spst toggle switch.
S3, S4 — Two-pole, 6-position, 2-section rotary (Centralab 2511 or similar).
T1, T2 — See text.
Z1 — 7 turns No. 16 space-wound on 100-ohm, 2-watt resistor.

capacitor. This circuit covers the 80- through 10-meter bands. Fixed-value capacitors are used in combination with C3 and C4 on 80 meters. These capacitors are switched into the circuit by means of S3, the band switch. A double-pole, double-throw relay, K1, can be activated to bypass the amplifier and run only the exciter, if desired.

The power supply is a voltage-doubler type, and with the transformer specified provides a no-load voltage of approximately 2500, which drops to about 2300 volts under load. Filtering is accomplished by a series string of high-capacitance electrolytics, C6 through C11, inclusive. A meter is switched to read grid current, plate voltage or plate current.

Scrounging Parts

One of the more expensive items in any amplifier is the power transformer. One way to reduce this cost to peanuts, is to use a TV set power transformer. Many TV repair shops are loaded with old TV chassis which can be had for the asking, or for only a few dollars. Power transformers from most sets are rated at 300 to 400 watts, continuous duty. In amateur operation, such as ssb or cw, neither of which is continuous duty, it is possible to increase these ratings considerably without any damage to the transformer. The amplifier shown here has been run for long periods without the transformer getting warm to the touch.

In the voltage-doubler circuit you can expect to get 2.8 times the secondary ac voltage. For example, a TV power transformer that has a total secondary ac voltage of 800 will provide about 2300 volts dc in this type of voltage doubler.

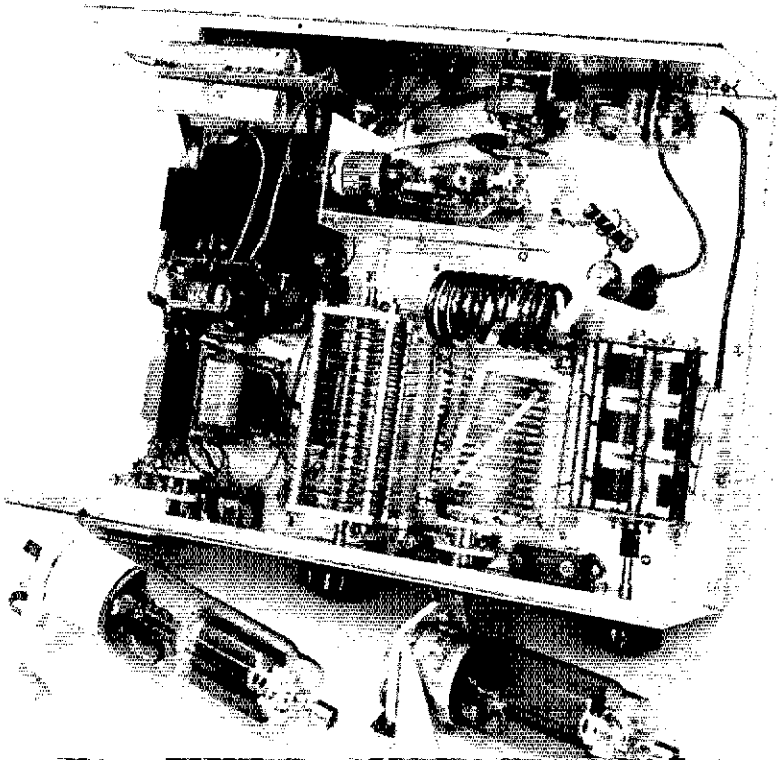
While it didn't occur to us at the time, another large savings could have been effected in obtaining the tank capacitor, C2, and some of the other components. C2 is a relatively expensive unit, but there is one piece of surplus gear that has a suitable capacitor for C2 plus many other useful parts. This is the TU-5B tuning unit that was used in the BC-375 transmitter[2]. This piece of surplus has two variable capacitors capable of handling up to a kW of power input. Also, the unit has the large fixed-value mica capacitors required for C3 and C4. C5 is a 3-gang trf type variable that is available from many surplus houses. Close-spaced capacitor plates can be used at C5 without danger of capacitor arc over.

We used commonly-available tubular electrolytics in the capacitor string of the power supply. These units are obtainable from most radio parts dealers. However, some surplus dealers have high capacitance electrolytics in stock. In order to obtain adequate filtering, one should figure on no less than 15 μF of capacitance. When capacitors are connected in series, and all capacitors have an equal value, the total capacitance is equal to the value of a single capacitor divided by the number of capacitors used in the string. In other words, four 100 μF capacitors connected in series will provide a total of 25 μF of capacitance. The voltage rating of the string is equal to the sum of the working voltages of all the capacitors. For example, four series-connected capacitors having a working voltage of 450 volts each will handle 1800 volts. In figuring your string of capacitors it is a good idea to allow at least 20-percent safety margin on the total working-voltage rating.

As to the tube or tubes you decide to use, 811As, 813s, and 803s can all be purchased as surplus, and you'll save about 40 percent of the cost of new tubes. If you belong to a radio club it is a good idea to ask around among the other hams and see what they might have tucked away. We've found that some hams are like pack rats; they save everything.

The 811A requires 6.3 volts at 4 amperes for the filament. Two tubes will require 8 amperes. The average TV transformer has a 6.3-volt filament winding rated at about 8 amps. It may seem ridiculous, but there is no reason you cannot use

2 These units are available from Fair Radio Sales, Lima, OH. 45802.



In this unit a pair of 811As is used as the amplifier tubes. Note the shield section between the tubes and the tank coil. The shield serves the dual purpose of shielding plus directing the air flow from blower fan directly behind the tubes. The power supply section is along the left side. The tank coil, at the front right, is between the tuning and loading capacitors. Visible directly below the band switch are the two mica capacitors used for 80-meter operation. In front of the unit are the two tubes that were tested in the amplifier, an 803 at the left and an 813 at the right.

two TV transformers – one for the filaments and the other for plus B. If you find a really rugged transformer, a single unit could be used, for both plate and filament but we recommend a separate filament transformer to ease the power load on the plate transformer. An 813 or 803 filament requires 10 volts at 5 amperes, and again, the surplus market is a good bet for such a transformer. Also, don't overlook club auctions!

The enclosure for the amplifier is a homemade unit, bent up from sheet aluminum. A small piece of perforated aluminum is used over the tube area to permit air flow for cooling of the tubes. The layout of the amplifier is not critical so any enclosure or chassis large enough to hold the parts is suitable. Local sheet-metal shops should have plenty of material for making your own cabinet. Also, the surplus market occasionally yields some good buys in cabinets and enclosures.

Which Transformer?

TV transformers provide from 500 to 750 volts across the entire secondary. The first step you must take is to decide which type of tube or tubes you will use. The 811As will work nicely with 1500 volts on the plates, so a 500- to 600-volt transformer (in a voltage doubler) will give you just about the correct voltage. The 811A unit shown in the photo has a power supply that delivers slightly over 1600 volts with no load. Without negative grid bias on the 811As (zero bias) the resting plate current of the tubes was at a safe level. If you find that the resting current is too high (the plate dissipation rating on the 811As is 65 watts) you may have to use some negative bias. (Usually only a few volts are required, and this can be obtained from batteries.) The point is that you should shoot for a transformer with a 500-volt winding for powering these tubes.

The 813 has a maximum rating of 2500 volts, so a 700- to 800-volt transformer would be best. The 803 has a maximum rating of 2000 volts so the 600-volt range is called for here. In a grounded-grid amplifier it is better to run the tubes at their maximum voltage ratings rather than some lower value. Better efficiency can usually be obtained when using higher plate voltages.

Construction Information

As mentioned, any cabinet and chassis large enough to contain the amplifier will be suitable. The chassis shown was made from a single sheet of aluminum. It is 19 inches wide, 15 inches deep, and 8 inches high.

There is nothing critical in the layout of the components. But be sure that any components carrying high voltage are adequately spaced from the chassis or other ground points. With the tank circuit coil, try to keep the leads for the 15 and 10-meter taps as short as possible.

We made an etched circuit board to hold the electrolytic capacitors, rectifiers, and associated components in the power supply filter section. These components can be mounted on a piece of Plexiglas, or on any similar material. RFC1 can be homemade but we've run into one problem here.

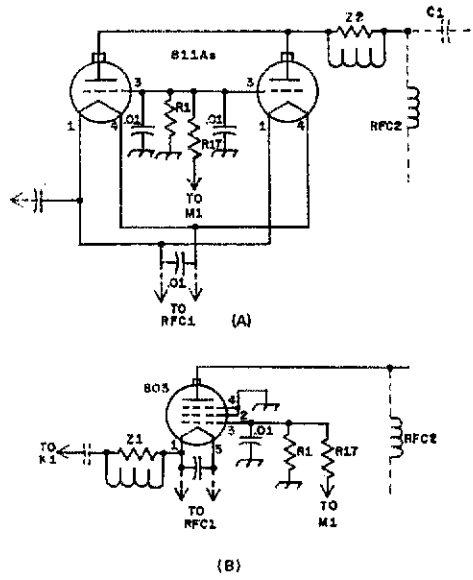


Fig. 2 – At A, the circuit for a pair of 811As. Z2 consists of 3 turns of No. 16 wire 3/4-inch dia., 3/4-inch long, wound on Globar resistor. At B, the circuit for an 803.

The ferrite core we used is a 1/2-inch diameter, 7 1/2-inch-long unit that was available from a mail order house, but they no longer stock the material. However, Amidon Assoc.[3] has a choke kit available. Also, there is another commercially-made choke available[4].

The relay, K1, is a surplus item that required about 30 volts dc to operate it. The voltage was obtained by connecting all of the filament windings on T1 in series, and using a voltage doubler circuit. If you choose this system be sure to have the windings phased correctly so that one winding doesn't buck another.

In figuring the voltage rating for the high-voltage rectifiers (CR1 through CR6) the total required in each leg must be three times that of the *total* secondary winding. In other words, for a 600-volt secondary, you would need a rating of 1800 volts for the rectifiers. It is a good idea to allow a 20-percent safety factor. (Surplus rectifiers are available in the 1000-volt, 1-ampere range.)

A piece of Plexiglas, 4 x 5 x 1/4 inches is used to support L2. We drilled two rows of 1/8-inch diameter holes, 1/8 inch apart. The two rows are three inches apart. There are 15 holes in one row and 16 in the other. Next, we wound 18 turns of No. 12 bare wire on a 3-inch form. You won't need 18 turns but the extra turns will provide some extra lead lengths when the coil is completed. The next step is to carefully thread the coil wire through the holes in the Plexiglas. It took us about

[3] Amidon Assoc., 12033 Otsego St., North Hollywood, CA. 91607.
[4] William Deane, W6RET, 8831 Sovereign Rd., San Diego, CA. 92103.

an hour to get all the turns on, but the job wasn't a tough one at all. L2 is made of copper tubing wound up on a 2-inch form. The turns are separated 1/8 of an inch. Both end leads of this coil were then flattened in a vise and drilled so they could be mounted along with L1 on the Plexiglas. The entire assembly was then mounted on standoffs which are later mounted on the chassis. All the coil taps are made from strips of copper flashing, about 1/4-inch wide.

For either an 803 or 813, the parasitic suppressor should be installed at the filament side of the tube. If 811As are used, we found that parasitic suppression (Z2) was required in the plate lead (see Fig. 2 at A.) In constructing the unit, the three types of tubes tried were all mounted horizontally. For an 803, pins 2 and 5 should be in a horizontal plane if the tube is to be operated horizontally. For an 813, in a horizontal position, pins 2 and 6 should be in a *vertical* plane. For 811As, pins 1 and 4 should be in a vertical plane.

In testing the amplifier with the various tubes, we found that the 803 and 813 provided stable operation on its own. However, the 811As showed self-oscillation until an aluminum shield was mounted between the tubes and the tank coil.

Tune-Up Procedure

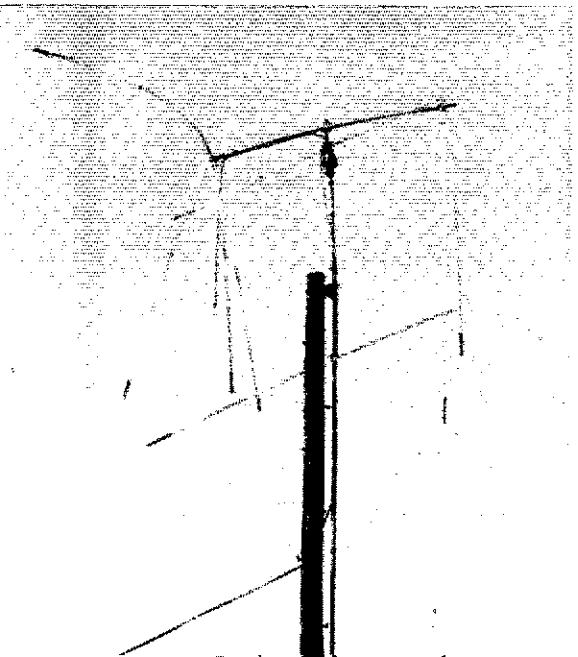
In tuning up a grounded-grid amplifier you don't look for the conventional plate-current dip that is a useful indicator in other types of circuits. What is required here is an output indicator such as most hams use in their feed lines. An SWR bridge can be used in the output position. In grounded-grid operation, the grid and plate current readings are used primarily to check the operating conditions. The ideal instrument to use in tuning up *any* linear amplifier is an oscilloscope, but you can do a good job without one. Also, additional information on adjusting linear amplifiers can be found in considerable detail in the *Handbook*.

Any exciter in the 50-watt or more class will provide adequate driving power for the amplifier. When using an 813 or 803 adjust the driving power plus the tuning and loading controls for maximum output with a grid current of approximately 50 mA and a plate current of 200 mA. With 811As (two tubes), shoot for a grid current reading of 50 to 60 mA and a plate current reading of about 350 mA. This should be done using a cw driving signal. When these conditions are met, reducing the drive slightly should cause the rf output and dc input to drop. With these conditions, the unit should be capable of linear amplication. With the voltages stated earlier, these values of plate current should give about 500-watts dc input on ssb. As general information, the 813 and 803 should show no reddening of the plate under any operating conditions. The 811As, however, can show a barely perceptible red color when operated at their maximum ratings.

We like the performance of this amplifier. It provides an inexpensive method of putting "shoes" on our low-power exciter. QST

Strays

Well, back to the drawing board! (W1MN's tri-band quad after an ice storm last winter).



The Overlook Radio Society of Ulster County, NY, has presented a copy of the 1970 edition of the ARRL *Handbook* to the Kingston city library. Shown making the presentation to Mrs. Mildred Buddington of the library's staff is WB2LZJ. The Overlook Radio Society suggests that other clubs consider presenting amateur publications to their local libraries. Two benefits ensue: Ham radio info becomes available to prospective hams, and good public relations are achieved for amateur radio.

A High-Performance HF Converter

160 Through 10 with an 80-Meter Tuner

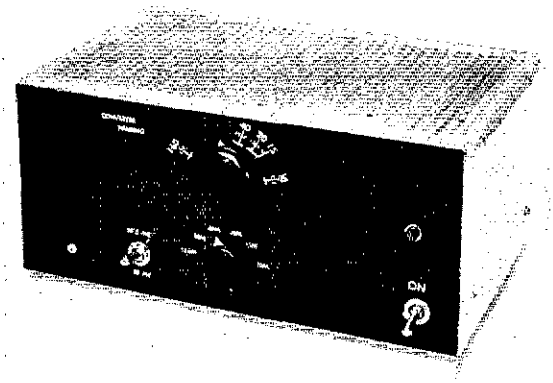


Fig. 1 — Outside view of the five-band converter. The peaking control is at the top center with the band switch directly below. A homemade cabinet encloses the equipment, and the front panel is painted a royal blue to set off the white decal labels.

BY DOUGLAS A. BLAKESLEE,* W1KLK and AUGUSTUS M. WILSON,** W1NPG

A CONVERTER can be an inexpensive approach to livening up an older receiver. The unit shown in Fig. 1 allows any receiver capable of tuning 3.5 to 4 MHz to have coverage of all the hf amateur bands, including 160 meters. But, if only one or two bands are desired, the builder may simply leave out the coils and crystals for the unwanted frequency ranges. Because FETs are used, the converter out-performs many of the low- and medium-priced receivers in sensitivity, rejection of out-of-band signals, and freedom from cross modulation. Crystal control is employed for the hf oscillator. Thus, the stability and tuning rate of the complete receiving system will be determined by the 80-meter tuner — most receivers perform adequately in this range.

Circuit Details

The input stage, Q1 in Fig. 2, uses a JFET in a common-gate rf amplifier. Source bias for this transistor is provided by the 270-ohm resistor which is isolated from the rf-input signal by a 1-mH rf choke. The source is tapped down on the input coils to provide a proper impedance match to this low-impedance common-gate circuit. Since the transistor operates with its gate grounded, neutralization is not needed. Diodes CR1 and CR2 protect the input transistor in the presence of high levels of rf voltage. They will conduct at about 0.6 volt, shorting the input link of the band in use. The preselector capacitor, C1, tunes the rf-stage input and output circuits to resonance. Link coupling is used on the input and interstage coils to improve the converter's ability to reject strong signals from outside the tuning range.

A dual-gate MOSFET, Q3, functions as the mixer. The amplified rf signal is fed to gate 1 of this device, while gate 2 is coupled to the hf oscillator, Q2. The dual-gate MOSFET is a good choice for mixer service as it has excellent conversion gain, provides isolation between the signal and oscillator inputs, and performs well on strong signals that might otherwise cause overload. The mixer output tank has low Q to permit sufficiently-broad response for covering the 3.5- to 4-MHz tuning range. A capacitive divider across L17 provides a low-impedance output; shielded cable should be used between the converter output and the 80-meter tuner.

A heavy-duty power supply is included on the chassis, but size-D flashlight cells can be connected in series to provide a portable source of power for the converter. As the current drain of the entire unit is only 6 mA, batteries should last a long time with normal use.

Construction

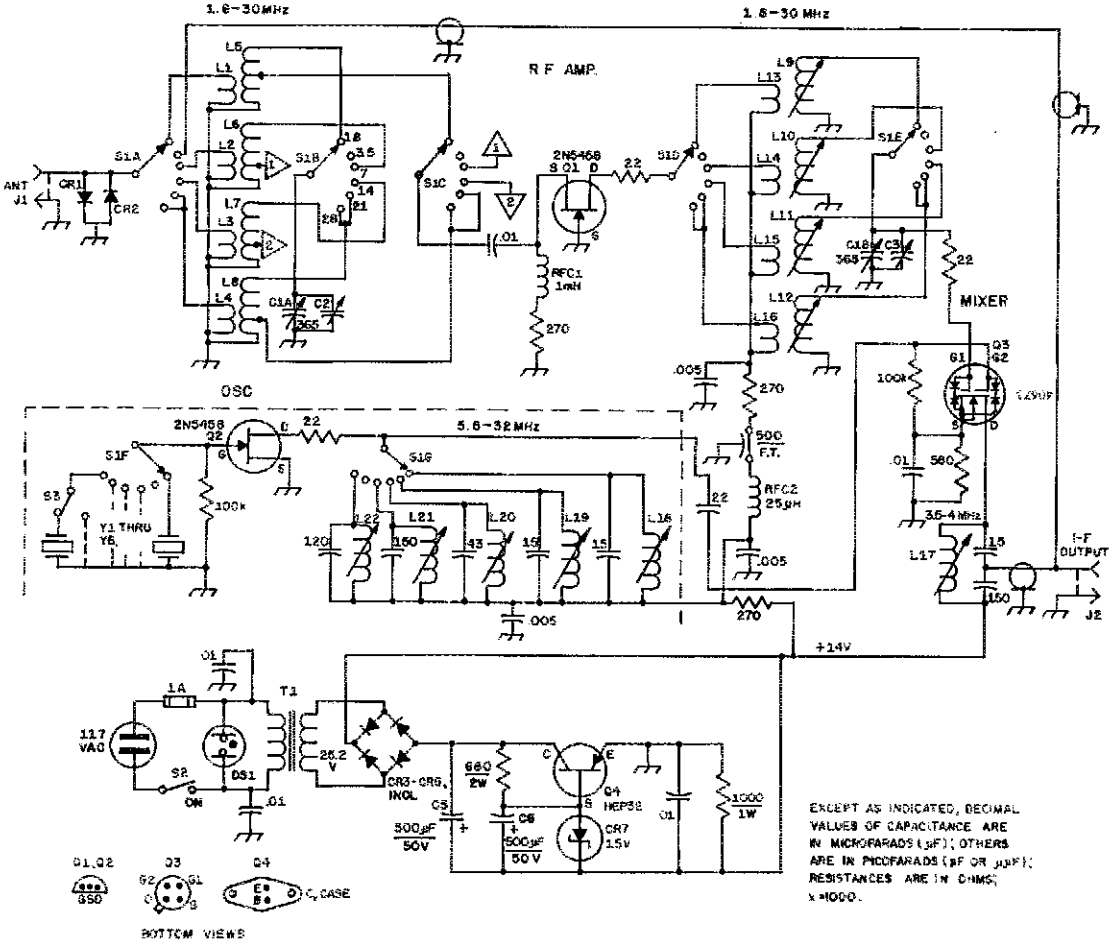
The main chassis is a 7 x 11 x 2-inch commercially-made aluminum type, fitted with a 4 1/2 x 11-inch front panel. The front piece and the homemade cabinet are cut from sheet-aluminum stock, the type available at many hardware stores. Strictly speaking, the cabinet isn't required, but it does impart a finished appearance to the unit.

Shields, also cut from aluminum stock, are used to isolate the oscillator from the rf amplifier and mixer circuits. The dimensions of the shields aren't critical; Fig. 3 shows the placement of these dividers. Subminiature coax is used for the leads to the input and output jacks, as well as connecting the drain of Q1 to the band switch. Sockets are used for the transistors, but those who know the tricks of making etched-circuit boards may wish to use this assembly technique for the small parts. If the transistors are soldered in, care should be used; overheating can damage these devices. The dual-gate MOSFET has built-in transient protection, so it can be handled without fear of internal damage. Commercially-made coil stock is used for the air-wound coils. A rectangular piece of polystyrene, cut so that it makes a tight fit inside the coil, is used with an L-shaped bracket to mount the large coils. A drop of cement between the coil's plastic support rods and the stand-off post will secure the assembly. As many connections must be made to the band switch, the best approach is to complete all of the chassis wiring except the coils. Then, starting with 10 meters, the coils should be wired in, one band at a time. As each coil set is soldered in, the converter should be checked for

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

Fig. 2 — Diagram of the converter. Fixed-value capacitors are disk ceramic or mica, except those with polarity marked, which are electrolytic. Resistors are 1/2-watt composition unless otherwise noted. F.T. denotes feed-through capacitors.

C1 — Dual-section broadcast-type variable, 365 pF per section (Miller 2112).
C2, C3 — Padders, part of C1.
CR1, CR2 — Silicon small-signal switching diode (1N914 or equiv.).
CR3-CR6, incl. — 50-V, 1-A silicon.
CR7 — Zener, 1 W, 15 V (GE type GE-ZD-15).
DS1 — Neon panel lamp, 117 V (Leecraft 32-211).
J1, J2 — Phono jack, single-hole mount.
L1 — 4.5 μH, 15 turns No. 20, 16 tpi, 1-inch dia., over the bottom end of L5 (B&W 3015).
L2 — 1.2 μH, 5 turns No. 22, 22 tpi, 1-inch dia., over the bottom end of L6 (Polycoil 1749).
L3 — 2 turns of hookup wire over the bottom end of L7.
L4 — 2 turns of hookup wire over the bottom end of L8.
L5 — 20 μH, 52 turns of No. 24, 32 tpi, 3/4-inch dia., tapped 32 turns up from the bottom end (B&W 3012).
L6 — 5 μH, 25 turns No. 20, 16 tpi, 3/4-inch dia., tapped 12 turns from the bottom end (B&W 3011).
L7 — 2 μH, 12 turns No. 18, 16 tpi, 5/8-inch dia., tapped 6 turns from the bottom end (B&W 3007).
L8 — 1.4 μH, 10 turns No. 18, 16 tpi, 5/8-inch dia., tapped at 7 turns from the bottom end (B&W 3007).
L9 — 19-41-μH variable inductor (Miller 42A335CBI).
L10 — 2.4-5.8-μH variable inductor (Miller 42A476CBI).
L11 — 1.9 μH, 14 turns No. 18, 5/8-inch dia., 16 tpi (B&W 3007).
L12 — 1.4 μH, 10 turns No. 18, 5/8-inch dia., 16 tpi (B&W 3007).
L13 — 60 turns No. 30 enam. wire wound over L9.
L14 — 20 turns No. 30 enam. wire wound over L10.
L15 — 14 turns insulated hookup wire wound over L11.
L16 — 10 turns insulated hookup wire wound over L12.
L17 — Variable inductor, approx. 82 μH (Miller 21A825RBI).



L19 - 1-1.8-μH variable inductor (Miller 21A156RBI).
L20 - 3.5-5.6-μH variable inductor (Miller 21A476RBI).
L21 - 2.4-4-μH variable inductor (Miller 21A336RBI).
L22 - 0.8-1.2-μH variable inductor (Miller 21A106RBI).
RFC1 - Miniature type (Miller 73F103AF).
RFC2 - Iron-core type (Millen J300-25).
S1 - Rotary ceramic switch, 8 poles (6 used), 6 positions, 4 sections (Centralab PA-2027).
S2 - Spst toggle.
S3 - Spdt toggle.
T1 - 24-volt, 1-A filament transformer.
Y1 - 5.5 MHz.
Y2 - 11 MHz.
Y3 - 10.5 MHz.
Y4 - 17.5 MHz.
Y5 - 32 MHz.
Y6 - 32.5 MHz (Y1-Y6, incl., are International Crystal Mfg. Company type EX).

Fig. 3 - Bottom view of the converter. The crystal oscillator section occupies the upper compartment. Below the shield, the rf-stage input coils are to the right of the rotary switch, while the mixer input coils are to the left.

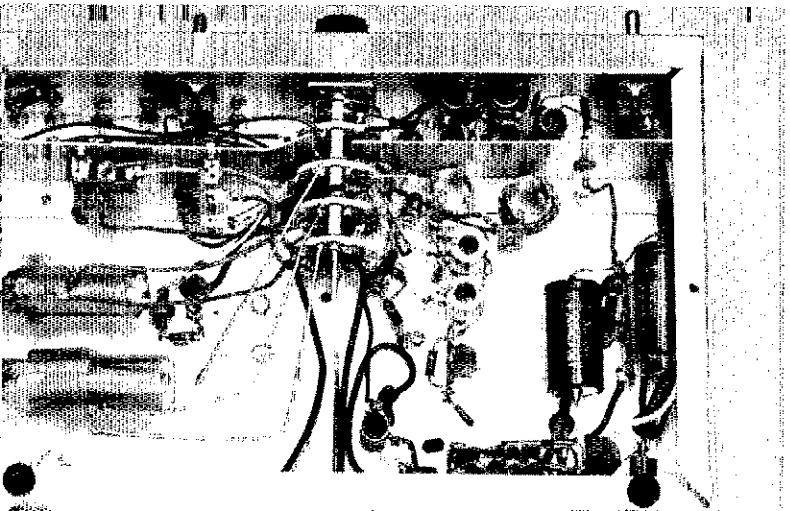
proper operation. In this way any wiring errors in the switching will show up as they happen.

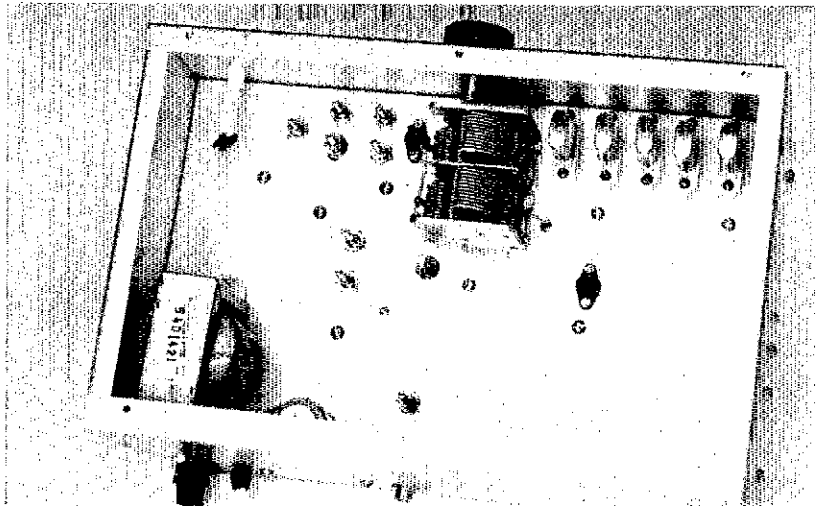
Alignment

The first alignment step is to check the oscillator for proper operation. A general-coverage receiver or wavemeter, coupled to the oscillator coil, can be used. Adjustment of the appropriate slug-tuned coil should start each crystal into action. L22 should be set for operation with Y6, and be "touched up" slightly for Y5, if necessary. Then the other bands should be aligned, in turn, for maximum oscillator output consistent with an immediate start of oscillation each time that the unit is turned on.

With the converter switched to 10 meters and connected to an antenna or signal generator, and to the station receiver, apply operating voltage. Set C1 at minimum capacitance. Tune in a weak signal, and adjust C1 for maximum signal strength, which should occur with the capacitor almost fully unmeshed. Then, adjust the two trimmers, C2 and C3, for maximum signal. These adjustments should be repeated several times until tuning C1 produces only one peak reading on the S meter of the 80-meter receiver. The output coil, L17, should be peaked near the center of the 80-meter band. The 160-, 40-, and 10-meter bands will tune backwards on the 80-meter range. Thus, 7 MHz will come in at 4 MHz, while 7.5 MHz will produce output at 3.5 MHz. However, the 15- and 20-meter bands will tune in the other direction. This difference occurs because on some bands the lif oscillator is *above* the signal frequency, while on others it is lower in frequency than the incoming signal. QST

Fig. 4 - Looking topside on the converter, the power supply is at the lower left. J1 and J2 are located on the rear apron of the chassis. Q2 is immediately to the left of the tuning capacitor, while Q3 is directly below this capacitor and Q1 is at the center right. Only half of Q4 is visible next to the power transformer - this transistor is insulated from the chassis by means of mica and nylon hardware which comes with the HEP 32. The chassis serves as a heat sink.





A Frequency Multiplication Technique for VHF and UHF SSB

Signal Processing to Eliminate Distortion Produced by Conventional Frequency Multiplication Methods

BY KARL MEINZER,* DJ4ZC

THERE HAS been increasing interest recently in single-sideband operation in the vhf, uhf and shf bands, particularly since space-communications experiments have been proposed involving the 420-MHz band.[1] Unfortunately the usual method of producing ssb power, by mixing and linear amplification, becomes rather difficult at the higher frequencies, since it involves a lot of "plumbing," and it generally results in rather low-efficiency equipment.

The varactor multiplier offers a relatively simple way of developing cw power in the uhf region,[2,3,4] but it has been thought impractical to use frequency multiplication with ssb systems. To remedy this situation, a theory has been developed that will allow the use of a varactor tripler in a sideband system for 432 or 1296 MHz. A relatively-simple adapter employing this method has been built and used on the air, with good results. It may be used with any exciter that generates the ssb signal in the hf region, in this instance at 9 MHz. The signal at this frequency is modified in such a way that when it is tripled in frequency a conventional ssb signal is restored.

*38 Hoehenweg, 355 Marbach, Hessen, Germany 355.

1 "*Amsat Newsletter*," December, 1969 (available from Amsat, PO Box 27, Washington, DC 20044).

2 Cross, "Frequency Multiplication with Power Varactors," *QST*, October, 1962. Also *Radio Amateur's VHF Manual*, Chapter 10.

3 DeMaw, Blakeslee and Hess, *QST*, March, 1966 (3 articles).

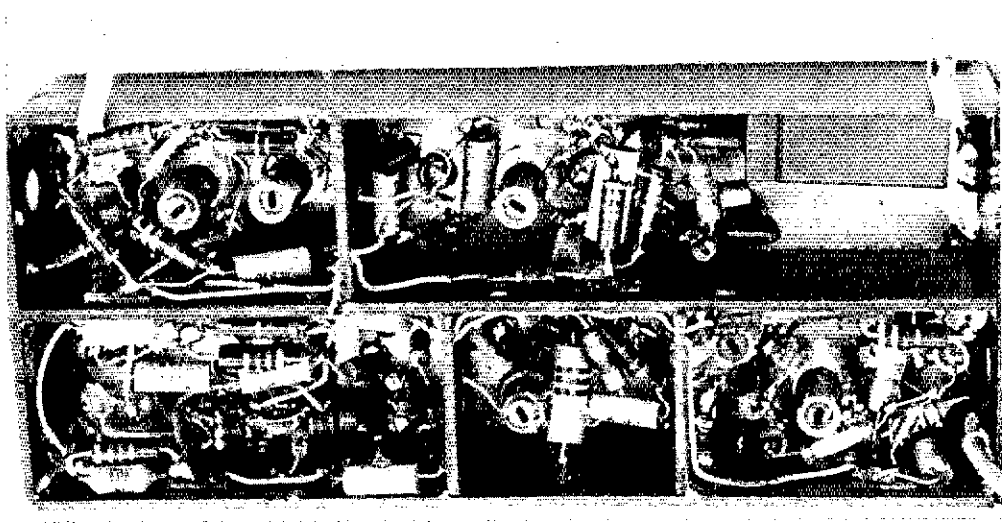
4 Franke, DK1PN, "Varaktorverdreifacher 70/24 cm in Streifenleitungstechnik," *UKW Berichte*, December, 1969.

Basic Principles

It is well-known that conventional frequency multiplication results in distortion of an amplitude-modulated signal. Frequency multipliers are usually Class-C amplifiers, which have a nonlinear relationship between the input and output voltages. The third harmonic of an amateur a-m signal may be readable enough, though somewhat distorted, but the complex nature of sideband (which is really a-m of sorts) makes the signal unintelligible after multiplication in conventional stages.

The solution proposed here requires some explanation. Imagine a single-sideband transmitter having a carrier frequency of 7000 kHz, with upper-sideband. Suppose this transmitter is fed from an audio generator that can be switched between 1 and 3 kHz. This results in emissions of either 7001 or 7003 kHz, as seen in Fig. 1A. Upon reinserting the carrier at the receiver, we recover

The DJ4ZC 9-MHz ssb processing unit was built in a small assembly using copper-clad circuit-board stock. The 9 MHz preamplifier and limiter are in the upper left, the digital circuitry in the larger section to the right. The 12-MHz oscillator, mixer, and output amplifier occupy the three lower sections.



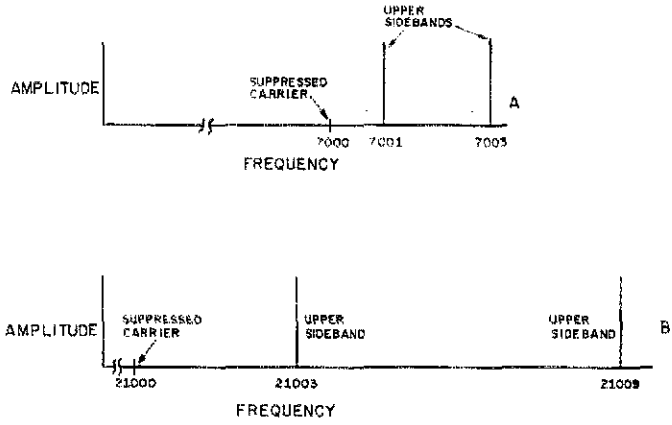
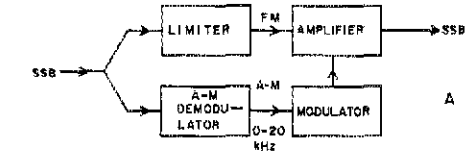


Fig. 1 — Effect of frequency multiplication on the sideband frequencies with single tones. The upper sidebands with tones of 1000 and 3000 Hertz are shown at A. These become 3000 and 9000 Hz when the signal is passed through a conventional tripler, appearing with respect to the suppressed carrier as shown at B.



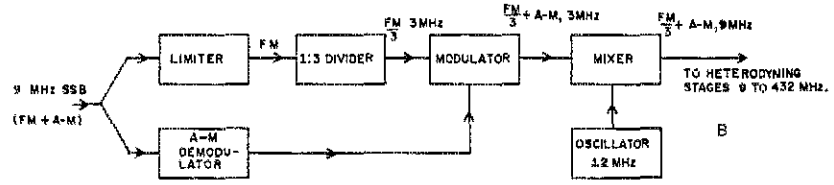


Fig. 2 — Separation of a sideband signal into its fm and envelope components permits handling of the signal in the same manner as if it were frequency modulated. A Class-C amplifier can be used, and the ssb characteristics are restored by remodulation with the envelope, as in A. Application of the principle to stages involving frequency multiplication is shown at B.

the 1- or 3-kHz tone, as the beat between the sideband and the reinserted carrier. But if we feed this modulated signal into a tripler stage, the frequencies obtained are 21,003 or 21,009 kHz, (Fig. 1B). The audio frequencies obtained after reinserting carrier at the receiving end are thus 3 or 9 kHz, instead of the original 1 or 3 kHz. Since audio frequencies are multiplied in the multiplication process, speech becomes unintelligible. To make the situation worse, the usual receiver selectivity of 3 kHz or less used in ssb reception will prevent a large part of the emission from being received at all.

To carry this hypothetical experiment a bit further, let us now tune the audio generator continuously between 1 and 3 kHz. We see that the sideband signal due to this tuning will constantly change in frequency. We can, therefore, consider the sideband emission to be essentially frequency-modulated in nature, with a deviation of 2 kHz. By tripling, this deviation increases to 6 kHz.

Now imagine that the signal is passed through a limiter, so that all amplitude variations are removed. The resulting signal contains only frequency-modulated information, and can be treated as fm. (The modulation content is not the original audio, but rather is a complicated result of the sideband-generating process.)

If now the amplitude variations are demodulated *before* the limiting, we can use the resulting amplitude envelope to remodulate the fm signal afterward, thus getting back the original ssb signal,[5] as shown in Fig. 2A. Here, the demodulated signal is not the original audio, but rather the envelope of the ssb signal, which one can hear by tuning in a sideband station without the receiver bfo on. This a-m envelope component contains frequencies from dc to about 20 kHz.

We have seen that a frequency multiplier also multiplies the deviation (and therefore the bandwidth) of an fm signal, thus destroying the original signal when any form of amplitude modulation is used. The point of this discussion is that, by treating the ssb signal as a combination of amplitude and frequency modulation and separating the two modes, we can utilize the process shown in block-diagram form, Fig. 2B. After separating the signal into its two components, we run the fm portion through a frequency divider. Our 9-MHz signal comes out on 3 MHz, with one-third the deviation it formerly had. The 3-MHz signal is then modulated with the envelope, and fed

5 Kahn, "Comparison of Linear Single-Sideband Transmitters with Envelope-Elimination-and-Restoration Single-Sideband Transmitters," *Proc. IRE*, December, 1956.

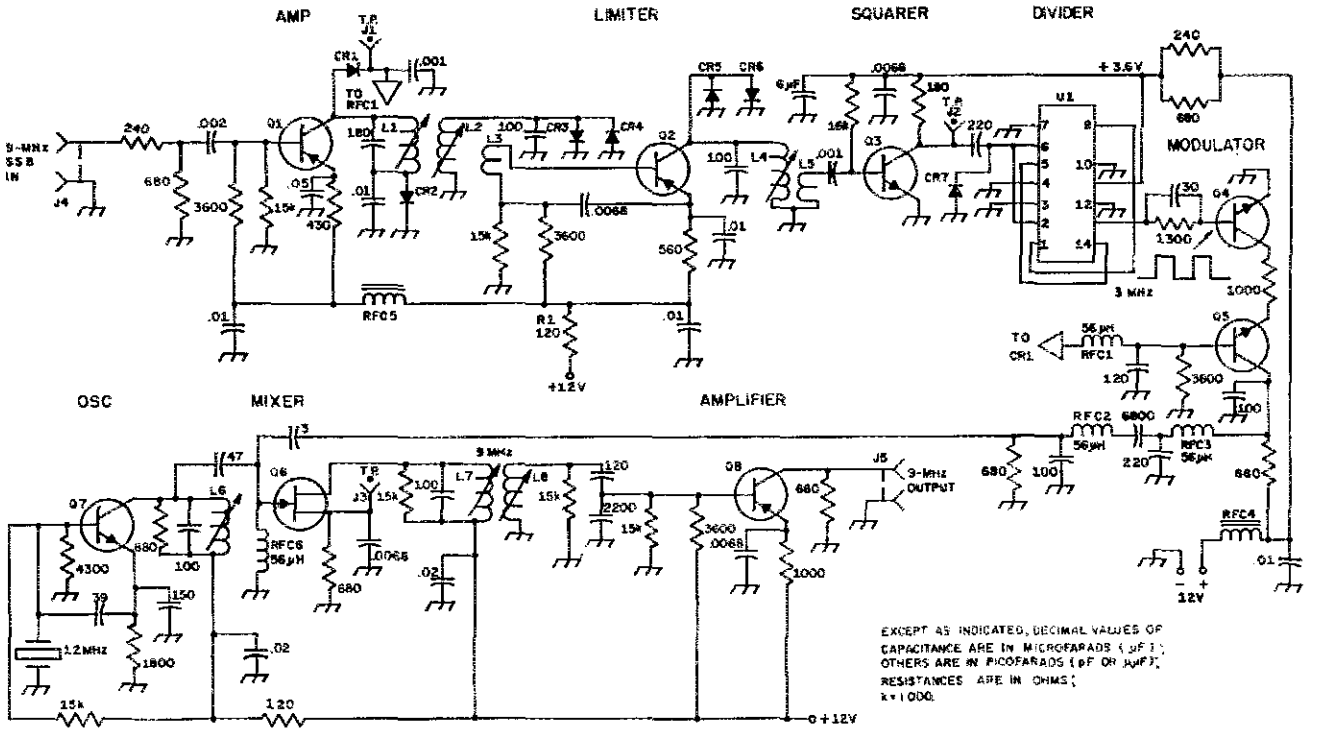


Fig. 3 — Practical circuit and parts information for the DJ4ZC 9-MHz ssb adapter, for use with uhf transmitters involving frequency tripling. Labelled components not mentioned below are referenced in the text.

CR1 and CR3 — 7 incl. — 1N914.

CR2 — Any germanium video detector type diode.

Q1, Q2, Q3 — Germanium pnp transistor for hf use (AF121, AF202, or AF203 available from Telefunken Sales Corp., South St., Roosevelt Field., Garden City, NY 11530; Motorola HEP-3 also suitable.)

Q3, Q4, Q5, Q7 — Vhf npn transistor, 2N706, 2N708 or equiv.

Q6 — N-channel FET, Motorola MPF-102 or equiv.

RFC4 — Ferrite-bead r.f. choke (3 beads, adjacent).

RFC5 — Ferrite bead

U1 — Dual JK Flip-Flop (Motorola MC-790P).

All coils are wound on 1/4-inch plastic coil forms with powdered iron slugs; No. 28 enam.

L1 — 16 turns.

L2 — 22 turns; 2 turns on coupling coil.

L3 — 22 turns; 4 turns on coupling coil.

L4 — 16 turns.

L5,-L6 — 22 turns.

Center-to-center separation between windings:

L1 and L2 = 5/8 inches,

L5 and L6 = 1/2 inches.

to a mixer. A 12 MHz oscillator is also fed to this mixer to heterodyne the signal back to 9 MHz, where it still has its fm component with one-third the original deviation.

The mixer output can be heterodyned to any frequency that is one-third of the intended operating frequency, in the same way as would be done in any exciter for a vhf or uhf ssb transmitter, and then tripled in a varactor multiplier to the final operating frequency. This tripling stage restores the characteristics of the original ssb signal, and it can be tuned in on, say, 432 or 1296 MHz, where it will not be distinguishable from a sideband signal generated in the usual way. Following these steps, the circuit diagram, Fig. 3, can be understood.

A Practical Circuit

At the upper left of Fig. 3, which is the actual circuit of the system described above, a 9-MHz ssb signal is fed into J4, at about 0.1-volt level. It is amplified to about 5 volts by Q1, and then demodulated by CR2 to obtain the a-m envelope. The diode CR1 serves to produce some bias, to overcome the base-to-emitter voltage of the following modulator, Q5.

Part of the amplified signal is coupled to L2, and limited by CR3 and CR4. After amplification in Q2 the signal is limited similarly by CR5 and CR6. The limited signal is turned into a square wave by Q3, and is then passed to an integrated circuit, U1, consisting of two flip-flops, connected to form a divide-by-three circuit. Transistor Q4 is a switch, controlled by the 3-MHz signal. The current flowing through this switch is varied by the voltage at the base of transistor Q5, and thus can be modulated by the envelope.

After this modulation, the signal is fed to the mixer, Q6, through a low-pass filter in the collector circuit of Q5. This removes the 9-MHz harmonic. In this stage the signal is converted back to 9 MHz again, by mixing the 3-MHz energy with 12-MHz injection from the crystal oscillator, Q7. The 9-MHz amplifier stage, Q8, raises the signal again to the original level of 0.1 volt, or higher, but with modulation of such characteristics that the frequency must be run through a tripler stage to transmit intelligible ssb.

The complete unit as described was built into the small box shown in the bottom-view photograph. It is made entirely of copper-clad circuit-board stock, which is readily cut to any desired shape, and soldered together with a small iron. A partition runs the full length of the box, which is roughly 2 1/4 by 5 1/2 inches in size. One smaller partition is used in the upper section, with the 9-MHz preamplifier-limiter in the smaller section at the left, and the digital circuitry at the right. Two partitions break up the lower portion, which has the 12-MHz oscillator, the mixer and the output amplifier, in that order, reading from left to right.

Adjustment of the equipment is straightforward. With a voltmeter between J1 and ground, L1 is adjusted for maximum positive voltage, using a small 9-MHz signal at the input. Do not exceed 5 volts at J1, as this would exceed the linear range of the demodulator. This applies to operation later, as well. A scope or rf probe is then connected to J2, and the input signal is reduced until the reading is just discernible. Adjust L2 and L4 for maximum reading, reducing the input signal and repeaking until no further increase in amplification can be obtained. Move the indicator to J3 and adjust L6 for maximum reading; then, with a medium-level 9-MHz input signal, adjust L7 and L8 for maximum 9-MHz output, at J5.

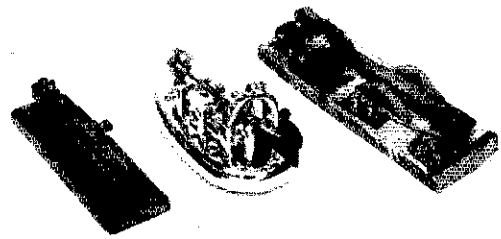
The unit is now ready for operation with any transmitter that involves one varactor tripler stage, which will restore the characteristics of the original ssb signal. Note that this system inverts the sideband; to transmit upper-sideband, as is usually done in vhf or uhf communication, the unit must be fed with a lower-sideband signal, and vice versa.

The equipment described has been used on the air at DJ4ZC, in the exciter of a 432-MHz transmitter that drives a tripler to 1296 MHz. The third-order distortion of the overall system has been measured 25 dB down. Stations worked have reported that the resulting ssb signal sounds completely normal, and in no way shows effects of the processing it underwent.

The circuitry presented is by no means the only way of getting a sideband signal with divided fm components. It is conceivable that synchronized oscillators or even regenerative dividers could be used, without even requiring the use of limiters to remove the envelope. The design presented is, however, straightforward in nature, and it requires a minimum of alignment.

The author wishes to thank members of Amsat for their kind encouragement, and particularly Perry Klein, K3JTE, for his careful reviewing of the manuscript.

From the Museum of Amateur Radio



Keys appear to have come a long way since the two wooden specimens were made out in the mid-west. The lads who made these very functional keys probably had no means of acquiring the real thing. They have a nice touch. In the center is a fine specimen of the "Mac-key" designed and manufactured by Ted McElroy, the famous speed artist. — *W1ANA.*

A Scope Adaptor for Transmitter Monitoring

TO MONITOR the constantly changing output of a sideband transmitter requires the use of an oscilloscope. No meter moves fast enough to tell much about how an ssb or keyed cw rig is performing. Most general-purpose oscilloscopes can be pressed into service as transmitter monitors by using a tuning-unit adapter, and, if necessary, making a few simple modifications to the scope itself.

Obtaining an oscilloscope isn't difficult. There are several fine kits available or, if you prefer, a search of the surplus flyers, *QST* Ham Ads, and local radio club auctions should turn up a suitable unit in short order. A "super duper" scope isn't required. However, the oscilloscope chosen should have an internal sweep circuit adjustable in frequency from 15 to 1000 Hz. An external sweep sync input is desirable, but not mandatory. If the unit has provision for direct connection to the vertical plates, so much the better – you will save a little work.

The scope tuner used with an old Heath O-6. A twisted pair made from hookup wire is used to connect the output of the tuner to the direct-connection input jacks added to the front panel of the Heath. The oscilloscope was modified as shown in Fig. 2.

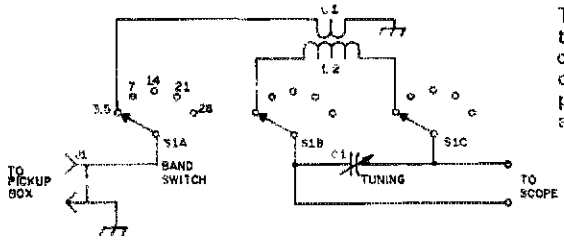


Fig. 1 – Schematic diagram of the oscilloscope adapter. Output connections are made through nylon binding posts (Johnson 111-102). Capacitance is in picofarads (pF). The Miniductor coil stock is available from Newark Electronics, 500 N. Pulaski Road, Chicago, IL 60624.

C1 – Small variable (Hammarlund HF-100).

J1 – Phono type.

L1 – Link wound over L2 using hookup wire as follows: 3.5 MHz, 3 turns; 7 MHz, 2 turns; 14, 21 and 28 MHz, 1 turn.

L2 – 3.5 MHz: 35 turns No. 24, 1 1/4-inch dia., 32 turns per inch (B&W Miniductor 3020). 7 MHz: 21 turns No. 20, 1-inch dia., 16 turns per inch (B&W 3015). 14 MHz: 6 turns No. 20, 3/4-inch dia., 16 turns per inch (B&W 3011). 21 MHz: 8 turns No. 18, 5/8-inch dia., 8 turns per inch (B&W 3006). 28 MHz: 4 turns No. 18, 1/2-inch dia., 4 turns per inch (B&W 3001).

S1 – Phenolic rotary type, 3-pole, 3-section, 2-6 position (5 used) non-shorting contacts (Centralab 1421).

The Tuner

The vertical amplifiers in inexpensive and older oscilloscopes only work up to about 1 MHz. So, some other method is necessary to provide sufficient rf deflection voltage. A simple link-coupled tuned circuit connected directly to the vertical plates of the scope tube is the answer. The tuning unit shown in the accompanying photographs will provide the several hundred volts necessary for full-scale deflection on a large scope tube. The rf output of a transmitter is sampled in a pickup box which contains a two-turn link. This low-level rf voltage is built up to a sufficient level to drive the scope by the transformer action of the tuned circuit.

The schematic diagram of an 80- to 10-meter oscilloscope adapter is shown in Fig. 1. A separate coil, made from Miniductor stock, is used for each band. Input links are wound around the main coils with plastic-covered hookup wire. The tuning capacitor, C1, must be isolated from ground, so it

is mounted on a ceramic stand-off pillar and insulated from the control shaft with a Millen 39016 coupling. All of the coil assemblies are supported by their own leads between two of the band-switch wafer sections. The third wafer selects the appropriate input link. A 4 X 2 1/4 X 2 1/4-inch Minibox houses the pickup unit, while the tuning adapter is constructed in a 5 X 8 X 5-inch homemade enclosure. The scope adapter does not have to be shielded, so any available box can be used.

Values given for the coils and tuning capacitor are not critical. Use what you have in your junk box. The only requirement is that the tuned circuits resonate in the ham bands. As the scope used with the adapter shown in Fig. 1 had high internal capacitance, it might be wise to start with a coil somewhat larger than specified, then prune the turns as necessary. Removing turns is much easier than trying to add them! An experimenter can save some money by winding his own coils. The scope adds capacitance to the tuned circuit, so check your tuned circuits with the tuning unit connected to the oscilloscope.

The Oscilloscope

If your oscilloscope doesn't have external vertical-deflection-plate connections, you will have to add them. Two jacks or binding posts are mounted on the front or rear deck of the scope, and are connected as shown in Fig. 2. The isolating capacitors prevent the dc centering voltages on the deflection plates from being shorted out by the tuned circuit. Capacitors with a breakdown rating of at least 1000 volts should be used. The vertical amplifier in the scope is shut off when using the adapter by simply turning the VERTICAL GAIN control all the way down.

With many scopes it is difficult to get good synchronization so that your picture stands still. A voltage rectifier circuit, added to your dummy load and connected to the EXT. SYNC input on the scope will help to lock the picture in place. Fig. 3 shows a schematic of such a sampling device, most of which is already built into Heath's Cantenna.

With the oscilloscope ready to go, connect the pick-up box in the transmitter output line, and attach the tuning unit to the scope (see Fig. 4). With the transmitter keyed, and giving cw output, adjust the TUNING control on the adapter for maximum deflection on the scope tube. It may be that you will have too much deflection; readjusting

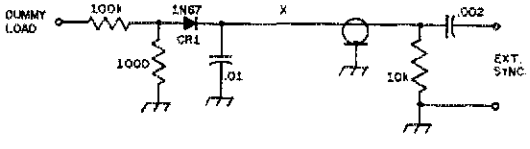


Fig. 3 — Rf voltage rectifier to provide sync pulses for the oscilloscope. The components to the left of point X are already built into the Heath cantenna. Resistances are in ohms, K=1000. Capacitance values are given in microfarads (μF). CR1 is a germanium diode.

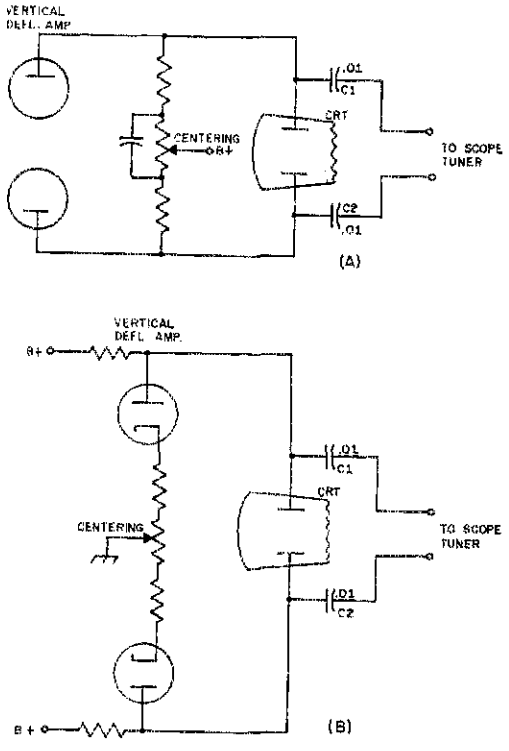
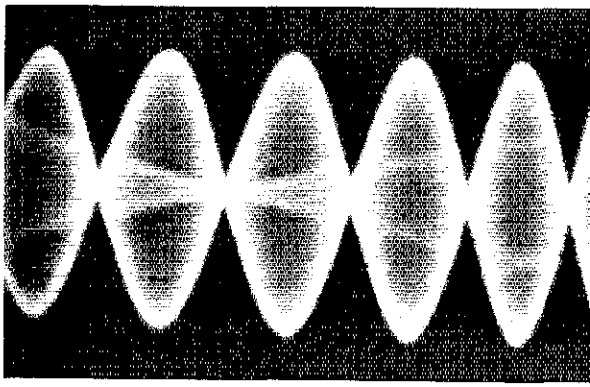


Fig. 2 — Modifications to a general-purpose oscilloscope to allow direct input to the vertical deflection plates. (A) connection for a scope where centering is done in the B-plus lead and (B) where centering is accomplished at the cathodes of the vertical amplifier tubes. The capacitors used for C1 and C2 should have a rating of 1000 volts or more. Connections can be brought out to the front or rear panels of the oscilloscope.

Sample of what you will see using a two-tone test. The defects of an inexpensive scope, visable retrace and nonlinear low-frequency sweep, are evident, but the display is good enough for amateur purposes.



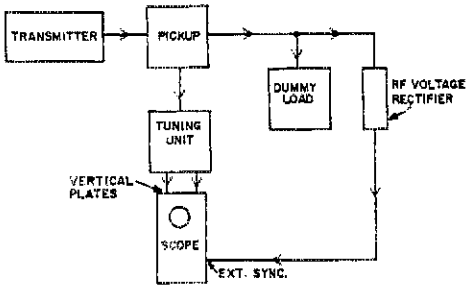


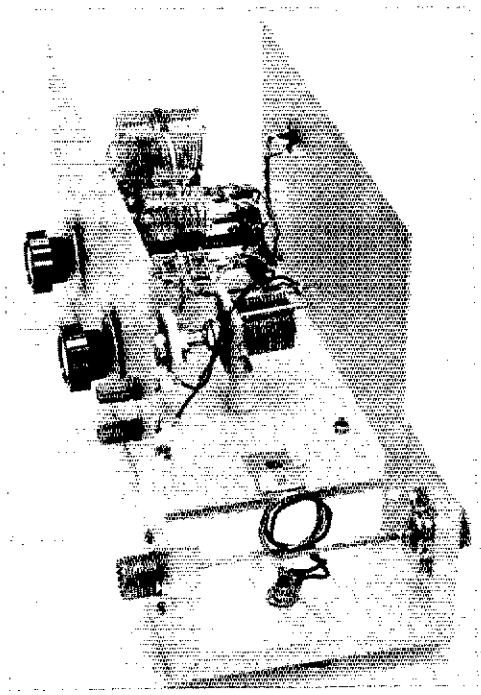
Fig. 4 — Connections to test an ssb or cw transmitter. To avoid unnecessary interference to other amateurs, tests should be made into a dummy load.

the TUNING control will lower the pattern to a suitable viewing height. A 100-watt-output exciter will provide more than full-scale deflection on a 5-inch scope tube. If you don't get a peak in the pattern height, your tuned circuit isn't hitting resonance. Then set the scope sweep to about 30 Hz and say a few words. The familiar "Christmas-tree" pattern will appear. If you want to look at your cw keying, run an electronic keyer at 30 to 50 wpm, sending continuous dots or dashes and observe the make-and-break pattern's rise and fall times. Too fast a make or brake indicates key clicks are being generated.

It is beyond the scope of this short article to explain the techniques of fully testing a transmitter. A recent *QST* article,[1] and Chapter 9 in *The Radio Amateur's Handbook*, have many sample scope patterns with explanations of each. Reading this material is recommended, as well as W1DF's series on the basics of oscilloscope operation.[2] — *W1KLK*

[1] "The IC-TT Generator," *QST*, May, 1970.

[2] Grammer, "The Flying Spot," in three parts, *QST*, March, April and June, 1964.



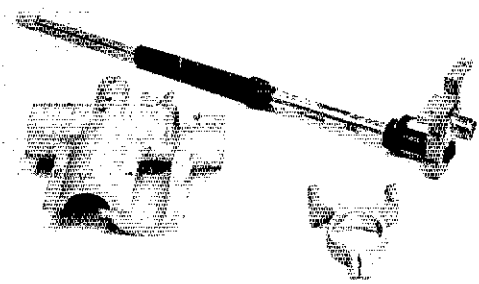
Interior view of the tuning unit and its pickup box. The variable capacitor is used to adjust the vertical deflection on the scope. The tuning unit should be mounted near the scope so that short interconnecting leads may be used. The pickup box consists of a No. 16 conductor forming a single-turn loop. Next to this loop is placed a second two-turn loop of plastic-covered hookup wire.

• *New Apparatus*

Kirk Antenna Hardware

SOME OF the new antenna products from Kirk Electronics should be of special interest to those hams who like to "roll their own" when building beam antennas. The unit shown at the top of the accompanying photo is a concentric, reactance gamma-matching assembly. The variable capacitor used in the more conventional gamma-matching device is replaced in this unit by two lengths of telescoping aluminum tubing which are insulated from one another to form the two parts of a variable capacitor. This method of construction provides a neat, weatherproof matching system for use with 50- or 70-ohm antennas. The gamma rods are available for frequencies from 14 through 50 MHz.

Some additional items of beam-antenna hardware are shown in the photo. At the left is a boom-to-mast bracket which is made of cast aluminum, and appears to be quite rugged. An aluminum element-support bracket is shown in the lower right of the photo. These hardware items are directly available from Kirk Electronics, 6151 Dayton-Liberty Road, Dayton, Ohio 45418. — *W1ICP*



Been looking for details on how to build your own vhf rf power meter and SWR bridge? Well, here is a unit that can fill the bill at minimum cost and complexity. Any amateur with average workshop experience should be able to duplicate the author's unit in a few hours time.

A Combination Wattmeter, Voltmeter and Field-Strength Meter for VHF

BY ROBERT D. SHRINER,* WA@UZO

IN ORDER to tune up an fm transceiver (or any vhf rig) it certainly helps to have a good wattmeter, a dc voltmeter, and a field-strength meter. A study of the catalogs revealed the sad truth that a good wattmeter for vhf would cost at least $100 by itself. After an inventory of my billfold indicated that I was about $99.99 short, the instrument described here was developed.

The circuit is shown in Fig. 1. It features a forward-and reflected-power meter, a dc voltmeter and a field-strength meter thrown in for good measure. The wattmeter and voltmeter functions provide three ranges – 0 - 3, 0 - 30 and 0 - 300.

Design Requirements

The wattmeter design is the result of building practically every Monimatch, Micromatch and similar device that has been published and discovering that none of them was entirely satisfactory for my vhf work. After building these various types, and studying the results, the following rules for constructing an rf wattmeter were developed:

1) The pickup area must be of the same impedance as the feed line.

2) The velocity factor of the pickup area must be unity. Air dielectric is the only medium that will satisfy this factor. (A vacuum would be better but we must remain practical.)

3) The introduction of the pickup loop must not interrupt the concentricity or change the impedance of the pickup area.

4) The pickup loop must enter and leave the area at 90 degrees to the feed line.

5) The pickup loop must be terminated by an ohmic resistance equal to the impedance of the feed line.

6) The length of the pickup loop for a particular frequency can be found from the chart in Fig. 2. A loop cut for 150 MHz will give a meter reading about 30 percent too high on 450 MHz and about 70 percent too low on 50 MHz, as far as the power scale is concerned.

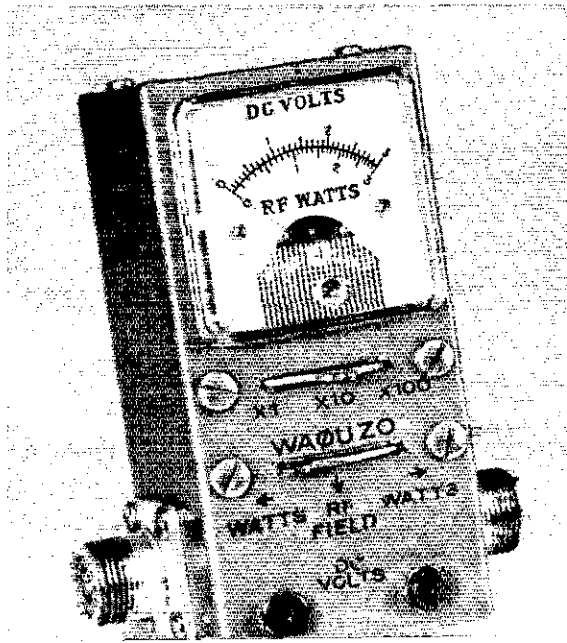
If we make the assumption that my rules are valid, the pickup area must be arranged as illustrated in Fig. 1. The sizes of tubing were chosen from the formula

$$Z_O = 138 \log_{10} \frac{D}{d}$$

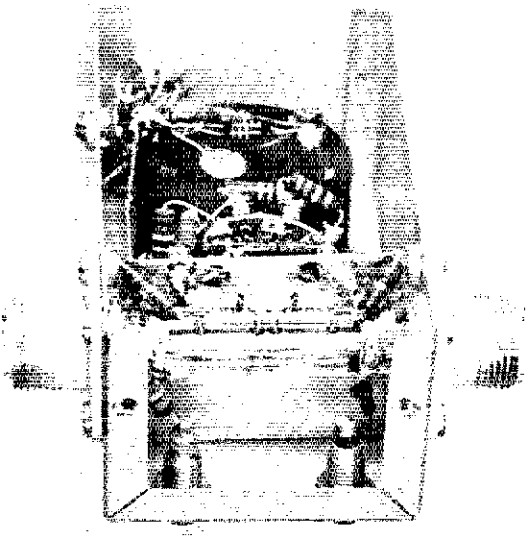
where Z_O is the impedance of the feed line and D is the inside diameter of the outer conductor, and d is the outside diameter of the inner conductor. One combination of sizes for 50 ohms works out to an inner conductor 3/16-inch OD and an outer conductor of 7/16-inch ID. These dimensions were chosen for the author's unit.

In the instrument shown here the loops are for the 2-meter band. Appropriate adjustments will have to be made for other frequencies. Two loops are used and are switched to read forward and reflected power. Diodes CR4 and CR5 should be as closely matched as possible. This can be done with an ohmmeter by checking the forward and reverse resistance of the diodes, looking for two that have similar resistance characteristics.

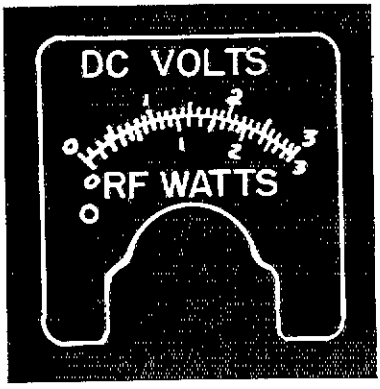
*P.O. Box 969, Pueblo, CO 81002



The top switch is used to provide the three power ranges and the switch at the center is for forward- or reflected-power readings, or for using the instrument as a field-strength meter. The two tip jacks at the bottom are for the dc probe leads.



This close-up view shows the window in the coax and the mounting of the diodes.



This drawing can be cut from *QST*, or copied and used with the meter specified in Fig. 1.

Fig. 1 — Circuit diagram of the vhf test instrument. All resistors are 1/2 watt composition, *not wirewound*, 5-percent tolerance.
C1 — 220 pF disk ceramic.
C2 — 15 pF disk ceramic (for 2-meter band).
C3,C4 — 500-pF feed-through capacitor (Centralab type MFT 500).
CR1-CR5, incl. — 1N34A germanium diode.
J1 — Closed-circuit jack.
J2,J3 — Tip jacks.
J4,J5 — Coax chassis receptacles, type SO-239.
M1 — 50-μA. meter (Burstein-Applebee Co. Cat. No. 17A556).
S1,S2 — 2-pole, 3-position lever switch (Centralab type 1454).
L1 — See text.

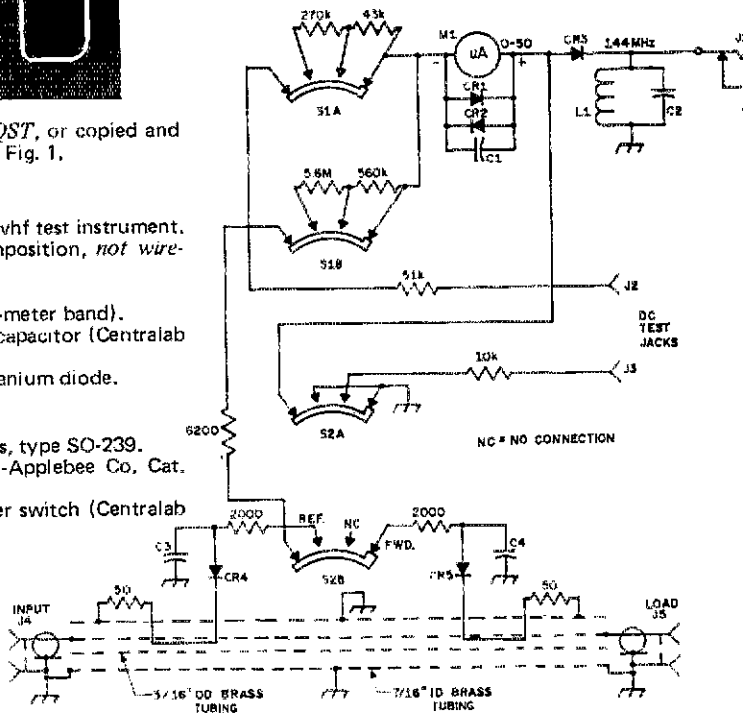
The meter face has two scales; the upper scale is for dc volts and the lower scale is expanded for rf watts to match the nonlinear response characteristics of the diodes.

The field-strength meter arrangement was thrown in for good measure and consists of a simple tuned circuit and a miniature closed-circuit jack to short out the tuned circuit when the antenna is removed, Fig. 1.

Construction Details

Start construction by assembling all parts. The thin-wall brass tubing is available from most model airplane shops. Lay out the box dimensions on aluminum sheet and cut to size (see Fig. 3). Drill all holes; then, using a sharp chisel, cut the slots for the switches. A little patience and file work will make a nice-looking job. Bend the 1/4-inch lips first and then bend the ends over into the box form. You might want to get your friendly sheet-metal shop down the street to do the work for you if your experience along this line is limited. We didn't try one, but a 2 1/4 x 2 1/4 x 5-inch Minibox should work if you don't want to make your own instrument case. A coat of primer and paint will cover a lot of mistakes and give your instrument a professional look. Use press-on or wet-transfer decals for the lettering, and follow up with a coat of clear spray to finish the job and to protect the decals.

Cut the tubing to length and carefully lay out and drill the four holes in the inner and outer tubes. Use the dimensions given in Fig. 2. Cut out a window in the large tube making the hole 1 1/4 inches long and about one half the circumference



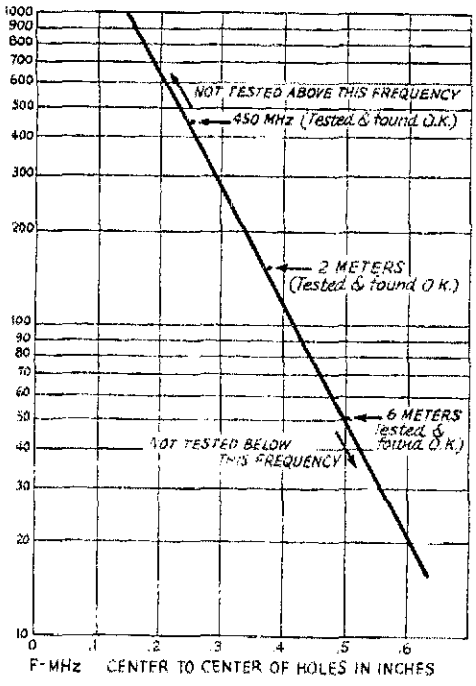


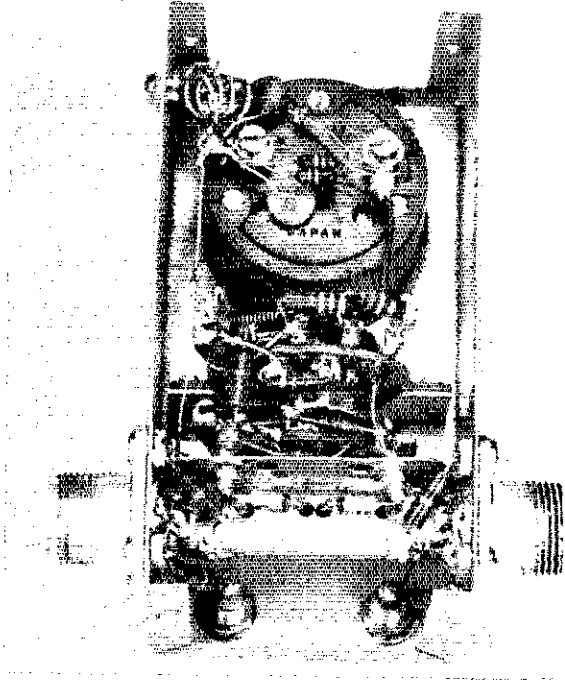
Fig. 2 – This chart shows the hole spacing for the pickup leads for the various vhf bands. These dimensions must be followed as closely as possible in order to assure accurate meter calibration.

of the large tube. Next, tin the inside of both ends of the inner tube.

Mount the tubes and the coax connectors in the box, taking care to align the holes for the pickup loops. Locate the window for easy access to the inner conductor. Solder the outer conductor to the SO-239 connectors. Make sure the copper shield fits tightly inside the box, then solder it to the large tube. Next, the inner conductor can be soldered in place by reaching through the window with the iron. Install the feed-through capacitors (C4 and C5) next, and solder them to the copper shield.

Now comes the critical part. Slip a piece of Teflon tubing over the wire leads of diodes CR4 and CR5, and using a pair of long-nose pliers (and a lot of luck) feed the wire down through the outer tubing, into the inner tubing, across and back up, and out again. This will take considerable patience but it can be done, and should be done as neatly as possible. After the diode leads are installed in the tubing, the window can be closed by means of a section cut from scrap tubing then soldering the section in place.

The rest of the job is easy. The only requirement is to keep the lead length short and as direct as possible.



In this inner view the tuned 2-meter circuit is visible at the upper left, just above one of the meter terminals.

If 5 percent resistors are used no calibration will be necessary for average work; however, if extreme accuracy is desired the resistors should be hand picked and the instrument calibrated to the best standard available.

The tuned circuit, L1C2, consists of a 15-pF ceramic capacitor and three turns of No. 18 wire, 1/4-inch diameter. The coil-turn spacing is adjusted to provide resonance in the 2-meter band. A closed-circuit jack, J1, is used in conjunction with a 2-meter pickup antenna when the instrument is functioning as a field-strength meter. QST

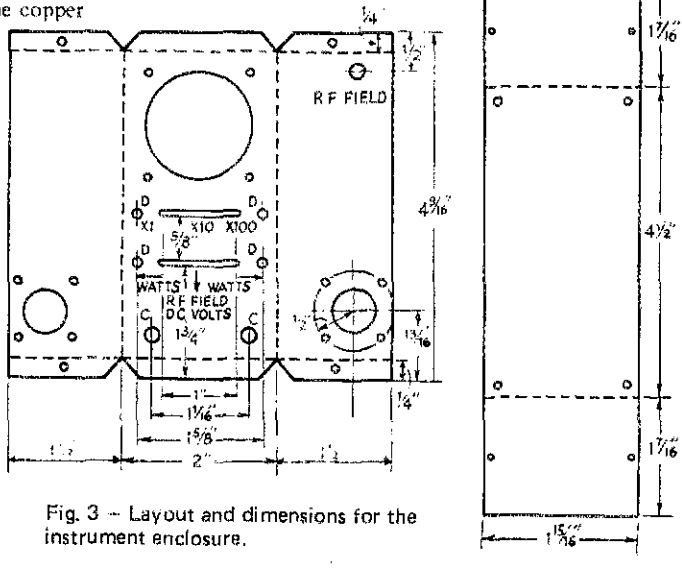


Fig. 3 – Layout and dimensions for the instrument enclosure.

An External VFO for the SB-100 Transceiver

BY A. S. MATHER, VK2JZ

AFTER HAVING an SB-100 for some time, the thought occurred to me that without altering the circuit it should be possible to utilize the crystal-oscillator tube, V5B, as an rf amplifier. The stage could then be driven by an external VFO. The OSC MODE switch, in its various positions, will permit the following types of operation:

a) Transceive operation, controlled by the internal LMO in the LMO or first position of the switch.

b) Transceive operation, controlled by the external VFO in the XTAL or second position of the switch.

c) Cross-frequency operation in the AUX 1 or third position of the switch, using the internal LMO for reception and an external VFO for transmitting.

This has been accomplished by building and using a VFO similar to that in the Swan 350, but with a range of tuning 5 to 5.5 MHz. Fig. 1 shows the external VFO circuit. The buffer stage was modified from that of the Swan circuit. As shown it provides rf amplification (2 to 3 volts of rf is necessary to drive V5B to give sufficient output). Neutralization should not be necessary.

It was desired to make no circuit alteration that would affect the resale value of the SB-100, and to make the addition of an external VFO as simple as possible. The output of V5B could be increased considerably by modifying its circuit, but using it "as is" provided satisfactory performance; consequently, the only modification needed is to run a short piece of coax from under the crystal socket of V5B to the female coax connector marked SPARE on the pack panel of the SB-100. Into this connector is plugged the output line from the external VFO, as shown in Fig. 2.

A full-vision 180-degree dial (see photo) was used to facilitate frequency calibration of the VFO. A 9-volt battery is used to power the VFO.

L1 and C2 are adjusted to give practically linear coverage from 5 to 5.5 MHz, calibrated in 10-kHz steps from 0 to 500 kHz on the dial.

By using the XTAL position of the OSC MODE switch and the CAL position of the FUNCTION switch, the calibration of the external VFO dial can be checked at 100 kHz intervals against the internal calibrator of the SB-100. Adjustment is made by means of C3, accessible through a small hole in the front panel beneath the main tuning knob.

The stability of the unit is excellent, and no warm-up time is required. Although frequency readout on the external unit is not nearly as good as that of the internal LMO, it is adequate for my purposes. There is no reason why the readout accuracy of the internal LMO could not be duplicated, if desired.

The unit could be made smaller, but mine was made from parts that were on hand, and only a limited amount of time was devoted to it. The

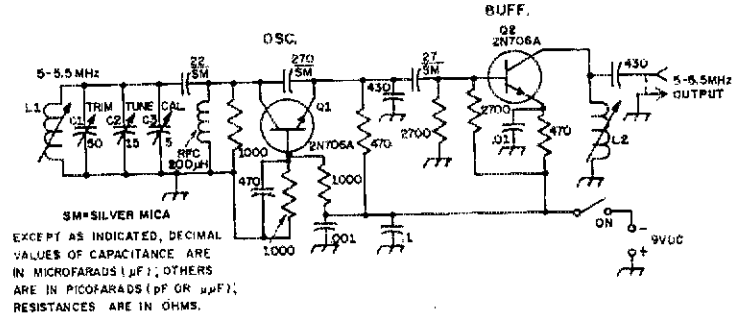
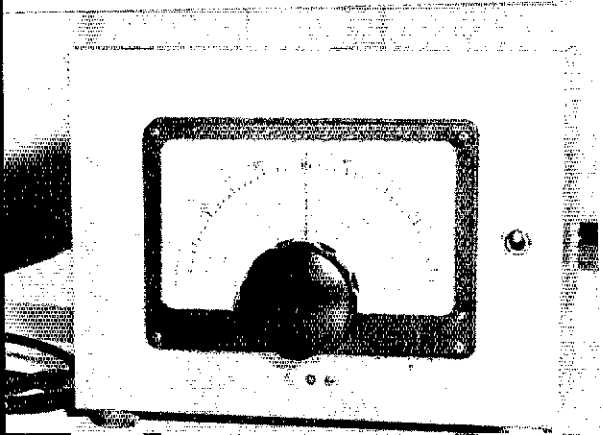
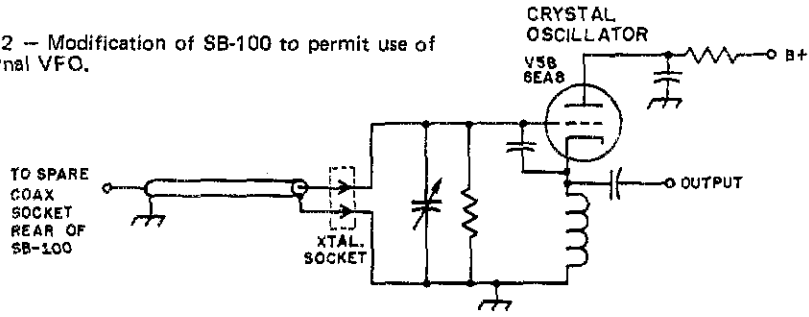


Fig. 1 — Schematic diagram of the VFO. All resistors are 1/2-watt, capacitors are mica.
C1 — Air variable, 50 pF.
C2 — Air variable, 15 pF.
C3 — Air variable, 5 pF.
J1 — Phono jack.
L1 — Slug-tuned variable, 18.8 to 41µH (Miller 42A335CBI or equiv.).
L2 — Slug-tuned variable, 30 to 69µH (Miller 4408 or equiv.).
Q1, Q2 — Silicon npn, rf or high-speed switching (2N706 or equiv.).



The external VFO for the SB-100 transceiver. The case is 6 1/2 × 5 1/2 × 9 inches. Below the frequency-control knob is a small screwdriver-adjust capacitor for calibrating the VFO.

Fig. 2 — Modification of SB-100 to permit use of external VFO.



VFO output is fed to the SB-100 through a 6-foot length of RG-58/U coax.

As a final word, Heath advises that when using separate transmit and receive frequencies (as in the AUX position of the OSC MODE switch), the frequency spread should be limited to about 20 kHz at 3.5 MHz, 40 kHz at 7 MHz, 80 kHz at 14 MHz, and so on. This is because the driver preselector tunes both the transmit and receive circuits. I find that peaking the preselector on the transmit frequency does not degrade the receiver sensitivity too much when used at a greater frequency separation than is recommended.

[EDITOR'S NOTE: Shortly after accepting Mr. Mather's article for publication, we were saddened to learn of his passing.] QST

Frequency Counter

(Continued from page 23)

perhaps, for anything else at the operating position. One of the wonders of "third-generation" computer components is the compactness of the resulting equipment, which in this case turns out to be no larger than a table-model radio.

The photographs show top and bottom views of the frequency counter minus its homemade sheet-aluminum box. The panel is of 1/8-inch aluminum and is held to the 7 x 9 x 2-inch chassis by the control nuts on the three selector switches. The long window in front of the readout tubes is covered by a glued-in red plastic filter, which improves visibility of the display in a brightly lighted room.

Mounted on 1/2-inch threaded spacers at the top front of the chassis are two two-sided etched-circuit boards,[9] each measuring 4 1/4 by 4 1/4 inches. Each board holds the circuitry for four of the eight digits of the main counter, including the four readout tubes in sockets lined up along the front edge. At the rear of the chassis deck is the power transformer, and beside it, heat-sinked to the chassis, is the 2N5037 transistor for the 5-volt supply. Next to the transformer on the other side is a two-sided etched-circuit board measuring 2 1/2 by 3 1/2 inches; this board holds the five integrated-circuit chips comprising the count gate and control logic. Supported above the digital counter, on sloping sheet-aluminum brackets, is the FS-1 frequency standard.

On the rear apron of the chassis are the 117-volt twist-lock power receptacle, the fuse holder, and seven phono jacks for the coaxial cables from the transmitter and receiver. An eighth phono jack is provided for bringing out any of the marker frequencies from the FS-1, if desired.

[9] The author has layout patterns available for the etched-circuit boards. Send SASE. — *Editor*

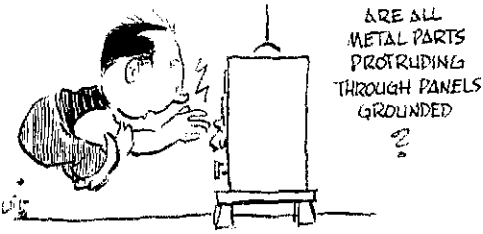
The non-digital circuits have been mounted beneath the chassis to shield them from the steep wave-fronts in the counters and the logic circuits. Most of the power-supply circuits are on an etched-circuit board supported on 5/8-inch threaded spacers beneath the chassis. The mixer circuits, the band switch, and the linear integrated circuits are combined into a subassembly which is supported under the chassis on a bracket at the rear and on the control-shaft bushing of the band switch at the front.

Conclusion

This project has provided the writer with a liberal education in current state-of-the-art digital circuitry, microcircuits, and frequency-measuring techniques. It has also resulted in a serviceable instrument that is a pleasure to use in everyday station operation.

The counter has been used in an ARRL frequency-measuring test and it turned in an award-winning performance. Between FMTs, it is doing yeoman service as a piece of precision frequency-measuring equipment, not only for the writer but for many other amateurs who have requested frequency checks.

Thanks are due W2CA, W3RKF, and W4AX for editorial assistance, and for their continued interest and encouragement. QST



Technical Correspondence

MICROCIRCUIT ELECTRONIC KEY

Technical Editor, *QST*:

The Microcircuit Electronic Key by K2ERI, in September 1969 *QST*, provided me with a most enjoyable exercise in integrated circuitry. However, an annoying feature of the completed keyer caused me to reexamine both my wiring and the article: the DASH lever must be held closed a tiny bit longer than the length of a dot for the dash flip-flop to make a dash. If the DASH lever is released earlier than a "dot-plus" length, the keyer will only make a dot. Fig. 3, page 33 of the earlier article, verifies this, although it is not immediately apparent.

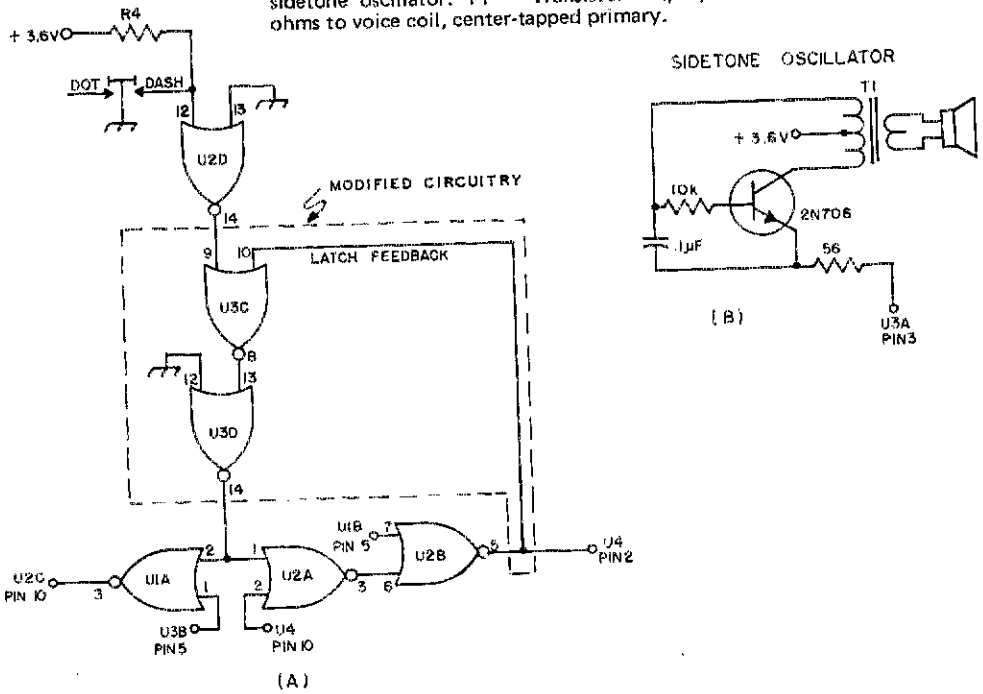
Practice with the keyer teaches one to hold the paddle closed long enough to make dashes. Human imperfections persist, however, and one eventually lets go of the lever too soon — in particular when the speed control is changed, and you send an S for an R or a D.

Fig. 1 shows modifications to the original circuit to make a self-completing dash whenever the DASH paddle is closed, *regardless of how quickly the paddle is released.* This is done with two additional NOR gates, obtained from the original sidetone oscillator. The oscillator function, in turn, is obtained from a single npn transistor. Since I hand-wired my keyer (instead of using an etched board as shown in the article), rewiring was not difficult. One could easily remove foil from the etched board with an X-Acto knife and rewire to the new configuration with small hookup wire. Color-coded telephone-cable strands are ideal for this confined work.

The circuit works as follows. Closing the DASH lever brings both inputs of U2D low and its output goes high. This high causes the output of U3C to go low and U3D, used as an inverter, to go high. At this point U1A pin 2 and U2A pin 1 are both high, and the circuit functions as described in the original article. The dot generator operates and the dash flip-flop toggles on the negative-going output of U2B. The combination of the dot from U1C and the output from U4 is used in U3A to make the dash. Note, however, the connection from the output of U2B to pin 10 of U3C. It is this line which brings a high input to U3C, a few nanoseconds after the DASH paddle closes, causing its output to stay low (or latch) when the DASH paddle is released. U3C will thus stay low slightly longer than the negative-going dot from U1B, causing the dash to become self-starting as well as self-completing. The circuit does not affect dot generation.

The above modification results in a keyer that is much easier to operate. No conscious effort is

Fig. 1 — Circuit modification for Microcircuit Electronic Key to provide self-completing dashes. U3C and U3D, originally used as the sidetone oscillator, are rewired to provide a dash memory. Shown at B is a circuit suitable for a replacement sidetone oscillator. T1 — Transistor output, 500 ohms to voice coil, center-tapped primary.



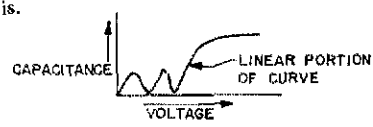
required to hold the paddle in the DASH position longer than a dot. The sidetone oscillator presented in Fig. 1 is one of several described in earlier keyer articles: any favorite audio oscillator circuit will do. *Lt. Col. Herbert M. Rosenthal, W4VFP, 4741 Playfield St., Annandale, VA 22003.*

FSK CIRCUIT FOR VFO/FREQUENCY-MULTIPLIER TRANSMITTERS

Technical Editor, *QST:*

Perhaps the circuit of Fig. 2 is nothing new. I obtained it from a friend, and do not know where he got it. I have installed it in two VFOs, an Eico 722 and an Apache TX-1, and in both cases it worked very well. This circuit gives exceptionally clean and positive frequency-shift keying.

The circuit works on the capacitance-vs-voltage change of diode CR2. The C/V curve is something like this.



R1, CR1 and C1 merely provide regulated dc at 18 volts. It is desirable to have this source within the transmitter, since the rest of the circuit will cause the VFO to chirp during cw keying, unless this bias voltage is regulated. The bias control R2 sets the operating point of CR2 on the C/V curve. It is desirable to bias the diode into the linear portion of the curve for obvious reasons. CR2 is not critical as to type. Any silicon diode with a PIV rating of 50 or greater will work. The value for C3 can be determined experimentally. In the Apache, 5 pF worked fine; the Eico required a much smaller value. In general, it must be less than 10 pF. The idea is to try a value and then check for VFO chirp during cw keying. If there is chirp, try a smaller value. If too small a value is used though, it may be difficult to obtain enough shift.

With this circuit, any value of shift between 50 Hz and 5 kHz can be obtained. By adding a resistor in series with R3, an upper limit may be set so that shift cannot exceed 900 Hz.[1] The amount of shift changes with changing VFO frequency, but remains relatively constant over about 20 kHz, so small changes in frequency do not necessitate readjustment of the shift control. Also, when the variable frequency is doubled or tripled, so is the shift, so the shift control must be readjusted for band changes.

For RTTY operation, this circuit gives exceptionally clean keying and good shift control, with only a few inexpensive components. — *Robert Cram, WA8YUB, 2851 12th St., Cuyahoga Falls, OH 44223.*

"FIST" MONITORS?

