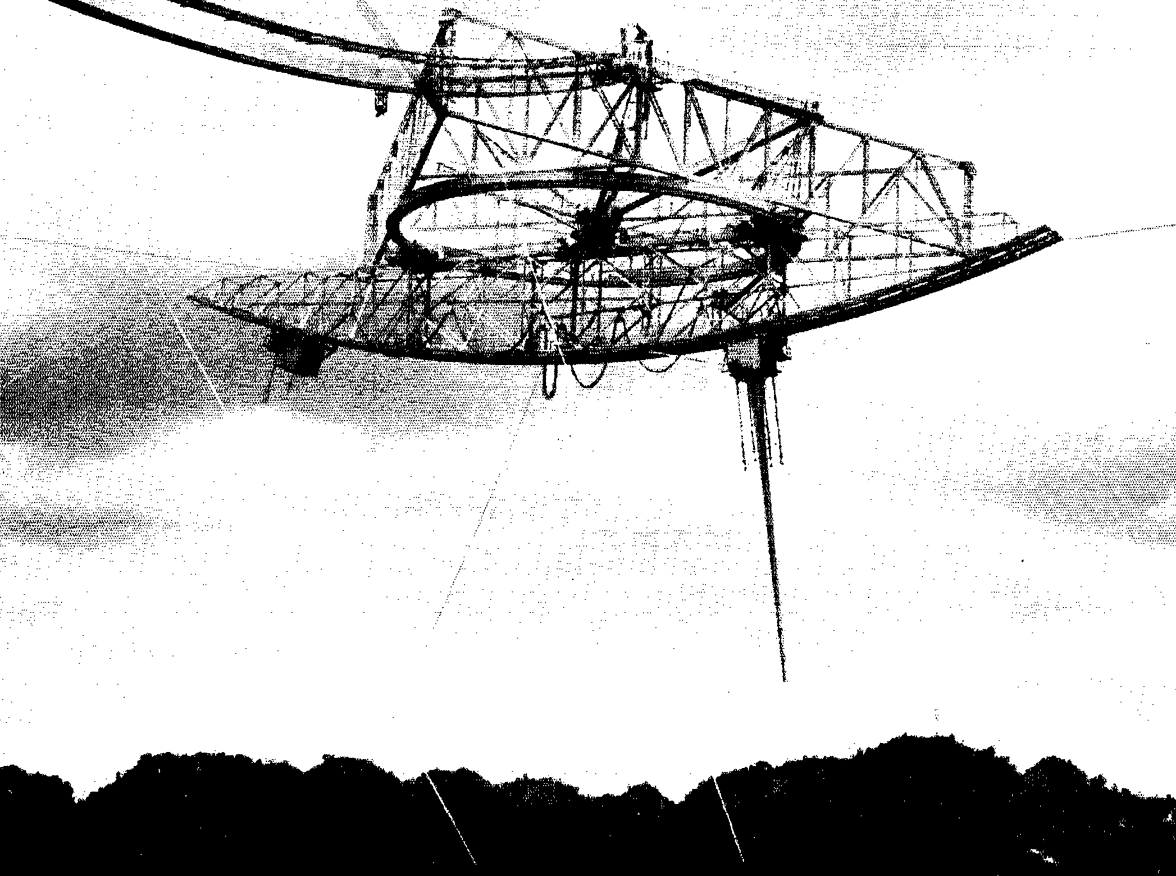
September 1965
60 Cents

QST

devoted entirely to

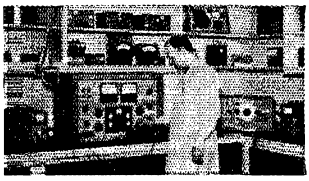
amateur radio

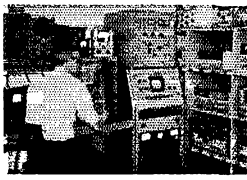


PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

Compromise...
but not with quality!

The SX-122 is subjected to exactly the same exhaustive Quality Control Procedures applied to the most costly of Hallicrafters amateur-band equipment.





NEW SX-122 dual conversion general coverage receiver $295.00

If you operate **exclusively** on the amateur bands, we hardly need point out that an amateur-band-only receiver will give you more sophisticated features and performance for your money than **any** general coverage unit.

But if your personal interests require the versatility of a general coverage receiver, the wisest compromise you can make is the new SX-122 receiver.

For maximum flexibility consistent with the **high standards of basic performance you demand,** nothing even close to its price can touch the SX-122.

In addition to the solid value specifications listed alongside, the SX-122 brings you a major advance in stability through additional temperature compensation of the h.f. oscillator circuits and use of crystal-controlled 2nd conversion oscillator.

The SX-122 is in stock, at your distributor's today.

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

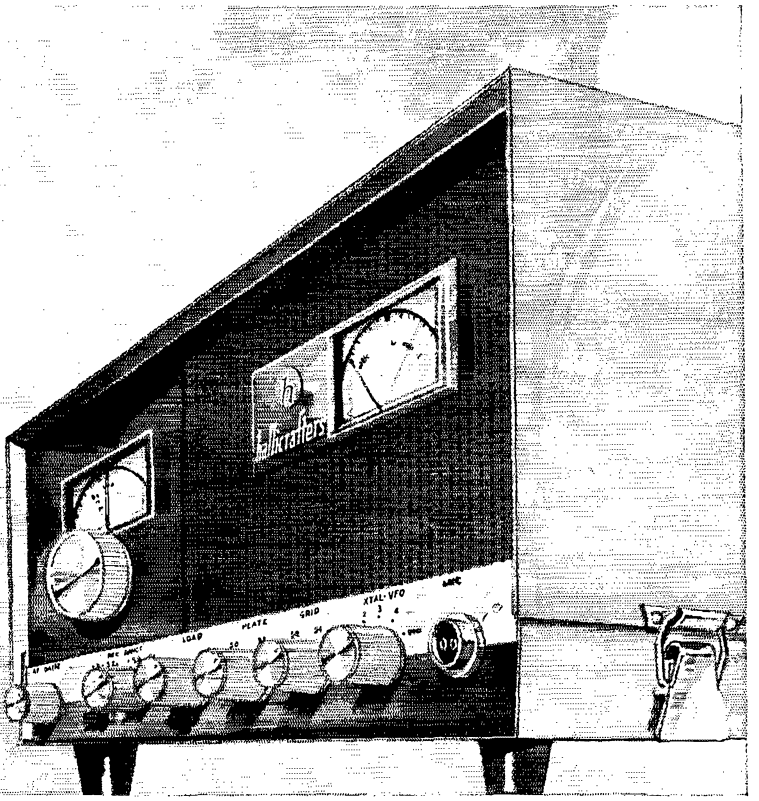
FEATURES: Deluxe general coverage receiver. Broadcast (538 1580 kc.) plus three S/W bands (1720 kc.—34 Mc.). Dual con version, superheterodyne over the entire frequency range. SSB. CW/AM reception. Product detector for SSB/CW. Envelope de tector for AM. Series noise limiter. Heavy-duty tuning capacito with copper plates in oscillator section for maximum electro mechanical stability. Audio output: 1.0 watts with less than 10% distortion. Three steps of selectivity: 0.5, 2.5, 5.0 kc. at 6.0 db down. Antenna trimmer, amplified AVC. 2nd conversion oscilla tor crystal-controlled. Size: 18¾" wide, 8" high, 9¾" deep Provision for 100 kc. crystal calibrator accessory (HA-7). UL approved.

The new ideas in communications are born at . . .

hallicrafters

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

Bye Bye Birdie



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

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

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

FEATURES

Frequency Coverage: 50 to 52 Mc and 52 to 54 Mc (144 to 146 Mc and 146 to 148 Mc in the SR-42). **Power Input:** 10-12 watts. **Power Supply:** 115 VAC and 12 VDC (vibrator and line cord optional extra). **Transmitter Crystals:** high frequency type; provision for four (one furnished), plus external VFO, switch-selected from front panel. **Tubes:** 10, plus zener diode oscillator control and four diodes (11 tubes, 2 zeners and four diodes in the SR-42). **"S" Meter** automatically switches to RFO. **Cabinet:** "snap-off" type for easy access. **Size:** 5½" high, 12⅛" wide, 8¼" deep. **Shipping Weight:** 17 lbs. **Amateur Net Price:** $189.95.