Technical Editor, *QST:*

Notwithstanding all the *sidetone* audio oscillators, powered by rf or otherwise, and blithely called *cw monitors*, they "h'aint!"

A *monitor* is an instrument with which the operator checks his *signal*. It used to be (1930s) an autodyne detector in a shielded case with its own batteries — inside, of course. With headphones switched to it, one heard a weakened replica of the rig's output, *knew* how it sounded, knew if bad things happened. Not so with audio frequency tones. — *Temple Nieter, W9YLD, 707 Sheridan Rd., Evanstan, Il 60202.*

1 Limiting the frequency shift in this manner will be useful only in transmitters which heterodyne the VFO signal to the operating frequency. If frequency multiplier stages follow the VFO, the shift will be multiplied accordingly, as mentioned in the text. — *EDITOR.*

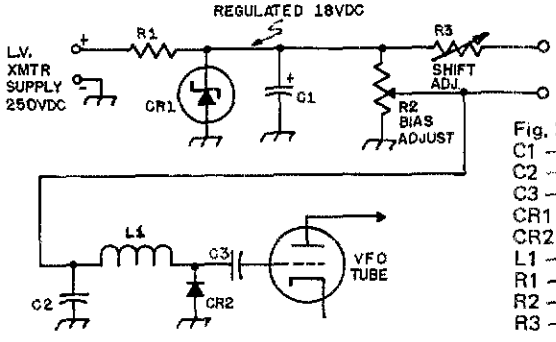


Fig. 2 — FSK circuit for addition to VFO.
C1 — Electrolytic, 25-μF, 25-Vdc.
C2 — .01-μF disk.
C3 — See text.
CR1 — Zener, 18-V, 5-W (1N5355 or equiv.).
CR2 — See text.
L1 — Rf choke, 2.5 mH.
R1 — 5000-ohm, 15-W.
R2 — Linear-taper control, 5000-ohms 2-W.
R3 — 10-turn control, 5000-ohms 2-W.

The Ham Builder's Nightmare

(Continued from page 14)

of small orders has caused many distributors to cease handling small parts, and many more are expected to drop out of this business for the same reason.)

6) Customers should include this specific information with orders:

a. "Ship everything you can within 10 (?) days and cancel the balance of the order.

b. "Ship partial ASAP, and balance when available."

It would appear that Bil has made some excellent points. So, try to extend a little courtesy and patience when working with your favorite distributor. He has his problems too!

Good hunting gang! QRT

—•••—

Changes of Address

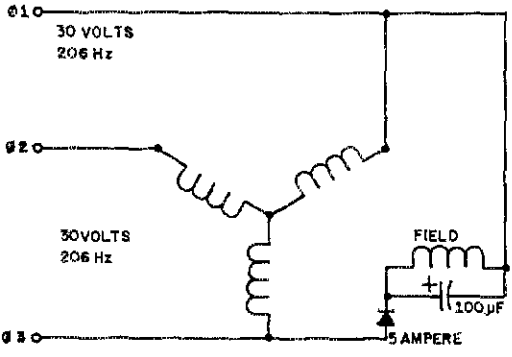
Please advise us direct of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

Hints and Kinks For the Experimenter

EMERGENCY LIGHTING POWER

Several articles in past issues of amateur radio magazines have described the use of 6- and 12-volt alternators coupled to lawn mower engines for use on Field Day, and as emergency power supplies. In each case the requirement of a battery for a field supply has been somewhat of a handicap. A battery, however, is not needed. Such systems will self-excite; at least my Leece-Neville 7-volt 50-ampere 5172-G-3 alternator does, provided the field is energized as described by the drawing and a sufficiently large capacitor is used.

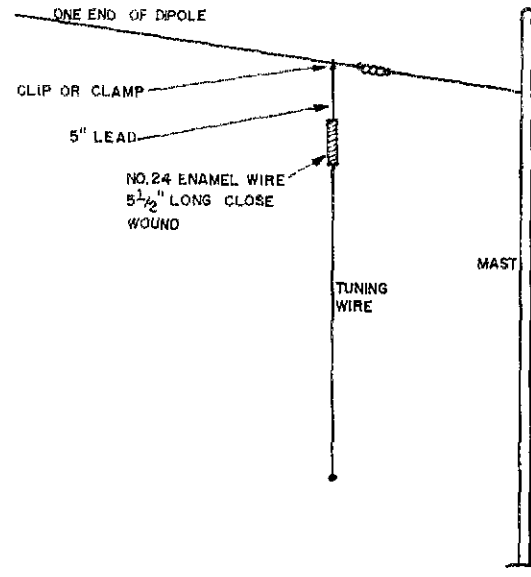
My alternator is driven by a Briggs and Stratton engine at about 2000 rpm. The field supply is excited from one phase of the alternator through a single Westinghouse 50-volt, 5-ampere diode, and a Mallory NP3014 100-μF, 200-volt capacitor (which happened to be on hand.) The measured field current is 5 amperes. The output frequency is 206 Hz.



As described, this alternator produces secondary voltages of 30 volts ac per phase. This 7-volt machine has run for periods of more than 5 hours continuously at 400 watts while operating eight 30-volt, 50-watt marine bulbs for emergency lighting without any indication of alternator heating or voltage breakdown. This arrangement may be used in many ways. The point of my suggestion, however, is the elimination of the need for a separate storage battery for field supply. – *James O. Wood, W1AYG*

A 160-METER SHORT DIPOLE

While searching through the *Hints and Kinks* publication I saw an idea by K7CRO using loading coils at the ends of a 40-meter dipole so it could also be used on 80 meters. Since I live on a city lot just long enough for my 80-meter dipole, I thought this idea might be used with an 80-meter dipole to get a 160-meter antenna. After several hours of trial and error I finally found the right



combination of coil and tuning wire that would work on 160.

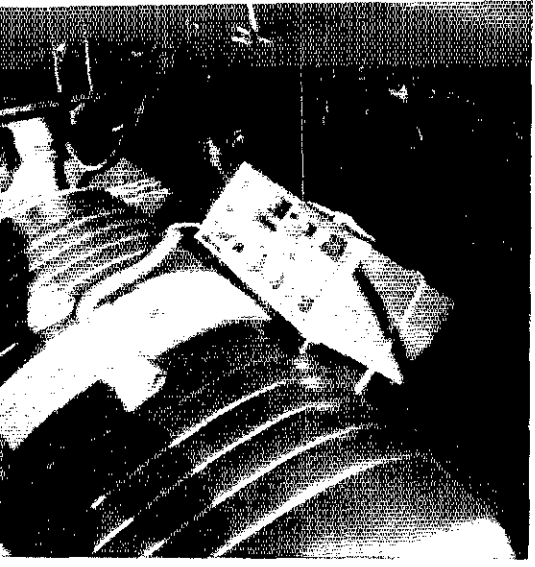
The coils are close-wound on an 8-inch piece of golf-club-protection tube (which has an OD of 1 1/4 inches) using No. 24 enameled wire for a length of 5 1/2 inches. To one end of the coil I attached a 5-inch clip lead, and to the other end an 8-foot length of "tuning wire" using No. 26 wire. The coils and their tuning wires are clipped to each end of the 80-meter dipole and are allowed to hang straight down. After tuning up on 1810 kHz I cut 2 to 3 inches at a time off each tuning wire until the SWR dropped to 1 to 1. The final length of each tuning wire was 6 feet 6 inches.

The addition of these loading coils raised the 80-meter resonance point about 100 kHz but it could be lowered again by increasing the length of wire clipped between the antenna and the coil. The coils permit the dipole to be used on both bands. – *Neil Klagge, WØYSE*

AN INEXPENSIVE MOBILE MOUNT

The heart of this mount is a boat tie-down strap. This strap is made of cloth-covered nylon, or rubber, and is available from marine supply companies in almost any length. The price ranges from 49 cents to one dollar and the strap comes complete with hard plastic hooks on each end. (Even in colors!)

Just set the rig on the transmission hump, prop the front feet on the seat, and hook one end of the tie-down strap to a spring under the seat. Then stretch the strap across the rig and hook it to a spring on the other side of the seat. If you have



any slack in the strap, and can't find a spring far enough back to keep tension on the rig, tie a knot in the strap. If the connections for the rig are too near the floor, place a small piece of wood or rubber under the rear of the rig. Removal is easy; just unhook one end of the boat tie, pull the rig up, and let the tie fall under the seat until you wish to use it again. – *Dave Ingram K4TWJ*

LIGHTNING PROTECTION FOR YOUR HOME AND EQUIPMENT

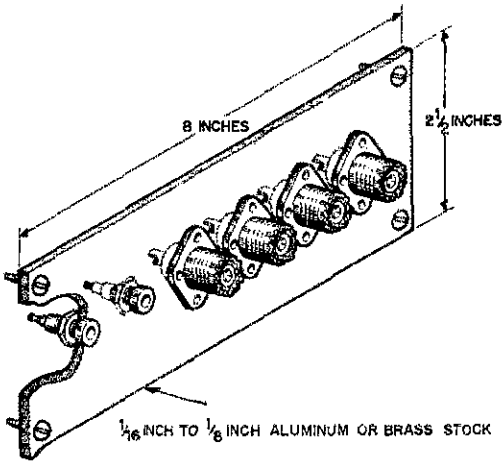
The National Electrical Code No. 70, section 810-57, states: "Lightning Arrestors – Transmitting Stations. Each conductor of a lead-in for an outdoor antenna shall be provided with a lightning arrestor or other suitable means which will drain static charges from the antenna system. *Exception No. 1*: When protected by a continuous metallic shield which is permanently and effectively grounded. *Exception No. 2*: Where the antenna is permanently and effectively grounded."

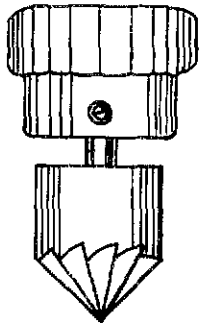
Knowledgeable, safety-minded amateurs provide electrical and mechanical facilities which will achieve the above. But what happens if a direct lightning stroke hits your tower, support, or antenna? Lightning arrestors, described in amateur radio handbooks, are probably adequate for bleeding off static charges when thunder storms develop near your home. These devices will not, however, prevent damaging voltage and current from reaching your shack and equipment when your antenna tower or support is subjected to a direct hit.

A simple system which I devised has been in use at my QTH for several years. Though no direct hits have occurred in my area, this protection will prevent a lightning stroke from reaching the building or equipment via the feed lines. I have five antennas on my property. They are terminated in such a manner that the coax and open lead-in lines may be easily removed and laid several feet from the building.

The metal plate, equipped with coax connectors and banana jacks, is mounted on the outside wall of the shack and a similarly-equipped plate is mounted on the inside wall of the radio room. Coax connectors are linked together by short pieces of RG-8/U cable. The banana jacks are glued with epoxy into 5/8-inch diameter plastic tubing and connected with No. 14 copper wire which runs through the protective tubing from jack to jack. The antennas selected for use are attached to their respective connectors, and when operation ceases for the day the feed lines are disconnected and placed on the ground, 3 or 4 feet from the building.

Use of a rotating beam will necessitate a control cable. The builder may wish to add a multiple connector to the metal strip which may also be disconnected. This simple procedure will afford ample protection to home and gear and will eliminate much anxiety during stormy weather. – *Merl N. Boyer, W9ZSI*





A DE-BURRING TOOL

One of the problems confronting the equipment builder is the task of de-burring the holes drilled in metal or printed-circuit boards. A small countersink fitted with a control knob is a very handy and convenient tool for removing sharp edges. – *Ray Norberg, W9PYG*

Recent Equipment

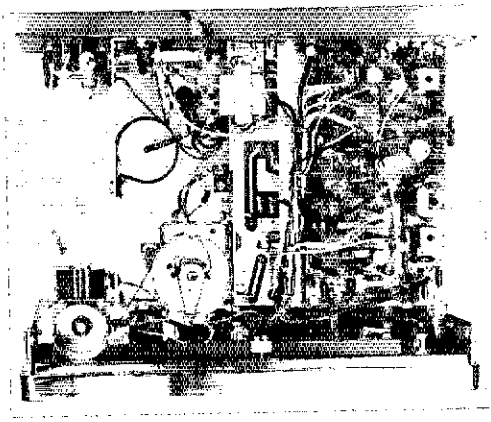
To acquaint you with the technical features of current amateur gear.

The Heath GR-78 Receiver

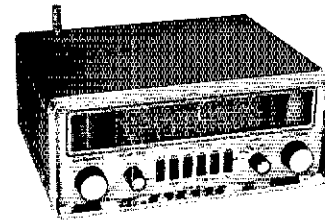
ABOUT TEN years ago the Heath Company brought out its "Mohican" transistorized portable receiver kit,[1] quite an innovation for its day. That model has now been discontinued in favor of a newer version, the GR-78. By comparison it certainly merits a number of "plus" marks – expecially those for selectivity, avoidance of cross-talk, compactness/portability, and mighty attractive appearance.

The unit covers 200 kHz to 30 Megs in six bands. Aside from its short-wave general coverage, and ham bandspread, it is useful also for lf marine-band listening (tho there's not too much to be heard there by us inland folks these days) as well as a bc portable for the summer cottage or beach. It has good sensitivity and surprising selectivity – in the rf section as well as i-fs. It is more compact, adding to its main purpose of portability. An internal "Ni-Cad" battery will keep it running any reasonable number of hours a day if kept plugged into house power for automatic charging; or for straight in-the-field operation, more than 8 hours (in our tests, at least) without revitalization. Charging – as well as full-time operation – can also be accomplished by connection to a 12-V car battery. An integral, collapsible whip antenna makes the unit completely self-sufficient – tho naturally connection to a separate antenna improves the reception considerably. Audio power probably wouldn't satisfy a rock-and-roll teenager, but is quite adequate for any normal purpose. Sideband reception is good, though you won't find an "upper" or "lower" switch; the BFO is right at the i-f center. And it is a rather handsome piece of gear; the most hard-hearted XYL would have difficulty faulting its appearance in any room of the house.

[1] *QST*, December 1960, page 32.



Top view of the GR-78. The basic receiver board is at the right, accomodating the i-f, second conversion oscillator, detectors, BFO and audio circuits. A larger board, underneath and only partly visible, serves as a patch panel between the various sections.



Circuit Features

The block diagram in Fig. 1 shows the general set-up. All circuitry is of course solid-state. There are thirteen silicon and two germanium transistors. Five of the former are FETs, with dual-gate types employed at appropriate points (rf amp., mixers, product detector) to help avoid cross-modulation and overloading – somewhat of a problem in the earlier Mohican.[2]

Selectivity is attained primarily through the use of four tiny ceramic passband filters, twice the number used in the Mohican; the spec is 7 kHz at 6 dB down, which is a good compromise to cover both bc reception and ham sideband. Moreover, they need no attention in the alignment process, and the book says they will hold adjustment for ten years or so. Two detector circuits perform their special functions – a simple diode for a-m; an FET product job for cw and sideband, with the BFO signal fed to gate 2. Agc action is provided at two points. A portion of the i-f signal is rectified by a 2N3694 and this transistor, in turn, controls the gain of the first i-f amplifier. In addition, when the incoming signal rises above a preset level, agc voltage from a pair of diodes is applied to gate 2 of the rf amplifier to further reduce the overall receiver gain.

A double-conversion system is used on the top band[3] only, 18 to 30 MHz, to reduce images from direct use of the basic 455 kHz i-f. A portion of the circuit is shown in Fig. 2. In all band-switch positions but F, the basic mixer FET produces 455 kHz output which is fed to G1 of a dual-gate FET

[2] The Mohican used bipolar transistors throughout, and bipolar transistors do not have the dynamic-range capability of FETs.

[3] With apologies to our G friends, to whom 160 meters is "top" band.

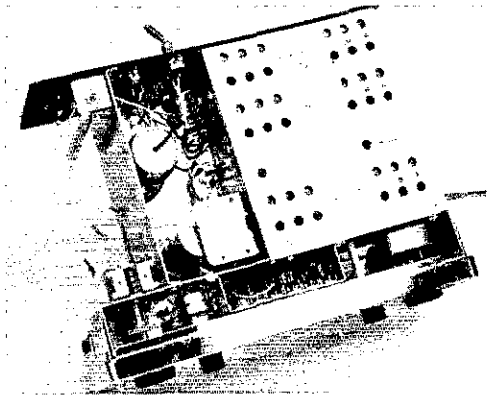
(40673); in the F position the output is at 4.034 MHz – the local oscillator being that much higher in frequency than the incoming signal. The same band-switch position also connects power to a conversion oscillator (2N3694), crystal-controlled at 3579 kHz, whose output goes to G2 of the 40673. The two signals (3579 and 4034) combine to produce the necessary 455 kHz, which continues on its way through the ceramic filters.

Assembly

The unit is in modular form. Four printed-circuit boards – antenna, rf, mixer, oscillator – plug into a large panel furnishing power and the "patching" between sections, which are well-shielded. All this makes for ease of wiring and assembly and – should the occasion arise – servicing.

Up to the test stage, a total of 14 1/2 hours was required for assembly. A more careful workman might require additional time, since the writer seldom goes through the proper preliminaries of parts counting and sorting, but instead sooner or later mutters a few four-letter words to describe the Heath Company and its missing part – then later finds the part was just where the instructions said it was.

In a unit as compact as this, some of the soldering processes get a bit delicate, but not beyond average ability if suitable care is taken. We found only the mounting of trimmer capacitors tricky; again, if one relies on the instructions rather than his own judgement, he'll make out okay. In other words, the instruction manual is up to the usual Heath first-rate standards.



With the bottom cover removed, alignment is normally accomplished by adjustment of only the trimmer capacitors. Coil slugs can also be adjusted, but this is not usually required. The open area in the center includes the main tuning capacitor and the Ni-Cad battery. The vacant space at the right is room for the speaker, mounted on the top-and-sides cover.

Alignment and Operation

The receiver can be aligned with or without test instruments. We tried "without" first, and found it an extremely simple procedure – mostly because the ceramic i-f filters need no adjusting. Oscillator-trimmer settings did take a bit of time to provide accurate dial calibration. In fact on one band, 3.0 to 7.5 MHz, we had to resort to coil-slug adjust-

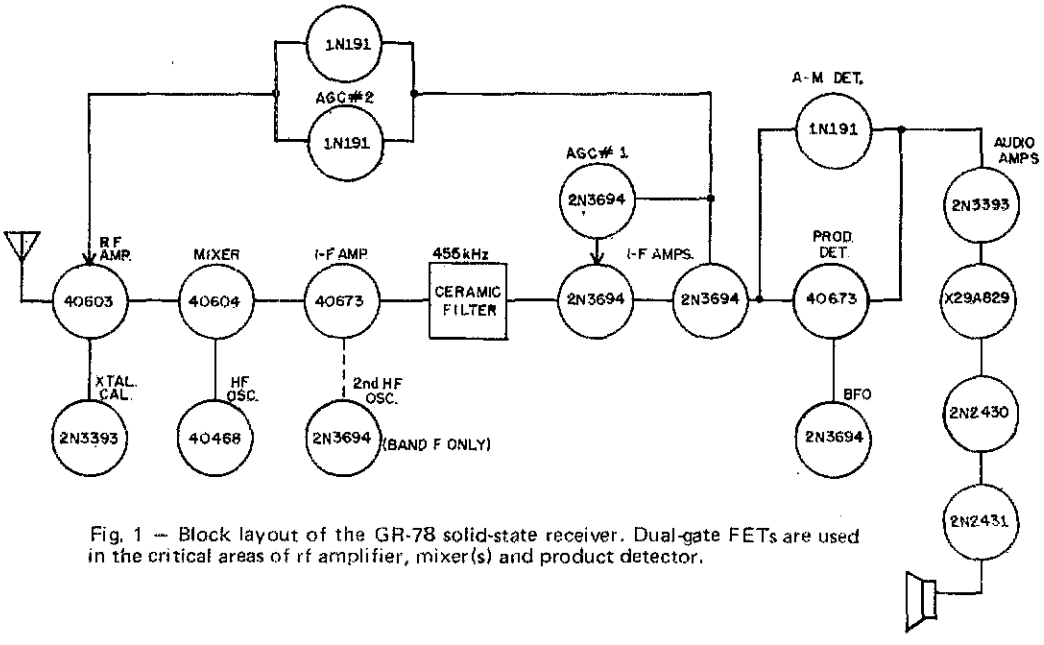


Fig. 1 – Block layout of the GR-78 solid-state receiver. Dual-gate FETs are used in the critical areas of rf amplifier, mixer(s) and product detector.

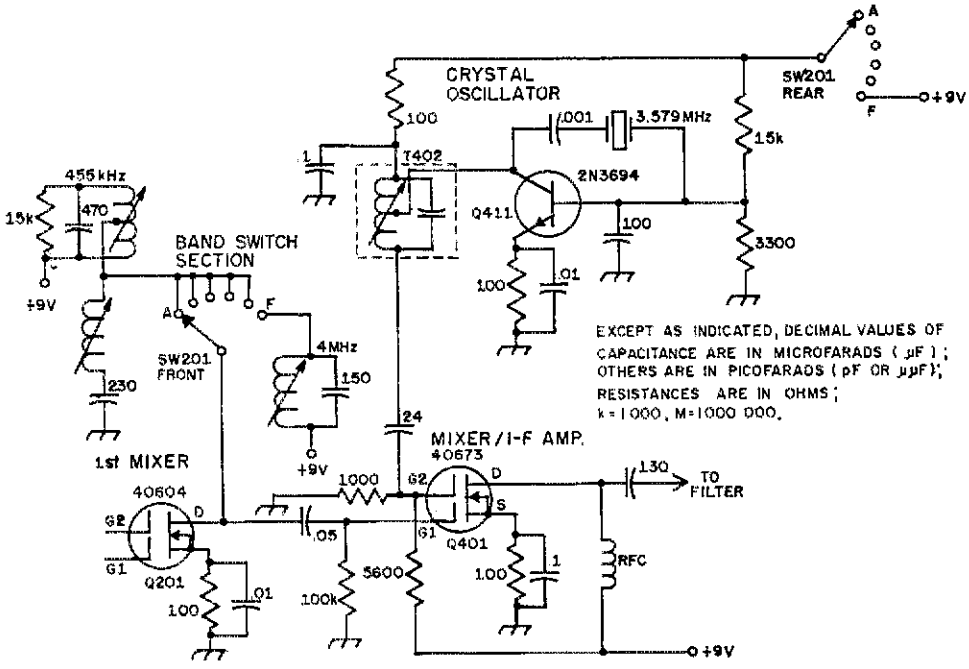


Fig. 2 — Dual conversion is used on the highest-frequency band, 18 to 30 MHz. Normally the output at 455 kHz from the drain of the first mixer is simply fed to gate 1 of a 40673 i-f amplifier. When the band switch is turned to F, however, the first hf oscillator operates 4.034 MHz (rather than 455 kHz) higher than the desired incoming signal; at the same time a 3.579 crystal oscillator is activated and its energy fed to gate 2 of the 40673 — which then becomes a second mixer instead of a straight-through i-f amplifier.

ment to obtain proper calibration — and one isn't supposed to do that without instruments. A later check with a signal generator, however, showed that the initial alignment was overall, more than adequate.

Despite the use of an FET rf amplifier that is tapped down on the first-stage coils, self-oscillation (with rf gain full on) was at first a troublesome problem, solved by redressing a couple of leads to the main variable capacitor and slipping braid over them, with the braid soldered to nearby ground lugs. Use of small-diameter coax might even be better.

The only significant difficulty encountered was in the bandspread setup. First of all, for an old low-end-of-80 cw man (and there are still a few of us left) it is nigh impossible to read the dial unless you (1) set the unit on an eye-level shelf, or equip it with propped-up front, or (2) crouch down with your chin on the operating table. The top of the bandspread dial is effectively hidden from view in any other situation.

But more important, once you set the main dial to the desired band edge and start tuning the bandspread knob, the overall receiver gain rapidly goes to pot. The reason is that the bandspread variable is a single-section capacitor,tuning only the oscillator. This arrangement was used in the Mohican also, but apparently the greater selectivity of the GR-78 causes tracking problems. The difficulty arises to only a slight degree at 15 and 10 meters, but on 80, for example, tuning 100 kHz from the peaked position requires about double the signal strength to obtain the same output.

A partial solution is to peak the antenna and rf trimmers with the bandspread set at center scale. Or one can set the main dial close to the desired frequency and then "zero in" with the bandspread with little or no loss of gain. A much better solution, if it doesn't produce feedback, would be a 3-gang capacitor to replace the single unit now used for bandspread; there is cabinet room. (We may just try it later.)

Otherwise, operation is satisfactory. A 500-kHz calibrator helps locate yourself on the dial, especially if you haven't matched the readout exactly. The flywheel on the main tuning knob provides a fairly smooth "feel." Two dial lights operate from a spring-return rocker switch for momentary use at night.

Final Comments

This is not an expensive unit; one doesn't expect or get R-390 performance. W1CUT's review of the old Mohican included the comments, "These measurements (about 7 inches high, 12 wide, 10 deep) represent about the smallest practical size one would want without sacrificing dial area, knob size, and so on." The newer model has been lowered in chassis height so that the earlier

3-inch-high dial is now squished to 1 1/2 inches. It is a compromise between compactness and operating convenience.

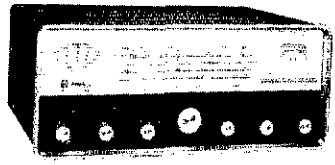
A beginner should find the GR-78 wholly satisfactory as a basic station receiver. For a more experienced amateur it could be a good standby and general-coverage receiver to supplement the ham-band-only units most of us have these days, as well as having the convenience of completely portable operation when desired. In addition, it would be reassuring to know that in case of power outage for disaster or whatever reasons, you have an operating receiver that can go anywhere. – *W1LVQ.*

Heathkit GR-78 Receiver

Height: 4 3/4 inches for chassis, plus 1 1/2 more for antenna tip.
Width: 11 1/2 inches.
Depth: 9 inches.
Weight: 10 pounds.
Price Class: $130.
Manufacturer: Heath Company, Benton Harbor, MI 49022.

QST ——— QST ——— QST

The Knight-Kit R-195 Receiver



AN EXAMPLE of straightforward solid-state circuit design is seen in the Knight R-195 kit receiver. This 13-transistor superheterodyne receiver employs a standard single-conversion lineup with a 455-kHz i-f. It provides coverage from 200 to 420 kHz on its lowest band, then permits continuous coverage from 550 kHz to 30 MHz on its four remaining bands.

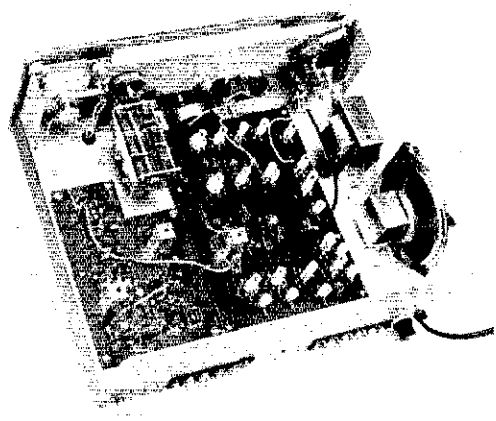
Ceramic filters are used to set the i-f bandwidth at 2.5 kHz at the 6-dB points on the i-f response curve. Though this bandwidth is suitable for ssb reception, it tends to restrict the fidelity when listening to the broadcast band. Cw reception is satisfactory at this bandwidth, and if additional cw selectivity is desired it should be a simple matter to add an outboard passive filter.[1]

The kit comes with complete assembly instructions, and there are no baffling procedures to follow when putting the unit together. This writer required approximately 15 hours to build the receiver. The alignment took one hour to complete.

Modern circuit design is used in the front-end section of the equipment – JFETs being put to work in the rf amplifier, mixer, and local oscillator. A common-gate hookup is used in the rf stage. The source is tapped down on the input tuned circuit to assure an impedance match and resonable selectivity. A second tuned circuit provides added selectivity. It is used in the drain of Q1, and the signal from it is coupled to the gate of the mixer, Q2, through a 0.005-μF capacitor.

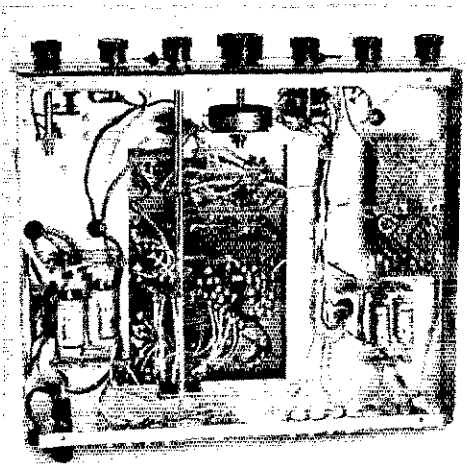
A Hartley oscillator is used at Q3. Its output is taken from the oscillator source tap and is fed to the source terminal of the mixer, across its 51,000-ohm source-bias resistor.

The ceramic i-f filters mentioned earlier are used as coupling elements between the three bipolar i-f stages. An i-f transformer couples the third i-f stage to a diode detector for a-m reception. The mode switch on the front panel selects audio output from a bipolar-transistor product detector during ssb or cw reception. In the ssb/cw position another section of the same switch applies operating voltage to the BFO and product detector to activate those two stages. Audio output from the detector in use is coupled to a four-stage audio amplifier which in turn operates the built-in speaker or an externally-connected pair of headphones.



This top-chassis view of the receiver shows the front-end circuit-board module extending across the center section of the chassis. The three-gang bandset capacitor is near the front panel at the left end of the chassis. Directly below it is the i-f/detector circuit board. The band-spread tuning capacitor is visible at the upper right of the photo, ahead of the power transformer.

1 McCoy "A Solid-State Selectoroid," *QST*, May 1970.



Looking at the under side of the R-195 one can see the af circuit board at the far right (center). At the left center of the chassis are the power-supply filter capacitors and rectifier diodes. A flywheel is used on the bandset-tuning dial drive to provide speedy band scanning. It is visible at the upper center of the photo.

The internal power supply is used when operation from the 117-volt mains is desired. Alternatively, a 12-volt dc supply can be connected to the rear apron of the equipment to permit portable, mobile, or emergency use of the receiver.

Most of the small components are contained on three preassembled circuit boards. The builder installs the controls, several terminal strips, and some additional small components which are used to complete the circuits between the three modules. The remainder of the assembly work consists of soldering in the interconnecting wires and band-switch leads.

A slide-rule dial mechanism, string driven, is used for the bandset tuning. A circular dial plate, also string driven, reads out the bandspread settings. Separate tuning capacitors are employed for the two tuning functions.

Tune-up and Performance

No difficulty was experienced when aligning the receiver. The instructions were easy to follow and execute. In fact, very little peaking and aligning was necessary beyond the adjustment of the oscillator section of the receiver.

The performance specifications listed in the assembly manual are met, and the completed receiver is rugged and neat appearing. In this writer's opinion the designers might have done the operator a favor by reversing the dial functions. That is, it would be much more convenient to utilize the slide-rule dial for bandspread, thus providing an easier-to-read scale. Furthermore, in this model of the R-195 the bandspread dial is a bit spongy feeling when tuned, and introduces sufficient backlash to be somewhat annoying when tuning the three highest bands. However, good results were had when operating the receiver on frequencies below 14 MHz.

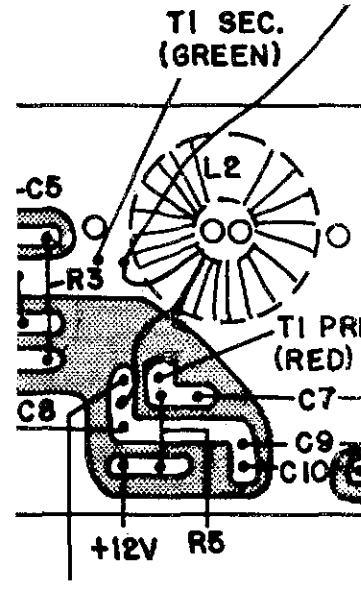
A two-tone brown and buff finish gives the receiver a pleasing look. The cabinet is modern in appearance, and is fashioned from thick metal to assure ruggedness. – *WN1LZQ.*

Knight-Kit R-195 Receiver
Height: 5 1/2 inches.
Width: 13 1/4 inches.
Depth: 11 inches.
Weight: 10 pounds.
Power: 117 volts ac or 12 volts dc.
Price Class: $90.
Manufacturer: Allied Radio Corp., 100 N. Western Ave., Chicago, IL 60680.

Strays

Important Notice

Those who have ordered templates for the August 1970 *QST* QRP transceiver, "Once More With QRP," will find that a drafting error exists in the area of L2 and T1. L2 should not connect to the primary side of T1, but rather to the secondary winding. The corrected circuit-board pattern is shown here.



Feedback

The schematic diagram, Fig. 1, page 48, of September 1970 *QST* incorrectly shows Q5, Q6 and Q7 as 40237s; they should be 40327s, as specified in the text.

COMING A.R.R.L. CONVENTIONS

October 17-18 – Hudson Division, Tarrytown, N.Y.
Oct.31/Nov.1 – Roanoke Division, Raleigh, N.C.

ROANOKE DIVISION CONVENTION

Raleigh, NC October 31 – November 1, 1970

The 1970 ARRL Roanoke Division Convention will be held in Raleigh, North Carolina, sponsored by the Raleigh Amateur Radio Society. Activities will begin on Saturday, October 31 and continue through Sunday, November 1. Governor Robert W. Scott will proclaim the following week (November 1 through November 7) as Amateur Radio Week in North Carolina in recognition of the public and community service performed by licensed amateur radio operators. The convention, almost a year in planning, will include in its program a full variety of features to hold the interests of all devotees of amateur radio as well as their XYLs. Featured speakers will be highlighted throughout the convention, during both the individual programs and at the main banquet. Convention headquarters is the Statler Hilton Inn, located at 1707 Hillsborough Street in Raleigh, just a short drive from all major highways into Raleigh.

On Friday, October 30 from 1600-2200 E.S.T., a talk-in to convention headquarters will be conducted on 75 meter ssb, 6 meter ssb, and 2 meter fm. The talk-in will continue from 0800-1200 E.S.T. on Saturday, October 31 for those arriving on that day. Activities, commencing at 1000 E.S.T. on Saturday, October 31, will include items of interest such as a DX forum (the North Carolina DX Association as hosts), MARS programs, RACES and cd programs, manufacturers presentations, net forum, fm and repeater discussions, state-of-the-art and space communications programs, and many more. Of particular interest will be the ARRL forum featuring Vic Clark, W4KFC, our Roanoke Division Director, and League officials from headquarters.

Highlight of the convention will be the banquet to be held on Saturday night featuring a well-known and very entertaining guest speaker. Climaxing Saturday's activities, ceremonies of the Royal Order of the Wouff Hong, the amateur secret society of the ARRL, will be held at midnight.

Latest radio gear and related equipment from several manufacturers will be on display at convention headquarters during the day Saturday. A flea market will be conducted all day Saturday with a cw contest, a home brew contest, and a QSL card contest on Sunday morning.

Girls, we haven't forgotten you. The XYLs are planning a fantastic luncheon, complete with speaker and mementos of your visit, followed by a shopping spree in a completely enclosed all weather center with inside access to all stores. Transportation will be provided. There will be a ladies hospitality room on Saturday for your entertainment with coffee, snacks, a presentation by Merle Norman Cosmetics, and a suite of rooms just for the girls so you can freshen up, prop up your feet, etc. Cost of the luncheon and transportation for the shopping spree is $3.50 for pre-registration or $3.75 at the time of the convention.

Pre-registration closing October 20, will be $2.75 per person with advance banquet tickets $8, a total of $10.75. Registration at the time of the convention will be $3 and banquet tickets $8.50, a total of $11.50 at the door. Banquet seats are limited; tickets will be sold on a first-come, first-served basis, so get your requests in early. Checks or money orders for advance registrations go to: John Fried, W4WWD, 3606 Winton Road, Raleigh, NC 27604. Hotel reservations will be available for those desiring them and will be made and confirmed by the pre-registration committee on request.

Watch your mailbox for further announcements concerning one of the finest ARRL Roanoke Division conventions ever held. Plan to come to Raleigh, North Carolina's capital city, for the 1970 ARRL Roanoke Division Convention on October 31 - November 1. QST

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

California — The San Gabriel Valley ARC will hold an auction October 6 at 7:30 P.M. at the Arcadia County Park Bowling Green Clubhouse, 405 South Anita, Arcadia, Calif. The club's mailing address is P.O. Box 45, San Gabriel, CA 91778.

California — The Crescenta Valley RC auction will be held Thursday, October 8 at 8:00 P.M. at the Glendale Federal Savings Bldg., 2350 Honolulu Ave., Montrose, Calif.

California — 9th Annual Greater Bay Area Hamfest, October 17-18, Edgewater-Hyatt Motel off Nimitz Freeway near Oakland Coliseum. Full schedule of seminars on technical, operating, and specialized topics. ARRL Forum and meetings of special interest groups. The annual big meeting of amateurs in Northern California. $9.00 registration includes wind-up luncheon on Sunday. Send for registration or Hamfest circular to Box 541, San Mateo, CA 94401.

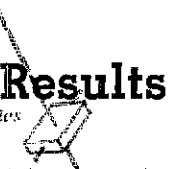
Illinois — The Chicago ARC, W9CAF, will hold their Ham Auction on Sunday, October 25 at St. Viator Hall, 3608 N. Kedvale, Chicago, from 3:00 P.M. until ? For information call 267-3724 or 545-3622.

Michigan — The Monroe County Radio Communications Assn. Swap and Shop will be held on October 11 from 10:00 A.M. to 4:00 P.M. on Highway M-50, 4 miles west of Monroe. Donation is $1.25 in advance, $1.50 at the door. Auction, free parking and many contests. Talk-in on 146.94, 52.525, 50.4 and 3.930 MHz (WA8MTX).

Michigan — The Sixteenth Annual VHF Conference will be held on October 24 at the Western Michigan University. For information and reservations write VHF Conference, P.O. Box 243, Battle Creek, MI 49016.

(Continued on page 92)

Australis-Oscar 5 Ionospheric Propagation Results



BY RAPHAEL SOIFER,* K2QBW

HUNDREDS OF radio amateurs around the world monitored the signals of Australis-Oscar 5 (AO-5). For the first time, a transmitter in outer space was active in a high-frequency amateur band. Inasmuch as four previous Oscar satellites had transmitted in the amateur vhf spectrum, AO-5 yielded no particular surprises at two meters. This article, then, deals with propagation effects noted at 29.450 MHz.

Background

In the thirteen years since Sputnik I, the professional literature on hf satellite signal propagation has been almost exclusively concerned with "undesirable" effects which act to disturb line-of-sight propagation. Amateurs, however, unlike many other spectrum users, are very interested in sporadic long-distance propagation. Many types of propagation at high or very high frequencies, now well known and used, had their origins in sporadic propagation reports originally noted by amateurs.

With the exception of antipodal propagation, this area is generally left untouched by the literature. Most of the effects to be covered here are quite new, insofar as systematic observation is concerned. Several papers on antipodal reception of Sputnik signals at Stanford, by W6QYT and W5LFL, appeared in *Proceedings of the IRE* during the late fifties. This aspect of the AO-5 observations was of particular interest, owing to AO-5's higher operating frequency and the generally lower level of sunspot activity as compared with the Sputnik observations.

Data Reporting

This experiment enlisted many different observers, each having a different level of training and experience. Their receivers, antennas and locations each differed, often very substantially, from the others. Radio amateurs are also very strong individualists concerning their operating and their interpretations of what they hear. Each observer generally tended to concentrate on whichever aspects of the experiment interested him the most.

Furthermore, participating observers were not in the least helped by the failure of AO-5's ten-meter modulation during its first day in orbit, never to recover. Particularly when signals were weak, it was sometimes very difficult to pick out the real satellite signal from the various others which could be found around the frequency.

* c/o AMSAT, P.O. Box 27, Washington, DC 20044.

The total effect of these factors is to reduce the importance of any one observation and to place credence only in patterns of evidence sustained over relatively large numbers of reports. This led to the screening method used in the evaluation process.

Observers were asked to record their data using a standard form which gave times, signal strength and telemetry information, and left room for comments. These reports, together with station descriptions, were forwarded to central collection points; all logs were eventually entered into a master file in Australia. Amsat received copies (originals from the Western Hemisphere) of all logs of potential propagational interest.

At Amsat Headquarters, these logs were screened under the direction of Dr. Perry Klein, K3JTE. Logs in which unusual effects were apparent from the data submitted were isolated and sent on to the author, who had a copy of the Project Australis master file as a reference, as well as orbital information from Goddard Space Flight Center. The logs were then screened a second time, separating the effects into categories and weeding out those reports which, when weighed against the others, did not appear to contain anything of interest. A number of real anomalies were probably missed, but in view of the unreliable nature of any individual report, it was felt that it would be better to have the data as uncontaminated as possible than to try to include every questionable entry.

This double screening still left several hundred reports, submitted by 58 different observers, which contained data of propagational interest.

Horizon Effects

At the altitude of AO-5, approximately 910 statute miles, the maximum time interval between acquisition (AOS) and loss of signal (LOS) would not be expected to exceed 22.5 minutes, if a perfectly smooth earth is assumed. This corresponds to a maximum distance of the subsatellite point from the observer, at the observer's horizon, of approximately 2450 miles.

Substantial variation was present, however, in the reports of AOS and LOS, which leads to some interesting findings. Considerable interest was expressed, for example, in whether hf or vhf would exhibit longer duration times between AOS and LOS. According to the computer run compiled by Project Australis, some 33 stations reported passes during which both transmitters were received simultaneously and in which significant differences were noted in the duration of signal between hf and vhf. Their reports covered a total of 260 orbits, and are summarized in Table I.

As may be seen, in approximately two-thirds of the reports the hf pass duration was longer than

TABLE I

Pass Duration
(from acquisition of signal to loss of signal)
29 MHz vs. 144 MHz.

	29 MHz Longer than 144 MHz	*144 MHz Longer than 29 MHz*
Total Simultaneous Reports Showing Differences	177 (68%)	83 (32%)
Daytime Only	118 (68%)	58 (32%)
Nighttime Only	59 (70%)	25 (30%)
Majority of Reports at Each Station (By Stations)	23 (70%)	10 (30%)

the vhf. This approximate percentage was maintained regardless of whether daytime or nighttime passes were considered, and also held whether tabulated by individual reports or by the majority of reports at each station. The small variations in Table I, from 68 to 70 percent, are not statistically significant.

Specifically, where the hf transmitter is concerned, many well-equipped stations reported pass durations well in excess of 22.5 minutes, even after efforts were made to weed out obvious cases of "skip" reception. For example, VK3ATN, using a large rhombic, reported nine near-overhead hf passes with an average duration time of over 28 minutes, including one of 33 minutes 35 seconds. WØZWW, using stacked Yagis, reported 17 near-overhead hf passes with an average duration of over 26 minutes. From comparison of station results with equipment, it would appear that these over-the-horizon signals are arriving at extremely low angles relative to the horizon. For example, the author, whose otherwise efficient antenna exhibits high ground-absorption losses below ten degrees elevation, reported an average hf pass duration of only 19 minutes.

This effect came somewhat as a surprise, and will probably cause some revision of existing models concerning hf satellite-to-ground propagation through the *F*-layer. According to Davies[1], so-called "topside sounder" experiments had revealed ionospheric blockage, i.e., reflection back into space, of certain signals arriving at low elevation angles, depending upon the ionospheric density at the point of incidence, and the operating frequency. Some people, therefore, predicted that the ten-meter signal would be acquired after, and fade out before, the two-meter signal, which in general is not what happened. What does appear to have occurred is an extended horizon at 29 MHz resulting from a combination of two effects – ionospheric scattering, and refraction in the *F*-layer.

Even though the satellite is beyond the line of sight from the observer (more than 2450 ground miles), a portion of the *F*-layer will normally be visible to both the satellite and the observer. With the distance from observer to subsatellite point up to approximately 3500 miles, this region may act as a scattering volume, its efficiency depending upon many things including the geometry of the ray paths involved and the ion density in the region itself. If this density is too low, the scattered signals will be too weak to be heard. If too high, reflection will predominate over refraction and the signals will be blocked. There appears to be some medium range of densities in which scattering is taking place. The favorable geometry of such a path for scatter propagation is assisted by what Davies refers to as a second-order refractive bending effect,[2] in which rays passing through the ionosphere are focussed into a slightly narrower cone as they emerge. Paths such as some of those observed in this experiment would probably not be accounted for by either effect alone. This extension of the radio horizon from satellite to ground at high frequencies has not been previously noted in the literature, and should be significant in future Oscar experiments.

Antipodal Propagation

The antipodal propagation effect, in which the signal reappears as the satellite is passing over a point nearly antipodal to the observer, was of particular interest. Eleven stations submitted reports of this effect, covering 35 occurrences (See Table II). Out of the 35, all but three occurred during afternoon or early evening hours, local time at the observer's location. Perhaps the most significant finding was that for 27 of the 33 orbits during which antipodal propagation was reported, or 82 percent, other types of long-distance reception were also reported by the same or other stations. There was only one case of continuous reception from the point of closest approach through the antipodal region; the rest exhibited substantial dropouts of signal along the way.

Ionospheric propagation predictions for the period, prepared by W3ASK,[3] showed that for

1 Davies, *Ionospheric Radio Propagation*, U.S. Department of Commerce, 1965, pp. 204-210.

2 Ibid., pp. 208-209.

3 Jacobs, "Propagation," *CQ* December 1969 through February 1970.

Each observer tended to concentrate on whichever aspects of the experiment interested him the most.

observers in the eastern United States – where the great majority of the reports originated – the ten-meter band was "open" to regions near the antipodes during afternoon and early evening hours. The evidence, then, suggests that the antipodal propagation observed during this experiment resulted from ionospheric skip, rather than from a scattering or ducting effect as suggested in an earlier article.[4]

Most reports of antipodal propagation came from observers who had submitted numerous reports of ordinary, line-of-sight reception as well. It therefore became possible to compare the antipodal signal strength reports with those of line-of-sight propagation to the same stations. Statistically, the mean and median antipodal signal strengths were both found to be six S-units weaker than the highest levels reported by the same stations on line-of-sight paths. If each S-unit is assumed equivalent to 6 dB, the antipodal path loss would be approximately 20 dB greater than that which would have been expected from the additional distance alone.

Ionospheric Effects and Their Relationship to Future Amateur Satellites

The real surprise in observing ionospheric effects is not that so much "skip" was reported, but so little. Specific reports of "long distance" propagation were received on only 81 orbits, from 24 different stations. In all, "long distance" reception – reception beyond 3500 miles between the subsatellite point and the observer – was reported during less than 30 percent of the orbits during which the 29 MHz transmitter was functioning. It is not possible to determine the extent to which this resulted from propagational variables, rather than failure to observe what was going on or failure to report what was observed.

Owing to the many variables involved, no attempt was made to extend the comparison of signal strength reports to include all cases of "skip" reception. The analysis of antipodal propagation indicates, however, that significant path losses over and above free space are probably involved.

By far the most numerous category of "skip" reports concerned what came to be known as the "north polar anomaly." This effect was reported a total of 64 times, and consisted of a reappearance of signal, or, less frequently, a delayed LOS with an increase in strength, from one to several minutes after "normal" LOS. This effect was reported only in the daytime and only in the northern hemisphere, with the satellite generally at high northern latitudes to the observer's northwest. In the vast majority of cases, the anomalous reception occurred after a dropout following normal LOS; only occasionally was reception continuous. In contrast to the over-the-horizon effects reported above, its occurrence did not seem to favor stations well equipped for low-angle reception.

It appears that this phenomenon, which resulted even though the band was predicted to be open for single-hop terrestrial propagation to the South as well as the north, may be due to geographical variations in critical frequency and virtual height. In general, ionospheric "skip" from a topside satellite such as AO-5 requires at least two contacts with the ionosphere– one in a downward direction in which the ray emanating from the satellite is allowed to penetrate, and a second in which a ray moving upward is reflected toward the earth rather than passing through back into space. For this to occur, one or both of the following conditions must apply: Either the ion density must be greater at the point of second incidence than at the first, or the virtual height must be higher at the point of first incidence than at the second, thereby resulting in a different incidence angle.

One or both of these conditions were generally present for those instances in which ionospheric "skip" from AO-5 was reported, and, for "north polar anomaly" reported in the United States, generally both conditions applied. They also applied during the common case of "skip" to the United States from high southern latitudes. Relatively few reports involved equatorial regions.

March 7 and 8, 1970, were days of ionospheric disturbance. Although a number of stations reported "flutter" or similar difficulty with line-of-sight reception, both were fairly active days for "long distance" reception. A total of ten occurrences were reported on seven orbits, including three reports of antipodal propagation and two of north polar anomaly. On March 8, which was severely disturbed, all three reports of "skip" were from a southerly direction.

Line of Sight Propagation

Amsat did not concentrate on propagation phenomena observed while AO-5 was within line-of-sight range, owing to the extreme difficulty of obtaining meaningful results from such widely varying sources of data. Nonetheless, fortunately several amateurs and club groups, notably K2SS, WA1IOX, WØLER, WØWVM and WA8YBF, submitted results of their own experiments.

These results showed, in general, that maximum observed signal strength conformed well with a theoretical prediction of -101 dBm, or approximately 2μV into 50 ohms, using a dipole antenna. Just about any receiver incorporating a BFO, with

Helix at W5CAY for AO-5 reception.

4 Soifer, "Antipodal Reception of Oscar Signals," *QST*, November 1968, p. 32.

antennas as short as four feet, gave successful results at 29.45 MHz. At 144.05 MHz, several amateurs even reported success with Twoers and small beams.

A number of amateurs reported characteristic fading due to Faraday rotation. Though there were variations from one station to another, the general pattern at 29.45 MHz was one of rapid rotation (fading period of less than one second) at the time of acquisition, with fading periods lengthening to 20 seconds near the zenith, depending upon the propagation path. Faraday effects, which conformed well with theory, were less pronounced at vhf than at hf.

Conclusions

Although some of the observations were made with elaborate equipment costing many thousands of dollars (e.g. those of K2SS), quite a few were made with very simple equipment and simpler antennas, and a number of these were very valuable in the data analysis. Some of the participating observers were graduate engineers, but some of the most active and helpful were young students, both in groups such as at the Talcott Mountain Science Center (WA1IOX) and as individuals with their own amateur station facilities.

Amateur radio experiments such as these are also important aids in education, both in countries such as the United States and Australia and in the developing nations as well. In the future, it is hoped that more participation will come from these developing nations, since truly meaningful participation has been demonstrated to be well within the present capabilities of their radio amateurs.

An important objective of this experiment was to examine the feasibility of an eventual repeater satellite using the ten-meter band, to function primarily during periods of low sunspot activity and during evenings. At these times, utilization of this band drops sharply, owing to the lack of ionospheric propagation.

With one qualification, the feasibility appears highly encouraging. Ionospheric blockage or shielding is not a significant problem; on the contrary, the ionosphere sometimes acts to extend the range of the satellite. Skip, when it occurs, is usually a lossy phenomenon with relatively weak signals which do not cause harmful interference to other amateur communication. This low-powered satellite was generally received well with a minimum of antennas and equipment.

The one qualification has to do with fading and distortion caused by Faraday rotation and by ionospheric disturbance. The fading may be rectified easily by the use of circular polarization. The distortion is probably not too important for amateurs, since most are quite accustomed to similar variations in normal short-wave propagation. Owing to the AO-5 modulation failure, its true significance, if any, will have to await another satellite for full evaluation.

The reader will, no doubt, come up with many ideas for further research. This is, of course, a major objective of Amsat – to stimulate interest and enthusiasm for research conducted with amateur satellites in many amateur bands. It is hoped that out of this effort will come proposals for many such projects in the future. If so, then the Australis-Oscar 5 propagation experiment will have been an even greater success than anticipated.

TABLE II
Reports of Antipodal Propagation

Orbit	Station	Date	Hour GMT	RS	Notes
1	VK8KK	1/25	13		(S)
2	WØZWW	1/23	16		(S) Weak, Fluttery
12	K2SS	1/23	11	34	
28	K2SS	1/25	18	33	
29	K2SS	1/25	19-20		(S) Continuous reception for 68 min.
31	WA4JID	1/25	23	42(S)	Beam 180 degrees
32	WA7DUR/7	1/26	01		(S)
41	K2SS	1/26	19	44	(S)
87	K2SS	1/30	11	32	
90	K1HTV	1/30	17	23	(S)
105	K2QBW	1/31	21	14	(S)
181	WA4JID	2/6	19	41	(S)
192	W9BHR	2/7	20		(S) Beam SSE
201	F2DC	2/8	13		(S)
203	K2SS	2/8	17		(S)
279	K2SS	2/14	19	56	(S)
279	K3JTE	2/14	19		(S) Five minutes later than K2SS
280	K2SS	2/14	21	33	(S)
292	K2SS	2/15	20	45(S)	HI-keyer possibly heard.
304	K2SS	2/16	19	53	
367	K2SS	2/21	20	53	(S)
378	K2SS	2/22	17	42	(S)
379	K2SS	2/22	19	43	(S)
380	K2SS	2/22	21	22	(S)
381	K2SS	2/22	23		(S)
404	K2SS	2/24	19	32	(S)
405	K2SS	2/24	21	21	(S)
453	K2SS	2/28	17	22	(S)
454	K2SS	2/28	19	55	(S)
466	K2SS	3/1	18	32	
467	K2SS	3/1	20	52	
468	K2SS	3/1	22	52	(S)
542	ZZ1HC*	3/7	18	17	(S)
543	WA4JID	3/7	21	53(S)	Beam 180 degrees
543	K3JTE	3/7	21	46(S)	Simultaneously with WA4JID but longer duration.

Notes: (S) denotes orbit number during which other skip was reported in addition to antipodal. *ZZ1HC is Mr. H. Cooperman of Winnipeg, Manitoba. Mean and median normalized signal strength: S3.

To correct for variations in signal strength judgments, the values in the RS column have been normalized based upon the strongest line-of-sight report from each station being placed equal to S9.

Totals: 35 reports from 11 stations. 27 of 33 orbits reported above, or 82%, were denoted by (S).

Participation and Acknowledgments

The following is an aphabetical listing of the call letters of those stations submitting data used in this study. We wish to express our thanks to F2DC, K1s CSQ HTV QFD, K2s QBW SS, K3JTE, K4SAO, K7MWC, K8QYR, VEs 3EDZ 6IP, VKs 3ATN 7PF 8KK, Wis DGJ JSM, WA1IOX, W2UTH, WA2s EJM FLX KSB KUL UDF, W3s GEX HI, W4s IUD KFC, WA4JID, WB4PLW, W5CAY, W6s OYJ RP, W7s GVX JVF ZC, WA7s DUR GCS, W8s BI FAZ SMO, WA8s LOW YBT, W9s BHR TGB, WA9HCZ, WØEOZ FWN JUV LER PB PGP PHD WMP ZWW, WAØFLL, ZL1WB, and SWL H. Cooperman of Winnipeg, Man., Canada. The author would also like to acknowledge the help of K3JTE, W3KMV, W3GEY and K2MBU in the preparation of this article.

37th ARRL November Sweepstakes Announcement

ALL SET for the 37th ARRL November Sweepstakes? As you read this there's only little over a month to go till that first "CQ SS." The basic SS rules are unchanged from last year, but please note carefully the following:

LOW POWER MULTIPLIER DROPPED
MESSAGE CREDIT ELIMINATED
TIME–OFF PERIODS CHANGED TO 15 MINUTES
SUGGESTED OPERATING FREQUENCIES

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

CONTEST PERIODS

Starts		*Ends*
Saturday, Nov. 14 2100 GMT	PHONE	Monday, Nov. 16 0300 GMT
Saturday, Nov. 21 2100 GMT	CW	Monday, Nov. 23 0300 GMT

These changes are brought about on the recommendation of the ARRL Contest Advisory Committee. Recent changes which remain the same are: New precedences (A and B) based on power input, results to indicate two-category scoring (high and low power) with expanded editorial treatment of QRP winners; minimum criteria for section award; dupe check sheets (Op Aid 6 or similar) required with log of 200 QSOs or more; incomplete entries processed as check logs.

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

Read the rules thoroughly, then send for our "SS Package": log-sheets, summary-sheet, Op Aid 6. (Be sure to specify approximately *how many* log-sheets you'll need.) **Your entry (and, for clubs, the secretary's letter) must be postmarked no later than December 15, 1970.**

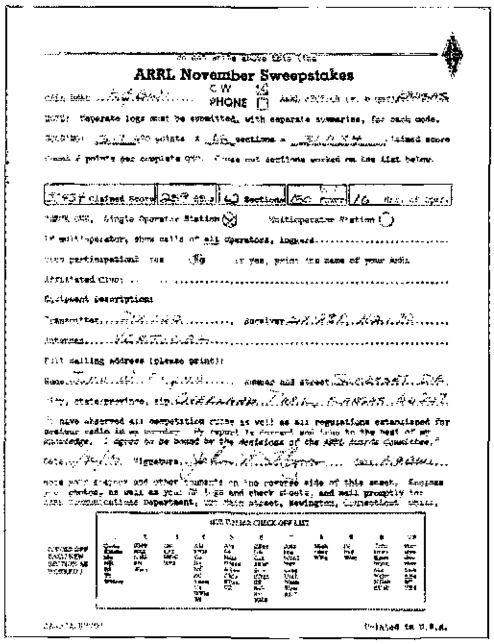
GL, C U THEN.

Rules

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

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

3) *QSO*: Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. Cw stations


ARRL November Sweepstakes
CW
PHONE

EXPLANATION OF "SS" CONTEST EXCHANGES							
	Nr	*Precedence*	*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Consecutive Serial Number	Power input less than 150 watts d.c.	Send your station call	CK (Last two digits of year first licensed)	Your ARRL section	Send GMT time of transmitting	Send month and day of birth (not year)
Sample	NR 1	A	WA3FHB	65	MDC	2101	Nov. 15

work only cw stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) *Scoring*: Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (plus VE8) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or send and acknowledged, before credit is claimed for either point(s) or multiplier. If your power is 150 watts or less, send "A" as your precedence; otherwise, send "B."

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

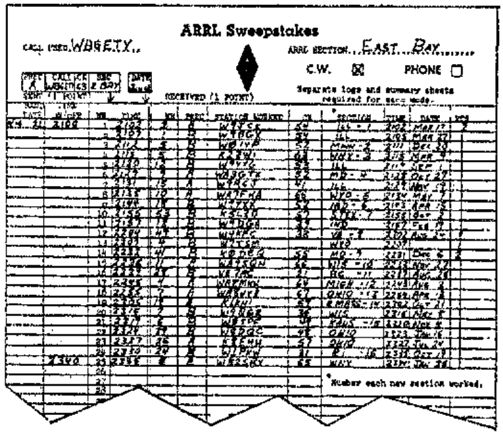
5) *Reporting*: Contest forms (log sheets, summary sheets, Operating Aid 6) are available free from ARRL Hq., or you may use forms of your own design provided they follow the indicated format. Every competing entry claiming 200 or more QSOs must have cross-check sheets (Op Aid 6 or similar) attached. To aid us in getting these forms to you as fast as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with zip code. We suggest a minimum of 12c postage attached. This will assure your receiving 1 summary sheet, 1 Op Aid 6, and 4 log sheets, enough for 400 QSOs. Using this as a guide-line you can adjust the postage according to your needs. ANY LOG OMITTING TIMES ON AND OFF, OR OMITTING CROSS-CHECK SHEETS (WHEN REQUIRED), OR OMITTING A SUMMARY SHEET OR ANY INFORMATION REQUESTED THEREIN (see sample), WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTINGS OR AWARDS. Such logs will be classified as "check-logs" and processed accordingly. Entries must be postmarked no later than December 15, 1970 to insure eligibility for *QST* listings and awards. All entries become the property of ARRL, and none can be returned.

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

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

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

6) *Awards*: Certificates will be awarded to the highest-scoring cw entrant and to the highest-scoring phone entrant in each ARRL section, provided that *either* (1) there are at least three single-operator competing entrants from that section, *or* (2) the top single-operator score is 10,000 points or more. Similarly, a certificate will be awarded to the highest-scoring Novice or



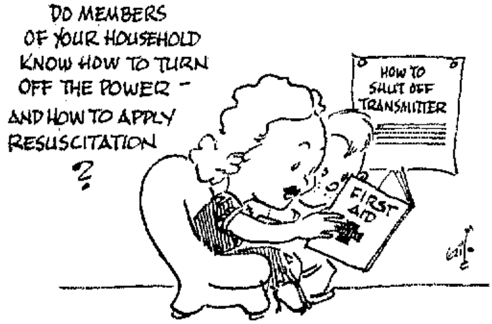
The log-sheets and summary sheets are now available without charge from your ARRL Headquarters. (Ask for Op. Aid 6, too.) Unless first-class postage is included with your request, log sheets will be sent by third-class mail.

Technician licensee in a section if (1) there are at least three single-operator competing entrants of that license class in that section, or (2) if, in the opinion of the Awards Committee, the entrant displayed exceptional effort. Multiple-operator entries, regardless of license class of operators, are not eligible for certificate awards and will be listed separately in the final results in *QST*.

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

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

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



Results

SK6AB

36th ARRL International DX Competition

REPORTED BY AL NOONE,* WA1KQM/WB6SAZ

ONCE AGAIN we take great pleasure in another record-breaking ARRL DX Test. Due in no small part to the outstanding conditions exhibited on most bands during three of the four contest weekends, (Contrary to popular opinion; an aurora, not the eclipse, played havoc with the second phone weekend, Mar. 7–8.)our total entries for 1970 ran at 2822 as compared with 2468 in 1969. Breaking this total down, we find 918 W/VE CW entrants followed by 864 W/VE Phone, 767 DX CW and 273 DX Phone. The above representing returns from 122 countries and 49 states. (Where was Wyoming?)

If our figures are any indication, it certainly appears that while phone operation in the USA and Canada continues to gain ground, such is definitely not the case for the rest of the world where cw still dominates the scene.

A number of people have expressed increasing confusion with the amount of unusual prefixes appearing in contests. In most cases, the answer may be found by consulting the ARRL Handbook under International Prefixes. If this fails, try W9BRD's "How's DX" column in *QST* for the latest in DX news.

In each years contest there are always a number of QSOs/Multipliers to be gained from 160 meter operation. This year FI9J, JA7AO, KH6IJ, KP4AST and PJ2VD were but a few of the DX stations active on Top Band. In the interest of promoting more activity on this band the ARRL Board of Directors has authorized a 160 Meter Contest (CW only, initially.) to take place from 0001 GMT Dec. 12 to 1600 GMT Dec. 13. Be sure to see the complete rules elsewhere in this issue.

And, since its never too early to begin preparation for next year, here's some news I'm sure you will find of interest. The 1971 ARRL International DX Competition will formally recognize single-transmitter multioperator entries as a distinct category from multi-multi. The results will indicate the groupings, probably with expanded editorial coverage.

*Asst. Communications Mgr., ARRL.

CLUBS

Forty-one ARRL-affiliated clubs, a considerable increase over last years 32, piled up a fantastic combined score of over 277 million points. Competition was keen, the *POTOMAC VALLEY RADIO CLUB* coming out on top over the *FRANKFORD RADIO CLUB* by a slim 3 million points! In a close race for third, *MURPHYS MARAUDERS* nosed out the *SOUTHERN CALIFORNIA DX CLUB*, who in turn outclassed their competition to the North, the *NORTHERN CALIFORNIA DX CLUB*. The only other score over 10 Megapoints was claimed by the *128 CONTEST CLUB*. Rounding out the Top Ten were the *ORDER of BOILED OWLS of NEW YORK*, the *NORTHERN ILLINOIS DX ASSOCIATION*, *RICHARDSON ARC* and the *CENTRAL MICHIGAN ARC*.

	CW		Phone
1	Potomac Valley RC	1	Potomac Valley RC
2	Frankford RC	2	Frankford RC
3	Murphy's Marauders	3	SCDXC
4	SCDXC	4	Murphy's Marauders
5	NCDXC	5	NCDXC
6	128 Contest Club	6	Boiled Owls of N.Y.
7	Boiled Owls of N.Y.	7	128 Contest Club
8	CMARC	8	NIDXA
9	NIDXA	9	Richardson ARC
10	Richardson ARC	10	CMARC

1971 ARRL DX COMPETITION
Phone: Feb. 6-7, Mar. 6-7
CW: Feb. 20-21, Mar. 20-21

SOAPBOX

Ten meters the best I have heard, eighty very good second weekend but local QRN stopped many QSOs. Still the best DX test there is. – VK2FU, (VK2FZ, opr). Second week was dead. – OX5BL. Great contest, worked a lot of guys on 5 bands. Where was VE8? – KZ5NR. Best contest operators are the boys in 6-land. – KP4AST. My first contest and quite an experience. Worked all States on 10 meters. – KP4CQB. First weekend outstanding conditions, second weekend poor. – KL7GSG. All bands totally useless the weekend of March 7-8. – KL7AIR. For the first time I worked in the contest from my home station, before at UQ2KCR. – UQ2PG. Thanks FB contest. Hope will be more active with our new callsign UK2GAZ in the next year. – UQ2KBP. We all agree that this is one of the greatest contests and we hope to participate again next year. – YU3EY. W/K5s, where were you all? – WA3EEE/KG6. Pileups were fantastic, especially on 15 meters. – CT2AT. I took part in the ARRL DX Test for the first time. – JR1ACP. Most of the time for operating was spent at KA9MF. – KA9RC. In submitting my logs for the 1970 ARRL DX Test I would like to say what fun it was to participate. My only regret is that I couldn't devote more time. It is hoped that your contest was a complete success and I feel sure that the fellowship engendered, despite the extremely short contacts, does much for amateur radio. – A2CAH. Propagation this year was not as good as in 1969 particularly on 9 March after 1930 GMT when all bands were esentially out. On 8 March after 2000 GMT conditions were fantastic on the higher bands, the usual very high noise level here on 80 meters was absent, but so was propagation from the states! – EL2BD. I would like to say that the DX Test has interested me very much and I am very satisfied with the results I got. Be sure that in the next one many of our club will be present. – I1BCL. After 1200 GMT on 7 March I could get nothing through, conditions were as bad as possible. – LA2DL. At the start of the second weekend disaster struck, for the first hour no Ws heard on 20,40 or 80 meters. Five hours later was averaging 6 QSOs per hour. First day producedno 10 meter band opening at all, only a couple of hours on 15. Second day atmospheric disturbance was so bad that all noise disappeared from the 80 meter band. English and German stations who are usually S9+ were down to S3! – LAØAD. Sorry couldn't spend more time in the phone portion, already had 70 hours planned for the cw portion. – PAØLOU. They used to put people like us away–but thanks to the ARRL DX Test there is a healthy outlet for aggressive tendencies and unleashed frustrations. I'm having the shack padded–er, paneled for next year! –, W3TGF. Since I can't seem to win the contest on the basis of skill, make it four weekends each mode! Then maybe I can beat the competition on the basis of endurance! – W3WPG. Would like to see the Hq. Technical Staff invent an 80 meter QRN squasher. – W3YIK. W3NPZ was the station of W3MSK operated under a different call while Ed was away. QSOed him from SV1AB and SV1AE the first weekend, from VU2MSK the second. – W3NPZ. Almost as much fun as a CD Party. – K2KIR. Finally–a contest for which Murphy's Law was invalid and during which the F2 layer was most cooperative. – K3VXV. Please only one weekend. At 27 I feel like I'm already losing steam. – W9LKJ. Thanks to the many chaps who were patient with us beginners. – WB9BPG. Multiop stations ruin contests. – W9BG. Had to stop test to help stop grass and forest fire first weekend; broke bone in left foot in bathroom fall second weekend. Would rather murphy attacked my rig! – W5IOU. Suggest rest period be added to the rules. – W4LW. Wish I could have operated both weekends. – WA8LYF. Not sure if our promise got KV4AM to go on 28 MHz or not, but the QSO was appreciated and the cookie has been sent. – K8UDJ. Bet we are the youngest multi-op with the highest score–average age is 17. – WA8ZDT. This contest may catch on yet! – W8DB. This contest is too long or I'm getting too old. – W2SUC. Whatever you do, keep it two weekends. – K2BMI. Dipoles still get you places. – WA2HIU. Who says you can't have fun with a piece of pipe and a dipole strung lower than the rig? The only contest I know where everyone wins! – WA2YWR. Forty years ago it was "gung ho;" now it's "ho hum."

PJ9GF, in a one weekend effort, managed 5529 QSOs for a score of over 4 million points! W1BIH, shown operating.

–WØEQN. When I finally got ZC4DA, he logged me as WAØWOW. Rats! – WAØWOA. Never pass up a multiplier thinking it will show up the second weekend--it probably won't! – W1FBY. Entirely different ball game from the east coast. – K6OZL/1. Conditions very good. I have taken part in every single one of the ARRL International DX Competitions and enjoyed this one as much as the first. – W1AJO. Conditions on 10 meters were fantastic, the best I have ever heard in a DX Competition. – W1WY. My last operation from Massachusetts. New Hampshire next year. – W1BPW. Fantastic contest, should have one every weekend! – WA1JKZ. I did this contest from a motel with just three dipoles. Next year I hope to do it from Wyoming! – W6JHV/7. Tell me how you arranged for such fabulous radio propagation conditions. Are you seeding the layers? – K6MG. Full break–in enabled me to work at least 20 stations that I'm sure I would not have otherwise worked. How did I get along without it for so long? – K5MAT. Never again with a portable call. – W7PU/6. It seems we need an extra multiplier to pick up 160 meter activity. – W5SBX. Got 81 different countries on 50 watts during the two contest weekends. – K5JZY. Conditions very good but a noticeable decrease in "rare" DX. – VE3DBB. Never included the 20 to 30 W/K QSOs in my score. Somebody should tell those guys we're on the same team. – VE8ZZ. Suggest second and third place awards to sections with large number of entries. – K3EUR. Even an old brass pounder like me can enjoy phone with all those goodies available. – W3YIK. Never knew there was so much good DX on 75. – WA3JKO/3. Horrible conditions the second weekend. A perfect example as to why the contest should be kept two weekends long. – W3MWC. Visited Frankford RC after the second phone weekend. Big sign on blackboard said, " PVRC bought the ionosphere". – W3EZT. Let's go one weekend each test and substitute an IARU sponsored test for our second weekend! – W3BQN. Recommend this contest be one weekend only to encourage DX peditions. – W3PWO. Please no more blackouts. – W2UI. Kept hearing W3FBF in pileups and it finally happened, we worked one in succession. He couldn't believe it. – W2FBF. What about California? What about California? This question came screaming over the air about a dozen times. So, I give up; what about California? – K3CPF. I bemoan the complete changeover to transceive operation by DX phone stations. What has happened to the practice of calling CQ below 14.2 MHz, for example, and indicating a listening frequency in the American band? Contacts could be made much faster. – W3VT. Darn, my advanced came ten days after the contest ended! – WA3JIH. There ought to be a certificate for a good reliable competitor, consistent but never a winner, hi! – W9JJV. Would like to see more South Americans in the contest, also some bonus for contacts on 40 and 80. – WA9WSS. Some of the pileups were unreal but then so were some of the participants. – W9ZBD. My first effort, but I've decided to stop fighting 'em and join 'em – next year I'll be a 9G1. WA5WUJ. Couldn't get my quad up because it was under the snow in the backyard someplace. –

AFFILIATED CLUB SCORES

Club	*Score*	*Entries*	*CW Winner*	*Phone Winner*
Potomac Valley Radio Club	2,035,602	62	W4YHD	W4BVV
Frankford Radio Club(Pa.)	49,086,953	74	W3MFW	W3DHM
Murphy's Marauders(Conn.)	26,652,402	57	W1BGD/2	W1BGD/2
Southern California DX Club	25,609,839	60	W6RR	W6RR
Northern California DX Club	21,375,577	62	W6CYX	K6AHV
128 Contest Club(Mass.)	17,698,600	31	K1DIR	K1UHY
Boiled Owls of N.Y.	9,117,867	18	WB2CKS	W2IRV
Northern Illinois DX Ass'n	8,390,903	27	W9LKJ	W9BZW
Richardson Amateur Radio Club(Tex.)	6,306,553	21	W5EQT	W5QWF
Central Michigan Amateur Radio Club	6,192,852	11	W8TJQ	K8UDJ
Minnesota Wireless Association	5,640,102	17	WØHP	WØHP
Golden Triangle DX Club	5,473,586	8	W4JDR	W4QBK
Oak Park Amateur Radio Club(Mich.)	5,395,647	10	WA8LYF	. . . . .
Niagara Frontier DX Ass'n(N.Y.)	5,374,842	17	K2KNV	K2DJD
Laurentian DX Club(Que.)	4,896,423	11	VE2DCW/2	VE2YU
Indian Hills Radio Club(Ohio)	3,860,262	8	W8QXQ	W8DKI
Overlook Radio Society(N.Y.)	3,836,433	4	. . . . .	. . . . .
South Jersey Radio Association	3,584,387	33	W2FYS	W2EPA
Connecticut Wireless Association	2,865,900	8	W1BIH	. . . . .
Etna Radio Club(Pa.)	2,533,644	8	W3VEQ	K3HZL
West Park Radiops(Ohio)	2,284,686	20	K8CHH	W8IPA
New Providence Amateur Radio Club(N.J.)	1,006,802	10	W2GZZ	W2GZZ
Warren Amateur Radio Ass'n(Pa.)	948,836	6	WA8FNO	W8MKE
North Alabama DX Club	936,309	4	. . . . .	K4MG
Colorado DX Association	898,719	8	WØCAW	WØMYN
Ohio Valley Amateur Radio Club	799,329	8	W8JAQ	WA8PRR
South Hills Brasspounders & Modulators(Pa.)	744,486	5	WA3KOS	. . . . .
Winnipeg DX Club(Man.)	634,743	7	. . . . .	VE4FU
Kentuckiana Radio Club(Ky.)	634,506	6	K4FXN	K4FXN
Gloucester County Amateur Radio Club(N.J.)	477,948	10	. . . . .	W2SUA
Brightleaf Amateur Radio Club(N.C.)	388,836	6	W4OMW	K4AJR
ARINC Amateur Radio Club(Md.)	323,247	5	WA3JYV	. . . . .
Delta Amateur Radio Club(Tenn.)	307,863	4	. . . . .	. . . . .
K–W Society(Ohio)	284,397	4	W8HDC	. . . . .
Northwest Amateur Radio Club(Ill.)	259,008	6	W9GYN	. . . . .
Suburban Amateur Radio Club(Pa.)	225,334	4	. . . . .	. . . . .
Georgia Southern Area ARC	204,646	3	. . . . .	. . . . .
McDonnell Douglas Astronautics Radio Club(Calif.)	101,241	6	K6TXA	K6TXA
Lake Success Radio Club(N.Y.)	94,200	6	W2CZZ	W2TUK
Springfield Amateur Radio Club(Ohio)	74,805	4	. . . . .	. . . . .
Chicago Radio Traffic Association	25,926	4	W9REC	. . . . .

WA8VRB. Massive antenna destruction to our 40 and 20 meter quads kept us out of the cw contest. – K8HLR. VR4BC had such a pileup on him that he was working them by call area and first letter after the number. The WØZ fellas must still be waiting! – WA8QIY. Who but a silly ham would work so hard, with so little, to achieve so little? – W8AJW (who broke 100K with 95 watts of am!). The miserable conditions of the second weekend sure didn't keep the multipliers from appearing–in fact, they never seemed to quit. – W1BGD/2. The sun's eclipse was great on the second weekend, but those unexpected solar flares were something else! Result: poorest weekend band conditions in my experience. – K2BK. The aurora on the second weekend slowed things down a bit. Was strongly tempted to get on 2 meters but decided to stick it out on 21 MHz. – K1AGB. Thank you JA. – K6AHV. I particularly enjoyed increasing my operation on 3.5 and 7 MHz. That's DX! – K4AJR. WE4SUN was a special events station, licensed to operate in connection with the total solar eclipse. – W4DQD.

THIRTY-SIXTH ARRL

International DX Competition

W/VE scores are listed by ARRL division and section; DX scores are listed by continent and country-prefix. Multioperator scores follow single-operator scores within each section or country-grouping.

Awards: The operator of the first-listed *single-operator* station in each section or country is the winner for that area and receives a certificate award. In a section or country from which at least three valid *multioperator* entries were received, the top-scoring station in that category receives a certificate award. (Awards are scheduled for an October 15 mailing. The top-scoring single operator DX entrant for each *continent* each mode, receives an engraved plaque. *Affiliated-Club* awards are shown elsewhere in this article.

Scores: In the list to follow, read (from left to right):*call* of entrant, final *score,multiplier* (total countries per band for W/VE; total states and Canadian call-areas per band for DX), *contacts*, approximate dc *power* input (A represents power up to and including 150 watts; B, over 150 and up to and including 500; C, over 500; D, combination of A+B; E, A+C; F, B+C; G, A+B+C and N, no power noted on entry.), total *time* of operation (to the nearest hour). Example: W3NX 594,156-268-739- C-70 indicates final score 594,156, multiplier 268, contacts 739, power over 500 watts, operating time 70 hours.

A single asterisk following a call denotes an ARRL Hq. staff member, ineligible for an award.

QRP CHAMPS
(150 Watts or Less at All Times)

CW		Phone	
K5ABV	886,386	WA1DJG	717,880
W1DXB	766,119	VE3BS	544,260
VE3KZ	606,096	W4CRW	401,931
K2BMI	568,347	VE3GCO	291,920
WAØRDJ	536,616	WA3HGV	284,634
W3QOR	521,136	WAØETC	200,475
K2MFY	452,352	W4DQD	150,804
W4WHK	447,228	W1ODY	136,080
W1FTX	439,956	K9HDP	129,054
W2HUG	394,200	W6JPH	123,522

CW SCORES

ATLANTIC DIVISION

Delaware

W3TGF	837,558-237-1178-C78
W3NX	823,116-287- 956-C68
W3NNK	580,563-257- 753-C71
W3DRD	331,059-211- 523-C49
WA3HGV	56,070-105- 178-A15
W3DPA.	49,588- 92- 180-C19

Eastern Pennsylvania

W3MFW	1,497,888-336-1486-E73
W3WPG	1,475,910-310-1587-C91
K3HTZ	1,348,095-347-1295-C95
W3NZ	933,866-271-1154-C78
K3WJV	835,275-259-1075-C82
K4WUY/3	726,750-285- 850-C62
K3EUR	700,350-230-1015-C75
W3YIK	676,728-241- 936-C65
W3ALB	527,850-230- 765-N69
W3QOR	521,136-231- 752-A58
K3AIG	513,000-200- 855-C57
WA3LNM	504,306-198- 849-C86
W3GRS	384,000-256- 500-C
W3ARK	356,535-171- 695-B45
W3AIZ	342,495-177- 645-B34
WA3HOM	330,576-194- 568-B70
W3BYX	218,514-158- 461-C
W3QLW	166,254-121- 458-B53
W3GID	165,474-174- 317-C41
K3TGM	147,375-125- 393-C37
W3CGS	147,204-141- 348-C31
W3KFQ	129,159-113- 381-C29
WA3MIB/4	123,136-128- 322-B43
W3FAN	96,798- 73- 442-C25
WA3JKO/3	93,312-128- 243-A25
W3EQA	81,320- 95- 288-C19
W3YO	75,130-110- 229-A33
K3RDT	57,132- 92- 207-A24
W3EOP	39,960- 74- 180-C28
W3EVW	39,114- 82- 159-F
WA3HMM	37,440- 65- 192-B27
W3HMR	34,710- 65- 178-C13
K3NPC	33,396- 92- 121-A19
WA3KLS	24,616- 68- 121-A17
W3CBF	19,500- 65- 100-B10
K3EMF	12,528- 58- 72-E15
W3GQC	7020- 39- 60-B19
WN3MHF	2580- 20- 47-A25
WA3IXF	2277- 23- 33-C14
W3GHD	2268- 21- 36-B 4
WA3IUV	1026- 18- 19-B
W3GM (7 oprs.)	5,546,520-465-3976-C96
W3WJD (+W3YUW)	3,483,402-426-2741-C96
W3MWC (+K3s JLJ JLK)	1,941,654-341-1898-C90
W3OV (+WB2ZDR)	1,318,746-286-1537-C75
W3KT (+WA3ATX)	1,286,873-309-1399-C96
W3BIP (+WA3s JYB LA)	806,265-285- 943-F94
W3AES (+W3SS)	702,999-263- 891-C50

Maryland-D.C.

W3GRF	1,657,308-334-1654-C75
W3MVB (WA3LKH, opr.)	1,334,880-309-1440-C90
W3EYF	779,382-283- 918-E72
W3MFJ	762,552-238-1068-C61
W3AXW	643,808-248- 868-C73
W3QQI	551,702-223- 826-B60
W3GN	379,848-196- 646-C40
W3BQN	341,901-201- 567-G63
W3FU	280,899-177- 529-D40
WA3GVP	270,200-200- 455-C73
WA3IYV	155,628-131- 396-A45
WA3BGC	142,920-120- 397-F58
K3KHK	139,077-101- 459-A43
W3HVM	111,069-129- 287-C25
W3KMV	105,336-114- 308-C60
W3YSH	95,904-144- 222-C38
WA3NGL/3	72,384-116- 208-F40
W3LMZ	69,300-105- 220-B28
W3FA	63,648- 96- 221-B12
W3FSR	49,128- 92- 178-F28
W3EPR	35,910- 95- 126-B23
W3RYV	35,784- 84- 143-A57
W3EKZ	26,270- 71- 126-A26

Members of the LAURENTIAN DX CLUB at a recent meeting. They are, L to R, VE2AQQ, Steve; VE2IZ, Dennis; VE2DCW, Dave; VE2WY, Ross; VE2YU (now VE3HD), Ernie; VE2WA, Graham and VE2NV, Jack.

W3CSZ 20,632- 58- 118- B 8
W3HH 18,954- 84- 117- B11
W3HVO 15,230- 55- 96- B27
W3KE 12,054- 49- 82- C 4
K3KMA 7830- 45- 58- B 9
WA3EYH 1458- 18- 27- A 3
W3NPZ (10 oprs.)
9,597,675-497-4464- E96
K3IYZ (8 oprs.)
3,060,090-363-2810- C96
K2JVB/3 (+WA2SLL, WB4NGR)
1,063,584-288-1231- E75
W3TOS (+WN3MLH)
22,032- 84- 136- D19

Southern New Jersey

W2BOF 1,189,656-328-1209- C74
K2OIL 726,270-215-1126- C65
W2EYS 503,757-223- 753- E70
W2UI 279,864-156- 598- B60
W2SDB 226,953-151- 501- B55
W2GGL 213,144-166- 428- E67
W2EBF 173,010-158- 365- B29
W2DLT 170,307-149- 381- C
WA2BLV 154,290-139- 370- C
W2FHY 37,350- 83- 150- B49
WA2EVU 32,163- 71- 151- B40
W2QKJ 30,654- 78- 131- C40
WA2VYA 27,477- 71- 130- A38
K2QPN 23,175- 75- 103- C
W2UBW 16,974- 46- 123- B22
WA2HJF 10,608- 52- 68- A 7
W2HAZ 8910- 45- 66- A10
WB2WAK 7344- 36- 68- B
W2LPA 6840- 30- 76- C 6
WA2HDF 1920- 20- 32- B 6
WB2WRP 264- 8- 11- A 1
WA2BPL 22- 3- 3- A 1
K2SQS 18- 2- 3- A 1
WN2JII 3- 1- 1- A 1
WA2IZS (+K2CPR, W3KVQ)
1,226,550-325-1258- C96
WB2ZPB (+WA2BPL)
636,000-265- 800- B63
W2PAU (+W2ESX)
570,622-221- 864- C68
K2AA/2 (W2EYS+WB2WRP
+W3CXO) 37,074- 74- 167- G23

Western New York

K2KIR 1,894,635-355-1779- C75
K2KNV 1,611,015-335-1603- C75
K2DJD 1,348,518-317-1418- C79
VE2MW/W2 969,896-296-1092- C98
WA2UUM 548,760-269- 680- C64
W2IR 408,686-254- 538- C40
W2EBA 486,250-206- 675- C31
W2QIP 298,048-185- 519- C42
W2HJH 265,527-181- 491- C52
K2LG3 180,297-203- 299- C35
W2RPP 133,440-139- 320- B35
WB2SXJ 113,336-124- 305- B49
WB2PGM 109,800-122- 300- C25
WB2ZOW/2 87,084-118- 246- F23
W2VXA 66,102-106- 189- A
WA2CDV 43,776- 57- 258- E80
W2PXL 41,515- 95- 147- C27
W2EUI 36,884- 76- 153- A84
W2SSC 33,516- 98- 114- C10
W2ICO 13,680- 57- 80- A12
W2UI 13,338- 57- 78- N
WA2ICU 11,466- 49- 78- A17
WB2OEO 11,388- 52- 73- B 5
W2EXA 10,974- 59- 62- C12
WB2YQH 8874- 51- 58- C14
WA2BEX 8550- 50- 87- A 9
WA2EOM/2 8190- 39- 70- C11
WA2AIV 2106- 26- 27- B 9
W2TMI 2046- 22- 31- A
WB2EQR 663- 13- 17- B 3
WA2DHS (+WA2BCK)
190,854-138- 469- B54

Western Pennsylvania

W3NU 1,619,568-368-1475- C69
W3VT 1,439,949-359-1337- C80
W3VEQ 847,440-264-1070- C70
K3HZL 399,024-204- 652- C60
WA3KOS 274,758-181- 506- A38
K3VXV 267,288-172- 518- D47
W3PZC 265,200-170- 520- C35
K3OCY (WA3IIH, opr.)
236,052-158- 498- C36
W3UT 175,086-142- 411- B37
WA3JGY 158,148-138- 382- B54
W3VK 106,428-129- 275- C39
WB3SU 38,098- 86- 148- A17
W3QE1 19,883- 59- 113- A25
WA3MQJ 15,582- 42- 125- D10
W3YX 3627- 31- 39- C18
W3DKU 741- 13- 19- B 5
WA3JBN 147- 7- 7- B 1
W3TV (4 oprs.)
2,655,192-349-2536- C60
WA3NYH (+WA3NAZ)
8232- 42- 68- A48

CENTRAL DIVISION

Illinois

W9LKJ 1,609,830-310-1731- C67
K9BGL 952,295-283-1123- C81
W9QHH 695,040-256- 905- C
WA9IVL 684,125-275- 812- C70
W9WYB 428,352-194- 736- C
K9KDI 365,580-180- 677- B
W9QON 276,000-184- 500- C60
W9AG 269,361-173- 519- C49
WA9WJS 126,846-111- 362- B37
W9YYG 113,458- 71- 866- C30
W9GYN 101,706-144- 253- B40
W9CB 88,920-104- 285- C22
W9EI 85,176-104- 273- C28
W9VBV 69,420- 89- 260- C15
K9RJO 64,236-106- 202- A38
W9IB 56,856- 92- 206- C21
K9MNT 46,368- 92- 168- B30
WA9FWZ 43,320- 95- 152- B43
W9QWM 40,908- 84- 164- A33
W9HBY 38,700- 75- 172- A35
KA9ION 31,680- 64- 165- C15
W9IUV 29,403- 81- 121- C10
W9BZW 29,154- 86- 113- C24
W9KTB 24,192- 56- 144- A
WA9ZQG 24,000- 64- 126- C19
W9RIC 19,497- 67- 97- B
WA9SQY 19,294- 59- 109- B
W9IVR 18,360- 40- 153- C15
W9MLR 14,136- 38- 124- B26
WA9EKJ 13,005- 51- 85- A11
W9DRN 10,032- 44- 76- C30
W9NZS 6900- 46- 50- A10
WB9BCR 6438- 37- 58- A20
W9HPG 5472- 32- 57- A14
W9TCU 2886- 26- 37- A18
K5LOQ/9 2400- 25- 32- A15
WA9UOT 1349- 19- 24- A11
W9WR 882- 14- 21- N
WB9DGQ 60- 4- 5- B 2
K9YJL 48- 3- 12- C 9
W9DY (5 oprs.)
258,060-220- 391- C28
W9DWQ (multiop.)
244,500-163- 500- C
W9EXE (+W9ICE)
18,291- 67- 91- C21
WA9VOL (+W9DY)
17,280- 48- 120- C 6

Indiana

W9IOP 1,755,990-327-1790- C93
K9CUY 929,600-280-1112- C88
K9DWK 346,968-183- 632- D44
K9HDP 288,840-166- 580- A73
W1DRN/9 51,300- 95- 180- A24
KA9VQK 44,032- 88- 163- A49
K9IBF 14,784- 44- 112- D18
WA9UFO 8694- 42- 69- A18
WB9BER 4410- 30- 49- C22
W9QUQ 1134- 18- 21- A10
W9YB (WB2RKK+WA5BRB
+WA9ZML) 524,250-233- 750- E62
WB9BPG (4 oprs.)
135,792-164- 276- B69

Wisconsin

W9RQM 948,250-278-1125- C71
W9GII 772,668-284-1014- C78
W9HRN 501,216-227- 736- C62
KA9DKU 462,644-217- 712- C47
W9BG 414,230-230- 601- B44
W9VZP 405,600-169- 800- C52
W9SDK 301,716-174- 578- C47
W9PJT 167,832-148- 378- D43
W9HE 145,080-130- 372- A35
W9EZ 131,820-137- 320- A20
W9OW 99,303- 79- 425- C41
WA9VCK 35,040- 73- 160- B21
W9YFG 13,050- 58- 75- A17
W9IAX 11,289- 53- 71- C 7
WA9ZWI 10,368- 48- 72- B 7
WA9RTU 10,290- 49- 70- A 6
WA9EM 8424- 39- 72- D
W9TXF 6384- 38- 56- B14
WA9UEA 1953- 21- 33- B29
WN9ZJE 288- 8- 12- A11
W9YT (7 oprs.)
2,670,055-379-2349- C96

DAKOTA DIVISION

Minnesota

W0HP 1,268,820-285-1484- C
KØEKR 649,215-329- 945- E71
W0YCR 506,853-199- 849- C64
WA0KDI 404,142-193- 698- C
W0DAK 374,532-177- 708- X42
KØORK 358,479-187- 619- C37
KØTPF 340,887-199- 571- B
WAØYAW 287,655-151- 655- A73
W0DYA 178,502-149- 402- U54
W0IYP 172,890-153- 377- C28
WØBE 119,349-149- 267- E34
WAØIPG 112,098-119- 314- A48
WAØVBV 68,355- 93- 245- C48
KØCNC 48,240- 87- 240- C12
WAØVPK 34,932- 71- 164- A22
WAØVPN 16,854- 53- 108- A24
WA0VIS 15,360- 90- 128- A13
WØPAN 7128- 44- 54- B
WAØTGM 6090- 35- 58- A 8
WØAIH (+WAØUPD)
1,241,220-302-1374- C75
KØZXE (+KØIJL)
246,540-156- 505- E67

North Dakota

WAØELO 69,216-103- 224- B25
WØEOZ 22,848- 64- 119- C13
WAØAAD 20,250- 84- 125- A15

South Dakota

WAØOML 90- 5- 6- C 2
EØVVY (W8GKB, WAØQCC)
633,061-247- 855- C
WAØCPY (+WAØ, CPX YAK)
408,954-214- 637- C92

DELTA DIVISION

Arkansas

WA5SOG 170,839-137- 417- B41
W5DRW 92,418-146- 211- E24
W5RUH 36,540- 87- 140- A46

Louisiana

W5IOU 1,171,734-358-1091- C90
W5WMU/5
1,010,394-297-1134- C90
W5KC 536,316-239- 748- C50
W5MDH 291,950-185- 490- F54
W5OB 260,610-170- 511- C81
WA5VQE 11,550- 55- 73- A10
K5BLV 9000- 40- 75- A13

Mississippi

W5RUB 663,780-230- 962- C64
W5MUG 76,890-110- 233- B25
W5AG 56,940-130- 146- C29

Tennessee

W4NBV 853,068-267-1065- F80
K4PQZ 848,190-245-1154- C65
W4OMS 724,626-243- 996- B70
K4FW 560,672-224- 841- N70
WA4FDR 249,780-181- 460- E26
W4EWR 100,548-114- 294- B29
W4ZWZ 17,424- 48- 121- B24
W4OGG 11,193- 41- 91- A13
WB4KWT 396- 11- 12- F 2

GREAT LAKES DIVISION

Kentucky

K4GSU 1,811,596-353-1712- C78
W4LW 387,150-178- 725- C62
K4FXN 213,408-152- 468- E39
W4JBQ 144,024-136- 353- C33
K4ITI 89,270-158- 189- A42
K4KI 74,700-100- 249- B30
K4BAM 3510- 26- 45- A 8

Michigan

W8VSK 1,802,250-373-1602- C77
WA8LYE 1,025,418-298-1147- C42
WA8JUN 870,102-246-1179- C90
K8RCT (WB8HTU, opr.)
521,181-199- 873- C49
W8DA 377,055-189- 666- E51
W8TJQ 376,461-191- 657- B58
WD8DQL 239,145-149- 535- C30
WB8IKZ 151,200-120- 420- B13
W8SH (WA3GBU, opr.)
135,474-134- 347- C31
WB8CCE 100,368-123- 272- B50
W8WVU 92,454-114- 277- D27
WB8AAX 89,130- 90- 219- B36

DIVISION LEADERS

CW			Phone	
Single Op.	*Multiop.*		*Single Op.*	*Multiop.*
K2KIR	W3NPZ	Atlantic	K2DJD	W3ZKH/3
W9IOP	W9YT	Central	K9CUY	W9LKJ
WØHP	WØAIH	Dakota	WØHP	WAØCPX
W5IOU	. . . .	Delta	W5IOU	WA5WUJ
K4GSU	K8UDJ	Great Lakes	K8UDJ	K8HLR
W1BGD/2	K2AHQ	Hudson	W1BGD/2	K2UQT/2
WAØRDJ	KØMKD	Midwest	KØRNZ	WAØQJX
K1DIR	WA1JUY	New England	K1THQ	W1MX
W7RS	W7RM	Northwestern	W7RS	W7EXM
W6CYX	K6FBB	Pacific	K6AHV	W6YRA/7
W4YHD	W4BVV	Roanoke	W4BVV	K4CG
W5EU	. . . .	Rocky Mt.	W5EU	K7RAJ/7
W4JDR	W4ZXI	Southeastern	W4QBK	K4LK
W6RR	W6VSS	Southwestern	W6RR	W6TEZ
W5JAW	WA5RXT	West Gulf	W5JAW	W5KUC
VE2DCW/2	VE5US	Canadian	VE7BDJ	VE3EVZ

The above represent but a few of this years Top Ops. They are, (L to R,top to bottom); KP4AST, PJ2VD, CT2AT, KH6SP, XE1KS, K2KIR, WA9RAT/HR2, LA0AD, YV5KL and KINOL.

Minimums	30	50	80	70	70
Band	80	40	20	15	10
K1AGB				104	
K1DIR	46	67	105	87	83
K1DKX	8	38	82	59	42
K1HVV	8	42	29	78	12
K1IFJ	39				
K1JHX	28	57	64	73	71
K1NOL	46	60	91	83	79
K1THQ	34	52	68	74	62
K1UDD	30	52	61	59	51
K1VTM	20	55	71	70	66
W1AX	43	52	63	51	58
W1BIH	44	55	89	73	77
W1BPW	49	65	82	77	73
W1CW	64				
W1DIT	31	53	55	37	34
W1ETU	32	50	68	68	67
W1FBY	31	34	82	72	71
W1FJJ	42	26	75	75	76
W1FNW	26	55	47	70	32
W1SWX	73				
W1TS	15	26	70	73	59
W1WAI	33	47	79	65	60
W1WY					75
W1YK	45	63	86	80	75
WA1DJG	24	45	72	75	68
WA1FHU	37	63	74	79	66
WA1IRG	36	56	84	68	66
WA1JTM	30	64	72	70	68
WA1JUV*		60	86	86	80
K2AHQ*	30	54	65	66	60
K2DJD	27	53	84	78	75
K2KIR	50	57	82	86	80
K2KNV	30	66	90	79	70
W2AJR	35	8	26	2	18
W2BQF	41	54	80	80	73
W2CVW	25	50	62	47	47
W2DXL	42	58	79	82	73
W2FR	48	51	54	45	56
W2GGE	36	65	80	77	71
W2LXK	45	77	60	60	59
W2PCJ	33	54	86	73	74
W2SSC	32	30	14	4	18
W2WD	28	51	79	79	66
W2WZ	37	56	78	67	64
W2YT	42	53	54	63	69
WA2BCT	30	33	27	39	32
WA2DPT	21	40	63	71	58
WA2HIU	5	55	67	62	28
WA2IZS*	28	52	82	84	79

Minimums	30	50	80	70	70
Band	80	40	20	15	10
WA2UJM	31	64	59	41	74
WB2CKS	45	63	72	84	75
WB2ZPB*	15	37	86	65	62
W1BGD/2	46	67	90	80	83
VE2MW/W2	37	55	54	62	63
K3HTZ	55	62	81	74	75
K3IYZ*	20	66	104	91	82
K3KHK			101		
K3NPC	30	16	16	17	13
K3WJV	34	40	61	64	60
W3AES*	25	54	58	74	55
W3BIP*	25	48	70	76	66
W3EOP	74				
W3EYF	19	42	82	73	67
W3GM*	68	87	113	103	9
W3GRF	41	67	79	74	8
W3GRS	9	36	81	68	7
W3KT*	25	60	77	74	7
W3MFW	54	58	71	78	7
W3MVB	30	66	77	70	7
W3MWC*	38	64	79	79	81
W3NNK	32	42	55	64	64
W3NPZ*	61	92	132	111	93
W3NU	47	63	89	89	80
W3NX	31	55	64	65	72
W3NZ	34	54	61	61	61
W3OV*	24	51	77	64	70
W3QOR	15	32	52	70	2
W3QQL		29	52	71	
W3TV*	34	58	91	84	
W3VT	43	61	92	89	
W3WJD*	60	84	101	98	
W3WPG	47	54	69	68	
W3YIK	22	39	51	72	5
K2JVB/3*	17	58	69	75	69
K4WUY/3	26	44	82	68	65
K4BAI	32	57	79	76	80
K4CAX	21	51	42	34	25
K4CG*	50	78	97	102	87
K4EZ	16	39	66	78	67
K4FXN		5	30	76	41
K4GSU	38	70	90	81	74
K4II	47	61	76	79	81
K4POL	34	58	73	70	71
K4PUZ	1	34	72	73	65
K4THA	39	57	101	74	66
K4TIG	40	56		77	84
W4BVV*	65	95	128	109	91
W4BYB	4	91	2	17	37

Minimums	30	50	80	70	70
Band	80	40	20	15	10
W4DMS	13	21	63	73	73
W4DUQ	3	46	80	81	62
W4DXI	3	21	59	64	70
W4ETO	50	65	90	85	70
W4EZ	18	35	68	75	50
W4JDR	44	57	90	70	70
W4KEC	36	63	85	72	75
W4KXV	32	53	76	68	76
W4WS			87	5	1
W4YHD	38	66	93	90	81
W4ZXI	62	82	105	96	84
K5ABV	9	48	71	83	80
W5AO	13	59			58
W5GO			32	75	72	65
W5IOU	56	64	85	77	76
W5JAW	32	65	97	84	83
W5KYD	2	52	83		31
W5SBX	33	50	46	62	20
W5WMU/5	36	54	62	70	75
W5WZQ	33	75	90	79	79
WA5RXT*	9	38	74	69	72
K6AHV	23	38	74	76	69
K6AN*	11	50	65	60	58
K6DC	16	57	80	62	43
K6FBB*	32	76	119	99	79
K6SDR	11	38	48	27	78
K6SXA	23	32	84	73	66
K6TYC	21	48	77	83	61
K6VOQ					79
K6ANN*	35	69	102	83	78
K6RH		56	79	72	
K6RIP*	12	30	82	55	53
K6CYX	17	37	81	71	66
W6DGH	20	42	76	77	59
W6HOC	9	52	70	67	60
W6ITY*	15	58	95	78	80
W6NKR	15	65	66	57	
W6RR	20	42	72	77	68
W6VSS*	48	78	123	96	80
WA6HRS*	6	40	81	64	64
WA6IVN*	19	52	78	83	70
WB6FOJ*	16	42	80	68	65
W7DI	26	61	75	76	71
W7IR	16	69	99	86	78
W7RM*	51	83	114	108	91
WA7IFD		31	95	81	75
K8EHU	30	46	90	80	67
K8NMG	37	13	43	21	
K8RMK	27	51	81	75	69

Minimums	30	50	80	70	70
Band	80	40	20	15	10
K8UDJ*	54	86	119	106	83
W8BDO	36	38	19	1	39
W8BQV	3	26	86	63	58
W8BT	35	39	53	53	53
W8DB	25	50	74	74	76
W8GMK				78	
W8QXQ	33	57	102	87	70
W8VSK	9	52	109	104	101
WA8LYF	27	68	68	76	62
WA8QIY	3	43	71	56	71
WA8RCN		30	57	65	76
WA8TNO		30	71	70	69
WA8ZDT*	23	53	88	71	70
K9BGL	30	50	70	73	60
K9CUY	25	52	72	68	63
K9DKU	2	11	65	72	67
W9BG		22	82	57	69
W9BZW	40	13			33
W9DY*	6	54	46	65	48
W9EXE*	30	37			
W9EZ			28	39	70
W9GB			104		
W9GIL	3	52	63	70	66
W9IOP	12	50	109	80	76
W9LKJ	18	38	93	84	80
W9OHH	5	27	81	73	70
W9ROM	18	41	73	75	71
W9YB*	10	36	58	72	57
W9YT*	33	63	97	94	82
W9VYG					71
WA9IVL	14	37	79	75	67
KØEKR		30	48	82	69
WØAIH*	21	58	94	71	58
WØBE	36	24	32	38	19
WØBX	18	52	63	43	54
WØCAW			83		
WØCQC		10	56	60	72
WØHP	25	63	70	63	64
WAØCVS	16	37	37	81	57
VO1AW	38	37	46	43	49
VE2DCW/2	47	71	76	71	66
VE2WA	20	40	89	67	68
VE2YU	29	49	81	68	73
VE7BDJ	21	37	81	68	60

*Multioperator Station

W8EW 51,300-76-225-E18
W8JWN 49,720-88-189-B60
W8FEM 39,144-84-156-B22
WA8ZZZ 37,368-72-173-N16
WA8YNU 34,848-96-121-A27
W8HXZ 33,600-70-160-N16
K8IDE 27,885-65-143-E10
WB8RZG 18,900-50-126-A 6
WA8SJS 17,019-61-93-B11
W8CXP 13,197-53-83-C
WA8VZK 6222-34-61-B
W8JUL 5775-33-59-E 9
W8EGI 4284-34-42-F 4
K8TDJ 1827-21-29-A 4
K8UDJ (6 oprs.)
4,146,066-449-3078-F96
WA8ZDT (+WA8s VBY VRB)
1,504,260-305-1644-F95
K8PTZ (+WA8VIE, WN8EIE)
284,475-145-585-C59
WA8ZGF/8 (4 oprs.)
1425-19-25-A 2

Ohio

W8QXQ 1,601,910-349-1530-E74
K8EHU 1,152,153-313-1227-C80
K8RMK 1,038,078-303-1142-C80
W8DB 931,086-299-1038-C61
WA8QIY 758,862-234-1081-F74
WA8TNO 633,600-240-880-C66
K8CFH 626,544-229-912-C60
W8BQV 526,044-236-743-C64
WA8RCN 413,328-218-632-B40
W8ELF 338,600-200-565-E56
W8AJW 328,860-174-630-A
W8EDU (WA3BGÉ, opr.)
269,838-171-526-E28
W8AQZ 247,020-179-460-C50
W8NPF 178,551-153-389-C50
W8GOC 171,504-144-397-A
W8LHV 164,892-156-353-B
WA8CIA 156,240-124-420-C53
W8JAQ 150,480-114-440-C51
W8IDC 148,500-132-375-C40
W8IPA 132,600-130-340-C20
W8PCS 107,625-125-287-C23
W8BDO 86,184-133-216-B49
WB8APJ 85,995-117-245-B22
W8YGR 82,764-132-209-B21
W8EE 82,283-107-258-C50

New York City – Long Island

WB2CKS 1,702,458-339-1693-C81
W2GGE 1,621,641-329-1647-C77
W2PCJ 1,341,120-320-1397-C76
W2WZ 1,019,250-302-1125-C58
W2LXK 932,799-301-1033-F70
W2IRV 658,560-245-896-C60
W2SUC 560,712-244-766-C45
W3YCW 483,840-256-630-C33
K2MFY 452,352-192-844-A60
W2AYJ 241,173-211-381-C42
W2MT 126,588-137-308-A26
W2EUO 108,675-115-315-A60
W2RDD 82,824-119-232-C14
WB2WXR 78,084-108-241-A26
W2AFM 64,872-102-212-D30
W2CKR 63,753-79-209-B40
WA2DUQ 43,890-70-209-F14
WA2FNY 42,174-66-213-C21
W2AJR (WA2UWA, opr.)
41,118-89-154-K10
W2CP 38,514-98-131-C10
W2CZZ 32,370-83-130-B13
WA2APO 21,600-72-100-A 8
K2DDK 12,672-64-66-C
W2MYK 9964-53-221-B20
W2ZPG 9000-50-60-A
WA2VDA 5088-32-53-B 5
WA2LQZ 4788-28-57-A18
W2TUK 2952-24-41-C 2
WA2LNU 840-14-20-A
WB2CYX 108-6-6-B 1
WA2HBP (+WB2HOM)
29,184-64-152-D48
WB2LMI (3 oprs.)
3888-27-50-B19

HUDSON DIVISION

Eastern New York

W1BGD/2
2,031,300-366-1850-C65
W2DXL 1,717,428-334-1735-C88
W2HO 786,132-251-1044-C70
WA2HAI 156,354-138-379-A
K2SHL 38,448-89-144-B21
WB2HEM 22,791-71-107-B
K2EKM 1104-16-23-B 8
K2AHQ (+WA2DNY)
923,175-275-1119-C90
K2BK (+WB2ZPW)
764,520-230-1108-C85

Northern New Jersey

W2WD 1,046,865-303-1153-C80
W2YT 961,863-281-1141-F72
WA2DPT 585,189-253-771-B75
K2EAC 584,381-217-907-B76
K2BMI 568,347-247-768-A71
K9IIFJ/2 464,424-212-700-F70
WA2HIU 450,492-217-692-D79
W2CVW 439,824-231-635-F59
W2HUG 394,200-219-600-A59
W2GZZ 286,335-189-505-C30
K2DNL 275,040-191-480-C41
W2ZZ 240,642-174-461-B20

W2NEF 184,680-163-380-A27
W2BHM 166,842-186-299-C25
W2HL 132,624-144-307-C24
WA2BCT 114,954-161-238-G25
WB2WID 106,200-118-300-F
W2YEM 60,610-93-214-B28
WB2GGO 32,160-67-160-D24
WA2JNQ 29,799-77-131-A16
W2SE 28,608-64-149-C20
K2KHR 26,448-76-116-C11
WA2DBD 20,196-68-99-A11
W2LKH 11,772-54-73-A15
WA2YWR 10,101-39-87-B 8
WA2CSP 3960-30-44-C 5
WA2LDX 3842-34-38-B 4
W2UL 300-10-10-A 7
F3VN/W2 270-9-10-B 2
WA2CFA (5 oprs.)
381,762-167-762-F60
WB2FUE (+WA2GAG)
33,592-76-148-A28

MIDWEST DIVISION

Iowa

WØMYW 481,611-233-689-C
WØBX 478,860-230-694-C51
KØIIR 367,227-203-603-C52
WØCQC 358,182-198-603-E53
WØBSY 165,648-136-406-C40
WAØPKE 133,515-129-345-B65
WØKB 108,528-152-238-B35
WAØVKF 90,513-113-267-B40
WØEQN 30,672-71-144-C 9
WØFZO 18,207-51-119-C10
WAØATY 4482-28-53-C11
WAØYJW 3683-29-43-A15
KØMKD (+WAØVCN)
154,575-135-385-A96

Kansas

WØWPL 161,226-169-318-B58
WØLYE 21,357-63-113-C11
KØBYC 6468-44-49-A15
WNØVJF 138-6-9-AA11

Missouri

WAØRDJ 536,616-257-696-A
WØPME 70,290-110-213-F28
KØIPL 40,800-85-160-C12

K0ARS 18,827- 67- 95-A 9
WA0WOA 9360- 50- 63-B13
WA0ZLU 4371- 31- 47-A19

Nebraska

W0IDW 490,992-212- 772-E

NEW ENGLAND DIVISION

Connecticut

W1FBV* 1,444,200-290-1660-C63
W1BIH 1,391,208-338-1372-C66
K1THQ 1,373,730-290-1579-C75
K1JHX 1,353,660-293-1540-C64
W1ETU* 1,285,065-285-1503-F69
K1VTM 1,252,080-282-1482-F78
WA1DJG 1,243,352-284-1462-F69
WA1QJ/1 865,500-250-1154-C73
K1UDD 615,696-254- 808-G40
W1TS 500,094-243- 686-B54
K1DPB 480,732-194- 826-C57
W1FTX 439,956-242- 606-A65
K1ASJ/1 439,878-167- 887-B82
K6OZL/1* 413,100-204- 675-C40
WA1JLD 355,833-207- 573-A50
W1DIT 349,230-210- 555-C41
W1OR 324,864-188- 576-C60
W1AJO 314,028-183- 572-B31
W1ODY 241,566-163- 494-A
W1GNR 197,055-151- 435-B65
W1CNU 196,911-143- 459-B45
W1LVQ* 180,780-131- 460-F24
WA9HHH/1* 128,592-141- 304-F24
K1QKR (WA1JZC, opr.)
92,988-108- 287-B23
W1ZJJ 73,041- 97- 251-B30
WB6SAZ/1* 72,885-113- 215-F8
W1ECH 64,260-102- 210-A11
W1WY 53,850- 75- 240-C22
W1JKS 41,406- 67- 206-F40
W1FLM 41,400- 75- 186-F12
W1CW* 24,960- 64- 130-C40
WN1NM* 23,754- 74- 107-C 7
K1LWC 18,360- 45- 137-B17
K1IEJ 12,636- 39- 108-B19
WA1HOL 10,251- 51- 67-A 5
W1IKE* 8190- 35- 78-C 3
WA1AAY 6264- 36- 58-B20
W1EGM 5460- 35- 52-B 7
WA1JZC 2700- 27- 34-B14
WA1HNR 684- 12- 19-A 1
G3XPM/W1 60- 4- 5-A 2
K1GUD (+W1FLM)
500,976-196- 852-C60

Eastern Massachusetts

K1DIR 2,101,020-388-1805-C83
K1NOL 1,997,372-359-1836-C85
W1BPW 1,568,418-346-1511-C58
WA1IRG 1,491,720-310-1605-C80
WA1FHU 1,412,532-319-1476-C84
W1WAI 1,127,196-284-1327-E64
W1FJJ 979,020-294-1110-C56
K1HVV 417,261-169- 823-C
W1AX 410,112-267- 512-C20
W1FNW 366,390-230- 531-A74
W1EHT 288,864-177- 544-B40
K1AGB 200,928-104- 644-C49
WA1JKZ 194,856-138- 471-D53
W1BQL 102,141-117- 291-C44
W1FIQ 71,136-104- 232-B41
K1OME 61,509-101- 203-B15
W1EKH 29,925- 75- 133-A
K7JRE/1 25,461- 69- 123-A17
W1FJN 21,420- 70- 102-D 7
W1PLJ 8280- 36- 77-B15
W1NYA 6042- 38- 53-B13
WA1IRY 1560- 20- 26-B 5
WN1LMM 1275- 17- 25-A 7
WN1MQI 1035- 15- 23-A 3
WA1JUY (W1ARR, WA1s CQW GFW) 1,062,934-262-1354-C86
W1MX (4 oprs.)
371,496-184- 682-C60

Maine

W1MN 196,812-154- 426-C40
K1GAX 34,560- 80- 144-C18
W1PAJ 14,625- 65- 75-B18

New Hampshire

WA1JTM 831,440-304- 916-C61
W1DXB 766,119-263- 971-A78
W1SWX 53,217- 73- 243-B
WA1JSD 9512- 41- 79-B18
WA1KTX 2016- 24- 28-A10

Rhode Island

W1AWE 59,400- 90- 220-N
W1AM 19,296- 48- 136-C11
W1VPY (WA1CKI+W2ECT +WA2LBT) 314,148-188- 557-B47

Vermont

W1ZW 313,140-170- 614-C37
W1PEG 93,744-126- 250-B60

Western Massachusetts

W1YK (WA1ABW, opr.)
1,700,328-349-1624-E76
K1DKX 672,115-229- 979-C68
W1EZD 514,488-221- 776-C52
WA1EBX 40,824- 84- 162-A24
W1HRV 6786- 39- 58-B 8
K1KNQ 2730- 26- 35-C 2

NORTHWESTERN DIVISION

Idaho

W7DV 338,376-184- 613-C34

Montana

W6JHV/7 222,735-155- 479-C50
K7CTI 210,600-180- 390-C35
K7ABV 88,725- 91- 325-C26
W7GKE 15,984- 37- 144-A13

Oregon

W7RS 477,015-245- 649-C33
W7DCR 93,765- 95- 329-B57
W7ULC 73,530- 95- 258-B40
WA7CGR 64,584- 92- 234-B30
W7PIC 4674- 34- 46-C 8
WA9WIE/7 2346- 17- 46-D12
WA7KRH (20- 4- 10-B 1
WA7JAV (+WA7JAW)
24,168- 53- 152-B33

Washington

W7DYQ 294,240-160- 613-E64
W7NP 180,194-122- 493-C36
W7GYF 84,600-120- 235-A16
VE7ZZ/W7 73,014- 86- 283-A28
W7IEU 72,072-104- 231-A58
W7YTN 48,825-105- 155-B63
W7QN 24,924- 67- 124-C26
WA7GYR 21,150- 47- 150-B20
W7WMY 18,972- 51- 124-B14
W7FIM 2415- 23- 35-C10
WA7KQK 54- 2- 9-A 3
W7RM (8 oprs.)
5,918,022-451-4599-N
W7DA/7 (WA7s JZO MJJ)
62,640- 80- 277-A36

PACIFIC DIVISION

East Bay

K6AHV 1,009,680-280-1202-C61
W6BH 543,996-207- 876-C
K6QW 322,830-170- 633-C40
WA6IQM 201,345-155- 433-C45
K6TWT 95,424-112- 284-C27
K6JB 47,880- 76- 210-C30
W6RGG 9408- 49- 64-C 8
W6EJA 6831- 33- 69-B10
W6RQZ 5694- 26- 73-N
W0PAN/6 48- 4- 4-B
WB6TOJ (K6PJY, WB6s HDH QJD) 1,165,029-271-1433-C96
W6KG (+W6DOD)
642,675-209-1025-C40
K6AN (+K6AUC)
610,488-244- 834-C80
W6MAV (+WA6s IQM VAT)
112,617-129- 291-C20
WA6TNN (+W6IAM)
2970- 15- 66-C 8

Sacramento Valley

W6NKR 358,092-203- 588-C62
K6RN 269,328-178- 513-B48
W6HB 90,506-118- 257-C30

Minimums	*15*	*30*	*80*	*70*	*70*
Band	*75*	*40*	*20*	*15*	*10*
K1AGB				100	
K1IKN		29	70	76	53
K1JHX	23	34	82	91	64
K1KNQ	20	35	75	88	70
K1THQ	36	38	88	89	82
K1UHY	36	37	89	92	82
K1VTM	18	37	70	90	62
W1CKA	27				
W1DIT	18	28	22	21	19
W1DO			23	72	3
W1ESN		24	82	65	51
W1ETU	20	36	53	66	60
W1FBY	14	28	80	72	59
W1FIJ	27	6	72	66	74
W1MX*	17	20	64	69	34
W1UYU	16	22	62	60	49
W1YK	37	39	83	74	75
WA1DJG	20	22	81	76	75
WA1EBX			6	24	76
WA1JHQ	1	5	94	76	48
WA1JUY	2	19	67	71	7
W2NSD/1			100		
K2BR*	17	22	46	46	24
K2BPP		20	69	43	79
K2DJD	27	34	88	88	80
K2LGJ*	9	21	57	43	71
K2PZT		31		38	9
K2QIL		5	65	57	71
K2UNY			70	77	
K2UQT/2*	25	48	88	82	70
W2AJR	21				
W2CP	18	10	47	58	34
W2DKM*		27	68	61	85
W2DXL	36	43	89	88	74
W2EHB		9	61	70	63
W2EPA	22	18	48	50	70
W2ITG	17	26	28	39	44
W2JSX			89		
W2LEJ	16	29	56	53	50
W2MB	30	45	81	74	62
W2PAU	20	18	44	42	46
W2PDB		6	54	74	65
W2SKE	19	33	101	85	86
W2WZ	19	18	65	57	56
W2YCW	21		18	27	21
W2YT	32	30	59	64	78
WA2CFA*	5	24	89	68	62
WA2HSX*	26	37	92	84	82
WA2IZS*	28	37	75	87	93
WA2UJM	20				74
WB2CKS	19	21	31	47	60
WB2OBU	31	20	19	37	69
WB2SQN	3	24	97	84	64
WB2UDQ*		35	89	88	58
WB2UZU	20	35	32	40	5
WB2YQH	12	20	58	79	6
WB8GDJ/2	30	33	102	101	9
WA3BZA/2	4	26	49	52	8
WA3HRV/2	24	30	80	70	6
K4BUR	17	9	59	81	4
K3HTZ*	37	46	76	65	77
K3HZL	14	37	76	74	77
W3ADO*	18	52	97	79	81
W3AXW	14	24	72	75	6
W3BQN	6	36	87	57	7
W3BYX			67	76	8
W3CRE	1	16	65	76	4
W3DHM		31	69	66	7
W3EZT	26	20	63	79	6
W3GM*	51	63	121	119	10
W3GRS	17	11	60	59	62
W3KDD					100
W3KMV	30	37	61	61	62
W3MWC*	33	54	80	93	8
W3NNK	24	33	55	53	6
W3NU	30	35	77	88	6
W3NX	21	37	76	61	7
W3NZ	18	24	46	58	4
W3OV*	15	22	80	68	6
W3SS*	15	27	63	77	70
W3VT	28	35	95	87	79
W3WPG*	28		47	50	16
W3ZKH/3*	53	72	150	137	121
WA3ATP*	11	29	97	86	8
WA3FXI*	28	41	72	71	6
WA3HGV		6	81	80	3
WA3JKO/3	15		3	13	1
WA3JXJ		1	35	41	7
WA3KEG	41	36	87	87	5
K4AJR	17	18	59	74	46
K4ARP	1	21	19	48	76
K4BAI	1	12	46	60	92
K4BBB			66	72	61
K4CG*	36	46	100	112	9
K4DAP	1	20	74	81	5
K4EZ	21	32	80	69	6
K4LXN			24	87	3
K4IL	31	27	53	52	5
K4LK*	16	22	64	76	8
K4MG	8	14	64	68	82
K4OSE*	12	28	64	62	73
K4PUZ	9	42	40	53	38

Minimums	*15*	*30*	*80*	*70*	*70*
Band	*75*	*40*	*20*	*15*	*10*
K4TTA	16	33	81	79	66
W4BVV	32	50	90	94	85
W4BYB	19	63	7	40	15
W4CRW		30	42	52	89
W4DFK	4	22	48	32	70
W4DM	14	17	59	74	62
W4EZ	25	36	62	72	50
W4FCJ	12	8	53	48	70
W4JDR	18	25	62	66	57
W4LBP	15	25	74	70	73
W4NBV	23	39	92	73	71
W4NPE			86	15	
W4QBK	25	44	103	89	78
W4VAN					80
W4WSF	17	22	61	65	58
W4WWD				4	72
W4ZCY	22	33	92	100	91
W4AFFW	9	27	76	77	34
W4AUXU	10	27	64	99	68
WB4DQM*					75
WB4KWT	2	10	56	70	49
W5EQT*	9	15	80	63	60
W5ECX	1	4	42	46	72
W5IOU	37	47	97	80	78
W5KAW	31	49	93	94	91
W5KWM		51			
W5LC	17	31	47	56	63
W5LUC*	39	48	100	100	74
W5KYD	12	21	82		38
W5QWF	10	42	90	63	72
W5RSZ					81
W5WMU/5	29	40	73	75	79
W5SRXT*	10	37	88	74	53
W5SVPZ*		32	48	62	91
W5ZXO					85
K6AHV	25	47	86	84	65
K6AN*	12	40	67	58	46
K6EVR	16		110		
K6NA	13	32	69	63	55
K6PUR		32	90	80	70
K6SVL			37	26	51
K6SXA	19	42	66	57	44
K6UYC	26	47	82	72	67
K6YRA			80		
W6BH		33	79	79	
W6BXL	6	36	22	37	38
W6DGH	15	22	61	69	48
W6DQ	19			42	52
W6EJI	16	17	1	9	30
W6JKR	20	18	17	25	30
W6RR	24	47	94	92	83

Minimums	*15*	*30*	*80*	*70*	*70*
Band	*75*	*40*	*20*	*15*	*10*
W6TEZ*	8	37	74	64	17
WB6UDC	11	32	51	60	66
WB6UKO*		23	69	75	62
WB6WIT	10	36	72	62	58
K7RAJ/7*	23	32	69	74	34
W7RS	12	17	96	93	64
W6YRA/7*	17	31	61	63	65
K8HLR*	42	64	118	109	84
K8IDE	4	9	36	71	47
K8MMH		4	16	16	77
K8UDJ	34	50	88	91	80
W8RDQ	23	37	45	24	36
W8UCS/8*	8	30	78	81	74
W8IPA	11	28		76	71
W8JFD			88		
W8LXU	13	38	83	81	76
W8NGO*	7	47	90	77	61
W8UWA	13	33	75	62	58
WA8QIY			22	33	87
WA8RWU	9	30	72	70	84
WA8YVJ					71
K9BGI	20	34	70	70	69
K9CUY	25	42	87	70	64
K9DKU			24	32	79
K9PPJ*	16	39	96	78	70
W9BZW	5	13	58	83	91
W9EWC	21	32	72	52	55
W9EXE	14	40			
W9LKJ*	25	36	101	94	92
W9OHH		13	73	74	84
W9QQN	10	21	79	85	65
W9ZBD		4	8	57	72
WA9QAM		2		6	78
KØRNZ	3	5	70	65	70
KØVVY*	21	34	59	54	54
KØWWX*	3	28	67	66	73
WØHP	23	55	79	92	72
WAØCPX*	22	28	65	73	61
WAØUHY*	1	11	72	50	73
VE2WY	4		75	75	65
VE2YU	7	20	74	66	70
VE3BS	2	9	84	75	65
VE3EVZ*	7	14	85	75	65
VE3GCO		6	81	60	68
VE3HJ	5		43	31	80
VE3WQ	13	23	80	64	73
VE7BDJ	24	21	82	61	40

*Multioperator Station

DX CONTINENTAL CHAMPIONS

	CW		Phone	
	Single Op.	*Multiop.*	*Single Op.*	*Multiop.*
Africa	EL2CB	9J2XZ	ZS6DW	CR6GA
Asia	JA1AEA	KR6VX	JA1AEA	KA2KS
Europe	LAØAD	SK6AB	CT2AT	SK6AB
N. America	OX3WQ	KZ5KN	KP4AST	KZ5KN
Oceania	KH6IJ	. . . .	KH6IJ	KH6SP
S. America	PJ2VD	LU2DKG	HC1TH	PJ9GF

W6KYA 3198- 26- 41-A 7
W6DZK 192- 5- 8-A 4

San Francisco

W6WB 358,800-208- 575-C35
W6KWE 20,700- 50- 138-C
W6BIP (+WA6DJI) 583,944-232- 839-C36

San Joaquin Valley

W6KEV 425,166-191- 742-C47
W6ZSO 204,726-149- 458-C43
W6CLP 15,498- 42- 123-B26
W6MMH 5394- 29- 62-B10
WA6IVN (+WA6IVM) 1,341,786-302-1481-C74

Santa Clara Valley

W6CYX 1,122,816-272-1376-C72
WB6KBK 628,488-232- 917-C69
W6HOC 540,252-258- 698-F50
K6DC 528,240-248- 710-C54
W6EYY 232,965-155- 501-C35
K6MG 189,666-123- 514-C39
K6CLV 165,846-131- 422-C56
W6EBO 143,766-147- 326-C26
W6CLM 92,415-101- 305-C41
K6VOQ 88,401- 79- 375-B36
W6KHS 87,630-127- 230-C
WB6ZHD 66,483- 89- 249-C26
W6ATO 65,365- 85- 257-C
W6HJP 62,010- 90- 230-A41
W6GJV 59,985- 93- 215-B37
W6EJ 50,100-100- 167-C
W6ISQ 28,635- 83- 115-C 8
W6GBY 27,633- 61- 151-B32
W6OL 15,933- 47- 115-B 9
K6TZX 11,466- 42- 91-A10
WB6KOR 10,076- 44- 77-A15
K6AO 9477- 39- 81-C10
W6AKM 8976- 34- 88-C 7
W6CEO 8658- 39- 74-C16
WA6DWO 3925- 25- 53-B 9
W6QDE 3822- 26- 49-C12
W6CLZ 720- 12- 20-B 2
WA6PYS 570- 10- 19-A11
K6EBB (8 oprs.) 3,915,945-403-3223-C96
WA6HRS (+WB6NXK) 785,655-255-1027-C77
W6JKJ (multiop.) 436,230-222- 655-C
WA6IBU (+WN6GHO) 13,920- 40- 119-A45

ROANOKE DIVISION

North Carolina

W4TMR 572,418-231- 854-B73
K4ARP 268,314-197- 454-C46
K4CAX 200,334-173- 386-A51
K4CIA 131,208-142- 308-C20
WA4FFW 76,680-120- 213-C15
W4OMW 52,983- 87- 203-C16
K8TVK/4 51,282- 77- 222-A
K4JO 33,970- 86- 133-A28
WB4IRD 2961- 21- 47-B
K4LI 210- 7- 10-A

South Carolina

K4II 1,125,912-344-1091-C89

Virginia

W4YHD 1,965,120-368-1780-C86
K4PQL 1,650,564-306-1798-F84
W4KFC 1,484,535-331-1497-E56
W4KXV 1,313,025-305-1435-C79
W4UQ 624,052-286- 729-C65
W4DUQ 612,816-272- 781-B
W4NH 556,818-206- 901-C40
W4EZ 521,028-246- 706-C43
K4OD 475,170-235- 674-E55
W4DM 430,500-205- 700-C40
W3WBC 404,616-184- 733-C44
W4PHL 228,150-169- 450-C65
W4GF 216,810-165- 438-C
W4WSE 214,434-171- 418-C34
K4BKG 193,116-154- 418-C21
K4ZA 149,076-164- 303-A34
W4ZM 133,056-144- 308-C19
K4ORQ 125,685-133- 315-C16
W4QCL 62,856-108- 194-C24
W4NM 58,656- 96- 205-A32
WA4IVL 52,536- 88- 199-C20
W4KMS 27,489- 77- 119-F18
WB4GAH 11,952- 48- 83-B16
W4EXI 10,212- 46- 74-B14
K4EJG 6640- 40- 56-A40
K4EOF 4416- 32- 46-A 7
W4LXJ 3120- 26- 40-B 7
W4KPB 2175- 25- 29-B10
W4KOQ 495- 11- 15-B 5
WB4ODN 462- 11- 14-B 2
W4BVV (10 oprs.) 6,879,815-493-4653-E96
K4CG (7 oprs.) 3,373,272-414-2716-C96

West Virginia

W8BT 592,539-263- 751-C47
W8CDV 126,604-124- 342-E41
K8MYU 93,000-124- 250-A20
WA8DOY 63,261- 99- 213-A37
W8BJ 22,800- 76- 100-B41
W8BKK 9225- 41- 75-A17

ROCKY MOUNTAIN DIVISION

Colorado

WAØGUH 554,472-204- 906-C75
WAØCVS 484,956-228- 711-C57
WØCAW 43,077- 83- 173-B24
WAØVPO 42,480- 72- 202-B43
KØZFL 35,805- 77- 155-A16
WAØUDS/Ø 32,256- 72- 150-C19
WAØWKW 7605- 39- 65-C
WAØSUD 1575- 15- 35-B 5
KØEZH 576- 12- 16-B 6

New Mexico

W5EU 649,512-216-1005-C61
W5QNY 207,014-178- 388-C46
W5FKP 65,340-110- 198-A31
W5PDO (WA5ROU, opr.) 38,850- 74- 175-C30
W5OQ 31,104- 81- 128-C23
K5MAT 23,166- 78- 99-A15
W5MHT 16,524- 54- 102-C 9
W5RE 2025- 25- 27-C 2

Utah

W7HS 601,208-223- 899-C68
WA7MGK 78,486-103- 254-B54
W7RO 37,800- 63- 200-A21

SOUTHEASTERN DIVISION

Alabama

W4KVC 244,032-496- 164-E
WA4WED 50,955- 79- 215-B55
WB4EOW 12,742- 46- 98-A28

Eastern Florida

W4JDR 1,549,080-331-1560-C91
W4ETO (WA4SDC, opr.) 1,522,698-361-1406-C74
K4THA 1,520,207-337-1504-G90
K4TIG 475,707-257- 617-C54
W4WHK 447,228-246- 606-A72
K5YPS/4 255,750-155- 550-C38
W4HOS 202,752-176- 384-F46
WB4JSV 173,229-113- 511-C
W4BYB 108,267-151- 239-C
W4WS 75,888- 93- 272-C24
WA4SVH 68,478-101- 226-C38
K4NE 68,002-121- 188-B23
WB4OGW 50,343- 97- 173-B36
WB4MKB 34,428- 76- 151-C24
K4AUA 27,336- 67- 136-B17
W4KJL 11,832- 58- 68-C11
W8WVU/4 8040- 40- 67-A10
W4DRK 7439- 43- 58-C
W4EEO 3960- 33- 40-N
WA8USU/4 216- 8- 9-A 2
W4ZXI (8 oprs.) 3,821,658-433-2942-C96
W4TKI (+WA4SQD) 19,980- 60- 111-B39

Georgia

K4BAI 1,390,932-324-1431-F76
K4EZ 894,558-266- 821-C65
W4DXI 461,125-217- 711-C67
WA4CZM/4 49,410- 81- 205-A44
WB4EQQ 42,660- 60- 237-B25

Western Florida

K6QPH/4 29,952- 78- 128-C15
W2AGT/4 702- 13- 18-A 6

SOUTHWESTERN DIVISION

Arizona

W7IR 1,442,808-348-1384-C78
W7DI 1,213,443-309-1309-C86
WA7IFD 904,092-283-1074-C66
W7UDG 397,320-220- 602-C62
W7AYY 370,173-163- 757-C51
W7IV 2484- 23- 36-B10
WA7MMK 770- 14- 21-B 1

Los Angeles

W6RR 1,462,239-279-1747-C88
W6DGH 966,075-275-1171-C84
WA6EPQ 733,194-231-1058-C
W6TZD 641,388-226- 946-C60
WB6WIT 550,827-207- 887-C67
W6CS 320,760-198- 540-E41
W6IPH 303,696-171- 592-F37
WB6GMN 302,679-199- 507-C
WA6DGQ 261,000-145- 600-C84
K6SXA 243,528-278- 292-C60
W6RCV 218,964-142- 514-C52
W6NJU 205,356-157- 436-C
K6MP 188,415-159- 395-C35
WB6HDG 181,050-142- 425-C
W6ONG 177,642-139- 426-B60
K6YEZ 167,979-133- 424-B41
W6MXN 161,304-143- 376-C
W6BXL 152,460-140- 365-C36
W6JKR 117,750-157- 250-C32

TOP TEN
Single Operator

CW				*Phone*			
W/VE		*DX*		*W/VE*		*DX*	
K1DIR	2,101,020	PJ2VD	3,160,524	W6RR	2,085,900	KP4AST	6,779,598
W1BGD/2	2,031,300	KH6IJ	3,127,884	W4BVV	1,587,924	HU1P	5,615,313
K1NOL	1,997,372	LAØAD	2,786,616	W4ZCY	1,553,448	HC1TH	4,058,940
W4YHD	1,965,120	YV5KL	2,493,702	K6UYC	1,534,680	KH6IJ	3,964,350
K2KIR	1,894,635	OZ1LO	2,440,848	K6AHV	1,504,914	XE1KS	3,529,170
K4GSU	1,811,596	DL4QQ	2,399,358	W1BGD/2	1,491,645	KZ5NR	3,321,675
W8VSK	1,802,250	OH5SE	2,397,600	K1THQ	1,398,600	XE1LLS	3,262,239
W9IOP	1,755,990	G3FXB	2,174,784	W5JAW	1,389,756	YV4UA	2,701,327
W2DXL	1,717,428	G2RO	2,144,730	W2SKE	1,360,719	VK2FU	2,319,840
WB2CKS	1,702,458	GD5APJ	2,084,358	W4QBK	1,356,678	WA9RAT/HR	2,296,575

K6BEP 109,890-110- 333- F
K6OC 63,180- 90- 236- C23
W6FJJ 62,916-107- 196- C
W6WAW 58,860- 90- 218- C
K6CNV 50,367-103- 163- A24
W6DQ 41,902- 82- 171- C
W6BUD 19,140- 55- 116- C 8
WA6MYV 13,668- 34- 134- B36
WA6CMX 12,978- 42- 103- D30
WB6ZHT 12,240- 34- 120- A23
WA6DPQ 9045- 45- 67- A 8
W6RW 8400- 40- 70- C
K5MHG/6 8010- 30- 89- B
K6KWN 7110- 30- 79- A28
WA6LLY 5508- 27- 68- B22
OH3UQ/W6 5184- 32- 54- B 8
WB6DBZ 4536- 21- 72- B36
W6JSO 3807- 27- 47- A17
K6MV 1008- 16- 21- A 6
K6GLC 972- 18- 18- C
W6VSS (10 oprs.)
4,623,804-426-3620- C96
WA6BCQ (+WA6DIS)
107,589-111- 323- C70

Orange

K6UYC (W6DQX, opr.)
1,233,549-291-1413- C87
W7PUI6 574,578-233- 822- C39
K6CU 116,508-133- 292- C50
W6NT 45,696- 68- 224- D45
W6JXO 36,423- 71- 171- A46
K6TXA 32,175- 65- 167- B21
WA6JQX 21,450- 55- 130- B41
WB6UDC 13,860- 42- 110- C
K6PE 3402- 21- 54- C 3
WA6BZT 1456- 16- 31- A15
WB6WIW 48- 4- 12- B 1
W6ANN (5 oprs.)
2,256,240-357-2110- C94

San Diego

K6SDR 355,116-202- 586- C60
WB6LXS 247,618-161- 514- F38
W6MAR 128,643-137- 313- C
K6PUR 117,150-142- 275- C20
W6PRY 18,444- 58- 106- F18
WB6IXC 1380- 20- 23- A 8
W6ITY (+K6VZA, WB6OLR)
1,603,920-328-1630- N

Santa Barbara

K6OW 454,944-224- 677- C59
W6KPJ 129,954-121- 358- B51
W6GEB 60,876- 89- 228- A14

WEST GULF DIVISION

Northern Texas

K5ABV 886,386-291-1016- A81
W5EQT 664,119-243- 936- C47
W5GR 590,058-223- 882- C56
W5FCX 323,400-196- 550- C39
WA5VSL 208,926-159- 438- C36
W5KYD 201,432-168- 400- C40
W5FKB 199,584-154- 432- C40
WA5UCT 135,063-129- 349- A58
WA5QEU 29,106- 63- 154- B12
W5QU 3612- 28- 43- D12
W5FKQ 2622- 23- 38- N
W5MSG 27- 3- 3- A 1
WA5RXT (4 oprs.)
815,868-262-1038- C90
W5ZSX (+W5ONL, WA5UCT)
551,520-240- 766- C72
WA5YMV (4 oprs.)
155,520-144- 360- D51

Oklahoma

K5BOC 342,081-191- 597- C38

Southern Texas

W5JAW 1,579,014-361-1458- C70
W5WZQ 1,275,192-356-1194- C80
W5GO 817,644-244-1117- C77
K5TSR 410,916-242- 566- C47
W5MCO 336,600-204- 550- C70
W5SBX 317,796-213- 498- G58
W5LJT 270,204-178- 506- C35
W5LPO 185,592-148- 418- B75
W5GEL (WA5PUQ, opr.)
173,680-167- 348- C22
K5IZY 149,184-168- 296- A68
WA5AUZ 104,118-134- 259- F23
WA5UHG 57,600-100- 192- F36
WA5NOM 16,530- 58- 95- A64
W5ELN 360- 6- 20- B12
WSAC (WB2HEY, K5s FTZ SBR)
32,895- 85- 129- C20

CANADIAN DIVISION

Maritime

VO1AW 587,241-213- 919- C60
VE1WP 276,192-168- 548- A39
VE1EK 104,877-129- 271- A23
VE1AI 76,680-108- 237- D18
VO1CO 29,110- 71- 137- A31
VE1AE 16,146- 39- 138- A36

Quebec

VE2DCW/2
1,300,830-331-1310- C72
VE2YU 972,000-300-1080- C64
VE2WA 915,048-284-1074- C70
VE2AYU 803,520-248-1080- F82
VE2NV 297,792-192- 517- E26
VE2DKJ 67,650-110- 206- B18
VE2PJ 18,483- 61- 101- A20
VE2AQP 3330- 30- 37- A19

Ontario

VE3KZ 606,096-244- 828- A65
VE3DBB 328,452-202- 542- C72
VE3GCO 205,600-160- 432- A40
VE3CQA 136,404-108- 421- A55
VE3WB 71,595-111- 215- A41
VE3AIA 33,600- 80- 140- D16
VE3PQ 28,877- 67- 145- B14
VE3WZ 26,062- 83- 106- F16
VE3DZV 19,440- 45- 144- C10
VE3AYR 13,552- 56- 82- B13
VE3FGV 12,720- 53- 81- A16
VE3WW 10,830- 38- 95- B 7
VE3DV 10,692- 44- 81- C15
VE3GUM/3 (4 oprs.)
599,850-215- 930- C93

Manitoba

VE4MP 10,206- 42- 81- C12

Saskatchewan

VE5PM 63,360- 96- 220- B
VE5TT 7488- 39- 64- A29
VE5DZ 5496- 24- 79- A12
VE5US (VE5s PC UE)
701,325-225-1075- C85

Alberta

VE6VV 22,878- 62- 123- C
VE6IC 648- 12- 18- B 3
VE6MZ 189- 7- 9- A 2

British Columbia

VE7BDJ 712,089-267- 889- C
VE7BZC 178,542-109- 546- B47
VE7HQ 148,022-109- 454- B50
VE7IQ 19,440- 45- 144- N

Yukon – N.W.T.

VE8ZZ 298,557-147- 637- F51
VE8NWT (VE8BB, opr.)
60,300- 75- 268- B13

PHONE SCORES

ATLANTIC DIVISION

Delaware

W3NX 539,550-275- 654- C62
W3NNK 366,624-228- 536- E64
WA3HGV 284,634-189- 502- A42
W3DRD 237,552-196- 404- C47
W3DPA 59,994-101- 199- C23

Eastern Pennsylvania

W3DHM 587,334-242- 809- C62
K3EUR 386,883-207- 623- C50
W3BYX 291,060-198- 490- C48
W3YIK 278,499-193- 481- C54
W3ALB 267,057-189- 471- C42
W3NZ 262,656-192- 456- C45
W3GRS 237,006-209- 378- C
K3AIG 223,053-149- 499- C56
K3TGM 215,424-187- 384- C46
W3KCS 140,910-154- 305- C23
W3CGS 93,765-133- 235- C30
W3KFQ 91,191-113- 269- C23
W3QLW 89,424-108- 276- C44
W3EQA 89,334-126- 238- C19
WA3FOQ 13,230- 45- 98- A11
W3EVW 11,907- 49- 81- E
W3EAD 10,647- 39- 91- A10
K3NPC 10,206- 54- 63- A12
W3CBF 9900- 44- 75- B 8
WA3JKO/3 8883- 47- 63- A 6
W3GHD 8580- 44- 65- B 5
WA3IXF 8256- 43- 64- C23
WA3IUV 2976- 31- 32- A
WA3ETT 585- 13- 15- B11
WA3MIB 3- 1- 1- A
W3GM (8 oprs.)
3,618,024-466-2588- C96
W3MWC (+K3s JLJ JLK)
1,296,864-342-1264- C90
WA3ATP (+WA3ATX)
980,583-311-1051- C96
K3HTZ ($ oprs.)
848,820-301- 940- C96
W3OV (+WB2ZDR)
792,396-253-1044- C80
W3SS (4 oprs.)
511,056-252- 676- C72
W3OK (8 oprs.)
447,174-234- 637- C 8
W3KT (+WA3HOM)
320,397-209- 511- C
W3WPG (multiop.)
108,360-140- 258- C

Maryland-D.C.

WA3KEG 969,108-332- 973- C62
W3AXW 510,048-253- 672- C75
W3EZT 484,592-248- 689- B59
W3KMV 480,414-251- 638- C70
W3BQN 394,299-227- 579- G66
W3CRE 381,924-206- 618- C50
WA3JXJ 142,272-152- 312- E38
WA3GZT 136,782-153- 298- C65
W3KDD 129,300-100- 431- C36
W3GN 114,426-117- 326- C20
W3HVM 81,765-115- 237- C30
W3PWO 80,442-123- 218- C25
W3FU 69,630-110- 211- D24
W3JPT 60,543- 93- 217- B25
W3ARU 52,938-102- 173- C30
K3TVE 46,800- 90- 174- B43
WA3JYV 46,191- 89- 173- A29
WA3HDT 32,956- 77- 144- B32
WB2VQG/3 25,410- 77- 110- C
W3MVB 20,574- 54- 127- C 8
K3CBW 14,076- 46- 102- C14
W3LMZ 8256- 43- 64- B12
W3FA 2850- 25- 38- A 4
W3ML 2418- 26- 31- B 3
W3MPJ 2046- 22- 31- A 3
W3ZM 1224- 17- 24- B16
W3BVO 798- 14- 19- A13
W3CSZ 663- 13- 17- A 2
W3DWF 507- 13- 13- B 8
W3ZKH/3 (6 oprs.)
5,793,177-533-3676- C
W3ADO (18 oprs.)
1,248,813-327-1273- C96
WA3FXJ (3 oprs.)
747,441-279- 893- C75

Southern New Jersey

W2EPA 340,288-208- 546- C84
K3QIL 324,918-198- 547- C60
W2EHB 291,711-203- 479- F53
W2UCV 261,522-174- 501- C47
W2UI 260,721-177- 491- B30
W2SUA 216,132-166- 434- C49
W2PAU 186,660-170- 366- F48
W2ITG 139,035-155- 299- C40
W2FYS 136,290-154- 295- E45
W2PU (K4BNC, opr.)
61,755-115- 179- A24
W2QKJ 60,840-104- 195- C
WB2IZX 49,749-103- 161- C20
WB2CGW 42,624- 74- 192- C20
W2ORA 38,106- 87- 146- A19
W2FHY 37,260- 90- 138- B48
K2QPN 34,596- 93- 124- C
K2PZF 33,696- 78- 144- C22
W2FBF 24,747- 73- 113- A14
WA2HJF 19,392- 64- 101- A12
W2PFQ 14,514- 59- 82- B34
W2SDB 13,050- 50- 87- B18
WB2VMD 6966- 43- 54- A16
WA2VEE 5310- 30- 59- B14
W2OWA 5280- 32- 55- C18
K2SQM 1377- 17- 27- B 4
WA2FVU 1035- 15- 23- D 9
WA2IUF 918- 17- 18- B 9
WA2NPD 660- 10- 22- A 3
W2EOT 624- 13- 16- C 5
WB2EJE 624- 13- 16- A 4
K2IPQ 450- 10- 15- B 4
W2IUG (WA2HJF, opr.)
264- 8- 11- B
WA2EOB 264- 8- 11- A 4
WB2WAK 108- 4- 6- B 1
WA2BPL 48- 4- 4- B 1
WA2CDX 48- 4- 4- A
WA2IZS (+K2CPR)
877,440-320- 914- C96
WB2ZPB (+WA2BPL)
112,320-130- 296- D30
K2AA/2 (K2MZP+W2FYS+W3CXO)
82,296-127- 216- F41
W2ZQ (WB2JSS, K3CPF)
55,290- 97- 190- F30

Western New York

K2DJD 1,022,325-317-1075- C77
WA3HRV/2 516,384-264- 652- C73
WB2YQH 487,872-231- 704- C41
W2PDB 328,947-199- 551- C52
K2UNY 194,922-147- 442- C51
WB2OEU 180,048-176- 341- C29
W2SNI 150,936-152- 331- C38
W2QIP 58,206-109- 178- C32
WA2UJM 57,528- 94- 204- C40
WA2BYJ 56,240- 95- 205- C12
WA2ARM 19,800- 55- 120- C13
W2FR 19,491- 73- 89- C10
W2RPP 19,110- 65- 98- B15
WA2HSU 18,483- 61- 101- B15
WA2DKV 17,172- 53- 108- D27
W2SSC 15,936- 64- 83- C10
K2KNV 10,296- 52- 66- E14
WA2CYQ 9720- 45- 77- A15
W2WZO 8979- 41- 73- C21
WB2MOI 8901- 43- 69- C15
W2TMI 4455- 33- 45- A15
WB2EQR 1980- 20- 33- A11
W2FXA 1728- 24- 24- C
W2UJ 810- 15- 18- A
WB2DTE 672- 14- 16- B 4
WA2BEX 147- 7- 7- A 1
K2LGJ (+K2LWR)
186,327-201- 309- C85
WA2DHS (+WB2HUA)
124,108-142- 296- A57

Western Pennsylvania

W3VT 954,504-324- 982- C82
W3NU 770,523-299- 859- C61
K3HZL 601,314-278- 721- C70
K3OTY 338,352-212- 532- C60
W3QZH 171,915-157- 365- C56
WA3JHB 160,000-160- 334- E38
W3YX 64,376-104- 207- C46
W3PIX 60,237- 97- 207- B32
W3VK 38,220- 91- 140- C24
WA3JGY 24,192- 56- 144- A19
W3PZC 24,150- 70- 115- B20
WA3KOS 20,100- 67- 100- A 7
W3UHN 16,560- 60- 92- C13
WA3HXX 12,789- 49- 87- B 9
W3KVS 10,812- 53- 68- C20
W3QEI 10,575- 47- 75- B21
W3DKL 9450- 45- 70- B12
WA3KQA 6903- 39- 59- B 8
WA3KKL 5904- 41- 48- C10
W3SDV 3312- 23- 48- B15
W3TV (+W3s AOH VW)
72,192-128- 188- A38
WA3JIH (+WA3MQJ)
36,708- 76- 167- A61

CENTRAL DIVISION

Illinois

W9BZW 687,690-270- 849- C67
W9QQN 576,420-260- 739- C70
K9BGL 523,107-263- 663- C81
W9OHH 484,584-244- 662- C
W9WYB 269,028-188- 477- C
W9JJV 245,016-166- 492- C59
K9JDV 149,703-139- 389- C42
W9TFY 135,888-149- 304- C46
W9ZMF 80,598-101- 266- C35
K9KDI 72,924-118- 206- B
W9GAQ 53,730- 90- 199- C28
W9GYN 29,784- 73- 136- A37
W9QLM 27,510- 70- 131- B35
K9BJM 26,082- 54- 161- B37
WA9IVL 25,636- 68- 126- C 8
W9YYG 22,500- 50- 150- C15
W9EBY 21,114- 69- 102- A47
W9IVB 21,060- 54- 130- C13
WA9WSS 19,293- 59- 109- F27
K9UQN 16,974- 46- 123- C13
W9EXE 13,446- 54- 83- C12
W9LMH 13,197- 53- 83- A15
W9VBV 11,880- 40- 99- C 7
WA9VGW 11,466- 42- 91- B33
WA9VGX 10,716- 47- 76- B20
WA9SQY 8910- 45- 66- A
WA9UCE 7626- 41- 62- A10
W9JIV 7560- 40- 63- C 8
W9GXH 6903- 39- 59- C 8
WB9CKY 5616- 36- 52- B16
W9KRU 4284- 34- 42- C10
WA9EKJ 4089- 29- 47- A 9
W9NZM 1728- 18- 32- C 5
K5LQJ/9 1170- 15- 26- A16
W9ZII 1080- 18- 20- A12

HERE'S WHO YOU MISSED ON 80/40!

CW

Call	80	40	Call	80	40	Call	80	40	Call	80	40	Call	80	40
CR6AI	15	288	DL4BT		35	LA3UF		17	SMØCCE	3	122	YO3AC		31
CT3AS	40	94	DL4QQ	170	419	LA8OM		11	SMØDSG	8		YO6AFP		153
EA8FO	109	204	DL6WD	135	414	LA9JM		23	SMØFY		5	YO6GZ		50
EL2CB	128	307	DL7AA	109	363	LAØAD	274	568	SP2AVE/2	13	79	YO7NA/8		14
TJ1AW	19	89	DL7MQ		84	DJ6SI/LX	85	105	SP2BMX		7	YO8DD		3
ZE1DC		4	DL7NS	18	111	LZ1KPG*	105	211	SP3BHG		146	YO8KAE*		13
ZS6AYU		2	DLØFR*	54	290	LZ1KVP*	14	201	SP3DOI		104	YO8MH	1	
ZS6FN		89	DLØJR*	38	274	LZ1SS		26	SP4DCS		31	YO9HO		305
5H3KJ		34	DM2ACC	4		LZ2DC	5	97	SP5AIB	4	27	YT1BCD*	133	261
9J2XZ*	2	37	DM3OML	4	26	LZ2IM	7	11	SP5ASY		11	YT1FJK*		6
HL9VQ	49	82	DM3PA	3	16	LZ2ND		7	SP6ASD	36	178	YT1SJ	4	12
HS5ABD	23	47	DM3SBM	8	33	LZ2RF	4	57	SP6XA		3	YT2CBM*	30	67
JA1AEA	65	220	DM3UDM	7	12	OE3RE	3	2	SP7CKF		24	YT3JS		8
JA1AFF		6	DM3XHF	25	29	OH1VA		2	SP8AG		12	YU1AHI*		36
JA1AS		61	DM3XI	7	43	OH1XX	6	213	SP8KBN*	2		YU1LW		12
JA1HLR		44	DM4ROL		22	OH2AA*	22	27	SP9KHX*		5	YU1SF		25
JA1JKG		52	DM5DL*		28	OH2BJY		1	TF2WKF*	259	474	YU3EJ*	175	404
JA1NDO	12	11	EA2CL		29	OH3MM		72	UA1KAG*		50	YU3NY	109	301
JA1SMA		11	EA2DT	43	87	OH4RH		48	UA1KBR*		68	3Z3CDD		62
JA1SR	10	47	EA2HR		9	OH5SE	12	46	UA1TL		72	3Z5ATO		163
JA2BSD		4	EA2HW		9	OH5UQ		140	UA1ZW	2	289	3Z5PWK*		5
JA2CPD		5	EA3KT	20	46	OH5UX	5	10	UA2BZ		85	3Z8AFS		4
JA2HO	13	14	EI9J	203	270	OH6NO		6	UA2EC		21	3Z8HR		44
JA2IU		16	F2PO	44	35	OH8RW		62	UA2KBR*	51	79	3Z8KAF*		45
JA3EVJ		23	F8TC	17	61	OJ3NY		4	UA3KAO*	10	114	3Z8MJ		10
JA3HBF		32	F8TM	38	25	OK1AE[illegible]		6	UA4AN		75	3Z9ABE		124
JA3JM	19	110	F8TQ	90	172	OK1AF[illegible]	3	91	UB5IF		48	3Z9CEM		10
JA4BNT		60	F8VJ	160	265	OK1AII		5	UB5KBD*	5	112	CO2LD/7		43
JA7AMK		33	F8ZF	137	126	OK1AO[illegible]	49	12	UB5KEQ		4	FP8AP	165	240
JA7HQP		20	F9EP		2	OK1AOX	5	138	UB5KVF*		61	KL7EWA	32	122
JA7YAF*		29	G2AJB	6	192	OK1APV*	76	217	UB5MZ		90	KL7GCV		9
JA8DIM	13	47	G2DC	83	63	OK1ATX	88	134	UB5TH		18	KP4AN	210	34
JA9BE	32	46	G2QT	21	143	OK1JBF	11		UB5TR		42	KP4BJM	74	65
JA9YBA*		9	G2RO	307	398	OK1KTL*	53	88	UB5ZAA		11	KP4DIS		48
JAØEMS		5	G3APN	26	97	OK1KYS*	43	43	UB5ZE		48	KP4DJI	10	51
JH1AGH		59	G3ESF	106	183	OK1MSP		63	UC2CY		77	WB4FOT/KP4	64	184
JH1CBI		68	G3FXB	193	384	OK1STU	39	83	UC2IJ		39	KV4AM	235	235
JH1EYM	16	109	G3HZL	60	156	OK1TA		99	UF6DA		7	KZ5KN*		70
JH1GNL	48	173	G3KMA	111	232	OK2BOB	81	226	UK1WAB		11	KZ5NR	347	237
JH1QYL		26	G3KSH	25	10	OK2B[illegible]	[illegible]2	28	UK1ZAA*	9	281	OX3WO	10	104
KR6VX*	74	137	G3TXF	126	314	OK2[illegible]		34	UK1ZAB*		6	PJ8AA	277	200
OD5LX	14	54	GD5APJ	161	478	OK2P[illegible]		50	UK2AAO		33	PJ8PM	92	152
UA9PP		7	GI3JEX	21	40	OK2Q[illegible]	8	100	UK2BAV*	41	120	VP9BY	35	116
UA9WS		2	GI3OLJ	38	87	OK3C[illegible]	2	69	UK2BBB*	1	15	KH6HAM	34	104
UAØIW		11	GM5APK		142	OK3CC[illegible]	22	36	UK2WWW		7	KH6IJ	352	470
UAØKCA*	16	19	GW3JI	145	311	OK3CI[illegible]	3	109	UK4HAP*		4	KS6DH	9	
UAØKCO*	53	150	HA1KSA*	50	124	OK3KG[illegible]*		168	UK5KAA*		4	AX2VN	34	44
UAØKZB*		72	HA3KNA*	1	31	ON4XG	97	220	UK5VAA		34	AX3AXK	3	77
UAØLJ		14	HA3MB	1	1	OZ1LO	193	359	UK5WAA		94	AX5EM		30
UK9CAE*		96	HA3NA	3	9	OZ1W	176	543	UK5WAS	2		AX5OR		3
UKØCAB*	17	53	HA5KFZ*	53	79	OZ3PO	32	75	UK5WAZ*	38	90	VK2GW		251
UKØZAA*	17	44	HA7RN		29	OZ4H	13	30	UK6LAZ*	44	168	VK3QI		345
UL7GW		6	HA8CH		51	OZ5CI		6	UP2KBC	56	346	ZL1AMO	1	317
UL7RL		1	HA8KCC		14	PAØFRI	4	22	UP2OX		98	ZM1AFW		43
UWØIX	2	76	HA8UF		19	PAØGN*	10	83	UP2SB	5	83	CE2CR		14
VU2JN		16	HA8UH		52	PAØKOR		47	UQ2KAA*	26	114	CE3CF		144
VU2MSK		45	HA9KOB*	10	36	PAØLOU	231	332	UQ2KBP*	8	271	CX9BT	11	12
W6DLE/4X		34	HA9KPE*		6	PAØRCT	8	34	UQ2KCR*	16	109	LU2DKG*	6	132
9M2LN	1	47	HAØLR		34	PAØTA	13	19	UQ2OF		5	LU6DAZ		16
CT2AT	357	158	HB9AGH	35	107	PAØUV		45	UT5BP		21	PJ2HT	141	85
DJ2YE	1	10	HB9ANN		28	PAØVB	2	19	UT5KDP*	8	143	PJ2VD	383	485
DJ3XK		18	HB9DX	76	113	SK2CI*		6	UT5MD		82	PY1NEW		23
DJ4UF	32	73	HB9KC	53	58	SK3BP*	25	180	UT5SY		8	PY7AZO		286
DJ4ZR	50	384	HBØXGR*	74	196	SK6AB*	320	994	UT5XB		31	PY7SR		182
DJ5GG	4		I1ASE	10	294	SK6CF*	290	484	UV3BK		4	PZ1AH	132	167
DJØTA	32	18	I1BCL		29	SM2COR		51	UW1CX		18	YV4MC		48
DK2KV	1	7	I1BLF		82	SM3ARE		43	UW4AT		13	YV5KL	341	623
DK3BN		10	I1ER		5	SM5ACQ		5	UY5DV		22	9Y4VU	132	144
DK3HA*	1	38	I1YCZ		10	SM5CMP		94	UY5OB		18	* Multioperator Station		
DL1GN	1	2	JX5CI		2	SM5UU	11	57	UY5UI		14			
DL1QT	29	20	LA1OA	66	326	SM7AIL	1	3	UZ3TG		10			
DL2JO	33		LA2Q	7	4	SMØBDS		37	YO2AVP		27			

PHONE

Call	80	40	Call	80	40	Call	80	40	Call	80	40	Call	80	40
CR6GA*		41	UW9AF	8	14	HA5CQ	1	4	SM5FXE		19	DU1FH	22	95
EL2BD	21	226	W6DLE/4X		23	HB9DX	5	2	TF2WKF*	6	261	KH6IJ	229	308
EL2BZ		144	CT1BH	117	180	HB9QD*	111		UA2KBD*		2	KH6SP*	238	774
EL8H		111	CT1FL	1		I1AJ*	74	227	YT1BCD*	53	82	KH6UL*	124	492
ZS3S		8	CT2AT	410	407	I1BAF	62	188	FP8AP	159	104	KM6CE*		90
ZS6DW	1	198	DJ2YE	7	18	I1BBZ		11	WA9RAT/HR2	124	208	KS6DH	9	258
HL9VQ	3	21	DJ8YQ[illegible]		1	I1BCL	12		H[illegible]MG		31	AX3QV		8
HS5ABD	30	15	DJ9MH[illegible]	1	[illegible]	[illegible]LD	63	[illegible]	H[illegible]P	[illegible]06	373	VK2FU	57	324
JA1AEA	32	172	DL4AP[illegible]	25	[illegible]	[illegible]OL	[illegible]01	13[illegible]	[illegible]AST	405	720	VK3QI	29	164
JA1NDO		5	DL4RM[illegible]	56	[illegible]	[illegible]H*	7[illegible]	[illegible]	[illegible]CQB	25	290	ZL1AMO	1	74
JA3ERG		41	DL6WD[illegible]	9	1[illegible]	[illegible]O*	[illegible]1	[illegible]	[illegible]DJI	1	108	CX2CN		1
JA3HBF		2	DL6WE[illegible]		1[illegible]	[illegible]AD	[illegible]4	39[illegible]	[illegible]FOT[illegible]P4		45	HC1TH	169	395
JA3USA		70	EA3QW[illegible]	20		[illegible]EGL	[illegible]44		[illegible]AM	85	231	LU5DKA	2	61
JA4FSD	37		EA4LH[illegible]	162	2[illegible]	[illegible]SSE	1	10[illegible]	[illegible]NR	[illegible]370	477	PI9GF*	328	259
JA7GQB		1	F3KW	136	22[illegible]	OHØNI		3	TG9GF		71	PZ1AH	4	3
JA9BE		3	G2OT	15	56	OZ1LO	58	103	VP9HY	135	145	K4MUP/YV1		275
JA9YBA*		4	G3FVA/A*	10		PAØLOU	6	8	VP9GE	43	417	YV4UA	244	438
JH1EYM	3	16	G3YXR*	12		SK3BP*		30	VP9MI	33	2	4M7AV	143	181
KA2KS*	71	232	GM5AME*		16	SK6AB*	42	204	XE1KS	394	553	ZF5GS		1
KR6VX*		89	GW3NWV	11	88	SM5EAC	12	20	XE1LLS	257	538	9Y4MM*	76	35

K9YIL 672- 14- 16- C 9
W9REC 75- 5- 5- B 7
W9LKJ (+W9ICE)
1,321,704-348-1266- C81
K9PPJ (4 oprs.)
881,751-299- 983- F96
K9VFF (+WB9AAJ, WN9BKD)
190,323-159- 399- C86
W9DWQ (multiop.)
159,858-166- 321- C
W9DY (multiop.)
109,398-143- 255- C35
WA9VOL (multiop.)
31,242- 82- 127- C20
K9LUI (multiop.)
5040- 30- 56- A 4

Indiana

K9CUY 699,840-288- 815- C85
WA9RQY 306,528-206- 496- C68
K9ODF 141,638-151- 313- C65
K9HDP 129,054-137- 314- A58
WA9CYV 110,802-118- 313- C58
WA9SMM 44,265- 65- 127- C30
K9VQK 26,418- 74- 119- A44
W9VDB 14,592- 64- 76- B10
W9UTQ 7968- 48- 60- A30
W1DRN/9 6000- 40- 50- A 6
WB9BPG 75- 5- 5- C

Wisconsin

W9EWC 424,560-232- 610- C50
W9GIL 375,804-219- 872- N70
W9BG 292,182-209- 466- F38
W9RQM 168,378-133- 422- D38
W9ZBD 165,816-141- 392- C35
K9DKU 140,760-136- 345- C31
W9LAX 82,128-116- 236- C20
WA9QAM 44,073- 83- 177- F
K9DIN 21,114- 51- 138- B21
K9EEQ 21,060- 65- 108- B43
W9OW 1458- 18- 27- C 4
WA9PUN (+K9YBC)
56,376- 87- 216- B32

DAKOTA DIVISION

Minnesota

W0HP 1,005,372-321-1044- C78
W0PAN 471,960-228- 690- C64
K0TPF 228,144-194- 392- C
WA0YAW 116,181-117- 331- B47
WA0EPG 93,366-126- 247- B45
WA0VBV 56,531- 91- 207- C32
K0EKR 54,000- 90- 200- E17
K0ZXE 40,608- 94- 144- A48
W0LYP 39,858- 91- 146- C15
W0BE 18,423- 69- 89- B16
K0CNC 5982- 32- 62- C 4
K0WWX (4 oprs.)
454,329-237- 639- C
WA0TKU (5 oprs.)
260,260-169- 514- C94
W0AIH (+WA0UPD)
92,520-120- 259- C 9
WA0CJU (3 oprs.)
15,228- 54- 94- C10

South Dakota

W0ACT 53,280- 96- 199- C32
WA0LYO 30,150- 67- 150- A24
WA0OML 14,520- 55- 88- C35
WA0CPX (4 oprs.)
523,647-249- 701- C
K0VVY (W8GKB, WA0QCC)
415,584-222- 626- C

DELTA DIVISION

Arkansas

W5MN 66,708-109- 204- C22
WA5SOG 60,456- 88- 229- B26

Louisiana

W5IOU 1,238,706-339-1218- C96
W5WMU/5 976,800-296-1100- C90
W5KC 312,654-214- 487- C40
W5OB 81,054-114- 237- C57
WA5WUJ (+W5s EGH MDH)
162,024-157- 344- C70

Mississippi

K7AUZ/5 236,610-165- 478- C68
W5NCB 156,519-153- 341- B76
W5RUB 221,805-155- 477- B37
W5MUG 172,044-162- 354- B30
W5OER 140,070-145- 322- C35

Tennessee

W4NBV 777,780-298- 870- C70
K4TTA 570,900-275- 692- C80
WB4KWT 245,157-187- 437- E46
K4PUZ 234,780-182- 430- C45
W4FCJ 206,280-191- 360- B33
K4UVH 134,460-135- 332- B48
W4NBO 104,058-123- 282- C45
W4EWR 98,679-127- 259- C27
WA4CCW 90,171-129- 233- A49
WB4CQL 27,738- 69- 134- E37
WA4EDR 26,550- 75- 118- C 7
W4OGG 20,340- 60- 113- C14
W4CGW 19,260- 60- 107- B16
WB4KYA 11,850- 50- 79- B34
W4VSV (6 oprs.)
41,022- 86- 159- G20

GREAT LAKES DIVISION

Kentucky

K4FXN 162,009-141- 383- E40
K4KJ 109,647-131- 279- B40
K4FJK 71,232-106- 224- B
W4FIN 10,500- 50- 70- C 5
WB4DQM (3 oprs.)
49,500- 75- 220- F41

Michigan

K8UDJ (K1ZND, opr.)
1,323,024-344-1284- E82
W8TWA 464,166-241- 642- C86
W8DQL 304,668-186- 546- C37
K8IDE 214,428-167- 428- C45
K8PAO 197,620-164- 406- F64
WA8ASV 146,853-147- 333- C52
WB8CCE 127,746-141- 302- B52
W8TJQ 57,405- 89- 215- B38
W8SH (WA3GBU, opr.)
52,728-104- 169- C19
W8HXZ 46,956- 91- 172- N16
WB8CKW 35,775- 75- 159- C16
WA8VRB 35,028- 84- 139- E19
W8VPW 27,051- 71- 127- C38
WA8TDY 7912- 46- 58- B 8
K8RNP 2244- 22- 34- B 7
WA8VZK 1380- 20- 23- B
W8AQF 1026- 18- 19- B19
W8JUL 966- 14- 23- C 5
W8CXP 396- 11- 12- C
K8HLR (10 oprs.)
2,741,244-418-2186- C96
W8NGO (+W8s CLR ONA)
758,016-282- 896- C90
W8DC (9 oprs.)
49,128- 89- 184- A40

Ohio

W8LXU 707,130-291- 810- G67
W8IPA 330,894-186- 593- C52
W8ZOK 302,860-190- 532- C65
WA8RWU 282,000-235- 400- E51
W8MKE 204,786-186- 367- C24
WA8QIY 157,620-142- 370- F46
W8DKI 155,109-149- 347- C53
WB8AQZ 152,304-152- 334- C48
W8BDO 146,025-165- 295- B57
W8NPF 109,725-133- 275- C51
WB8AKW 108,468-138- 262- F24
K8MMH 102,717-113- 303- B54
W8AJW 101,520-120- 282- A
WA8PRR 90,720-126- 240- C
W8MBB 66,744-108- 206- C32
W8WUO 66,144-104- 212- B25
W8JFD 56,760- 88- 215- C40
W8LHV 54,000-100- 180- B
WB8APJ 52,128- 96- 181- B15
W8JTU 49,350- 94- 175- b44
W8YGR 41,613- 97- 143- A16
W8GMX 39,201- 73- 179- B25
W8VZE 37,680- 80- 157- A13
WA8YVJ 32,163- 71- 151- C27
W8GMK 29,766- 82- 121- B22
K8CEH 24,780- 70- 118- A15
K8NMG 24,382- 73- 112- B
WB8ENY 15,756- 52- 101- F10
WA8TNO 15,399- 59- 87- C 7
W8ZCQ 13,272- 56- 79- C11
K8GVK 12,960- 45- 96- C
WB8AVH 12,750- 50- 85- B 8
WB8BOR 11,316- 46- 82- B17
WB8AFP 11,280- 47- 80- B12
WA8WGX 10,500- 35- 100- C11
WA8GRR 9792- 48- 68- A11
W8ELB 7257- 41- 59- B40
WA8KQF 5616- 36- 52- B13
WB8CGW 5508- 36- 51- B14
K8GRO 4056- 26- 52- A12
W8DZG 3822- 26- 49- B16
K8NVS 2484- 23- 36- C 9
W8PJN 2277- 23- 33- A13
WA8WSP 2208- 23- 32- A 6
W8FJS 2175- 25- 29- b41
K8TBQ 1925- 25- 28- C 7
W8OEM 798- 14- 19- C 3
W8EDU (WA3BGE, opr.)
612- 12- 17- C 1
WB8CKI 396- 11- 12- A
W8ICS/8 (7 oprs.)
736,578-271- 901- C90
W8MEL (+WA8DCH)
303,600-176- 575- C65
WA8AXB (4 oprs.)
10,086- 41- 82- B38

HUDSON DIVISION

Eastern New York

W1BGD/2
1,491,645-359-1385- C58
W2SKE 1,360,719-321-1413- N
W2DXL 1,185,690-330-1217- C86
K2JMY 128,478-133- 322- C30
WA2CAC 61,491-103- 199- B27
W2FCU 24,948- 77- 108- B19
W2EFE 12,672- 44- 96- B 7
WB2LPQ 9918- 47- 71- A16
WB2HEM 2250- 25- 30- B
K2UQT/2 (+K2s BQO UYC)
1,017,420-310-1094- C72
K2BK (+WB2ZPW)
168,795-155- 363- F47

New York City – Long Islands

W2DKM 477,180-241- 660- C52
WA2FCA 353,769-193- 611- C50
W2WZ 331,530-215- 514- C38
W2FSK 312,432-184- 560- C63
W2LEJ 281,520-204- 460- B66
WB2EXS 253,089-183- 461- A55
W2IRV 250,056-184- 453- C49
WB2CKS 199,716-178- 377- C
WA2GCG 170,232-173- 328- A33
W2CP 139,278-167- 278- C25
W2AEE (WA2LNU, opr.)
117,612-132- 297- C37
WB2UZU 111,078-153- 242- F17
W2GHY 109,080-120- 303- C48
W2CKR 40,560- 80- 169- B28
W2YCW 32,886- 87- 126- C14
W2TUK 31,050- 69- 150- C 7
K2DDK 26,622- 87- 102- C
W2ZPG 17,424- 66- 88- A
WA2VDA 15,606- 51- 102- B14
WB2HTW 11,193- 41- 91- B 8
WB2ZIN 9384- 46- 68- A11
WB2WXR 6888- 41- 56- A15
W2AYJ 6864- 44- 52- C 8
WB2FAX 2592- 24- 36- B 5
W2AJR (WA2UWA, opr.)
1575- 21- 25- B 5
W2NBJ 1404- 18- 26- C 5
K2MFY 504- 12- 14- A 2
WA2HSX (7 oprs.)
1,014,039-321-1053- C48
WB2ZYY (8 oprs.)
100,440-124- 270- B69
WA2PXB (WB2s DNV DNW IPG)
2772- 22- 42- B 5

Northern New Jersey

WB2SQN 938,199-277-1129- C58
W2MB 739,344-292- 844- C80
W2YT 687,219-263- 871- C72
WA3BZA/2 420,396-211- 661- F78
K2BPP 353,214-211- 588- C90
W2GZZ 185,832-178- 348- C30
K2DNL 169,455-165- 343- C48
WB2JLW 166,848-158- 352- E50
WA2VSQ 89,856-128- 234- B30
WA2BCT 66,045-119- 185- F24
WB2VFT 60,270- 98- 205- D20
WB2HEO 54,912- 88- 208- B49
W2YFM 48,546- 93-174- B28
W2ISX 43,788- 89- 164- C18
K2KHR 30,636- 74- 138- C10
W2SE 26,937- 73- 123- C20
W2CIY 12,960- 54- 80- A 7
WB2KQC 10,824- 44- 82- D 7
W2CVW 10,752- 56- 64- C
W2KXD 10,710- 51- 70- B11
WA2CSP 9936- 46- 72- F18
F3VN/W2 7998- 43- 62- B 8
W2UL 2997- 27- 37- A10
K2SKV 2652- 26- 34- F 4
WB2MXZ 2574- 26- 33- B
WB2IQF 960- 16- 20- B 2
WB2UDJ 816- 16- 17- B 4
WA2CKU 297- 9- 11- A 3
WB2UDQ (+WA2ATO)
681,000-250- 868- C66
WA2CFA (7 oprs.)
530,472-248- 713- C86

MIDWEST DIVISION

Iowa

WA0ETC 200,475-165- 405- A58
W0MYW 131,733-153- 287- C
WA0PUJ 87,120-120- 242- C30
K0IIR 44,892- 86- 174- C19
W0KB 37,380- 89- 140- B19
WA0IOK 14,868- 42- 118- A30
WA0ROM 7503- 41- 61- B20
W0FZO 5088- 32- 53- C
WA0ATY 360- 8- 15- C 4
WA0QJX (WA0s PKE PTV TGK)
195,600-163- 400- B66

Kansas

K0RNZ 411,516-213- 644- C56
WA0WVM 47,806- 82- 195- A28
W0ZUX 8960- 40- 75- A18
W0IYE 5664- 47- 59- C 6

Missouri

WA0TVC 152,145-147- 345- C70
W0UCK 37,260- 92- 135- C33
K0ETY 26,199- 71- 123- F15
K0IPL 18,648- 56- 111- C10
W0CDC 12,876- 58- 74- C16

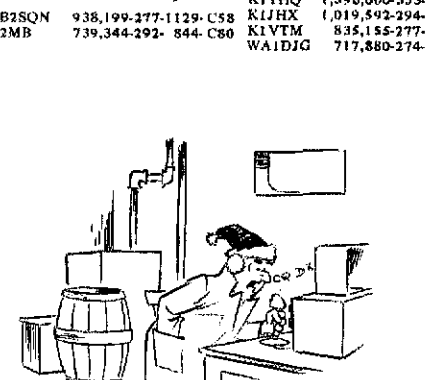
Nebraska

W0KH 37,638- 82- 153- B30
W0EXJ 31,671- 69- 153- C20

NEW ENGLAND DIVISION

Connecticut

K1THQ 1,398,600-333-1400- C75
K1JHX 1,019,592-294-1156- C55
K1VTM 835,155-277-1007- F78
WA1DJG 717,880-274- 874- A53



W1EBY* 607,200-253- 800-C47
W1ETU* 437,805-215- 671-C50
K1GUD 379,848-196- 646-C45
K1DPB 257,481-183- 469-C42
W1DEP 161,028-142- 378-B30
W1RIH 154,167-177- 291-C
W1ODY 136,080-140- 324-A
WA1JLD 119,520-160- 249-A25
W1ETX 103,818-143- 242-A40
K1ASJ/1 87,978-115- 256-B51
W1DO 87,024- 98- 296-C15
W1LVQ* 72,615-103- 238-B18
WA4HHH/1* 70,950-110- 215-B18
K1QKR (WA1JZC, oprs.)
68,495-103- 223-B31
W1DIT 55,404-108- 171-C32
W1CNU 46,464- 88- 176-B22
G3XPM/W1 44,326- 74- 201-A33
W1PPN 39,480- 94- 140-F20
W1AYR 24,895- 89- 148-C
WA1ISD 20,853- 63- 111-F11
W1ZOQ 20,520- 60- 114-C16
WA1KQM/1* 20,301- 67- 101-F 8
W1LLM 16,688- 56- 101-E16
W1IQP* 6552- 39- 56-C10
W1CKA 3321- 37- 41-C 6
W1IKE* 3276- 28- 39-C 3
WA1HJI/1 1890- 21- 30-C 3
K6OZL/1* 1800- 20- 30-E10
WA1HNR 741- 13- 19-A 1
WA1JZC 3- 1- 1-B 5

Eastern Massachusetts

WA1JHQ 621,753-227- 913-G67
W1EJJ 503,475-245- 685-C36
W1ESN 380,286-222- 571-C56
W1UYU 358,644-209- 572-B49
WA1JUY (WB2YEW, oprs.)
244,518-166- 491-C60
W1FHT 204,376-152- 446-B35
W1JOP 176,013-159- 369-B47
K1AGB 124,580-100- 415-C44
W1BHV 112,176-123- 304-B27
W1IJE 50,826- 86- 197-A20
WA1IXL 48,312- 88- 184-C19
WA1JWQ 42,588- 91- 156-B
K1DIK 34,272- 84- 136-C 8
WA1ANR 31,968- 72- 148-A16
K1HVY 23,214- 53- 146-N
WA1CHU 19,872- 69- 104-E15
WA1JKZ 16,740- 45- 124-D13
W1TNK 12,264- 56- 73-C19
WA1KZE 10,584- 54- 66-B41
W1PCI 9636- 44- 73-B18
W1AX 4680- 39- 40-C 3
W1MX (WA1CQW, WA8WNO)
439,660-204- 585-C75
WA1KYJ (+WA1LGE)
35,224- 74- 159-B10

Maine

W1MN 156,114-147- 354-C42
W1PCD 83,628-138- 202-C20
K1GAX 13,800- 46- 100-N10

New Hampshire

K1UHY 1,112,832-336-1104-C72
WA1CET 74,256-112- 221-A53
W2NSD/1 42,600-100- 142-C17
W1ETC 8448- 44- 64-B
WA1JTM 6966- 43- 54-C 6

Rhode Island

K1TKN 472,644-228- 691-C69
W1YRC 405,000-225- 600-C51
K1UIX 23,100- 70- 110-B19
W1AWE 20,880- 60- 116-N
W1ELN 7155- 45- 53-B15
W1VPY (6 oprs.)
222,876-164- 454-C67

Vermont

W1ZW 136,800-120- 380-C26
WA2EIN/1 2376- 22- 36-B 9

Western Massachusetts

W1YK (WA1AHW, oprs.)
1,033,032-308-1118-E66
K1KNQ 822,528-288- 954-C67
W1EZD 79,560-102- 260-C27
WA1IBX 78,546-106- 247-A30
W1HRV 14,094- 58- 81-B11

NORTHWESTERN DIVISION

Idaho

K7RLS 128,385-135- 317-B35
W7DV 126,888-136- 311-C34

Montana

W7GKF 24,702- 46- 179-A18
W7FIN 2700- 20- 45-A13

Oregon

W7RS 593,892-282- 702-C31
WA7EFS 93,720-110- 284-D41
WA7CGR 30,330- 48- 225-B20
W7LJ 24,069- 71- 114-C35
WA7IHN 16,974- 41- 138-A37
WA9WIE/7
459- 9- 17-E 6
WA7KRH 126- 6- 7-B 2

Washington

W7BJ 222,396-129- 575-C52
W7RU 188,634-149- 422-C58
W7QN 25,326- 67- 126-C27
K7GEX 11,016- 54- 68-B21
W7QCV 1218- 14- 29-A 9
W7FIM 231- 7- 11-C 4
W7EXM (+K7JCA, KL7FIX)
218,316-161- 452-C54

PACIFIC DIVISION

East Bay

K6AHV 1,504,914-307-1634-C84
W6BH 360,990-191- 630-B
K6DYO 228,960-160- 477-C96
WB6CWQ 134,676-116- 389-B67
WA6AHF 62,730-102- 205-C30
W6MAV 35,721- 81- 147-C19
K6MHD 20,904- 59- 152-C25
WA6CPY 12,300- 41- 100-C16
WB6OOQ 2347- 31- 79-C13
WB6AUA/6
2104- 32- 74-B 8
K6IWT 3666- 26- 47-C 9
W6RQZ 1386- 14- 33-N
W6KG 1200- 20- 20-C 1
W6IAM 627- 11- 19-C 2
K6AN (+K6AUC)
614,685-215- 953-C85
W6DOD (+W6KG)
444,222-174- 853-C40

Nevada

K7LLB 28,116- 66- 142-B58
W6YRA/7 (10 oprs.)
868,287-237-1219-G96

Sacramento Valley

K6RN 162,060-148- 365-B36
W6NKR 18,792- 58- 108-C23
W6KYA 324- 9- 12-A 3

San Francisco

W6KWE 3564- 22- 54-C
WA6OQZ 60- 4- 5-A 1
W6BIP (+WA6DJI, KL7JDO)
344,964-178- 646-C37

San Joaquin Valley

WA6LVN 445,260-181- 820-C37
W6MMH 9348- 38- 82-B12

Santa Clara Valley

W6ZKM 342,798-194- 589-C51
K6ERV 333,300-202- 550-C51
WA6BKN 303,408-168- 602-C48
W6WX 294,840-180- 546-C47
W6FYY 221,886-126- 587-C33
W6EBO 218,280-136- 535-C31
K6ITL 204,960-160- 427-D54
K6PIH 172,980-124- 464-C46
W6ISQ 148,239-181- 273-C20
WB6KBK 123,888-116- 360-C24
W6ZBS 81,396-119- 228-D40
K6AO 36,018- 69- 174-C20
W6EJ 20,184- 58- 116-C20
W6CLM 17,484- 47- 124-C28
W6KHS 16,995- 55- 103-N
WB6UOM 16,698- 46- 121-A10
K6UXV 11,868- 43- 92-B19
WA6FKZ 3600- 25- 48-C 5
W6GBY 1890- 18- 35-B25
WA6HWO 9- 1- 3-B 1
WB6UKO (4 oprs.)
819,591-229-1193-F60
W6JKJ (multiop.)
213,189-179- 397-C30
WA6HRS (+WB6NXK)
213,120-148- 480-C50
WA6BVY (multiop.)
52,272- 76- 132-B13

ROANOKE DIVISION

North Carolina

WA4UXU 631,338-278- 787-G69
WA4EFW 368,619-223- 551-C55
W4TMR 327,753-199- 576-B65
K4AJR 309,444-214- 492-G50
K4ARP 206,415-165- 417-C53
K4UKA 94,104-118- 264-F49
WB4APP 85,239-123- 231-C27
WB4INE 57,096-104- 183-B
W4WWD 34,656- 76- 152-B31
W4REZ 19,656- 63- 105-C13
K4SKI 16,218- 53- 102-C10
W4OMW 2020- 39- 60-C 9
WA4NUO/4
75- 5- 5-B
W4ATC (WB4s HGL, IOI)
187,414-166- 377-D67

South Carolina

K4JI 309,747-225- 463-E56

Virginia

W4BVY 1,587,924-351-1508-C73
W4ZCY 1,553,448-338-1536-C78
W4DM 450,000-225- 668-C50
W4EZ 446,145-245- 607-E46
W4CRW 401,931-213- 629-A72
W4WSF 315,768-223- 472-C
W4KFC 299,520-192- 520-E22
W4UPJ 231,363-171- 451-C48
W4DFK 202,224-176- 383-C48
W4WBC 128,640-114- 320-C38
W4TKN 86,304-116- 248-C41
K4BKB 85,626-142- 201-C33
W8QGP/4
85,116-123- 232-C35
W4VAN 73,720- 80- 303-C42
WA4IVL 66,328-104- 219-C20
W4BKP 59,187-109- 181-A27
K4ORQ 58,344-104- 187-C11
W1KMS 36,456- 98- 124-C17
K4ZA 18,240- 64- 95-A12
W4IVN 16,686- 54- 103-C16
W4KOQ 12,240- 48- 85-C24
W4FXI 10,626- 46- 77-B17
W4QCL 2048- 22- 31-C
W4KPB 966- 14- 23-A 6
WB4GAH 27- 3- 3-A 1
K4CG (9 oprs.)
1,937,883-393-1644-N96

West Virginia

K8QYG 120,198-134- 299-C50
W8BJ 7191- 47- 51-B30

ROCKY MOUNTAIN DIVISION

Colorado

W0MYN 238,875-175- 455-C46
WA0WKW 186,648-158- 362-C
W0GIL 149,445-135- 369-B59
K0ZFL 18,792- 88- 108-A16
W0BWJ 13,068- 81- 85-C16
WA0VPQ 12,236- 46- 89-B36
WA0DS/0
11,700- 52- 76-C10
WA0CVS 10,764- 46- 78-C 4
W0LJF 7800- 40- 65-C 8
WA0UHY (4 oprs.)
417,933-207- 673-C88

New Mexico

W5EU 395,289-167- 791-C37
W5RSZ 67,068- 81- 277-C40
W5QNY 52,089- 97- 179-B33
W5PDO (WA5ROU, opr.)
49,680- 90- 184-C60
WA5YES 42,120- 72- 195-B56
K5EVK 24,674- 73- 114-C35
W5QNQ 2520- 21- 40-A 7
WA5VAL 1824- 19- 32-A18
K5MAT 5- 1- 5-A
K5EIQ (K4EIY, WB6HLL)
26,934- 67- 144-A30

Utah

W7HS 250,272-176- 474-C65
WA7DTG 204,330-139- 490-E65
W7MFU 130,126-125- 347-F61
WA7MGK 29,106- 66- 147-B37
K7RA1/7 (6 oprs.)
746,808-232-1074-C88
WA7GQA (+K7SAD)
129,168-117- 368-E30

SOUTHEASTERN DIVISION

Alabama

K4MG 373,824-236- 528-C64
K4BBI 364,873-199- 609-C58
K4VKW 171,312-172- 332-C42
K4BYM 147,957-149- 331-C50
K4DOY 35,235- 87- 135-B25
WB4EOW 2256- 24- 32-A13

Eastern Florida

W4QBK 1,486,678-339-1344-C88
K4LBP 500- 79- 287- 649-C
W4JDR 404,643-229- 589-C 10
K4ELK 196,596-172- 361-C58
W4HOS 129,654-147- 294-B44
W4IGW 119,880-120- 333-C32
W4GJD 98,988-117- 282-B48
W4NPE 93,324-101- 308-F46
W4BYB 91,584-144- 212-B
W4DRK 78,000-125- 208-C
WA4IIU 44,616- 88- 169-F25
WA4KGH 43,596- 84- 173-C26
W4YK 39,375-105- 125-C 8
K5YPS/4
35,670- 58- 205-C30
WB4OKY 24,288- 69- 118-B32
WA4SVH 16,815- 57- 99-C25
W4WVB 15,048- 59- 85-F 9
WA4RSF 4305- 35- 41-C 6
K4ITG 3348- 31- 36-C 4
W2ECR/4
2958- 29- 34-A 9
K4ROZ 2592- 27- 32-C 4
W4WHK 2178- 22- 33-A
W4JEU 1920- 20- 32-A20
W4TKI 1648- 21- 26-B15
K4LK (4 oprs.)
692,991-241- 917-A96
K4TRH (+K4LMI, WB4LEV)
160,920-149- 360-F72

Georgia

K4EZ 567,368-265- 715-C55
K4BAI 507,033-211- 801-C64
K4DAP 353,860-230- 553-C82
W4DXI 175,460-155- 378-C50
W4DQD 150,804-142- 354-A34
K4WRY 14,508- 52- 93-A16
K4GSX 11,715- 53- 71-B16
K4TIO 1458- 18- 27-B 5
WF4SUN (5 oprs.)
39,324- 87- 154-G16

Western Florida

WA4HN/W4
198,826-178- 374-C70
K4QPH/4
68,997-109- 211-C18
WB4JCV 64,872-106- 204-C
W9WKU/4
17,280- 64- 90-B14
K4CES 13,872- 49- 68-B20
W2AGT/4
27- 3- 3-A 6
K4OSE (4 oprs.)
406,539-239- 567-C76

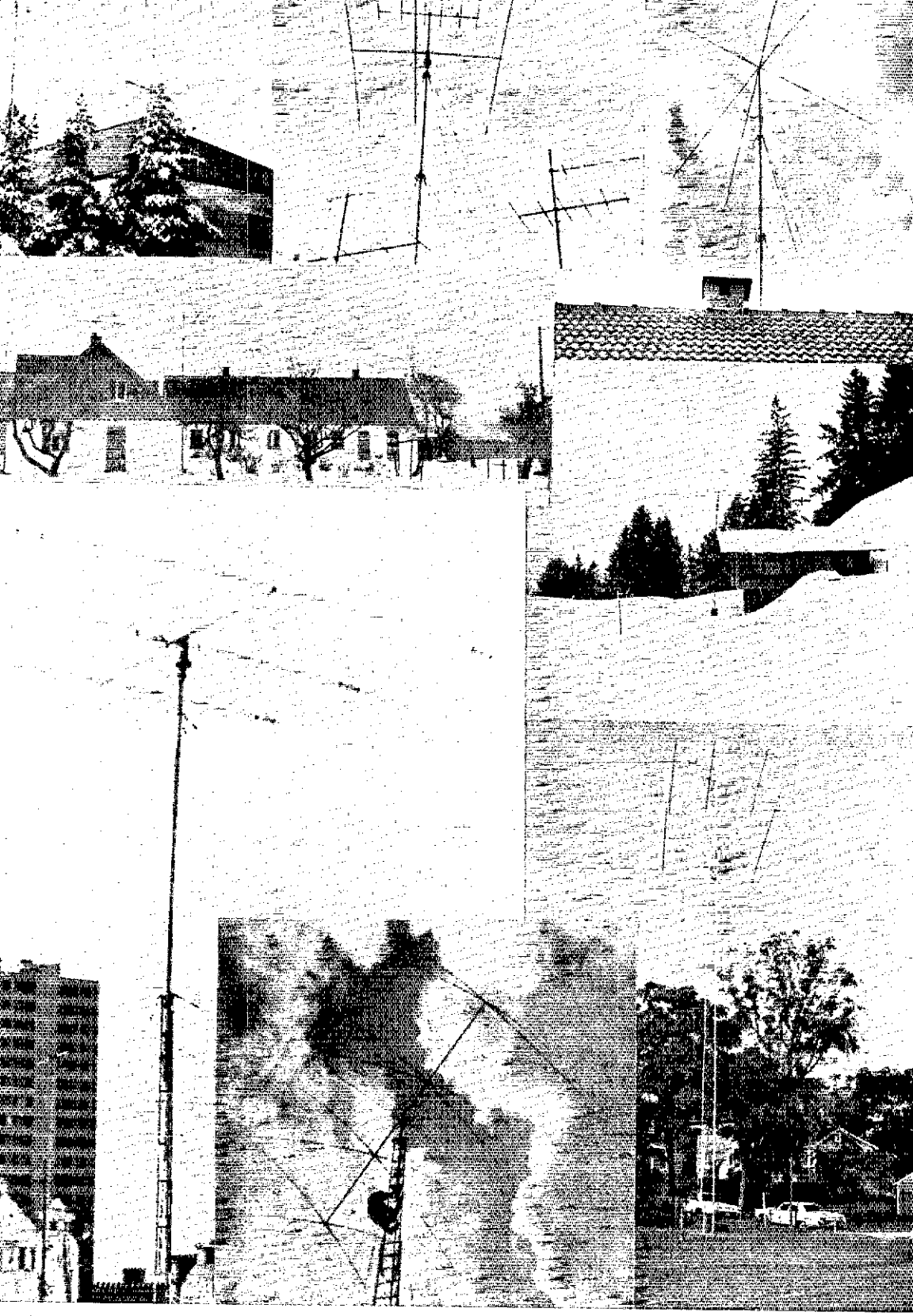
SOUTHWESTERN DIVISION

Arizona

K7YWZ 524,892-204- 858-B66
W7CFJ 328,947-199- 551-C55
W7AYY 260,928-181- 576-C41
W7EE 189,261-143- 445-C43
W7UDG 100,737-123- 273-C30
W7FQV 62,496-112- 186-C33
K7RDH 22,152- 52- 142-B20
W7FCD 4230- 30- 47-A 4
W7IV 576- 12- 16-B 6

Los Angeles

W6RR 2,085,900-340-2045-C85
K6NA 967,440-232-1390-C62
WB6WIT 887,502-238-1243-C76
WA6UPO 677,250-215-1050-C
K6SXA 588,828-228- 817-C60
W6DGH 546,318-215- 847-C59
K6SVL 421,152-164- 856-C67
K6ZQP 372,766-169- 638-C46
K6LVR 233,226-126- 617-C
WB6GMN 194,310-170- 383-C41
K6SSN 159,120-156- 340-C50
K6YFZ 136,041-137- 331-C40
W6JPH 123,522-119- 346-A29
WB6XL 114,675-139- 277-C43
W6CS 98,631-117- 281-E19
W6DQ 97,293-113- 287-C
W6JKR 61,380-110- 186-F31
W6NJU 55,968-106- 176-C



Success can certainly be measured by the size of your antenna farm, QTH etc. The above belong to, (L to R, top to bottom); OH5SE, IIASE, 9M2LN, OZILO, HBØXGR, EA8GK, W4ZCY and KØIIR.