New SR-46

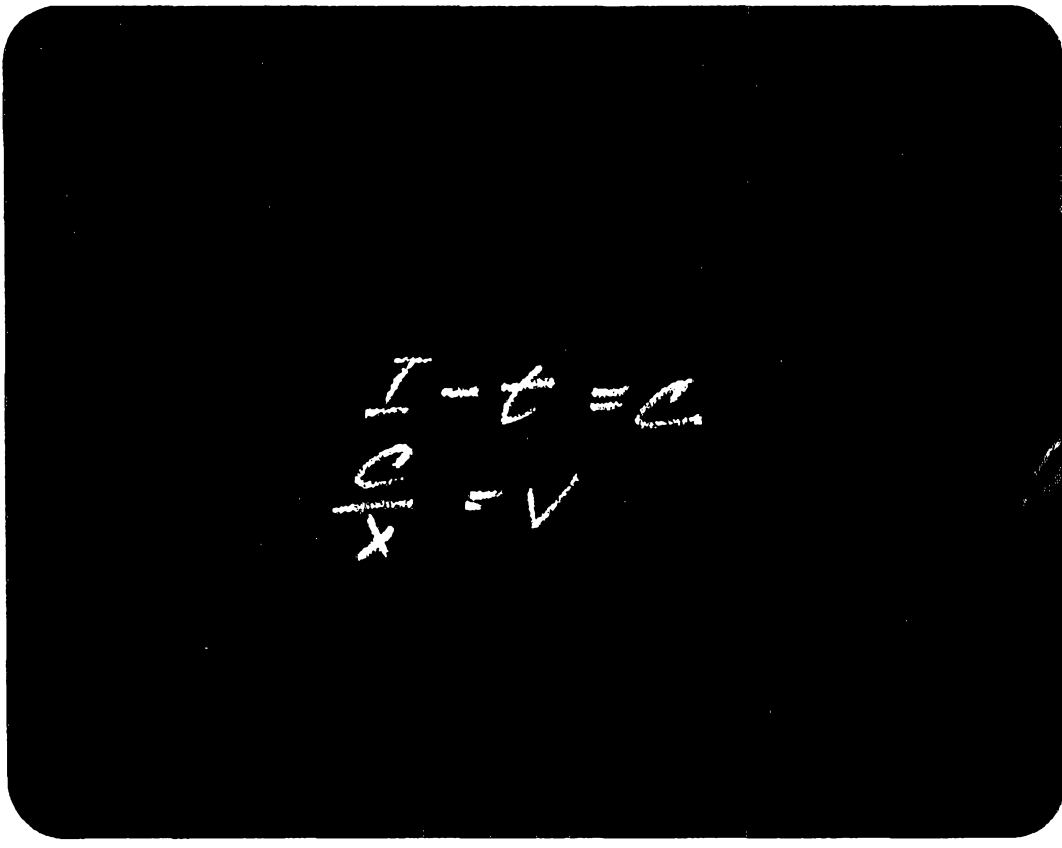
SIX METER VHF TRANSCEIVER and SR-42 for two meters

"Quality through Craftsmanship"

hallicrafters

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

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



SIMPLE ARITHMETIC

No other equipment on the market holds its value like Collins' S/Line gear. That's one reason Collins is such a good investment. A little simple arithmetic brings home the point. Your initial investment minus trade-in value equals your cost for Collins' S/Line. Divide your cost by the number of years you keep your S/Line gear and you'll have the true value of how little it costs to own the finest. ☐ Check your Collins distributor and compare prices. Then check and compare equipment features. Collins offers you complete station compatibility; frequency stability; frequency calibration; more QSO's per kilocycle; mechanical filters; dual or single PTO control; automatic load control; negative RF feedback; light weight; distinctive simplicity and styling. ☐ Once, these features were all Collins "exclusives." Even today, Collins offers you all ten — Collins is still unexcelled. ☐ Visit your Collins distributor and see the S/Line. Then do your own simple arithmetic. Find out for yourself that it costs less to own the finest.

COLLINS

QST

SEPTEMBER 1965

VOLUME XLIX NUMBER 9

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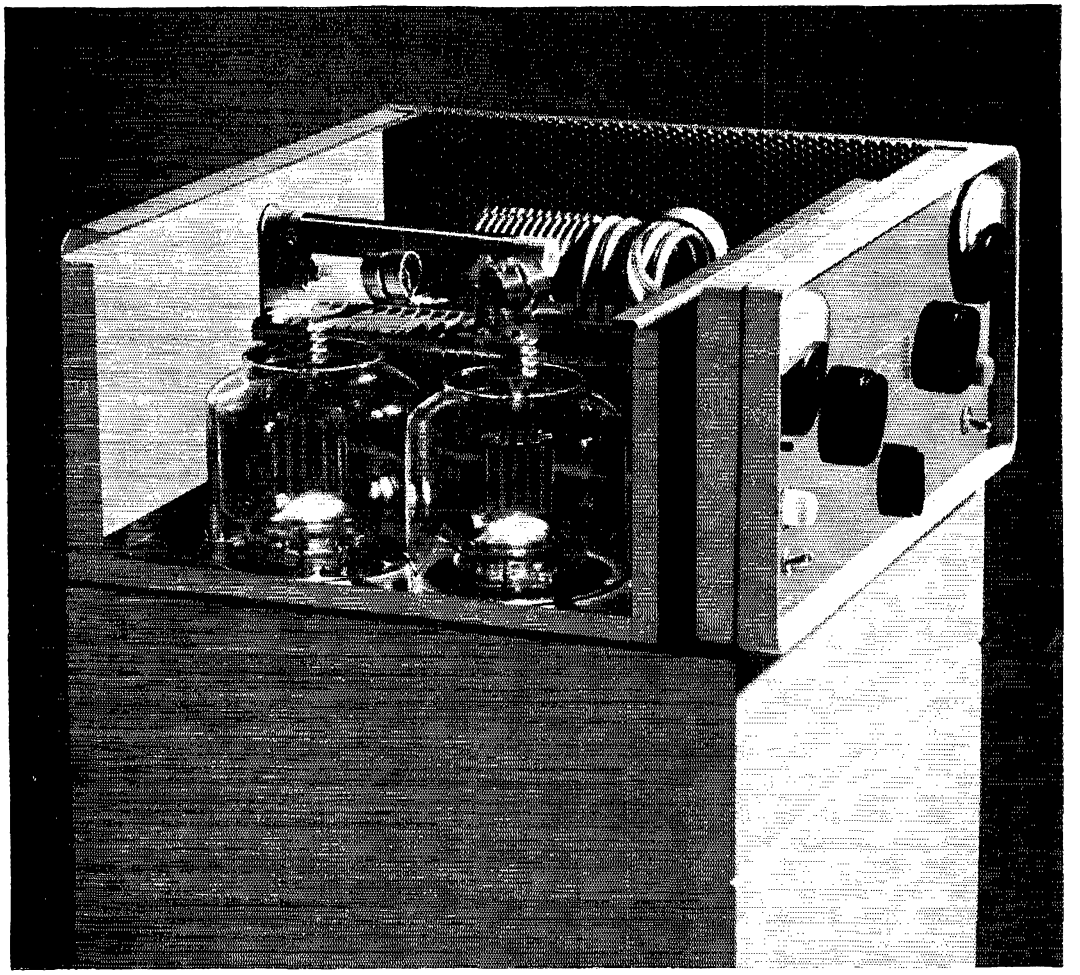
—CONTENTS—

EIMAC 3-400Z triodes power new Henry Radio 2 K linear amplifier

Henry Radio Co.'s new 2 K linear amplifier is sure to become a classic in its field. With an ultimate simplicity of design, it covers the 80, 40, 20, 15 and 10 meter bands for SSB, AM, CW, FM or RTTY. It provides Pi-L plate tank output circuit for maximum attenuation of unwanted harmonic output and resonant cathode input circuit for finest linearity and minimum drive requirement. The best possible performance was demanded of this new linear amplifier. That's why Henry Radio chose two rugged, original design Eimac 3-400Z grounded grid triodes. Designed especially for zero-bias operation, these two Eimac 3-400Z's provide 800 watts of plate dissipation and make possible simplicity of equipment design with no screen or bias power supplies required. For complete information on Eimac zero-bias triodes write Power Grid Manager or contact your local EIMAC distributor. Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California. In Europe, contact Eitel-McCullough, S.A., 15 rue du Jeu-de-l'Arc, Geneva, Switzerland.



Be "winter ready" to work 10, 15 and 20 M

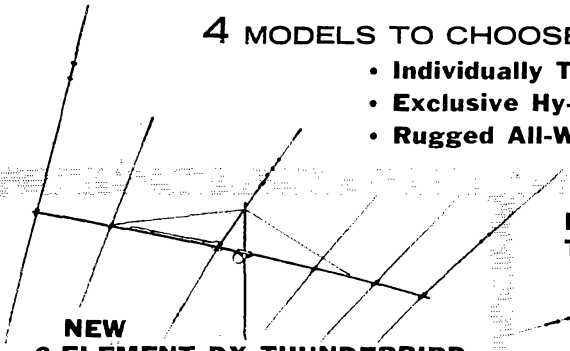
with a new hy-gain

THUNDERBIRD

10-15-20

4 MODELS TO CHOOSE FROM—ALL FEATURING...

- **Individually Tuned Hy-Q Traps for each band**
- **Exclusive Hy-Gain Beta Match**
- **Rugged All-Weather Construction**