K6YRA 55,920- 80- 233- C
K6MP 34,749- 81- 143- C19
W6EHA 31,752- 63- 168- F55
W6EUF 31,746- 74- 143- C17
WA6PNN 31,659- 61- 173- B30
W6YFR 29,106- 66- 147- A31
WB6IDZ 28,545- 55- 173- B39
W6RCV 28,260- 60- 157- B20
W6EJJ 27,594- 73- 126- C
W6BUD 21,060- 60- 117- C 9
W6QY 19,716- 53- 124- C 8
WA6EQW 17,820- 45- 132- A17
W6DQX 11,610- 45- 86- C10
K6QC 6536- 32- 58- C 9
W6ZIA 5568- 32- 60- C
K6GLC 1584- 16- 33- C
W6TEZ (+W6AKP)
337,200-200- 562- C30

Orange

K6UYC (K9ZMS, opr.)
1,534,680-294-1740- C
WB6UDC 665,940-220-1009- C80
WB6FCR 291,840-160- 608- B63
W6EIF 198,450-135- 490- C48
K6TXA 58,056- 82- 236- B26
WB6WTW 6720- 40- 56- B 5
K6PE 840- 10- 28- C 3

San Diego

K6PUR 755,616-272- 926- C74
WB6GGI 124,074-122- 339- B55
K6SDR 29,610- 70- 141- C12
WB6WHM 18,544- 61- 102- C45
WB6IXC 5670- 30- 63- A21

Santa Barbara

K6OW 282,960-180- 524- C58
WA6ENF 33,330- 55- 202- B52
W6GEB 5130- 30- 57- A 5

WEST GULF DIVISION

Northern Texas

W5QWF 823,521-277- 991- C84
W5FCX 195,030-165- 394- C32
W5KYD 144,126-153- 314- C40
W5TKB 98,631-117- 284- C17
W5QBM 72,417-101- 239- C30
WA5UCT 52,440- 92- 190- A32
W5ZSX 34,686- 82- 141- E16
WA5VSL 29,580- 68- 145- C16
WA5OEU 16,200- 54- 100- B10
W5KND 8471- 43- 69- B18
W5FKQ 2856- 28- 34- N
W5MSG 144- 6- 8- A 3
W5KUC (4 oprs.)
1,514,034-361-1398- C80
WA5RXT (+WA5s QXD SGD)
883,884-292-1009- C92
W5EQT (+W5KTR, WA5UCT)
560,268-237- 810- C55
W5RR (+W5KTR)
484,100-235- 688- C50
W5EQ (+WA5YMV)
209,508-158- 442- B42

Oklahoma

WA5VPZ (5 oprs.)
580,170-233- 830- C85

Southern Texas

W5JAW 1,389,756-358-1294- C72
WA5AUZ 67,527-123- 183- F21
WA5ZXO 59,415- 85- 233- C43
W5SU 55,020- 84- 219- C31
W5LPO 40,764- 86- 158- B40
W5OP 23,850- 75- 106- C25
W5JWM 15,453- 51- 101- C25
W5ELN 13,098- 59- 74- C30
W5RO 11,466- 49- 78- C36
K5JZY 9075- 55- 55- C25
W5LJT 5550- 37- 50- C 5
W5EDX 363- 11- 11- B40
WSAC (WB2HEY, K5SBR)
27,120- 80- 113- C13
WA5TWT (6 oprs.)
14,448- 56- 86- B27
WA5UFP (+WA5TPK)
10,716- 47- 76- B17

CANADIAN DIVISION

Maritime

VE1EK 12,300- 50- 82- B11

Quebec

VE2YU 510,498-237- 718- C66
VE2AYU 507,360-224- 755- C75
VE2WY 390,915-219- 595- C65
VE2WA 220,542-178- 413- C37
VE2NV 121,137-149- 271- E30
VE2DJR 81,528- 86- 316- B30
W1EXZ/VE2
135- 5- 9- A 3

Ontario

VE3WQ 646,921-253- 853- C74
VE3BS 544,260-235- 772- A55
VE3GCO 291,920-205- 476- A37
VE3HJ 168,540-159- 354- B54
VE3ALE 33,072- 78- 142- C35
VE3PQ 25,740- 78- 110- B10
VE3DYB 23,598- 57- 138- A22
VE3DHU 16,128- 42- 128- A20
VE3BIZ 9585- 45- 71- A15
VE3DFU 9030- 43- 70- A
VE3WZ 7056- 42- 56- C14
VE3AYR 6000- 40- 50- B10
VE3DNR 3534- 31- 38- C 5
VE3EVZ (4 oprs.)
467,988-236- 661- C61
VE3CFP (multiop.)
26,068- 76- 115- E15

Manitoba

VE4FU 239,232-178- 448- B54
VE4MP 128,105-185- 411- C55
VE4RP 101,625-125- 271- C52
VE4BJ 23,310- 74- 105- B24
VE4SD 22,302- 63- 118- C16
VE4AE 9963- 41- 81- B14
VE4ZP (+VE4DD)
52,500-100- 175- A22

Saskatchewan

VE5TO 59,994- 101- 198- C44
VE5NW 55,500- 100- 185- F28
VE5US (VE5s PC UF)
267,156-181- 517- C57

Alberta

VE6AGV 115,599-113- 341- A47
VE6AP 110,880-132- 280- D45
VE6VV 12,804- 44- 97- C12

British Columbia

VE7BDJ 701,784-228-1026- C54
VE7EL 152,205-139- 365- B59
VE7IQ 28,920- 54- 160- E35
VE7AJ 11,214- 42- 89- A12
VE7AZG 4680- 20- 60- A28

Yukon – N.W.T.

VE8NWT (VE8BB, opr.)
19,599- 47- 139- B12

CW SCORES

AFRICA

Angola

CR6AI 814,212-189-1438- B58

Mozambique

CR7LU 20,586- 47- 146- A

Madeira Islands

CT3AS 161,406-122- 441- A

Canary Islands

EA8FO 272,934-118- 771- B14

Liberia

EL2CB 1,929,240-230-2796- B68

Kerguelen Islands

FB8XX 1152- 12- 32- N 2

Cameroun

TJ1AW 648,284-169-1279- A26

Ascension Island

ZD8H 6084- 26- 78- B 3

Rhodesia

ZE1DC 402,192-114-1176- A

South Africa

ZS6BN 390,231-149- 873- A20
ZS6AYU 110,544- 98- 376- A25

Tanzania

5H3KJ 461,700-150-1027- A21

Malagasy Republic

5R8AP 1920- 20- 32- B

Zambia

9J2XZ (+9J2RQ)
1,046,131-173-2016- A65

ASIA

Korea

HL9VQ 590,976-152-1342- A52

Thailand

HS5ABD 576,600-155-1240- C54

Japan

JA1AEA 1,591,920-220-2413- C60
JH1GNL 967,083-181-1781- D96
JA1JKG 420,849-143- 981- A
JA9BE 387,234-142- 909- E
JA1NDO 264,120-124- 710- D30
JA2HO 253,500-125- 678- A29
JA1SR 249,750-125- 666- A55
JA2CPD 237,650- 98- 809- A
JH1WIX 218,880- 95- 768- A
JA3JM 185,592-114- 572- D33
JA7AMK 182,685- 95- 641- A30
JH1EYM 154,872-108- 513- A
JA1BAL 111,786- 93- 403- A22
JH1CBI 105,726-134- 789- A29
JA2IU 105,708- 92- 383- A
JA1AFF 104,052- 92- 377- A16
JA4BNT 98,496- 76- 432- A
JA8DIM 76,506- 82- 311- A
JA1AS 61,344- 71- 288- A
JH1AGH 47,424- 76- 210- A
JA2ITH 45,450- 45- 330- A
JA2GBS 40,527- 57- 258- A
JA7IKH 27,940- 55- 170- A
JA3QXM 25,215- 41- 205- A
JA3HBF 24,072- 51- 163- A
JA6EVJ 20,496- 48- 146- A21
JA1SMA 17,388- 46- 141- A23
JA6GPR 5359- 23- 79- A20
JA1ACA 4800- 25- 64- A
JA8GR 4669- 23- 68- A13
JA2KKA 3120- 20- 53- A 6
JA7HQP 1368- 12- 38- A 5
JA1HLR 1320- 10- 44- A11
JH1QYL 1210- 10- 41- A
JA2NOQ 1170- 10- 39- A 3
JA3AVO 741- 13- 19- A
JA2BSD 570- 10- 19- A
JA3BGF 360- 8- 15- A
JA3OEA 357- 7- 17- A
JA4BTD 54- 3- 6- A
JA7AO 24- 2- 4- A
JA6EMS 15- 1- 5- A 1
JA9YBA (4 oprs.)
50,475- 75- 236- A
JA7YAF (5 oprs.)
15,228- 36- 145- A

Ryukyu Islands

KR6VX (3 oprs.)
1,369,044-204-2237- C

Lebanon

OD5LX 405,420-145- 932- A32

Turkey

TA2AE 16,500- 44- 126- A12

Asiatic R.S.F.S.R.

UA9PP 497,205-127-1305- B
UW0IX 222,336-128- 579- A
UW9WB 219,570-130- 563- A
UA9WS 156,493-108- 489- B
UA9TT 120,771- 81- 497- A
UW9PR 94,446- 53- 594- A
UA9TD 61,152- 49- 416- A
UA9BS 48,438- 46- 351- B
UW9OP 42,381- 51- 277- A
UA9TP 34,344- 54- 212- A
UA9ED 30,294- 51- 198- B
UW9WL 29,070- 57- 170- B
UA9IW 24,750- 55- 150- D
UW9BJ 15,330- 35- 146- A
UA9IF 13,653- 37- 123- A
UA9GF 11,214- 21- 178- A
UA9LB 10,176- 32- 106- A
UA9LJ 6720- 28- 80- B
UW9FR 6630- 34- 65- A
UK9YAA 6240- 32- 65- B
UA9CN 5880- 35- 56- B
UW9LR 3360- 20- 56- A
UW9DU 3300- 22- 51- A
UW9DO 3102- 23- 47- A 5
UA9 YD 3024- 24- 42- A
UW9BT 2223- 19- 39- A
UA9QAA 1728- 16- 36- A
UK9OAA 264- 8- 11- B
UK9SAA 180- 6- 10- B
UK9CAE (2 oprs.)
335,580-140- 799- B
UK9CAB (3 oprs.)
306,015-115- 887- B
UA9KCO (3 oprs.)
296,484-124- 797- B
UK9HAD (3 oprs.)
83,691- 51- 547- A
UK9ZAA (3 oprs.)
79,488- 72- 368- B
UA9KIP (2 oprs.)
76,496- 48- 184- B
UA9KCA (3 oprs.)
9632- 28- 117- B
UA9KZB (3 oprs.)
9384- 34- 92- B
UK9AAZ (3 oprs.)
4275- 25- 57- A 1

Turkoman

UH8BO 8463- 31- 91- A
UH8DK 1734- 17- 34- A

Uzbek

UI8OJ 52,668- 44- 399- B

Tadzhik

UK8JAA 12,112- 48- 223- B
UJ8AB 13,998- 38- 122- B

Kazakh

UL7GW 188,277- 97- 647- B
UL7YP 44,955- 45- 333- A
UL7JG 37,410- 43- 290- A
UL7RL 16,416- 48- 114- A
UL7BB 11,827- 37- 107- A
UL7KBA 3588- 26- 46- A
UL7GR 3174- 23- 46- A
UK7EAA (3 oprs.)
32,706- 46- 237- B
UK7GAB (3 oprs.)
18,696- 41- 152- B
UL7KCA (3 oprs.)
10,767- 37- 102- B

Kirghiz

UM8FM 9858- 31- 106- B
UK8MAB 8370- 30- 93- A

India

VU2MSK 193,584-111- 582- A20
VU2JN 53,636- 53- 338- A
VU2KO 3768- 24- 53- A 1

Afghanistan

YA2HWI/1
10,815- 35- 103- N

Cyprus

2C4DA (3 oprs.)
427,990-127-1145- D53

Ceylon

4S7DA 37,149- 61- 203- A18

Israel

W6DLE/4X
145,800-108- 450- B

Saudi Arabia

7Z3AB 63,690- 55- 386- B

Malaysia

9M2LN 51,330- 58- 295- A

EUROPE

Azores

CT2AT 358,431-157- 777- D31

Germany

DL4QO 2,399,358-247-3238- B88
DL6WD 1,950,648-238-2561- B74
DL7AA 1,593,200-228-2300- B77
DJ4ZR 1,284,114-202-2119- B80
DJ4UF 750,288-174-1510- C
DL7MQ 474,628-154-1030- B
DL2JO 304,128-128- 792- C35
DK2KV 142,800-100- 476- B27
DM3XI 114,712-104- 371- A
DL7NS 91,530- 81- 377- N
DJ5GG 80,544- 96- 280- B
DJ3XK 75,576- 47- 536- B
DJ9TA 75,565- 85- 307- A
DL4BT 66,154- 97- 229- A34
DM3OML 60,480- 64- 315- B
DK3BN 58,800- 70- 280- B
DM2BBK 46,156- 44- 381- A
DL1QT 42,687- 93- 153- B10
DM3PA 38,927- 67- 195- A
DM3UDM 35,910- 57- 212- A
DL1GN 35,443- 67- 181- D
DM4YEL 33,642- 42- 267- B
DM2DEO 21,525- 35- 205- A
DJ2YE 20,709- 59- 117- B
DL1JP 10,260- 38- 90- A

Ever wonder who the man was behind the mike, or key? If so, I'm sure you'll be interested in the above. They are (L to R, top to bottom); A2CAH, PYINEW, 9M2LN, 4S7DA, KS6DH and G3FXB.

DM2CRM 10,200- 40- 85- A
DM3SBM 9450- 42- 76- B
DL4BY 5935- 25- 79- B 2
DL6WE 5580- 31- 60- A
DM4RFM 4032- 21- 64- A
DM3XHF 3381- 21- 54- A
DL7BO 2288- 26- 30- A
DM3XUE/A
1536- 16- 32- A
DM3YMO 966- 14- 23- A
DM2ACC 864- 12- 24- A
DM3RQG 741- 13- 20- A
DM4ROL 594- 9- 22- A
DLØJR (4 oprs.)
1,524,640-208-2443- N
DLØFR (4 oprs.)
1,412,550-219-2150- B
DK3HA (+DK2PH)
274,800-120- 767- C
DM5DL (+DM5SDL)
29,792- 56- 179- B

Spain

EA2DT 359,544-142- 844- A
EA3KT 175,875-125- 469- AS6
EA2IA 82,512- 72- 382- B25
EA2HW 34,080- 71- 160- A22
EA2HR 26,664- 63- 141- A38
EA5BS 17,472- 39- 151- A 8
EA2CL 7881- 37- 71- A38
EA2CR 3948- 28- 47- A

Republic of Ireland

EI9I 1,562,232-238-2197- A42
EI5F 110,838- 91- 406- A

France

F8TQ 935,830-203-1550- A63
F8VI 928,584-216-1433- AS5
F8TC 865,593-161-1171- B35
F8ZF 547,305-165-1127- B29
F2PO 231,819-133- 581- A
F8TM 76,176- 92- 276- A20
F9RO 25,320- 60- 141- A 6
F8VO 16,170- 49- 110- A
F9EP 9480- 40- 79- A15
F9DW 8979- 41- 73- B10
F2GO 189- 7- 9- A

England

G3FXB 2,174,784-241-3008- A78
G2RO 2,144,730-245-2918- A70
G3TXF 1,702,065-233-2453- A76
G3KMA 828,036-198-1394- A70
G3ESF 688,416-202-1136- A
G2QT 556,686-169-1098- B
G3APN 437,076-162- 901- A38
G3HZL 263,655-155- 567- A39
G2DC 250,509-151- 553- A20
G2AJB 127,544-107- 410- A
G3KSH 90,496-101- 299- A20
G3JKV 64,320- 80- 268- A
G8RZ 29,859- 37- 269- A37
G3CWL 4650- 25- 62- A 8
G3WP 1386- 18- 26- A

Isle of Man

GD5APJ 2,084,358-229-3036- A

Northern Ireland

GI3OLJ 232,820-136- 815- A40
GI3JEX 108,990-105- 346- A26

Scotland

GM5APK 273,776-142- 644- A48
GM3SKX 63,720- 54- 394- A22

Wales

GW3JI 1,009,113-203-1657- A

Hungary

HA8KCC 128,977-101- 426- A
HA8UH 102,942- 86- 399- B16
HA3MB 10,952- 37- 100- A
HA8UF 28,899- 57- 169- A
HA8KUC 26,334- 38- 231- B
HA5AX 22,800- 38- 201- A26
HG5EA 10,440- 29- 120- A
HA8CH 2432- 16- 51- A
HAØLR 1428- 14- 34- A
HA7RN 952- 11- 29- A
HA3NA 360- 10- 12- A
HA1KSA (3 oprs.)
772,200-165-1560- B
HA5KFZ (multiop.)
688,500-170-1373- B96
HA9KOB (2 oprs.)
114,492- 94- 406- A
HA3KNA (7 oprs.)
18,288- 48- 127- A
HA9KPE (2 oprs.)
5400- 30- 60- A
HA5KBM (multiop.)
5082- 22- 77- A 5

Switzerland

HB9AGH 599,400-150-1401- B42
HB9DX 526,338-171-1026- B
HB9AJI 279,744-124- 752- B14
HB9KC 268,182-141- 634- B23
HB9ANN 114,742-103- 373- A
HB9ANR 24,252- 47- 172- B17
HB9NL 20,433- 49- 139- B 2

Liechtenstein

HBØXGR (DJ9MH, DL4CE)
1,068,033-199-1789- B48

Italy

I1ASE 1,855,300-206-2517- B72
I1BCL 231,363-123- 628- D40
I1FGP 151,200- 84- 600- B14
I1MGN 49,335- 65- 258- D19
I1YCZ 16,605- 41- 138- A20
I1BLF 15,222- 43- 118- A 4
I1ER 7686- 42- 61- A

Sardinia

IS1VEA 69,204- 79- 292- B14

Jan Mayen

JX5CT 12,816- 48- 89- A15

Norway

LAØAD 2,786,616-252-3689- A80
LA1OA 1,866,936-214-2909- A85
LA8OM 301,126-137- 733- A29
LA3UF 89,544- 82- 364- A49
LA9RM 82,914- 78- 357- A50
LA3HM 54,750- 73- 250- A12
LA9JM 29,427- 51- 194- A19
LA1P 25,920- 54- 160- A14
LA4DM 12,978- 42- 103- A
LA2Q 10,680- 40- 89- A18
LA6XI 9504- 36- 88- A
LA9M 1785- 17- 35- A 7

Luxembourg

DJ6SI/LX
141,600-118- 400- A23

Bulgaria

LZ2DC 720,780-164-1465- B
LZ2IM 167,760-120- 466- A
LZ1SS 83,880- 60- 466- B
LZ2RF 76,788- 79- 324- B
LZ2ND 68,884- 68- 339- B
LZ2KHN 56,024- 47- 399- A
LZ2KAF 28,512- 36- 264- B
LZ1KWF 27,612- 39- 236- B
LZ1KSE 12,780- 30- 142- A
LZ1KPG (4 oprs.)
2,152,332-234-3066- C82
LZ1KVP (3 oprs.)
697,404-178-1306- B
LZ1KEZ (3 oprs.)
233,310-105- 741- A
LZ1KBG (3 oprs.)
26,949- 39- 231- A

Austria

OE3RE 406,296-132-1026- B
OE1DEW 2750- 22- 42- A 5

Finland

OH5SE 2,397,600-222-3601- B72
OH4RH 300,915-135- 749- B
OH3NY 268,128-112- 798- B
OH2MK 238,242-118- 673- B
OH8RW 176,760-120- 491- B
OH1XX 120,879-111- 366- B
OH3NR 117,096- 84- 470- A38
OH5RZ 97,366- 89- 371- B
OH2BAH 69,687- 87- 267- B
OH1VA 67,968- 64- 356- B
OH6NO 61,236- 84- 243- B
OH5UQ 51,756- 76- 230- B
OH3MM 46,008- 71- 219- B
OH2BJY 35,532- 54- 232- A
OH7NW 34,599- 57- 203- A
OH6RB 28,026- 54- 175- A
OH1LX 24,354- 41- 198- A
OH2BO 12,256- 32- 128- A
OH5QV 9620- 37- 87- A
OH1LU 8330- 34- 82- A
OH6RC 6968- 26- 90- A
OH1PG 3477- 19- 61- B
OH8RV 2460- 20- 41- A
OH1UR 2448- 24- 34- B
OH5UX 1152- 16- 24- B
OH2BHU 27- 3- 3- A 1
OH2AA (5 oprs.)
915,656-166-1850- B

Czechoslovakia

OK2BOB 689,544-183-1256- B50
OK1AOX 330,501-123- 943- A
OK3CIR 262,514-119- 739- B
OK2QX 254,070-135- 629- F22
OK1STU 198,858-131- 506- A
OK1FV 195,216- 83- 744- B
OK3CGP 167,088-118- 472- A
OK1TA 148,326-118- 419- A
OK1ATX 90,132- 84- 358- A
OK3CGI 83,226- 97- 286- A
OK1AFN 75,603- 79- 319- A
OK2BOL 75,360- 80- 314- AS2
OK1AOR 62,805- 79- 265- B
OK2BBJ 55,000- 55- 334- B
OK1KZ 38,995- 55- 254- B
OK2BPE 35,397- 57- 211- A
OK2BMF 35,154- 54- 217- A12
OK1FAR 30,114- 42- 239- A
OK1ÉP 29,601- 39- 253- A
OK2BFS 29,436- 44- 223- B
OK1MGW 24,585- 55- 165- A19
OK3CJE 24,282- 38- 213- A
OK3YCK 23,754- 37- 216- A
OK1ND 23,616- 36- 220- A
OK2OV 20,097- 57- 117- B
OK3RMG (OK3CIG, opr.)
16,905- 35- 161- B
OK3ALE 15,975- 45- 119- B
OK3KGI 15,593- 31- 168- A
OK1MDK 12,284- 37- 118- A
OK1MSP 10,634- 26- 139- A17
OK3CCC 10,455- 41- 85- A
OK2BDM 10,430- 35- 101- A 4
OK3CEG 10,146- 38- 89- A
OK1ATP 8700- 29- 180- B
OK2BCJ 8667- 27- 108- A
OK1NW 7279- 29- 84- B
OK1AGV 7047- 29- 81- A
OK3TGS 5184- 24- 72- A
OK2BCI 4554- 23- 66- B
OK2BEU 4444- 22- 77- A
OK1AVI 4176- 24- 58- A 3
OK1AQO 4137- 21- 67- A
OK3BT 3456- 24- 48- A
OK3KGQ 2916- 18- 54- A
OK2PCN 2250- 15- 50- A
OK2BCH 1377- 17- 27- A
OK1ZW 960- 10- 32- A12
OK1AEH 396- 11- 12- A
OK1JBF 198- 6- 11- A
OK1AII 60- 4- 5- A
OK1APV (+OK1GT)
1,470,644-212-2320- A80
OK1KTL (6 oprs.)
1,032,427-187-1844- B90
OK1KYS (2 oprs.)
86,700- 85- 342- A
OK3KWK (3 oprs.)
60,920- 40- 509- A22

Belgium

ON4XG 1,117,314-209-1782- B54

Denmark

OZ1LO 2,440,848-241-3376- B82
OZ1W 1,327,664-208-2192- A60
OZ3PO 236,115-135- 586- D20
OZ4H 174,447-117- 497- A
OZ7G 85,488- 52- 548- A
OZ5CI 80,676- 81- 332- A
OZ7ON 69,231- 47- 497- A24
OZ7XG 19,624- 44- 150- A
OZ4HW 6570- 30- 73- A
OZ6HS 6120- 24- 88- A
OZ2CE 1014- 13- 26- A

Netherlands

PAØLOU 1,944,152-233-2861- A70
PAØKOR 415,245-155- 893- A34
PAØRCT 206,426-121- 569- A
PAØFRI 144,324-114- 422- A
PAØVB 86,597- 89- 333- A
PAØYN 62,208- 72- 288- B
PAØUV 54,492- 76- 239- A35
PAØWAC 32,391- 61- 177- A10
PAØTA 19,981- 53- 126- A
PAØVDR 17,850- 51- 117- A 6
PAØHY 9272- 38- 82- B
PAØGN (multiop.)
578,920-164-1184- A71

Sweden

SM5CMP 653,082-178-1230- D44
SM6BZE 469,026-142-1101- B39
SMØBDS 405,552-142- 979- A63
SMØCCE 365,148-147- 843- B
SM5ACQ 334,530-135- 826- B
SMØDSG 289,080-120- 803- B
SM4DHF 283,392-123- 768- B
SM5BNX 238,050-115- 690- C
SM5UU 219,888-144- 509- B58
SM3ARE 199,836-122- 546- B
SM2COR 184,080-130- 472- A
SM7AIL 116,181-117- 331- B
SMØFY 98,010- 99- 330- B
SM5CAK 56,550- 58- 327- B
SM5BRS 37,611- 63- 199- A
SM5CPC 34,959- 43- 271- A
SM6CZU 17,472- 52- 112- B
SM1DIE 15,336- 36- 142- B15
SM5BMB 10,560- 32- 110- B
SMØFO 9600- 32- 100- A
SM5XX 8424- 27- 104- A20
SM5BXP 7224- 28- 86- B
SMØPF 4464- 31- 50- B
SMØOY 3825- 22- 47- A
SMØETK 2052- 18- 38- B
SM4AZD 1254- 19- 22- A
SM6BLT 459- 9- 17- A
SM6JY 270- 9- 10- B
SK6AB (8 oprs.)
4,860,978-258-6323- B96
SK6CF (12 oprs.)
3,678,336-248-4944- B90
SK3BP (4 oprs.)
1,619,568-207-2608- B
SK2CI (SM2s ECL EKM)
89,760- 88- 352- B

Poland

SP3DOI 428,844-156- 917- A45
SP6ASD 328,653-159- 709- A
SP3BHG 275,064-146- 628- A
3Z5ATO 270,000-128- 720- A
3Z8HR 230,580-122- 630- A
3Z9ABE 163,317-101- 571- A
SP5AIB 80,868- 92- 296- B48
3Z8MJ 51,942- 66- 264- B
SP2AVE/2
51,660- 82- 215- A
SP8AG 51,136- 64- 274- B
3Z9ZD 34,773- 62- 174- B
3Z6BAA 26,325- 45- 195- B
3Z8ARY 25,050- 50- 167- A
3Z8AFS 24,138- 54- 149- B
3Z2PI 18,036- 36- 167- B10
3Z8AWP 17,640- 42- 145- B25
3Z5BAK 15,372- 36- 143- B
SP4DCS 12,958- 38- 114- A
3Z3CDD 12,915- 41- 105- B
SP6XA 11,088- 28- 132- A
3Z9CEM 10,890- 33- 110- A
3Z4AGR 8944- 26- 121- A
3Z9BQX 6966- 27- 86- A
3Z9AWV 3600- 25- 48- A
3Z2AGH 3510- 26- 45- A
SP5ASY 2664- 24- 37- A
3Z5CJU 2448- 24- 34- A
3Z8CCC 2268- 18- 42- A
SP2BNJ 2070- 18- 39- A
3Z3AOT 1728- 18- 32- A
3Z2AEO 1575- 21- 25- A
SP9AGS 1560- 18- 29- A
3Z8CFZ 936- 12- 26- A 4
SP7CKF 858- 13- 24- A
SP2BMX 60- 3- 7- A
3Z8KAF (multiop.)
121,542- 94- 431- B
3Z5PWK (7oprs.)
109,280- 80- 456- B
SP9KHX (multiop.)
52,206- 66- 266- A
3Z9KDD (SP9s CAX DEW)
7582- 17- 150- A
SP8KBN (3 oprs.)
6162- 26- 79- A

Greece

SVØWP *424,512-132-1072- C22*
SV1AE (W3MSK, opr.)
8874- 34- 87- A 4

Iceland

TF3SF 3024- 24- 42- B 6
TF2WKF (3 oprs.)
2,769,870-254-3664- B93

European R.S.F.S.R.

UA1ZW 857,844-188-1561- B
UA1NR 221,076- 92- 801- A
UW1CX 167,232-104- 546- B
UK4HAW (UA4IN, opr.)
135,450-105- 430- B
UA4AN 126,126- 98- 429- A
UA4QX 90,930- 70- 433- A
UW3EH 76,869- 73- 351- B
UA1IA 75,378- 51- 501- B
UA4LK 68,340- 68- 335- B
UA1TL 67,440- 80- 281- D
UV3GW 64,491- 83- 262- B
UA3TV 50,922- 69- 246- B
UA1DI 50,142- 61- 274- B
UV3DO 47,031- 61- 257- A
UW1ZJ 36,096- 47- 256- B
UV3BJ 32,712- 58- 188- B
UK1WAB 29,583- 57- 178- B
UA1GU 25,956- 42- 206- A
UA4QK 21,942- 46- 159- A
UW6DR 21,105- 35- 201- A
UA1MV 20,202- 37- 182- A
UA6BV 17,646- 34- 173- B

UW3UO 15,504- 38- 136-A
UA3TA 15,198- 34- 151-B
UA4LT 13,221- 39- 113-A
UW4AP 9828- 39- 84-A
UA1UD 9504- 32- 102-B
UA3DD 9136- 28- 109-B
UA3MT 8736- 26- 112-A
UA3JD 8640- 36- 80-B
UA3TE 7452- 23- 108-B
UZ3TG 7320- 40- 62-A
UA3RH 7128- 27- 88-B
UV3TC 6426- 34- 63-A
UA3FK 6225- 25- 83-B
UA3PE 5772- 26- 74-A
UW3IY 4536- 21- 72-A
UA1MA 3819- 19- 62-A
UA3ST 3150- 21- 50-A
UV3BK 2898- 23- 42-A
UA3GO 2592- 24- 36-B
UA3KKA 2280- 20- 38-A
UW3HD 2160- 18- 40-B
UW6CU 1980- 20- 33-A
UA3GP 1488- 16- 31-A
UA4SW 1344- 14- 32-A
UW6MD 1053- 13- 27-A
UA3NG 828- 12- 23-B
UW3TA 495- 11- 15-B
UA3RJ 390- 10- 13-B
UW4AT 195- 5- 13-A
UK3TAR 75- 5- 5-B
UZ3TC 27- 3- 3-A
UK1ZAA (3 oprs.)
1,533,921-191-2677-B
UK6LAZ (4 oprs.)
1,143,525-193-1976-B
UA3KAO (4 oprs.)
1,033,110-195-1803-B
UA1KBR (multiop.)
438,150-115-1270-B
UK3EAA (3 oprs.)
388,326-122-1061-B
UA1KAG (3 oprs.)
199,080-105- 664-B
UK1ZAB (3 oprs.)
173,550- 89- 748-A
UK4WAC (3 oprs.)
55,215- 45- 409-A
UK4WAB (3 oprs.)
46,944- 48- 326-A
UA4KWO (3 oprs.)
43,950- 50- 293-A
UA4KWP (3 oprs.)
35,217- 43- 294-A
UK4HAP (3 oprs.)
17,520- 40- 146-A
UK4UAA (2 oprs.)
3567- 29- 41-B

Franz Josef Land

UA3XL/UA1
3168- 24- 44-A
UA1KED 1584- 16- 33-A

Kaliningrad

UA2BZ 149,000-100- 497-B20
UA2EC 88,209- 81- 363-A
UA2KBR (3 oprs.)
243,720-120- 677-A

Ukraine

UB5MZ 589,545-165-1191-A
UB5DW 287,676-122- 786-B
UB5ZE 178,200-108- 550-B
UT5SY 163,965- 85- 643-A
UB5IF 74,688- 64- 389-A
UY5OB 73,680- 80- 307-A
UT5XB 69,174- 63- 391-A
UB5TR 64,584- 78- 281-B
UB5TH 56,072- 86- 219-A12
UT5BP 46,656- 48- 324-B
UK5VAA 37,800- 60- 211-B
UB5RR 36,180- 60- 201-B
UB5RS 33,600- 64- 175-B
UY5XA 25,623- 39- 219-A
UB5IU 22,308- 52- 143-B
UY5UW 20,586- 47- 146-A
UK5WAS 15,480- 40- 129-B
UT5DL 15,318- 37- 138-A
UY5DV 12,198- 38- 107-A
UY5UI 11,934- 34- 117-A
UB5OE 11,070- 30- 123-A
UY5EM 10,800- 36- 100-A
UK5WAA 8742- 31- 94-B
UY5AB 5394- 31- 58-A
UB5VY 4608- 24- 64-A
UB5JX 4416- 23- 64-A
UT5MD 4182- 17- 82-B
UB5ZAA 2967- 23- 43-A
UB5NU 2793- 19- 49-A
UY5NW 2793- 19- 49-A
UB5KEQ (UB5QA, opr.)
2457- 21- 39-A
UK5ZAA 324- 9- 12-B
UK5WAZ (4 oprs.)
807,445-167-1669-B
UB5KBD (3 oprs.)
304,155- 95-1383-B
UT5KDP (7 oprs.)
296,418-127- 778-A48
UK5KAA (2 oprs.)
71,610- 77- 310-B
UB5KVF (3 oprs.)
33,630- 59- 190-A
UT5KDS (2 oprs.)
31,644- 36- 296-A

White Russia S.S.R.

UC2WP 320,850-115- 930-A
UC2CY 57,846- 62- 315-A
UK2AAO 44,919- 69- 221-A
UC2IJ 31,992- 62- 172-A
UK2WWW 13,566- 34- 133-B
UC2WG 5256- 24- 74-A
UC2XT 4071- 23- 59-A

Azerbaijan

UD6AM 22,992- 48- 160-D
UD6BW 2457- 21- 39-B

Georgia

UF6HS 28,620- 45- 212-B
UF6AM 15,651- 37- 141-B
UF6DA 11,745- 45- 87-B
UF6AD 144- 6- 8-B
UK6FAA (3 oprs.)
15,402- 34- 151-A

Armenia

UG6KAF (3 oprs.)
480- 8- 20-A

Moldavia

UO5GS 22,560- 40- 188-A

Lithuania

UP2KBC (UP2PX, opr.)
1,322,304-194-2272-B
UP2OX 113,850- 69- 550-A
UP2OQ 104,208- 52- 720-A
UP2OJ 50,310- 43- 390-B
UP2BV 42,582- 47- 326-A
UP2AY 24,180- 52- 155-B
UP2AG 11,160- 31- 120-A
UP2SB 6804- 27- 88-A
UP2BY 1215- 15- 27-A
UP2BK 168- 7- 8-A
UP2OG 162- 6- 9-A
UK2BAV (3 oprs.)
456,582-136-1119-B
UK2BBB (3 oprs.)
86,103- 81- 355-B

Latvia

UQ2OC 9324- 28- 111-A
UQ2PG 4158- 21- 66-A
UQ2IL 3483- 27- 43-B
UQ2PP 405- 9- 15-A
UQ2OF 108- 6- 6-A
UQ2KBP (3 oprs.)
1,160,330-197-2109-B
UQ2KCR (3 oprs.)
941,364-158-1986-B
UQ2KAA (4 oprs.)
885,546-186-1635-B
UQ2KFN (4 oprs.)
62,745- 47- 449-A

Estonia

UR2LO 168,948- 57- 998-B
UR2QD 110,112- 74- 496-A
UR2FU 43,252- 44- 339-B
UR2LL 75- 5- 5-A

Romania

YO2BM 237,552-112- 710-B
YO2AFB 149,898- 83- 602-A
YO6GZ 114,660- 91- 436-A
YO8MH 96,635- 77- 432-A
YO3AC 89,094- 62- 480-A26
YO4KCE 87,399- 83- 351-B
YO8ME 36,960- 56- 235-A
YO9HO 32,025- 35- 305-A
YO8DD 21,298- 46- 155-C
YO7NA/8
15,744- 41- 128-A
YO5PJ 13,440- 32- 140-A
YO6AFP 13,311- 29- 153-A15
YO2KAM 10,890- 33- 112-A
YO8GL 9144- 36- 86-A
YO2RA 7416- 36- 83-A14
YO8RL 7308- 29- 84-A
YO4YT 6732- 22- 102-A
YO9AFY 4602- 26- 59-A 8
YO3AAJ 3381- 23- 49-A
YO7AQE 2484- 18- 46-A
YO2KAR 2109- 19- 37-A
YO2AVP 1377- 17- 27-A
YO8GP 504- 12- 14-A
YO8KAE (YO8s AHL OK)
7236- 36- 67-A

Yugoslavia

YU3NY 1,672,992-222-2512-B
YT1SJ 423,440-134-1055-B36
YU1LW 182,104-103- 591-A36
YU1SF 35,319- 61- 204-A33
YU1DKL 8554- 26- 110-B20
YT3JS 5508- 36- 51-B 3
YU3EJ (6 oprs.)
2,584,546-239-3864-B94
YT1BCD (5 oprs.)
2,152,365-235-3069-B
YT2CBM (7 oprs.)
313,122-138- 759-B96
YU1AHI (3 oprs.)
177,008- 92- 651-B
YT1FJK (3 oprs.)
22,344- 49- 152-A

NORTH AMERICA

Cuba

CO2LD/7
2709- 21- 43-A

St. Pierre & Miquelon Is.

FP8AP 469,125-139-1125-A

Alaska

KL7EWA 322,530-130- 850-A28
KL7GCV 68,943- 67- 343-D15

Puerto Rico

KP4AN 325,350-150- 723-B18
WB4FOT/KP4
205,482-138- 497-B25
KP4BJM 177,165-127- 469-B12
KP4DJI 107,310-105- 341-D25
KP4DIS 8064- 36- 76-A 4

Virgin Islands

KV4AM 404,976-176- 767-C

Canal Zone

KZ5NR 602,040-173-1160-B17
KZ5KN (+KZ5KD)
545,889-157-1159-C28

Greenland

OX3WQ 671,520-160-1399-A30
OX5BL 41,448- 44- 314-B22
OX3FD 28,386- 38- 249-A

Sint Maarten

PJ8PM 443,408-148- 999-A22
PJ8AA 173,880-108- 541-A12

Bermuda

VP9BY 299,925-129- 775-A

OCEANIA

New Caledonia

FK8AH 13,320- 40- 111-A 3

Guam

WA3EEE/KG6
23,280- 40- 194-B17

Hawaiian Islands

KH6IJ 3,127,884-277-3764-E76
KH6HAM 189,056-128- 498-D20

American Samoa

KS6DH 130- 5- 9-C 1

Australia

VK3QI 617,550-179-1150-A58
VK2GW 533,172-157-1132-A56
AX3AXK 437,400-162- 900-A44
AX8FM 299,088-134- 744-A15
AX2VN 14,175- 45- 105-A 4
AX5OR 2052- 19- 36-A 7

New Zealand

ZL1AMO 1,054,680-188-1870-A50
ZM1AFW 321,570-135- 794-A40
ZL1AUA 34,902- 42- 277-A

SOUTH AMERICA

Chile

CE3CF 711,189-171-1393-C42
CE2CR 134,160-104- 442-A14

Uruguay

CX9BT 403,650-138- 975-A
CX1OP 11,070- 41- 90-A

Argentina

LU6DAZ 26,082- 54- 161-B 4
LU2DKG (+LUs 1DAY 6DKX)
687,225-165-1401-B90

Netherlands Antilles

PJ2VD 3,160,524-268-3931-A66
PJ2HT 349,830-169- 690-A18

Brazil

PY4KL 426,492-132-1077-B
PY1NEW 169,560-120- 471-A
PY7SR 137,310-115- 398-A32
PY2BBO 100,320- 80- 418-A 7
PY1ADA 72,708- 83- 292-B 7
PY7AZQ 34,320- 40- 286-B
PY1CKV 5184- 27- 64-A

Surinam

PZ1AH 342,608-161- 710-A

Venezuela

YV5KL 2,493,702-246-3379-B76
YV4MC 65,016- 86- 252-B12

Paraguay

ZP5GS 33,928- 56- 196-B 4
ZP5OI 6435- 33- 65-N

Trinidad

9Y4VU 416,247-169- 823-B25

PHONE SCORES

AFRICA

Botswana

A2CAH 31,350- 50- 209-B 7

Angola

CR6GA (+CR6s LX XX)
2,543,400-180-4710-C70

Canary Islands

EA8GK 505,134-133-1266-B36
EA8CF 19,023- 51- 126-B14

Liberia

EL2BD 1,434,916-196-2441-C64
EL2BZ 1,012,434-166-2035-B29
EL8H 479,520-148-1080-A30

Kerguelen Islands

FB8XX 4050- 18- 75-N 3

Swaziland

ZD5R 404,793-123-1097-A

Ascension Island

ZD8H 75,828- 71- 356-B 5

South Africa

ZS6OW 1,659,852-188-2943-B
ZS2GP 138,780- 90- 514-B17

Southwest Africa

ZS3S 811,330-158-1713-A
ZS3CJ 211,092- 98- 718-A24

Tunisia

3V8AL 87,368- 67- 435-B14

Tanzania

5H3LV 1,030,260-154-2230-A43

Saudi Arabia

7Z3AB 37,392- 41- 304-A 9

Dem. Rep. of Congo

9Q5GJ 3822- 26- 49-D 4

ASIA

Korea

HL9VQ 106,074- 83- 433-A25

Thailand

HS5ABD 30,240- 45- 224-C30

Japan

JA1AEA 1,354,368-192-2352-C70
JA3USA 540,243-153-1212-B
JA3ERG 131,970- 83- 532-B
JA1NDO 85,170- 85- 334-D16
JA9BE 82,419- 83- 331-E
JA7BSK 67,527- 61- 369-A
JH1EYM 24,381- 43- 189-A
JH1IMX 9840- 40- 84-A
JA3PGV 5434- 22- 83-A

JA3HBF 3196- 17- 63-A
JR1ACP 2240- 14- 55-A 1
JA1AS 1470- 14- 35-A
JA7GQB 957- 11- 29-A
KA9KC 837- 9- 31-A 2
JA8DED 810- 10- 27-A
JA2AXB 621- 9- 23-A
JA4FSD 580- 8- 37-A
JA7JPB 465- 5- 31-A
JA7YKE (JA7HQP, opr.)
432- 6- 24-A 3
JA2ODB 378- 5- 25-A
JA1HFE 340- 5- 23-A 4
JA3AVO 144- 4- 12-A
JA4DVT 36- 3- 4-A 3
JA0BXP 27- 3- 3-A 1
JA4GXS 12- 1- 4-A
KA2KS (4 oprs.)
1,655,478-198-2787-G96
JA9YBA (4 oprs.)
45,333- 69- 238-A27

Ryukyu Islands

KR6VX (3 oprs.)
589,176-147-1336-C

Asiatic R.S.F.S.R.

UW9AF 504,570-121-1399-B
UW0X 28,611- 51- 187-A
UA0W 14,872- 34- 108-B
UA9IT 1980- 15- 44-A
UK9HAD (3 oprs.)
48- 4- 4-A

India

VU2DK 220,365- 83- 485-A13
VU2MSK 2574- 22- 39-A 9

Cyprus

ZC4RS 2223- 19- 39-B

Israel

W6DLE/4X (multiop.)
59,850- 57- 350-B

EUROPE

Portugal

CT1BH 1,815,780-212-2855-C
CT1EL 119,880- 74- 540-B

Azores

CT2AT 2,199,120-238-3159-D63

Germany

DL4AP 916,320-160-1909-B50
DL6WD 507,312-156-1139-A
DJ9MH 284,383-103- 968-B
DJ8YQ 236,544-112- 704-A34
DL8BS 225,441-111- 677-B
DL4JW 116,397- 81- 479-B16
DL2JO 114,312- 88- 433-C14
DL6WE 86,067- 73- 393-F
DM3RML 45,162- 39- 386-O
DL6NP 39,760- 71- 209-A
DJ2YE 22,578- 53- 143-B
DL9HC 17,667- 39- 151-B
DL4RM (DK1OE, DLs 4ER 8KH)
1,001,852-178-1878-B60
DM3OML (2 oprs.)
14,355- 29- 165-B

Spain

EA4LH 1,483,581-201-2462-B65
EA3QW 515,700-150-1146-A39
EA3NA 37,412- 47- 266-A
EA2IK 4836- 31- 52-A

Balearic Islands

EA6BN 5346- 22- 81-B 4

France

F3KW 1,474,308-219-2244-B40
F2YS 169,822- 82- 691-B
F3U 29,421- 63- 356-A10
F6AKD 663- 13- 17-B 4

England

G2QT 623,328-172-1208-A30
G3KMA 217,200-100- 724-A30
G3YBH 69,090- 70- 329-A19
G2AJB 2337- 19- 42-B 7
G3YXR (10 oprs.)
388,260-135- 960-A65
G3FVA/A (8 oprs.)
290,043-117- 827-A96
G3MMH (G3s LEJ VCV WTW)
76,347- 51- 504-A16

Isle of Man

GD5APJ 30,132- 36- 279-A

Scotland

GM5AME (+GM5s AQM AQR)
347,160-110-1083-A

Wales

GW3NWV 611,886-146-1397-B

Hungary

HA5CQ 90,780- 85- 386-A26

Switzerland

HB9T 240,090-106- 755-B18
HB9OX 34,776- 56- 207-B
HB9QD (4 oprs.)
826,488-156-1817-C57

Vatican

HV3SJ (WA6ZWL, opr.)
50,490- 55- 306-C

Italy

IIBAF 1,308,639-199-2187-B
IIMOL 974,400-175-1856-B70
IIEID 778,143-171-1511-B42
IIBCL 466,762-139-1120-B50
IIBBZ 200,655- 91- 740-A
IIAJ (4 oprs.)
1,195,545-195-2047-B96

Norway

LA9AD 2,144,142-234-3055-C90
LA2DL 99,114- 41- 318-A12
LA8OM 38,820- 60- 199-A11
LA3K 11,700- 39- 100-A31
LA3HM 8103- 37- 23-A 6
LA4VG 4293- 27- 53-B
LA3RC 1539- 19- 27-A 5
LA1YM 330- 10- 11-A
LA1H (5 oprs.)
632,786-154-1384-A50
LA4O (7 oprs.)
59,202- 69- 286-A24

Austria

OE2EGL 824,064-148-1856-A76

Finland

OH5SE 633,450-150-1409-B23
OH3NY 33,687- 57- 197-B
OH4RH 27,144- 52- 175-B
OH5UQ 10,800- 36- 100-B
OH8OW 924- 14- 24-B
OH2BHU 6- 1- 2-A

Aland Island

OH0NI 1800- 20- 30-B

Czechoslovakia

OK2ABU 41,128- 83- 262-O
OK2BEN 36,504- 39- 312-B10
OK1HEG 30,451- 37- 277-B
OK2QR 5412- 22- 82-B

Belgium

ON4XG 248,508-117- 708-B21

Denmark

OZ1LO 883,788-188-1567-B38
OZ4IA 16,500- 50- 110-A15
OZ6RT 16,023- 49- 109-B
OZ7HM 3042- 13- 78-A
OZ5VT 2325- 25- 31-A
OZ3CE 1539- 19- 27-B
OZ4H 1344- 16- 28-A
OZ2CE 750- 10- 25-A
OZ6EI 60- 4- 8-A
OZ7RD (OZs 2CJ 3TD)
134,688- 92- 488-A22

Netherlands

PA0LOU 26,624- 52- 174-B 4

Sweden

SM5EAC 613,695-163-1255-B
SM5EXE 381,720-120-1061-B16
SM5CMP 141,426- 97- 486-D21
SM7DLK 137,977- 68- 678-B
SM7CSN 108,120- 85- 445-B
SM2CAA 70,350- 62-1050-B
SM0OS 60,809- 73- 278-B
SK0CC (SM5BXP, opr.)
37,842- 53- 238-B
SM6CZU 5487- 31- 59-B 3
SM7AIL 3192- 21- 51-B
SM6BLT 3060- 18- 57-B
SM7DER 2925- 25- 39-B
SM5CSS 1428- 17- 28-B
SM0BDS 729- 9- 27-A 3
SK6AB (9 oprs.)
2,127,774-206-3443-B
SK6CF (SM6s APQ CKU)
249,480-126- 660-B11
SK3BP (4 oprs.)
239,742-114- 701-D

Poland

3Z5CJT 175,518- 98- 597-A40
SP5AKG 125,241-109- 383-B
3Z9BZM 1566- 18- 29-A
3Z8AWP 240- 8- 10-B
3Z5PWK (multiop.)
162- 6- 9-B

Greece

SV0WNN 5244- 19- 93-B 4

Iceland

TF3SE 168- 7- 8-A 3
CF2WKF (7 oprs.)
962,925-185-1737-B56

European R.S.F.S.R.

UA3EF 98,496- 72- 456-B
UA1LU 10,125- 25- 135-B
UA3HH 2835- 21- 45-B
UV3NB 2487- 9- 91-A
UW3DH 126- 6- 7-A

Kaliningrad

UA2KBD (3 oprs.)
215,912- 96- 749-B

Ukraine

UB5DW 23,463- 33- 237-B
UY5HK 2550- 17- 80-A
UY5KKM (3 oprs.)
50,184- 41- 408-A

White Russia S.S.R.

UC2BF 16,800- 40- 145-B
UK2AAB 3465- 21- 55-A

Lithuania

UP2OV 16,128- 28- 192-A
UK2BBB (4 oprs.)
119,214- 74- 537-B

Latvia

UQ2KBP (UQ2GA, opr.)
59,202- 69- 286-B
UQ2KAA (4 oprs.
77,724- 65- 381-B

Romania

YO2AFB 14,355- 33- 145-A

Yugoslavia

YU3EY 4284- 21- 68-B 1
YT1BCD (3 oprs.)
1,198,857-187-2142-B31

NORTH AMERICA

St. Pierre & Miquelon Is.

FP8AP 525,789-141-1243-A

Honduras

WA9RAT/HR2
2,296,575-225-3404-A45

Nicaragua

HT1MG 834,534-142-1959-B35
HT1EAS 324- 9- 12-B 1

El Salvador

HU1P 5,615,313-263-2117-B75

Alaska

KL7GSG 200,928-104- 644-C27
KL7AIR (4 oprs.)
372,075-121-1025-C14

Puerto Rico

KP4AST 6,279,598-302-7483-C82
KP4CQB 2,072,704-213-3253-C42
VE3OSZ/KP4
455,390-127-1190-B38
KP4DJI 446,700-150- 992-B17
KP4CL 238,056- 56-1417-C18
WB4EOT/KP4
110,688- 96- 385-B20
KP4DIS 44,421- 31- 292-A12

Virgin Islands

KV4AM 992,358-207-1608-C19

Canal Zone

KZ5NR 3,321,675-259-4275-B55
KZ5KN (+KZ5KD)
467,460-147-1060-C18

Greenland

OX5BL 106,272- 54- 656-B14
OX3WQ 76,590- 74- 345-A

Guatemala

TG9GF 542,241-133-1359-B16

Bermuda

VP9BY 1,071,984-184-1942-A
VP9GE 760,594-178-1425-A
VP9MI 681,408-156-1456-A

Mexico

XE1KS 3,529,170-270-4357-C
XE1LLS 3,262,239-261-4263-B
XE1J 1,158,894-198-1951-M
XE1UA 95,742- 54- 591-B

OCEANIA

Philippine Islands

DU1FH 537,540-155-1156-C

New Caledonia

FK8AH 26,832- 52- 174-A

Fr. Oceania

FO8BX 103,596- 89- 388-B

Guam

KG6ASP 180,323- 97- 620-B
WA3EEE/KG6
990- 11- 30-B

Mariana Islands

KG6SX 30,600- 40- 172-B

Hawaiian Islands

KH6IJ 3,964,350-247-5350-C
KH6SP (9 oprs.)
4,035,324-262-5134-C
KH6UL (4 oprs.)
1,891,206-226-2347-C

Midway Island

KM6CE (4 oprs.)
88,398- 86- 331-B

American Samoa

KS6DH 797,220-180-1478-B

Australia

VK2FU (VK2FZ, opr.)
2,319,840-216-3580-B
VK3QI 696,762-187-1242-B
AX3QV 133,920- 80- 558-A
AX5MF 76,224- 64- 397-B
VK3ARX 31,473- 39- 269-D
AX7KI 19,569- 33- 198-B
AX3ASU (12 oprs.)
37,269- 41- 303-B

New Zealand

ZL1AMO 175,182- 86- 679-A
ZL1AUA 51,984- 48- 361-B
ZM3SL 20,832- 32- 217-A
ZL1AGO 15,606- 34- 153-A

SOUTH AMERICA

Chile

CE3OE 815,332-148-1837-A
CE5EQ 55,044- 44- 417-B
CE2GK 28,194- 37- 254-A

Uruguay

CX2CN 547,480-130-1532-A
CX1JM 231,545-115- 961-B

Ecuador

HC1TH 4,058,940-244-5545-B

Argentina

LU8DKA 2,024,568-182-3708-B
LU2FAO 694,467-153-1513-A

Peru

OA4LM 454,512-136-1164-

Netherlands Antilles

PJ9GF (3 oprs.)
4,030,641-243-5529-C

Brazil

PY3APH 626,340-143-1460-
PY1DEE 22,274- 37- 214-

Surinam

PZ1AH 264,307-113- 780-
PZ1CK 128,872- 89- 494-

Venezuela

YV4UIA 2,701,327-257-3510-
K4MUP/YV1
1,201,575-185-2165-
4M7AV 1,019,503-209-1626-

Paraguay

ZP5GS 1,041,852-157-2212-
ZP5OI 280,500-110- 850-
ZP5GJ 268,755-115- 779-

Trinidad

9Y4VV 209,040- 82-1340-
9Y4MM (3 oprs.)
350,700-140- 849-

(Continued on page 104)

CONDUCTED BY GEORGE HART,* W1NJM

PSCM REVISED

THE PUBLIC Service Communications Manual is up for reprinting and revision. By the time you read this it will already have been done, but you may be interested in some of the changes which will appear in the "current" edition and in some of the background.

The first edition of the *Emergency Communications Manual* came out in 1940, but it was preceded for several years by a 1938 pamphlet entitled *A Personal Word about Emergency Preparation* from the Communications Manager and a reprint of a 1938 *QST* article entitled "When Emergency Strikes." Since 1940 several editions have been produced, and in 1949, CD-24, a mimeograph describing the operation of the National Traffic System, was produced and widely distributed. The two publications went their separate ways until 1966, when they were combined into a 26-page *Public Service Communications Manual*, which looked very much like the present publication.

One thing that did change along the way was the ARPSC diagram. At first it showed AREC and NTS as the principal divisions of ARPSC, with an arrow indicating "Other Amateur Facilities" as a recognized part of ARPSC without any specific definition. Then in 1966, when the Board of Directors ordered the inclusion of RACES, the diagram changed to show AREC, NTS and RACES as the three divisions of ARPSC and the text was revised wherever necessary to include RACES.

Strangely enough, this did not set too well with some of the civil defense people, who were inclined to look upon it as a "grab" by ARRL to take over RACES. Such was the uproar, both unofficial and semi-official, that the diagram was changed to show plainly that ARRL centralized the activities of AREC, NTS and RACES, but implemented only the former two, and occasional efforts were made to explain this distinction.

The new edition of the PSCM will revert to the former diagram showing AREC and NTS as the two principal divisions, with RACES and "Other Amateur Facilities" again as an arrow. This is supposed to indicate, as will be explained textually, that while AREC and NTS are the ARRL programs for direct public service operating, RACES and the other facilities are *recognized* additionally as a part of the amateur radio public service effort, but since the League does not sponsor or implement them we do not presume to diagram them.

This is as it should and must be. ARRL has sponsored a traffic-handling system since its earliest days—in fact, this was the basis for the founding of the League in the first place. The AREC dates back to 1935, assuming definite organizational proportions before World War II and expanding on them subsequent to this. ARRL sponsorship and implementation denote control from a central ARRL point. This is what we have in ARPSC. We do not have it in RACES, or MARS, or any other government-sponsored amateur organization, or in many organizations sponsored by other amateur groups or individuals. Thus we can *recognize* these and encourage them, but we may not give the appearance of sponsoring or controlling them.

This is what the "arrow" on the ARPSC diagram will mean.

For many years this writer has campaigned for "a single strong facility" of amateurs operating in the name of amateur radio in its own right, for public service to all persons, agencies or entities who want it and who are willing to receive it on our terms – just as they receive it from the telephone company, the electric company and just as you receive services from craftsmen and tradesmen – on the basis of "tell us your requirements, *we'll* tell *you* whether or not or to what extent we can fulfill them." Instead of that, organizations and agencies, both private and public, recruited, organized and utilized amateurs for their own purposes, set up their own private communications systems within amateur radio. An amateur interested in public service work had three choices: (1) Join an ARRL-sponsored net or group. (2) Join one of the amateur or quasi- amateur groups sponsored by non-amateur agencies, government or private. (3) Join a net or group sponsored by an amateur or amateurs outside the ARRL sphere.

Thus was the amateur public service effort divided among three types of sponsorship, and among a great many different organizations or agencies. Naturally, the ARRL-sponsored group was the largest, but others have been growing and today there is some question whether the majority of active amateurs interested in public service work prefer an ARRL-sponsored activity. Furthermore, in our efforts to push participation in an ARRL-sponsored activity, some amateurs have been alienated in the mistaken assumption that we are opposed to other amateur public service efforts. And now, in our efforts to correct this mistaken assumption, some are asking if we have changed our viewpoint.

*Communications Manager, ARRL.

The answer is that we have not; not in the slightest. We still think that the welfare of the general public and the cause of amateur radio can best be served by "a single strong facility" of ARRL-sponsored amateurs. But there are and always have been some "ifs" involved in this thinking — for example, *if* the amateurs will support the effort, *if* we can get some degree of cooperation from government agencies and others involved, and *if* this course of action appears to continue to be, from the facts of life, the most beneficial one from all standpoints.

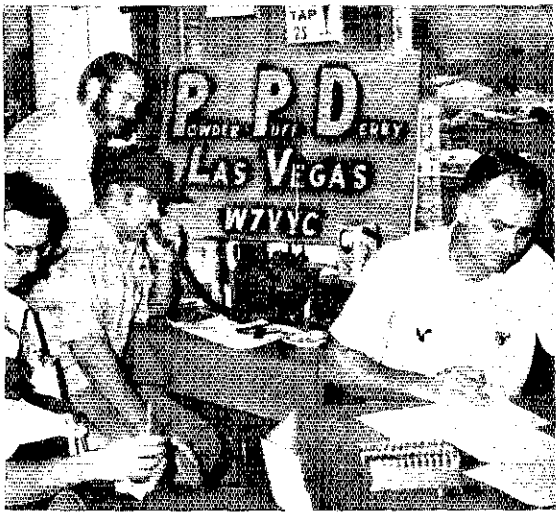
Meanwhile, the non-ARRL public service efforts also benefit the amateur as well as that segment of the public involving them. We have never opposed them and do not do so now. The revision of the *Public Service Communications Manual* will contain some material designed to make this clear.

New Net Directory

By the time this appears in print the new net directory will have been in circulation for several weeks. This annual undertaking uses up a large chunk of two people's time during the summer months, but each year we institute some changes to enhance the efficiency of the procedures, so this year we were able to get it out a couple weeks earlier than last year. If all goes well, we should eventually reach Aug. 1 as the annual distribution date.

If your net does not appear, it is because you did not register or re-register as required (see p. 70, June '70 *QST*) — unless we goofed, of course. If it is registered wrong, it is because you or someone gave us the wrong information — unless ditto.

The new net directory contains 581 net names, a slight increase over last year, of which 163 claim to be a part of ARRL's National Traffic System. Voice nets outnumber cw nets by about 4 to 1, but cw nets have almost as many sessions per week as voice nets, so the preponderance of voice activity is not quite so great as this ratio might indicate. There is little doubt, however, that there are many more stations participating in our public service nets on phone than on cw.



Manning the station at the Las Vegas, Nev., stop of this year's Powder Puff Derby are, left to right, WA7GIV, K7RBM, W7YAE and W7VYC. Also participating but not in the photo were W7PBV, W7OQF, K7PPE and K7USR.

All amateurs interested in public service should have a copy of the current net directory in their shacks. There is no charge, it's just another service of the League. There is also no automatic mailing list, so if you want a copy send us a s.a.s.e. and we'll gladly mail you one. It consists of about ten 8-1/2 X 11 sheets, so don't send in a 4 X 6 envelope. — *WINJM.*

Public Service Diary

On May 28 after flash floods had knocked out long distance telephone service in Southeastern Minnesota, KØZRD began a net on 3925 kHz, and was soon joined by many amateurs in the surrounding area. Information on the progress of the flooding condition was passed to Civil Defense and Red Cross authorities as well as to a commercial broadcast station in Red Wing. Most of the roads in the area were also rendered unusable and information of this type was gathered for the sheriff's office. — *KØZRD.*

— • • • —

While returning from work on June 16, K8BHH was in contact with WA8LAM and WA8IDL when he discovered an automobile accident near Canton, Ohio, involving two trucks and a car. One of the passengers appeared to be injured and was pinned in the wreckage. WA8IDL was advised to call the police and an ambulance. — *K8BHH, AEC Alliance, Ohio.*

— • • • —

At 2100 GMT on July 18 the Weather Bureau issued a tornado watch for nearly one-third of Minnesota. As this was announced on local radio and TV stations, the AREC Weather Watch Net on 75, six and two meters was activated and at 2240 a tornado warning was issued for Todd, Douglas and Wadena counties. At about the same time, WAØEBZ in Osakis, began to notice distant lightning and thunder which continued to move toward his location. A few minutes after 0000 of July 19, the local police department reported that a tornado had touched down in Miltona.

WAØEBZ quickly installed mobile equipment in his car and as he headed toward Miltona, some 12 miles away, he made contact with WAØPDH in Alexandria who acted as relay station to the AREC net. After obtaining permission from local authorities, WAØEBZ entered the small town and contacted the civil defense director. Since telephone service was out, amateur radio was used to pass several messages to and from state civil defense headquarters. The operation was secured at about 0300. — *WAØMZW, SEC Minnesota.*

— • • • —

On July 19 W7RK was driving south on U.S. Highway 101 near Quilcene, Wash., when he came upon a head-on collision involving a car and truck. Using a ten-watt transistor rig on the Pacific Amateur Radio Guild net frequency of 7137 kHz., contact was made with WA7JZO who reported the accident to the state police in Seattle. — *W6CIS.*

— • • • —

For fourteen hours on May 16, West Orange, N. J., area amateurs manned an exhibit at a Boy Scout Fair in the South Mountain Reservation. About

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for July Traffic

Call	Orig.	Recd.	Rel	Del	Total
W3UDL	447	1530	1406	119	4496
W*BA	4	629	604	71	1388
WA5GPO	1	503	503	0	1007
WA4IYS	30	445	491	36	1002
K*ZSQ	1	417	0	417	835
W4VK	194	319	290	14	817
WA*VAS	119	343	12	331	805
W*LCK	18	369	265	21	673
K8ZIU	7	304	213	102	626
K*ONK	152	223	212	12	599
WA8WZI	20	303	259	4	586
K5IEY	2	266	261	6	535
W1OJM	5	264	262	2	533
K8LNE	11	274	221	23	529
WA5PPE (June)	124	1230	956	274	2584

BPL for 100 or more originations-plus-deliveries

WA8FTX/3 252	K9TXJ 127	W6DEF 109
WA3ATQ 242	WB9BXX/9 121	W2OE 108
W9UYO 214	W8OYE 118	W3TN 107
WA4MKH 192	W*AXT 118	W8QCH 105
K8ONA 181	WA8YVR 119	WA1GCF 103
WA6BYZ 166	WB8CWD 111	W9UQO 101

More-Than-One Operator Station

WA4PDM/2 137

K9WBD 123

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: WA1LLB, WA2EBI, WB4HKP, WB8DSV.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

250 messages were received from scouts and their families and were handled through existing nets. – *WA2BAN, EC Livingston, N.J.*

— • • • —

Ten members of the Glens Falls, N.Y., AREC provided communications for the annual Little League Parade on May 24. WB2FRV and WB2JDD handled the arrangements for the procession which was divided into several divisions, each of which was to be led by an amateur unit. WB2JDD led the entire line followed by WB2KBQ, WA2AQD, WB2YMY, W2OP with WB2BZJ and K2PBE bringing up the rear. A six meter portable was also used by W2BOR in the staging area to maintain the proper order. – *K2AYQ, EC Glens Falls, N.Y.*

— • • • —

On June 14 the members of the Queens Co. (N.Y.) with AREC-RACES group provided radio communications for the New York City Police Volunteer Day at Flushing Meadow Park. Handling the radio link were WB2OGM, WB2UDD, WB2IPO, WA2PWP, W2WUE and WA2BRE who coordinated all exhibits and a parade. The sponsors of the activity were well pleased and commended the group. – *WB2IPO, RO Queens, N.Y.*

— • • • —

Members of the Central Ohio AREC-RACES net provided communications for the annual Fourth of July Parade in Columbus. Six- meter mobiles, located along the parade route, were used to regulate the speed of various parade units to keep it flowing smoothly. After the parade, a sky-diving exibition was scheduled. Amateurs attached a receiver to the public address system so spectators could monitor communications being used by the divers. A total of seven amateurs participated in the operation which was planned and coordinated by W8KJM. – *W8ERD, EC/RO Columbus, Ohio.*

— • • • —

West Virginia amateurs were alerted to standby for possible flooding on July 22 and 23. Bulletins were issued on both the West Virginia Phone and Post Office Nets, but no severe flooding developed and only a few messages were passed concerning the alert. – *WA8NDY, SEC/RO West Virginia.*

— • • • —

Racing blindly through the rain in an effort to get off the lake before a severe thunderstorm on July 28, a sport fisherman was thrown from his boat when it struck a buoy and was drowned. Tullahoma, Tenn., amateurs were asked to provide communications for recovery operations. W4WJH, Tennessee SEC, notified K4EGC who activated the local emergency nets on two-meter fm and 75-meter phone. K4VEA, W4IYU, WA4RAS and WA4CLN responded to the call. Information was passed between rescue workers and the local Red Cross Chapter. – *W4WJH, SEC Tenn.*

— • • • —

Setting a new high mark for the year, *forty-five* reports were received from SECs for June, with 15,327 AREC members listed. This is six more reports than were received last June, and is an increase of about 600 AREC members. Sections reporting: Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPa, Ind, Iowa, Kans, Ky, LA, La, Mar, MDC, Mich, Mont, Nebr, Nev, NLI, NNJ, NTex, Ohio, Okla, Ont, Org, Oreg, Que, RI, SDgo, SF, Sask, SDak, SNJ, STex, Tenn, Utah, Va, Wash, WVa, WFla, WMass, WNY, and WPa.

As usual, herewith is presented the bi-annual summary of AREC activity as taken from SEC reports. During the first six months of the year, 255 reports were received (242 last year) from 84 different sections (48 last year). Those sections having solid reporting records thus far during 1970 are: Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPa, Ind, Iowa, Mar, Mich, Mont, Nebr, Nev, NLI, NNJ, NTex, Ohio, Okla, Ont, Org, Que, SF, Sask, SDak, SNJ, STex, Tenn, Utah, Wash, WFla, and WPa, a total of 33 (31 in 1969).

Traffic Talk

As a "natural" for handling of point-to-point traffic, RTTY seems to be doing precious little of it. Oh, we know that old Iron Man K6BPI handled much of his traffic this way, and others have likewise used it, but considering the potential and the number of RTTYers on the air, it seems that more of the traffic, especially transcontinental, ought to be handled this way.

In that connection, for years attempts have been made in NTS to line up traffic stations who have RTTY facilities. Note the phraseology – traffic stations who have RTTY facilities, not RTTY stations willing to handle traffic. The latter are comparatively easy to find, but they are not interested in the handling of traffic per se. What they are interested in, usually only until the novelty wears off, is using their favorite mode for some new type of pursuit. The traffic man may equip himself with RTTY so he will be equally as capable in this mode as he is in handling traffic by voice and cw. The RTTY enthusiast may handle traffic in order to use his favorite mode, but if he is equally as capable on phone and cw it is incidental.

Traffic men equipped for Rtty are hard to come by. There are a few, but their personal affairs are such that it has been next to impossible to line them up for schedules in the Transcontinental Corps (TCC) of the National Traffic System. All such functions are now being conducted by cw - quite successfully, as it happens, because the

Public Service Honor Roll July, 1970

This listing is available to amateurs whose public service performance during the month indicated qualifies for 50 or more total in the nine categories below. Use CD-190 or submit equivalent information through your SCM. See page 28, Nov. '69 *QST* for details. Please note maximum points for each category.

Category	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*Totals*
Max. Pts.	10	5	16	12	12	20	3	—	5	
K@LVB	10	5	16	12	12	12			5	72
W6RNX	10		16		12	20		4	5	67
W7OCX	10	5	12	12	12				5	56
W@LCX	10	5	16		12	5	3		5	56
WA1HOL	10	5	16	12	12					55
WB4JMH	10	5	16	12	12					55
WB4LAL	10	5	16	12	12					55
WB4LAO	10	5	16	12	12					55
WA@IAW	10	5	16	6	12				5	54
WA1KZL	10	5	16	8	12	2				53
WA@VAS		5		12	12	20	3			52
WA1LLB	10	5	12	12	12					51
W8IMI	10	5	16	3	12				5	51
W2MTA	10	5	16		12				5	48
W3MPX	10	5	16		12				5	48
WA5RRH	10	5	4	12	12				5	48
W6RGP	10	5	16		12				5	48
W7AXI	10	2	16		12		3		5	48
W@HRY	10	5	16		12				5	48
WA9WMT	10	5	16		12				5	48
WA3AEI	10	4	16		12				5	47
WA1GUE	10	5	16		12		3			46
WB4EDT	10	5	16	3	12					46
WA8LTX	10	5	8	6	12				5	46
K1SSH	10	2	16		12				5	45
K@ONK	10	5	16		6		3		5	45
WA1JYY	10	5	16		12	1				44
WA4JZB	10	5	16	12		1				44
W1DVW	10		16		12				5	43
W1KEW	10		16		12				5	43
WA1HSN	10		16		12				5	43
K1PQV	10		16	12					5	43
W2ETR/5	10	5	16		12					43
W2BR	10		16		12				5	43
WA2ICU	10	5	16		12					43
W2RUF	10		16		12				5	43
W3EML	10		16		12				5	43
W3LOS	10		16		12				5	43
W3NEM	10		16		12				5	43
W4HEU	10	5	16		12					43
W4ZJY	10	5	16		12					43
WA5EIN	10	5	16		12					43
WSQMJ	10		16		12				5	43
K5ROZ	10	5	16		12					43
WA6ROF	10	5	16	3	9				5	43
WB8ALU	10	5	16		12					43
WA4ZKK	10		16		12				5	43
WA@OTQ	10	5	16		12					43
WA@VKI	10	5	16		12					43
8RLY/W4	10	4	16		12					42
W1BVR	10	3	16		12					41
W4UQ	10	3	16		12					41
WA8UPC	4	5		12	12	3			5	41
W@BV	10	3	16		12					41
WA3JSU	10		16		9				5	40
W7GHT	10	1	16		12					39
W7LBK	10	5		12	12					39
W9BUQ		5		12					12	39
WA1LNE	10		16		12					38
W1UBG	10		16		12					38
WA2BFX	10		16		12					38
K2KTK	10		16		12					38
W2QC	10		16		12					38
K3HKK	10		16		12					38
WA3IYC	10		16		12					38
K4QIO	10		16		12					38
K4KNP	10		16		12					38
W7GMT	10		16		12					38
WA@HIN	10		16		12					38
WA6CEI		5		12		20				37
W7JWJ	10	5		12		10				37
W@PAN	6	5	16	9		1				37
WB4ODN	10	2	6		12	6				36
W2THY	8		16		12					36
WA1ESI	10		16		9					35
WA@DEJ	4	5	8	6		7			5	35
K1FIR	10		12		12					34
K1SXE		5		12	12				5	34
WA1IZC	10	5		6	12					33
WA3CKA	10	1	16		6					33
WA8ETX/4	10	5		3	12		3			33
W7BQ	10	5	12						5	32
WA2MEO	10	5	16			1				32
W7QGP		5	12			10			5	32
WA@HRM	10	5		12					5	32
WA1JMO	2	5		12	12					31
K2KIR	10		16						5	31
WA3IUV	10	5		1		15				31
WA@IQO	10		12		9					31
W7UU	6	5				20				31
W4NOG		5		6		19				30

The following stations had the necessary total of points for inclusion in PSHR, but no breakdown was furnished: WA3IPU 38.

Category Key. (1) Checking into cw nets; (2) Checking into phone/RTTY nets; (3) NCS cw nets; (4) NCS phone/RTTY nets; (5) Performing liaison; (6) Legal phone patches; (7) Making BPL; (8) Handling emergency traffic; (9) Serving as net manager.

personnel involved are dedicated and dependable. But there is no bar to using other modes for this function. Even phone (ssb, of course) can be used, provided the two stations concerned can make a go of it.

But what is needed are *traffic* men — amateurs interested in handling traffic. Not cw men, not phone men, not RTTY or vhf-fm or repeater enthusiasts. The name of this game is traffic handling, and the object is not *how* you handle traffic, but *that* you handle it. True, many traffickers have their preferences, but to the extent that they restrict themselves to a particular mode, to that extent are they handicapped in accomplishing their objectives.

Now let's suppose that you're interested in handling traffic and that you are equipped, both by ability and gear, with cw, phone and RTTY capability. There are all sorts of avenues open to you. You can take part in your section phone net and serve as liaison either to the section phone net or to the NTS region net. If your times are erratic, you can take part in ECARS, MWARS or WCARS. If you want to make yourself available for TCC, you contact your TCC director (W3EML East, W@LCX Central, W6VNQ Mountain and Pacific.) If an opening exists, you will get an assignment. (There aren't many TCC assignments going begging, these days.) Your function will be only one night a week, on a specific night. Either you will receive traffic from an assigned counterpart in another area, then put that traffic into *your* area of destination net, or you will receive traffic out of your area net and transmit it to an assigned counterpart in another area. Since area nets are on cw, you will have to be capable of cw operation, although the contact with your counterpart can be by RTTY or, if you prefer and can make it, even by voice.

If you are equipped for RTTY and phone but do not have sufficient cw ability to hold your own in an area net, this limits your NTS capability but does not completely nullify it. That is, you can still handle half of a TCC function if you have a means for quickly transferring traffic to or from another amateur who can handle the cw end of it. For example, a friend may be sharp in cw traffic but has low power or a poor location. He reports into the area net as a TCC functionary, collects the traffic, gives it to you (by hand, telephone or on the air) and you slap it to your other-area counterpart by RTTY. At the other end, the

receiving station can put the traffic directly into NTS section nets for delivery. If the area is well covered at section level on phone, he may not require cw ability; but his reliability as a TCC functionary is impaired if he cannot fall back on the area net in case time does not permit him to clear the traffic before this net meets.

Yes, we've said it before and we'll keep saying it. The maximum in public service can be performed by those amateurs with the maximum in versatility. You may prefer one mode over another (most of us do), but if you utilize that mode to the exclusion of all others you are impairing your usefulness as an amateur in public service. — *W1NJM.*

National Traffic System. Most of the managers have been commenting on the lack of traffic to be had; WØINH says July was CAN's worst month since daily sessions were begun in 1956. Total traffic just squeezed by last month's all time low on 2RN according to W2FR. W3NEM and W6BNX also added that vacations are taking their usual toll of missed schedules. The percentage of unreported sessions is up also which makes the overall picture that much more bleak.

July reports.

Net.	*Sessions*	*Traffic*	*Rate*	*Avg. Rep. (%)*	
EAN.	31	1145	.881	36.9	98.9
CAN.	31	675	.732	21.8	100.0
PAN.	31	685	.726	22.1	98.8
1RN.	61	532	.364	8.7	92.9
2RN.	62	352	.559	5.7	99.0
3RN.	62	273	.306	4.4	98.3
4RN.	53	301	.260	5.7	80.1
RN5.	62	441	.296	7.1	89.1
RN6.	62	582	.492	9.4	100.0
RN7.	57	198	.224	3.4	35.3
8RN.	60	379	.309	6.1	88.6
9RN.	62	372	.334	6.0	94.8
TEN.	58	218	.275	3.7	52.8
ECN.	58	201	.210	3.4	81.7
TCC Eastern.	122[1]	498			
TCC Central.	93[1]	376			
TCC Pacific.	124[1]	578			
Sections.	1584[2]	7724		4.9	
Summary.	2333	15,527	EAN	8.5	
Record.	2890	26,748	1.267	15.2	

[1]TCC functions, not counted as net sessions.

[2]Section and local nets reporting (51): KTN (Ky.); CN, CPN (Conn.); NYS, NLI, NYCLIPN (N.Y.); ILN (Ill.); PVTEN, NJAN, NSN, NJN (N.J.); SGN (Me.); CHN (Colo.); BUN (Utah); GSN, GTN (Ga.); MDCTN (Md.-D.C.); OTZ (Okla.); VEN, FMTN, GN (Fla.); BEN, WIN, WSSN, WSBN, BWN (Wis.); OSSB, BN (Ohio); OZK (Ark.); MSPN, MJN, MSN (Minn.); WMN (Mass.); CNE, CNL (N. & S. Car.); QMN (Mich.); PTTN, EPA, EPAEPTN (Pa.); AENB, AEND, AENM, AENO, AENR (Ala.); W. Que. VHF? VSBN, VN (Va.); OQN (Ont.-Que.) WSN (Wash.); SCN, NCN (Cal.).

Transcontinental Corps. **July Reports.**

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern.	122	91.1	1335	498
Central.	93	94.6	796	376
Pacific.	124	96.0	1156	578
Summary.	339	93.9	3287	1452

We always show statistics for the various parts of NTS. Just for once we thought it might be nice to state a figure representing the performance of the entire system for a month. Whether this means anything or not, you can judge for yourself, but here is how our overall effectiveness percentage figure was derived. For simplicity sake we decided to base total effectiveness only on percentage of functions completed and on percentage of representation. In the Area Nets, all 93 possible sessions were held and the Regions were represented 99.2 percent of the time. In the Region Nets, 657 of 784 possible sessions were reported for 82.6 percent and the sections were represented 76.0 percent of the time. The Transcontinental Corps was 93.9 percent effective. Section effectiveness was a bit more difficult to determine, but ultimately it was decided that there should be at least one net report from each Section; of course there never are and this month 40 different sections had nets reporting for a percentage of 54.5. Since Section representation on Region Nets was 76 percent and since 54.5 percent of the Sections reported, overall section performance was determined to be 41.6 percent. Taking the sum of these various figures and dividing, it looks like NTS was 78.2 percent effective during the month of July.

Naturally our performance is somewhat higher than the figures indicate because there were no doubt some unreported functions which were carried out to completion. But these unreported functions are in limbo as far as records are concerned and don't help a bit. Where I come from, 78.2 is a C-minus average and that isn't very good for a system that is supposed to be functioning 100 percent everyday. — *WA9IHH.*

Independent Net Reports

Net.	*Sessions*	*Check-Ins*	*Traffic*
Clearing House.	26	452	409
Northeast Traffic.	31	370	236
20 Meter ISSB.	23	469	2866
7290 Traffic.	46	1947	789
LCFTN.	23	360	60
Hit & Bounce.	31	279	334

SET Addenda

In the SET report which appeared in August *QST*, the report of K2KDQ for the Passaic Area was omitted from the Northern New Jersey listing. This group should have been credited with 227 points.

There are also several errors in picture captions. On page 73, the caption should read "... K8IZN; K8DHJ, County EC; and WA8UPI ...." On page 78, the picture at the top of the page was "flipped" so the caption information is in reverse order, except for the lady at the right, who should have been on the left.

Received several weeks too late to be included in the SET write-up was information on the Kentucky exercise which had not previously been available. Especially prominant in this group of late reports was that for District 4, under the direction of EC WA4FMY, whose group managed to gather together a score of better than 600 points. These additional reports would have pushed the 1970 SET just above 1969 record levels if they had been received in time. QST

Happenings of the Month

ARRL STILL FIGHTS FEES

Despite the turn-down we (and the whole communications industry) received in FCC Docket 18802, the matter of higher fees, the League continues to fight.

We asked for a stay in the effective date while our petition for reconsideration was under study. Organizations in other fields also asked for a stay for similar reasons. These requests were promptly denied by the Commission, but it did promise to maintain records so that – if any of the new fee schedules were later overturned – refunds could be made. Amateurs are advised to keep their own records of payments made in the next several months, too.

The text of our reconsideration request follows:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of	)	
Amendment of Subpart G of Part 1 of the Commission's rules relating to the schedule of fees.	)	Docket 18802
To: The Commission	)	

Petition for Reconsideration and Hearing

The American Radio Relay League, Incorporated, a non-profit corporation organized under the laws of the State of Connecticut and having more than 80,000 amateur radio operators licensed by the Federal Communications Commission as members, submits this petition for reconsideration and rehearing pursuant to Section 405 of the Communications Act of 1934, as amended, 47 U.S.C. †405, and requests (1) that the portion of the Report and Order released July 2, 1970 (FCC 70-694, 35 Federal Register 10988), increasing the fees in the Amateur Radio Service be suspended and set aside, and (2) that certain amateur operator examination procedures be revised to lessen the burden upon applicants and to increase the efficiency of administration of such examinations by a Commission employee-examiner.

In support whereof, the following is respectfully submitted:

Maintenance And Growth Of The Amateur Radio Service Has Been Severely Endangered

The League is so deeply concerned over the certain adverse impact of the 125% increase in fees upon the viability and growth of the Amateur Radio Service that it implores the Commission to reconsider and set aside the increase in fees on the Amateur Radio Service.

Section 303(g) of the Communications Act directs the Commission to "Study new uses for radio, provide for experimental use of frequencies, and generally *encourage* the larger and more effective use of radio in the public interest." (Emphasis supplied).

When fees were first imposed in 1963, the Commission recognized the possible adverse impact upon the Amateur Radio Service. In its Report and Order, 34 FCC 811, the Commission said as follows:

With particular reference to amateur radio, it is argued that the assessment of fees will have the effect of discouraging the experimentation and technical development in radio which the Commission has the responsibility of promoting under Section 303(g) of the Communications Act of 1934, as amended. In view of the comments which were filed, *we believe the two areas in which the proposed fees may possibly discourage the larger and more effective use of radio are the field of amateur radio and the experimental use of frequencies.* As stated hereafter in this Report and Order, we have determined that it would be in the public interest to revise generally the proposed fees for filing applications in the Amateur Radio Service and to dispense altogether with the proposed fee for filing application for an experimental license. These changes were effected, in part, as a result of further reflection on the Commission's responsibility under Section 303(g). (Emphasis supplied)

The concern expressed in 1963 by both the Commission and the League has been proven to have been well founded. In its comments in this proceeding in opposition to an increase in fees, the League cited official Commission figures which vividly prove that the rate of growth of the Amateur Radio Service decreased most substantially beginning in 1964, the year fees were first collected. In the five year period, from 1959 to 1964, the number of amateur licenses outstanding at the end of the respective fiscal years increased by *33.8%*, from 191,493 to 256,237. In the next five year period, from 1964 to 1969, the number of licenses outstanding increased by only *1.58%*, from 256,237 to 260,294. (ARRL Comments, page 8)[1]

Even though Congress has expressed its desire that administrative agencies, including the Com-

[1]Such citations are to the Opposition and Counterproposal filed by the League in this proceeding on April 20, 1970.

Amateur Radio Weeks are still being proclaimed – here, in Red Bank New Jersey, the week was August 17 through 23 by proclamation of Mayor Daniel J. O'Hern, center. At left is Bill West, President of Garden State ARA and at right, Irving Gordon, W2MPT, the club's chief engineer.

mission, become as nearly self-sustaining as possible, the legislation authorizing the imposition and collection of fees, a part of Title V of the Independent Offices Appropriations Act of 1952, 31 U.S.C. §483a, does not give the Commission authority to impose and collect fees and charges of such magnitude that the basic purposes for which the Commission was created might not be realized.[2]

In the absence of a most convincing reason for increasing the fees on the Amateur Radio Service, and in light of the uncontradictable record of the adverse impact of far more nominal fees upon the Amateur Radio Service ever since fees were first collected, it is respectfully submitted that the 125% increase of the fees imposed by the Report and Order in this proceeding is not in the public interest and is unlawful.

Carefully Prepared Constructive Comments Appear To Have Been Ignored

In response to the invitation contained in the Notice of Proposed Rule Making, hundreds of individual amateurs, dozens of amateur radio clubs, and the national amateur radio organization, the ARRL, devoted thousands of man-hours to the preparation of comments, oppositions and counterproposals. Almost without exception, they pointed out the unique character, composition and contributions of the Amateur Radio Service and the added hardships which would be imposed upon thousands of existing and potential radio amateurs of school age, thousands of handicapped and incapacitated amateurs, and additional thousands of elder citizens who, in retirement, must rely upon fixed incomes with ever decreasing purchasing power. Each respondent sincerely believed his thoughtfully prepared comments would be carefully and thoroughly considered by the Commission.

The manner in which their comments were rejected by the Report and Order has brought disillusionment to a high percentage of the more than 260,000 amateur radio operators who have learned of the Commission's decision to adopt its original proposal without any reference whatsoever to the principal arguments advanced and without a single modification of the Commission's original proposal. To them, the inviting of comments appears to have been mere compliance with the letter rather than the intent and spirit of the law. The League shares their views.

In its comments, the League did not challenge the Commission's authority to continue to impose fees upon the Amateur Radio Service. The League did urge, however, that careful consideration be given to the following relevant and material facts:

(1) That the fee schedule, either present or proposed, does not represent the actual cost to many amateurs of obtaining and maintaining a license (ARRL Comments, pages 6-8);

(2) That the Amateur Radio Service actually has been weakened by the nominal fee structure adopted in 1963, as discussed earlier in this petition (ARRL Comments, pages 8-9);

(3) That a fee increase is incompatible with the incentive licensing program reestablished by the Commission in 1967 after some years of controversy and study by the Commission (ARRL Comments, pages 9-11);

(4) That the Amateur Radio Service should not be required to support Commission activities on behalf of fee-exempt services. In this regard, the League demonstrated that the proposed fee schedule would raise approximately $1,003,000 per year from amateurs, which amounts to 4.03% of the entire operation of the Commission and 13.18% of the cost of operation of the Safety and Special Radio Services Bureau (ARRL Comments, pages 11-14); and

(5) That the relationship of the "value to the recipient" and the higher fees had not been established by the Commission (ARRL Comments, page 14).

In an attempt to be constructive, the League proposed a revision of certain examination procedures which would save the Commission money as well as an amateur applicant (ARRL Comments pages 14-16).

The only references by the Commission in its Report and Order to the hundreds of comments filed by radio amateurs were to (1) the complaint that it would be unfair to charge $9 for an amateur examination and only $5 for a commercial operator examination when both are so similar, and (2) the suggestion that there should be an examination fee and a license fee rather than a single fee for all amateur applications (Report and Order, para. 43(b)). Not one of the arguments presented by the League and by most of the amateurs were even mentioned by the Commission.[3]

Even though the Commission may not be required to refer in its order to every one of the arguments presented by each of the parties, it is respectfully submitted that the integrity of the rule making process cannot be maintained by merely stating, in the order adopting a rule, that all comments "have been carefully considered in the Commission's continuing analysis of such matters".

The League is so deeply concerned over the adverse impact of the 125% increase in fees upon the viability and growth of the Amateur Radio Service that it respectfully urges the Commission to again consider the arguments and facts presented in the League's Opposition and Counterproposal.

Present Examination Procedures Should Be Revised Or Certain Fees Abolished

One of the most frequent complaints to the League is the manner in which Commission-conducted examination procedures are administered.

The League's comments in response to the Notice of Proposed Rule Making reviewed the manner in which examinations are conducted and recommended as follows:

> When an applicant passes the code examination but later fails the written examination, he should receive credit for the code element if he seeks reexamination within the next twelve months. Such a procedure will reduce the work load upon the Commission employee-examiner. The savings to the Commission by following such a procedure will justify the elimination of an entirely new fee for reexamination within the next twelve month period. A simple, fool-proof receipt or certificate can be given at the time the code examination is passed for surrender when reexamination on the written elements requested. (ARRL Comments, pages 14-16)

Recently revised FCC Form 610, a copy of which is attached hereto, makes possible almost immediate adoption of the League's proposal. In

[2] It appears that an important provision of Section 483a has been omitted from the quotations of that section which appear in both the Notice of Proposed Rule Making (FCC 70-188, 35 Fed. Reg. 3815) and the Report and Order (FCC 70-694, 35 Fed. Reg. 10988) in this proceeding.

[3] The discussion of the "value to the recipient" appears to be limited to commercial services and operations (Report and Order, para. 5).

fact, it is believed that the form was revised so as to make possible a procedure such as proposed by the League.

The allowance of credit for having passed some elements of an examination would do much to reduce the cost of entering and advancing in the ranks of the Amateur Radio Service. Adoption of a procedure such as suggested by the League would remove at least some of the "sting" of the increase in fees.

As always, League officers and representatives are available to confer with members of the Commission's staff on this proposal.

Amateurs Should Not Be Required To Support Fee-Exempt Services

The Commission rejected arguments advanced by the League and others that collections from fees should not exceed the total cost of the Commission's operation, i.e., the commission should not be operated at a profit as long as some services are fee-exempt. Specifically, the League objected to having a portion of the income derived from the Amateur Radio Service used to defray the costs of fee-exempt services (ARRL Comments, pages 11-14).

Such arguments were rejected by the Commission, citing and quoting both Section 483a of the Independent Offices Appropriations Act of 1952, 31 U.S.C.†483a, and portions of recent reports of Congressional committees.

The League continues and carries forward its objection to financing completely unrelated operations of the Commission from fees collected from radio amateurs.[4]

It is respectfully submitted that Section 483a, under which the Commission has the authority to impose and collect fees, refers only to making the Commission's services as "self-sustaining" as possible "to or for any person (including groups, associations, organizations, partnerships, corporations, or businesses) except those engaged in the transacting of official business of the Government." Even though the reports of the Congressional committees express the hope that the Commission will be completely self-sustaining from the collection of fees, such reports do not have the force and effect of law and cannot and have not enlarged the basic authority bestowed by statute, Section 483a. Accordingly, the Commission is respectfully requested to reconsider the increase in fees on the Amateur Radio Service.

Conclusions

The adverse impact upon the Amateur Radio Service of the fees imposed beginning in 1964 is conclusively established by the Commission's own records. There is absolutely no reason to believe that the 125% increase will not have a more severe impact. In fact, the impact may be so severe as to bring about a decrease in the number of amateur radio operators.

The establishment and maintenance of a healthy Amateur Radio Service has been a national policy for more than 50 years. That policy should be continued. The increase in fees should be suspended and the entire relationship between fees and the maintenance of a healthy Amateur Radio Service should be far more carefully and thoroughly explored.

Wherefore, the premises considered, the Commission is urged (1) to suspend and set aside the increase in fees in the Amateur Radio Service and (2) to revise certain amateur operator examination procedures to lessen the burden on applicants and increase the efficiency of administration by the Commission.

Respectfully submitted,
THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED
By Robert M. Booth, Jr.
Its General Counsel

August 3, 1970

[4] It is inconceivable that the Commission expends $1,000,000 a year on the Amateur Radio Service. In fact, based upon the number of employees devoting even a substantial amount of time to amateur radio activities and considering overhead and administrative costs, it appears that expenditures are less than $1 per year per amateur. Requests by other services for more complete and accurate cost breakdowns have been rejected by the Commission.

NEW EXTRA CLASS QUESTIONS

In August, FCC changed SS Bulletin 1035 (a), "Study Questions for the Amateur Extra Class Examination," as follows:

An addition to present question 7:

7. . . . Can A5 emission be transmitted satisfactorily using one sideband only?

A replacement for question 29:

29. What are microwave frequencies? What type of oscillator is commonly used to generate microwaves?

A replacement for question 30:

30. What are some of the factors that affect the field strength of a signal radiated from an antenna.

Question 86 is amended as follows:

86. What major factors affect the Q of a coil? Of a circuit? For what purpose is a Q-multiplier used in amateur equipment?

These changes will be reflected in future printings of Bulletin 1035 a. No changes in the other classes of study questions are proposed at this time.

The numbers here correspond to the numbers used in the Extra Class chapter of the *License Manual*, 64th edition (red stripe).

DUPLICATE LICENSES NOW $6

Up until Docket 18802 was adopted, amateurs have been able to secure duplicate licenses by letter, without fee. Now, however, application must be made on form 610 (or 610-B in the case of club stations) and a fee of $6 is required. This provision is effective August 1, with the other fee increases.

One exception: if the original license is lost in the mail between FCC's office and the amateur's mail address, no fee will be charged. A statement about such loss is required, of course.

DAVID L. MOORE, ARRL FOUNDER

David L. Moore, ex-1WK, Glastonbury, Connecticut, past president of the old Hartford Radio Club and one of the six original directors of the American Radio Relay League, died in August at the age of 77. Not a ham in recent years, Mr. Moore was, however, of considerable assistance to the staff when in 1964 the 50th Anniversary series was written for *QST* and ultimately for "Fifty Years of ARRL," (which was compiled from the series).

And Governor Daniel J. Evans declares Amateur Radio Week in Washington State September 6th through 12th, honoring amateurs' work in natural disasters, civil defense, international goodwill and daily traffic-handling. Looking on from left are WA7GWJ, W7AXT, W7BQ, W7JWJ (Washington SCM), WA7BBJ, W7QGP, W7PGY (Northwestern Division Director), K7PIN, W7HMJ, and K7IND. *(Photo courtesy of W7JWJ)*

SSB MARCHES ON

Industrial Radio Services operating below 10 MHz will soon have to use ssb exclusively. After July 1971 all new systems in the Power, Petroleum, Forest Products, Motion Picture and Special Industrial services have to reduce carrier 40 dB below PEP; observe a maximum 2kW PEP and maintain a tolerance of 50 Hz. Existing systems have to convert to the "new" mode within five years.

CANADIAN-U.S. TREATY FOR GRS

Canadians coming South may now use their General Radio Service (CB) gear in the U.S. under a new treaty reached between our two governments. Canada had earlier extended GRS privileges to U.S. CBers on a unilateral basis; and the two countries have permitted amateur reciprocal operating for nearly two decades.

QST

Strays

Feedback

The schematic diagram for the "Packaged QRP" rig described in March 1970 *QST* has an error in the 12-volt line. Receiver module A2 is shown connected to the high side of the 1000-ohm decoupling resistor which is in the collector supply line of Q1. It should go directly to the 12-volt bus to prevent a large voltage drop across the 1000-ohm decoupling resistor. If motorboating should occur, place a 1000-ohm resistor and 50-μF capacitor in the 12 volt lead to the CA3028A product detector on A2. Connect this extra decoupling network in the same manner as shown at Q1 of Fig. 1.

Stolen Equipment

On the weekend of July 10, the Civil Defense Agency office in Baton Rouge, Louisiana was broken into and the following equipment was stolen:

1 SM-1 microphone P.T. 12814, Serial No. 2740
1 Collins 516F2 Power Supply P.T. 12809, Serial No. 23194
1 Collins 32S-3 Transmitter P.T. 12805, Serial No. 101254
1 Collins 75S-3C Receiver P.T. 12811, Serial No. 13753
1 Collins 312B-4 Speaker Console P.T. 14560, Serial No. 60133
1 Collins 30L-1 Linear Amplifier P.T. 12815, Serial No. 28517
1 set interconnecting cable set.

The city of Baton Rouge would appreciate any help in locating this equipment or for leads pertaining to the recovery of same. Any information pertaining to the above should be forwarded to Fred McMurray, Communication Officer, City of Baton Rouge, P. O. Box 1471, Baton Rouge, LA 70821.

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

FIRST PY RECIPROCAL

Dr. John A. Hutchins, W3OBD, of the Naval Academy's Area Language Studies Department has been honored by the Brazilian government for his contributions to radio communication between that nation and the U.S. He received the first Brazilian license, PY1ZAA, under a new reciprocal operating agreement concluded recently between Brazil and the U.S. Presentation of the license was made in Rio de Janeiro on a nationwide Brazilian telecast.

W3OBD has combined his amateur interest with his expertise as a Portuguese language specialist in a research project sponsored by the U.S. Office of Education. For the past two years, he has conducted "An Investigation of Spoken Brazilian Portuguese," comparing the spoken as contrasted to the written language. He has recorded over 500 phone-patch conversations in Portuguese taken from amateur radio frequencies. From transcriptions some 400,000 words have been computerized into a frequency list. This has enabled him to compile a basic vocabulary of some 13,000 words for further study.

During his three-week visit, Professor Hutchins also received the Anchieta Medal of the City of Sao Paulo, a one-time award to foreigners who have made significant contributions to the city.

W3OBD produces a weekly Portuguese language program which has been carried on the Voice of America's Brazilian service since 1967.

Dr. John A. Hutchins, W3OBD/PY1ZAA.

From left are HC2CT, HC2VI, and HC2JN.

HC AND OA HAMS HONORED

A special microwave link between Guayaquil and Lima was set up for the Apollo 12 operation. The job was done entirely by radio amateurs and it is believed to have been the first long-distance microwave operation in South America. It was on commercial frequencies, of course. But the several hams involved, HC2VI, HC2JN, HC2CT, OA1X, and OA4AV, were presented plaques by Panamericana TV, the Latin TV network.

ITU ANNOUNCES CONFERENCE DATES

The Administrative Council of the International Telecommunication Union has plans for holding the following conferences: The World Administrative Radio Conference for space telecommunications is scheduled to begin June 7, 1971. (This conference was discussed in last month's column.) The ITU Plenipotentiary Conference will be held in Geneva, starting September 14, 1973. And, the next World Administrative Radio Conference for maritime services will be held early in 1974. At the present time, no conference dealing with allocations throughout the hf spectrum has yet been scheduled.

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, Finland, France*, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands,* New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom,* and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write League headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, India, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Senegal, Sweden, Switzerland, United Kingdom, U.S., Uruguay and Venezuela.

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), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX FI HC HH HI HK HP HR LU OA PY TI VE VO W or K/8P XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U.S. and Venezuela. Permissible prefixes are: CE CP HR K OA II W XE YS YV and 4Z.

DX Restrictions

U.S. 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.

Cambodia and Vietnam forbid radio communications between their amateur stations and such of other countries. U.S. amateurs should not work XU XV or 3W8. Canadian amateurs may not communicate with Cambodia, Laos, Vietnam and Jordan. Prefixes to be avoided by Canadians are JY XU XV XW8 and 3W8.

*Agreement includes overseas entities.
**By special agreements, third-party traffic is also permissable with Australian amateurs for traffic regarding amateur satellites, and with 4U1ITU.

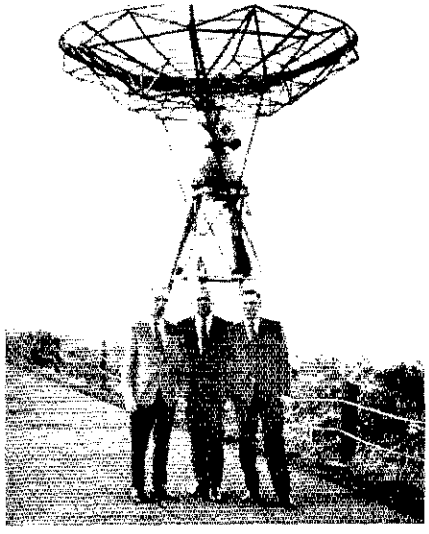
W/VK 3rd PARTY AGREEMENT EXTENDED

A temporary exemption has been made to the international limitations on third-party communications between U.S. and Australian amateurs. This arrangement is to permit the exchange of information on matters relating to the next amateur satellite experiments, and the permissable traffic is limited to such. Oscar 6 is now being planned with a launch hoped for in late 1971.

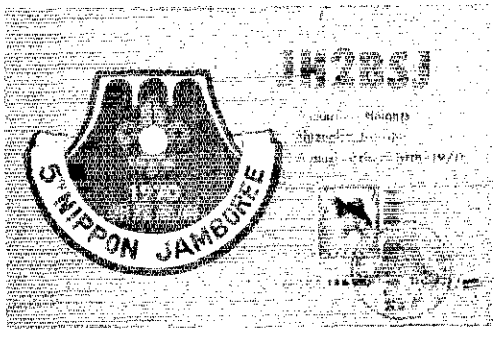
The temporary exemption is effective immediately and will end four months after the satellite ceases to transmit. Australian amateurs wishing to participate in this exchange of third-party traffic must first notify the *Wireless Institute of Australia.* A similar agreement was in effect for the Australis-Oscar 5 amateur satellite experiment.

CANADA/SWEDEN RECIPROCITY

A reciprocal operating agreement is now in effect between Canada and Sweden. There are now 18 such agreements between Canada and other countries. A complete list appears elsewhere in this column. QST



On a recent IARU/*ARRL* headquarters visit, SV1AB, president of the *Radio Amateur Association of Greece* also inspected the nearby amateur space communications station at WA1IOX. Shown from left are Hq. staffer WA2INB, SV1AB, and WA1IUO of the Talcott Mountain Science Center staff. *(K1UOV photo)*



Here is the QSL from the amateur station JH2BSJ located at the Boy Scouts Jamboree in Shizuoka, Japan, August 6-10.

Correspondence From Members-

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

REPEATERS

● I was fortunate enough to borrow Vice President Best's copy of the ARRL comments filed on Docket 18803. Our local fm group has studied the proposed rulemaking and as many comments and reviews as we could lay our hands on.

We find our position on virtually all points to be the same as the ARRL comments. Additionally your comments covered many points which we never even considered plus legal background and precedents of which we were unaware. Our sincere "thank you" and congratulations for a job well done. — *William R. Clark, WA5AUB, Corpus Christi, TX*

DOUBLE-DUTY RENEWAL

● Are you looking for an idea to encourage longer memberships while providing a new service to League members? Look this one over: my license expires in May, 1972. My membership expires in December, 1970. If I could get a membership to expire at the same time, my renewal notice would be a license renewal notice too.

The membership renewal notice is so dependable, it's a shame not to let the average amateur use it to his advantage. — *J. H. Doyle, W3CKU, Rockville, MD*

[EDITOR'S NOTE: In such instance one can add $2.20 to the December 1970 renewal of $6.50, so his membership would then expire in April, 1972. First notice would be received in mid-March, about 60 days before license expiration. You can, too — figure 55 cents per month.]

MOTIVATION PLUS

● After a short span as a contented sedentary General (much like a cow lying in a field chewing its cud), and after ignoring the *QST* series, "Those Higher Class Examinations," March – August, 1968, I decided that I might as well get the darn thing over with, and started studying for my Advanced. That was in February 1969. Somehow, I found out about the commercial exams, and began looking at them. Then the incentive spark started to burn. April: passed Advanced and Third Phone, flunked Second Phone. December: passed Extra, again flunked Second Phone. February: passed Second Phone (finally) and flunked First Phone. April: passed First Phone.

During the time I was studying for these exams: I began taking piano lessons from a no-nonsense teacher, beginning with the 4th grade level; I joined the Rockport Community Chorus, and sang in four major concerts; As the sound technician for our school's drama club, I did the sound effects and music for five major productions; I joined or continued in two social action groups dealing with people at the end of their ropes; I continued at school as Assistant Dean of Students, Bookstore Manager, and Moderator of the Radio Club; To supplement our meager summer income (which was zero), I took a full-time job in a restaurant, while continuing with some of the above, including my studying.

Lest you think I'm some sort of whiz, I have never successfully passed a math course in school. Never been to college. Before I began really digging into the stuff, I couldn't tell a resistor from a boxcar (except that a boxcar has wheels — hi!), and my code speed was a daring 15 wpm.

I found that two things were responsible for the change:

I *wanted* to get a higher class license;

I studied hard and regularly.

Without those two, forget it. And I think that's the biggest mistake made by people who fail the exam or who gripe about it. — *Brother Tom Carten, WA1DJC, Holy Cross Fathers, Gloucester, MA*

[EDITOR'S NOTE: Brother Tom is also quite a wit — sample: "Do you know why *carrier* pigeons are extinct? They all went single-sideband!"]

● I would like to publicly congratulate Nils, WA8OJI, and Bob, WA8OGR, upon receipt of their respective Amateur Extra Class Licenses. They both are disabled amateurs and should be an inspiration to us all, particularly those Conditionals who can hop in their cars and drive coast to coast mobiling all the way, but cannot find their way to the examining room. — *James W. Voorhees, W8EGR, Hillsdale, MI*

NEW BREED. . .

● I am in favor of RM-1633 [petition by Wayne Green, W2NSD/1] which would bring about a new class of license for use of the middle part of the 220 MHz band.

If this proposal is passed a new breed of amateurs will be joining the ranks of Amateur Radio.

This may also clean up the 11-meter Citizen Band and return it to its original purpose, for *business communication*. — *Robert G. Damrau, WN1LOT, Clinton, CT*

● Please do what you can to expedite RM-1633, a petition designed to get amateur radio moving by establishing a new amateur license for operation on part of the amateur 220 MHz band without a code or technical examination. The teenage radio amateurs of today are the tecnicians and engineers of tomorrow. To meet our country's needs in ten years we must have more amateurs today. This could also provide a workable solution to FCC problems with the Citizens Band. — *William Burnett, KRN-1773, Cheboygan, MI*

● I support RM-1633, and hope that the ARRL will do all it can to help this proposal become law. I am sure that this will help ham radio very much. — *J. Henry Felton, Jr., WA4HXZ/KH6GMQ, Honolulu, HW*

● I've gone over RM-1633 and feel that it would be of great value to amateur radio. I find no

disadvantages in the proposal and it should help channel many new radio amateurs into being. — *Robert F. Evans, Ravenna, OH*

● The idea of putting a code-free license on 220 MHz looks very good to me. I would like to see the ARRL Board of Directors start some kind of study on this. — *Kenneth A. Becker, WA1MEE, Newton Centre, MA*

● I believe that RM-1633, if adopted, can prove to be a big boost to amateur radio. I hope that the ARRL will do all that is possible to support it. — *Paul Neuman, WB2HEO, Hawthorne, NJ*

. . .OR SPECTRUM POLLUTION?

● A petition (RM-1633) has been filed with the FCC proposing creation of a "hobby-type" radio service in the 220 MHz amateur band, which would require no code or technical examination. The petitioner, a radio magazine publisher, cites the potential $100 million equipment market this service would open up via the proposed 100 watt narrow-band fm technical standards.

Basically, this petition is a blatant attempt to commercially exploit almost 5 MHz of precious radio spectrum. In exchange for anticipated equipment sales of $100 million plus added millions in licensing fees the petitioner would create a service capable of completely polluting this portion of the radio spectrum in short order.

Aside from commercial considerations, what needs will the proposed service fulfil? With no code or technical requirements the "hobby-type" license will simply create additional vast numbers of "10-4" button pushers. To consider these people a pool of technical talent is obviously ridiculous.

A hobby-type radio service has been available since the beginnings of amateur radio for those who are really interested. Yes, some study and effort are necessary to earn a ham license — but then, almost every serious hobby requires some study and practice for attainment of proficiency and full enjoyment; otherwise, the activity is merely a diversion.

The radio spectrum is a natural resource, as are our lakes, rivers and streams. Hopefully we are now starting to clean up the latter. Let us not permit increased pollution of the former. — *Jack Najork, W2YT, Westfield, NJ*

● This RM-1633 petition to drop the code test and technical examination, to "help promote engineers and technicians" is an insult to one's sanity. Any teenager who has an engineering desire or ability welcomes a chance to prove this by submitting to the code and theory examination. My daughter (WB9CTK) who is 15 years old passed this test as many others have because she and they had the desire to obtain this privilege by putting forth an effort. Those who favor this petition RM-1633 are surely poor material for technicians or engineers by admitting an inability to put forth this effort. — *Albert M. Hillberry, WA9WDA, Blue River, WI*

● I am selfish about the vhf bands. They are a resource that are often taken for granted. We hams had to work hard for our tickets. The CBer only has to fork out a few bucks to obtain his license. Let us keep amateur radio for hams, not for "Appliance Operators" who know only how to "Plug it in and Turn it on." We are one close-knit fraternity and we must stay that way. — *Don Brown, WA@ZSY/4, Key West, FL*

● I think the time is now for unity between all of the ham radio operators to ban such action to get CBers on any ham bands without giving them the proper license exam like the rest of licensed operators on the Amateur Radio bands. Tune across the 11-meter band sometime and listen to the foul language being used, the length of the QSOs, no call signs, CBers talking to skip stations, illegal power used, and many more offenses that happen day after day. If the FCC permits the CBers on our vhf and uhf bands, that's the last straw! — *Daniel B. Atwell, Jr., WA9WVX, Chicago, IL*

● I personally am a user of the Citizen's Radio Service and support its basic use which is supposed to be short range communications for the general public. However, it does not take a genius to recognize the fact that this service is being abused. As I understand it, this petition is supposed to be a try at removing the hobbyists from CB and allowing them to do as they please on the new band. This does not make sense!!! — *Larry Scott, WA9ZRS, Herrin, IL*

● "League Lines" of August *QST* really burned me up. CBers should not get any more frequencies until they clean up eleven meters! — *Eugene Hult WA@VJG, Centerville, SD*

GETTING THERE, 3RD CHAPTER

● Quoting from *Technician-Engineer*, May 1970:
In Washington, D.C., if you have doubts about the slowing up of mail service these days, maybe this will convince you. The Post Office & General Service Maintenance Employees Union discontinued the semi-monthly newsletter it has been sending to its members because of "The inability of the Post Office to provide effective delivery." — *Dennis Lindner, K3NPL, Towson, MD*

DILEMMA

● Looking at *QSTs* of the 1950s and *QSTs* of the present, one sees the decline in equipment available for the amateur. In the past many varieties of moderately-priced equipment were available. Today if you can't afford, or don't want, a 600-dollar transceiver you may as well give up hamming. (Two companies, Heathkit and the QRP newcomer Ten Tec, do provide decent low cost equipment. But Allied Radio, which also has low cost equipment, has been bought by Radio Shack, Inc., an organization that is not very interested in serving the amateur market.) So the amateur, who is supposed to be a technical and operating innovator, has almost no choice in the type of equipment he uses.

What about the homebrew route? That is an even worse situation. Few "electronics" stores stock even such ordinary parts as Air Dux coils. *QST* construction articles warn the reader that parts are nearly impossible to obtain and that esoteric manufacturers must be contacted directly, by the ever-speedy U.S. Mail. So the homebrew experimenter is frustrated at the start of his efforts.

This is a ridiculous situation. It is as hard to get radio equipment in the United States as it is in Poland! — *Nickolaus Leggett, WB9BVI/1, West Tisbury, MA*

[EDITOR'S NOTE: This dilemma is thoroughly aired in the Doug DeMaw article, "The Ham Builder's Nightmare," in this issue, with some partial solutions.]

Hamfest Calendar

(Continued from page 52)

New York — The annual Syracuse VHF Roundup will be held at the Three Rivers Inn, Route 57, 10 miles north of Syracuse on Saturday, October 10. Reservations and information from Charles Sellwood, W2RHQ, 902 1st North St., Syracuse, NY 13208.

New York — The 23rd Annual Meeting of the QCWA will be held Friday, October 2 at the Engineers' Club, 32 West 40th St. in New York City. Members, their ladies, and guests will assemble at 5:30 P.M. for cocktails. Dinner will be served by 7:00 P.M. The program will include showing of the new ARRL film, "Ham's Wide World." Tickets are $9.00 per person. Reservations should be made at once through W2PF, W2NQR, W2KW, or to QCWA, Inc., P.O. Box 394, Mamaroneck, NY 10543. This dinner-meeting is being sponsored by the Metropolitan N.Y. QCWA Chapter.

Oklahoma — The annual Hamfest at Lake Texhoma Lodge on Lake Texhoma, near Kingston, will be held November 13, 14, and 15. All programs will be indoors with entertainment for all. There will be the customary technical discussions, swapland shop and display tables provided free if you are registered at the lodge. For more information write Ray Bryan, W5IQ, Box 246, Kingston, OK 73439.

Ontario — The Windsor ARC will be hosting the annual Radio Society of Ontario convention October 23 and 24 at the Holiday Inn, Riverside Dr., Windsor Ontario (across the river from Detroit Mich.) Registration is $4.00 for OMs, $3.00 for YLs, and $2.00 for students. Talk-in on 75 meters and 2 meters. Program for the ladies, manufacturer's displays. Tentative forums include R.S.O., ARRL, Antennas, ATV, FM, Servicing and Homebrew, RTTY, Solid State, and more.

Pennsylvania — On Saturday, October 10, the Radio Assn. of Erie will be holding its annual Dinner Banquet. For additional details write The Radio Assn. of Erie, c/o John Gebler, P.O. Box 844, Erie, PA 16512.

Tennessee — *Mem-Fest 70 sponsored by the* Greater Memphis Amateur Radio Council will be held October 3 and 4. On Saturday, the banquet will be held at 7:30 P.M. at Pappy and Jimmies Restaurant, 2462 Poplar Ave. There will be a showing of the ARRL film, "Ham's Wide World" and there will be an Army MARS meeting. On Sunday at the State Technical Institute at Exit No. 11 on Macon Rd. or Interstate 40 at first Exit, there will be the Hamfest. Registration is at 9:00 A.M. Bring your own picnic lunch or use restaurant facilities nearby. For room or banquet reservations write Mem-Fest 70, c/o Delta ARC, P.O. Box 16343, Memphis TN 38116. Talk-in on 3.980 MHz or the Memphis 2-meter repeater on 146.34 MHz in, 146.94 MHz out.

Texas — The Brownfield Free Swapfest is scheduled for October 24 and 25 in Brownfield. QST

1st ARRL 160-Meter Contest

'TOP BAND' TEST DECEMBER 12-13

At its' May 1970 meeting, the ARRL Board of Directors authorized a brand new event, a 160-Meter Contest. Guidance for the contest has been furnished by the ARRL Contest Advisory Committee and numerous "top banders." Based on their recommendations, an *initial* format has been developed with some interesting twists!

Curiousity piqued? Read on!

Rules

1) This contest will start at 0001 GMT December 12 and end at 1600 GMT December 13, 1970. This is a 40-hour period with no limitation on operating time. Cw only.

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

3) Multipliers are the 74 ARRL sections, plus VE8. One additional multiplier may be claimed for contacts with foreign countries (i.e. if three different 160 meter DX countries are worked, the "additional" multiplier is still just one). Thus, the maximum multiplier possible is 76 (74 sections plus VE8 plus DX).

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

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

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

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

8) Entries become the property of ARRL, none can be returned. Awards Committee decisions are final. Send an addressed stamped †10 envelope for appropriate entry forms. All entries must be received at ARRL Hq. no later than Jan. 11, 1971 to be eligible. Mail entries, photos, soapbox, ideas for contest improvement, etc. to ARRL, 225 Main Street, Newington, Connecticut 06111.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whereas:

Remember Tom Sawyer's fence? The main problem faced by a DX editor these fabulous DX days is just getting out of the way while the gang does his work for him. Thus we periodically demonstrate our dispensability by turning these proceedings over to your contributorial committee. You know, *vox* **DX** *populi*, a twirl of the beam in the "How's" roundtable for short and long skip alike. . . .

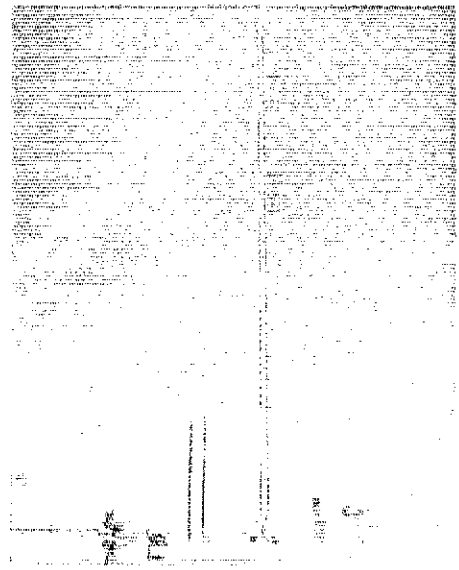
Lots of renewed DX activity here and even KP4WD is chasing rare ones after a five-year layoff. – *KP4BJM*. . . . If the Old Man were around today he would go after "QSO managers" with his wouff hong. – *W1ESN* . . . This "list" business may be getting out of hand but every day you hear 'em lining up. – *W3HNK* . . . I heard a W5 tell UR2TAX "your call sure is familiar to me." – *W1PL* . . . Eighty/sixty worked/confirmed in 18 months with a TR4 and attic dipoles on 10 through 40. – *WB2IWH* . . . Space restrictions and frequent moves make a difficult antenna situation. – *KA2DW (K5QIG)*. . . . GB2USA, our Plymouth Radio Club "Mayflower '70" station, was on ssb in July and August. – *G3SPI*. . . . I've been hearing good DX like KP4DJ going to waste on the 7-MHz Novice band. – *WN0VIF*. . . . A most enjoyable QSO with XE2OU on 40 cw. – *WN4OJD*. . . . I'm keeping regular schedules with KX6DR to help his QSLing. – *WA5UCT*. . . . It's been a long time since we were neighbors in my W9MUB days. – *W1MIJ*. . .

I've shifted DX activity from 15 to 20 meters to keep those DX QSLs rolling in. – *WB2DRS*. . . . Just finished my own version of the "Ultimate Transmatch" in July *QST* and it works like a charm. – *W6EAF*. . . . My 20-foot-high dipole treated me to 54 countries, 34 confirmed. – *WA1KZE*. . . . There is no substitute for lots and lots of listening; it's surprising what the howlin' mob doesn't hear. – *K2QBW*. . . . This month's WADM Test rules are the same as last year except that DMs will send kreiskenner numbers. – *DM2AAO*. . . . They'll go well in our kreiskenner collection – *W9BRD*. . . . After you learn how to spell it. – *WB9CIS*. . . . Found ZF1CC QTH tipoff in a '69 contest scores listing. – *K6SSN*. . . . As QSL manager for two VKs I'm working up to something rarer. – *WB6RIU*. . . . My first six August QSOs were a "WAC". – *W5IB*. . . . As a cw man I'm understandably proud of my CEØAE and KX6DR sideband QSOs.

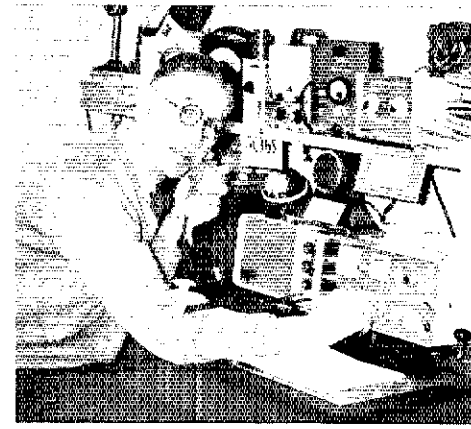
W5BZK. . . . Five months with a DX-60 and TA-33 brought me 78 countries on all continents. – *WAØZLU*. . . . Failed to confirm only five of the 154 countries I worked as KR6TAB, *KH6BJY/W6*. . . . After 5B-DXCC No. 37 I'm still shooting for more countries on each band. – *W1WQC*. . . . Met YNs ICOF IFP ITAL 4AC 4ICC 4JAB and 4JAM while visiting Nicaragua as HT4IM. – *W5QPX*. . . . If we really were meant to talk like ducks wouldn't we have feathers? *WB9BBC*. . . . Retired as of March so I now manage to get on the air once in a while. – *W1WY*. . . . Re G2MI's August comments on International Reply Coupons, the U.S. *Postal Manual* is quite definite in its premise of "other" countries. – *WA6AUD*. . . . Got my old DL5KS call back with intentions of finishing DXCC from Germany. – *WB4APC*. . . . June and July were fine DX months for my DX-20, SX-24 and dipole on 20 cw. – *WA5YLM*. . . . To me the most interesting ham is the well-rounded type who

* 7862-B West Lawrence Ave., Chicago, Ill. 60656.

KJ6CF's shack and skywires decorate your "How's QTH of the Month, sunsoaked Johnston Island. There KH6HET, W6PVQ, logger Bob, WB6GHG and logger Wayne (left to right) joined by WAs 4VHH ØTIE and WB6LOC at neighboring KJ6BZ, scored about a thousand contacts during a solid 24-hour marathon last Independence Day. Most space-starved Statesiders would settle for feeding just one of the guywires on that 300-foot stick. *(Photos via KH6BZF, W1YYM)*

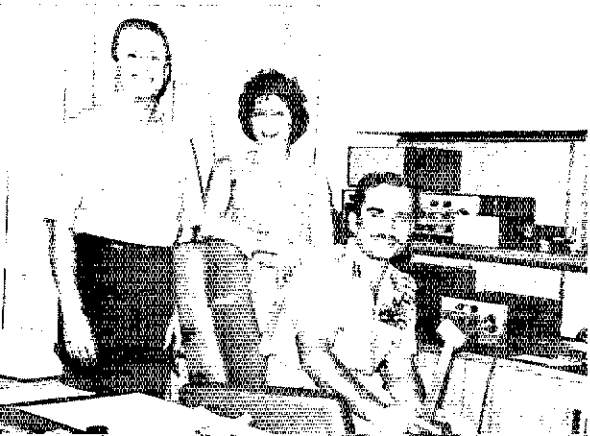


works both phone and cw. — *W7JAC*. . . . My 25-foot-high 7-MHz dipole does great both on 15 and 40. — *WB2JYM*. . . . If local interference on 40 isn't too bad we'll try some operation on that band later this month as W2UXP/KH6. — *KH6HCM*. . . . OK2BJR pleads for unneeded ham magazines, catalogs and tech manuals. — *I4EAI*. . . . It would be extremely unfortunate if DY5AD's experiences with false QSL promises by W/K hams become wide spread. — *W3CDE*. . . . Licensed since '67. I'm just beginning to enjoy the wounderful world of 21-MHz cw DX. — *WA9WKJ*. . . . Got my General in June and will try both phone and cw DXing. — *WB2JNA*. . . . BT1PK's 20-meter cw signal fades properly but is he for real? — *K5RPE*. . . . Summer 14-MHz conditions were generally blahh during daylight hours. — *I4TBAF*. . . . Ten was frequently open for north-south ssb work this summer but we could use more activity in Central and South America. — *W8EFW*. . . . My vertical is frustrated by aluminum-sided houses but does okay with 200 watts on 20. — *WA9YZD*. . . . Twenty cw on July 7th got hot enough for a CE0 and ZK1. — *WB8EAS*. . . . MP4BIJ started up on 15 phone in mid-June. — *WA3KSQ*. . . . Excellent 160-meter coverage in July's "How's" and the band should be peaking for DX by October. — *W1BB*. . . . How does anybody get QSLs from certain XF4s? — *W2KXK*. . . . Still having fun without my old antenna farm but no startling DX to report. — *W2DY*. . . . Those May DXHPDS meetings are great but the poems are too short. — *WA4ZZU*. . . . Those May DXHPDS meetings are great, but the poems" — *S. Nutt*. . . . Grand Cayman, only an hour and a half by plane from Miami, is wonderful for swimming, fishing, skindiving and, of course, ham radio. — *W4YKH/ZF1WP*. . . . I'll be back after DX this fall with a new triband vertical and a souped-up receiver. — *WA1JKZ*. . . . HQ2R is my nomination for your QSL bouquets list. — *WB4GAH*. . . . Skunk cabbage and rotten eggs to nonQSLers [bleep]. — *W8BJ*. . . . Trap troubles are apparently giving me a beam problem. — *WA2FOS*. . . . My ten-cent dipole still hits the DX jackpot on forty. — *W8YGR*. . . . Terrific 14-MHz signals from the AX/VK boys help toward WIA's Captain Cook award. — *W9LNQ*. . . . Since 10 and 15 are dead today I'll help you fill some *QST* space. — *WA5SOG*. . . . The 15-meter Novice band sure was loaded with nice DX last spring. — *WN0YMC*. . . . Has ten cw really thrown the big DX switch to lower bands? — *WA2HZR*. . . . Yes, will 28 MHz come back this season after that sharp April drop-out? — *WA9SQY*. . . . Trying for another DXCC from New England after much



GC3GS pops up on any and all DX bands from Jersey. Archie, 72 and retired, has a host of global friends after 32 years a ham.

DXing as W8CAG. — *W1FCC*. . . . ZD9BM complained about lids who call and call after hearing "KN". — *W4YOK*. . . . While stalking VQ8CD on 20 cw I ran across VQ8s CFB and CR. — *W8KZO*. . . . Still manage to snare a few on 15 and 20 with 150 watts and a low 2-element Yagi. — *WB9AVY*. . . . My downhill back yard makes my dipole actually lower than my NCX-500. — *WA2YWR*. . . . The Isle of Man has been eluding me on cw for ten years. — *WA4CZM*. . . . YO9HO puts through a consistent signal on 40 cw with his 25 watts. — *DE3GHO*. . . . First time I've sent you a report but we've never heard such DX before in New Mexico. — *W5GB - W5KKW*. . . . An HW-16 and dipole on 15 got me 55 cw countries in six months. — *WA2KEA*. . . . Sure hope ten opens up again for all those cw Europeans still needing Arkansas. — *WA5YJW*. . . . Here's some Pennsylvania stuff that may help someone. — *WA3JGY*. . . . Fairly new to 15 and hope to have more DX dope next report. — *WA5ZEH*. . . . Worked six continents in fifteen minutes on 20 cw last April. — *K4TWJ*. . . . QSLs have been pretty interesting lately so I'd better get back into the old DX ball game. — *WA3IIB*. . . . Most 15-meter DX for Novices is found below 21,140 kHz. — *WN9CDR*. . . . It takes only four minutes to go from our Capitol Hill Amateur Radio Society's QTH to the U.S. Senate floor. — *W3USS*. . . . School vacations mean DX time for my Apache and multiband dipole. — *WA1IRY*. . . . Nice DX on 10 and 15 cw between classes at Iowa State. — *WAØPXT/Ø*. . . . Week-end mornings are fine for DX on 15. — *WN4OFO*. . . . I'm taking a sudden hard look at DX after many years of ignoring it. — *W2FMX*. . . . Fifteen gets so amazing I thought I'd drop you a line. — *W4ZYT*. . . . I'm rapidly becoming another 40-meter DX fanatic. — *WA1JMR*. . . . Say, forty's getting mighty exotic! — *W9EY*. . . . Recent 7-MHz DX here includes plenty of JAs. — *WA5UAX*. . . . After retirement as a Novice I've been hitting 20 DX with an Advanced license. — *WB4JYB*. . . . Not a big DX chaser but your pages keep me informed. — *WA8TDY*. . . . School keeps me from reporting



JY1, Jordan's King Hussein, was gracious host to W3GE and WA3HUP, OM and XYL, during their recent nine-day visit. Since then JY1 has added Collins gear and is joined by JY2, Princess Muna, on 14-MHz sideband. Charlie and Mary Ann may revisit their royal amateur friends next spring.

more often but I still dig for DX. – *WA3GVP*. . . . ZD9BN was rare DX on 50-baud RTTY. – *K6RF*. . . . Thanks for the steady QSL info that keeps 'em coming in. – *WB2DCH*. . . . Any departed Nigeria licensee may reclaim his original call on return. – *5N2ABG*. . . . My OM, WAØERA, wants to be sure we don't accidentally work a "forbidden" country. – *WAØMNL*. . . . Many thanks for the fine ARRL Old Timers Club certificate. – *GC3GS*. . . . We'd get a lonely feeling out here at KG6NAA without that copy of *QST* each month. – *W4GWN*. . . . Conditions and activity quite low here in early August. – *W5JPC*. . . . I'm appalled at the number of DXers who apparently do not need the Bahamas. – *W4BRB/VP7*. . . . Just returned from a visit with JAs 1SGX 3AMQ 3IG 3OI 3USA and 3XPO. – *J. Simon*. . . . Signed AX3BGB in recent Pacific operations. – *K4II*. . . . May go to Navassa for some action in the near future. – *WB4FTR*. . . . I'm greatly interested in managing DX QSLs. – *WN8GRH*. . . . I work only 15 cw and hear good DX around 21,120 kHz. – *WN7OCL*. . . . Twin-City DX Association presented W4IDG with a framed scroll expressing admiration of her ex-

VP2GBR regularly presents Grenada to DX hounds all the way down to 160 meter. Dave signs G3UUR when home. *(Photo via WIBB)*

cellent operating as 9N1RA. – *WØYDB*. . . . Having been born and raised in China I'm very curious about BT1PK. – *W8BKK*. . . . I doubt if KL7AIZ believed I worked him with an input of only one watt. – *W6CIS/7*. . . . ZY2DTV QTH info was hard to find. – *W9OLW*. . . . I'd be very glad to help missionary DX ops with their QSLing. – *WA9ZQJ*. . . . Local 300-kW bc station QRM prevented us from helping 5B-DXCC hunters on 40 and 80 at C31CT. – *DL4ER*. . . . I'm also active in Air Force MARS work. – *DL5LC (WA8WNK)*. . . . A photo and letter with my QSL to JY1 brought back a registered reply with photos and QSL autographed by King Hussein. – *K1DRN*. . . . Where were all the YLs in our 10-through 40-meter July 4th QSO party? – *KJ6BZ-KJ6CF*. . . . OD5BZ's beam gets an excellent northwest shot from Beirut. – *HB9ANR*. . . . Hope to QSO W1AW before leaving Thailand in October. – *HS4ACE (WA3KXP)*. . . . VU2TG, an electrical engineer, is highly skilled at homebrewing. – *VU2JN*. . . . King Hussein's secretary and JY1 QSL manager, Patricia Salti, recently visited the U.S.A. – *WA3HUP*. . . . Please spread the word about our Rome centenary award. – *IRØPEP*. . . . Fine ham hospitality from VP2s DAE DAJ LB SF SAM, 8P6AH, 9Y4s BW KR LA VT VU and others while operating in the Caribbean this summer. *VE3GCO*. . . . Those commemorative calls just confuse things. – *XE1BN*. . . . Had a wonderful time as YA2HWI/1. – *K9HWI*. . . . I'll be assigned to Saigon for a couple of years. – *W6BPO*. . . . HS6ADE is my next door neighbor when home at WAØDYU. – *KØBHM*. . . . Getting my Stateside equipment together after closing down KR6JV. – *WB2INT/4*. . . . BY1D claims there are several active hams in Peking. – *W2BTQ/4*. . . . I do Univac field engineering in Canada. – *AP2LQ*. . . . UAs and OKs don't say much but they're appreciative listeners. – *WB6P4V*. . . . Our OJØDX group used Market's lighthouse generators but we had to supply the fuel. – *OH2NB*. . . . After a hundred countries on 7 MHz my dream is Five-Band DXCC. – *YO7NA*. . . . A letter form ON4FJ tells of his FØWV trip to Corsica. – *W3OCW*. . . . QSOs with club stations OX4s EDR and HAM count five points each toward BIA. – *OZ4PM*. . . . WAEIP and WAEIC hunters be advised Ireland has four provinces and twenty-six counties. – *EI2CC*. . . . For DARC field day portable locations the minimal distance to the next inhabited building is 100 meters. – *DF7JC*. . . . DK2UN, DLs 8FC and 1YA won our first three DIG trophies. *DLØXN*.

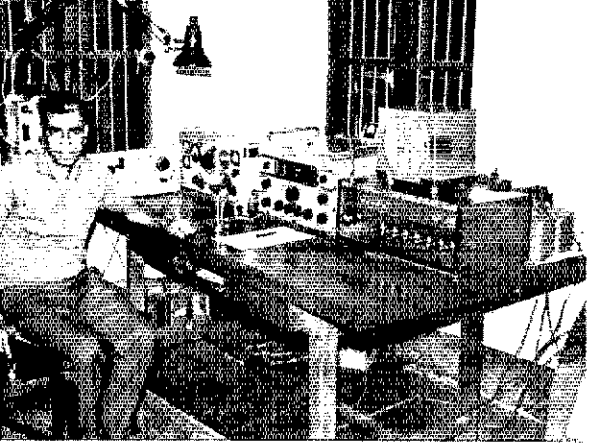
Where:

ASIA – "Anyone needing QSLs for my KR6TAB contacts between January, 1963, and March, 1970, should apply to my California address," invites KH6EJY/W6. "No self-addressed stamped envelopes or International Reply Coupons are needed although stamps from the various countries are welcomed." – – – Okinawa Amateur Radio Club, P.O. Box 465, APO, San Francisco, Calif., 96331, is the current bureau address for KR6 QSLs – – – W1NYA, QSL aide to TA3AY, received his first log shipment in mid-August – – – JA3IG's W/W QSOs dating after August 1, 1970, can be confirmed through Jim Simon, P.O. Box 109, Herndon, VA., 22070 – – – LIDXA's *Bulletin* mentions continuing efforts by WB6NDE to retrieve his 1966 BV1USF logs – – – K4MQG, tender of QSLs for MP4s BHH MBB QBK and others, changed address to 801 Chelwood pl., Charlotte, N.C., 28210.

OCEANIA – "Perhaps you might like to make mention of my correct QSL address," chides AX9AC, victim of various incorrect specifications. "I have no QSL manager and my address is T. Ivins, P.O. Box 5122, Boroko, Papua." – – – WA3HUP's term as KM6CE QSL representative begins with QSOs of February 28, 1970. Mary Ann also assists KC6BW – – "I'm now QSL manager for KX6s DC and DR," affirms WA5UCT, "and have their logs for the past two years. Requests without s.a.s.e. are answered via bureaus." – – – "QSLs should be received from VK9MS shortly," cheers K7BFL, promising prompt relay on arrival – – – YB1BM writes, "I confirm that DL7FT is my world-wide QSL manager beginning May 13, 1970."

EUROPE – "There are a few exceptions to the new Russian callsign system," finds K3CUI. "These include calls of the Central Radio Club (UK3A, B and F) and of magazine *Radio* (UK3R). Both activities are in Moscow." – – – WA3HUP, who also manages QSLs for CTs 1LN 1OF 2AA and 2AP, takes over M1B chores for contacts on or after November 1, 1969 – – – WN7OLT has UFTU logs dating from July 28, 1970, for W/W QSOs only – – – DL5LC accepts QSLs sent to his WA8WNK home QTH, via CMR Box 518, APO, New York, N.Y., 09332, or to 6239 Diedenbergen, Hasengasse 3, W. Germany, depending on your mailing point – – – Those 4N2 folks were YUs doing their thing on various Dalmatian islands this summer.

WHEREABOUTS – Yanks and Canadians may QSL K1WKK/T12 via K1ZND for QSOs after



VU2TG enjoys working the States on 20 cw with a homemade 150-watter, AR-88 and three-element rotary from Kottayam. The beam with exterior architecture shown here, however, is that of Guhan's friend and neighbor, VU2JN. The big Yagi was fired up just in time for the '70 ARRL DX Text with proxy assistance by W3AU. *(Photos via VU2JN)*

August 5, 1970. Dave's new address is P.O. Box 17401, West Hartford, Conn., 06117 — W4BRB is surprised that only forty QSL applicants showed up after 200 W4BRB/VP7 QSOs on 160 meters last October. Gene offers, "Special cards for my Bahamas work are available on receipt of correct QSO data and s.a.s.e." — — — VE3GCO will take care of QSLs for his July-August QSOs from VP2s DAE, LC SM and 9Y4VE; VE3EWY likewise re VP2s DAJ LY SN and 9Y4RK — — "I realize that an ardent DXer can go to the poorhouse if he mails each and every card airmail," agrees W3CDB. "There are alternatives open to him. Firstly, he can be more selective in his contacts, QSOing only those stations from which he would appreciate confirmations and for which he is willing to spend stamp money. Secondly, he could space his mailings apart, putting several cards in single envelopes." — — — "QSLs will be sent 100 percent," guarantees HP1AC concerning recent HP8C emanations — — — Ws 5JPC 7JAC, Ks 5QFG 8RXD, WAs 1KZE 2LJM and 7MMK nominate AX3DG, CR8AI, EA9AQ, FY7YG, HP1BR, JA3ULU, KC6WS, KH6FE, OK1DN, VU2LE, ZE2KV, ZMs 1BN 1AAF/k 3PO/c, ZP9BG and 9V1OJ, plus QSL agents W3HNK, WA6MWG and ZL2AFZ, as our "QSLers of the Month" for fast confirmation comebacks. Any recent commendables in your file? — — — Halp! WA7MMK is stuck for an XF4KJ QTH; WA0SDC needs a push toward KS6CI. '67 and VP8IY '67 affidavits; WB4KMH writes askance re TR8CQ; KH6FJY/W6 (then KR6FAB) wants late word on DU7GB, FR7ZR, HC2WN, UC2AA, VE3FJZ/SU and 6OJWF. Any 'alp? — — — WA9ZQJ, WB4KMH and WN8GRH offer to act as WSL helpers to overseas ops in need — — — Don't omit those s.a.s.e.s, or s.a.e. plus IRCs when appropriate, in mailings to QSL expediters, OMs.

HS4ACE (WA3KXP) is due for shutdown at the end of this month near Sakon Nakhon. Paul has a quad on 15, dipole on 20 and several 75-kilowatt generators to keep his pop cool.

SOUTH AMERICA — Everybody's doin' it. Former HK3AFX wants it known that he's now HK3GR — — — According to G. Watts's *DX News-Sheet* YV1YD has HC8RS logs going back to 1967 — WA3HUP's tenure as CE0AE QSL agent commenced June 23, 1970 — — — Peruvians signed their OB prefix in late July coincident with an independence anniversary. Colombian HKs switch to 5J and 5K occasionally, and YVs try 4M labels. Your ARRL *Handbook's* listing of international prefix blocks usually unravels such puzzlements promptly — "Please run my new address a few times" is a not uncommon request received. Glad to, but no more often than every six months as a rule, and only then if the *Callbook* hasn't picked it up — — — Now for individual items, keeping in mind that each is necessarily neither accurate, complete nor "official". . . .

A2CAK, Box 23, Gaherones, Botswana
AX9ES, Box 1124, Lae, T.N.G.
CE0AE (via WA3HUP; see text)
CE2s AA AP (via WA3HUP)
CX5BBV, P.O. Box 37, Montevideo, Uruguay
DK2s WV/CN8 XN/CN8 (to DK2s WV XN)
DL5LC (to WA8WNK; see text)
FK8KAA, Box 28, Noumea, New Caledonia
FL8LM, P.O. Box 468, Djibouti, Fr. Somaliland
HB9XKW-HB0XKW (to WA4WME)
HB9YC/4W, G. Burch, Box 126, 6903 Lugano, TI, Switzerland
HI8MMA, Box 951, Santo Domingo, D.R.
HK3BZK/W2, H. Londono, Aptdo. 12490, Bogota, Colombia
HK3CCS, P.O. Box 11717, Bogota, Colombia
HS4ADB, P.O. Box 3282, APO, San Francisco, Calif., 96310
HT1AJP, Aptdo. 434, Managua, Nicaragua
JY2, Box 1055, Amman, Jordan
K1WKK/TI2, G. Fowks, Box 2412, San Jose, C.R. (see text)
K4II/KH6/KS6 (to K4II)
KC6WS, W. Sedore, P.O. Box 185, Yap, Western Carolines, 96943

KH6FJY/W6, A. Edwards, P.O. Box 1478, Los Gatos, Calif., 95030
KH6GLU, E. DeYoung, 95213 Waimeli pl., Waipio, Hawaii, 96786
KM6CE (via WA3HUP; see text)
KM6DU/KH6 (via KM6CE)
ex-KR6TAB (to KH6FJY/W6)
KX6s DC DR (via WA5UCT)
M1B (via WA3HUP; see text)
MP4BIA, P.O. Box 116, Manama, Bahrain, Arabian Gulf
OA0BC, Aptdo. 1841, Lima, Peru
OE1s ZLC ZTA (to DL7FT, DJ7VY)
OH2BH/ZA (to OH2BH)
PA0GMM/OH0 (to PA0GMM)
ex-SV0s WDD WI (via WA3HUP)
SV0WY, Det. 15, 2140th Comm. sqdn., APO, New York, N.Y., 09223
ex-TA2SC (via WA3HUP)
TR8LB, Box 5050, Libreville, Gabon
VKs 3AYT 6 RZ (via WB6RIU)
VK9LL, Box 530, Rabaul, T.N.G.
VP2s DAE DAJ LC LY SM SN (see text)
VP8LQ, J. Adams, Moody Brook, Port Stanley, Falkland Is.
WA7ECT/KL7, V. Van Buren, Box 634, Amchitka, Alaska
YV3VN, Aptdo. 625, Barquisimeto, Lara, Venezuela
ZF1CC, Birmingham ARC, P.O. Box 6742, Birmingham, Ala., 35210
3V8AH, P.O. Box 780, Tunis, Tunisia
4N2s BR CI HV KR LO ML NV SO (via YU2NEG)
5A3TB, P.O. Box 2325, Tripoli, Libya

AC9A/br (via W2MZV)
AX3BGB (to K4II)
AX9AC (see text)
C31CY (via DL2LK)
C31DB (to F3YV)
C31DC (to F9IE)
CN8BN (via AAEM)
CR6GA (via WA3HUP)
FM0XF (to DL5RI)
HB0XID (to DJ2SX)
HB0XJF (to DL1GK)
HC8RS (via YV1YD)
HG100UA (via HSR1)
HK3GR (to HK3AFX)
HP1G/mm (via DK2AZ)
HP1XOD (to K4OD)
IIFTU (see text)
JA3IG (see text)
JD1ABO (via JA1BA)
JR1EAF (via JA1RJW)
KP6AL(via K3RLY)
MP4TCJ (via G3EIY)
OB4VE (see text)
OI9SUF (to OH2BBU)
OX5AP (via W3HNK)
PA6KM (via VERON)
PA0LJZ (via W3HNK)
PY1MIR/0 (to PY1MIR)
TA3AY (via W1NYA)
TR8JM (via DK2NU)
VP8LB (to G3URZ)
VQ9/A/f (via W2MZV)
VS5RG (via VE7BWG)
VS9MQ (via 9V1OY)
VU2IRA (via K6OE)
XP1AA (via W3HNK)
YT0M (via YU1BCD)
ZK1AJ (via KH6GLU)
3A0FJ (via W2GHK)
3B6CP (via W2MZV)
3B7DA (via 3B8AD)
3V8ZK (to F5ZK)
ex-5A3TX (via WA3HUP)
5J3CC (to HK3CCS)
5K3LR (to HK3LR)
ex-5L2BJ (via WA3HUP)
5X5MP (to LA8ML)
5Z4MD (via WA3NRV)
5Z4MO (via G3YWP)
6Y0UIR (via 6Y5RA)
7Q7JZ (via CR7FR)
7X3RT (via F5RQ)
9V1QA (via W6HRE)
9X5WJ (via W1MIJ)
9Y4RK (to VE3FWY)
9Y4VE (to VE3GCO)

Thanks for the foregoing suggestions go to Ws 1 PL 4YOK 5BZK 5IB 5JPC 5OM 7JAC 8BKK 9VRX 0YDB, Ks 5QJG 6SSN, WAs 1KQM 2JLM 3HUP, WBs 2JYM 4JYB 9CJS, KA2AA, WNs 7OLT 0VJF, VE3GCO, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore rd., Norwich, Nor. 72 F, England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), International Short Wave League *Monitor* (A. Miller, 62 Warward ln., Selly Oak, Birmingham 20, England), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall ct., Bellwood, Ill., 60104), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 698, Menlo Park, Calif., 94025), Southern California DX Club *Bulletin* (WA6GLD), UBA's *On the Air* (ONs 4AH 5VA), VERON's *DXpress* (Pa0s FX LOU TO VDV WWP) and West Coast *DX Bulletin* (WA6AUD). QTC? K!

\+ + +

Whence:

EUROPE – East Germany's Tenth WADM DX Contest, a code-only caper, comes off from 1500 GMT the 17th of this month to 1500 the 18th on 3.5 through 28 MHz. Each DM may be worked by non-DM stations once per band at 3 points per QSO, trading the customary RST001, RST002, etc., serials to which DMs will append *kreishenner* indicators. For final score multiply QSO points by the number of band-kreiskenners collected, and ship your log entry within 30 days to Radioclub GDR, DM Contest Mgr. DM2ATL, P.O. Box 30, DDR 1055 Berlin, E. Germany, to be eligible for certificate recognition of performance. At the same time you might make inquiry concerning the sponsor's popular SOP (Sea of Peace) certification, a diploma awarded for specified numbers of confirmed QSOs with countries bordering the Baltic.

\+ + +

We should be getting around to that promised 15-meter documentary next month with the aid of (cw) Ws 1BV 1PL4YOK 4ZYT 5BZK 5JPC 5OM 8KZO 8YGR 9LNQ, Ks 3CUI 5MHG/6, WAs 1IRY 1JKZ 1JMR 2BCT 2BHJ 2DFD 2FOS 2HDZ 2KEA 2YWR 3GVP 3JGY 5SOG 5UAX 5YMW 5ZEH 7CWM 9DQY 9TZD 9WKA, WBs 2DRS 2JNA 2JYM 4KZG 9AVY 9BBC 9CJS, WNs 2JQL 4OFO 4OJD 6KGQ 7OCL 7OLT 9CDR 0VJF 0YMC, VEs 3GHO 7BAF, IIER; (phone) Ws 1PL 2KXK 3HNK 4YOK 5BZK 5GB 5KKW 8YGR 9LNQ, Ks 4OI 4TWJ 8PYD, WAs 1JKZ 2FOS 3JHB 5SOG 9SQY 9TZD, WBs 2JYM 4KZG 9AVY. Later we'll give other bands their DX physicals thanks to (10 cw) Ws 1PL 4YOK 8EFW 8KZO 8YGR, K5MHG/6, WAs 2HZR 2KEA 5YMW 9SQY, WB4KZG, VE7BAF, IIER; (10 phone) Ws 1PL 3HNK 4YOK 5GB 5KKW 8EFW 8YGR 9LNQ, WAs 2FOS 4ZZU 5SOG 5YMW 9SQY, WB4KZG; (20 cw) Ws 1PL 2KXK 3HNK 4YOK 5BZK 8YGR; WAs 1JKZ 9TZD, WB4KZG; (40 cw) Ws 1PL 8YGR, WB2JYM, WNs 4OJD 0VJF; (40 phone) Ws 1PL 8YGR; (160) Ws 1BB 2BP, WB9BUV and other reporters to file. The DX water's fine – wade in!

OD5BZ tailors his speedy DX operating style for efficient accuracy. Note the headset and handy card index file. Bob's big sig comes off a set of rotaries atop the Material Research Institute in Beirut. *(Photo via HB9ANR)*

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* KØCER

Working Six-Meter Scatter

I WAS SURPRISED before the August Perseid meteor shower to receive a telephone call from a six-meter operator in Texas. He wanted to try a meteor scatter schedule during the shower to "see if we can make it." What surprised me was that this fellow has proven himself knowledgeable on propagation from his previous observations. I asked why wait until the shower. He wasn't aware that contacts of up to 1200 miles are possible almost any time on six meters using ionospheric scatter. This telephone conversation plus the obvious surprise of some operators I've worked recently on ionospheric scatter leads me to believe a few words about the subject is appropriate. Now that the prime *E* season is over, ionospheric scatter will be the primary means of working six-meter DX for the next several months, except for the expected fall aurora and an occasional *E* opening.

Ionospheric scatter is not generally workable by the transceiver crowd unless scatter conditions are especially good. Working scatter requires power for consistent results, 500 watts and a 6-element Yagi is a reasonable beginning, together with a low-noise receiver and a quiet location. A noise blanker is usually needed because the signals are weak, being in or just over the noise. Antenna height is secondary to these requirements.

The summer and fall months are best for ionospheric scatter, but it can be worked any time of year. Meteors are also more prevalent during these months and may help or hinder scatter work, depending upon one's point of view. Many scatter operators find meteor pings and bursts detrimental to concentrating upon the weak, fluttery residual signal typical of true ionospheric scatter.

Most scatter activity takes place on Saturday and Sunday mornings between 1300 and 1600 GMT. The hot-beds for this activity seem to be in Ohio, Texas, Illinois, and on the coasts. Anyone suitably equipped and within 1000 miles of these areas should be able to hear scatter signals. Some work is done on schedules using timed transmit and receive sequences common to 2-meter meteor scatter work. Short CQs with frequent listening periods are likewise productive on both cw and ssb.

Because the signals are weak, frequent information repeats are necessary. Many operators find slow-speed cw, 8 to 13 wpm, or slowly-spoken ssb to be the most successful. Cute phonetics are best avoided as they often tend to confuse. Headphones are helpful, their response is often better than most speakers and their use reduces room noise.

If you believe your equipment meets the requirements, give a listen. In the east and midwest you'll hear the signals of K8BBN, K8YUS, K8CLA, K8MMM, WA8PEB, W4GDS, W5OQN, K9HMB, WØPFP, K1JRW and others between 50.105 and 50.115 MHz. In the west there are many W6s plus others such as W7CNK, W7FN, W7UBI and WØMTK. You'll find these fellows reponsive to new scatter operators. If you don't attract their attention with your calls, you might give them a quick telephone call.

Unless the scatter signals are especially good, you won't carry on many ragchews. Typical exchanges after station identity is established consist of a signal report such as "42" repeated several times. This is more effective than the usual "your signal report is readability 4 strength 2." Location and name information may likewise be exchanged.

If you're wondering how some operators compile large section multipliers during contests when you have not heard the band "open," it was likely done on scatter. It is not too difficult to identify a station and then exchange contest information. A few such contacts will greatly increase your contest standing.

This is a once-over-lightly approach of the subject, but after your station and operating technique measure up, you'll find six meters is never "closed."

With many casual operators now using readily available commercial amplifiers for cross-town contacts, interference is becoming a problem in the popular scatter segment of the phone band. There is a move afoot to shift scatter operation higher in frequency, between 50.15 and 50.2. K8CLA edits

*Send reports and correspondence to Bill Smith KØCER, ARRL, 225 Main St., Newington, Conn. 06111.

Airline Captain Geoff Green, VS6DA, is active on 50 MHz from Hong Kong. Geoff frequently works Japan and recently made his first six-meter contact with Australia, VK8KK.

a newsletter giving information on times and frequencies of scatter activity. A self-addressed stamped envelope to Tom will bring you current information.

OVS and Operating News

50-MHz DXers are still scratching their heads over reports of Japanese stations being worked stateside during January, May, June and July. There have been too many to discount them completely, but we have yet to see QSL proof of any of these alleged contacts – and letters to the Japanese stations have brought no reply. Several of these contacts have been previously reported, this month we have several more.

WB4FTZ, Georgia, heard JV1IVC, Hiroshima, working a W4 on 50.23 a-m at 0130 GMT, June 29. WB4FTZ says, "what I heard *sounded* authentic, but then a good hoax should!". Just before hearing the JV1 station, WB4FTZ had been working WA5PDA in Oklahoma on *Es*.

Carl Williams, WA4IOP, Savannah, Georgia says he contacted JA1ILC at 0130 GMT, June 29 on a-m. The contact lasted about 15 minutes, but Carl has yet to receive a QSL. WA4IOP was running 25 watts of a-m. Carl says he understands the same Japanese station worked Miami and Oklahoma. WB4NDR, Jonesboro, Georgia, reports hearing apparently the same station, but copied the call as JV1ILC who said he was running 1500 watts.

WA7FHP, Great Falls, Montana told K7ICW he worked JH6BMF or JH6VMF at 0558 GMT, July 19. The contact lasted for several transmissions and the Japanese signal drifted in frequency between 50.123 and 50.125.

Several additional second- and third-hand reports have been received on similar contacts by stations in other areas of the United States, mostly Arizona, New Mexico and Texas.

In August we reported a station signing KS4ABX, supposedly on Swan Island in the Caribbean, had worked several stateside operators. At that time we questioned the authenticity of the KS4. We now have word from W4ZX1, who also holds the call KS4CF, that the "call KS4ABX and station are phoney." Russ says there has never been any six-meter activity from Swan Island. He makes periodic trips to Swan Island in connection with his work for the FAA.

Jack, K2OLS, had a very successful Grand Cayman operation in July signing ZF1AA. He made 409 contacts in 34 states, VE3 and KP4, and was heard in northern Alberta at VE6AHE. Jack caught a 5-hour opening to W1 and 2 on July 16 and the next day a 90-minute W6-7 opening. He believes there could be many fine Caribbean openings worked if the activity was there. He has written VP2AL asking that he use his six-meter gear and is trying to outfit ZF1GC, a permanent Cayman resident. Cards for ZF1AA should go to K2OLS with a stamped, self-addressed envelope. Otherwise Jack will distribute cards through the ARRL bureaus.

In other DX news, VS6DA (pictured elsewhere in this column) writes from Hong Kong that he and Bill, HL9WI, continue their schedules in hopes of working between Hong Kong and Korea. VS6DA reports activity in Hong Kong by VS6BF and VS6EK. He has hopes of activity from Laos and Thailand. The 50-MHz allocation in Hong Kong is 50.05 to 51.50. Geoff transmits on 50.1 and tunes 50 to 52 MHz. His antenna is a 5-element Yagi.

A solar flare during the third week of July was responsible for some exceptional auroral activity

Norm Foot, WA9HUV, near Chicago, recently completed this 12-foot homemade dish for use on 432 and 1296. The antenna, mounted on a 50-foot tower, allows solid ssb copy on 1296 at W9JIY in Indianapolis.

July 24-26. The most significant result appears to be VE2AIO's reception of the Iceland beacon station, TF3VHF, on 70.275 MHz between 0200 and 0221 GMT, July 26. The signals were weak but solid copy, T9 on c-w, and heard during a lull in nearer auroral activity. The TF3VHF beacon transmitter feeds two Yagis, one pointed on the United Kingdom and the second at Montreal with an estimated effective radiated power of *10 watts* in either direction! Geoff had heard broken signals at 0130 GMT, July 25, likely from TF3VHF, but the July 26 reception left no doubts. Needless to say, the reception has boosted VE2AIO's interest in the possibility of a 50-to-70 MHz contact between North America and the United Kingdom.

The aurora was worked from coast to coast. Here's a sampling. W6DOR (Sacramento area) worked VE6AHE, Oregon and Idaho between 0655 and 0730 GMT, July 25. This was only the third aurora opening he has heard in 8 years of California operation. At Seattle, W7FN heard aurora for three nights beginning the 24th and worked trans-aurora *E* to W8s on the 25th.

VE7AMP sends an interesting account of the aurora. On the 24th he worked W7FN and heard Montana, but nothing else. The next evening began slowly with aurora contacts into Washington and Oregon, but signals were strong. At 0345 GMT the band became quiet with no trace of aurora until 0600 when suddenly VE3CUA was heard in QSO. His signal was T9 with an unusual flutter, similar to mobile QSB. VE7ANP was unsuccessful in breaking the VE3 but was called by a Minnesota station and worked ten W8s and WA3HWB, Maryland. All signals were strong and steady, peaking due east. The eastern signals faded by 0638, Steve was also heard at K1JRW, Mass., who worked VE6AHE.

VE6AHE reports similar happenings, and also being mobbed by the W8 masses. Randy says he got a little "up tight" about some of the operating practices, after being passed from one to another like a ball. He heard or worked 12 states and 4 provinces.

Now a final quick look at this past summer's excellent *E* season, courtesy of WA1DFL, W1KZS, WA1IGQ, W2AXU, W3BWU, K7HIX/4, K4RNG, W4OIP, WA5IYX/5, WA6IYC, W6ABN, K6RNQ, W6YKS, K7ICW, K8UNV, WA9EFL, WØPFP, and VE2AIO.

WA1DFL says *Es* was the best he's heard in two years after working such as ZF1AA, Puerto Rico and W7s. WA1IGQ worked 28 consecutive 6s on

Junior, WB5AEH, was exceptionally active on 6 meters this past summer from Louisiana, joining the rapidly increasing number of 50-MHz DXers in that state.

July 19. W2AXU worked the West Coast on July 18 and 19. W3BWU calls for more 6-meter Caribbean DXpeditions between mid May and late June. Ed has 20 countries worked and confirmed on six meters. W4OTP reports that CO2CI, Havana, Cuba worked many stations from Florida to Michigan on June 28. WA6IYC heard or worked 34 states during the July 18-19 weekend in all call areas except KH6 and KL7. W6ABN commented on the July 19 session and notes likely reception of FG7XT on cw although signals were very weak. This is the first report on FG7XT this year. W6ABN also worked XE1GE and heard strong E backscatter. XE1GE had a good day on the 19th, working Nebraska and Colorado for the first time. Geoff was also worked by WBØAFL, S.D. K6RNO added ZF1AA to his log on July 17, making 19 countries on six for Bob. K7ICW also worked ZF1AA and then added VE1PL for the first VE1 AI has heard in 11 years of six-meter DXing. K8UNV worked VP7NA, Bahamas, July 9th and ZF1AA on the 15th.

We have another six-meter tropo report. WA2VZG worked stations from North Carolina north up the Eastern seaboard the evening of July 19. John says two meters was open also.

144-MHz meteor scatter fans found the reliable August Perseids a good performer again this year, producing its characteristic long bursts. Next month we should have a more complete summary, but early reports include K1ABR, Rhode Island, working KØCER, for South Dakota, giving Dick the number one position in states worked from the first call area, with 38. The contact took 16 minutes and was completed on a 15-second burst.

K1HTV, Meriden, Ct., mounted his 80-element moonbounce array on a rotator and 40-foot tower for the Perseids, and it paid off. Rich furnished the following detailed log of 144-MHz results. 8/8, 1200-1234 GMT — WAØCHK, Missouri, worked. 8/12, 0543 — heard KØMQS working K3ARN on cw, and WØLER, Minneapolis, working WA2DIR on ssb, on the same frequency. During this period WA1JLD and W1VTU worked K9KHW, Milwaukee. 0650-0715 — K9KHW worked, 2-way ssb. 0800-0839 — K5AGI worked (34th state for K1HTV) on 30-second burst, cw. 8/13, 0300-0330 — WØLCN sked, signals both ways, but no complete QSO. 0507 WØDRL heard. 0730-0736 — W5HFV, 1315 miles, heard working WA2UJM. 0744-0758 — WØLER, Minneapolis, worked on 55-second burst. 0800-0857 — W5UKQ, Baton Rouge, La., worked on 50-second burst; state No. 32 for W5UKQ, who heard K1HTV again at 0901, continuously for 2 minutes. 8/14, 0650-0703 — K2ZAT/8, cw-ssb QSO. 8/15, 1430 — WØNXF heard calling W2CUX.

August was productive for K1HTV in other ways. He worked WA3BAO on 432, for Delaware, his 17th state on that band, on the 15th. Sunday night, the 16th, he caught one of the best auroras he's experienced, in a session that ran from 8 p.m. local time through at least 4 a.m. on the 17th. Again, the moonbounce array for 144 worked well, and Rich heard stations as far away as WØCHK, in Missouri.

W2CUX, N.J., moved to 33 states worked by contacting K5AGI, Louisiana, and KØCER. The contact with KØCER took 2 hours and 15 minutes to complete on infrequent bursts. W2AZL and W2CUX scheduled W7JRG, Montana, and while no contact was made, both New Jersey stations made positive identification over the approximately 1700-mile path! W7JRG heard pings from the W2s and worked K6JYO, W9MAL, Illinois, and K2ZAT/8, Ohio. The contacts required from 16 to 90 minutes to complete.

In Texas, W5RAG tried ms for the first time and came away with 8 new states in a 24-hour period between August 12 and 13. Dick worked K8REG, WA9DOT, K9KHW, W9UNN, WØFRL, WØLCN and KØMQS, using almost totally automatic operation.

Earlier, W2CUX worked W5RCI, Miss., on July 25 catching a long, loud 1 1/2-minute burst. K7ICW, Nev., and WØLER, Minn., scheduled July 26-27. WØLER heard several complete sets of calls, but no contact was made.

In other 2-meter news, WA3HMK, Pa., reports good tropo on July 9, contacting VE1AFB and W1YTW, Maine. On July 11, he worked WA4WJP, N.C. K3CFA, also Pa., reports tropo July 2, 4, 12, 21, 24 and 25. W3BDP, Delaware, worked VE3CWT on tropo July 25 following the end of that night's auroral activity.

K7BBO, Tacoma, is ready for EME with a pair of 4CX250Bs and a 160-element collinear array. Dave says W7CNK helped design his moonbounce system.

220-MHz news is scarce. We know several stations ran ms schedules during the Perseids, but there were no early reports before our August 20 deadline for this column. W1AZK, N.H., reports working VE2HW July 23. W1AZK has worked 10 states and 375 miles with a single 4CX250B.

432 MHz was open on tropo in the east July 7-9 and K2RIW calls the opening "significant." Dick says W1YTW, Maine, began operation on 432 the night of July 9 and quickly worked N.Y., N.J., Conn. and Mass., with 2 watts from a varactor, and a single Yagi. On the 7th, K2RIW worked stations from Virginia to Mass., and on the 8th he worked the same areas and heard W4HJZ, N.C. Dick uses a 4CX250B stripline tripler producing 80 watts, and an 8-element Yagi 100 feet up. He is now preparing for 1296 operation. Dick reports that K2GOX has completed an 80-element az-el mounted array,

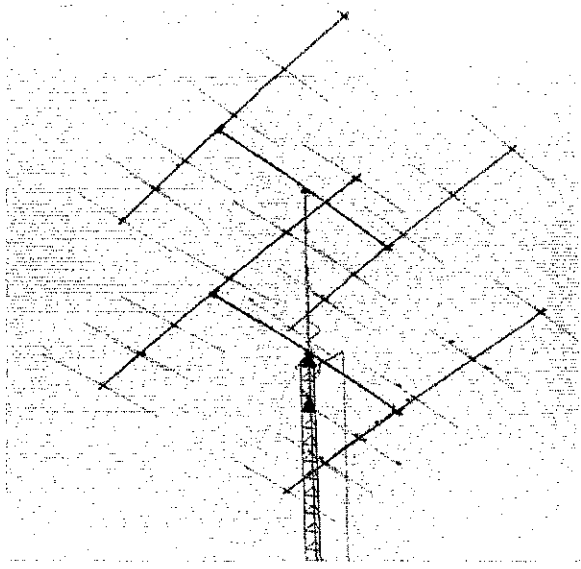
resulting in a considerable improvement in signal levels.

Al, K2UYH, has reached 19 states worked, adding W4VHH, S.C., and K4EJQ, Tenn. He is running schedules into the midwest, but says he has yet to hear a good tropo opening over that path this year.

Rich, K1HTV, sends an interesting report from Connecticut. His states total is now 16 after working West Virginia during the June contest. Delaware is proving difficult for K1HTV, although he has heard W3CGV several times. Rich says K3IUV is net control for Monday night 432 net. Time and frequency? K1SFF/3 is active in Eastern Pennsylvania. WA1JTK is experimenting with cubical quad antennas. K1HTV wonders why more operators don't check the bands before going to work, on mornings following good evening tropo. Conditions are usually just as good in the morning hours after down, and may be even better.

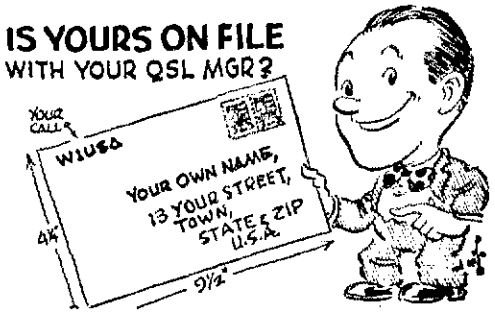
W4HJZ, N.C., recently completed a Heath SB-500 2-meter transverter for use as a tripling source to 432. Carl says he has improved the quality of his 432 signal and worked K4RKA/8 in West Virginia for state number 15.

1296 and Up is the territory for the hardy. WA9HUV, pictured elsewhere in this column, promises a construction description for his 12-foot dish. He and K2UYH are looking for a duct which could permit a Chicago-to-New Jersey 1296 tropo contact. Norm says W9WCD, DeKalb, Ill., contacted W9JIY, Indianapolis, on August 6 over a 225-mile path. 1296 tropo was also excellent in the East on July 10th. W1GAN, Salem, Mass., reports contacting K3IUV, Philadelphia, over a path of nearly 300 miles. W1GAN has some 100 watts output and a 4-foot dish, but K3IUV was running 5 watts output and a 3-foot dish! The same evening



This array may not appear too impressive to 2-meter operators, but this is the 6-meter antenna at WB5AEH, La. The antenna is 80 feet high, spaced 16 1/2 feet in each direction.

W1GAN also worked K2DZM, W2DWJ, W2DNG and K2UYH, all N.J. That contact between K2UYH and W1GAN gave the New Jersey station his 5th state on 1296. All of these are home stations. I wonder if a states-worked box for 1296 would serve a useful purpose? By the way, the 1296 tropo record, 400 miles, held by W6DQJ/6 and K6AXN/6, was set in June, 1959. QST



A.R.R.L. 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 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner).

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below.

W1,K1,WA1,WN1[1] – Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.

W2,K2,WA2,WB2,WN2 – North Jersey DX Assn., PO Box 505, Ridgewood, New Jersey 07451.

W3,K3,WA3,WN3 – Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4,K4 – H. C. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4,WB4,WN4[1] – J. R. Baker, W4LR, 1402 Orange St., Melbourne Beach, Florida 32951.

W5,K5,WA5,WN5 – Kenneth L. Isbell, W5QMJ, 306 Kesterfield Blvd., Enid, Oklahoma 73701.

W6,K6,WA6,WB6,WN6[1] – No. California DX Club, Box 11, Los Altos, California 94022.

W7,K7,WA7,WN7 – Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.

W8,K8,WA8,WN8[1] – Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, Ohio 43215.

W9,K9,WA9,WN9 – Ray P. Birren, W9MSL, Box 519, Elmhurst, Illinois 60126.

WØ,KØ,WAØ,WNØ[1] – Des Moines Radio Amateur Assn., PO Box 88, Des Moines, Iowa 50301.

KP4 – Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00902.

KZ5 – Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6,WH6 – John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.

KL7,WL7 – Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 – E. J. Fader, VE1FQ, PO Box 663, Halifax, N.S.

VE2 – John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 – R.H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4 – D.E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5 – V. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 – Karel Tetteliar, VE6AAV, Sub. PO 88, N. Edmonton, Alberta.

VE7 – H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 – George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

VO1 – Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland.

VO2 – Goose Bay Amateur Radio Club, PO Box 242, Goose Bay, Labrador.

SWL – Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1]These bureaus prefer 5x8 inch or #50 manila envelopes.

QSL Bureaus for other U.S.Possessions and for other countries appear in the June and December issues of *QST*.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Your Club Membership

WHAT IS a club? Broken down into bare definition it is a banding together of people who have a common interest and wish to meet together to share that interest. This group companionship can be the "our gang" type, or the most dignified formality. But formal or informal, tea and white-gloved dignity, or jeans and pony tail in the back yard – it's being a member and participating in something we enjoy. For we who are YL Amateur Radio Operators, it is sharing our experience.

What does it take to make a club? Ask any of the BAYLARCS, Alaska Lassies, YLRL, TOTs and all the other active YL groups. It takes *DOers*, women who are ready and willing to assume the responsibility of organization. It takes officers, gals who can assume the guidance of the club each year and maintain the activity that is vital to a live-wire group. It takes planning – e.g., the club awards and certificates and all the requirements for them. And that in turn takes committees, groups within the main body to act as custodians, handle the club publicity, the programs for the meetings as well as others to plan the activities.

It takes interest to hold a club together – more than just meeting with a common bond. The activity-planning, and the programs that are year-round work have to maintain that high rate of interest continuously. That is part of the answer.

There are two kinds of clubs within radio circles. There is the formal, monthly-meeting type that follows the plans of all clubs: business, program, social: and there are the informal organizations that are jsut as much a club as the gavel-and-business meeting type – i.e., the On-The-Air Clubs.

The gals who meet on the air are particularly unique in organization because of the membership and area that is covered. Ones like the MINOWS with gals in five states: WRONE, which as the name implies, includes all of New England; The TASYLS, Buckeye Belles, and Floridoras are clubs that exist on the air because they are state-wide and so that the gals within the state can get together and know each other by voices alone. Others such as the South African YLs, the Ontario Trilliums, and the newer Canadian CLARAS are national in scope with membership extending into other countries as well. The YLRL is world-wide. The Mid-West YL is one particularly outstanding group; it holds one meeting each year in the form of a convention as a meeting place for all the YLs in the central part of this continent. x For this type of club there is the semi-informality of net participation where the business meeting is brief, and the program is actually the social contact of YL and YL.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, Calif. 91001.

MINOW Net Picnic 1970. Front row: Verda, K7UBC; Jessie, W7TWQ; Bobbie, K7RAM; Tiny, WA7LOQ; Gladys, K7MFS. Back row: Beth, W7NJS; Jane, WA7FRM; Reida, K7PVG; Ethel, W7WLX; Lucie, WB6RFE; Joan, WA7BDD.

But the most important requirement for any club is being a member. Not all of us are DOers, in fact some of us would curl up and quietly roll away if we were asked to take an office, or line up a program or edit the club newsletter. But without the members there would be no one to enjoy the program, participate in the net or read the bulletin, for the attending members are the most important part of the organization.

A club is officers, and committee, and a meeting place and date. It is a business meeting and a program, and 99% of the time refreshments. It is planning and activities, and lots of active, willing gals with plenty of "git up and go" who make the plans and guide the club. And a club is membership. These gals are the heart of any club for they keep it alive by their interest and their presence.

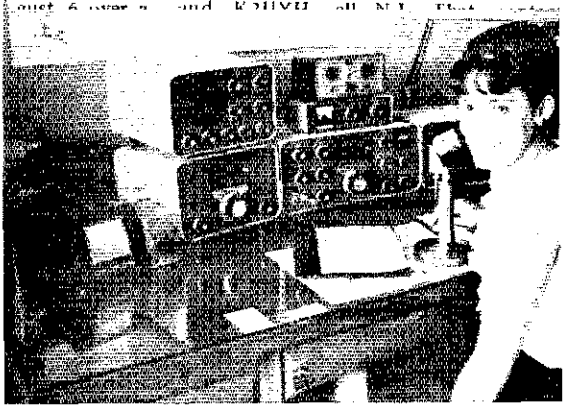
Trillium Weekend

Trillium Weekend contest will be held by the Ontario Trilliums from 0030 GMT, November 21, 1970, through 0030, November 22. Being the host club, the Trilliums will call "CW TW." All others will call "CQ TOT." Exchange signal report, name, QTH; the Trilliums will give their club number. Cw and phone contacts will count 5 points. Low-power multiplier of 1.25 for all transmitters running 150 watts cw or a-m, 300 watts p.e.p. and under.

Each Trillium station may be contacted twice — once on phone, and once on cw in the same band; or two phone contacts on different bands, and two cw contacts on different bands. No cross-band, or cross-mode, operation allowed. Cw contacts must be made below 3.725, 7.150, and 14.100 MHz. Logs must show: Date, time in GMT, RS or RST, Band mode, TOT number, as well as name and address and claimed score. All logs must be signed by the operator. Non-member with the highest score will receive a Trillium plaque.

The TOT member will operate all frequencies and all forms of emission on 80, 40, and 20 meters during the contest period. If you can't find them check the following net-controlled frequencies. There will also be a "Mystery Station in operation. Proof of working the mystery station will add 10 bonus points to the score. (Proof is log information.)

KR6HB plus WA0WOF and AI2WOF, is also known as Kay Eyman, A serviceman' wife, Kay is at present operating from Okinawa. *(USAF official photo.)*



EP2YL, Rosie Frisbee — also known as K3ZZS when she is in the United States. Her husband's work takes them both to DX countries where she manages to keep in touch by radio. She operated from Thailand, in 1969, as HS1FB.

Frequency (MHz)	*Date*	*Time (GMT)*
3.855	Nov. 21	0030
3.685	Nov. 21	0200
7.240	Nov. 21	1300
7.103	Nov. 21	1430
14.280	Nov. 21	1830
14.140	Nov. 21	2000
14.035	Nov. 21	2130

Send logs to Betty Peterson, VE3ASZ, 19 Innismore Crescent, Scarboro, Ontario, Canada. Logs must be postmarked not later than December 31, 1970, and received not later than Junaury 15, 1971.

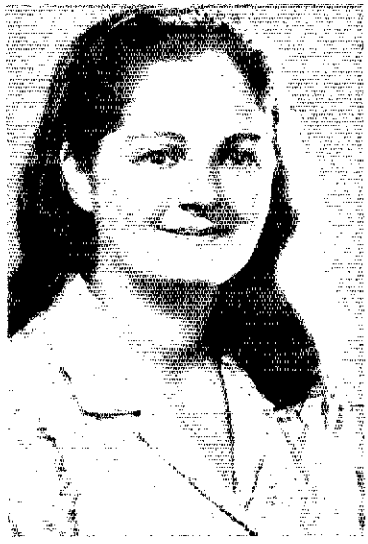
Floridora Contest

From October 10, 1970 at 0000 GMT to October 11, 2400 GMT. The frequencies are 3.933, 7.260, 14.285, 21.370, and 28.570 MHz.

Awards: Special certificate for working the most Floridora members both DX and Stateside will receive award.

Send logs to: Dorothea Seaver, W4QBY, 254 Oceanic Avenue, Fort Lauderdale, Florida, 33308. All logs must be mailed by November 15, 1970. (Note: The regular Floridora certificate is given, having worked 10 member (stateside) plus 5 members DX.)

Mary Gonsalves, WN7NHQ is one of the busy Novices who has managed to acquire WAS (all Novice) during her beginning activity.



PY1MHB, Marleni da Rocha.

YLRL Anniversary Party is NOW!

In case someone missed the dates for the annual YLRL AP, check September *QST*, "News and Views," for the 1970 rules. Any gal, YLRL member or not, is welcome to join this annual activity that marks the anniversary of YLRL.

(More on the YL suffix: Of interest to those who are working towards WAC-YL, or DX-YL by contacting gals with YL as the suffix in their call letters in EP2YL, Rosie Frisbee in Iran.)

Help Wanted

Marleni da Rocha, PY1MHB, is asking for assistance from YLs everywhere for her work as a correspondent with a ham's magazine in Rio de Janeiro. She is interested in all YL activities and in particular in the stories of what the gals are doing on the air.

She is a member of YLRL, and ISSB. Those who would like to write her about their activities can use the following address: P.O. Box 361, Petropolis R.J., Brazil. S.A. QST

DX Contest

(Continued from page 78)

Check Logs: (W/VE CW) W2CTY, W2EGI, W2MLO, WB2UDT, W3DS, W3GGN, W3IPS, W4JUK, W4EYR, W5GB, W5IUW, K6HIL/5, W6UYE, W6ZS, W6DYG, VE3EU, VE7AJ, VE7AMJ, VE7WL. (W/VE PHONE) W1WY, W2EGI, W2MLO, W3DS, W3MDJ, W4EYR, W6UEM/4, W6OR, W6MH1, K6HIL/5, W6GJV, W6HDP, W6UYE, W7GKV, WA7IOA, K8EIS, W6URT, W6DVA, WA6FLO, VE3IGV, VE6GN, VE6FP. (DX CW) AK8RX, DM2AUO, DM2BCF, DM2BYE, DM2CHM, DM2CUI, DM2CXN, DM3BI, DM3ERM, DM3FDM, DM4VXH, DM6MAO, F6ATF, HA2RH, HA5YG, HA5AF, HA5DJ, HA5LA, KH6AQ, LA2KD, LA7XX, LX8RL, OH2AC, OH2BAC, OH4XZ, OH4KN, OK1WL, OK2AOP, OK3CAN, OK3CAO, OZ7YY, PA0MLB, SM5CPK, SM5IIH, SM6BSM, SM7BUG, SM7DQC, SP2DVH, SP8-1079, SP9CTW, SP9CJH, UA1SW, UA1KAG, UA3RR, UA3UH, UA4SW, UA6KBS, UA9LCC, UA9LU, UA9VK, UB5APK, UB5ES, UB5NS, UC2AU, UO6AA, UH8DC, UK1ACO, UK2PAL, UK3WAF, UK6AAA, UK9LAB, UQ2AS, UT5WW, UV3MM, UW3NF, UW4IK, UW9CV, UW9PT, UY5ZP, YO3JA, 3Z2BMM, 3Z5BGL, 3Z6AKK, 3Z9BNY, (DX PHONE) OJ3VO, OM2LDL, LA3PK, LA4CM, LA7V, OH1IA, OH6AA, OZ9CR, PY2GF, SM2COR, SM5GA, SM6BSM, SM9MC, SP8-1079, UA3UG, UA3-142-112, UA9AR, UQ2IL, UV3FD, UV3MM, and 5H3KJ.

25 years ago

October 1945

. . . This issue is a sort of Navy issue. There are several articles about Naval communication and a nice one by Real Admiral Redman, Director of Naval Communications USN. His topic is "Navy Communications and the Amateur." The hams played a big part in the war, you bet. The Admiral pays a fine tribute to the radio amateur. About fifty pages, copiously illustrated, are devoted to the Navy, ashore, afloat and in the air.

. . . Well, we are back on the air at last, at least on 112 Mc. The other bands are expected to be opened very shortly.

. . . Don Mix, W1TS, describes rigs using the new high-power beam tubes. These are the 4-125-A and the 257-B. The introduction of these tubes has resulted in real peppy amplifiers requiring a minimum of drive.

. . . Ed Tilton, W1HDQ, re-activates his column "On The Very Highs." He has been on active duty in the South Pacific and reviews the activity on these frequencies.

. . . Walter Bradley, W1FWH, and Phil Rand, W1DBM, have articles on how to convert 112-Mc. gear to the new expected 144-148 Mc bands. Coils are a little smaller and rf chokes employed in filament leads, etc.

. . . Dawkins Espy, W6UBT, mathematically disects coupled circuits. I always like to read these mathematical articles – quickly, that is.

50 Years Ago this month

October 1920

. . . The Radio Club of America is going strong and we have another paper by Prof. (Neutrodyne) Hazleton, this time on Bulb Oscillators for Radio Transmission. This is a fundamental paper, diagrams, curves, etc. I note he indicates a motor-generator for high voltage.

. . . Sumner Young 1AE, holds forth on cage antennas. He says they are seldom used these days by amateurs. Maybe this article sparked their almost general use about a year later. Their use was supposed to increase the hot-wire amps. in the lead-in about ten percent.

. . . The Parkin Mfg. Co. introduce a rotary mercury condenser having a maximum capacity of .001 μmfd. We have a couple of this type in our Museum. You can hear the mercury slosh around when shaken.

. . . We have a long paper on QRM by John F. Gray, 6MZ. He sets forth a number of sound operating practices which, if adhered to, ought to result in improved operating conditions.

. . . 1HAA, the station of Irving Vermilya at Marion, Mass., is described. A 2-kW United Wireless "coffin" supplies the high voltage for the big rock crusher. He had a whopping big "fan" antenna 100 feet high and an equally large counterpoise underneath. Irv always had plenty of power around, it seems. — *W1ANA*

Operating News

GEORGE HART, W1NJM
Communications Manager

ELLEN WHITE, W1YYM,
Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE
DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD
Contests: ALBERT M. NOONE, WA1KQM
Public Service: WILLIAM O. REICHERT, WA9HHH

Prying Off the Lid. October used to be referred to as the beginning of the "active" season in amateur operating. Most activity came to a standstill during the summer months, even nets and trunk lines shutting down, to resume in the fall when people came back from vacations, the weather cooled off, school started and the annual grind got back in full swing.

Perhaps one of the reasons thing slowed down so much in those days was because the average amateur radio enthusiast was younger than he is today. Many shacks were located in attics, where the temperature rose to 120 or so, and home air conditions were unheard of. Then of course, since we were a younger group, our fancies turned to other things in the spring and summer.

The summer doldrums of amateur radio are not quite so noticeable today as they were, say, thirty years ago. But still, just as nature awakes in the spring, amateur radio still has its fall awakening in October. That's when the fireworks begin, when nets become more active, when traffic totals rise, when club meetings suspended for the summer resume and we all settle down for the long, radio-active winter. We start off with a quarterly CD Party to get tuned up for the November SS, to be followed later by the DX Competition. Meanwhile the quest for WAS and DXCC and their five-band graduate degrees continues with increased intensity as wintertime conditions make more and better contacts possible. It may be the gloomy end of summer for some of us, but it's the joyous opening of the fall active season to many of us too.

The November Sweepstakes is always a highlight of the fall season. Remember when this went on for *two solid weeks*? Don't suppose most of you do, but it was a real grind then, and nobody but nobody operated the full period. Now it's two weekends, one for cw and one for phone, and operating the full 24 hours of the 30-hour weekend period is commonplace for the high scorers. This year's rules are detailed elsewhere, but in case you feel you are familiar with them and need not refer to them, be advised that there are several significant changes, made at the recommendation of the Contest Advisory Committee, coordinated through W1YYM, our staff liaison.

Perhaps the most controversial of these is the demise of the "power multiplier." The Committee has long felt that such a power multiplier is unrealistic and to a large extent unenforceable, even though a large percentage of participants seem to prefer it. Last year it was omitted on a trial basis. This year, after extended discussion, the Committee again recommended that it be abolished, and so this is being done. *However*, don't despair, you low-power fans. If you run less than 150 watts, either through choice or necessity, your score will be listed separately from those running high power so you can compare your score with others running low power.

Another significant change recommended by the Committee and adopted is the elimination of the message credit. The object of the message credit was to familiarize operators with message-handling procedure by giving them an incentive to utilize it. However, the committee felt this was not appropriate or desired by the majority of SSers.

Two other recommendations of the Committee were adopted. Times off may now be taken in

OPERATING EVENTS
(Dates in GMT)

October

3-4	Cal. QSO Party, p. 130 Sept. Mass. QSO Party, p. 128 Sept. Mo. QSO Party, p. 126 Sept. VE/ZL/Oceania Test phone, p. 95 Sept.
7	W6OWP Qualifying Run
10-11	CD Party, phone VK/ZL/Oceania Test cw, p. 95 Sept.
13	W1AW Qualifying Run
17-18	CD Party, cw RTTY SS, p. 63 Sept. WADM, How's DX Zero District Party, Sta. Act. Scout Jamboree-on-the-air, p. 86 Sept.
21-22	YL/AP cw, p. 102 Sept.

November

4-5	YL/AP phone, p. 102 Sept.
5	W6OWP Qualifying Run
7	FMT, OOs only
7-8	Delaware QSO Party, this issue N.C. QSO Party, this issue
14-15	SS phone, this issue
18	W1AW Qualifying Run
21-22	SS cw, this issue

December

2	W6OWP Qualifying Run
10	W1AW Qualifying Run
12-13	160 Meter Contest, this issue
17	W1AW Morning Qualifying Run
31	Hand-Key Nite

1971

Jan. 9-10	VHF SS
Feb. 6- 7	DX Competition, phone
13-14	DX Competition, cw

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings.

July 1 - 31, 1970

New Members

7P8AR	260	K7CTI	147	WA1KRG	111	PJ2PS	105	W6GBY	101	W3UI	100
K2AGZ	216	WA3JHB	140	K4IJ	110	DL8TH	104	G3TOE	100	W3YG	100
WA3GNW	200	W5LUJ	138	W7QLC	110	JA8HZL	104	K1LEM	100	W4KFB	100
WA6DYO	182	OH2BFF	132	DJ4GS	107	WB6IEX	104	K3DFX/ø	100	WB4LDT	100
W2AXZ	179	W4ECJ	129	OA4DX	107	WA2RCT	103	K9CZU	100	W8IML	100
5H3LV	178	WB6YLG	129	W1ND	107	WA7CGR	103	K4OQN	100	W8OZA	100
DJ9PM	177	WB4HIU	125	WA9LIC	106	WA2DHS	102	OK3BH	100	W9OKH	100
W7PFZ	169	VE3BPQ	119	DJ4TX	105	WA3JBN	102	VE6AQZ	100	WA9IIS	100
OZ4IA	166	WA2GJT	118	DJ7DW	105	SP7ASZ	102	WA1JQC	100	WA9VCK	100
K4OD	160	WB4GLD	118	KP4DDO	105	K3AQR	101	WA2EOE	100	WA6CTH	100
K9YRT	156									WØSQD	100
XE3ER	233	W1LTC	137	PY1DEF	124	JA1NLZ	108	WA3NRV	102	G3TOE	100
ZL1AV	219	KØWWX	132	JA1CB	122	VO1CU	107	WA9LIC	102	KØHUD	100
W1COA	210	K9YRT	131	W4ECJ	116	W8DX	106	WAØYZN	102	VP9MI	100
DL5SV	202	ON5JE	131	K3YQK	115	W8ELE	105	YU3TXT	102	W1TPK	100
ZP5CF	181	W2RAD	131	F3VN/W2	114	LU1SE	105	K9LIH	101	WA7ISQ	100
5H3LV	167	W1EEP	129	KJ6T	112	DL8HD	104	WA1LDA	101	WA9RKJ	100
WB4KZG	143	WB6YLG	129	W7QLC	109	GM3UWO	103	W6UWP	101		

Endorsements

In the endorsement listings shown, totals from 120 through the 249 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.

DL7EN	325	WA3IKK	270	WA4FIW	240	VE3DMR	200	WAØHVR	180	K2KTR	140
W6KTE	315	DL1MD	260	WB4KZG	240	VE3CWE	200	DLØJK	160	K7GYA	140
W6RGG	315	JA8ZG	260	9V5AK	240	VE5JI	200	K2KGB	160	KØEKR	140
G2FYT	300	K2DDK	260	JA1CB	220	W1QUS	200	K2QBW	160	OE3HOW	140
ZL4BO	300	K3SGE	260	K6PZ	220	W2EPM	200	K9LIH	160	VE3CFP	140
K4FYO	290	K4CIA	260	OH2XF	220	W4HY	200	OK1AOR	160	VE3DIE	140
K5QHS	290	WA2HSX	260	OH4RH	220	W4WSF	200	PY2PH	160	VE5NW	140
W1DEP	290	W4AOD	260	W2ZZ	220	WA8TPL	200	W2HWA	160	W1HRJ	140
ZS2RM	290	W7LFA	260	WB2IEC	220	W9DDL	200	W2ZO	160	WB2DRJ	140
K2KDP	280	K2LGJ	250	W5MN	220	WA9UMH	200	WA2BUK	160	W4MGL	140
K4ADU	280	K3JLI	250	W6VD	220	7P5CE	200	WA3HGV	160	WB4JER	140
KØBUR	280	K4GLA	250	W8IPA	220	K1UDD	180	WB4JCV	160	W6CLM	140
WB2YQH	280	K4HPR	250	WA8PYL	220	W1SWX	180	WB4KWT	160	WA9YEY	140
WA3HUP	280	OE8KI	250	DJ5JH	200	W4UHI	180	WB6MVK	160	WØJYE	140
W4BRE	280	PY4BR	250	DL7LV	200	W3CDG	180	W7VSE	160	F3VN/W2	120
WAØCPX	280	SM7BEM	250	K9KXA	200	W7GYF	180	W9AEM	160	KZ5II	120
K6GLC	270	VE4SK	250	LA8ID	200	WA8PAW	180	VE2DHE/YV1		SP5BAK	120
W1FTX	270	K5QVH	240	SP6BZ	200	W9GHO	180		160	WB2QKQ	120
W2LWI	270					WA9SLD	180	JA8KB	140	WA9WXL	120
CR6BX	325	I1ZV	270	6W8DY	250	W4FUM	220	WA8PYL	180	W3AXW	140
LU9DAH	320	W4BRE	270	7P8AR	250	W5WJQ	220	W9DRL	180	WB6GKK	140
WØLIL	310	W8GKM	270	I1ANE	240	CR7FM	200	DL7LV	160	K6PZ	120
DL3RK	300	WØSFU	270	PY1JR	240	DL7OD	200	W2LEJ	160	VE1SH	120
W6RGG	300	ZL4BO	270	WB2IIZD	240	DU1FH	200	WA3HGV	160	VE5NW	120
PY3AHJ	290	I4GBS	260	WB6VCM	240	K1CMI	200	WB4JCV	160	WA1GNX	120
W1BPY	290	WA3HUP	260	WØYDB	240	K1KNQ	200	WB6MVK	160	W2CML	120
W6QOG	290	W7LFA	260	DL9SV	220	K2SHU	200	W7VRO	160	WA2DVO	120
DL7EN	280	DJ3CP	250	K4SKC	220	PY1HX	200	W8IPA	160	WB2ZDY	120
K5QHS	280	DL1MD	250	K4YFQ	220	VE3DNR	200	DLØJK	140	W4CHC	120
KØBUR	280	WA2HSX	250	OE1PC	220	W5HAK	200	DL5GJ	140	WA4CCW	120
W2LEC	280	WA3IKK	250	PY3BAD	220	W9DDL	200	K7GYA	140	W8GCJ	120
WA6AHF	280	W4AOU	250	VE3GMT	220	WA9UMH	200	KR6IAB	140	WØGY	120
I1AT	270	W6GRV	250	W1PCD	220	YV1PP	200	PY1CLI	140	VE2DHE/YV1	
		W9KRU	250	WB2DEC	220	F6SI	180	W1JUC	140		120

15-minute minimum periods rather than the 30-minute periods formerly required. It was felt that this is sufficient time to "do most anything" during the heat of the contest and still prevent use of "listening time" as time off. Also, suggested congregating frequencies will be published and, we hope, generally observed a concession to the non-contest or anti-contest element who have often complained that the SS occupied the entire band, and also an aid to the contester in readily locating the most active spots on each band.

We hope these changes will make the SS a better and more enjoyable contest for you. If not, *let your representative on the Committee know* about it. W3GRF is the new chairman, W1AX vice chairman. Other members are K2CPR, W4BRB, *W6CUF*, W8DB, W9RQM, WAØSDC and *VE2NV*.

160 Meter Test. The CAC also considered the 160 Meter Contest authorized by the Board last May but because of the time element recommended that headquarters develop an initial format based generally on current membership input. This has been done, principally by W1YYM, and the rules for the introductory Dec. 12-13 160 Meter Party appear elsewhere in this issue. Note that something new is being tried; *no logs are required.* Only a summary sheet and an Op. Aid 6 showing the calls of all stations contacted need be submitted. (Of course this does not eliminate the requirement for keeping your regular FCC log!) This will save a lot of work and postage for all concerned. If it works out, it's just possible it can be made a practice in other contests as well, with perhaps the highest-scorers later being requested to send in their logs. Note also that this first introductory contest is cw only. A phone section can be added next year if enough interest is shown.

Lil Retires. It was back in May of 1930 that a shy young gal came to work for Ed Handy in the Communications Department of ARRL Headquarters at 1711 Park St., Hartford, and the legend FEH*LMS began appearing at the bottom of letters and bulletins emanating from the department. During the following 40 years Lil was a mainstay in the department, and many members and officials have come to associate her with dependability and efficiency in handling administrative details. Lil's last day at the office is Oct. 30. Although two people have been training to take over her multitudinous administrative chores for the past six months, you just don't replace someone who has been on the job that long with such a record of dedication. For years, we will be discovering things that Lil did automatically which the rest of us just took for granted and never thought much about.

Anyway, let this chronicle a passing era in the annals of ARRL headquarters personnel history. Lil Salter, W1ZJF, retires.

FFH Honored. Speaking of such matters, it has come to our attention through various devious channels that Cony High School in Augusta, Maine, recently held a fiftieth reunion of the class of 1920, during which two of the alumni were honored as classmen who had achieved signal success in the world. One was a former governor named Cross; the other was F. E. Handy, W1BDI, Honorary Vice President of ARRL and former Communications Manager. *W1NJM.*

5BDXCC

Since the August listing of 5BDXCC qualifiers, the following amateurs have joined the ranks:

Nr. 36 - K4ZCP
Nr. 37 - W1WQC
Nr. 38 - OK1ADM
Nr. 39 - KV4FZ

July "Open" CD Parties

In the following tabulation of high *claimed* scores, read (from left to right) : total score, number of QSOs, number of sections, hours of operation. Asterisk after callsign indicates a non-appointee score. Final adjusted scores will appear in the October CD Bulletin. – *WA1KQM*

CW

K2KIR	372,600-1073-69-20
W1BGD/2	370,265-1036-71-20
W3CRE	323,761-907-71-20
K6EBB*	322,575-931-68-19
K2KTK	320,505-922-69-20
K2EIU/6	319,680-881-72-18
KØORK	317,100-900-70-19
K4PUZ	312,600-883-68-20
W1ETU	303,100-860-70-19
W5RUB	296,480-868-68-20
K4SXD	292,400-854-68-20
W9YT (K3OAE, opr.)	280,000-800-70-20
K4POL*	279,195-809-69-20
W6DQX	277,200-764-72-18
W3IN	275,655-793-69-19
K4BAI	271,015-802-67-20
W6MAR	267,315-746-71-16
K9BGL*	261,460-769-68-20
W1AW (WA9HHH, opr.)	261,140-781-66-17
WAØSDC/9	257,730-720-71-20
WB8AKW	255,300-736-69-20
VE7BDJ	254,180-729-71-19
K2MME*	250,920-731-68-20
KØGJD*	250,250-715-70-20
K1JZD (WA1IQJ, opr.)	240,120-691-69-18
W6JPH	233,800-663-70-18
K4JM	226,380-681-66-17
WØJNH	223,080-669-66-15
WA3IAQ/3	222,440-660-67-18
K5TSR*	210,600-644-68-17
WA8POS	209,550-630-66-18
WA5KQN	207,030-612-67-18
WA4JYB*	205,260-615-66-23
WB2RKK	205,250-618-66-20
K4CAX	193,675-628-61-19
W3HQU*	189,090-566-66-20
W5AC (K5SBK, opr.)	186,930-558-67-14
WA8VHY*	176,320-551-64-20
WA9IZD*	175,825-541-65-20
W8SH (WA3GBU, opr.)	163,475-499-65-19
W8EDU (WA3BGK, opr.)	157,480-503-62-10
WA8YUB	155,930-503-62-19
WØYC (KØUXQ, opr.)	154,690-499-62-12
W1MX (W4YAC, opr.)	154,285-523-59-15
WAØVKE*	149,310-470-63-18
W5RE	146,790-459-63-11
K5UCX	146,100-480-60-11
W6BIP	143,150-402-70-20
K4CEE*	136,640-443-61-19
WA8AJZ	135,140-459-58-10
W5OR	135,115-436-61-16
K1ZND	135,000-443-60-10
K4EU	134,310-400-66-12
WB2VPR	132,750-444-59-17
W4KFC	130,240-400-64-7
WB2REE*	128,030-434-59-20
WA2EAH/2	127,680-445-57-12
W7GHT	125,965-407-61-18
W5VA	125,860-400-62-13
WA3GVP*	124,745-405-61-19
WA5SOG*	123,500-380-65-15
WB4OSW*	123,200-378-64-20
WA3KDR*	121,520-431-56-20
WA8VRB	120,900-400-60-15
WAØPKE/9*	120,640-412-58-19
W2AZO*	118,440-371-63-19
WB6LJL*	117,705-414-57-20
WA2CWX*	116,525-391-59-19
W9UNO	116,450-351-65-12
WB9AWV*	116,290-401-58-19
W3GN	114,375-368-61-7
WAØOMO	114,000-306-65-15
WA2LBT*	113,575-381-59-20
WB2SMD	112,800-369-60-19
WB4MLI	111,600-372-60-12
WB9ANW*	111,600-367-60-17
WØKB	104,530-300-68-13
KØCNC	104,100-341-60-7
W9LVH/9*	103,820-353-58-10
KØAZI	101,370-323-62-7
K2KNV	101,260-326-61-5
WA5PWX	101,080-357-56-8
WA2FUX	100,920-343-58-16
K8ODJ (+K7NHV)	291,810-815-71-20

Phone

W6HX (WB6OJD, opr.)	324,860-875-74-20
K2EIU/6	307,875-814-75-20
K9LBQ*	252,750-667-75-17
WA1JHQ	246,375-652-75-16
K5TSR*	229,080-660-69-16
WA8ZDT	204,340-596-68-20
W6GP (WB6WIT, opr.)	180,880-532-68-12
WA6CRI*	164,368-463-71-18
KIHHN	162,860-473-68-17
W6RVN	147,315-427-69-17
W6BIP	143,065-396-71-19
WA8VRB	129,375-372-69-15
W5RUB	121,500-401-60-09
WA8VBY*	121,200-404-60-12
WB2SIH	114,880-355-64-10
WA7CDZ/7	114,880-355-64-20
K1EP1/3	107,880-341-62-04
WA3HWW (WA3IAQ, opr.)	107,100-336-63-09
K4EU	106,590-316-66-10
W6MAR	104,920-337-61-08
K4BAI	104,310-335-61-13
WAØSUR/4	103,090-332-61-09
WA8ZLN*	101,660-299-68-15
W4TYE/4	99,300-324-60-12
VE2MW/W2*	94,250-286-65-11
WB9AJP*	93,960-287-72-11
WA1NFS	91,140-287-62-07
K3AKR	90,770-309-58-14
W9KVI	89,280-279-64-10
WB2REE*	86,130-297-58-20
W1ETU	85,680-300-58-10
WA6CPP	84,900-279-60-15
W6IPH	83,600-290-56-06
K1GAX	80,400-261-60-13
WA1JQC	80,010-251-63-07
WA3KDR*	74,360-283-52-20
K6OZI	72,765-224-63-11
W9AA/9* (WA9YZX, opr.)	70,760-232-61-
WAØOTE/Ø	70,455-226-61-09
W6KWO*	63,860-206-62-11
WA5SFG	63,250-228-55-06
WB9BJR*	62,440-219-56-19
KH6GQW	62,300-208-60-12
WA4UAZ	61,480-207-58-07
W6NJU	60,145-207-57-10
WB6FZN	59,740-206-58-15
WB4JDD/4	58,320-241-48-07
WA9ZLN	58,140-199-57-19
W8NOH	57,400-200-56-05
WA5TVO*	56,420-214-52-18
WAØVCN	56,000-200-56-09
W4DQD	55,720-196-56-08
WB8CKI*	55,335-217-51-13
K4TTN	55,275-201-55-19
W8MXO*	55,000-200-55-09
WAØVHX	54,900-180-61-12
W3ZSR	54,400-167-64-05
WA8YWK	53,560-200-52-10
K6KVC*	53,075-190-55-14
WA2FAH	52,470-195-54-05
WA2HJS*	50,880-212-48-13
WR4FDT (+WB4s DRC LOV)	61,335-255-47-12

W1AW FALL-WINTER SCHEDULE
(Oct. 25, 1970—April 25, 1971)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M. EST, Saturday 7 P.M. 1:00 A.M. EST and Sunday 3 P.M.–11:00 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your *original* operator's license with you. The station will be closed Nov. 26, Dec. 25, 1970; Jan. 1, Feb. 15, Apr. 9, 1971.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY OBS[8,7]	.....	.....
0030	← CODE PRACTICE DAILY[1] 10-13-15 wpm →						
0100	.....	← CW OBS[1] →					
0120-0130[4]	.....	.....	3.700[6]	7.020	3.520	7.150[6]	7.020
0130	.....	.....	3.700[6]	7.080	3.555	7.150[6]	7.080
0200	.....	← PHONE OBS[2] →					
0205-0230[4]	.....	.....	3.820	56.120	145.600	1.920	3.820
0230	← CODE PRACTICE DAILY[1] (35-15 wpm TThSat), (5-25 wpm MWFSn) →						
0330-0400[4]	.....	.....	3.555	.....	1.805	.....	3.555
0400	RTTY OBS[8]	.....	← RTTY OBS[8] →				
0410-0430[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0430	PHONE OBS[2]	.....	← PHONE OBS[2] →				
0435-0500[4]	.....	.....	7.220	3.280	7.220	3.820	7.220
0500	CW OBS[1]	.....	← CW OBS[1] →				
0520-0530[4]	.....	.....	3.700[6]	7.020	3.945	7.150[6]	3.520
0530-0600	.....	.....	3.700[6]	7.080	3.945	7.150[6]	3.555
1400	← CODE PRACTICE[1] (5-25 wpm MWF), (35-15 wpm TTh) →						.....
1800-1900	.....	21.285	21.285	21.285	21.285	21.285	.....
1900-2000	.....	14.280	7.255	14.280	7.255	14.280	.....
2000-2100	.....	14.280	21.285	14.095	21.285	7.080	.....
2130-2230	.....	14.100	CW OBS[1]	14.100	CW OBS[1]	14.100	.....
2230-2330	.....	7.255	RTTY OBS[8]	21.1[6]	RTTY OBS[8]	7.255	.....

[1] *CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.*
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 28.095 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
[6] W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] *Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.*
Maintenance Staff: WIs QIS WPR. *Times-days in GMT. Operating frequencies are approximate.

ELECTION NOTICE

To all ARRL members in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must meet the following requirements prior to deadline date listed below. (1) Holder of amateur Conditional Class license or higher. (2) A licensed amateur for at least two years immediately prior to nomination. (3) An ARRL full member for at least two years immediately prior to nomination. Petitions must be received on or before 4:30 PM on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are *set ahead to the dates given herewith. The complete name, address, Zip code and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of the membership status, etc.*

Petitions must be received on or before 4:30 PM on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set *ahead to the dates given herewith. The complete name, address, Zip* code and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member *signatures be obtained, since on checking names against* Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, *individual signers uncertain or ignorant of the* membership status, etc.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence names of all eligible candidates.

The following nominating form is suggested. (Signers should be *sure to give city, street address and zip code.)*

Communications Manager, ARRL (Place and date)
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the . . . . .ARRL Section of the . . . . .Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next *two-year term of office.*

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

George Hart, W1NJM, Communications Manager

Section	*Closing Date*	*SCM*	*Present Term Ends*
N.NJ.	10/9/70	L.J. Amoroso, W2ZZ	12/9/70
S. Tex.	10/9/70	G.D. Sears, W5AIR	12/10/70
Md.-D.C.	10/9/70	J. Munholland, K3LFD	12/19/70
Ala.	10/9/70	D.W. Bonner, W4WLG	12/26/70
N.H.	10/9/70	D. Morgan, K1QES	1/2/71
Miss.	10/9/70	C.C. Comfort, WA5KEY	1/2/71
Idaho	11/10/70	D.A. Crisp, W7ZNN	8/17/70
Alta.	11/10/70	D. Sutherland, VE6FK	1/10/71
Mich.	11/10/70	J.L. Pontek, K8HKM	Resigned
Sac. V.	12/10/70	J.F. Minke III, W6KYA	2/25/71
Colo.	12/10/70	C.M. Cotterell, WØSIN	2/14/71
N. Dak.	1/11/71	H.L. Sheets, WØDM	3/8/71
Mo.	1/11/71	R.J. Peavler, WØBV	3/18/71
S.C.V.	1/11/71	A.F. Gaetano, W6VZT	3/10/71

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Quebec	J. Unsworth, VE2ALE	July 10, 1970
Arizona	G.M. Hamman, W7CAF	Aug. 9, 1970
Montana	*H.A. Roylance, W7RZY*	*Sept. 9, 1970*
Northern Texas	L.F. Harrison, W5LR	Sept. 12, 1970
Nevada	L.M. Norman, W7PBV	Oct. 22, 1970

ARRL QUALIFYING RUNS

Any person can apply for an ARRL code proficiency award. Neither League membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualified at one of the six speeds transmitted (10-35 wpm) you will receive a certificate. If your initial qualification is for a speed below 35 wpm, you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period. W1AW will simultaneously transmit a qualifying run on 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.6 MHz at 0130 GMT October 13. In converting, 0130 GMT Oct. 13 becomes 2130 EDST Oct. 12. W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. at 0400 GMT October 7. In converting, 0400 GMT October 7 becomes 2100 PDST Oct. 6.

W1AW CODE PRACTICE

W1AW transmits daily code practice according to the following schedule showing speeds, local times/days and GMT times/days. For practice purposes, the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries a checking reference.

10-13-15	7:30 P.M. EDST daily 4:30 P.M. PDST	2330 daily
5-7½-10-13-20-25	9:30 P.M. EDST SnTThS 6:30 P.M. PDST	0130 MWFSn
5-7½-10-13-20-25	9:00 A.M. EDST MWF 6:00 A.M. PDST	1300 MWF
35-30-25-20-15	9:30 P.M. EDST MWF 6:30 P.M. PDST	0130 TThS
35-30-25-20-15	9:00 A.M. EDST TTh 6:00 A.M. PDST	1300 TTh

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and August *QST* practice text to be sent in the 0130 GMT practice on the following dates.

Oct. 14:	It Seems to Us, p. 9
Oct. 22:	Short Antennas for Lower Frequencies, p. 15
Oct. 26:	CW Break-In for the S/Line, p. 47
Nov. 3:	Amateur Radio Public Service, p. 72

The subject of practice text for the following sessions is *Understanding Amateur Radio*, First Edition.

Nov. 6:	Modifying the Command Receiver, p. 139
Nov. 9:	Power Supply, p. 140

QST

Strays

Feedback

The footnote on page 80 of September *QST* should refer to October *1963*; "48" was the page number, not the year. (The Editor himself blew this one!).

Silent Keys

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

W1AOE, Henry C. Wing, Brier, MA
W1ARK, Chester Ward, Cranston, RI
W1BOF, Duncan C. Smyth, Westwood, MA
W1DXE, Palmer H. Southworth, West Hartford, CT
W1IYY, Norman D. Grant, Canton, MA
W1LOA, Francis J. Gordon, Portland, ME
W1MK, Bernard H. Stevens, Mattapoisett, MA
W1TNF, Oliver Martin, Franklin, NH
ex-1WK, David Lyon Moore, Glastonbury, CT
ex-W2DAP, Raymond L. Archbold, Mechanicsburg, PA
WA2DAU, Henry Neimeier, Center Moriches, NY
K2HWC, Gerald D. Hess, Moravia, NY
W2IG, Frank X. Hayes, Elmhurst, NY
W2LVL, Albert Smith, Valley Stream, NY
W2KKF, Harold W. Kaye, White Plains, NY
K2MPW, Walter W. Cotner, Ithaca, NY
W2NBY, Ward Alexander, Schenectady, NY
WB2SNM, Dr. W. C. Rucker, Huckensack, NJ
W2UKS, William S. Johnson, Ocean City, NJ
WB2UZX, Alexander T. Collesidis, Miller Place, NY
WA3BBG, L. Robert Hartle, Scranton, PA
W3NAL, Col. George J. McNally, USA Ret., Rockville, MD
W4BCL, Rev. Ronald Voigt, Bernard, AL
W4EPC, William D. Williams, Coral Gables, FL
WA4IGR, Nicolas W. Baklanoff, Hernando, FL
W4JHU, Marvin Carver, Russellville, KY
W4LU, William "Buck" Taylor, Chattanooga, TN
W4OLG, Aubrey H. White, Birmingham, AL
W4LQN, Paul W. Kline, Miami, FL
W4LBX, Thomas B. Cutchin, Jr., Suffolk, VA
W4VPO, Louis C. Bergenroth, Ft. Pierce, FL
W5ERS, Charles P. Zimmerman, Houston, TX
W5KXN, Joe B. Welch, Ponca City, OK
W5VO, Wilbur M. Jackson, College Station, TX
WA6KAN/KX6FW, Paul A. Gorman, Santa Ana, CA
W6KSM, George S. Keeler, La Mesa, CA
WB6LIC, Guy L. Warner, San Diego, CA
WA6NCK, Horace D. Cook, Sun City, CA
W6QJH, Archie L. Campbell, El Cajon, CA
W6LNQ, George Morey, Los Angeles, CA
W7CSR, Malcomb G. Moses, Las Vegas, NV
W7FW, Clyde Abbott, Tacoma, WA
WN7MTR, Harley A. Hill, Milton Freewater, OR
W7NO, Carl A. Hoffman, Tucson, AZ
W7ORK, George De Vries, Oak Harbor, WA
K7SD, Harry C. Britz, Seattle, WA
W7YRY, James R. Magee, Henderson, NV
K7ZSE, Clark W. Brown, Jr., Phoenix, OR
W7ZSH, Howard "Doc" Finley, Anacortes, WA
W8AOB, Carl A. "Tiny" Morton, Ravenna, OH
W8DAE, John C. "Cliff" Erickson, Cleveland Heights, OH
W8ERV, Charles A. W. Sayre, Steubenville, OH
K8IIO, Victor A. Myers, Lakewood, OH
K8ILC, Harry M. Kubiac, Quincy, MI
W8IDV, George L. Gray, Mason, OH
W8KBY, Adam Chulko, Barberton, OH
K8KMW, Edgar M. Branigin, Grosse Pointe Woods, MI
K8LNB, George W. F. Brendel, Lansing, MI
W8MHB, Donald G. Schultz, Cincinnati, OH
W8QG, William P. Johnson, Arthurdale, WV
WA8TKZ, Ralph Brown, Wellington, OH
W8ZM, Robert L. Osborne, Detroit, MI
K8ZWM, Marion McLaughlin, Elkins, WV
WA9BWK, George L. Soreghen, Chicago, IL
W9DGR, Holland H. Elsner, Gary, IN
W9YVS, Bert Milks, Fort Wayne, In
K9EEM, Harry N. Brewer, Terre Haute, IN
W9FOF, William B. Moore, Wilmette, IL
K9GHT, Dale H. Engler, Wood, WI
W9VRI/WØHWO, Albert O. Tadewald, La Crosse, WI
W9WHF, James S. Summerville, Chicago, IL
WØACU, James N. Haas, Chapman, KS
WØAZY, Maury E. Bettis, Leawood, KS
WAWVLF, Thomas J. Culnan, Littleton, CO
KØWIY, Burke H. Miller, Springfield, MO
KØZTO, Chester Triggs, Arnolds, Park, IA
VE3CKY, Gunther Kronmuellor, Osgoode Station, Ontario
VE6OD, Eric, Anderson, Calgary, Alberta
G3JRD, Don Willett, Stoke Golding, Nuneaton, Warks, England
ZE3JA, I. M. Gray, Salisbury Airport, Rhodesia

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE — SCM, John L. Penrod, K3NYG — SEC/PAM: W3DKX. RM: W3EEB. WA3LUA has been appointed as ORS, and is now visiting Z11-Land. WA3MSU, WA3LMY and WA3NSS passed the Advanced and General Class exams. W3DEO made a trip up to Mystic Island. W3IPC, Atlantic Division Director, visited the Maverick ARC. WA3DUM is working on a new control center. New amateur WN3OYA has started out his activity by being a traffic man. K3GKT is doing some traveling. WA3KZQ has brought his countries-worked total up to 80. WA3MGR has gone mobile. W3CZK has put up a five over five for 6 meters, and now is ready for some 6 ssb DX contacts. WA3BAO is active on 432. W3BHG has a number of skeds lined up for the Aug. Perseids shower. Traffic: (July) WA3KZQ 21, W3DKX 17, WA3DUM 16, WA3LUA 14, WA3GSM 8, K3NYG 4, WN3OYA 2. (June) W3DKX 14.

DELAWARE QSO PARTY

This contest, sponsored by the Delaware ARC, W3SL, will take place from 2300 GMT Nov. 6 to 0500 GMT Nov. 8. There are no power restrictions. It is open to all amateurs. Stations may be worked on more than one band, but no credit for contacts with the same station using two modes on the same band. The exchange will be QSO number, report and county (for Delaware stations) or state, province or country for non-Del. stations. Suggested frequencies: cw, 3560 7060 14060 21060 28060; phone, 3975 7275 14325 21425 28650; vhf 50 50.4 and 144 MHz. Scoring system: Del stations score 1 point per QSO and multiply the total by the number of states, Canadian Provinces and foreign countries worked. Outside stations score 5 points per Del QSO and multiply by the number of Del. countries worked. The three Delaware counties are New Castle, Kent and Sussex. Awards: A certificate will be awarded the highest-scoring station in each state, Canadian Province and foreign country (with 3 or more contacts) and to the highest-scoring station in each Delaware county. In addition, a W-DEL certificate will be sent to any station working all three Delaware counties. Party logs showing required data will be accepted in lieu of QSLs. The mailing deadline is Dec. 1, 1970. Send your log to Roy Belair, W3NX, 415 Brighton Road, Wilmington, Delaware 19809. Persons wishing the W-DEL certificate must apply to this address. No fee asked, but s.a.s.e. is required.

EASTERN PENNSYLVANIA — SCM, George S. Van Dyke, Jr., W3HK — SEC: W3ICC. RMs: W3EML, K3MVO, W3MPX. PAMs: WA3GLI, K3PSO, VHF PAM: W3EGQ. OO reports were received from K3RDT, K3HNP, W3NNC, W3KFK: OBS reports from WA3AFI, WA3JZB, WA3EFC, WA3NVO, WA3KFT, WA3JKB; OVS reports from WA3KFT, WA3EFC, K3WFU, WA3BJO, WA3JKB, W3ZRR, WA3KQX, WA3JWL, WA3NVO, WA3JZB, W3VAX. PSHR: K3OIO, W3EML, WA3EFX/3, WA3JZB, WA3IUV, W3MPX, WA3ISU, WA3CKA and WA3LYC. BPL: W3CUL, W3VR, WA3ATO.

Net	*kHz*	*Operates*	*QNI*	*QTC*	*RM/PAM*
EPA	3610	6:45P Daily	233	262	W3MPX
PTTN	3610	6:00P Daily		131	WA3AFI
PBN	3960	5:30P Mon-Fri	412	327	K3PSO
EPAEP&TN	3917	6:00P Daily	223	86	WA3GLI

Nets not listed did not submit reports. A new net on 28.8 has been started by Explorer Post 6 daily at 10:15 P.M. local time. Purpose is to try to get traffic nets on ten combined with OO and AREC activities. Contact WA3EPM for details. The club call at Inglis House. Home for Incurables, is WA3OZB. Look for the operators on any band; ham radio is their way out to the world. WA3LMO built a keyer to replace a bug, now it has him bugged. W3AXA will be back soon. The high activity of WA3EFX/3 was the result of the Airstream Rally at Hershey, Pa. Out of 3400 trailers there were 93 hams and lots of traffic. W3CUL and W3VR were the main outlet. EMT experts were W3BEF with zero error, K3HNP with 4.4 ppm and W3YO with 10.6 ppm. W3CUL reports an RTTY net in NTS will soon be a reality. W3RV will be on soon with new equipment. W3EML still is looking for help in 3RN. W3MPX has had a string of bad luck; it's gotta get better. Joe! WA3ATO is busy with Womens Marine Corps. WA3LXW got a new HQ-215. K3MVO was reported heard on ssb. W3HNK will be VP2. DS7, PJ7 and VP2K Oct. 19 to 25, looking for W3s. WA3EPM got his big A ticket. WA3IUV got his WAZ certificate. WA3KFT reports 6 meters really open lately. W3ICC still needs volunteers for EC. How about you! The Mt. Airy VHF Club, along with DelVal QCWA, had a real wingding picnic. Traffic: (July) W3CUL 3496, W3VR 817, W3EML 434, W3MPX 313, WA3EFX/3 296, WA3ATO 270, WA3EXW 159, WA3LMO 115, WA3AFI 97, K3OIO 94, WA3JZB 88, K3MVO 60, WA3JSU 58, WA3GLI 52, K3PIE 55, WA3CKA 47, W3HK 44, WA3CLU 42, WA3LAK 42, WA3LVC 37, WA3IYC 30, W3VAP 29, W3HNK 21, WA3EPM 10, W3EPC 8, K3HKW 7, WA3JWL 7, W3VA 6, WA4TMY/3 6, W3CL 5, WA3IUV 5, W3OY 5, W3BNR 4, WA3LEC 4, WA3IKO 4, WA3IAZ 3, WA3NJO 2, WA3NVO 2, W3FU 1, K3FOB 1, WA3JKB 1, W3KEK 1, WA3KFT 1, WA3KQX 1, K3KTH 1, K3VAX 1. (June) WA3JZB 88, WA3EXW 65.

MARYLAND-DISTRICT OF COLUMBIA — SCM, John Munholland, K3EED — SEC: W3LQY.

Net	*Freq.*	*Operates (EPM)*	*Manager*
MDD	3.643	7:00 Dy	W3EZT/RM
MDDS*	3.643	9:45 Dy	WA3LWT/RM
MDCTN	3.920	6:00 SPTS	W3ECS/PAM
MEPN	3.920	6:00 MWF 1:00 SS	K3IAG
MTMTN	146.208	9:00 Tu-Sa	W3HEW

Note new time; see text. PNHR: W3TN, 29 points. Appointments: WA3LEU and WA3MJF as ORSs, W3EZT and WA3LWT as RMs, W3ECS as PAM. The highlight of the July calendar was the Traffic Nets Picnic in Patapsco State Park. MDD, MDDS and MDCTN were all well represented and the eyeball QSOs were great fun. K3LED announced the award of Section Net certificates to the following for regular activity: On MDD — K3GZK, K3OUC, K3ESY, W3TN, W3EEB, W3ORB, W3FA, W3IZT, W3ATO, W3DYA, WA3GDJ, WA3ITQ, K3GPN, W3PRC, K3FQT, W3ERC, W3CBG, W3ECS, WA3LWT, WA3IAQ, WA3DUM, WA3IYS and K3JYZ. On MDCTN — W3ADO, WA3HIW, W3LDD, WA3LZN, W3DKX, K3ESY, WA3IIV, WA3LKJ, K3RPT, WA3ERL, K3GZK, WA3UIR, W3LQY, K3ORW and WA3GXN. On MDDS — W3ORG, W3ZNW, WA3LEU and WA3DUM. Our thanks to K3JYZ, WA3GXN and W3BG, retiring net managers, for their fine leadership and services rendered. Henceforth, MDDS will operate as a late session for MDD and will convene at 9:45 P.M. instead of 8:30 until further notice. A slip of the pen caused a slight inaccuracy in copy for the Aug. issue of this column. We referred to WA3NUL-TV436 as the "Antietam Club station;" we should have said "The Hehyeuo Park VHF Society station WA3NUL-TV436." Sorry, fellows! Thanks to WA3EOP for setting us straight. EA3NZ wrote to ask us to spread the word that Spanish amateurs are sponsoring a contest as a prelude to the Fourth International Convention of Radioamateurs scheduled for Oct. 27 - Nov. 1, 1970, in Barcelona. A pat on the back to WA3EOP and his Washington County ARES gang for their 1970 SET activity. We read in Antietam's QRN that W3IZY is is very active in Navy MARS and WA3CBC is a new MARS (Army) station. WA3LEU likes traffic operations on MDD and plans to QNI from W8EDU at Case Western Reserve U. in Cleveland when the fall term begins. A lot of MDD operators will be glad to hear that W3GRB is all right and plans to get back on the net soon. W3LQY suffered a badly bruised hand when she caught it in her car door in June. WA3MWO likes ragchewing and playing chess on 40 meters. Traffic: WA3LYS 1002, W3TN 216, WA3LEU 99, W3FA 52, W3ECS 38, K3LED 30, W3ZNW 26, W3EOV 21, W3LQY 19, K3ODC 15, W3ECP 14, K3GZK 13, WA3HIW 11, K3GPN 10, W3LDD 7, WA3LKJ 7, K3JYZ 5, WA3GXN 3, WA3GVP 2, WA3EOP 1, W3EWP 1, WA3MOW 1.

SOUTHERN NEW JERSEY — SCM, Charles K. Travers, W2YPZ — SEC: W2LVW. RMs: WA2KJP, WA2BEV. It is with mixed emotions that we say so long to our very dependable and capable operator of the Princeton University station, W2PU, Dave Hoaglin,

Here's the exciting new Heath SB-220 2 kW Linear Amplifier. Running maximum legal power on amateur bands between 80 and 10 meters, this compact powerhouse features two rugged EIMAC 3-500Z zero bias triodes in proven grounded grid circuitry. Note the modern desktop styling and the heavy duty components. And note the use of the reliable 3-500Zs. Heath chose EIMAC because these dependable tubes are ideal for heavy-duty operation, around the clock, around the world. And the two tubes have a total plate dissipation rating of 1000 watts.

Heath's choice is your choice. Go EIMAC. Look for the equipment featuring EIMAC power tubes.

The 3-500Z is one of EIMAC's family of zero bias power triodes: from 400 watts to 50 kW. Contact your distributor or a Varian/Eimac Field Office for further information. Offices are located in 16 major cities. Ask information for Varian Electron Tube and Device Group. Or write Amateur Services Department, Eimac Division of Varian, San Carlos, Calif. 94070.

Eimac®
division
varian

EIMAC 3-500Zs are Heath's Choice.

It's rough keeping up with planar triode requirements.

Month after month, standards get stiffer. But eve
next year and beyond, our miniaturized planar triod
will still meet them. They provide greater powe
higher frequency and more reliability than "standard
designs. Ceramic/metal construction stands u
to high voltage, high frequency, high current operatio
Large contact areas mean improved electric
and mechanical connections. Frequency stable anod
are standard. And extended interface arc-resista
cathodes let you handle more powe
Solderable terminals? We feature them. Pul
operation? Certainly. Switches? By all mean
But you're not limited by what we have
hand. EIMAC's Application Engineering Departme
is ready to help you design planars into yo
equipment, or to propose new plan
designs to glove-fit your requirements. So y
can spend less engineering time and dolla
A few examples that show how c
computer aided design helps you get fast respons
The 7815AL carries an extended warran
backed by demanding life tests. It's design
to meet the stringent reliability requir
ments of airborne transponder and DM
(Distance Measuring Equipment) servic
The new Y-503 planar for uhf pul
service was custom designed to meet
application program of high urgenc
The 8847 was created for DME a
CAS (Collision Avoidance System) broa
band amplifiers covering 125 MHz ne
1.1 GHz. It delivers up to 4 kW peak pow
with a gain of better than 8 decibe
Our new Y-518 planar provid
35 kW pulse output at 1 G
More information? Write for our plan
triode brochure or contact: Produ
Manager, EIMAC Division of Vari
301 Industrial Way, San Carl
Calif. 94070, or 1678 Pioneer R
Salt Lake City, Utah 841
Or ask Informati
Operator for Var
Electron Tube a
Device Gro

Eimac®
division
varian

So we moved ahead of them.

K8ILF/2. Dave will become a member of Harvard University faculty as of Sept. 1 and will operate W1AF. Our congratulations to you, Dave, and our very best wishes for your continued success. W2JI, now retired, is working part time as operator of local broadcasting station WBUD. Congratulations are in order for Burlington, Gloucester and Mercer Counties for a job well done in the recent SET program for 1970. We are informed by WA2FGS that the Penn-Jersey YL Club maintained a 40-meter traffic net during the P.P. Derby, relaying to 12 different stations across the country. Operators were WA3ATQ, W3INP, K3FYS, W3AAV, K3YPH and WA3IJL. WA2FGS represented the State of New Jersey. Rose Ellen and OM, W2CDZ enjoyed the Midwest YL Convention June 19, 20 and 21 at Flint, Mich. Field Day was operated by Salem Co. Radio Club using K2IYO/2. FD site was K2EJB, Reeves Lippincott's farm. Three rigs were in use. Operators were WA2FGS, W2CDZ, K2GYM, K2QPK and WA2KOH. Breakfast was prepared and served by the XYL of K2GYM. WN2PAT, 11-year-old son of Sid Dietz, was licensed within the month and made 30 contacts on 80 and 40 meters. OBS reports were received from K2ARY and OO reports from W2ORS. W2PEV, net mgr. of NJEPTN, reports 500 check-ins and 229 messages for July. The N.J. Slow Net, managed by WB2FEH, reports 19 sessions, 73 stations, 24 traffic for June and 24 sessions, 72 stations, 21 traffic for July. W2VPR, asst. mgr. of N-J-N Late Session, reports 29 sessions, 252 stations, 74 traffic for June and 174 stations, 64 traffic for July. Traffic: (July) WB2VEJ 137, W2PU 58, W2YPZ 24, WA2KIP 12, W2JI 4, W2KGM 4, W2ORS 4, W2IU 3, W2CDZ 2. (June) K2RXB 58, WB2SFX 7.

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2KTK – Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. Appointment renewals: W2EMW, W2RUF and K2IMI as ORSs. K2KNV, K2KIR, K2KTK and W2BLP easily qualified for OO Class I in the May ARRL EMT. A new radio club is the Hamburg Amateur Radio Club, with WA2DTP, pres., and K2FOB, secy./treas. In order to join, you must operate on *four* modes. The K2LDT repeater guys held a clinic and adjusted 25 fm rigs during it. K2PVN stares at his jammed halyard pulley at 50 feet scratching his head. NYS cleared 224 messages with 748 check-ins for July. WN2KZM is the new secy. for the Walton Radio Assn. He takes over from W2OSL, who OSYed the area. WB2VND expresses an interest in ORS. I am very sorry to report the passing of K2KBI. He was a good personal friend and a DXer known throughout the country. OO WB2NNA has been very busy. W2AFB was a volunteer examiner for a prospective Novice. W2AFB also received a shiny new NYS certificate. WB2JOE has applied for OBS. That station will be operated by WB2GDQ. K2DNN and ZYL WA2TCZ have a new HT-46 and HO-215. On vacation they visited the Eisenhower Lock and power station in Massena. WB2YEE says he is sorry now he bought a new outboard instead of a spare rig – power transformer you know. WN2LCC, in East Aurora, passed the General Class exam. WA2AEZ is moving to Greenville, S.C. K2CP, K3RHF and K3VAW all travelled over 250 miles to attend the Gassers Picnic. BPL certificates this month go to W2OE and WA4PUM/2, the latter was operated at Camp Idylwood in South Schroon. PSHR: W2s MTA, RUF, FR, QC, K2s KIR, KTK, WA2s BEX and ICU. I am not receiving reports from the phone men that I should. Traffic reports on phone should be routed through Asst. SCM W2PVI and should be addressed to him. Basically, any traffic report originated on phone should be addressed to W2PVI and those originated on cw should be addressed to me. Traffic: (July) W2OE 313, W2FR 297, WA4PUM/2 269, W2QC 165, WA2ICU 108, K2KTK 101, W2MTA 99, WB2VND 85, WB2SMD 84, W2RUF 78, WA2BLX 52, W2EFB 52, W2MSM 50, W2RQF 46, W2DBU 34, W2HYM 32, W2WAM 31, WB2LQP 24, W2AFB 23, K2OEV 23, WB2NNA 22, W2PZL 20, WB2HLI 14, K2KIR 13, W2CGD 9, W2PVI 5, W2RUT 5, WB2YEE 5, K2IMI 4, WA2ILE 3, WA2GLA 1. (June) W2EFB 47, W2CGD 8.

WESTERN PENNSYLVANIA – SCM, Robert E. Gawryla, W3NEM – SEC: W3KPJ. PAM: K3ZNP. W3WFR. RMs: W3LOS, W3KUN, WA3AKH. WPA CW Traffic Net meets 3585 kHz at 2300Z daily; WPPN meets daily at 0200Z on 3955 kHz ssb. The Allegheny County ARFC Net meets every Thurs. on 29.0 MHz at 0000Z summer time and 0100Z winter time. The Foothills ARC reports K3SHU is having a ball on 6 meters; WA3ANO received a certificate from the Wheat Straw Radio Club in Oklahoma for working 6 members. (It turned out to be 3 OMs and their XYLs all with their own individual calls). The Nittany ARC announces W3GNR is the new editor; the NARC had the worse Field Day score in 4 years. 11 of its members provided communications for the Annual July 4th Firemen's Parade; NARC again will supply message service for the Grange Fair. WA3JPJ, WA3IRI and WA3KWJ are new Advanced Class licensees. Also, WN3IDA went to Buffalo and passed the General and Advanced Class exams. The Indiana County ARC notes that W3CFC is the Radio Officer for the Western Area ed facilities with headquarters on the IUP Campus; WA3KSA is now the county Radio Officer; K3ZYK has joined the ranks of the married. Radio Association of Erie reports a new club has been formed in Erie called the Presque Isle Amateur Radio Club; WA3HSR and K3VXE are the new co editors of *QUA-RAE*. RAE's 2-meter fm repeater is finally coming about. K3TJM is a new vhf station in the Erie area. Check your license. Renew in time.

WPA traffic totals for July: 31 sessions, 300 stations ONI, 154 messages handled. WPPN traffic totals: 30 sessions, 126 stations ONI, 45 messages handled. Traffic: (July) K3ZNP 200, K3HKK 103, W3NEM 100, W3LOS 96, WA3IPU 90, W3KUN 73, K3SMB 28, WA3IPJ 25, K3ZOB 20, W3UHN 12, K3IICT 7, W3YA 6, WA3NAZ 4, WA3JBN 3. (June) W3KUN 76, WA3IPU 64, K3HCT 18, K3SOH 17, K3SMB 18, W3IDO 1.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v.h.f.). RM: WA9ZUE. Cook County EC: W9HPG.s,

Net	*Freq.*	*GMT/Days*	*Tfc.*
IEN	3940	1400 Su	73
ILN	3760	2330 Dy	138
NCPN	3915	1300/1800 M-Su	111
Ill PON	3915	2245/1430 M-F	736
Ill PON	145.5	0200 MWF	4
Ill PON	50.28	0200 M	4

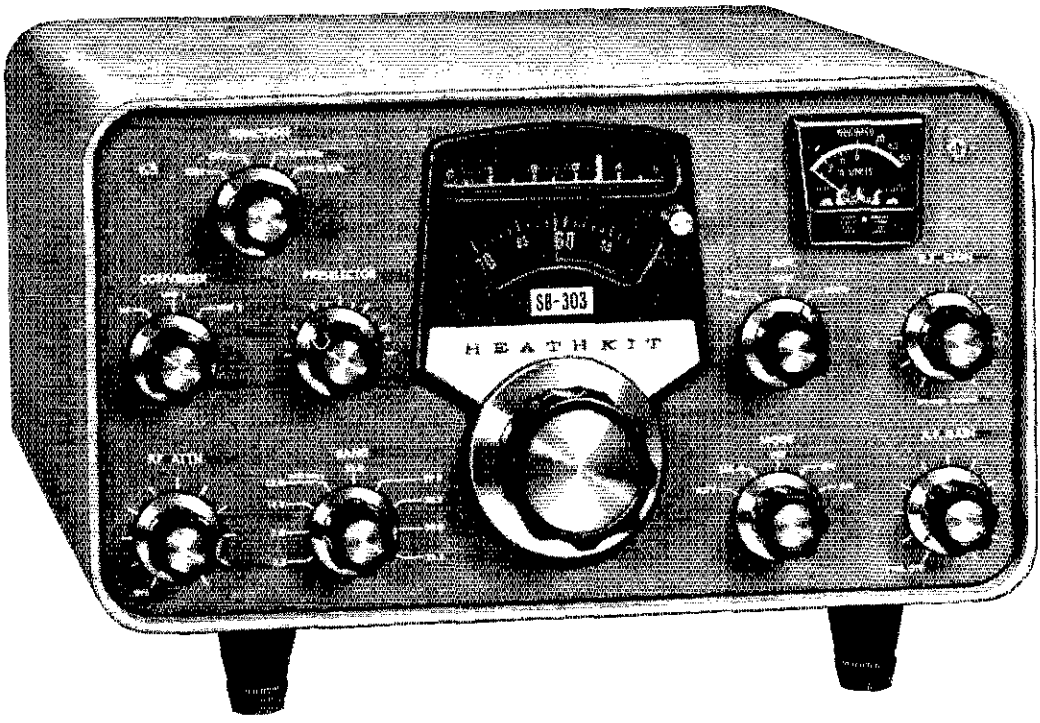
The Ninth Region Net had a traffic count of 334, according to Net Mgr. W9HRY. K9RAS, K9WMP, W9WYB, W9KFQ, W9HSD, W9HPG and K9DQU participated in the League's latest Frequency Measuring Test. WA9TNZ, W9EOK, WA9CCP, WA9GUS, WB9AQY, WA9RSH, W9KWA, W9DYP and WA9SEF are the new officers of the Chicago Suburban Radio Assn. W9MCE is recuperating after a short hospital visit. K9DWK, W9VOB, K9GUD, K9EWR, K9VVL and K9DQU have joined the 29.6-fm group with long-haul success. K9IXJ received his 35-wpm certificate. W9IJM is back from his mobiling vacation through W4-Land. K9KKN is now Extra Class. W9LNQ took first place in the YL/OM CW Contest. W9OUF is the proud grandfather of twins. K9ONK, W9MVT and W9AKQ have joined the ranks of the Silent Keys. This column's sympathy is extended to their family and friends. WA9ZBZ's new QTH is Terre Haute, Ind. WN9BUJ passed the Advanced Class exam and is ready for DX with an NCX-500. W9OKJ is sporting a new 75S3B and 312B4 station control of the Collins Line. K9WQB presented 300 feet of underwater movies and slides taken near Grand Caymam Islands at the York Radio Club meeting. WN9EOW (brother of WA9ZFR) is a new Novice in the Wheaton area. K9LWR is also a new Extra Class licensee. W9EL met W7DI (ex-W9ERU) in Phoenix and made a side trip to K7UGA's station. The Rockford Amateur Radio Assn., Inc. held its Annual Picnic July 26. The Mini-Hamfest was held near Belvidere and officers say it was the best yet. WB9HXX/9 and K9TXJ are BPL certificate recipients for the month. Traffic: (July) WA9WNH 422, WB9HXX/9 300, WA9RTR 253, K9TXJ 239, WB9DPU 184, W9NXG 163, WA9SFB 79, WA9ZUE 79, WA9ZLN 76, W9HOT 74, W9YH 62, WA9ZPL 51, W9ELF 43, W9OOQ 34, WA9LOC 34, WA9BRQ 23, K9AVQ 21, W9LNQ 20, W9PRN 20, WA9TCC 20, WA9NZI 17, W9HJM 11, K9RAS 6, K9HSK 5. (June) W9YH 28, K9RAS 27, K9DQU/WB9AIE 5.

INDIANA – SCM, William C. Johnson, W9BUQ – SEC: W9EC. RMs: W9EC, W9HRY, WA9WMT. WA9ZKX. PAMs: K9CRS, WA9OHX (vhf), W9PMT.

Net	*Freq.*	*Time/Days*	*Tfc.*	*Mgr.*
IPN	3910	1230 Dy 2300 M-F	187	WA9OHX
ISN	3910	0000 Dy 2130 M-S 2300 S-S	331	K9CRS
QIN	3656	0000 Dy	152	WA9WMT
ITN	3740	0000 Dy	59	WA9ZKX
PON	3910	1245 Su	125	WA9UMH
Hoosier VHF			8	W9PMT

jWith deep regret I report the following as Silent Keys: W9DGR of Gary and W9YVS of Fort Wayne. WA9ALU and K9LKC will leave for Germany with WA9DQB and her hubby. New Tech. Class licensees are WB9EPK and WB9ECF. New General Class licensees are WB4KIF/9 and WB9AIY. WA9CDP has a new transmitter on 6, W9VZX has 38 states on 6, W9UC sent in his FMT report. WA9CDP is on 6 now. W9VZX has 38 states for the most state worked to date in the Evansville 6-Meter Contest. K9HYV received the Outstanding Amateur Award for 1970. K9BPV reports that communications for the Jaycees Parade held July 4 at Laporte, was furnished by the Laporte ARC. The Hoosier Hill Annual Hamfest will be held at Spring Mill State Park Oct. 11. Attention all Indiana amateur radio

Introducing the New Heathkit® SB-303



the "303"... the new standard of performance in receivers

■ State-of-the-art solid-state circuit using 27 silicon transistors including 4 dual-gate, diode protected MOSFET's, plus 1 IC ■ Heath factory assembled solid-state Linear Master Oscillator for instant warmup, improved stability & more accurate tracking ■ A unique Heath design using 9 modular plug-in circuit boards ■ Receives *USB, LSB, AM, CW & RTTY* ■ Complete 80-10 M coverage plus 15 MHz WWV for exact calibration ■ 25 kHz & 100 kHz calibration markers ■ Front panel selection of antenna & power connections for up to two VHF converters with rear panel jacks built-in ■ Fast & Slow AGC selectable from front panel ■ Front panel selection of built-in 2.1 kHz SSB crystal filter or optional AM & CW crystal filters ■ Built-in, extremely stable solid-state power supply with circuit breaker protection ■ Speaker and/or headphone selection from front panel ■ Handsome SB-Series styling in a smaller package than the famed SB-301 ■ Easy, enjoyable assembly with the famous Heathkit manual.

The New Heathkit SB-303 . . . another hot performer in the world-famous SB-Series. The "300" and "301" were the choice of thousands because of their obvious performance superiority and value . . . and the new "303" delivers even more of both.

Advanced Design. A dual-gate MOSFET front end provides greater dynamic range and large signal handling capabilities with low distortion . . . new RF attenuator allows adjustment of receiver selectivity to copy weak signals without danger of overloading on strong ones. An all solid-state circuit employing the latest in techniques and devices gives instant warmup, 100 Hz stability in 10 minutes and superior tracking. The exclusive Heath solid-state LMO with 1 kHz dial readout is factory assembled and aligned to assure peak performance and provide the smooth, linear tuning that's become a hallmark of all SB-Series gear.

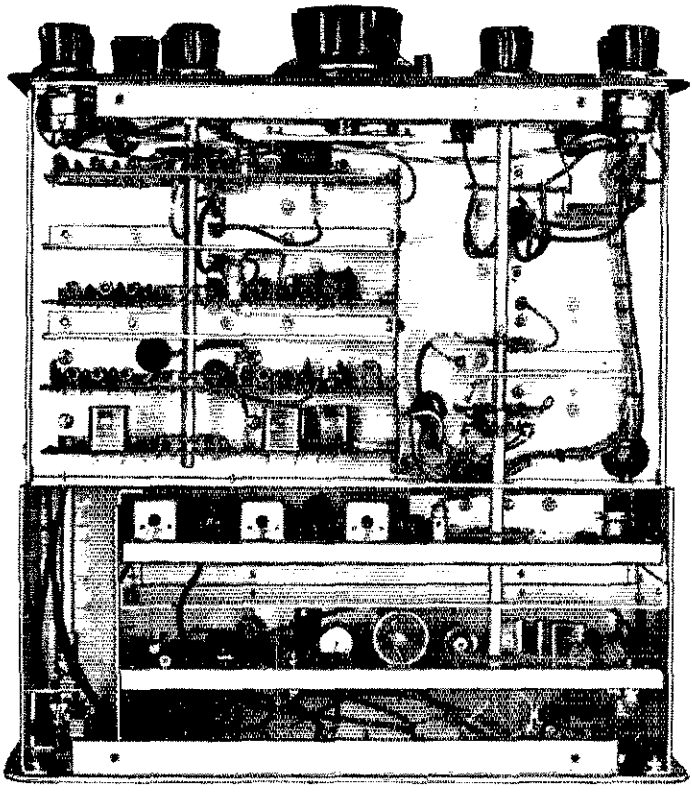
Compare The Performance Features. The new SB-303 offers all the features required for today's operations . . . and they're built-in, not added on later as costly options. The "303" gives complete SSB/CW transceive compatability with the famous "400" or "401". Three position AGC gives the versatility needed for different conditions: Slow limits the amount of background noise present between words and syllables for 5/9 copy . . . Fast position allows scanning large portions of the band without the AGC interruption that slow AGC would cause under this condition. To spot the new subband allocations quickly and simply, just turn the crystal calibrator to the 25 kHz position. Work the high bands? The "303" has antenna & power connections already installed for up to two VHF converters, and front panel switching eliminates cable changing. Spare sockets on the rear panel allow the "303" to be used with a wide range of famous Heath Station Accessories.

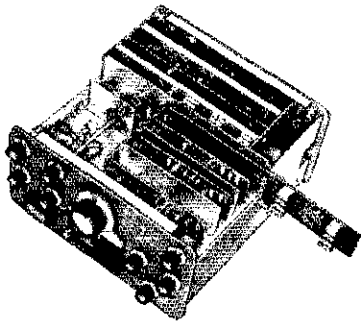
Compare the Specs. Most any receiver will do the job when the bands are hot... but you need good specs when the bands start to go — and the "303" delivers. Sensitivity: less than a quarter of a microvolt for 10 dB S+N/N. Selectivity: 2.1 kHz with the standard SSB crystal filter, and low cost optional filters for CW & AM can be selected from the front panel. Image Rejection: 60 dB or more. IF Rejection: 50 dB or better. Spurious Response . . . Dial Accuracy . . . AGC Characteristics . . . check *all* the specs. You'll see the SB-303 delivers more for a lot less than others.

New Construction Techniques mean faster assembly, less chance for error. Wiring harnesses and nine plug-in circuit boards combine to practically eliminate point-to-point wiring . . . and the special extender boards (see photo opposite) enable you to bring any board out of the compact chassis to check voltage and resistance readings without probing into tight spaces. And, of course, the famous Heath manual guides you a step at a time, with clear, concise instructions and giant fold-out pictorials.

Check Out The New "303"... send for a free spec sheet and see how other receivers stack up for performance, value & price. Then order your new "303"... another FB piece of gear — from the Hams at Heath, of course.

Solid-State Amateur Receiver... $319.95*





Inside The New "303". When the Hams at Heath design gear, it not only looks good . . . it's easy to work on should you ever have to. Because of the compact design, we've innovated a special technique to make service and adjustment easy — extender boards. These special boards allow you to bring any board out away from the chassis . . . and patchcables supplied mean you can make checks and adjustments while the "303" is operating. Note the liberal use of shielding between circuit boards that contributes to greater stability and more rugged mechanical design.

Kit SB-303, 19 lbs. **$319.95***
SBA-301-1, optional 3.75 kHz AM crystal filter, 1 lb. . .**$20.95***
SBA-301-2, optional 400 Hz CW crystal filter, 1 lb. . . .**$21.95***

SB-303 SPECIFICATIONS: Frequency Range (MHz): 3.5 to 4.0, 7.0 to 7.3, 14.0 to 14.5, 15.0 to 15.3, 21.0 to 21.5, 28.0 to 30. **Intermediate Frequency** (IF): 3.395 MHz. **Frequency Stability:** Less than 100 Hz drift per hour after 10 minutes warmup under normal ambient conditions. Less than 100 Hz drift for ±10% line voltage variation. **Frequency Selection:** Built-in Linear Master Oscillator. **Modes Of Operation:** SSB — Single sideband (suppressed carrier, with selectable upper or lower sideband). CW — Keyed continuous wave. AM — Amplitude modulated continuous wave. RTTY — Radio teletype (frequency-shift keyed continuous wave). **Sensitivity:** Less than 0.25 uV for 10 dB S+N/N for SSB operation. **Overall gain:** Less than 1.5 uV input for 0.5 audio output (single tone SSB). **AGC characteristics:** Blocking — Greater than 3.0 V CW/SSB/RTTY. Dynamic Range — Greater than 150 dB CW/SSB.

Selectivity: SSB — 2.1 kHz @ 6 dB down, 5.0 kHz maximum at 60 dB down (crystal filter supplied). CW — 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). AM — 3.75 kHz at 6 dB down, 10 kHz maximum at 60 dB down (crystal filter available as an accessory). RTTY — 2.1 kHz at 6 dB down, 5.0 kHz maximum at 60 dB down (uses SSB crystal filter). **Image rejection:** 60 dB or better. **If Rejection:** 3.395 — greater than 55 dB. 8.595 — greater than 50 dB. **Spurious Response:** All below 1 uV equivalent signal input. **Temperature Range:** 10°C ambient. **Dial Accuracy:** Electrical — Within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual — Within 200 Hz. **Calibration:** Every 100 kHz or 25 kHz. **Dial Backlash:** No more than 50 Hz. **Antenna Input Impedance:** 50 ohm nominal unbalanced. **Audio Response:** SSB — 350 to 2450 Hz nominal at 6 dB. CW (with accessory filter) — 800 to 1200 Hz nominal at 6 dB. AM (with accessory filter) — 200 to 3500 Hz nominal at 6 dB. RTTY — 1840 to 3940 Hz nominal at 6 dB. **Audio Output Impedance:** Matching Speaker — 8 ohm. Matching Headphones — Low impedance. **Audio Output Power:** 4 watts at less than 10% distortion. **Muting:** Open external ground at Mute socket. **Power Requirements:** 105 to 125 or 210 to 250 VAC, 40 watts maximum. **Front Panel Controls:** Main tuning dial; function switch; mode switch; band switch; AGC switch; converter switch; AF gain/power on-off; RF gain/speaker disable; preselector; noise blanker/off-on-threshold. **Circuit Board Controls:** IF/Audio — Bias adjust; meter zero; meter full scale. Power Supply/BFO — + 15 V adjust; 100 kHz adjust. RTTY — Wide Shift; narrow shift; CW shift. **Connections:** Rear Panel — Phones; HF antenna; VHF antenna #1, VHF antenna #2; mute; antivox; speaker; HFO out; LMO out; VFO out; CW shift; four spare sockets; 3-wire line cord socket; accessory socket: VHF Converter, + 15 VDC @ 25 mA, switched. RTTY Keyboard. **Cabinet Dimensions:** 12¼" W x 6⅝" H x 13" D. **Overall Dimensions** (with knobs & feet installed): 12¼" W x 7⅛" H x 14" D. **Net Weight:** 15¾ lbs. **Note:** specifications measured with 120 VAC line voltage at 25°C.

clubs: Do not forget to send a delegate to the Indiana Radio Club Council meeting in Oct. The date will be transmitted over all Official Bulletin Stations. QIN Honor Roll: W9HS 28, W9BDP 27, K9VHY 24, WB4DBZ/9 23, W9JBQ 19, WA9MXG 19, WA9ZKX 18, W9MZV 15, WA9WMT 15. *Amateur radio exists because of the service it renders.* BPL certificates went to W9EQO and W9IYO. Traffic: (July) W9IYO 378, W9JBQ 348, WA9ZKX 228, W9EWH 201, WA9WMT 161, WA9OHX 132, WA9GJZ 127, W9KQO 112, W9HRY 107, W9ICU 94, WA9VZM 90, K9CBY 66, WA9MXG 54, K9CRS 42, W9MZV 36, W9BUQ 34, W9DZC 29, W9VHY 28, WA9WJA 24, W9PMT 23, WA9VBG 23, WA9YBM 21, K9ILK 20, WA9AXF 16, K9RPZ 16, W9EJI 14, W9UEM 14, K9JQY 13, W9LG 11, W9YYX 11; WA9BHG 10, K9DIY 6, W9FC 5, W9HWR 5, W9BDP 1. (June) WA9MXG 74, W9MZV 20, W9UEM 16, W9CMT 4.

WISCONSIN – SCM, S. M. Pokorny, W9NRP – SEC: W9NGT. PAMs: WA9EZT, WA9IZK, WA9OAY, WA9QKP, WA9QNI. RMs: W9HQT, K9KSA.

Nets	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
WSSN	3662	0030 TTSat	75	12	K9KSA
WIN	3662	0115 Daily			W9HQT
WRN	3620	0130 Su (RTTY)			K9GSG
SW2RN	145.35	0230 Daily	145	2	WA9IZK
SW6RN	50.4	0300 Mon-Sat			WA9EZT
BWN	3985	1245 Mon-Sat	356	190	WA9OAY
BEN	3985	1800 Daily	659	87	WA9QKP
WI-Pon	3925	1801 Mon-Fri	399	85	W9VCM
WSBN	3985	2300 Daily	1145	109	WA9QNI
BEN*	3985	1800 Dy	632	71	WA9QKP
WIN*	3662	0115 Dy	212	72	W9HQT

*June. A new General Class licensee at Ellsworth is WB9ESK. During the past few months a code and theory class was held at the University of Wis., Whitewater, and the following now have their Novice licenses: WN9s DWF, DWG, EML, EMM, EMN, EMO, EMP, EMQ, EMR, EMS, EMT, EMU. WSBN Net certificates went to W9JIF, WA9YEC and WA9YMM. Renewed appointments: K9PKQ as EC, K9OSC as OO, WA9QNI as PAM and OPS, W9NLJ as ORS. Traffic: (July). WB9BJR 272, WA9QNI 64, W9ZGQ 53, W9NRP 52, W9YT 49, K9JPS 34, K9TRY 31, W9FSJ 30, W9RTP 30, WB9ABF 26, K9FHI 24, K9KSA 23, WA9YEC 17, WA9PDZ 16, WA4ICF/9 15, WA9OAY 15, WA9LRW 12, WA9PKM 8, WA9THF 8, WA9ZTY 3. (June) W9CXY 228, W9DND 28, W9HQT 25, WB9ABF 19.

DAKOTA DIVISION

MINNESOTA – Acting SCM, Bob Schoening, WØBE – SEC: WAØMZW. PAMs: WAØMMV, WAØIRM, WAØOEJ, WAØDWM. RMs: WØAAU, WAØURW, WAØIAW.

Net	*MHz*	*Time(Z)/Days*
MSPN Noon	3.945	1805 GMT M-Su (1500 Su)
MSPN Evening	3.940	2345 GMT Dy
MSN	3.685	0030 Dy
MIN	3.685	0100 Dy
MSTN	50.400	0430 Dy
MINN RTTY	3.620	0200 Su
MINN AREC	3.912	2300 Su
PICONET	3.925	1900 Su
MPON	3.910	1830 Sa
MINN 40 C.W.	7.06	2300 M-W-F

Note the GMT changes. Although most the nets meet the same time local time since daylight saving time is off. WØIYP, WØWAS and WAØMKB all qualified as Class I OO, as did WAØGYQ, but Mick is moving to Wisconsin where he hopes to continue his activities. WAØVHX is a new OPS/ORS and will be active from WB9DAK in Wisconsin during the school year. The Viking Amateur Radio Society has sent scores for the Minn. QSO Party to participants, with WA1JHQ and WØIYP winning the out- and in-state sections. Dates have been set for next year's, so watch for them. WAØSAD is moving to Western Minnesota where we hope he continues to work 6 meters. KØGYO has had to turn the MSTN management and PAM duties back to WAØDWM, but we congratulate him on a good job. WØZSW received the Minnesota Amateur of the Year Award for 1970, and we hope many others will emulate his fine example! WØIRJ and Orvin Fingarson, of Peterson, Minn., are being married in Oct. after meeting on the air. Orvin will have his license very shortly and we wish them both lots of happiness. Traffic: (July) WAØVAS 805, KØCSE/Ø 189, WØZHN 96, WAØWEZ 66, WØWFA 53, WAØEPX 47, WAØVHX 43, WAØHRM 39, WAØVTZ 39, WØIYP 38, WAØOEJ 38, WAØYMU 30, WAØTFC 29, WAØIAW 26, WAØZTU 26, WØPET 20, WAØTFY 20, WØBE 19, KØICG 19, KØORK 19, WAØYAH 18, WAØYJB 17, KØZRD 14, WØBUO 13, WAØMQH 13, WØYC 13, WNØYVT 11, KØFLT 10, WØPAN 10, WØUMX 10, WAØJPR 8, WAØWWM 7, KØZXE 7, KØGYO 4, WAØMNE 4, KØZBI 3. (June) WØAAU 15, WNØYWA 7, KØZBI 1.

congratulations W4BRB...

FOR WINNING 5BDXCC AWARD #8...*BAREFOOT!*

Your Five Band DXCC Award is clear tribute to patience, persistence and outstanding skill as an amateur radio operator. Certainly these same qualities are shared by your fellow amateurs who belong to this elite group, but we feel that you deserve special mention for confirming contacts with 100 countries on each of the 5 bands, 10 through 80 meters, without the aid of a high powered linear amplifier. To achieve this award running the legal limit is tough enough . . . to accomplish the task with 500 watts is even more noteworthy.

The honor is all yours Gene, but we are understandably proud that you earned your award operating 'barefoot' with a Swan 500C Transceiver.

73 from all the gang at Swan.

SWAN
ELECTRONICS
305 Airport Road
Oceanside, California 92054
A Subsidiary of Cubic Corporation

See your Swan dealer soon for complete information on the Swan line.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – SEC: WAØAYL. OBS: KØSPH. PAM: WØCAQ. RM: WAØRSR. OO: WØBF. The International Hamfest held at the Peace Gardens July 11-12 was well attended. The social hours on Sat. evening were well attended as was Sun. with church, meetings, transmitter hunt and prizes. WØBUO, ARRL Vice-Pres., was present, as well as WØPAN, Dakota Division Director. Next year this meeting will be held on the American side with WBØATJ and WAØUKD as co-chairmen assisted by WAØSJB. WAØMND is home recuperating from her bout in the hospital and getting along fine. WAØAYL is in Ohio going to school. We were saddened by the passing of WØOZY, a long-time amateur but known better as a radio engineer of the many BC stations in the community. WAØRWL has been very busy in scouting this past year and topped it off by going to Philmont Ranch in New Mexico this summer. Congrats to KØSPH and his XYL. They celebrated their 50th anniversary Aug. 2, at First Presbyterian Church in Fargo.

Net	*kHz*	*CDT/Days*	*Sess.*	*QNI*	*Tfc.*
Goose River	1990	0900 Sun.	4	31	
NDRACES	3996.5	1830 M-F	23	503	58
NDPON	3996.5	1830 S-S	12	103	21
		0900 Sun.			

Traffic: (July) KØSPH 33, WØDM 10, KØPVG 10. (June) WAØELQ 6.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – New calls are WNØCCD, WNØBJD, WNØATF and WNØBPX, all Sioux Falls, and WNØBWF, Hot Springs. WAØRIQ is mobile with an HW-12A and WAØSHB with an SB-100. WA5YHZ and WB9AIX are new hams in Sioux Falls. WBØALZ has left for Fort Lewis, Wash. WAØYRI and WAØYRH, of Madison, are on the air with Drake R4A/T4X. WAØYAK has been working DX with his new TH-6 DXX tri-band beam. SEC WAØFUZ reports 114 AREC members and 23 EC's. The Morning Net reports 431 check-ins, 65 formals. The South Dakota CW Net opened up Sept. 1 on 3645, same time as last year. Traffic: WØHOJ 106, WAØPNB 105, WØIG 35, WAØUEN 30, KØAIE 27, WØCAS 26, WAØFUZ 23, WAØRIQ 22, WØEJZ 2.

DELTA DIVISION

ARKANSAS – Acting SCM, Jimmie N. Lowrey, WA5VWH – SEC: W5PBZ. RM: WA5TLS. PAM: WA5KJT. Congratulations to K5YCM and WA5VNT on passing the Advanced Class exam and to WA5OKN on passing the Extra. K5YCM, WB5BTY, WA5PZP and WA5VWH have new SB-102s. WA5VNV received his Advanced Class license and has a Swan 500. WA5WMC has a new MP-33 and a two-element beam for 40 meters. WA5WMD has an NCX-3 mobile now. Welcome to new Tech. Class licensee WB5BYV. The Fort Smith 2-meter is growing every day and should be on the air in a few months. WA5KJT has his tower up and is hoping for a four-element 20-meter beam for the top.

Net	*Time/Day*	*Freq.*	*Tfc.*	*QNI*	*Mins.*	*Mgr.*
OZK	0000Z Dy.	3790	30	117	474	WA5TLS
RN	3995Z Dy.	3995	35	511	621	WA5KJT
PON	2130Z M-F	3925	53	243		W5MJO
APN	1100Z M-F	3937	4	392	1320	W5VFW
DX INFO	2345Z Mon.	3860				WA5EFL

Traffic: WA5GPO 1007, W5NND 98.

LOUISIANA – SCM, J. Allen Swanson, Jr., W5PM – SEC: W5OB. RM: K5ANS. WA5VQE now has regular assignment on CAN. Incidentally, LAN (3615) needs additional outlets in the state. The net meets twice nightly. WN5ZNV has worked WAS. Up Northwestern State way there are two new members of the gang: WN5BVZ and WN5BYQ. WA5MMD has built a new operating desk, antenna turner and injector keyer. WA5IEW has a new homebrewed 700-watt amplifier and is also building an injector keyer. WA5ITW has been busy teaching skin diving. WA5PAA is now in school in Texas. WA5USA and WA5USB are freshmen at Northwestern State. WA5NUK says his antennas were down but have been reinstalled and he is going all out on LAN. We still need a new net manager. Contact K5ANS. The American Red Cross Station, WA5WMP, operates 3830 kc. nightly and 7210 while hurricanes are in the Gulf or other disasters affect the Gulf Coast area. WB5CBS is a new addition to our ranks from New York. W5WMU has received the call VP1WMU and will operate from VP1-Land during the CQ WW DX Phone Test. K5RSH has gamed the Extra. W5YRU went to Advanced and WB5BLE earned his General. W5CEZ still pursues the elusive fish at Toledo Bend. WA5CAV is now with the Navy and occasionally operates from AX6US. Out Lake Charles way KHKS recently presented a program about ham radio. In addition KPLC-TV aired "The Wide World of Amateur." Incidentally, the Amateur RC Southwest Louisiana recently presented a Certificate of Appreciation to one of "MA" Bell's operators for her part in the 10,000th phone patch! Congrats, K5DXY, to you and your gang on

The Most Powerful Signals Under the Sun!

hy-gain/galaxy

FM-210 Transceiver

TOP FM PERFORMANCE FIXED STATION OR MOBILE

Capability... that's the word for the Galaxy FM-210 2 meter FM Transceiver. Top performance either fixed station or mobile, direct or repeater. There's a full 5 watts of power or 10 watts with the optional AC-DC Power Booster. American-made, solid state construction. Match the FM-210 with any of the suggested top performance Hy-Gain antennas and see what we mean by *capability!*

FM-210 Order No. 813 Price $229.50

SPECIFICATIONS:

Frequency range: 143-149 MHz. Antenna Impedance: 50 Ohms Nominal Power Req'mts: 12-14 VDC (or optional power booster).

Transmitter: Power Input: 5 watts (10 W. with pow. booster) • Freq. Control: 3 Chan.* crystal controlled • Microphone: High Impedance req'd. • Deviation: Adj. narrow or wideband with clipper filter also adj. for optimum clipping level.

Receiver: Sensitivity: SINAD .5uv for 12 db, 1uv provides 20 db quieting • Adjustable squelch • Modulation Acceptance: FM wideband (narrow band available) • Type: Dual Conversion, FET front end for minimum cross modulation and overload • IF Frequencies: 10.7 MHz and 455 KHz • Freq. Control: 3 chan.* crystal controlled • Audio Output: 3 watts (intr'nl 3.2 spkr.).

* Furnished with 146.94 crystal for transmit and receive.

Power Booster: Provides high power operation from either 12-14VDC or 117 VAC. Makes an ideal fixed station accessory. Order No. 814. Price $49.00.

Hy-Gain Fixed Station Antennas

No. 28, eight-element, 2 meter beam. Order No. 341. Price $19.95.
No. SJ2S4, four stacked, 2 meter J-pole. Order No. 362. Price $74.95.

Hy-Gain Mobile Antennas

130 to 174 MHz, 5/8 wave, 3 db gain, roof or deck Claw Mounted, 22' coax. Order No. 764. Price $28.50.
108 to 174 MHz, ¼ wave whip, Claw base. Order No. 786. Price $4.00.

Stop by the best dealer under the sun—the one who stocks Hy-Gain Antennas and Hy-Gain's Galaxy Line.

GALAXY ELECTRONICS DIVISION

HY-GAIN ELECTRONICS CORPORATION

P.O. Box 5407-HJ Lincoln, Nebraska 68505

For the shack and bench

Assemble these new RCA Integrated-Circuit Experimenter's Kits quickly and easily. All the active and passive components, the pre-drilled printed circuit boards, and full clear instructions are included. (8-ohm speakers for KC4005 and KC4006, and batteries not included).

KC4000: Microphone Preamplifier IC Kit – a high-gain, low-noise, wideband preamplifier that accommodates both low- and high-impedance microphones.

KC4001: 2-Channel Mixer IC Kit – combines any two audio inputs, such as microphone, radio, phono, or oscillator, into a single output.

7 NEW IC KITS FROM RCA

KC4002: Audio Oscillator IC Kit – for testing audio, hi-fi equipment, and amateur radio transmitters – also for code practice.

KC4003: Amplifier/Oscillator IC Kit – a 500 mW audio amplifier or a variable tone audio oscillator.

KC4004: 9-V Regulated Power Supply IC Kit – supplies 9 volts DC output with voltage regulation of less than 5% at a maximum current of 250 mA.

KC4005: Intruder Alarm IC Kit – a circuit that develops a warning "whooping" signal.

KC4006: Fire Alarm IC Kit – a heat-sensing wire sets off a warning circuit.

KC4500: IC Kit Enclosure and Hardware Pack – *optional for KC4000, KC4001, and KC4002* – a handsome, sturdy, prepunched case with input and output jacks, switch, and other hardware.

Buy these kits from your RCA Distributor. For information, write: RCA Electronic Components, Commercial Engineering, Section 129 J/S30R, Harrison, N.J. 07029

(STARTING AT UNDER $5.00*) *Optional distributor resale price.

RCA

Printed in U.S.A.

the fine PR job! There is a new radio club in New Orleans called the New Orleans Repeater Assn., according to WA5DXA. WA5KNO is pres.; K5EJP, vice-pres.; and K5KHG, secy.-treas. The GNOARC is again holding code and theory classes. WA5WPV is headmaster. Understand the Eye Bank Net, which meets at 3970 at 8 P.M. (LDST), needs an operator in the New Orleans area. Contact WØNTI if interested. Your SCM is off to England, Switzerland and Italy until Nov. 1. W5OB will handle the column while I am gone. The QRM monthly club bulletin from Slidell recently won three awards in a recent Amateur Radio News Service contest. Traffic: WA5VQE 142, W5CEZ 36, WA5WBZ 26, W5FA 8.

MISSISSIPPI – SCM, Clifton C. Comfort, WA5KEY – SEC: WA5JWD. RM: W5SBM. PAM: W5NCB. PAM GCSBN: W5JHS. The MSBN Summer Picnic held at Sardis Lake was a real success. WA5TOD and WA5OKI did the leg work. WA5UYW has been elected net manager for the year '70-'71. WA5TBA is EC for Benton County. WA5JWD is moving to Hernando to teach school and will use the 2nd call WB5AHE while there. W5NCB received his WAS certificate. New Novices: WN5BKM, the father of WA5UIH; WN5BEV, in Columbus; WN5BWA, in Starkville. Welcome back to Mississippi to W5GWD and W5RJJ and back on the air to W5WMQ. WA5YPR and W5NCB teamed to secure emergency information from the poison control center at the Univ. of Miss. concerning a child who had chewed castor oil bean tree leaves. WA5EIN is now on 6 meters. Did WA5YJA really get accidentally locked in his shack or did his XYL do it? Anyway, a local ham answered his radio call and got him out!

Nets	*Freq.*	*Time*	*Mgr.*
GCSBN	3925	1830 CDT Da	W5JHS
MTTN	3665	1845 CDT Da	W5SBM
MSBN	3930	1915 CDT Da	WA5UYW
CGCHN	3935	2000 CDT Da	WA5GOH

Traffic: WA5EIN 73, WA5JWD 60, W5WZ 39, WA5KEY 24, WA5BUE 22, W5NCB 10, WN5ADR 6, WA5SEG 4.

TENNESSEE – SCM, Harry A. Phillips, K4RCT – SEC: WB4ANX. RM: K4AMC. PAMs: W4PFP, K4MQI, WA4EWW.

Net	*Freq.*	*Time(Z)/Day*	*Sess.*	*QNI*	*QTC*	*Mgr.*
ESSB	3980	2330 Tu-Su	26	1384	114	K4MQI
TPN	3980	1145 M-Sa 1300 Su	31	1363	70	W4PFP
ETPN	3980	1040 M-F	23	614	24	WA4EWW
TPON	3980	2330 M	5	153	18	K4RTA
TN	3635	0000 Dy	31	132	28	K4AMC
ETVHF	145.2		9	51		WB4IOB
ETVHF	50.4		13	114		WB4IOB
TeMSN	50.1	0015 W	3	19		K4LQO
ETTMN	26.8	0130 W&F				K4LTA
MTTMN		0100 T&F	9	96		WA4GLS

The Crossville Hamfest was a big success. At the banquet Director Arnold, W4WHN, presented the ARRL Technical Merit Award to W4HHK for his moonbounce work with W3GKP, who shares the award. W4HHK and WA4HGN have set a new distance record on 2.3 GHZ of 249 miles from Sunset Rock, near Sparta, to Collierville, near Memphis. WB4ANX has been appointed SEC. If anyone has any questions or suggestions concerning the AREC, contact John at 2149 Heatherly Rd., Kingsport, Tenn. 37660. The new officers of the Tenn. Council of ARC are WA4NEC, chairman; WB4KHW, vice-chairman; W4OGG, secy.-treas. Yours truly met with the Cleveland ARC and discussed section activities. Traffic: WA4ZJY 106, W4SQF 77, WA4UAZ 65, W4MXF 45, W4WBK 44, WB4DYJ 31, WB4MPJ 28, WB4ANX 26, W4PI-P 23, W4SGI 18, WA4ZBC 13, WA4CGK 11, WB4ITS 11, WA4TWL 11, WA4GLS 9, K4AMC 8, K4SJV 8.

GREAT LAKES DIVISION

KENTUCKY – SCM, George S. Wilson, III, W4OYI – SEC: K4YZU. Appointments: WB4KER as EC and OPS. Endorsements: K4VDO as ORS, K4UMN and W4NBZ OPSs. BPL: W4OYI and WA4MKH, the latter a medallion winner.

Net	*Freq.*	*EST*	*QNI*	*QTC*	*Mgr.*
KRN	3960	0630	292*	20	W4BEJ
MKPN	3960	0830	461*	96*	K4TRT
KTN	3960	1900	891*	122	WA4AGH
KNIN	3725	2100	66	42	WB4NQZ
KYN	3600	2000 2200	271	297	W4BAZ

W4UX had a fine vacation, visiting many of his ham friends and his son, WA2ILL. The Louisville gang did a fine job, despite difficulties, in handling the Powder Puff Derby communications. Those known to have participated were W4BAZ, K4YZU, WA4AGH, WA4WSW and WB4AUN. WB4LIL has been making nets at all levels; he has an antenna party scheduled. It strikes me as a healthy sign that traffic totals are running par with last year with reporting up. More people

are getting into the act; yet there is a disturbing weakness in originations. We need more teenagers. Isn't your area ready for a training class? It is if it's been more than three years. Headquarters has excellent materials for this sort of thing. At the end of July, 62 individuals held 86 appointments. These included 25 ORSs, 22 OPSs and 19 FCs, with the rest scattered among OVSs, OBSs and OOs, plus the net managers and SEC. Traffic: (July) WA4VZZ 345, WA4MKH 272, WB4LIL 194, WB4KPE 163, W4OYI 130, W4BAZ 117, WB4KER 65, K4TRT 53, W4UK 50, WB4NQZ 49, K4MAN 44, WA4MXD 43, WB4EOR 41, WA4AGH 35, WA4FAF 22, WB4AUN 20, K4HOE 13, K4UMN 13, K4VDO 13, WB4EQY 12, *W4EWL 12, WB4MQR 12, K4UNW 10, WA4MEX 7*, W4BTA 4, W4NBZ 4, WA4WSW 3, K4HY 2, WB4GCV 1. (June) WB4HQW 41. Total reports 40*, total traffic 1790*.

MICHIGAN – Acting SCM, Ivory J. Olinghouse, W8ZBT – SEC: W8MPD. RMs: WA8PIM, W8RTN, W8WVL, K8KMQ, WB8DTT. PAMs: W8VXM, WA8TAN. VHF PAMs: W8CVQ, K8AEM.

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300 Dy	524	330	62	WA8PIM
WSSB	3935	0000 Dy	788	110	31	W8VXM
BR/MEN	3930	2230 M-F	856	88	27	WA8TAN
GLETN	3932	0230 Dy	743	110	31	W9KBI
PON-DAY	3953	1600 Dy	713	488	31	K8LNE
PON-CW	3645	2400 M-Sa	143	48	25	VE3DPO

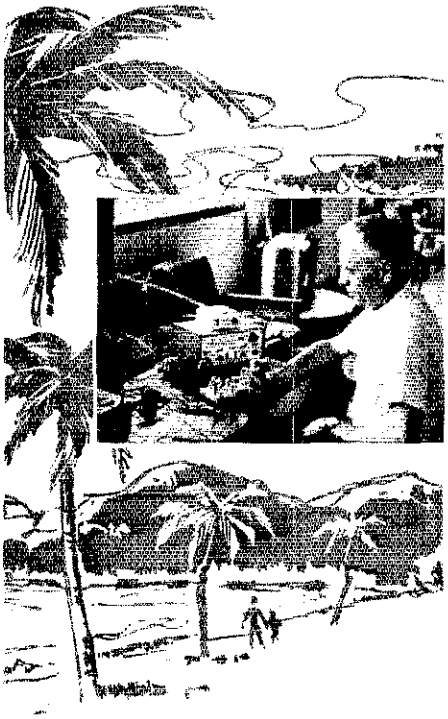
We regret to announce K8ILC as a Silent Key. K8LNE, K8ZJU, WA8ZDF and WA8YVR made the BPL. MI-PON members presented a plaque to K8LNE for his understanding and leadership of the net. K8EAC is visiting K8ACO and found time to get on the air. WB8BFK is busy with match-boxes – and they work! WB8BYB has a new HW-100. WB8DKQ is now General Class. New officers of GLETN are W9KBI, mgr.; K8PVC, asst. mgr.; WA8CPA, secy. New officers of BR/MEN are WA8TAN, mgr.; K8JED, asst. mgr.; W8FJU, secy. W8VXM is now mgr. of the WSSB Net. Many of the gang on vacation have fine signals from portable locations. Traffic: (July) K8ZJU 626, WA8WZF 586, K8LNE 529, WA8PIM 374, WA8YVR 374, WB8DTT 119, WA8LXY 100, K8MEG 71, W8MO 69, *WB8BYB 67*, W8FZ 67, *WA8ENW 66, W8IZ 66, WA8ONZ 60*, W8NOH 52, W8IUC 46, WA8IAQ 40, W8TBP 38, WB8CFV 34, W8ZBT 34, K8JED 30, W8BEZ 24, WB8ANR 16, WB8BJP 16, W8AGQ 13, WA8WWS 12, W8FX 9, WA8PDN 4. (June) K8ZJU 547, K8JED 54.

OHIO – SCM, Richard A. Egbert, W8ETU – SEC: W8OUU. RM: W8IMI. PAM: K8UBK. VHF PAM: WA8ADU.

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time(Z)*	*Mgr.*
OSSBN	2079	912	62	3972.5	1430 & 2245	K8UBK
BN	768	453	61	3580	2300 & 0200	W8IMI
O6MtrN	456	64	61	50.61	2300	WA8ADU
				50.16	0100	
OSN				3580	2225	WA8VNU

BPL certificates for July traffic go to K8ONA, W8QCU and WB8CWD. WA8DWL was inadvertently left off the BPL list last month. The Third Annual Traffic Nets Picnic was a very successful affair with about 50 in attendance and fine weather. Net managers delivered their usual fine oratory, and 8RN Mgr. W8CHT announced that 8RN certificates were earned by WA8YUB, WA8ULF, W8PMJ, WA8WAK, WB8AKW, W8IMI, WA8ZTV, WA8CXY, WA8OCG, WA8ETX, WA8GRR, K8LGA, WA7TYF, WB8ALU, W8GVX, *WA8UPI, WA8VNU* and *W8JD*. *WA8RWK*, ex-*EC* and *OSSBN* regular, is now in Colorado. OVS WA8VBK reports a number of good openings in July, providing 6-meter contacts with stations from Maine to Alabama. WA8TYF worked ZF1AA on 6, and W1, 2, 9 and Ø on 2 meters. ORS W8QCU won second prize in the code copying contest at the West Va. Convention. WA8STX took advantage of the openings on 6 meters and worked Fla., Nova Scotia and Cayman Is. W8EFW had a couple of weeks in Europe for some eye-ball DXing. Asst. EC K8BHH writes of providing communications in summoning police to an accident in the Canton area. Also participating were WA8IDL and WA8LAM. With regret we report that W8DAE, W8FRV and W8AJH have joined Silent Keys. The Stark Co. AREC/RACES Bulletin announces that EC K8DHJ has been appointed Civil Defense Communications Officer and Asst. EC WA8ETX has been appointed Radio Officer. The RACES call is now WA8NOQ. WA8ZCQ advises that there are a number of DX QSL cards in the W8 QSL Bureau for Novice licensees who have not sent envelopes to the Bureau. The new QSL Bureau address is given on page 79 of Aug. 1970 *QST*. Aug. *QST* erroneously listed K8ONV as a recipient of *BPL*. It should have been K8ONA. Central Ohio *EC* W8ERD gave a talk on Amateur Radio Emergency Communications to the Columbus Ambassador Club. Aug. *QST* presented the results of the 1970 SET. Once again our section led the nation AREC-wise, with a large improvement over last year's totals. Those who participated are to be congratulated, and those who didn't should be

he worked the world.

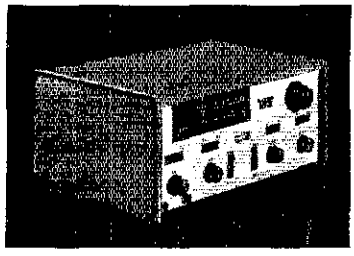


Mr. John H. Thompson, W1BIH/PJ9JT, recently packed his Ten-Tec Power-Mite PM 3A transceiver into a suitcase and headed for the Coral Cliff Hotel, Curacao (Netherlands Antilles). From there he worked the world.

"Final tally on the PM 3A results at PJ9JT are 261 QSOs on 14 MHz and 41 QSOs on 7 MHz for a total of 302. This includes 32 different countries in 5 continents. I operated only with the PM 3A on 7 and 14 Mc. CW. No contacts were set up first on high power, nor was any auxiliary receiver used. It was all done with the PM 3A. Of course I had a FB location and the PJ9 call didn't hurt. Among the DX worked were five VKs, a ZL, VU and 4X4. Only Africa was missed and I did get a PJ? response from an EL. The batteries, a pair of 6V lantern batteries in series, lasted the entire operation and showed no signs of failing. Some comments from stations worked:

W8KIT: 'Congrats on that signal with real QRP'
WØOPK: 'Unbelievable'
W5IUW: 'Ur really busting my ears'
W3KR: 'Boy, ur 5 watts FB here on my attic antenna'
W4KC: 'Did you say 5 watts?'
W2GA: 'Boy, ur rig doing FB'
W4YWX: 'Unbelievable — if I didn't know you I'd swear you're pulling my leg because ur hitting 20 DB'
K3CUI: 'Are you really running only 5 watts? FB'
OK1AOR: 'Sigs 589 FB'
K6IC: 'Your 5 watts sure good here'
UK2KAF: (ex UP2KNP): 'Ur low power sure doing FB'
K4ZA: 'Ur sig has real punch'

I did other hamming, making some 400 contacts on the other bands, both CW and SSB using high power equipment. Could have made many more QSOs in the same time using the high power rig but it wouldn't have been half the fun."



Power-Mite PM 3

PM 3: 20-40 meter bands CW only — power input 5 watts power required 12 V d.c. — 500 ma. High impedance output for headphones. **$69.95**

Power-Mite PM 3A

PM3 A: Same features except with break-in keying. **$79.95**

Order today from your distributor, or direct:

Please ship my ☐ PM 3 $69.95 prepaid at once.
☐ PM 3A $79.95

I enclose my ☐ Personal check ☐ Money order in full

Satisfaction guaranteed or money back.

Name_____

Address_____

City_____ State_____ Zip_____

Dept. L
TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862

encouraged to do so. Our SET performance NTS-wise is equally good, and kudus are in order for those participants. Congratulations to new Advanced Class WA8YIG. July appointments: WA8MIH as EC of Allen, Putnam and Auglaize Counties; W8EPA as EC of Jackson, Meigs and Gallia Counties; WA8VKF as OVS; WB8AYC as OPS; WB8DHY and WB8CWD as ORSs. Buckeye Net certificates went to K8RXD, WA8KPN, W8JMD, WA8YUR, WA8HGH, WB8CWD and W8BHY. W8CHT announces that the Fourth Annual Eighth Region ARPSC Conference will be held in Columbus Oct. 24. Every amateur interested in ARPSC should attend in the interest of improving our emergency communications system. Details are available from W8CHT, W8IMI or on any section net. Traffic: (July) K8ONA 345, W8QZK 343, W8LAG 339, WA8CXY 308, W8IMI 274, W8QCU 229, WA8DWL 160, WB8ALU 156, WA8ETX 130, W8GVX 127, WB8CWD 123, WA8WAK 115, W8ID 113, WA8YUR 104, WA8UPI 90, W8MOK 84, WA8TYF 84, K8UBK 78, K8BHH 72, WB8AKW 70, WA8ROQ 70, W8PMJ 67, WA8OLK 67, WA8SFD 65, W8CHT 64, WA8AJZ 63, WB8DSV 62, W8JMD 58, WA8ZTV 54, W8GNL 50, W8OUU 50, W8RYP 48, WB8CKI 45, WA8VKF 45, WB8DHY 43, WA8WPQ 43, WA8RUO 42, WB8AYC 39, WA8NOQ 39, WB8CLF 35, W8OE 34, W8UX 33, WA8ADU 31, K8EHE 29, W8ERD 28, WA8YIB 28, K8DHJ 27, WB8AJC 25, K8BYR 24, W8GQD 24, W8UDG 24, K8OYR 22, WA8VWH 21, WA8IEH 20, WB8CKG 18, W8ETU 16, W8GRG 14, WB8AHP 11, W8GOF 10, WA8STX 10, WA8ZGC 10, W8AJW 9, W8RZX 9, WA8FRE 9, K8CKY 8, K8ONV 8, W8IO 7, WA8MCR 7, WA8YHN 7, WB8AUK 6, K8RXD 6, W8OIW 5, K8PBE 5, WB8CQC 4, W8JXT 4, W8MGC 4, W8ELE 2, W8JH 1. (June) WB8AKW 169, WA8EQW 41, W8GNL 26, WA8AJW 8, W8JH 7.

HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJN – SEC: W2KGC. RM: WA2VLS. PAM: WB2VJB. VHF/PAM: WB2YQU. All section nets are the same as in past listings. Watch for one-hour time change at the end of Oct. if you're on local time. *Appointments and renewals:* Sorry to lose W2FAE, who has moved to up-state N.Y. Confirmation of OVS went to WB2EAH. If you've been thinking about accepting an LO appointment, why not make it a pre-fall project. Get in touch with the responsible person listed above. Particularly, get your station listed with the EC for your county through W2KGC. *Club activities:* Post-Field Day let-down and summer vacation means very little news from clubs. Secretaries: Be sure the club news sheet, meeting bulletins, etc., get to your SCM before the 10th of the month for inclusion in the column. Remember the delay between happening and notice, and send information along as far in advance as possible. The Communications Club of New Rochelle supplied radio help to the city swim meet for the 12th year in a row. W2DPV and K2EBX organized the crew. The Poughkeepsie vhf group voted on a set of by-law amendments at its July meeting. Advance notices from clubs: Westchester Amateur Radio Association will hold its usual Holiday Dinner in early Dec. New Rochelle Club's will be held Nov. 28. Classes planned by your club? Let ARRL Hq and your SCM know dates, times, ground covered as soon as possible. Inquiries from would-be students are coming in as fall gets nearer. *Individual station activities:* WN2NAA already has 30 on his way to WAS and is QNI on nets where he can go. Welcome aboard, along with new licensees WN2s OSO, OSR and OZL. WA2FBI finally reports he got WAS and WAC after a long wait for confirmations, and has a new sch rig although he prefers brassbounding. A newcomer to the PSC list is WA2CRW. WA4PDN/2 is back with loads of traffic on all nets. Important reminder to all in the section: Ballots will be out soon for Hudson Division Director and Vice-Director – your representatives at ARRL level. Be sure to vote. Don't go unrepresented. See you all at the HARC Convention Oct. 17. Traffic: (July) WA2VLS 155, WA2DFI 47, W2FAE 46, WA2FBI 34, WA2HHO 34, WB2EUV 33, WB2VJB 30, WA2CRW 20, WB2BXL 17, K2SJN 15, WN2NAA 4, WA2IGB 3. (June) WA2HHO 50, WB2VJB 38.

NEW YORK CITY AND LONG ISLAND – SCM, Fred J. Brunjes, K2UGI – SEC: K2OVN. RM: K2UAT. PAM VHF: WB2RQF. PAM HF: WA2UWA.

NCI*	3630 kHz	1919/2300 Nightly	K2UAT RM
NCI VHF*	145.8 MHz	1930 MTWTF	WB2RQF PAM
NCI Phone*	3932 kHz	1600 Dy	WA2UWA PAM
Clear House	3925 kHz	1100 Dy	WA2GPI Mgr.
Mic Farad	3925 kHz	1300 Ex. Su	K2UBG Mgr.
East U.S.	3683 kHz	0001 Nightly	K2DBG Mgr.
All Svc.	3925 kHz	1300 Su	K2AAS Mgr.
NYSPTEN	3925 kHz	1800 Dy	WB2VJB Mgr.

*Section nets. All times above are local. Well, the Hudson Division Convention is upon us and once again the Hudson Amateur Radio Council is bring us another rip-snorter of a "hamfest" (that's what

The Next Voice You Hear. . .

Could be WA4AZE. . .
or it could be WØMFL/4

They just happen to be our Chief Engineer and our Manager of Quality Control at Signal/One . . . active hams, too!

And they are *DXercising* your new CX-7 in Signal/One's radio club shack at our St. Petersburg plant.

It's all part of our expanded comprehensive inspection and test program implemented at Signal/One. Every CX-7 is *DXercised* on the air before shipment . . . and it's a really enjoyable assignment for WA4AZE and WØMFL/4. High quality components, plus elaborate testing and reliability requirements, make the CX-7 the real DX'ers choice . . . plenty of punch to work thru the QRM . . . and plenty of sensitivity to haul in those rare ones . . .

This expanded program is a rigorous one that would do justice to any piece of space-age electronic communications gear . . . tests that include receiving inspection of components . . . in-build tests that must meet high quality control standards . . . and others that have been designed to the sophisticated criteria of electronic engineering . . . things like 100 hr. burn-in and 2g shake testing.

After the testing comes the *"DXercising"* where experienced hams (they're engineers, too) go on the air to make sure that your CX-7 meets the normal high operational standards.

That's where WA4AZE and WØMFL/4 come in . . . and they know what they're talking about.

"It Speaks for Itself"

signal/one

A Division of ECI (An NCR Subsidiary)

2200 Anvil Street N. • St. Petersburg, Florida 33710

The DRAKE 4 LINE

Neat . . Compact . . Versatile !

Ray Grenier, K9KHW, Mail Order Sales Manager at
AMATEUR ELECTRONIC SUPPLY, says:

"Operating all bands (160 thru 2 Meters) is a real pleasure with my DRAKE 4 LINE setup. You, too, can eliminate all of that extra gear and mess usually needed for that much frequency coverage. Let me help you go the same route. . . . . all the way, as I have done - or just one unit at a time.

Visit our store or write me at AMATEUR ELECTRONIC SUPPLY for the best Trade or No-Trade Deal on new DRAKE equipment. You will be surprised how little per month it would cost you to own new DRAKE equipment when you use our convenient Revolving Charge Plan.

Remember, too! When trading with AMATEUR ELECTRONIC SUPPLY you can use our STAY-ON-THE-AIR PLAN, which means you can keep your trade-ins until your new equipment arrives. – Lose no operating time! CU on the air!"

The BIGGEST – The BEST – In the MIDWEST

AMATEUR ELECTRONIC SUPPLY

4828 West Fond du Lac Ave. Milwaukee, Wis. 53216

Phone (414) 442–4200

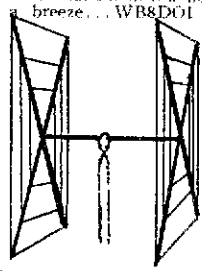
STORE HOURS: Mon & Fri 9-9; Tues, Wed & Thurs 9–5:30; Sat 9-3

AHA! YOU THOUGHT GOTHAM

was a giant, automated, mechanized, computerized factory. No, no, no. Just two brothers, making thousands of the best antennas possible at low, low, low prices that reflect the tiny overhead. In QST since '53 without missing an issue!

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FI8SR, F6AUM, HK7YB in few hours. Instructions a breeze. . . WB8DOI



CUBICAL QUAD ANTENNAS—these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' × 1¼" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' × 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

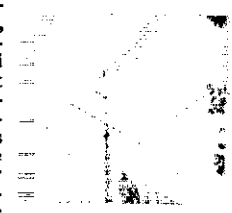
Now check these startling prices—note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD	$37.00
10-15 CUBICAL QUAD	32.00
15-20 CUBICAL QUAD	34.00
TWENTY METER CUBICAL QUAD	27.00
FIFTEEN METER CUBICAL QUAD	26.00
TEN METER CUBICAL QUAD	25.00

(all use single coax feedline)

BEAMS

"Just a note to let you know that as a Novice, your 3-El. 15 Beam got me R1 Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ¾" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20.	$21	4 El 10.	$20
3 El 20.	27*	7 El 10.	34*
4 El 20.	34*	4 El 6.	20
2 El 15.	17	8 El 6.	30*
3 El 15.	21	12 El 2.	27*
4 El 15.	27*	*20-ft. boom	
5 El 15.	30*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN,FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters. $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters. . . . $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters. . . $18.95

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect. *DEALERS WRITE!*

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

$3.00 U.S.A.
$3.50 Elsewhere
Postpaid

QUACK! QUACK!

Remember the days when the AM boys complained about that "Donald Duck" stuff?

Well, those days are long gone. Operating a modern SSB station is a lot easier than it used to be. BUT—have you kept abreast of the developments since those "Donald Duck" days?

NEW EDITION

The latest edition of SINGLE SIDEBAND FOR THE RADIO AMATEUR brings all of these developments together in a single book that will answer almost any question you might have about single sideband.

The American Radio Relay League, Inc.
Newington, Conn. 06111

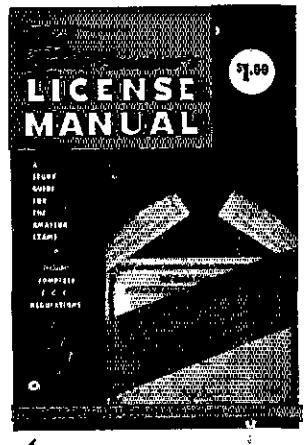
UP TO DATE...

THE 64th edition of the Radio Amateur's LICENSE MANUAL is complete, up to date and revised to include latest information on amateur licensing. Contains information on licensing procedures; sample questions and answers for all FCC amateur exams; all of the current information on frequency privileges for the various classes of amateur licenses; the full text of RACES regulations; details of the Reciprocal Operating Agreement, and the current FCC examination schedule.

A useful manual for all, newcomer and oltimer alike.

Order YOUR copy today

PRICE **$1.00** POSTPAID



ALL the dope between two covers . . . complete and easy to understand.
• NOVICE • CONDITIONAL
• TECHNICIAN • GENERAL
• ADVANCED
• EXTRA-CLASS

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

The *SEVENTIES* ARE HERE!

THIS IS THE *ALPHA SEVENTY* POWER AMPLIFIER

A NEW STANDARD OF COMPARISON

THIS COMPACT POWERHOUSE —

- •LOAFS ALONG AT MAXIMUM LEGAL POWER in any mode . . . but it's smaller than some popular amateur receivers.
- •OPERATES COMFORTABLY ALL DAY AT A FULL LOCKED-KEY D-C KILOWATT . . . yet it weighs less than many exciters.
- •THUNDERS THROUGH THE PILE-UPS . . . while it leaves your shack soothingly quiet.
- •PROVIDES INSTANTANEOUS VOX OR TRUE BREAK-IN without clatter . . . it's fully compatible with all modern exciters and transceivers.

The *ALPHA SEVENTY* is designed and rated for commercial service. It offers quality features not found in ordinary linears. Like the vacuum variable plate tuning capacitor . . . a rugged vapor-cooled ceramic-metal triode . . . tape-wound Silectron® transformer . . . giant oil-filled filter capacitor . . . and vacuum T/R changeover relays.

The innovator who introduced amateur radio to today's state-of-the-art is at it again. ETO's *ALPHA SEVENTY* is available now for use by amateurs who demand the ultimate in performance and quality.

Write for more details — or to order your *ALPHA SEVENTY*. ETO is represented in the West by Amrad Supply, Inc., 1025 Harrison St., Oakland, Ca. 94607.

ETO EHRHORN TECHNOLOGICAL OPERATIONS, INC.
BROOKSVILLE, FLORIDA 33512

they tell me!), with all kinds of goodies, especially in the DX and VHF-FM departments. K2US will be activated again, with talk-in operation including .94, .525 and 29.6 for the fm buffs, plus repeater operation (.34-.94) in the Tarrytown area. Yours truly will be there ready to be raked over the hot coals during the ARRL Forums (no fair using hot pokers), so I'll see you there (Oct. 17,18)? The following stations received net certificates for NLI VHF Net activity: W2UGF, WB2YET, WA2OBB, WB2GNZ. Congratulations to all. WB2WOI received WAC for SSB/Phone, and he did it with a mobile whip and an NCX-3 from an apartment. He needs Montana for WAS. The local QCWA chapter will hold its Annual Meeting/Dinner at the Engineers' Club, 32 W. 40th St., N.Y.C., Oct. 2. Contact W2PF or W2NOR for reservations. It is with regret that I announce the passing on of W2PFL to join the ranks of Silent Keys. Harry was considered to be "Mr. Amateur Radio" of Staten Island. He will be sorely missed by all of us! Novices take note: WB2HWI will start activity as an Official Bulletin Station shortly. Look for him on 7159 kHz, M-W-T-Sa, 1830 EST. W2BCB was vacationing in the Adirondacks with a battery-powered rig; an SWL receiver! W2TUK reports a chance meeting at L.A. Airport with K2LTC/W6LLJ while he was out there on business (small world, eh!) Looks like the exodus is starting early this year. WA2HMO, a top traffic man and W2DID (W4CAZ) and XYL WB2CDV (WB4RFB), long-time members of Suffolk County RC and Hudson Amateur Radio Council, are all migrating to Florida. Seems the stork dropped in at the QTH of WA2YOU and his XYL and swapped an 807 for a harmonic. WA2GPT is looking for stations in the L.I. area to help in traffic-handling. Bea invites stations who might be listening in to the Clearing House Net to check in. Many days are slow and a roundtable results while waiting for traffic. She will be glad to help those who might be interested in traffic but afraid to check in if inexperienced. The net controls are patient and understanding and anxious to train new-comers, so join in the fun! Traffic: WA2GPT 279, WB2LGA 124, WB2WOI 63, K2AAS 47, W2LGK 28, W2PF 14, K2JFF 6, WA2QJU 4, WB2HWI 2, WB2RQF 2.

NORTHERN NEW JERSEY – SCM, Louis J. Amoroso, W2ZZ – SEC: K2KDQ. RM: WA2TAF. PAMs: W2PEV, K2KDQ and WA2TBS.

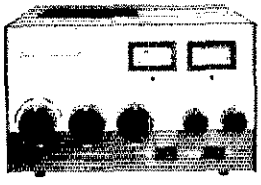
Net	*kHz*	*Time(PM)*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695	7:00 Dy	31	380	193	WA2BLV
NJN	3695	10:00 Dy	31	174	64	WA2BLV
NJSN	3740	8:00 Dy	24	72	21	WB2FEH
NJPON	3930	6:00 Su	4	56	11	WA2TBS
NJEPTN	3950	6:00 M-Sa	31	500	229	W2PFV
NJAN	50425	8:00 M-F	23	135	16	K2SGX
PVETN	145710	7:30 Dy	31	188	131	K2KDQ
ECTN	145800	8:30 M-Sa	31	132	65	WA2TBS
	146700	8:30 Su				

New appointments: K2SGX as EC for Denville and vicinity, WB2BKC as EC for Madison and vicinity, WA2UDT as OVS. Endorsements: WA2CCF as EC for Englewood and vicinity. WA2TBS as PAM. The Garden State ARA has been reactivated in Shrewsbury and elected the following as officers for 1970: W2UEZ, pres.; WB2HJI, vice-pres.; K2CTJ, secy.; WA2ILB, treas. WA2IUR is the new editor of the West Jersey RC Bulletin. OO reports were received from W2TPJ and WB2NYK. W2NCY has a new 14AVQ. K2FHF put up a new Hy-Quad with good results. WB2LTW's best DX is 1500 miles with his 2 watts. The group at WB2WNZ added a Sixer to the station and is now looking for a rotor. WA2EUX made over 100K in his first CD party. WA2DMF is looking for AREC members in the Jersey City area. WB2GTV is now 10-meter mobile. WN2OGU is a new ham in Clifton and WA2ASM passed the Extra. Congratulations to both. WA2JIM has a new Eico VFO. WA2CCF and WB2NYK participated in the May FMT. WB2RKK and WA2BAN both report rig troubles. K2ZIP is now WØNGI in Denver. WB2QPM is putting up an 8-over-8 slot on 2. WB2HXR completed his HW-17A with good results. W2KUL and WN2NAB are a new father and son team. W2QJY now is using the NCX-500. We plan on being at the Hudson Division Convention in Tarrytown. Hope to see some of you for an eyeball. Traffic: (July) WA2EPI 331, WB2RKK 202, K2DEL 186, WB2VPR 170, WB2TUL 169, K2KDQ 155, WB2DDQ 140, WA2KHQ 81, WA2DRH 72, W2PEV 60, WA2ERZ 52, WA2TBS 48, WA2CCF 36, WB2LTW 29, WB2GTV 24, WA2EUX 23, W2ZZ 19, WB2BKC 13, WA2GLI 11, WA2DMF 10, WB2WNZ 10, WB2BXR 8, WA2BAN 7, WB2BCS 6, W2CU 6, W2DRV 3, K2EQP 3, WA2JIM 2, WB2DRJ 1, W2LWZ 1, WA2BMH 1, WA2UZH 1. (June) WB2RKK 148, K2OOI 5, WB2WID 4, WB2WNZ 3.

MIDWEST DIVISION

IOWA – SCM, Al Culbert, KØYVU – SEC: KØLVB. Our congratulations to KØLVB on his exemplary showing in the PSHR

SB-35...great new transceiver



and SB-3LA... great new linear!

The SB-3LA Linear Amplifier

- 5 bands: Phone and CW sections, 80-40-20-15-10 meter bands.
- 2 kilowatts, p.e.p. power input on SSB--1KW on CW.
- Drive power needed is approximately 100 watts, easily supplied by SB-35 transceiver.
- 3rd order distortion is down 30db or more.
- Uses 2, Type 3-500Z triodes in grounded grid.
- Adjustable solid-state ALC.
- Input is 52 ohms with built-in fixed tune pi nets for each amateur band.
- Output, 50 ohms. Adjustable pi network.
- Power supply built-in, 115/240VAC, 50-60Hz.
- Built-in relays.
- Size: Approximately 14¼"W, 8¼"H, 14¼"D.
- Weight: Approximately 50 pounds.

See these great ones at your SBE dealer and also write for full line brochure.

The SB-35 Transceiver

- 5 bands: 3.5-4, 7-7.5, 14-14.5, 21-21.5, 28-28.5, 28.5-29, 29-29.5, 29.5-30 MHz.
- 260 watts p.e.p. input.
- **Built-in,** power supply, 12VDC **and** 117VAC.
- Selectable SB's: LSB,USB CW w/zero car. shift.
- CW keying--shaped--carrier re-insertion type.
- Offset--no leapfrogging on transceive.
- Double conversion receiver.
- Crystal lattice filter in 2nd I-F with shape factor of 1:1.9!
- **97% all solid state!** 30 transistors--8 FET's, low noise hot carrier diodes in balanced mixer.
- Only 2 tubes. Type 8417 hi-fi types matched for low distortion. **Not** TV sweep types.
- Accessories that fit **inside** of cabinet w/bottom of cabinet controls include VOX, 25kHz calibrator.
- External VFO accessory.

SBE

LINEAR SYSTEMS INC.

220 Airport Boulevard, Watsonville, California, 95076.

program. WAØNYU and XYL have left for an extended motor trip through KL7-Land. WAØVKF is DXing with a new tri-bander. KØOEX has been assigned duty in KL7-Land with the Army. Ex-WØTIH (now K2CK) was back visiting in the Fort Dodge area. WAØOTO is moving to Sioux City. It will be nice to have that area represented on TLCN. The North Iowa ARC had a family picnic July 26 at Clear Lake with a fine turnout. KØLKH is building a new station console. KØQKO reports WNØCCJ as a new Novice in the Perry area. WNØZFQ, of Decorah, passed both the General and Advanced Class exams July 31 and is anxiously awaiting his ticket. I wish to ask those holding appointments to notify your SCM of any address changes. I would also like to suggest that each and everyone make it a point to have an S.A.S.E. on file with the Zero District QSL Bureau in Des Moines. The address is listed elsewhere in *QST*.

Net	GMT	kHz	QNI	QTC
Iowa 75 Noon	1730	3970	1442	229
Iowa 75 SSB	2300	3970	524	25
TLCN (cw)	2330	3560	154	84
PON (fone)	2330	3915	76	9
PON (cw)	2330	3697	26	8

Traffic: (July) WØLCX 673, WAØVKI 336, WØUPX 259, WAØZID 76, KØJGI 58, KØAZJ 38, WAØVZH 36, WØJPJ 35, WAØOZL 35, WAØAUX 19, WAØOTO 17, KØQKD 15, WAØVRF 13, WØBW 9, WØMOQ 8, WAØAIW 5, WAØEFN 3, KØLKH 2, WAØMIT 1. (June) WØUPX 284.

ZERO DISTRICT QSO PARTY

This contest, sponsored by the Roosevelt H.S. ARC of Des Moines, Iowa, will take place from 0001-0400 GMT Sat. Oct. 17 and 0001-2359 GMT Sun. Oct. 18, 1970. It is open to all amateurs in ARRL sections. Stations may be worked on each band and mode for QSO points. The exchange will be QSO number, RS(T) and section (Zero stations will include county). Suggested frequencies: cw, 3580 7080 14080 21080 28080; phone, 3980 7280 14300 21380 28580. Scoring system: Score 1 point per QSO. Zero stations multiply by the number of sections plus the number of Zero counties. Others multiply by the number of Zero sections plus the number of Zero counties. Awards: A certificate will be presented to the highest scoring station in each section and Zero district county (20 QSO minimum entry). The mailing deadline is Nov. 17, 1970. Send your log to Roosevelt H.S. ARC, 45th and Chamberlain, Des Moines, Iowa 50312. Enclose an s.a.s.e. for results.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØLPE. PAM: KØJMF. RM: KØMRI. VHF PAMs: WAØCCW, WAØTRQ, WØLXA. of Salina, was recently awarded the Raymond F. Baker Memorial Trophy as the Amateur of the Year in the State of Kansas at the Concordia Hamfest Aug. 2. Because of recent changes in the SEC position and the rezoning of the Kansas AREC zones, this would be a good time to list AREC zones by counties for those interested: Zone 1 (Doniphan, Brown, Namaha, Marshall, Jackson, Atchinson Cos.) EC is Harvey Tewes, WAØOZP, P.O. Box 17, Hiawatha, Ks 66434. Zone 2 (Dickinson, Geary, Morris, Chase, Marion Cos.) EC Don R. Smith, WØCWJ, 733 West 4th, Junction City, 66441. Zone 3 (Riley, Pottawatomie, Wabaunsee, Lyon Cos.) EC Charles S. Fleckenstein, WAØPMS, Box 125, Onaga, 66521. Zone 4 (Shawnee, Jefferson, Douglas, Osage Cos.) EC William Brandenberg, WØQNI, 6120 Southwest Wanakmer, Rt 1, Topeka, 66619. Zone 5 (Leavenworth, Wyandotte Cos.) EC Art Sheldon, WØBGX, 306 West 7th, Leavenworth 66048. Zone 6A (Johnson, Miami, Franklin, Coffey, Anderson, Lynn Cos.) EC Robert H. Lanyon, WØRXD, 8908 W. 72nd St., Merriam 66204. This also takes in 6B at present. Zone 7 (Bourbon, Allen, Woodson, Greenwood, Elk, Wilson, Neosho, Crawford, Cherokee, Labette, Montgomery, Chautauqua Cos.) is vacant. Zone 8 (Cowley, Butler, Harvey Cos.) is vacant. Zone 9 (Harper, Sumner, Sedgwick Cos.) EC John Bandy, WAØUTT, 2810 Euclid, Wichita 67217. Zone 10A (Reno, Stafford, Pawnee, Rush, Barton, Rice Cos.) EC Harold P. Myers, WAØLBB, 603 S. Miles Ave., Lyons 67554. Zone 10B (Kingman, Barber, Comanche, Kiowa, Pratt, Edwards Cos.) is vacant. Zone 11 (Clark, Meade, Seward, Haskell, Gray, Ford, Hodgeman, Ness, and Lane Cos. and that part of Finney north of Gray Co.) EC Harold R. Fick, KØJDD, 1903 Hart, Dodge City 67801. Zone 12 (Morton, Stanton, Hamilton, Greeley, Wichita, Kearney, Grant, Stevens, Scott Cos. and that portion of Finney Co. south of Scott Co.) EC Ronald M. Schweppe, KØEXN, 2008 Downing St., Garden City 67846. Zone 13 (Washington, Republic, Jewell, Mitchell, Cloud, Clay Cos.) EC Joseph E. Hoover, KØLPE, P.O. Box 263, Concordia 66901. Zone 14 (Ottawa, Lincoln, Ellsworth, Saline, McPherson Cos.) EC Leonard Lamer, WØLXA, RR2, Box 140, Salina, 67401. Zone 15A (Cheyenne, Rawlins, Decatur, Sheridan, Thomas, Sherman, Wallace, Logan, Gove Cos.) EC Joseph G. Friendly, KØUVH, Box 58, Selden, 67757. Zone 15B (Norton, Graham, Trego, Ellis, Rooks, Phillips, Smith, Osborne, Russell Cos.) EC Gerald Wright, KØENU, Box 193, Norton, 67654.

Kansas AREC members total 384 with 287 full members and 97 limited. Ks WX report for July: 31 sessions, ONI 468, QTC 37. QKN, QNI 105, QTC 33, 31 sessions. KSB, QNI 870, QTC 105, 28 sessions. KPN, QNI 148, QTC 10, 16 sessions. WAØYII and KØSHB helped in the recent Powder Puff Derby. Traffic: WAØLBB 261, WØINH 137, WAØILC 97, KØMRI 80, KØJMF 76, WAØTZK 65, KØBXF 45, WØGCT 41, KØLPE 34, WØNEF 26, WNØAJU 20, WAØYXK 18, WAØOZP 16, WAØUTT 14, WAØOWH 12, WØBGX 11, WAØSRQ 10, WØCHJ 6, WØFDJ 4, WAØKDC 4, KØZHO 4, WAØSXR 2, WNØWXY 2.

MISSOURI — SCM, Robert J. Peavler, WØBV — SEC: WØENW. New appointments: WAØIIK as EC for Cedar County, KØBIX as EC for Johnson County. Appointments renewed: KØAEM as RM and EC, KØJPJ as Class I OO.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MoSSB	3963	2300 M-Sa	27	1182	82	WØRTO
MON	3585	0000 Dy	20	102	85	KØAEM
MON2	3585	0245 Dy	22	89	18	WAØSKP
PHD	50.45	0030 Fr	4	97	3	WAØKUH

Note that these nets will meet one hour later GMT with the shift back to Standard Time. Congratulations to: KØGJD, who received the first SBWAS to be issued in the tenth call area; to WAØSOK, who passed Advanced Class, to WAØAEW and WNØZNU, who passed General Class; to new Novices WNØBHA, WNØBOP, WNØBOQ, WNØBOR, WNØBOS, WNØBOT, WNØBOU, WNØBTR, WNØBTS and WNØBTT. I am sorry to report that WAØEMS spent two weeks in the hospital after a fall from a 60-ft. cliff, but am glad to report that he is home now. KØMLS has retired from Burstein-Applebee Company. His help has been greatly appreciated by those of us who bought equipment at B-A. WAØZLU is running only 30 watts but has worked 76 countries since Dec. Dave is working on a 15-watt 160-meter rig and helically-wound vertical antenna. CP3BY has gone back to Bolivia and is keeping schedules with his friends. My thanks this month to Old Reliables WØGBJ and WØOUD, who continue to report into the nets though little traffic comes their way. Traffic: KØONK 599, KØWBD 263, KØAEM 159, WØBV 71, WAØHTN 44, WØOUD 21, WAØVRI 17, WAØs, KUH 5, WAØZLU 1.

NEBRASKA — SCM, V.A. Cashon, KØOAL — Asst. SCM: Velma Sayer, WAØGHZ. SEC: KØODF. Congratulations to new General WBØALA. WØDMY now operates ssb and cw with a Cygnet 270. KØJFN is putting an SB-401 together and should have it on the air soon. The Central Nebraska ARC Steak-Fry was very successful with 110 amateurs registering and a total attendance of 262 people. KØOAL has the list of those in attendance for a large S.A.S.E. Articles for this (YOUR) Nebraska section column are solicited. Renewed appointment: WØIRZ as PAM.

Net	*Freq.*	*GMT/Days*	*QNI*	*QTC*	*Mgr.*
NSN 1	3982	0030 Dy	920	32	WAØLOY
NEB	3590	0300 Dy	179	17	WAØHWR
EBSN	3982	1130 1st M	3	0	WAØSOP
NMN	3982	1230 Dy	857	23	WAØJUE
WNN	3950	1300 M-Sa	522	8	WØIRZ
CHN	3982	1730 Dy	637	92	WAØGHZ
NSN II	3982	2330 Dy	727	26	WAØLOY
EBSN*	3982	1130 1st M	4	0	WAØSOP

*Late June Net report

Traffic: (July) KØUWK 126, WØLOD 118, KØJFN 29, WAØOEX 23, WAØIRR 22, WAØGHZ 21, WAØOOX 17, KØEJT 15, WØTOD 14, WØOOX 12, WAØPIF 12, WAØHWR 11, WØNIK 11, WAØYGI 11, WØBTV 10, KØDGW 10, WØFOB 10, KØSEA 10, WAØBIJ 8, WWØDMY 8, WAØJIH 8, WAØOEI 8, KØMUF 7, KØERU 6, WØKPA 6, WAØPCC 6, WAØJUE 5, WAØLOY 5, WAØEEI 4, KØHNT 4, WØRJA 4, WØATU 2, WØDJO 2, KØODF 2, WAØQLL 2, WAØTTM 2, WBØAEA 1, WØAGK 1, WAØSPF 1, WØYFR 1. (June) WAØSPF 4.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, John J. McNassor, W1GVT — SEC: W1HHR. RM: WA1HSN. PAM: K1YGS. VHF PAM: K1SXF.

Net	*Freq.*	*Time/Days*	*Sess.*	*QNI*	*QTC*
CN	3640	1845 Dy	31	318	417
CPN	3965	1800 M-S	31	478	204
			1000 Su		
VHF 2	145.98	2200 M-S	23	82	19
VHF 6	50.6	2100 M-S	23	122	7

High QNI: CN — WA1GPH, WA1LLB and K1FIR. CPN — K1EIC, W1GVT and K1YGS. New NCS CPN: WA1JVV, WA1JQC and WA1JZC. SEC: W1HHR is working very hard to get active ECs in all areas. Plans are underway to strengthen the Connecticut section AREC to be even better prepared for emergency. A complete report on EC coverage of the recent events at Powder Hill was submitted

It's The Biggest! Most Popular PENNY SALE IN THE INDUSTRY!

Type	Description	Case
900	Buffer	F
900*	Dual Buffer	F
903	Dual 3 input gate	F
903*	Dual 3 input gate	F
904*	Dual half adder	N
908	Full adder	F
909	Buffer	F
910	Dual two input gate	F
912	Half adder	F
913	Shift register	F
914/921	Dual 2 input gate	F
923/940	J-K flip flop	F
925	Dual 2 in. w/expand	F
926	Hi speed 923	F
960	Dual buffer	F
WC210**	2-3 in line driver	F
WC215**	J-K flip flop	F
WC226**	Triple 3 in. gate	F
WC227**	10 in. Diode expand	F
WC261**	Dual 4 in. gate	F
WC266**	Quad 2 input gate	F
SG-43 ***	Dual 3 in. gate	N
SG-123***	Expandable 8 in. gate	N
SG-163***	Triple 2 in. bus driver	N
NE-124**	R-S-T binary	F

99¢ Each 2 for $1.01

** DTL, otherwise RTL,
*** TTL, F=flat pak; N=dual inline
5=TO-5

TEXAS-NATIONAL DTL TTL ICs!

Type	Description	Sale
SN7350F*	Quad 2 input gate	.99
SN7400N	Quad 2 input gate	.99
SN7404N	Hex inverter	1.19
SN7430F	8 input Nand gate	.99
SN7440F	Dual 4 in. Nand buffer	.99
SN7441N	BCD-to-Decimal decoder-drvr	5.95
SN7442N	BCD-to-Decimal decoder	5.95
SN7470F	J-K flip flop	.99
SN7472N	J-K master flip flop	1.19
SN7473N	Dual J-K master slave flip flop	1.49
SN7474N	Dual 'D' type edge triggered flip flop	1.49
SN7475N	Quad bi-stable latch	3.95
SN7490N	Decade counter	4.95
SN7492N	Divide by 12 counter	4.95
SN7493N	4 Bit binary counter	4.95

* DTL, others TTL, F=flat pak, N=dual inline

FAIRCHILD 741CAMP Only **$2.50**
Same as 709 with frequency compensation.

10¢ Catalog on Fiber Optics, ICs, Semis, Parts

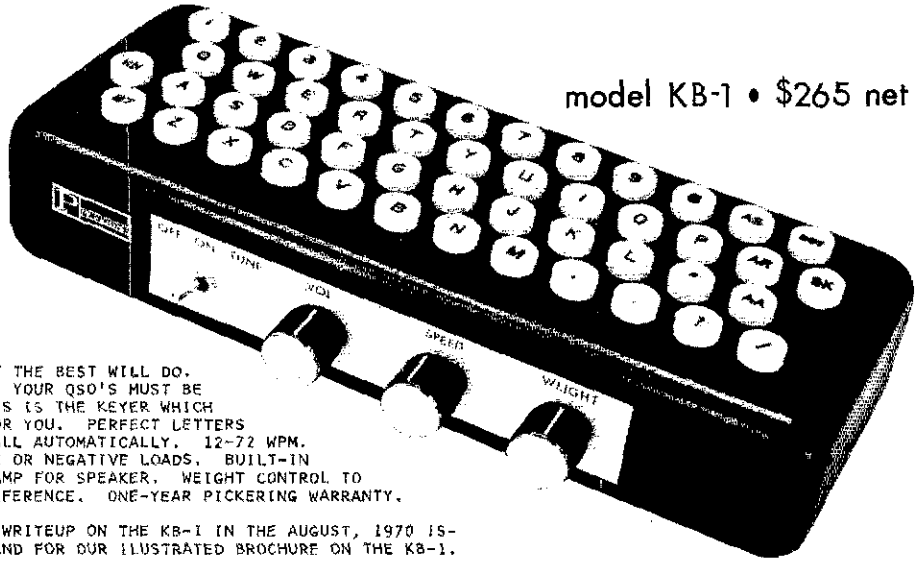
FALL-CHRISTMAS LIMELITERS

- 2-FT. finished fiber optic lite pipe $1.00
- 709 OP AMPlifier $1.49
- 2—N CHANNEL plastic Fets 2N3819 Texas $1.19
- 2—UNIJUNCTION transistors 2N4891 ..... $1.19
- 5 CLAIREX photo elec cells pancake $1.19
- 3—TRIGGER diodes for Scrs, Triacs $1.00
- 8—1 AMP 1000 PIV sil. rectifiers $1.19
- 10—1 AMP 800 PIV rectifiers $1.19
- 4 NIXIE tube driver transistors 2N4409 ..... $1.00
- 1-WATT WESTinghouse WC324 audio amp $1.49
- 1—15-AMP Triac 200 PRV $1.49
- NE161J One shot multivibrator Signetic $1.79
- 2 MICRO reed switches 1" long $1.00
- 100 Transistors asst npn-pnp-pwr-no test $1.98
- WESTinghouse positive volt regulator 0 to 40 VDC $1.19

Terms: add postage. **Rated:** net 30, cod's 25%
Phone Orders: Wakefield, Mass. (617) 245-3829
Retail: 211 Albion, St., Wakefield, Mass.

POLY PAKS
P.O. BOX 942 M
Lynnfield, Mass.
01940

FOR THE MAN WHO TAKES CW SERIOUSLY.



model KB-1 • $265 net

FOR YOU, ONLY THE BEST WILL DO. YOUR TRAFFIC, YOUR QSO'S MUST BE PERFECT. THIS IS THE KEYER WHICH WILL DO IT FOR YOU. PERFECT LETTERS AND SPACES, ALL AUTOMATICALLY. 12-72 WPM. KEYS POSITIVE OR NEGATIVE LOADS. BUILT-IN MONITOR OSC/AMP FOR SPEAKER. WEIGHT CONTROL TO SUIT YOUR PREFERENCE. ONE-YEAR PICKERING WARRANTY.

READ THE QST WRITEUP ON THE KB-1 IN THE AUGUST, 1970 ISSUE. THEN SEND FOR OUR ILLUSTRATED BROCHURE ON THE KB-1.

TO ORDER, SEE YOUR AMATEUR EQUIPMENT DEALER, OR ORDER DIRECT FROM FACTORY. YOU MAY USE YOUR MASTERCHARGE OR BANK-AMERICARD. SIMPLY GIVE US YOUR ACCOUNT NUMBER.

YOUR CW SENDING DESERVES THE BEST...ORDER YOUR KB-1 NOW!

PICKERING RADIO CO.
Post Office Box 29
Portsmouth R.I. 02871

PICKERING

by W1BKI. Thanks to all who helped. S.W. Conn. AREC Net meets Fri. at 2100 on 3905. ECs of Eastern Conn. will provide communications for the Canoe Regatta at Columbia Lake. Southington ARA will supply communications for the State Convention Fireman's Parade. Candelwood ARA is planning to visit ARRL. Hamden ARA is busy setting up a repeater station. Trumbull ARC includes 7 pages of very good Field Day photos in its "Un-Named Newsletter." W1BDI was very active in the recent CD Party. WA1JZC is going RTTY with a Model 26. K1IIE and W1PRT provided an opportunity for many to meet DL3LS and DL1RA. WA1EXS is still confined to the hospital after a long seige of illness. Congratulations to: WN1NFK and WN1NIU New Novice Class; WA1KRG for DXCC; K1VTM for First in Conn. to make 5BWAS! Now that summer is over it's time to check and improve that antenna system – to improve watts going out and also what's coming in! Traffic: (July) W1EFW 278, WA1HOL 240, W1EJI 199, K1EIR 176, W1OA 109, WA1JZC 101, WA1LLB 101, WA1JYP 86, K1EIC 82, WA1HSN 78, W1GVT 69, WA1GEH 64, WA1JVV 59, K1YGS 59, WA1JQC 34, K1SXF 28, WA1JMO 24, W1QV 17, W1YBI 14, W1DQJ 11, W1MPW 11, W1CUH 10, W1YBH 10, W1CVK 9, W1BDI 8, WA1JGA 8, W1BNB 6, W1CTI 5, W1HHR 3, WA1KRG 2. (June) WA1KRG 11.

EASTERN MASSACHUSETTS – SCM, Frank L. Baker, Jr., W1ALP – SEC W1AOG received reports from W1s LE, BHD, HKG, K1s NFW, DZG, ZUP, WA1DXI. WA1CRA is Radio Officer for New Bedford Red Cross. K1MAK is now Advanced Class. W1BVL and WA1BYM have Extra Class. W1QUT is back in Wayland. New YLs are WA1s NGO and NHI. W1QD is ex-W1ANB. W1AAR got married; also W1UIR. W7QO/1 is active on the Cape. W2QWC/1 is in Amesbury. W1DRB has an HW-17A. WA1FMC has a place next to K1FPI on the Cape. WB4PQP is ex-W1ALB on 14280 kHz. WA1CTR is new area coordinator for Navy/Marine MARS for Mass./R.I.; W1QVK for Army MARS and K1EWA for Air Force MARS. WN1NCW has TX-86, HA-700 and a vertical dipole. WA1ICW is moving to Florida. WN1NFW is studying for General class. K1BUF is busy working on the YL convention program W1ZQM was out in the sailboat. W1NF has a Certificate of Merit for copying the Armed Forces Day message 100%. W1KP moved to N.H. W1CSS has a new TR-4. W1JOT is on 1296 MHz. W1ZXG is going on a trip to Europe. EM2MN had 23 sessions, 112 QNIs, 132 traffic. W1OJM made the BPL. WA1KZE is going to Europe. Barnstable Radio Club, K1PBO/1, had a station at the County Fair and received an award for its exhibit. Operators were W1s CCL, NT, OGS, BOV, PX, OJM, ZZY, BCN, YAN, K1s EPL, HNQ, NKL, WQO, OIK, WOT, LIE, WA1s GXN and HWZ. Net Manager W1AOG reports the NEEPN had 4 sessions, 94 QNIs. W1TWG joined the OOTC. WA1KDL has an FT DX-560. WA1JKJ has W2UC on the air. W1AAR is in the Barnyard Net, 2 and 6. WA1DJC, now in No. Dartmouth, has an inverted "V" for 40 in the attic of a former barn. WB9RVI/1, from West Tisbury, is on 40 cw with 2 watts. WA1FSI/1 is in Framingham and on the cw nets again. WA1NHO is the Catholic Memorial HS ARC's call. WA1NIK is a new YL. K7OTR is back for a visit. The 6-Meter Cross Band Net had 9 sessions, 23 QNIs. WA1BYM is the new EC for Westport. WA1JHO is a new OPS. Appointments endorsed: W1MX and K1ODR as OVSs; W1s DWY, YYI, K1s NLQ, PNB and WA1IRY as ECs; W1s DFS and AYG as OOs; K1CLM and W1MX as ORSs, W1MX as OPS, K1VGM as OBS. WA1s KZE and FSI/1 made the PSHR. W1MD is very active in the Intercontinental Net on 14,330 kHz from 1100 to 1300 GMT every day. He did a nice job after the earthquake in Peru. W1RYB has a new ssb rig. TI2BB, TI8WW, OA5AO and XE3LK visited W1MD. WA1DFL has DXCC. W1DFS went on a trip to Wisc. K1VGM has an HW-100 home and mobile. WNAC-TV showed our film "The Ham's Wide World." WA1IFE, up in Maine and on 2 and 6, has an SB-110. W1s PL, AYG and BGW took part in the May FMT. Massasoit ARA held a meeting at W1EOK's QTH and a cookout. WA1ILN has been mountain-topping. W1LJT has been in the hospital. Capeway RC met at W1YTB's QTH, also visited the Alden Electronic Equipment Co. WA1s AXK-IVN/2 went on a trip in the Adirondacks. W1OFV has a TCS-12. W1MEG has his associate degree in electrical engineering. A good friend let W1ALP borrow his HW-12 and it works GB. Traffic: (July) W1OJM 533, WA1EYY 336, WA1FAD 233, W1PEX 230, WA1KZE 118, WA1FSI/1 73, K1PBO/1 64, W1ABC 58, W1CTR 46, W1UX 45, WA1IFE 32, K1FSG 20, W1AOG 17, W1DOM 13, W1TWG 12, K1CLM 9, WA1MEG 9, WA1BYM 7, WA1JKJ 5, W1AAR 4, W1LE 4, WA1DJC 2, WA1FNM 2. (June) WA1HJQ 11.

MAINE SCM, Peter E. Sterling, K1TEV – SEC: K1CLF. PAM: WA1FCM. RM: W1BJG. K1RSA is modifying an ARC-3 for 2-meter cw. K1AXO has a new Sygnet 260 and is mobile again. K1RSA has a model 100 for RTTY and has just finished building an amplifier for the DC bands. WA1LUW has just dropped the "N" and also has a new Swan 5100. K1FLO received his certificate for Worked

All Maine, also the WA9DZL Award sponsored by the 128th Air Refueling Group, 1970 Armed Forces Day. New hams in Maine are WA1NDW, WN1NDF, WN1NER, WN1NED, WN1NEL, WN1NFC and WN1NFD. Congratulations! I am still looking for new for the column. Any tidbits are welcome. The boys in Portland and Waterville are in the process of getting a repeater going for 2-meter fm. Anyone interested in getting on the repeater, please contact K1QIG for information. Traffic: WA1FCM 196, WA1JCN 14, K1TEV 8.

NEW HAMPSHIRE – SCM, Donald Morgan, K1QES – SEC: W1LUD. PAM: K1APQ. RMs: K1BCS and K1PQV. Endorsements: K1YSD as OPS and ORS, K1NBN as OO, K1RSC as EC. We welcome the following newly-licensed hams: WN1s NFZ, NGE, NGA, NFY, NFX, NGB, NGD, NGC, NGF, NGG, NEO and WA1NGQ. K1NBN is in Granada Hills, Calif., for a time as /6. W1IY/6 reported he was in Calif. for the recent contest and worked 275 contacts from the shade of a joshua tree in his car. He says it is fun working in the Mojave Desert with rattlesnakes and coyotes in the background. WA1JTM has put up a two-element beam for 40 meters at 90 feet and reports excellent results. 2-meter fm mobile activity seems to be on the increase, with the added help of repeaters. At least it does have its advantages over the crowded 75-meter band. We sadly acknowledge the passing of W1TNF, of Franklin. NHVTN reports QNI 191, traffic 201. GSPN reports 659 *check-ins, 75 traffic. NHAREC reports 74 check-ins and 15 traffic* for July, 73 check-ins and 15 traffic for June. Traffic: WA1JTM 236, WA1GCE 228, K1PQV 131, W1UBG 84, K1BCS 79.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – SEC: W1YNE. RM: W1BTV. PAM: W1TXL. VHF PAM: K1TPK. RISPN report: 31 sessions, 387 QNI, 76 traffic. It has been noted that the traffic activity reported during July has decreased. If you have a traffic count send it to the SCM so that it can be reported in the next report. A Providence Area Repeater will begin as a remote-base installation licensed under K1ABR. The fm group decided on the following frequencies: Repeater input 146.100 MHz, repeater output 146.700 MHz. The emission will be narrow-band fm. Hams interested in joining the group can contact K1ABR, W1FYH, W1KKE, W1LZY or K1HZN. The W1AQ Club is working on such activities as the painting of the club house. The club meets every Fri. night and invites all hams in the area to drop in at 54 Kelly Ave., East Providence. Congratulations to K1HZN, who recently passed the Extra Class exam. Traffic: WA1JST 66, WA1CXF 18, K1QFD 14, K1VYC 14.

VERMONT – SCM, E. Reginald Murray, K1MMPN –

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
Gr. Mt.	3932	2130 M-S	358	20	W1JLZ
Vt. Fone	3955	1300 Sun	57	3	W1KKM
MNV	3685	2230 M-F	191	201	K1BCS
Carrier	3945	1300 M-S	390	3	W1BLC
VTSB	3909	2130 M-S 1230 Sun	485	29	WA1HSG

Congrats to new Novice WN1NIF (Springfield). K1HDB and K1OXG are on 2-meter fm mobile with FB sigs. New pres. and mgr. of the Carrier Net is W1BLC, with W1JLZ as vice-pres./treas. and K1QGX as secy. W1MRW expects to mobile with an SR-150 soon. W1OKH is doing a top job handling international phone patches – *two of his contacts back in Vt. The 2-meter fm group is planning* state-wide coverage during the Nov. elections. Contact W1DQO for any assistance you can give. From Aug. 1, '69 to Aug. 1, '70, VTSB had QNI 6609 and QTC 954. Thanks to WA1HSG, net mgr., all NCSs and participants. Traffic: K1BOB 122, K1MPN 3.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVR – SEC: WA1DNB. CW RM: W1DVW. 6-Meter PAM: WA1LGQ. The SEC reports excellent activity on the Sun. morning Section AREC Net (3935 at 8:30 A.M.). Worcester County also has an AREC net (first Sun. each month, 3947 at 9:00 A.M., W1HRC NCS). The CW RM reports that WMN had 195 QNIs and handled 185 messages. Top five in attendance were W1BVR, W1DVW, K1SSH, WA1LNF and K1UTU. Incidentally, two of our excellent operators on WMN, WA1LNF and WA1LPJ, are both 13 years old and both hold Advanced Class licenses! WA1MFB is working in Eastcars (a very excellent net, 7255 all day, every day) as well as in two NTS nets. WA1LNF has a new Ten-Tec keyer. New OPSs: WA1DVE, WA1LGU, WA1LNF and WA1LPJ. W1FLX is DXing on 15 and 20, and has 96 countries to date. W1KZS and XYL WA1GQ are really knocking off *DX* on 6 meters (at one time 28 straight log-ins from California). From personal observation the SCM can report that the VARC had a very fine picnic at Look Park. As this is being written (early Aug.) the W1ZPB's are in the fifth week of their six-week European trip. There could have been no finer family than Walt, Betty, Nathan and Joy Congdon as representatives of the United

States for visits with our brother hams across the sea! Traffic: K1SSH 144, WIBVR 130, WIDVW 83, WA1LNF 65, K1WZY 44, WA1LPJ 35, W1KK 20, WA1BXQ 19, WA1MFB 16, W1HRC 1.

NORTHWESTERN DIVISION

IDAHO – SCM, Donald A. Crisp, W7ZNN – SEC: WA7EWV. The FARM Net meets on 3935 kHz at 0200 GMT each day. The Idaho RACES Net meets week days on 3991 kHz at 1415 GMT. WA7IJL has a new SR-160. Amateurs in the Boise area provided communications for a Lions-Club-sponsored water carnival held July 11 at the Lucky Peak Reservoir. Two-meter communications were used between the officials booth and a boat in the reservoir and the boat pit area. W7NPO, K7LKZ, WA7GWV, K7AAP, WN7KXR, W7IWU, and WA7LJL participated in the communications net. The amateurs were commended by the carnival officials for their efficient communications ability. W7GNZ, formerly W5RAM, moved to Coeur d'Alene from Monroe, La. W7OWA has a new TR-4. FARM Net report for July 1970: 30 sessions, 839 check-ins, 65 traffic handled. Traffic: W7GHT 126, WA7BDD 29, K7CSL 10, W7ZNN 8, W7FIS 2.

MONTANA – SCM, Joseph A. D'Arcy, W7TYN – SEC: W7RZY. Congratulations are in order to W7RZY who has been elected as SCM of Montana. Harry has been active for many years in ARRL business in the section and will do a great job. He will be in the process the next few months of getting support for some of the programs in the state. If you would like W7RZY to talk to your club or group on ARRL activities and problems in Montana, drop him a line and he will schedule a meeting time. The Great Falls area repeater is now on the air and getting good coverage with 34 and 94 being used. K7SIK is getting up a new antenna system. Both Director W7PGY and Asst. Director W7LQE were at the Glacier Hamfest and spoke to the group on ARRL affairs. W7LQE visited with W7RZY and W7TYN while traveling in the state on his vacation. There has been some interest in an 6mers hamfest in the state next year. If you are interested in the idea write W7TYN or W7RZY and we will see if it would work out. K7YNZ has a new FTDX-560 on the air. Montana PON traffic: 41. Traffic: W7LBK 19.

OREGON – SCM, Dale T. Justice, K7WWR – SEC: W7HLF. RM: WA7KIU (acting). PAM: K7RQZ. Section net report: K7YOM reports for the AREC Net, sessions 31, check-ins 595, contacts 62, traffic 15, maximum number of counties 16. A new Novice is WN7PJZ. New Novices in Bend are WN7PCG and WN7PFN. WA7LDZ blew his rig on 6D and hasn't been on since. The SAUDSN met at the home of WA7BOO for the monthly get-together, with 15 hams in attendance. OSN has been doing very well this summer, holding sessions and handling traffic as well as in the winter. This month's report is QNI 122, QTC 35, sessions 23. WA7FTN handled $41 phone patches to S.E. Asia this month. Traffic: (July) K7RQZ 309, WA7IFS 110, WA7ICX 88, W7BDU 63, WA7KIU 57, K7QFG 42, WA7BOO 34, K7WWR 20, K7YQM 19, W7BHX 13, W7BNS 12, WA7MIF 12, W7LT 11, WA7KDU 9, K7KPT 9, W7M1J 9, WA7LDZ 3. (June) W7BFX 4.

WASHINGTON – SCM, Harry W. Lewis, W7JWJ

Net	*Check-ins*	*Tfc. Handled*	*Tfc. Lists*	*Sess.*
WARTS	1690	103	125	31
NTN	989	115		31
NSN	204	49		31
WSN	27	87		28

Attorney Bill Goodloe, WA7GWJ is running for Washington State Supreme Court. He is originator of the license plate bill. The SCMs of Oregon, Montana, Idaho and Washington held their annual meeting in Seattle early this fall. W7QGP is new mgr. of the WARTS Net. WA7MEO is recorder and temporary mgr. of the Northwest Slow Speed Net meeting nightly on 3700 kHz. W7PI retired from work this fall and is now busy hamming and resuming his music activities. WN7OSQ is a new call in Kennewick and is the probation officer there. As of Sept. 1970 W7BA has made 8PL continuously for 19 years each and every month. Loyd was commended during Washington State Amateur Radio Week by Governor Evans. Traffic: W7BA 1358, W7LOQ 329, W7PI 254, W7AXT 155, WA7DZL 79, W7MCW 70, WA7LMO 53, K7TCY 49, WA7MEO 44, W7GVC 26, W7JFV 24, W7ZHZ 17, WA7EDQ 13, WA7DYG 11, WA7CYY 10, W7AIB 9, K7OKC 9, K7RBT 8.

PACIFIC DIVISION

EAST BAY – SCM, Paul J. Parker, WB6DHH – RM: WA6DIL. WA9FDU/6 finally got his Extra Class ticket in the mail after waiting about three months. K6PJ reports that the DX conditions as of late have been fair with some good openings into Africa and Europe. The increase in fees has taken its first toll for those who had to renew during the month of Aug. Be sure that you send the correct amount in with your ticket when you do or there will be the

proverbial red tape to go through. For those who made it to the Sierra Hamfest I hope it was a good one. W6ZF is still transmitting the Pacific Division Bulletins the 1st and 3rd Mon. at 0400 GMT on 3540 kHz. W6RGG has been putting some time in as the hard-working OO in the section and always seems to pick up a few who have a little too much ac on the old note. W6TTS has been very busy building of late, making an adapter for his monitorscope. WN6DRU has been trying to get a 4-H net going in the Napa, Sonoma areas. If you are interested, give him a call or drop him a line. That's about it for this month gang, see you all soon. Traffic: W6IPW 239, WA9EDU/6 142, WB6VEW 74, WB6YMB 9, W6AR 6, K6PJ 1.

HAWAII – SCM, Lee R. Wical, KH6BZF – SEC: KH6GQW. RM: KH6AD. PAM: KH6GJN. OSL Mgr.: KH6DQ. ECs: KH6s GPQ, LP, BAS, GRV, KH6NO/KH6, K2HBA/KH6, KC6EJ and W7UZH/KG6. RACES Nets coordinate with Henry Gamache, Radio Officer.

Net	*MHz*	*Times(Z)/Days*
Friendly	7.290	2030 M-F
World Wide Boy Scout	21.360	1800 Sat
Confusion (Patches)	21.400	0130 All
Pacific Interisland	14.335	0830 M-W-F
Micronesia	14.345	0800 Tu-Th-Sat-Sun
S.E. Asia	14.320	1200 All
Pacific Typhoon	14.265	

Field Day for Hawaii was quite good this year with many groups and stations active. Honolulu ARC, KH6WO, was out as usual but from atop Round Top, KH6ERQ made an especially good showing from the Wainae Mts. Among those heard from were KH6LG, Kauai, KH6GLU from Molokai and KH6RX from Maui. KH6SP and others were active. An added treat this year was more participation by remoter areas of Hawaii. KG6, KX6, KC6 – all were on this year. Recent ARPSC News: W7UZH/KG6, EC Guam, had a nice write-up and pictures in Guam's newspaper. Your SEC needs volunteers as EC for Oahu and other areas. All present ECs solicit AREC participation. Contact KH6BZF or KH6GQW if you care to help. July CD (Open) Party had sparse activity from KH6, but multipliers were provided by several stations. WØDAD/KH6 was heard active from Guam again as he's there on business. The Honolulu DX Club continues to enjoy increased membership. Three new members joined its DX tip-off net. Traffic: KH6GQW 23, WØDAD/KH6 16, KH6BZF 16, K4RSD/KH6 8, W7UZH/KG6 5.

NEVADA – SCM, Leonard M. Norman, W7PBV – SEC: Lewis L. "Mike" Blain, WA7BEU, 560 Cherry St., Boulder City, NV 89005. W7YRY is a Silent Key. He devoted many hours to phone-patching and public service and was an active MARS members. Las Vegas Radio Amateur Club, Inc., officers for 1970 are WA7GIV, pres.; K7PPF, vice-pres.; W7BFS, secy.-treas.; W7OQF and W7PBV, dir.-at-large and K7RBM, past-pres. Custodian of club station K7UGE is W7FJN. 6M repeater 34/94 is located on Red Mountain between Boulder City and Las Vegas using the club call. W7OQF, WA7GIV, W7PBV, K7PPF, K7RBM, K7USR, W7VYC and W7YAE provided communications for the powder puff derby using 2-meter fm for local traffic and 40-meters for the long-haul. Each received thanks from the Ninety-Nines as well as from Nevada Senator Howard Cannon, who was on hand to meet the first arrival. WA7KTY is building a $20 million high-rise office in downtown Las Vegas. Sierra Nevada Amateur Radio Society, Inc., officers for 1970 are W7DNX, chairman; WA7FBU, trustee; WA7MOD, secy.; WA7DUL, treas.; K7VYT, public dir.; K7JJS, dir; WA7FGW, dir.

SACRAMENTO VALLEY – SCM, John F. Minke, III, W6KYA – It appears that the RAMS have moved its meeting place again, this time to Carmichael Park garden house in Carmichael. W8VDA has left Sacramento Valley for the Washington, D.C., area. Loyd for Dave, depending if he were on ssb or cw) was an RM active in NTS in this section and also was on the committee for the Pacific Division Convention in 1969. The new Northern California State MARS (Army) Director is now K6ZIM in Janesville. WN6NPS is a new ham in Crescent City. It looks like club memberships are on the increase. Sacramento and North Hills clubs have shown an increase. W6VUZ is busy constructing a linear amplifier and hopes to have it done in time for the Nov. Sweepstakes. K6HTM is putting up a four element quad. Another Chico area amateur, W6HBM, is straining for Southern California on 2-meter ssb. Don't forget the California QSO Party, the first week end in October. Traffic: (July) W6LNZ 43, W8VDA/6 37, W6VUZ 5, (June) W8VDA/6 62.

SAN FRANCISCO – SCM, Kenneth S. McTaggart, K6SRM – SEC: W6WLV. ECs: WA6AUD, Marin County; WB6KMI, Sonoma Valley; W6KXT, San Francisco County; W6PZE, Petaluma; K6AWB, Santa Rosa; W6BWV, Humboldt County; W6KVO, Mendocino County. New officers of NCDXC are W6MAV, pres.; WB6UJO, vice-pres.; K6KON, secy.-treas. K6UGS finds 20 cw of interest and

is patiently waiting for a new SB-102 to arrive. He recently obtained his Advanced Class ticket. Check July 1970 column for details of the license-renewal notification program which I have started. Please, amateurs in this section only. WA6BYZ has been awarded a Certificate of Merit for his 12 successive BPLs in the last year. Hopefully, there will be a section ssb net started this fall. Tentative plans call for Sat. mornings, about 11 A.M. local time, on the 40-meter band, frequency still undecided. Comments to the SCM would be appreciated regarding the net. There will be appointments opened for manager, assistant and OPSs. WB6FZN thoroughly enjoyed his first CD Party and is now a member of the Marin Club. W6OFR joins forces with W6WLV to dispatch W6 QSL Bureau traffic from Santa Rosa. W6RQ likes the Open CD Party idea and finds about a third of his QSOs to be "MBR." Don't forget the Bay Area Hamfest this month! To those wondering why they don't see their reported traffic sooner – the delay between my write-up and the appearance of the column in *QST* is two months. This is being written in Aug. for Oct. If your Form 1 does not reach me by the 4th or 5th of the month, it is not included until the next month because of deadlines. Traffic: (July) WA6BYZ 253, WB6FZN 195, W6KVQ 154, W6OER 73, W6BWV 16, W6BIP 7, WB6JQP 5, W6PZE 2, (June) W6KVQ 48, W6OER 43.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – W6JPS, at the Pacific Division Convention, was judged to have the best mobile station. W6YKS is very active on 6 meters, is holding daily skeds with W7FN and has 41 states. WA6CPP had 97 contacts in the June VHF Contest and W6YKS had 89. W6IFX, at this writing, is the only station on in Stanislaus County. The Delta Amateur Radio Club in Stockton meets the 3rd Fri. of each month at the Daniel Webster Jr. High. The Delta Amateur Radio Club helped in the Annual Horse Run near Mt. Blue, with many members helping in communications. W6FRG and K6HXY are now on 50-MHz ssb. WA6SLS is a news reporter for the *Fresno Bee*. W6JUK demonstrated his 1-kw. amplifier for 2 meters at the Tulare County Amateur Radio Club. At the Madera County Amateur Radio Club, W6ZRJ was the guest speaker, and showed slides of ARRL and the "Ham's Wide World" movie. The new officers of the Fresno Amateur Radio Club are WB6VRJ, pres.; WB6SVY, vice-pres.; W6DPD, secy.; W6WME, treas.; WB6VSV, editor. The FARC meets the 2nd Fri. of each month on the 10th floor of the PGE Building. All are welcome. W6BUA is active on 40, 20 and 15 meters. WB6KOB is active on ssb. Traffic: WA6SCE 58, WA6JDB 17, WA6CPP 2.

SANTA CLARA VALLEY – SCM, Albert F. Gaetano, W6VZT – SEC: W6NVO (acting). RM: WA6LFA. W6ASH has been helping in the installation of permanent antennas at the Elcomino Hospital and the cd headquarters in Mt. View. W6BPT has taken over the coordination of all MARS traffic from RN6. This is a big job and good luck to you, Pinky. W6BVB has just put up a new 80-meter dipole fed with open wire line and it seems to work well on all bands. WA6BXH has just received his Extra Class license. Congratulations, Sandy. W6DEF acted as liaison from the San Mateo County Fair to NCN. K6DYX is now sending high speed code practice (35 to 40 wpm) on 3690 kHz at 7:30 PDT Sun. evenings. This is for those high-speed boys who want some practice. W6RFF has been busy rebuilding his equipment. The NCDX Club had a fine meeting and get-together at the Paul Masson Winery for dinner. The wine was delightful and free. Yours truly met a lot of the fellows who spend most of their time handling DX. Most of the DX hounds are also very good operators and would be a real asset in time of emergency when one can never get enough good operators. So the SCM always welcomes a get-together with these fellows. Traffic: W6YBV 202, W6NW 184, W6DEF 180, WA6LFA 169, W6BVB 131, W6VZT 88, W6BPT 65, K6DYX 49, WA6NHD 42, W6AUC 40, W6ASH 12, K2EIU/6 9, W6YHM 9, W6RFF 8, W6OH 7, WA6BXH 3.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Calvin M. Dempsey, WA4UQC – SEC: W4EVN. PAM: W4AJT. VHF PAM: W4HJZ. RM: W4WXZ. WB4QRT has worked 41 states and 3 countries on 6-meter ssb. WN4QJA passed the Advanced Class exam and is putting up a tri-band quad. He plans to work 20-meter cw. K9ZCH/4 is building a lineat. He made 16,575 points in the July CD Party. K4CAX is transmitting Official Bulletins at 2330 GMT on 7060 kHz Tue., Thurs. and Sun. He also was active in the CD Party. The Brightleaf Amateur Radio Club had 10 operators, plus several more members, logging in Field Day. Its club bulletin, "Ham Chatter," placed third for club activity reporting. This was listed in the *Amateur Radio News Service*. Keep up the good work. W4OMW, editor of "Ham-Chatter," received his OOTC. Please let me have your reports by the 6th of the month.

Net	*Freq.*	*Time(Z)/Days*	*QTC*	*Mgr.*
N.C. SSB	3938	2330 Daily	11	WB4ADE
THEN	3923	2330 Daily	83	WA4UQC

Traffic: (July) W4EVN 181, WB4MLI 124, W4WXZ 102, WA4VNV 29, K4MC 22, WA4UQC 18, K4VBG 16, WB4JMG 8, WB4BGL 7, WB4HGT 6, WB4HGS 5, WB4OZL 5, K4EO 4, WB4NZB 3, W4TYE/4 2. (June) W4TYE/4 8.

NORTH CAROLINA QSO PARTY

This contest, sponsored by the Raleigh Amateur Radio Society, will take place from 1800 GMT Sat. Nov. 7 to 0200 GMT Mon., Nov. 9. It is open to all amateurs. Stations may be worked once on each band. (Phone and cw will be considered separate contests, requiring separate logs.) The exchange will be QSO number, RS(T) and county for N.C. station, ARRL section or country (for non-N.C. stations). Suggested frequencies: 3565 3865 3925 7065 7265 14065 14300 21065 28065 28565. Scoring system: Score one point per QSO times the number of N.C. counties for non-N.C. stations. N.C. stations score one point per QSO multiplied by the number of ARRL sections plus countries. Awards: A trophy will be awarded to the top scorer in N.C. and also to the top score outside of N.C. The high scorer in each ARRL section will receive a certificate. The high novice scorer will earn a certificate. The mailing deadline is Nov. 30. Send your log to Raleigh Amateur Radio Society, P.O. Box 12541, Raleigh, N.C. 27605. Y'all come.

SOUTH CAROLINA – SCM, Mrs. Elizabeth Y. Miller, WA4EFP – SEC: WA4ECJ. Asst. SEC: W4WQM. PAM: WA4GAW. RM: WB4DXX. Many thanks to all for the fine activity reports. Many more thanks for the splendid support of the CW Net. W4NTO advises that former SCM K4HDX is mending well after wringing out a small experimental plane the hard way. All current appointees of more than a year are urged to update their certificates. WB4OVQ is handling phone patch traffic from Canal Zone. The DX Radio Club of Camden how has a Bishopville branch. W4CE has retired as State Civil Defense Communications Officer. We will miss that familiar call on the RACES Net. WB4OBZ is at summer school up "Nawth.

SCPN: 3930 kHz Dy Noon; Sun 0830 and 1530 EDT.
CN: 3573 kHz Dy 2245Z and 0200Z.
SC SSBN 3915 kHz Dy 1900 EDT.
SC AREC Forum 3915 kHz T-W 2000 EDT.

Visitors in this section can nearly always find a South Carolina station on 3915. Traffic: WB4DXX 358, WB4OBZ 69, W4MC 41, W4NTO 38, WA4EFP 34, W4JSD 24, WB4OVQ 9, W4WQM 9, K4ULT 6, WB4MCI 5, SCSSBN 98.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A.E. Martin, W4THV. SEC: WA4PBG. Asst. SEC: WB4CVY. RMs: WA4EUL, K4MLC, W4SHJ. PAMs: W4OKN, WA4YXK, W4QGW still is in the hospital. The XYL of WA4NJG is recuperating after an operation. No word has been received on the XYL of W4QDY in the hospital. W.T. Woodson High School, WB4LRH is on the air with TR4 feeding TA33 and doublets. VFN: 29 sessions, average QNI 17.3 (June). W4GEO is getting settled in a new house. W4DM was in nets and the CD Party. There was a good turnout at Winchester with WB4NNO drooling at gear. Contests are keeping K4JM out of the sun. W4ZYT reports K4RKA and WA4REI have the Charlottesville repeater, WB4KNX, operational. WB4PYA has a new IC keyer and will join WB4DRB at W & M this fall. WB4DRC was multi-operator at WB4FDT FD. Classes are keeping WB4FDT off the nets. W4THV got Digi-Key and Ten-Tec and threatens competition on cw. W4JUJ is chasing counties and CD Parties. WB4ODN got a TH3 Jr up 60 feet and working fine. W4CDC worked the OH DXpedition to ZA. Director W4KFC worked his 100th different station on 146.94 with his 1'm 3-watter; he went to Richmond ARC/VARC, Winchester and Jacksons Mill with W4GF; met ON4VY, former pres. of the Belgium Radio Society, and took him to PVRC. WA4MME and WB4FQR are taking up flying. K4MR's antenna pole was struck by lightning while he was in Europe. W4ZM substituted on TCC for summer vacationers; he spent 2 weeks on Cape Cod. W4UQ went to Michigan for 3 weeks. OO W4HU got to .00008 percent in the IMT! SEVWA got a nice write-up with pictures in the local paper on FD. W4KAO still is working on the rig.

Net	*kHz*	*Local Dy.*
VSBN	3945	1800
VSN	3680	1830
VN	3680	1900
VFN	3947	1930
VSBN	3935	2200

Traffic: (July) WB4NNO 266, WB4CVY 180, K4PQL 169, K4KNP 152, W4NLC 111, W4TF 106, W4UQ 102. W4ZM 77, WB4ODN 61, WA4EUL 48, K4GR 46, WA4JJF 45, K4FSS 29, WB4DRB 26, W4SHJ 26, WB4FDT 16, WA4PBG 15, WB4PYA 14, W4KAO 11, WA4OLN 11, WA4WQG 10, W4ZYT 9, W4KFC 8, WA4NJG 6, K4JM 5, W4MK 5, WA3IYS 4, W4DM 4, W4OP 4, W4THV 3,

W4KX 2, W4YZC 1. (June) W4UQ 161, WB4DRB 66, K4FSS 47, WB4LQV 8, W4OP 5, WB4GMC 3. (May) WB4GMC 8, WB4LQV 7.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – SEC: WA8NDY. RM: WB8BBG. PAMs: W8DUW, W8IYD, K8CHW. Phone Net Mgr.: WA8LFW. WVN-CW, 0000 at 3570; Phone Net, 2300 on 3995; RACES-CD Net, 3996.5 at 1300 and 1800 on Sun. I regret to report the passing of two active amateurs, K8ZWM and W8QG. WA8YWK has the 220-MHz rig on the air. PARA officers are W8GWR, pres.; WA8EKC, vice-pres.; K8ARA, secy.-treas.; W8KBM-W8AFN, activities. WA8NDY and WA8WCK were NCSs for the 11-county flash flood warnings. WVN Phone Net, with 31 sessions and 496 stations, handled 136 messages. The Northern Panhandle (Wheeling) ARC held its Annual Corn Roast Picnic at the club's garden. K8CFT boosts Oak Hill with a new QSL card. The 1970 State ARRL Convention held at Jackson's Mill was a hugh success in every way. The fall meeting for organizing the '71 Convention will be announced soon. Dates for 1971 are July 3 and 4. The Roanoke Division Convention will be held in Raleigh, N.C. Oct. 31 and Nov. Traffic: WA8POS 130, WA8NDY 70, W8HZA 56, WB8CYB 32, W8SQO 21, WA8LFW 19, W8JM 9, WB8AQE 5, W8DUV 4, WA8WCK 4, WA8ZNH 4. W8AFB 3, W8AEC 2, W8KBM 2, WA8OKG 2, WA8THX 2, W8AEN 1, WB8AKR 1, K8ARA 1, WA8DQH 1, WB8EQH 1, W8GWR 1, WA8HGA 1, K8MND 1, K8PRC 1, WRTWR 1, W8WVA 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Charles M. Cotterell, WØSIN – WØLRN, our RM, has sent letters to some of our traffic-minded amateurs and the response has been poor. Are you all happy? CCN has a new manager, as WØUAT felt he didn't have the time, and KØECR has taken on this responsibility. Thank you, Phil, and welcome Ray. WAØMNL and many helpers did the Colorado Springs end of the Powder Puff Derby up in style. WØWYX has some NCAR recorders at Squaw Mtn. Good to see all of you at the convention; I also attended the Wyoming Hamfest. Traffic nets show some lessening of activity and 160 is still being tried by WØLRW and others. The repeaters in Colorado are busy and congrats to the Pueblo Ham Club on its work with them and the League. WØMOX and WAØSIK report on vhf. The Weather Net and KØZSQ are still going strong. Work is going on in organizing the Colorado Council of Amateur Radio Clubs. WØCJK is temporary secy. Lots of section news appears in the DRC's bulletin "The Round Table." Why not send in your traffic report each month? It counts on the section totals that way. Hi-Noon Net reports QNI 744, QTC 133 total time 944 minutes, 25 sessions. Columbine Net had QNI 904, QTC 60 and time 1313. WAØSUD is now the Columbine Net reporter. For June KØZSQ had a 1300 count. Traffic: KØZSQ 835, WØWYX 358, KØJSP 84, WØLG 76, WAØMNL 55, WØLRN 50, KØECR 43, WØKFH 16, KØMNO 10, KØIGA 4.

NEW MEXICO – SCM, James R. Prine, W5NUI – SEC: W5PNY. PAM: W5DMG. OOs: W5QNQ and W5QNY. RM: WA5UJY. Congratulations to WA5TWA, who is the section recipient of the PICON award for 1969. The formal presentation will have to await Doc's return from Yap Island in the south Pacific. Preliminary reports indicate that considerable traffic was handled by section members during the hurricane which struck the South Texas area. WA5LZX's roof on the ham shack collapsed and he is temporarily off the air. WA5RPC is now serving as net manager of the New Mexico Net, which meets 0230 GMT 3750 kHz each week day evening. Additional participation, particularly from some of the outlying communities, would be appreciated. Traffic: W5PDY 57, W5DMG 40, WA5MIY 35, W5NUI 33, WA5JNC 27, K5ISJ 26, W5MYM 23, W5RE 22, WA5OHI 11, W5PNY 5.

UTAH – SCM, Thomas H. Miller, W7QWH – SEC: W7WKF. RM: W7OCX. WA7KMJ has been appointed OBS and will be transmitting Official Bulletins Fri., Sat. and Sun. at 2300, 1500 and 1300 GMT, respectively, on 7055 kHz. K7YLT has been awarded the BUN certificate. This is certificate No. 78 in more than twelve years of operation of BUN. W7FM lost his 2-meter and 434-MHz beams twice to high winds in July. The Rocky Mountain Division ARRL Certificate of Merit was awarded to K7WYU for his work in handling phone patches. Early reports indicate the WIMU Hamfest was very successful. BUN report for July: Sessions 31, QNI 553, QTC 23, time 367 minutes. Despite the usual bad conditions on the band during the summer months the net has functioned very well. Frequent use has been made of relays. NCSs are still needed for the week days. Traffic: K7HLR 86, W7OCX 46, W7FM 40, K7CLO 2.

WYOMING – SCM, Wayne M. Moore, W7CQL – SEC: K7NQX. RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX, W7SDA, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 1830 on 3608; Jackalope, Mon. through Sat. at 1215 on

7260; Wx Net, Mon. through Sat. at 0630 on 3920; PO Net, 190 Mon. through Fri. on 3950. WA7IFX is back on the air after havi rig trouble. WA7FHA has added a transceiver to his station. Ne pres. of the Wyoming Mobile Club is K7WNF of Cheyenn Cheyenne took away the SCM Field Day trophy for the year. suggestion has been made to make this trophy a permanent travelir trophy and award the annual winner with a certificate and let the keep the trophy for one year. Send me your comments on thi WA7MKU, who is working on her ticket, was married Sept. Traffic: W7GMT 146, K7VWA 89, W7TZK 61, W7VJI 20, K7TA *18, K7AHO 6, W7SDA 5, K7BTE 4,* WA7FGK 2, W7NNX 2.

SOUTHEASTERN DIVISION

ALABAMA – SCM, Donald W. Bonner, W4WLG – RM W4HFU. The North Alabama Hamfest was a big success this year *Huntsville. It is good to see net participation holding up during th* summer months. Several members of the section made PSHR th month. Congratulations to WB4JMH, W4HFU, WB4LAO ar *WB4LAL.* Regular *QNI* AENM from Decatur now are *WN4QAI* ar WB4NLK, also WN4OCU from Mobile. The new NM of AEN 6-Meter net is W4QAU. Our thanks to WB4IEY on a fine job he h done on the net. It is good to see that the section made anothe good showing this year in the SET (3rd place). And did you note the good showing the slow-speed AENM made? WB4JMH is no in charge of the special fund on AENM. Birmingham now has 2-meter repeater operating on fm. Traffic: (July) W4HFU 14 WB4EKJ 112, WB4JMH 95, WN4OJD 86, WB4LAL 81, WB4LA 62, K4AOZ 53, WB4KSL 29, W4WLG 22, W4DGH 18, K4WOP 1 WA4AZC 15, WB4OVR 13, WA4VEK 12, K4HJM 10, WN4POC WB4MLV 6, K4UMD 6, K4BSK 4, WB4NLK 3, WB4CJC WN4OCU 1, WN4QAI 1.

EASTERN FLORIDA – SCM, John F. Porter, W4KGJ – As SCM: Albert Hamel, K4SJH. SEC: W4LYT. Asst. SEC: W4SM *RMs: W4ILE, K4FHY. PAM 75: W4OGX. PAM 40: W4SDR.* Traf totals are down this month partly because of the illness of our "Ir Man" IT, and with WA4SCK and others off on their vacatior K4BNE lost his tower, not from a wind storm but a wild ceme truck. Wonder how he will explain it all to his insurance ma Deltona Radio Club now brags that about a dozen QCWA membe are active on their 10-meter emergency net. According to W4IY editor of *Florida Skip*, the winner of the 1970 *Florida Skip* Fie Day trophy is NOFARS, W4IZ, with a score of 20,086 points. V welcome many of the old-timers back to the Knights of Kilocycle W4NGR, master oscillator, extends an invitation to all to join the each Sun. on 3910 kHz at 7:30 A.M. W8BZY, who has been acti in our section nets, is now off for Viet Nam. Best of luck to yo Jim. OO K4PMA is still going strong on the reports. He racked 170 for July. How about you other OOs picking up a little stea Our bands sure sound like you are needed. Would like to hear fr some of you club secretaries about the activities of your clubs *well as meeting times. I plan to attend at least 7 more club meetir* throughout the section this year. Don't forget our section ne Keep those cards and letters coming. Traffic: (July) WB4AIW 3 *W4EPC 198, W4SDR 150, WB4GHD 126, W4NGR 116, WB4OM* 113, WB4HJW 103, WB4PWD 85, WB4MIQ 74, K4DAX WA4ABY 60, 8R1Y/W4 60, WB4HNL 53, W8BZY/4 52, WB4F *47, W4IHW 45, W4OGX 41, W4KGJ 39,* W4SMK 38, W4IA WB4KPK 34, WB4JSK 25, K4LPS 23, W4YPX 23, W4GUJ W4DVO 18, W4IYT 18, WB4EQO 17, WB4IKP 17, K4JWM W4TRS 17, W4IAD 16, W4BNF 15, W4CP 14, W4ZAK 14, K4B 13, W4FFF 12, WA4EYO 10, K4SJH 9, W4TJM 9, WB4JRV W4LK 5, WA4OHO 5, WA4UQQ 5, K4EBE 1. (June) WB4IKP 1 W4KRC 88, W4BNF 55, K4GJ 55, W4DVO 16, W4FFF 6.

GEORGIA – SCM, A.J. Garrison, WA4WQU – Asst. SCM: Jc F. Laney, III, K4BAI. SEC: W4YDN. RM: K4BAI. PAMs: K4H W4LRR.

Net	*Freq. Time(Z)Days*	*Sess.*	*QNI*	*QTC*	*M*
GSN	3595 2300/0200 Dy	62	565	164	K4I
Ga. SSB	3975 0000 Dy	–	–	–	WB4D
GTN	3718 2200 Dy	21	84	13	WB4J

We're glad to welcome W4KRC back to Georgia. He is active a *in the Atlanta area, and with a big signal this time, too.* The Geo Single Sideband Assn. held its regular quarterly board of direc meeting Aug. 2 at Savannah Beach. Attending were WB4D *WB4DMO,* W4WKP, WA4VWV, *W4NNB,* W4KRI., WB4D K4OSL and WA4WQU. K4HQI is sporting a new tri-band be supported by a shiny new tower. W4BGH has put the finis touches on his elaborate hamshack. *WB4NDR* made 33 contact 6 meters during band openings on July 4, 15, 16 and 18. W4L reports having worked ZL1AA on Cayman Island on 50.104 s ssb during recent 6-meter opening. Phil also reports that the SI

Mountain repeater station is going strong. Traffic: WA4RAV 123, K4BAI 89, WA4WQU 58, W4CZN 36, W4UVP 32, W4RNL 29, W4AMB 25, WA4LLI 8, K4HQI 4.

WEST INDIES – SCM, Jose Medina-Hernandez, KP4CO – Plans for reactivating KP4VA at the College of Agriculture and Mechanic Arts of the University of Puerto Rico at Mayaguez are completed equipment-wise, Soler Air Travel Agency donated equipment, tower and antenna for use at KP4VA. HK5AUD/KP4 is very active from Valle Hermoso, Mayaguez. KP4GH and KP4CO were active from State Mountain at Maricao. KP4BAD was also active on 6 meters from State Mountain. WB2PNF visited the Island and operated fixed portable from various towns. The Puerto Rico Amateur Radio Society is planning a special Field Day for all KP4s for a week end Fri. through Sun. at State Mountain. There will be lodging and food services for hams and their families. Please indicate your interest to KP4AST or HI7FCL over the air. KP4ANG is using SB-34 mobile on all bands including 75. KP4TIN is very active on 7 MHz. KP4AST is now an electrical engineer, plus a wild DX-chaser. The P.R. DX Club is planning a social gathering. Watch for the date. Traffic: KP4WT 240.

WESTERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: W4IKB. PAM: W4MQQ. RM: K4VFY. RM-RTTY: W4WEB. Pensacola: WA5GTJ/4 is building a mobile rig. WB4DVM and K4VFY are QRL school. Tate High School has formed a radio club, and needs parts and equipment. Write: Jay Reynolds, P.O. Box 68, Gonzales 32560. W2FEX/4 is a new ham in town. The W4UC repeater is temporarily off the air for relocation of the receiver site. Milton: K4DDV is active on 75-meter ssb. Fort Walton: Is WN4RFM, at age 10, the youngest local ham? WN4QYJ, WN4RBD and WN4RKT are more graduates of the Novice Class. WB4NHH made the Phone CD Party; he is building a QRP transistor rig. W4UHI and XYL WB4OGO have moved to Chicago. The CD van has finally been painted, and is being readied for equipment. The Playground ARC had a fine program on building codes, insurance and taxes as related to amateur radio. Chipley: W4IKB, WA4ZFK, WN4PVG and WN4PVH took a camping trip all the way to Fairbanks, Alaska. Panama City: The PCARC has a new clubhouse in Millview. Meetings are now held Wed. nights. WA4VIY renewed as OVS. Tallahassee: The TARC had a good crowd at its installation banquet, including WA4GRU from Newport. Apalachicola: K4BDY is recovering from a back operation. WB4GOO is mobile on 2-meter fm. W4WSY has moved to Monticello. Traffic: (July) K4VFY 262, K6QPH/4 42, WB4LOQ 29, WA5GTJ/4 10, W4RKH 9, WB4DVM 6, W4FDJ 4. (June) WB4DVM 12.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – SEC: K7GPZ. RM: K7NHL. PAM: W7UXZ. The annual Fort Tuthill Hamfest at Flagstaff brought out approximately 200 hams this year. Southwest Division Director John Griggs participated by having an Open Forum. Other activities were a Crazy Hat Contest, a Cake and Cookie Baking Contest, transmitter hunts on 75 and 2 meters, films of Lake Powell and Ham's Wide World, and many eye-ball contacts. The Amateur Radio Council of Arizona sponsored the hamfest with K7GHS as chairman. K7YAF handled registration and K7REA handled the swap table. Some of us on vacation this month are W7UXZ to Louisiana, K7JKG to the White Mountains; WA7DTT to the Pacific Northwest and Canada; K7NHL to Europe; K7WUG to Glacier Park; W7OIF, W7RII and W7CAF to Western Canada, and K7UYW to Ensenada, Mexico. Any amateur who would like to see the ARRL reply to the FCC Repeater Proposal can contact your SCM. Recently appointed as ORS is K7UYW. Other current appointees are W7CEJ as ORS, OVS, OO; W7DQS as ORS; W7DRR as ORS; WA7GDC as EC; K7GPZ as SEC; WA7HUH as EC; WA7ILD as ORS; K7IRV as OO; WA7ISP as ORS; K7NHL as RM; K7NTG as EC; W7OIF as OPS; K7RDH as OPS; W7UXZ as PAM, OO, OBS; K7ZMA as EC. Anybody wishing to be considered for appointment should contact your SCM. The Worked All Arizona award is available from your SCM for contacts in all 14 counties.

LOS ANGELES – SCM, Harvey D.D. Hetland, WA6KZI – Asst. SCM: Phil Goetz, W6DQX. SEC: WA6QAY. The IPI Radio Club had K6HIJ as a guest speaker on the subject of his involvement in breaking the old communications records of 190 and 179 miles on 3300 and 5650 MHz, respectively, by communicating over a 214-mile path on both bands. The gear used was their own and used stabilized receivers for first time. WB6DPV is active on the SoCon 2 Net, as is WA6BUK. W6LYY reports his new 80-meter dipole is working EB on SCN, while K6CL is having a gas with his first beam. WA6MCK and WA6GSM also have new beams in the air and K6NA is reported to have big plans for the coming 80-meter DX season. WA6CBL is attending the U.S. Merchant Marine Academy in N.Y.

and hopes to have its club active soon. W6GOG joined the ranks of Silent Keys. UCLA instructors K6SE and W6OEO took in Europe during the summer. WB6GHH got a 40-meter antenna up, plus his 20-wpm CP, while WN6BJP added a new receiver and a bug. WB6JZL has been doing some late evening QRP DX work on 20-meter cw. WA6FQC has a four-element job up for 50-MHz DX. WN6BRO got his Novice ticket – one day after Field Day (groan). WB6ZVC picked up his Amateur Extra Class. K6LA is back in Minnesota for the summer. K6OMU finished a solid state TU for 2-meter RTTY. The So. Cal. ATV Club reports their members, W6PCQ/6, WB6WPQ and W6CMQ, participated in a two-way TV contact between San Diego and the Santa Monica Mtns. using 1240 MHz. The So. Cal. ATV Club will have a booth at the 1971 ARRL Southwestern Division Convention at Disneyland on Labor Day week end. WB6WFI moved into a new home and has a 40-meter dipole and a tri-bander up. WB6WGS expects HP-Land assignment with the USAF soon. WB6RXC has undertaken a homebrew project. Southland visitors of late included ZL1BBK and HS5ABD. An AREC meeting was held Aug. 10 with ECs W6OI, W6TXJ, WA6ILI, WA6JXG, WB6VYX and K6VGH; Asst. Dirs. K6UMV and W6YAN; SEC WA6QZY and SCM WA6KZI present. Plans were made for a meeting frequency (WCARS) in an emergency and discussions were held on a future command net and possible section information station. SCM WA6KZI and Asst. SCMs K6UMV and W6DGH made an appearance at the invitation of the Inglewood RC and presented a discussion on their objectives within the Los Angeles section. It has been proposed that the League more actively support the use of WCARS, MWARS, ECARS, WPSS, etc., as calling/monitoring frequencies, and Comm. Mgr. George Hart, W1NJM, has solicited comments regarding same. All amateurs providing the SCM with a monthly report will receive a free copy of the section's bulletin, "Didi-dumdum-didi." Traffic/PSHR: W6AM 4/0, WB6HBO 62/0, W6BHC 90/0, K6CDW 61/0, W6DGH 8/0, K6CL 32/0, WA6DPV 21/5, W6DQX 6/0, K6EA 2/0, WA6EIM 1/0, W6FD 40/0, WA6FJJ 0/3, W6FJT 26/38, WA6FQC 2/3, WB6GGL 0/3, W6HUJ 12/0, W6IL 5/39, W6INH 484/39, W6IVC 0/2, W6JPH 13/0, WB6JZL 0/7, WB6KGK 9/14, WB6LSB 0/30, W6LYY 86/13, WA6MCK 0/32, W6MLI 179/0, W6NAA 4/4, W6OEO 17/4, WB6PAV 1/7, W6QAE 115/39, W6TXJ 0/2, W6USY 2/0, WB6WFI 0/3, WB6ZVC 153/38.

ORANGE – SCM, Jerry L. VerDuft, W6MNY – Asst. SCM: Richard W. Bierbeck, K6CID. SEC: WB6CQR. Your SCM now has the call W6MNY and is ex-WA6ROP and ex-K6CLS. New officers of the Citrus Belt ARC, W6IBT, are WB6ETB, pres.; WA6IYN, vice-pres.; WB6ZRU, secy.; WA6PVZ, treas.; WB6PLD, activities; WN6HGG, custodian. New officers of the Anaheim High School Electronics Club, W6MIB, are WA6AOX, pres.; WB6BIH, vice-pres.; WB6RAL, sgt. at arms; WB6QVY, sponsor and trustee. Club station equipment includes a Heathkit 301-401 sideband with a 50-ft. TH6DXX tribander. The Victor Valley ARC, K6OWR, now meets at the Victor Village Recreation Center, 15790 Eto Camino Street in Victorville. The club also now sponsors a weekly vhf net, meeting Wed. at 2000L on 145.35 and/or 146.94 MHz. The So. Cal. ATV Club plans to have a booth at the 1971 ARRL Southwestern Division Convention on Labor Day week end at Disneyland. The club had quite a few stations operating video during Field Day. RN6 Manager W6LRU reports his new cabin near Bishop is progressing well. WB6ASR is very active on 6 meters with a new Clegg 66er. WN6FPZ has upgraded and got W6OBD back again and is operating from Lucerne Valley. WB6AJW and W6IB tested the 2-meter rig at Desert Hospital, which was donated and installed by the Desert RATS Club. OBS WA6LGZ is also now an OVS. OBS W6BAM now has some help with cw bulletin tranmissions from 16-year old WA6CEI, who sends Official Bulletins Mon., Wed., Fri. on 3735 kHz, and Tue., Thurs., Sat. on 7075 kHz, all at 2100 local time. All transmissions may also be on 14070 kHz. WB6UDC did some DXing while vacationing in Hawaii. Congratulations to WB6YXY who obtained his Advanced Class license. PSHR: W6RNX 67, WA6ROF 43, WA6CEI 37, WA6FQQ 31, WB6ASR 5. Traffic: (July) W6LCP 190, WA6FQQ 120, WA6ROF 76, W6LRU/6 71, W6WRJ 51, W6BNX 40, WB6ZEC 15, K6GGS 12. (June) WA6FQQ 202.

SAN DIEGO – SCM, Richard F. Leffler, WA6COE – Asst. SCM: Art Smith, W6INL. SEC: K6EDA. A total of seven area clubs reported their activities for July, which is some sort of FB record! The SD DX Club held its Aug. meeting at the home of K6CF. The El Cajon ARC had its annual picnic in Aug. at Flynn Springs Park. SD Radio Council reports WB6IKF as its new secy. SOBARS reports its July meeting was given over to FD summary and reports. No. Shores ARC had the local FCC engineer as speaker at its Aug. meeting. Imperial Valley ARA (IVARA) was visited by WA6COL and W6INL at its July get-together. Palomar ARC held its Annual County-wide Picnic Aug. 30 in Fallbrook. All clubs in the section

are invited to send news to the SCM at the end of each month. *Station Activities* K6ROR (Colo.), WB6IFH (Wyo.) WA6HGU (N. Calif). K6BTO and WA6TFC renewed as OVSs. New EC for Eastern District is W6TAL. For 2-meter AM Net is WA6AAP. W6SRS now is Advanced Class, WB6ZFK, Extra, WA6GAH and WB6LYG now Generals. WN6HOI and WN6CGU are new amateurs in the section. W6YDK helped as NCS during the recent Hurricane Celia emergency at Corpus Christi. K6EC moved past 300 countries on ssb (has already done this on cw only). Station activities reporting cards are welcomed and available through your club secy., WA6COE or W6INI. Ask for some and report your activities each month! PSHR: W6BGE. Traffic (July) W6VNQ 479, W6BGE 245, W6EOT 195, K6HAV 140, WA6COE 8, W6MAR 1.

SANTA BARBARA—
SCM, Cecil D. Hinson, WA6OKN — SPC: W6JTA. RM: W6UJ. W6TSH and W6SUN, both of Thousand Oaks, have a contest going to see which is the better antenna, the quad or the Yagi. WB6BH, of Thousand Oaks, has moved to Australia and is now VK5PK at present. Phil operates club station VK5WC and can be found on 15 meters, Wed. and Fri. evenings between 7 and 8 P.M. local time. W6HF is aboard a freighter operating W6HF/MM with a Signet and reports that his next port of call is Oslo, Norway. WA6CPM did well in the recent Frequency Measuring Test with an overall error of less than 2 ppm. The Poinsettia ARC is active again and meets the 3rd Fri. of each month at 8 P.M. at the Red Cross Building. W6URP is pres. and K6VBC secy. The Santa Clara High ARC meets each Thurs. at 2 P.M. at the school ham shack (WB6OTK). Field Day was a great success for the Conejo Valley ARC and the films of that happy event were shown at a recent club meeting. The Mike & Key ARC is having special program nights wherein they feature QRP, RTTY, etc., and meets the 2nd Thurs. of each month at the Security Bank in Camarillo. Traffic: WA6DEI 240, WB6IWF 12, W6UJ 10.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.E. Harrison, W5LR Asst. SCM: Gene Pool, W5NFO. SEC: W5JSM. PAM: W5BOO. RM: W5GQZ. Asst. SEC ETex/PAM VHF: WA5KHE. SEC W5JSM has prepared a special form letter addressed to all ECs in our 127,000 square mile area of Northern Texas with a check list for your convenience and return so that our EC appointments may be updated. Please comply. Also our Asst. SEC East Texas mailed some 400 letters to members with SASE enclosed requesting certain information relating to AREC/EC work. The recent Lubbock tornado makes you and me more appreciative of accurate emergency communication data. Ken has given our leadership appointment and station activity problem a boost. EMT reports include W5PBN and W5MSG. WA5WAI is a Novice from West Texas; he's age 64. Field Day messages arrived. Thanks to all participating clubs. Someone in Dallas is working slow-scan TV. WA5VPI's traffic in the Lubbock tornado was 767 welfare, 26 originated, 12 relayed, points 2339. Delta SSB Net officers are W5IZU, net mgr.; W5YZL, asst. net mgr.; WA5SAD, secy.-treas. W5JPM has been endorsed as EC. The Caprock Club is buying a van for emergency work. WA5RTB climbed a 70-ft. tower to mount the four-element 20-meter beam. W5GWF is back in Sherman. WA5VJB's report on 145.5 am is not so good. He now is trying 432 and wants skeds on this frequency. W5URD is interested in appointment as EC of Smith County. WA5RNF retired from FAA and now is a full-time ham on MARS. WA5KNN has a new job with a polution firm in Longview. W5QMF and K5ILL are new QCWA members. Following are interested in appointment: WA5YCC and W5MVF as OVSs; WA5WBF and WA5YCC as ORSs; W5KYN, WA5YCC, K5ZVZ and WA5QWA as OPSs; W5CTM and W5IZU as OBSs; WA5WBF, W5IUW, W5MZO and W5MVF as OOs. Many others are interested in AREC, AEC and EC work. Your SCM attended the West Gulf Division Convention at which attendance was 350 plus. The Orange crowd did an excellent job. The traffic meeting was attended by K5ROZ, W5AIR, K5QQG, W5GCF, K5MSQ, W5ZAT, WA5DJK, W5JSM, W5BGE, WA5FSM, W5PML, K5VXP, W5FYB, WA5YYD and W5LR. The Panhandle Radio Net completed 175 check-ins during July. WB5BCA, Denton, submits a fine letter regarding "cw" requirements. Congrats, Benny, we need more outspoken "Hams" in our group. Two new Lubbock Novices are WN5BXO and WN5CBL. Also they have a Novice net on 7155 kHz Sat. at 1600Z. WA5OEQ made the BPL. Traffic: (July) WA5VJW 74, W5URD 60, W5LR 19, W5HVF 18, W5PBN 17, W5JSM 12, K5LZA 12, W5IZU 10, W5NFO 10, WA5SXS 10. (June) WA5PPF 2584.

OKLAHOMA — SCM, Cecil C. Cash, W5PML — Asst. SCM: W.L. Smoky Stover, K5OOV. SEC: WA5FSN. RM and OSL Bureau: W5QMJ. PAM: W5MFX. Well yours truly is back in the grind for another year after burning off the vacation time and winding it up

at the West Gulf Convention in Orange, Tex, I am sure I am joined by other officials in saying a great big thanks to the Orange Club for a real fine convention. As this report goes to press it finds the Corpus Christi and area emergency nets still running 24 hours per day. WA5JGU, of Oklahoma City, got local TV publicity for his part in the emergency operation. The Oklahoma City ACARC, W5PAA, is sporting a new signal one. W5QAC and W5GC are sporting a new SB-101 and 220 amplifier. The Enid ARC presented the new Meadow Lake Park with a flag pole with agreement to use it for an antenna mast during Field Day and in the event of an emergency. Congratulations to W5TT on joining the two-letter call group. Congratulations to Extra Class W5ERM, Advanced WA5ZAI and WB5ATG, General WA5WKV, WA5ZNF and WA5ZWA and Novice WN5CDR.

Net	*kHz*	*Local Time*	*Sess.*	*QTC*	*QNI*
OPEN	3915	0800 Su	4		159
OPON	3913	1700 M-F	23	55	329
STN 1	*3850*	*1730 M-S*	*26*	*12*	*250*
STN 2	3913	1730 M-S	26	26	404
OWXN	3913	1800 M-S	26	–	364
OLZ	3682.5	1900 M-S	18	55	37

Traffic: K5TFY 535, WA5IMO 78, W2FIR/5 66, W5QMJ 46, W5FW 37, W5CDG 27, W5FKL 27, W5MFX 23, W5PML 16, WA5UEJ 8, WA5WRC 6, WA5FSN 5, K5OCX 4.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – SEC: VE6XC. PAM APSN: VE6ADS. PAM VHF: VE6DO. OVSs: VE6MX, VE6AHE. OOs: VE6HM, VE6MJ, VE6TY. I regret to report the passing of VE6OD. He will long be remembered for his years of work on the old APN. Once again the amateurs of Alberta helped out on the AMA BEBA project for the civic holiday week end Aug. 1 to 3. A great deal of thanks to the many amateurs who assisted throughout the province from either their mobiles or their home stations. VE6AZU did an excellent job on his first coordinating *effort in the Calgary area. VE6SB won the praise of all for his* excellent work as provincial NCS. An excellent PR job for amateur radio was done and perhaps we did save a few lives. I wonder, did VE6QW have a deer license for his car? VE6ALQ put out an excellent signal from his mobile. VE6ALS did his usual outstanding job from the Banff, Lake Louise, area. Conditions seem to be improving on 75 after some real bad days. The APSN is holding its own with around 45 QNI per session. The ATN seems to be in a summer recess.

BRITISH COLUMBIA – SCM, H.E. Savage, VE7FB – Field reports are glowing references to the weatherman with perfect weather to plain lousy and wet from B.C.'s FD reports. The RI, Ernie Coe, paid a visit to Prince George ARC and passed six more into the amateur radio fraternity. VE7ALU at last made Class "A." VE7BXD handles phone patches and traffic and VE7BGJ handles swap and shop on phone on the BAT. Phone Net. Both are sightless. Many times it is hard to believe that they are. VE7AED's FD report reads like the generator worked, cw rig not, FT-DX-400 worked, mosquitoes worked hard harder than the stations worked. The fellows made 39 contacts, but it was well earned. VE7LL is still looking for members on Green Keys.

MANITOBA – SCM, Keith Witney, VE4EI – With the summer recess most people evacuated the ham shack for the beach or such activities as the Mid-Continent Hamfest, at which a great time was had by all, even though I did end up totally in left field in the rabbit hunt. As a matter of fact, the rabbit was never really found on 2 meters. VE4RF spent half an hour driving in front of it and was eventually declared the winner. WØBUO eventually won the 75-meter hunt. I had an interesting talk with the North Dakota State Radio Officer and apparently the fellows are very interested in working with us in emergencies, something to keep in mind when the net and SET activities are planned this fall. VE4VA is quite busy with a monster quad and a receiver. VE4UX took a week end off from fishing to get up a 2-meter base antenna. The Brandon boys don't like mobiles any more; the latest thing is how to develop the perfect wrist radio. Summer does have its hazards, VE4FQ has one shredded coax cable somewhere in the grass clippings. Traffic: VE4FQ 17, VE4CR 6, VE4QI 6, VE4LN 1.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – SEC: VE3GWD. Your SCM took home the Heathkit HW-12A for 75 meters complete right down to the mobile antenna from the Calgary Hamfest held July 10-12. Had a fine visit with the VE6 gang and can heartily recommend a visit to their dynamic and beautiful city. The many answers to my questionnaire to all ARRL appointees (less ECs) has been most gratifying and your good wishes are appreciated. It is only appropriate that we also thank our immediate past SCM VE3BUX on an outstanding job. This month we are going to single

out the Sault Ste Marie bunch and the Algoma ARC in particular, thanks to a nice write-up by VE3EYW. FD was a real successful one with a record number of contacts. VE3EPF and VE3EYW have new towers with stacked 2-meter beams. VE3DNB has SB-102. 2-meter activity is at a high with a dozen QNIing. Repeater VE3SSM is out of action for repairs but should soon be back in operation again with much greater range and power. VE3FOJ is plugging away on the electronics study course. VE3BPS is completing his SB-102. The Algoma ARC would like to swap bulletins with other clubs. Your SCM would also appreciate receiving copies of bulletins. Nice to hear VE3DVE back on the cw nets again after a big rebuilding job in addition to teaching high school science. The Ontario Phone Net, 3770 kHz, is a real traffic-mover. VE3AKQ, PAM OPN, is asking for replacement after a very FB job of running OPN. We are looking for the right man for a big job. I will reply to your many letters just as soon as I get the records in order. I am considering the endorsing of appointment forms Jan 1, of each year. Any comments or suggestions? Traffic: (July) VE3FRU 153, VE3GCE 99, VE3FXI 45, VE3DBG 41, VE3DU 28, VE3AWE 20, VE3CWT 17, VE3EWD 7. (June) VE3DV 50, VE3AWE 17, VE3VD 4.

QUEBEC – SCM, Joe Unsworth, VE2ALE – VE2OJ retired as SCM in July. Thanks for a job well done. VE2ALE has gone to day shift work while VE2WM went to night shift. Sorry to hear that VE2SS was ill in early July and that VE2AVP is being transferred to La Touque this fall. Many Quebec hams enjoyed vacations during the recent hot spell and K2SNJ was seen mobile in the province during the month. VE2RM has a new repeater building with help from VE2s BQM, GA, DM and BSX and now is heard maritime mobile on 2 meters. VE2CPR (Payette Radio) had a very successful picnic on the Terre des Hommes (VE2XPO). VE2s WY, DJR and AQQ are helping VE2NV with QSL card distribution. Le congres 70 tenu a Quebec en juillet a remporte un tres grand succes; felicitations aux organisateurs, membres de VE2CQ, ainsi qu'au nouvel executif de RAQI sous la presidence de VE2BAI. Bienvenue a tous au Reseau de telegraphie tous les soirs a 2230 GMT a 3690 kHz. VE2XPO a terre des Hommes a ete tres actif cet ete. In reviewing the SET reports in Aug. *QST* the AREC has lost ground this year over last. The SCM and SEC and ARRL can only report properly when reports are turned in on a regular basis. Green Hornet night the 1st Tue. of the month has many turnouts for the 80?s even during summer vacation months. Traffic: VE2DR 22, VE2EC 16, VE2BVY 14, VE2APT 8, VE2OJ 8, VE2BTZ 4, VE2ALE 2. QEN

Changes of Address

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

QUALITY MERCHANDISE — QUALITY SERVICE

MERCHANDISE IN STOCK — PROMPT DELIVERY

NATIONALLY ADVERTISED BRANDS, THE LATEST MODELS

Instant shipment on cash or bank charge orders of new equipment and accessories. TRIGGER ELECTRONICS has the most complete stock, for your convenience. Shipment is usually made the same day your order is received. Avoid delays! With cash orders send cashiers check, postal note or certified personal check.

•

NO DOWN PAYMENT WITH INTERBANK AND MIDWEST BANK CHARGE CARDS. Just confirm your order in writing along with the number and expiration date or series of your card. Your goodies will be on the way.

•

Trade-ins: We allow much more on trade of ur present gear. (Clean, recent vintage equipment.) Write for a trade-in quote.

•

Like new equipment at money saving prices. The most complete inventory of top-notch, clean as a pin gear at bargain prices.

another important
TRIGGER service:

WE BUY USED HAM GEAR FOR CA$H

PROMPT SERVICE...
PROMPT CASH!

Write today! Send for FREE Catalog!

TRIGGER Attn: W9IVJ Q10/70
7361 North Avenue
River Forest, Ill. 60305 Amount
RUSH THE FOLLOWING: Enclosed

☐ **Send free catalog.**

NAME_____

ADDRESS_____

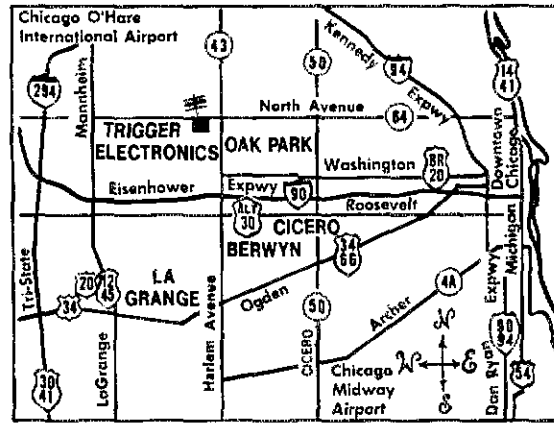
CITY_____ STATE_____ ZIP_____

TRIGGER ELECTRONICS An Exclusive Ham Store.
ALL PHONES: (AREA 312) 771-8616

STORE HOURS
(CENTRAL TIME)

WEEKDAYS . . . . . 10:00 A.M. - 7:00 P.M.
SATURDAYS . . . . . 10:00 A.M. - 3:00 P.M.

TRIGGER ELECTRONICS is conveniently located 2½ miles north of the Eisenhower Expressway near the west city limits of Chicago on the main street of North Avenue (State Route #64), 3 blocks west of Harlem Avenue (State Route #43). Just 10 miles due west of downtown Chicago, or 20 minutes southeast of O'Hare Airport. Plenty of free parking. Come in and browse. See the latest in ham gear attractively displayed.



CLEAN AS A WHISTLE LIKE-NEW BARGAIN SPECIALS FOR OCTOBER

2563	$449	SWAN 508	$119	HA-1 KEYER	$ 77
5134	559	TV2 (14MC)	249	HQ110C	159
3255 & AC	699	GALAXY GT550	399	HQ170C	179
5012	599	RANGER II	169	HQ170A/VHF MINT	279
3120A	169	INVADER 200	249	HQ180C	289
DRAKE 2B	189	NATIONAL NC121	109	HQ180A &NB	399
DRAKE 2C	199	NC303	269	B & W 5100 MINT	98
DRAKE R4B MINT	369	HRO500 NEW	1295	HEATH GR54	79
DRAKE SW4A	229	LPIO NEW	599	SB301 RECEIVER	259
DRAKE 2NT	129	NCL2000 LINEAR	450	SB200 LINEAR	199
DRAKE T4XB MINT	379	HT37	219	SB630	79
DRAKE TR-4&NB	549	HT44 & AC	329	EICO 720	69
DRAKE TR-6&NB	529	HT46	279	EICO 722 WIRED	39
SWAN 240 & AC	199	SX73	399	GONSET IV 6MTR.	149
SWAN 250C MINT	339	SX100	169	900A & 901AC	349
SWAN 270B MINT	399	SX115	329	SBE 34	319
SWAN 350	289	SX122 MINT	269	CLEGG 99ER	77
SWAN 500C	449	SX146 MINT	229	INTERCEPTOR	249
SWAN 500CX MINT	479	HR2000 MINT	77	REGENCY AR136	69

(Special mail order prices valid to end of month only)

TRIGGER Electronics

7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)

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. Write for information. A. J. Gironda, W2JE, Box 394, Mamaroneck, NY 10543.

FREE Sample copy Long Island DX Association Bulletin. Latest DX news. Business size s.a.s.e. to K2AFY, Box 74, Massapequa Lf NY 11762.

SAROC, January 7-10, 1971, Flamingo Hotel Convention Center, Las Vegas, Nevada, Sponsored by Southern Nevada ARC, Inc., Box 73, Boulder City, Nevada. Advance registration $14.50 per person accepted until January 4, regular registration at door, includes Flamingo Hotel late show and drinks, Sunday breakfast, cocktail parties, technical seminars and meetings, ARRL, DX, FM, MARS, QCWA, WCARS-7255, WPSS-3952 and WSSBA. Ladies program. Flamingo Hotel SAROC room rate $12 plus room tax, per night, single or double occupancy January 3 thru 12 1971. Mail accomodations request to Flamingo Hotel. Mail advance registration to SAROC.

FOUNDATION for Amateur Radio will award its annual collegiate scholarship in December; applicants should write DeCourt, 8101 Hampden Lane, Bethesda, MD 20014.

WANTED: All types of tubes. Top prices paid for Varian and Eimac. Jaro Electronics Corp., 150 Chambers St., New York NY 10007.

WE BUY all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co. Box 516, Hempstead NY 11551.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway NY 10012. Tel 212-925-7000.

WANTED. For personal collection. The Radio Amateur's License Manual, Edition 12, ARRL "Map of Member Stations," 1914, WICUT, 18 Mohawk Drive Unionville, CT 06085.

NOVICES. Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk VA 23508.

WE'RE trying to complete our collection of callbooks at Hq. Anyone having extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111.

EDITING a club paper? Need public relations help? You should belong to Amateur Radio News Service. For info, contact Al Marcy W4ID, Secy, 461 Third Ave., Eau Gallie FL 32937.

WORLD QSL Bureau. See display ad elsewhere in this issue.

QSLs?? Personalized made-to-order. Samples 25c. Deluxe 35c. Religious 25c. (Deductible). Rus Sakkets W8DED Box 218 Holland MI 49423.

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.50. 1000, $16.25. Also unusual non-picture designs. Generous sample pack 25c. Half pound of samples 50c. Raum's, 4154 Fifth St. Philadelphia PA 19140.

NEW! QSLs professionally designed. Every card original, exclusively for you. Free samples. W1FLX QSL Designs, 20 Britton St. Pittsfield MA 01201.

FREE QSL samples. Designs cut catalog 25c. Ace Printing 6801 Clark Av. Cleveland OH 44102.

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.

C. FRITZ for better QSLs! Samples 25c deductible. Box 1684 Scottsdale AZ 85252.

NEW QSL catalog! Hundreds of cuts, stock and ink samples, nine report forms, plus ten sample QSLs. 25c. Cornelison's Quality QSLs 321 Warren St., North Babylon LI NY 11704.

QSLs. All types. Attractive designs, quick return, free sample. W7IIZ Press, Box 2387, Eugene OR 97402.

SAMPLES 10c. Harry Sims, 3227 Missouri Ave. St. Louis MO. 63118.

QSLs — 100 3-color glossy $3.50; silver globe on front — report form on back. Free samples. Rusprint Box 7575, Kansas City MO 64116.

QSLs 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St. Riegel Ridge, Milford, NJ 08848.

3-D QSLs — The modern concept that makes all others old-fashioned. Samples 25c (refundable). 3-D QSL Co. Monson, Mass. 01057.

QSLs 300 for $4.50. samples 10c. W9SKR, George Vesely, Rte.#1, 100 Wilson Rd., Ingleside, Ill. 60041.

3-LINE Engraved badges, any color, $1.25. Special rates to clubs. WB8GEW, Fallert's Engravings, 121 N.C. St., Hamilton OH. 45013.

RUBBER stamps $1.25 includes tax and postage. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, NJ 07044.

QSLs. With all this competition, you've gotta have something different. Try us. Samples 10c. Alkanprint, Box 8494, Minneapolis, Minn. 55408.

QSL, SWL cards that are different. Quality Card Stock Samples, 10c. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

QSLs. Second to none. Same day service. Samples airmailed, 25c. Ray, K7BLR, Box 331, Clearfield UT 84015.

GORGEOUS QSLs. Rainbows, etc. Top quality! Low prices! Samples, 10c. Refundable. Joe Harms, W4BLQ, Box 158, Edgewater Fla. 32032.

QSLs "Brownie," W3CJI, 3111 Lehigh, Allentown PA 18103. Samples 10c, Catalog 25c.

QSLs, SWLs. Samples 25c. Malgo Press, Box 375, M.O., Toledo OH 43601.

QSL Print. Samples 25c, K1FF, Blaisdell, PO Box 33, Melrose MA 02177.

QSLs. Radio Press, Box 272, Poway CA 92064.

DELUXE QSLs. Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

DON'T buy QSL cards until you see my free samples. Fast service, Economical prices. Little Print Shop, Box 9848, Austin, Texas 78757.

PICTURE QSLs made from your photo. 1,000 $16 postpaid. Free samples, Picture Cards, 129 Copeland, LaCrosse WI 54601.

QSLs, SWLs, WPE. Samples 15c in adv. Nicholas & Son Printery PO Box 11184, Phoenix AZ 85017.

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astral Electronics, 150 Miller St., Elizabeth, NJ 07207. Tel. 201-354-3141.

SPIDERS for boomless quads. Heliarc welded aluminum. Al's Antenna Accessories, 1339 So. Washington St., Kennewick, Wash. 99336.

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 3 for $1, 10 for $3, prepaid and guaranteed. Tepabco Box 1987 Gallatin TN 37066.

TELETYPE Mod. LPR 28 receiver-only typing reperforator without cover good operating condx, sync motor 60 wpm. $125. Tape winder 115vac $15. + 28 LBXD1 trans-dist 60 wpm, sync motor, wired for complete 100vac operation and converted to 7.42 code $75. T. Howard Box 252 Boston MA 02101. Tel. 617-742-0916.

160 meter Matchverter resonates any 40 or 80 meter inverted vee/dipole on 160 meters. Handles 250W PEP. $29.95 ppd. Top Band Systems, Dept.4, 5349 Abbeyfield, Long Beach, Calif. 90815.

CIRCUITS for 32 electronic projects, RF, audio and gadgetry, complete plans $1. PM Electronics, Inc., Box 46204, Seattle WSN 98146. Dealer inquiries invited.

QSTs before 1927 and amateur teletype publications wanted. Orville Magoon, 1941 Oakdell Dr., Menlo Park, Calif 94025.

SAVE on all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Rd. Swampscott Mass 01907. 617-589-9700.

WIRELESS sets, parts, catalogs, bought, traded. Lavery, 118 N. Wycombe, Lansdowne, Pa. 19050.

REPAIR and calibration service. Write before shipping. Pan Tronics, Inc. Box 209 Annandale VA 22003.

RTTY gear for sale. List issued monthly. 88 or 44 MHy toroids *five for $2.50 postpaid.* Elliott Buchanan & Assoc., Inc. Buck W6VPC 1067 Mandana Blvd., Oakland, CA 94601.

TELETYPE parts. Fast service. Machine to M-35. Buy, too. S.a.s.e. Typetronics, Box 8873 Ft. Lauderdale FL 33310.

NOVICE crystals: 40-15M $1.38, 80M $1.83. Free flyer. Nat Stinnette Electronics, Umatilla FL 32784.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

COLLINS for sale. Rdceiver & Transmitter 32A4 and 32S1. Used less than 3 mo, before stored. Excellent condition sacrifice $750. J. Johnson POB 12006 Santurce Puerto Rico. Call eves 809-789-2735.

GREENE Center of dipole insulator with or without balun, see ad page 143 June 1970 QST. O. Watson Greene, Box 423, Wakefield RI 82880.

CAPACITORS brand new 140 ufd electrolytics at 450 wvdc. 10 *for* $9.50. Mehaffey K4IHP Atlanta G4.

WESTERN hams, new and reconditioned equipment. Exciting new Yaesu here. Wireless Shop 1305 Tennessee St. Vallejo CA 707-643-2797.

DRAKE 2C, 2CS speaker, gud condx $160. HQ145 with clock and matching speaker gud condx $98. Tom Louden 905 E. Adams, Fairfield IA 52556. Phone 515-472-5807.

DISCOUNTS! Galaxy GT550 factory sealed cartons $425. Limited supply. HamMs $98 (lots of 2/more). HTI LK2000 linear $449. New standard 806 2-meter fm 10 watts out $299. Prices FOB. L. A. Amateur Radio Sales 24214 Crenshaw Blvd. Torrance CA 90505.

TRANSFORMERS rewound W4CLJ 411 Gunby Orlando FL 32801.

BRAND new fully identified epoxy diodes 1000 PIV @ 2 amps includes disc bypass and bridging resistors 10 for $4.50. Diodes only 10 for $3.50. G. E. Line spike suppressors with order 50c each. Postpaid USA. East Coast Electronics 123 St. Boniface Rd. Cheektowaga NY 14225.

COLGANS amateur station 1 yr old. 75S3B, 32S3, 312B4, 516F2, 30S1, MP1, 351D2. Two SR90D mikes. 344A Waters dummy load wattmeter, 376 Waters Regonair quad aluminum spreaders. HamM rotor, 50 ft tower, Rotor lead & RG8/u coax. *40/80 dipole ant. Vibroplex bug. Hustler mobile ant with* 10/15/20/40/80 coils. Estes ignition harness for V8. All leads and connectors. Original factory cartons and manuals. Absolutely mint condition. Must be seen to be appreciated. $2750. K3CZT John Rohrbach PO Box 275 Schuylkill Haven PA 17972. Tel. 717-385-2121.

WANTED Lampkin model 111 PPM meter in good condition. Frank McJannet 108 University St. Seattle WA 98101.

HALLIURAFTERS HT37 xmtr, mint, $190; HT41 linear, $175 HT33A, $225; Johnson Valiant, $100; Collins 75A1, $120; Collins 75A4 with 3 filters, $375. John Kakstys, W2FNT, 18 Hillcrest Terr., Linden NJ 07036

DX60B, HG10B, mint condx, with NC109 with spkr, xtal calibrator, Q-multiplier. In gud condx, P.O. Box 191, Shokan, NY 12481. Price: $235.00 WA2SRO

SWAN 250 6 mtr. transceiver. Brand new. Used less than 2 hours. Crystal calibrator, a.c. supply: $375.00. Call 813-733-3225 or write Bob Bryar, 503 Baywood Drive So., Dunedin, FL 33528

WANTED: An opportunity to quote your ham needs. 31 years a ham gear dealer, Collins, Signal/One, Drake, Swan and all others. Also $25,000 inventory used gear. Request list. Chuck Schecter, W8UGC. Electronic Distributors, Inc. 1960 Peck St., Muskegon MI 49441

SELL: NCX-3 w/H.B.P.S. Very good condx, recently aligned, $150.00. Dick Freitag, W2CXQ, Treetop Road, White House Station, NJ 08889 Tel: 201-439-2615

SAFETY Belt climbing, $15. 8 ft. dish, $80; 100 MC counter, $110; rotor prop pitch, $45. 2M duplexer, $115. F.O.B. Link, 1081 Aron, Cocoa, FL 32922

WANT early issues of Pioneer Wireless Magazines for W4AA Historical Library, Wayne Nelson, Box 127, Concord NC 28025

DIODES — 1N4007 1000 volt PIV@ 1 amp. Silicon diodes, 28 cents ea. $25 for 100 ppd. M. Weinschenker, Box 353, Irwin PA 15642

YAESU Munsen FLDX400 Transmitter (not a transceiver). Self-contained a.c. power supply. New, never used. All ham bands. $285. No swaps, and no personal checks. F.o.b. L.K. Laird, W9RLW, 501 No. Pine, Mt. Prospect, IL 60056

ESTATE of Harold W. Tabor WA60QD (or new one if available) DRAKE 2-B-like new, $185.00; Heath Pawnee $155.00. Jean Tabor 2217 S. Lakeshore Blvd., No. 109 Austin, TX 78741. 512-442-9768 Both $325.00

FET converter kits: 50,144, 220. $10.20. Includes silverplated glass-epoxy p.c. board, crystal, coilforms, trimmers. IF 28-30 MHz. VHF Communications, Box 87F, Topsfield, MA

SOLID-state stripline transverter 144-432. AM-FM-CW. Silverplated enclosure. Requires 1.2 Watts RF in transmit, 12 VDC in receive. $37.50. Spectrum International. Box 87F, Topsfield, MA

DISCOUNT prices. New Equipment. Full Warranty. Factory-sealed cartons. We'll beat any legitimate, written quote submitted to us. Ham-m Rotor (Regularly $129.95) $99.95; Hy-Gain 400 Rotator (Regularly $189.95) $149.95; Drake SPR-4 (Regularly $449) $379. R-4B ($475) $390. T4XB ($495) $415. TR-4 ($599.95) $590. Galaxy GT-550 (Regularly $550) $449. FM-210 ($229.50) $185. Hy-Gain TH6DXX (Regularly $179.95) $140. TH3MK3 ($144.95) $115. Hy-Quad (Regularly $129.95) $104. Mosley CL-33 (Reg. $145.15) $115. CL-36 ($171.92) $135. TA-36 ($167.85) $134. TA-33 ($133.10) $106. Tri-Ex W-51 (Regularly $393.40) $330 Prepaid freight. Write for other quotes. Special package prices. Discount Radio Sales. P.O. Box 6044, Lubbock, TX 79413

.01% CRYSTALS — Texas and Peterson, guaranteed. Airmailed, immediately. All frequencies $1.50. TRIestman, WA2IPG. 150 Overlook Ave., Great Neck NY 11021.

RECEIVING & Industrial Tubes, Transistors, All Brands — Biggest Discounts. Technicians, Hobbyists, Experimenters — Request Free Giant Catalog and Save! Zalytron 469 Jericho Turnpike, Mineola, NY 11501

WANTED: Schematic and/or operating manual for TBA-11 Navy 1 KW, C.W. Transmitter or photostats of same. Will pay cash to *purchase or borrow. C. L. Pennington, 800 First Street, Macon,* GA 31201

KNIGHT T-60 transmitter with a key and 3 crystals. New condition. $80. Michael Kinsman 111 N. Main St. Towanda, PA 18848

WANTED R389 R390 R390A Receivers Price must be realistic. Supply information on Electrical and Physical condition in First Letter. Bill Smitherman WA4YFI East Bend NC 27018

QSTS 1927 to Aug. 1964. 1941, 1942 missing, up to 1956 in binders. Price, $325.00. CQS 1950 to Aug. 1964, Price, $120.00 Also large collection of: Wireless World, IRE Proceedings, Popular Electronics, Electronics World, Electronics, many others. Prices include airfreight prepaid to Miami. Will accept reasonable offers. Giovanni L. Rota, P.O. Box 414, Quito, Ecuador.

COLLEGE Calls — SB-101, SB-600, AC-DC P.S., HW-12A and AC P.S., Glass Quad and Rotor, HM-15 Bridge, DX-60 & HG-10, GR-64, No reasonable offer refused. All or part. WA7FSB. 2567 S. 150 E. Bountiful, UT 84010

ALLIED A-2516 super hot receiver, 80-10M, AM-SSB-CW, see January 1970 QST for specs. WN9AYH, 9245 Keating, Skokie, Illinois, 60076, 312-674-7099

HAMMARLUND HQ 110A with clock 185.00., Viking Ranger 2 140.00., National 109 100.00. All in good condition, revrs with speakers and manuels. W1KC, 240 Moreland St., Worcester, MA 01609

SELL: Great Novice Station: Heath RX-1 Mohawk rcvr $75.00/offer; viking challenger xmtr with Heath VF-1 VFO $30.00/offer. You pay shipping. Craig WA8UXK/6 2675 Fayette Apt. 207 MT. View, CA 94040

TELETYPE Pictures for Sale. Volume 2. 16 pages containing 50 pictures $2.00. Volume 3 coming $1.50. Also audio and perforated tapes. W9DGV-b 2210-30th. St., Rock Island, ILL. 61201

JOHNSON Viking Navigator for sale $40.00 will ship Wiesen, 18 Wilbur, Newark NJ 07112 201-923-5322

†FORSale: Eico 720 e w. transmitter factory-wired $55.00. HQ 110a revr $75.00 All manuels intact, hot junk. Will ship. Elmer J. Worth 946 Franklin St. Reading, PA 19602

NCL 2000 $495, TX62 w/VFO $125, HRO50T1, Coils B,C,D,E,F $150, Three BC-611 $50, Jones K9TZJ 317/643-9613.

SELL: Heath AJ-13 Stereo Tuner. Handbook 144 and 50 MHz converters with low noise FETS. Twoer, 6 watt 50/14 MHz Transverter, 100 watt 432 amplus transmitter, 50 MHz 5 *element tagi, 40 foot tower with mast. Ross Lunan, Apt. 318,* 11490 Goun West, Pierrefonds, Quebec.

SB-33 - $150 or trade for photography equipment. Also many misc. items. Ray Jorgenson, 595 N. Main St., Suffield, Conn. 06078

FOR Sale: Drake 2-B $150, Valiant II F-W $100, HP-13A $50. You pay shipping. WA9WGT 533 1/2 Clermont Antigo, WI 54409

MANUALS — R-390/URR, R-390A/URR, BC-639A, $6.50 each. Hundreds more. S. Consalvo, 4905 Roanne Dr., Washington, DC 20021

2B RECEIVER, Q Multiplier/spkr, xtal calibrator, mint $165, Power transformer Cygnet 260-270 or 1200 w amplifier 220V $15, 110V $10. *Noreleo 101 recorder ac adaptor, case, phones* $50. Ballantine 316 vtvm $70. All FOB. William 802, 9060 Palisade Ave., N. Bergen NJ 07047

SALE: Hammarlund HX-50a xmtr, Johnson Ranger II. All good condx. WB4AKQ 305 Caroldale Middletown KY 40243

DRAKE TR-4 — AC-4 — MS-4 Top Electrical, Mechanical and Finish Condition $500.00 Also DAVCO-30 A little Gem with NICAD supply. Make Offer. W1PFB G. H. Wayne Box 26, Watertown, CT 06795

TECHNICAL Assistance Needed — Will pay Detroit area ham for help in making Mighty Midget receiver operate properly. William J. Kirby WA8KXC Phone 881-2771

BC-1306 Transceiver for sale $25.00 Wiesen 18 Wilbur, Newark NJ 07112 201-923-5322

COLLINS 328-3 Exciter, Excellent condition has c.w. Transceive conversion, also has 6146-Bs and hi-power screen conversion, $500 - contact Warren Davis K6NA 213-6822915

SELL: Viking invader 200 - 40F010 excellent condition $2.40. - K2MFX, Freehold, NJ

SWAN 250C and noise silencer. Mint, used 23 hours. Cost $486.00 new. Best offer over $335.00, Kenneth Massie 115 Woodlawn Dr., Ironton OH 45638

DON'T need new K.W. matchbox with coupler will sell or trade for Linear you make deal W6QVI 3081 Garden Circle No. 16 Shingle Springs CA 95682

FOR SALE: NC-303 and DX-100, $300, in excellent cond; other items-transmitters, test equipment, odds & ends, no junk; components, parts, tubes, all gud condx, some needing slight work. No shipping, sry! S.a.s.e. for list. W1JZA, Waterbury Rd., Prospect CT 06712. Tel: 203-758-4817

WANTED: HA-1 calibrator for SX-122 receiver. Richard Bernhardt, 4475 Henry Hudson Parkway, Bronx, NY 10471

YOUR kit professional assembled, wire, tested. Example: Heath SB220, 2 kw linear $50. Also ham equipment calibration and repair service. Tony Maugeri, W2SDO. Tel. 609-854-7927. 117 E. Cedar Ave., Oaklyn NJ 08107

I NEED QST for February 1927. Must have both covers, Elmore Fitz, Lunesboro MA 01237

SELL Collins KWS-1 SN955, due to apartment living. Excel condx. Best cash offer, you pay shipping. G.J. Messer K3ATM/1, C4-40 Hillside St., East Hartford, CT 06108

HALLICRAFTERS equipment discounted at fantastic prices. All brand new factory sealed cartons. Write for low, low prices. PM Sales 65 Birchfield Av. North Babylon NY 11702.

2KW linear pair 4-400s in 44" rack $250, Mosley CM1 rcvr and DX100 $60. FOB. Greg Glazier WA0QOI 314-966-2849.

50 WATT 6 meter B&W xmtr, vfo, pwr supply. 4 el beam, intl crystal conv to 40 meters, pass band filter, control pnl. All for $95. WA7GUV Fred Ziesenise 8535 SW Gayle Ln, Portland OR 97225.

SALE Central Electronics 100V transmitter $290 Hallicrafters SX-117 receiver $190 National HRO 60 with all coils 50kc. through 30Mc. $175 Don Miller P.O. Box 1007 Harrisonburg VA 22801 703-432-7902

SWAN 500C transceiver and power supply $350.00 Swan six meter 250 transceiver $300. Power supply included Almost unused. WB2HHR 10 Wall Court 516-LIL-3072

LISTING Service - Gear to sell? Need rig? Sellers - $1.00 Lists information year. Buyers- Free. SASE brings details. W8TXX Listing Service Box 1111 Benton Harbor, MI 49022

SELL Globe Champion 350 and NC-300. K4PRT P.O. Box 177 Fork Union, VA 23055

WANTED G1000DC PS for GT-550 K4BTQ/6 Roger Cooper 727 W 30th San Pedro CA 90731

HQ-170 Excellent $130, Valiant Good $95, ART-13 $25. Make Offer, Trade? WA4SXD, 1421 SW 13th AVE., Gainesville, FL 23601

SALE: Eico 720 CW Transmitter, extra tubes, $45. Lafayette HE-10 Receiver, BFO ANL $40. Heathkit Q-multiplier $10. Globe 755A 150-10M VFO $25. All excellent condition. Chrome Vibroplex, mint condition $25, matching case $5 Reasonable offers considered. John Zimmerman, 53 Whitebirch, Pease AFB, NH 03801

SELL: Collins 75A4 Receiver $325; Johnson Invader 200 SSB/CW/AM Transmitter $200; National NCL2000 Linear Amplifier, New Finals $325; Swan 4 element 10/15/20 Beam $75. All manuals, Equipment recently aligned and in mint condition. Satisfaction guarranteed, FOB St. Louis. K0OUI H. Frank, 21 N. Iola Drive., St. Louis MO 63119 314-962-0448

DRAKE 2B + Q Mult. - $190, Eico 720-$40, Great Novice Station. Mark Shertzer, 1620 Western Drive, West Lafayette, IN 47906 Call 317-743-0831

HEATH SB301 with three filters; Heath SB401 with crystal pack and all cables. Excellent condition, Both for $500.00; AMECO TX62 and VFO, never used $100.00; BC221 Frequency meter and AC supply $40.00. Philip Schwebler, W9GCG 4536 N 50 St., Milwaukee, WI 53218

SELL Galaxy GT550, AC400, SC550, VX25c, calibrator original boxes, manuals mint. $425.00 Sell Simpson 260 VOM with manual. $25.00 Want SLR or RF current 35mm camera, will deduct camera price from above. R.Pohorence 11046 NW 6th Lane Miami, FL 33126

SELL: Ham Station - Viking 11-RME 45 receiver-speaker. Match box VFO Oscilloscope-4 monotor-SWR bridge C.W. transmitter - Heath model DX20 15 Tower- Rotator, CDR, Cornell Dublier-TRZ Reasonable offer accepted. W1FST 31st. St., Medford MA 02155

SELL: Hammarlund HQ-170 matching speaker. Much above average condition. $150.00. WAJYX 2214 Janlyn Road, Jeffersontown, KY 40299

SWAN 250, 117 XC AC supply and TV2B (new). SB 500 transverter. Clegg-Venus xcvr & 416 AC Supply. SASE for details. Scotty 14634 Vaughan Detroit 48224 MI

HAM-M rotator bargain, good condition, complete $75. Bill Leonard, Fox Lane, Mt. Kisco, NY 10549 914-234-3713

"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! Used equipment: Swan 270 Cygnet, $395.00; Swan 500C, $419.00; Drake TR-4, $519.00 R4-B, $559.00; T4-XB, $389.00; TH6DXX, $129.95; GT-550, $399.00; KWM-2, $625.00; 75A-4, $319.00; New Rohn 50 Ft. Foldover Tower Prepaid, $199.95; New Mosley Classic 33 and Demo Ham-M Rotor, $199.00; New Gonset GSB 201 MKIV Linear, 2000 Watts, ($495.00), Cash Price $395.00; New Hallicrafters HA-20 VFO, $149.95; Reconditioned Equipment: L-4-B, $549.00; R4-A, $279.00; Ham-M Rotor, $79.95; 2B, $169.00; HQ-180, $225.00; Moory Electronics Co. Phone 501-946-2820 P.O. Box 506 Dewitt, AR 72042

PREPARE for FCC exams! You need Posi-check, Original, expertly devised, multiple-choice questions covering all areas tested in FCC exams, Same form as FCC exams. Keyed answers, explanations, IBM sheets for self-testing. Over 300 questions and/or diagrams for each class. Each class complete in itself. Basic questions duplicated where they apply. Continuously updated and reprinted since 1964 General Class $3.50, Advanced Calss $3.75, Extra Class $4. Third class postage prepaid. Add 32c per copy for first class mailing. 64c for air mail. Send check or money order to Posi-Check, PO Box 3564, Urbandale Station, Des Moins IA 50322 Write for club rates.

SQUEEZE Key, the ultimate electronic keyer. Integrated circuits, silicon transistor throughout. Built-in double lever key, monitor speaker, relay. Imported $79.50 S.a.s.e. for brochure. Quali-Fi Products, RR No. 1, Box 295-B, Elburn IL 60119

FOR Sale: Drake 2B with 2BQ, FB condx. $165.00. K1TUQ, Forestville CT 06010 Phone 203-582-8849 after 6:30 pm.

WANTED, V70-D tubes for Globe 400B. Don Perryman W5VBH 5800 N.W. 65th Oklahoma City, Oklahoma 73132

MINT NC303: Nationals' famous "dream receiver" complete with speaker and XCU303 deluxe calibrator. $175.00 FOB Seattle — Merlin Walton WA7ACQ 1401 S. W. Cloverdale St., Seattle, WA 98106

BACK issues Ham Magazines 40c each prepaid. Bob Powell- Box 30 Westwood, NJ 07675

GOING transceive sell Hallicrafters SX-117, Ht-46 and Johnson 250-39 TR Switch all for $400.00 or make separate offers. Will ship FOB Wiesen 18 Wilbur, Newark NJ 07112

TEST equipme nt — Meas. 80 Signal generator, 2-400mHz - $250; Berkely 5500 Univ. EPUT Counter, 100khz - $165; others, SASE for list. Dave Tkach WA8OEZ - P.O. Box 941, Monroe, MI 48161

COLLINS KWS-1 $700 and 75A4 $400, both for $1000. Immaculate, I.I. Tryon W3WFR 1500 Tretter, Pittsburgh, Pa. 15227 412-882-3141

HENRY 2KD-2 desk type linear amplifier, with remote heavy duty 2K-3 solid state power supply. Mint condition. $550.00 Pickup only. W2HC, Telephone 516-333-1079

MATRIX Design, Reference June QST. Minimum Diode matrix computed for your message. $12.50 W2WJS 206 Willard Ave. Farmingdale, NY 11735

YOUR Beam-Quad-Vertical stays up longer with fine Stainless hardware fasteners! Insulators; Guying, antenna, accessories. Lists 15c! W8BLR, 29716 Briarbank, Southfield, MI 48075

FOR Sale: HT32B, $225; SB200, $200; 30L1, $400; mod. 610 Heath, mint, 'scope, $60; homebrew demodulator, $60. Works perfectly. K4NJY, Box 236, Camp Hill AL 36850

FOR Sale - Rugged 2000 PEP linear, 4-1000A, blower, meters, power supply 0-4500 DC, cables, spare 4-1000A, and 2 inerteen 25mfd condensers, $250, K1VOL

SELLING Eico 720 transmitter, Eico 730 AM modulator, and Heath VF-1 vfo. In A-1 shape, all wired up and ready to be used. Must sell $80.00. WB2FG Frank Tarantino 4135 Monticello Ave, Bronx NY 10466 212-994-3388

SELL: Collins 32S3 transmitter with 516F2 and speaker WA8PCT, 3300 Tampa, Cleveland OH 44109

SELL: SB301, 600, Guaranteed mint condition. $225.00 W6LCT 3235 SanLuces Union City, CA 94587

CONTACT us for the best deal on new or reconditioned Collins, Drake, Swan, Galaxy, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to beat any deal you get anywhere 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

WANTED - SSB Transceiver - Good condx - J. Allen, 2787 Mill Ave., Bklyn., NY 11234

CALIFORNIA: HQ150C, excellent, $220; VHF/UHF Receiver RDO, manual, 30-1000 MHz, $100; Oscilloscope, TS-34, $40; Frequency Meter, LM-13, calibration, $40; BC453, $10; Eico GDO, $15; Power Supplies, Modulation Transformers, Tubes. WA6CFE, 213-378-0110

CLEANING house: New Heathkit keyer $29.95, Knight dipper $15.00, HiVerter 14MC in 50MC out 50 watt SSB with supply $65.00, Johnson VFO $8.00. Gifford W5SYB 5000 Hall Amarillo TX 79109

TRADE: Drake T4X, SB-200 for TR4. Randy, WA3DNS 215-462-8808

DRAKE TR4, new condition, very little use, and DC-3 $400.00. Don Alfred 559 Bob-Home Drive, Nokomis, FL 33555

HALLICRAFTERS HT32B $300. W2CR R. Van 412 Humboldt St. Rochester NY 14610

QST since 1932 good condition 380 issues $40.00 fob Don Urtel 53 Prospect ST., Lockport NY 14094

DRAKE 2-B and Q-mult speaker, $150. Knight T-60, $25. Both $170. All in excellent cond. Wanted: good used beam. WN9DGY 1328 Park Dr., Munster, IN

HT-37 - $200.00, 75S1- $200.00 Heath electronic keyer $35.00. Above equipment very little used. Home brew 500 watts final 10-40M, with power supply and cabinet $35.00. Call after 8 PM. 212-327-8751 Sy Kaftan 2729 Healy Ave., Far Roakaway NY 11691

COMPLETE station Valiant SX146 Assessories D104 Gstand lowpass Tr antennae swtces SWR clock vom 20ft Tower AR22 TA33J 2 manuals extras $440.00 W2SGH Moustakakis 8116 259 St., Floral Park NY 11004

FOR Sale Complete 40 meter mobile or home station - HW 22A - HP23 A- HP 13- HS 24- GH12A - $150 plus shipping or trade for Heath 10-18 or equivalent Scope - K 40Q 114 Windward island Clearwater FL 33515

CENTRAL Electronics 10B, DeLuxe VFO, and coils for four bands - $65.00 you pay shipping. Electronic slide rule, instruction books and case $18.00 K4ZQR, 409 Kaelin Drive, Louisville, KY 40207

COLLEGE, must sell this excellent equipment. All with manuals. DX-60B, factory aligned, crystals, $75. HT-40, crystals, $80. Lafayett HA-350, speaker, $105, GR-64, $20 WB4ODK, P.O. Box 903, Davidson College, Davidson, NC 28036

FOR Sale, NCX3 with AC supply in original cartons $260. W5AER, 3709 67th Street, Lubbock, TX 79413

18AVQ- $45, HW-16 Plus 3 xtals, spkr, ant apptr. - $70 Want Quad, TR-44, Vibro-Keyer H. W. Clark WB2KBR 1803 Lincoln Ave., Pompton Lakes, NJ 07442

HENRY 2K3 Floor console in like new condition call or write Mel Marsley 2242 Stevens Ave., Kalamazoo MI 49001 Phone 616-3428838

SELL or swap: T15QA - $60.00, SX-100-130.00; 2Meonv-20.00; 6M conv -25.00; TX 62 & VFO - 140.00; SIG GEN - 20.00; ARC5-10.00, XTAL mike - 8.00; Super 6 25.00; 6V-Dynamo -5.00; 12V, Car Radios - 6.00; Knight VTVM - 10.00; All offers replied 219-887-9284 - WA9YOZ - or CU on 6 M daily. Also Tandberg Taperecorder 250.00

VINYL Call letters and numbers; self-sticking, weather, oil waterproof, 3" 10c; 4"- 15c. 6" - 20c each. WN8FZA, Schoenbach, 18740 Warwick Road, Detroit MI 48219

HAMMARLUND HX50 transmitter like new. Usb, lsb, a-m, cw, PTT, vox, bk-in, built in ant changeover relay, other extras. $175 or best offer. Ted Sitnik 108 Dubiel Av. Syracuse, NY 13209.

APACHE TX1 & SB10 and H'crafter SX101A $275. Gary Moeller, Milford IA 51351.

SELL National NCXA p/s converted to NCXB with schematics $45. WA4MXD 3417 S. Griffith, Owensboro KY 42301.

RECEIVERS. Hammarlund HQ110 with 24-hr clock, matching speaker, good condition $90. Hallicrafters S85 $40. Write Jerry Hall K1PLP 181 Grimfield Rd, Wethersfield CT 06109.

SELL SP600JX and 60 watt Motorola 6/10 meter mobile. Stan Staten 545A University Village, SLC UT 84108.

SELL SX111 mint condition $100. R. McGregor 2924 Santa Rosa Ft Wayne IN 46805.

DRAKE R4B, T4X, MS4, AC3. Excellent condition. $650. Jack Cramer 21055 Keswick, Canoga Park CA 91304.

SELL S40 gen cov rcvr working condx $35. WN8GJQ R. D. Mayo RFD1, Rossburg OH 45362.

TWO meters. Factory aligned HW17 $90. AR22 CDR rotor $25. Tom Wood WA2DSL 24 Roxbury Rd. Port Washington NY 11050.

SWAN 250 117XC pwr supply, dc module, noise blanker, mic $300. W8TWJ 21335 Virginia, Southfield MI 48075. 313-353-7529.

SELL SBE34 with mike, never mobile, 5 months old $350. HX11 50 wt cw $30. HG10 vfo $15. Pete Zawasky WØNDD 1799 So. College †38, Ft. Collins CO 80521.

HQ170, speaker, headphones, manual $145. Apache TX1, key $100. Precision Apparatus series 85 volt-ohm meter $20. Cofrad crystal mike, stand, model 400C $15. Dick Doolittle W9KMF 133 Highview Parkway, Rhinelander WI 54501.

MUST sell due to college expenses. SB101 (cw filter) SB600, *HP23, ac supply and HDP21A mike. All in excellent condition.* $365, Galen Wenger, 1064 Van Voorhis Rd, Apt J121, Morgantown WV 26505.

COLLINS - Swan. W6QJH estate. All very clean, top operating condx. KWM2, 516F2, 30L1, D104 with G-stand $1200. SW240, SW117ac, SW12dc, mobile mike and antenna $300. Prefer SoCal. Inquiries invited. W6KS San Diego CA 714-274-7060.

SELL Collins KWS1, 75A4, SC101 station control with speaker, *beam direction indicator SWR meter, 24 hour clock, phone* patch, 68Y1 antenna selector (wall mounted), 534A1 wiring duct & harness. $900 cash. L. W. Brown III W5RLS Box 459 Orange TX 77630. 713-883-5351.

ONE Pierpoint TV camera, video & rf output $125. One grounded grid linear pr 4-400As less p/s $125. Other miscellaneous parts. WB2ZBI 14 Iona Pl. Glen Rock NJ 07452, 201-447-2581 after 6 PM.

DX Awards Log, 150 page book lists contacts for over 100 major worldwide awards. Individual logs for each award for record of contacts and confirmations. Required over two years to prepare. $3,95 ($4,95 foreign). McMahon Co. 1055 So. Oak Knoll, Pasadena CA 91106.

SELL Drake 2NT novice transmitter mint condition few months old $120. Drake 2A receiver $99. Bill Jones WB4PUD Route 2 Springfield TN 37172.

SELL Hallicrafters HT40 xmtr $75. Swan 120 20m transceiver with ac supply $125. Gonset GSB201 linear $200. Hy-Gain TH3 beam $35. 212-353-4388, Wells, 56-28 Main St. Flushing NY 11355.

HX10 xmtr cw a-m ssb fsk mint condition $150. Bendix portable 1F5A crystal frequency indicator 125 to 64,000 kHz with calibration charts and additional 12 volt dc rotary converter *power supply $50. Pick up only. W2OBF Massapequa NY* 11758. 516-PY8-0121.

SELL Swan Cygnet Model 270 with Vox. $360 plus shipping. First class condition. W9IGW Route 12 Bloomington IN 47401.

HEATHKIT HW16 assembled, tested, unused $85. Wier Chrisemer, 418 Burdan Dr. Pottstown PA 19464.

HW12A $80 HP13 $50. Tutar 1625 N. Park Cleveland OH 44106.

SWAN 240 ac-ps and microphone $200. K4EPG 14269 Ardel Dr. Juno FL 33403.

SELL Heath HW30,manual, electrically perfect $27.50. W2CMD 2205 Smith St. Merrick NY 11566.

HEATHKIT SB101 w/cw filter SB600 spkr, ac and dc power supplies $400. Ted Shema Apt 201, 188 Charlotte, Laurel MD 20810.

WANTED Drake MN4 2000, Grid dip meter, Impedance bridge, *State lowest price in first letter. WB4OTJ 10429 Spoonbill Rd.* Bradenton FL 33505.

MOONBOUNCE DX on 220 MHz or higher? Parametric amplifier and major components, trade. Want Drake T4XB. Vhf/uhf/shf gear, list s.a.s.e. W4API Box 4095 Arlington VA 22204.

FOR SALE to highest bidder. SX101 MK3 Johnson Valiant HP524A freq counter. Highest offer takes it. Send bid(s) to WA2LdK Box 85 Union NJ 07083.

EICO 753 transceiver, transistor no-drift V-fo, 75lac built in *speaker mint $140. Millen Monitor oscilloscope mint $50. Heath* calibrator $9. Heath keyer mint $25. Wanted HT32B. F. Martin 202 Kenny St. Fayetteville NY 13066.

WANTED Collins filters for 75A4 500 Hz, 1.5 kHz, 2.1 kHz. Johnson Courier. Selling Vibroplex deluxe $15. Hallicrafters CRX100 27-50 MHz monitor receiver $10. 516-334-3155, Charles Copp W2ZSD 6 Northfield Lane, Westbury NY 11590.

LINEAR Johnson Thunderbolt excellent $240. Gonset GSB100 transmitter $130. Harvey Wells R9 double conversion receiver, ham bands only $60. Manuals for all. 2000-0-2000 volt 400 mA cased transformer $25. High voltage pyranols $1 and $2. WB6MUV Curtis, 17180 Copper Hill Dr, Morgan Hill CA 95037. Phone 779-2637.

FOR the best buys on Swan gear, write for quotes and catalog. Save $$. All gear in stock. Amateur Radio Headquarters 1916 7th West, Billings Mont 59102.

CIRCUIT Board fiberglas any size 4c square inch, minimum $3 postpaid. Frontier Electronics, Orr MN 56771.

COLLINS 75A4 good condition 2.1 kHz filter $300. Hallicrafters HT37 good condition $125. We pay shipping. RPI Radio Club EE Dept. Troy NY 12181.

TOWER 44 ft self supporting galvanized steel. No guys required. Good for 100 mph wind. Propitch rotor 20 meter beam $75. You dismantle. Tom McCullough 27 Birchwood Rd. Stamford CT 06907.

EICO 753 transceiver with ac dc power, whisper fan for drift free operation $150. Collins speaker, joystick antenna, Heath TO2 tube checker, nearly complete TV camera with vidicon tube, Eico 430 scope. Make offer. WØNIT 920 W. Adams, Pueblo CO 81005.

TOWER Const Co 100' heavy duty 43" triangle, galvanized bolted tower - best offer. QSTs 1920 thru 1969 few missing copies. Duck 1920 cat. Henleys handbook 1922 - best offer. Collins TCS marine a-m/cw with 110/60 cv 12/24, 230 dc power supplies - offer. ARC 5/T23 transmitter R28 Rec MD7 mod/amp Dy8 dynamotor 28V as new $45. W9FCL 585 Turner, Glen Ellyn IL 60137.

SELL General Radio type V20 20a varine, excellent $25. WU desk "fax" machine excellent $20. Q Nobatron power supply *QR150-1A adjustable to 200 volts at 2 amps good $25. HP audio* oscillator TS382 c/u complete, excellent to trade for two meter mobile T-R or $150. WA4WIA 1645 Dobbs Lane, Birmingham AL 35216.

COLLINS 32A1/516F2 $395. Drake 2B/2BQ $185. Homebrew linear 1250 watts PEP $125. All mint. Rube Tyson 271 W. Main St. Mooretown NJ 08057. (Phila area) 609-235-8756.

SELL SX100 speaker $110. Valiant $100. Apache $75. SB10 $45. Wanted AR22 rotor control. Bob Miller WA6MTY 1377 Newport, Long Beach CA 90804.

WANTED to buy or borrow to make a copy manual for Hallicrafters original S38 receiver. Harold Hasbrouck K6OVN 236 4th Av. Venice CA 90291.

SWAN 250 power supply, xtal calibrator, Smeter, original cartons $300. K1EMU/WB8FVI, George Dessert RFD 4 Parkersburg WV 26101. 304-863-5405.

WANTED HP13 and HP23 power supply. Vic WA8TNJ 143 *Longford, Elyria OH 44035.*

HEATHKIT SB200 linear wired, perfect condition $190. W1DO Ernest Bosselman 210 South Rd, Farmington CT 06032. 203-521-3617.

HEATH GR54 $70. Gary Koenig 2547 West 2, Brooklyn NY 11223.

SELL National 200 5 band transceiver with ac 200 supply. Like new. Recently factory checked and aligned. $275. WB2ZAT 32 Boxwood Lane, NJ08046.

SELL Eico 720 cw xmtr $50. Eico 722 Vfo $15. Both excellent. WAØRXR/0 Mark S. Hansen, Luther College, Decorah IA 52101.

ROTATOR heavy duty commercial type, continuous, reversible, for pole mounting, includes mount, indicator, 200 ft 8 wire cable, $150. Also Hy-Gain TH4 tribander $65. No shipping. W5LZP 2429 Nottingham Pl. Grand Prairie TX 75050.

HEWLETT Packard 400 HR Vtvm $135. Lambda hv supply, 125-325 v, new, $65. Collins audio analyzer 478G1 new $95. *Heath IO18 scope, little used $85, Heath IM13 Vtvm $20,* Heath IG42 signal generator new $45. Call 713-781-0380 evenings. H. L. Collins Jr 759 Tennessee Bldg. Houston TX 77002.

FOR SALE complete kilowatt station. Heath TX1 $90. RX1 $110. HA10 $140, HO10 and HO13 $45 each. Vibroplex $20, Eico keyer $50. Lot price $450. Frank McJannet 11557 Evanston N.,Seattle, WN 98133.

DRAKE TR3 trcvr and ac supply for sale. Mitchell 55 Edgewood Av. Mount Vernon NY 914-664-0734.

SELL FT200 (similar to Tempo-1, 240 w PEP) with ac supply speaker and mike $350. Hallicrafter mint condition SR160 with home brewed ac supply $200. P150DC 12 Vdc supply $90. MR150 mobile mount for SR150 $20. FOB. W1ERX.

"DON and Bob" new guaranteed goodies. Bugcatcher all band mobile kw coil, standard Icom 2404T, 2"/8TPI $24.95, Monarch SWR relative power dualmeter kw bridge $15.95, Motorola HEP170 epoxy diode 2.5A/1000PIV 39c. Tower special EZWay 4300 7.5ft tower section $14.50, Rohn 20G 10 ft $15.45, Triex W51 freestanding tower (Reg. $394) $330, RCA 6LQ6 $4.50, 6146B $4.45, Model 15 teletype $50, Typing reperf $35, TD $20. Write for quote any brand tube, New gear cash quotes. All items new, guaranteed. Orders must include postage, excess refunded, rest collect. Madison Electronics, 1508 *McKinney, Houston TX 77002. 713-224-2668.*

SELL SX99 mint DX60B VF1 many extras. First best offer, I'll ship. WB9CSI, Geff, RR2, Trout Brook Rd, Hudson WI 54016.

SB200 kw linear $195. Ronald M. Nagata W6RQZ 1330 Curtis St. Berkeley CA 94702. 415-526-7345.

COLLINS station immaculate, complete. KWS1, 75A2 with product detector, crystal calibrator, 2.5 Kc elevite filter. Vertical stack with all cables, relays and wiring space. $750. Frank W. Christensen 1235 E. 5500 S., Ogden UT 84403.

NOVICE station & Vfo Hw16 and Eico Vfo. Both FB cond. Best offer. WA6KYU Box Marsolais 3631 Calmgrove, Covina CA 91722.

RANGER II factory wired, push to talk, antenna relay $85. K6CEZ Chet Hartley 19772 Providence Lane, Huntington Beach CA 92646.

SB101, HP23 powr supply, SB600 speaker. Wired by experienced kit-builder. Excellent condition. $400. Klug, Marist H.S. 1241 Blvd., Bayonne NJ 07002. 437-6107.

LOOK Galaxy 5 Mark 2 ac supply, console, vox, perfect $375. Gonset G50 $145. CV57 terminal unit 50kc i-f, parts, cables manual, lab aligned $65. Bill Handel K8SSY 95 Murwood Dr Chagrin Falls OH 44022. 216-247-6130.

COLLEGE Must sell Collins 75A4 S.N. 4033 xtnt w/extra vernier knob $390. Plate xmfr 3600-0-3600 vac @ 1500 mA CCS $30, pair SK400 sockets $10. Chuck Rushing 107A Moore Hall Austin TX 75040.

SELL Vhf, Uhf and microwave equipment. 2 meter solid state QRP transmitter with crystal $10. Send S.a.s.e for list of other equipment. W6KRC Murray Fastermack 6891 Vista del Sol Drive, Huntington Beach, CA 92647.

CRYSTALS airmailed. QST "Novice special" all frequencies FT243, active, accurate, five or more 40M-15M 99c each, 80M $1.39, mix OK, singles all bands $1.50. Add postage. Fast service from Mid America. Ssb, MARS, marine - custom finished etch stabilized FT243, .01% 3500-8600 kc. $1.90 (minimum five, same or mixed $1.75), (nets, minimum ten same frequency $1.45). 1706-3499 and 8601-13500 fundamentals and 10000-30000 overtones $2.95. Add 50c/crystal for .005%. Add 75c/crystal for HC-6/u hermetics above 2000. Airmail 10c/crystal, surface 6c. Builders crystals. Free order bulletin. Crystals since 1933. WØLPS C-W Crystals, Marshfield MO 65706.

COLLINS 75S3C receiver and SM2 mike. Used less than 10 hours, original carton, manual. Latest model with round Collins emblem. Both excellent condition, $550 FOB Dallas. Paul E. Talley 11011 Paddock Circle, Dallas TX 75238.

COLLINS 75S1 with Waters notch. Excellent $275. Prepaid in US. W9JVF 1849 E.49th, Indianapolis IN 46205.

SX146 $160, SX100 $85. HA1 and Vibroplex $60. WA9SPA 5253 S. Luna, Chicago 60638.

75S3 high S/n 13619 $375. 312B3 $15. 30L1 high S/n 13862 $325. SX117 $170. HT32A $200, HT37 $160. Drake 2B $150. Clegg 22er $135. Swan 175 $65. All mint. Prices firm. Don Burns 4410 Reading Rd. Dayton OH 45420. 513-256-0345.

76A4 owners, transceiver adapter, P&H Vfo-matic $60 or trade. K3AIG 215-647-2750.

YOUR Heathkit professionally wired, debugged and calibrated for 15% of kit price. John C. Allen WA7OAE 1232 NW 201st St. Seattle WN 98177.

TOROIDS! Lowest price anywhere, 40/$10, postpaid. Center tapped 88 or 44 mhy 5/$2. Fan fold page printer paper $10/box/920. Sync motors $7. Model 14TD $20. Model 32KSR reconditioned, perfect page printer $200. Lorenz 60 speed page printer with reperf and TD built in $125. Reperferator tape (11/16") $10/case/40. Stamp for list. Van W2DLT 3022 Passaic Av. Stirling NJ 07980.

FOR SALE Jap rec unit #42270 7 bands HW12 $70 plus other misc. equip estate of late W9ETC contact G. Hawkins 222 East Av. Park Ridge IL 60068 Tel. 692-5465.

HEATHKIT DX60 HG 10 Vfo. TR relay. Perfect $89. Doug Murdock 1503 161st Av. NE, Bellevue WA 98007.

COLLINS KWM2 with Waters 340A notch filter and 516F2 power supply. Need cash. $650. Wyma 3909 N. Longview Av. #4, Phoenix AX 85014.

FOR SALE Johnson "rotomatic" beam rotator with dual beam relay, bearing indicator, manuals, 100' indicator cable, new condition. $150 freight collect. Geo. Smith, Pottsboro TX 75076.

HAVE mint 1925 RCA Radiola 25 receiver model AR919. Need tubes. Five UX199 and one UX120. Can you antique radio buffs assist? W5ZGZ Ray Calhoun 406 Maiden, Richardson TX 75080.

VERY In-ter-est-ing! Next 8 issues $1. "The Ham Trader," Sycamore IL 60178.

JOHNSON 6&2 meter converter 28 Meg $16. Ameco 6 meter converter broadcast band $16. Eico grid dip 710 $16. DK relay 60XR $10. BC 454B receiver 3-6 Meg with P supply and speaker $16. 5-811As new $16. G. Scharf, Scotrun Pa 18355.

COLLINS 32S3, 75S3B, 312B4 and 516F2 one year old with less than 10 hours service $1100. Also Heath SB200 $175. Bob Winter 6946777 5392 Antoinette Dr. Flint MI 48507.

WANTED impedance measuring bridge: GR821A, 916A, 1601A, 1602A, 1603A, 1606A, Boonton RX meter, or equal. Nagle 12330 Lawyers, Herndon VA 22070.

CLOSING shack all must go. Drake 2B, DX60, HG10, 3 band beam 70 ft tower and more W6BLN 7922 Rudnick Canoga Park CA 91304. Tel. 887-1677.

WANTED QSTs from 1930 to 1922 old catalogs and old radio magazines. State price and condition. Andy Brewer WA4JGP 4917 Monte Vista Dr. Knoxville TN 37914.

COLLINS 75S3, 32S1, 30L1, 516F2, 312B4 with cables, manuals, etc. $1290 or best offer to clear estate. Will deliver anywhere in the midwest within reason. WB4ZT 6127 Southampton Dr. Dayton OH 45459. Tel. 513-434-1694.

FOR SALE 100V perfect operating mint condition $395. John Gerzi W8OOP 12901 Forest Av. Cleveland OH 44120.

VIKING Ranger $70. Gonset Communicator 2 m transceiver $50. W3KZ 441 W. Stafford St. Phila PA 19144.

HQ170 $130. Ranger w/Dowkey relay $80. Courier linear $115. Johnson Matchbox 250 $40. TO keyer w/key $55. F.W. dipper $18. Or trade complete station for garden tractor. Wanted: HW32 w/de pwr supply. WA8AHG 852 Walnut St. Elyria OH 44035.

SELL Drake T4XB with AC-4 pwr supply, R4B and Heathkit SB200. All manuals and cables included. All yours for only $800. RL Case K9SIY RR3 Box 61 Lot 54 Altus OK 73521. Tel. 405-482-0296.

GOING to college must sell Heath SB101 with cw filter, SB600, HP23A D104 microphone. For information write Chuck Schmidt WA9ZEH RR2 Anna IL 62906.

TELREX 10 and 15 meter beams, models 10M636, 15M532. Near new condition. $195 each. K2GXI 120 Yorktown Buffalo NY 14226 839-3335.

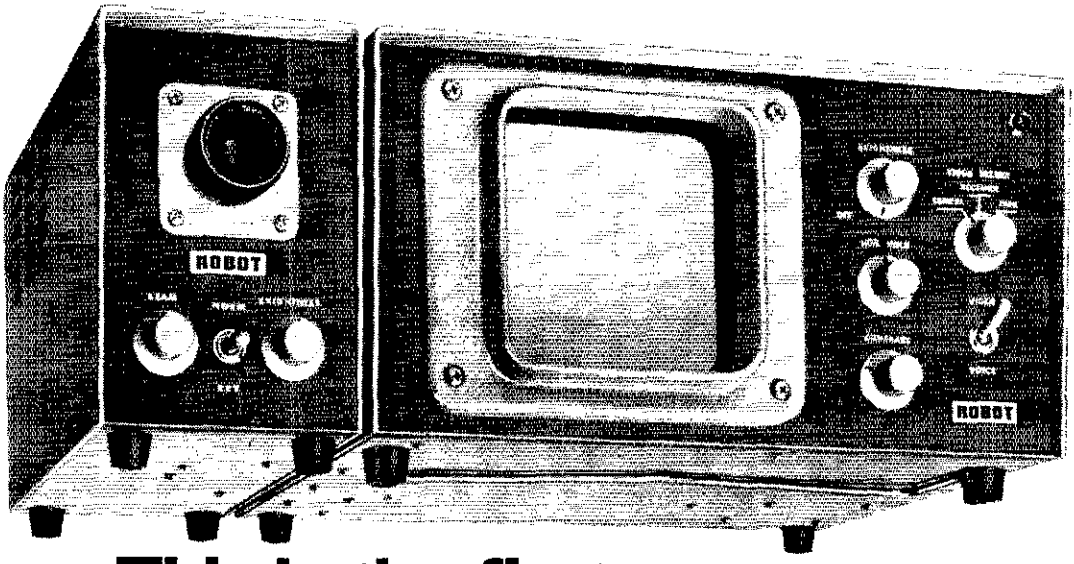
HRO dial, drive, two capacitors $25. B&W audio frequency meter $20. New Telex headset, boom mike $15. Fixed vacuum capacitors $2-6. RME filter-clipper $10. B&W TR switch $12. Plugin coils, large variable capacitors, Filament, plate transformers. Cleaning shack. W7DI 6633 E. Palo Verde, Scottsdale AZ 85253.

FOR SALE 6 meter a-m transceiver Utica 650 with Vfo very clean $75. Also 6 meter GE pre-prog base station on 52.525 fm $75. Will ship you pay freight. M. Heiman K7BDY Box 744 Showlow AZ 85901.

10A Ssb exciter $25. W2YI 822 Village Green, Westfield NJ 07090.

QSLs samples dime. Holland R3 Box 649 Duluth MN 55803.

Index of Advertisers



This is the first commercially manufactured amateur slow scan television

It is now available for you to purchase.

With Robot SSTV, you now have the capability to transmit and receive pictures around the world to the growing number of SSTV stations now on the air. Yet the cost is modest, and the equipment is simple to install, easy to operate.

The camera sells for $569

It is the ROBOT Model 80 slow scan camera that enables you to transmit pictures of yourself, your station, drawings, QSL cards, etc. It is engineered to produce good pictures without involved adjustment. Both the camera and monitor have been tested on the air extensively, and have generated enthusiastic comment on the excellent picture quality transmitted by the Model 80 camera. The camera works equally well with live subjects or printed material.

ROBOT

RESEARCH, INC.
LA JOLLA, CALIFORNIA

The monitor sells for $569

The ROBOT Model 70 Monitor demodulates and displays pictures transmitted by amateur radio stations. It is designed to produce the highest performance possible over normal amateur communications links.

Now there is an exciting new dimension of amateur radio communications available to you . . . with the ROBOT Model 70 SSTV monitor.

If you would like our free booklet on Slow Scan TV, and on our camera and monitor, mail this coupon.

ROBOT RESEARCH, INC.
1250 Prospect St.
La Jolla, California 92037

Gentlemen:
Please send me your free booklet on Slow Scan TV.

Name_____

Street_____

City_____

State_____ Zip_____

Call_____

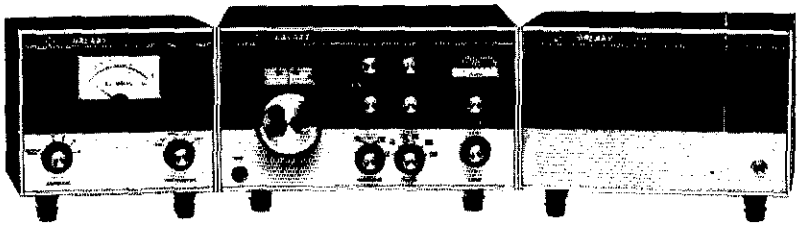
WANT *MORE* FOR YOUR MONEY?

This new Galaxy "550" line of coordinated equipment is winning plenty of plaudits from hams who find it gives plenty of performance for surprisingly few dollars investment. And, the compleat (and QRM considerate) ham rounds out his station with a UHF rig for local QSO's. 2 Meter FM is FB, and the Galaxy FM-210 is the FB'est!

Galaxy's real value, plus Harrison unique services gives you truly *MORE* for your money.

For the very best deal, visit any of our stores, or drop me a line today. TNX

73 *Bil Harrison* W2AVA



THE EXCITING NEW "550 LINE"

GALAXY GT550 TRANSCEIVER. Highest power in a compact design, 550 watts SSB, 360 watts CW, with tune power provisions for longer life — Solid-State circuits where they provide maximum performance and reliability — Selectable Sideband without frequency jump — Audio derived AGC — Sharpest filter for minimum QRM — King size finger-tip VFO tuning knob — Size: 6" X 11¼" X 12½" (HWD) — Weight: 17 pounds **. . . $550.00**

CAL-25. Plug-in 25KH$_z$ solid state calibrator **$25.00**

VOX35C. *Plug-in VOX control unit* **$29.95**

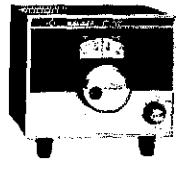
F3. Plug-in 300 Hz CW filter **$37.50**

RF550 R.F. CONSOLE. Precision wattmeter, switch to select 5 antennas or a dummy load (not supplied) **$75.00**

SC550 SPEAKER CONSOLE. With headphone jack—AC400 power supply will mount inside **$29.95**

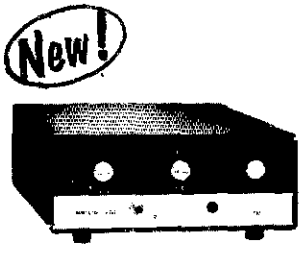
AC400. *Full power, heavy duty state supply for* 115/230 volts **$99.95**

GALAXY RV550 REMOTE VFO



$95.00

A solid state VFO complete with simple plug-in cables. Gives flexibility of a separate transmitter and receiver.



2 METER FM

The big swing is to FM on 2! Repeaters are the rage. For a new experience in 100% communications capability, install a Galaxy FM-210 Transceiver in your car or shack. FET front end, dual conversion, adjustable squelch, gives receiver sensitivity that's "hot"! 3 separate crystal controlled channels for receiver and for transmitter. Works on 12-14 VDC. Compact! Built in speaker. **$229.50**

Power Booster. Doubles transmitter input power to 10 watts. Works on 12-14 VDC or 115 VAC. **$49.00**

PROMPT ORDER DEPT.
We carefully pack and ship ham gear, accessories and parts to most any part of the world.
Address your orders to:
20 SMITH STREET
Farmingdale, N.Y. 11735
Please include ample postage (plus $1 handling cost with orders under $10.)
OR, PHONE YOUR ORDERS TO (212) BA 7-7922 OR (516) 293-7990

SINCE 1925

Harrison

"Ham Headquarters, U.S.A."®

NEW YORK CITY · 8 Barclay St. · BArclay 7-7922

JAMAICA, L. I.
139-20 Hillside Ave.
REpublic 9-4101

FARMINGDALE, L. I.
2265 Route 110
2 miles South of LIE Exit 49S
(516) 293-7990

The Yaesu FTdx 560 Transceiver. 560 watts PEP SSB. 500 watts CW. $450 complete. All you add is mike, speaker and antenna.

Incredible.

At $450 the Yaesu FTdx 560 is an incredible buy. It would be impossible if it weren't for a couple of facts. One, the Yaesu is made in Japan; two, it's sold direct to you—eliminating the big dealer's profit.

These days, when you think of Japanese-built products, think of Nikon, or Sony, or Toyota. And Yaesu. Our transceivers are state-of-the-art engineered and carefully hand-assembled. They're so solid, stable and reliable we guarantee them for one year. Yaesu is quite likely the best transceiver made anywhere in the world today.

The complete Yaesu story is a long one. So we've compiled a comprehensive information packet that gives you the complete picture. Including things like comparative detail photos, a schematic, and a comparison chart that shows you the FTdx 560's superiority over rigs you're more familiar with. Once you've looked over the FTdx 560 literature we think you'll agree that the amateur operator's impossible dream has become an incredible fact.

SPECTRONICS WEST
Box 338, Lakewood, Calif. 90714 / Telephone: (213) 421-6167

SPECTRONICS EAST
Box 1457, Stow, Ohio 44224 / Telephone: (216) 923-4567

Please send me your free Yaesu FTdx 560 information packet:

Name_____

Street_____

City & State_____ Zip Code_____

Call_____

WHILE MOBILE

Hearing is believing!

IGNITION NOISE IS GONE!

DRAKE TR-4 SIDEBAND TRANSCEIVER

Now with Noise Blanker built-in!

34-NB now factory-installed

A GREAT BARGAIN AT $699.95

INCLUDING THE FAMED DRAKE RELIABILITY

Years of Drake transceiver design experience make the TR-4 one of the finest available. Ahead in circuitry and compact lightweight packaging, it is ideal for mobile use, portable, and vacations. USB, LSB, CW or AM.

• **300 Watts PEP** input on SSB, 260 watts input on CW. • **Complete Ham Band Coverage:** all necessary crystals for 80 thru 10 meter ham bands. • **Separate Sideband Filters:** • **Nominal 1.7:1 Filter Shape Factor:** • **Crystal Calibrator** • **VFO Indicator Light** • **Automatic CW Transmit Receive Switching** • **Solid State Permeability Tuned VFO** for accurate 1 kHz divisions on all bands. • **VOX or PTT for use on AM or SSB.**

ACCESSORIES

AC-4 120V 50/60 Hertz Power Supply	$ 99.95
DC-4 12 VDC Solid State Power Supply	$125.00
MS-4 Matching Speaker	$ 22.00
RV-4 Remote VFO— Separate Receive and Transmit frequencies on same ham band	$110.00
FF-1 Crystal-Control Adaptor	$ 26.95
MMK-3 Mobile Mounting Kit	$ 6.95

R. L. DRAKE COMPANY 540 Richard Street, Miamisburg, Ohio 45342