NEW 6-ELEMENT DX THUNDERBIRD

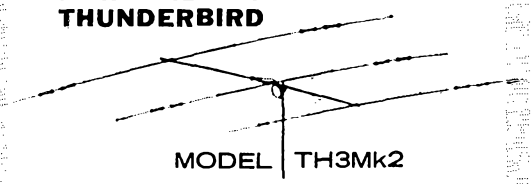
MODEL TH6DX

Takes Maximum Legal Power

The Model TH6DX offers the ultimate in tribander performance and mechanical reliability for 10, 15 and 20 meters...is superb on DX and other long haul contacts. Individually tuned Hy-Q traps for each band insure peaked performance working phone or CW. Feeds with 52 ohm coax. Beta matched for optimum gain and maximum F/B ratio without compromise. SWR less than 1.5:1 on all bands. 24' boom; longest element, 32'; 47 lbs. net. Survives winds up to 100 MPH.

MODEL TH6DX ..... **$139.50** Net.

NEW 3-ELEMENT THUNDERBIRD



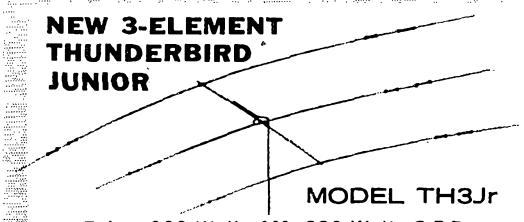
MODEL TH3Mk2

Takes Maximum Legal Power

The Model TH3Mk2 is an outstanding performer on 10, 15 and 20 meters. Individually tuned, large diameter Hy-Q traps provide peaked full-size performance on each band. Feeds with 52 ohm coax. Is beta matched for optimum gain, maximum F/B ratio without compromise. SWR less than 2:1 at resonance on all bands. 14' boom. Longest element, 28'. 36 lbs. net. Heavy gauge seamless construction—survives winds up to 100 MPH.

MODEL TH3Mk2 ..... **$99.75** Net

NEW 3-ELEMENT THUNDERBIRD JUNIOR



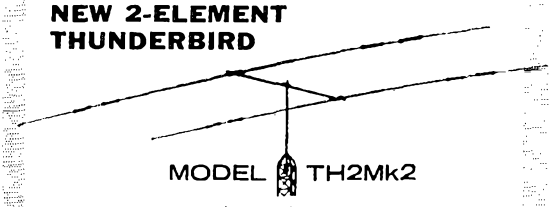
MODEL TH3Jr

Takes 300 Watts AM; 600 Watts P.E.P.

A compact, 3-element tribander designed to deliver outstanding performance where hampered by severe space limitations. Ideal for roof-top or lightweight tower installations. Individually tuned Hy-Q traps for each band. Beta matched for maximum gain and F/B ratio. Rotates with heavy duty TV rotator. SWR less than 2:1 at resonance, all bands. Rugged construction...withstands 80 MPH winds. 12' boom. Longest element, 26'. 21 lbs net.

MODEL TH3Jr ..... **$69.95** Net

NEW 2-ELEMENT THUNDERBIRD



MODEL TH2Mk2

Takes Maximum Legal Power

A ruggedly constructed compact tribander for 10, 15 and 20 meters that installs most anywhere...delivers excellent performance. Individually tuned Hy-Q traps for each band. Beta matched for maximum gain and F/B ratio without compromise. Rotates with standard TV rotator. SWR less than 2:1 at resonance on all bands. Heavy gauge seamless aluminum construction...withstands winds up to 100 MPH. 6 ft. boom. Longest element, 28 ft. 23 lbs. net. MODEL TH2Mk2 ..... **$69.95** Net

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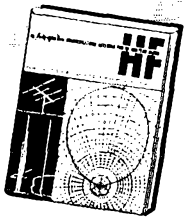


Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired 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, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

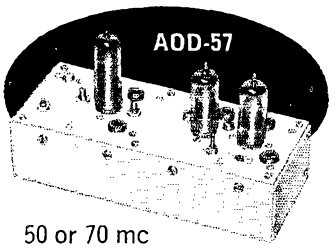
ATLANTIC DIVISION				
Delaware	W3IYE,	Roy A. Belair	415 Brighton Road	Wilmington 19809
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua 18252
Maryland-D. C.	W3QA	Bruce Boyd	415 Wickham Rd.	Baltimore, Md. 21229
Southern New Jersey	WB2PHV	Albert E. Hankinson	2309 Raymond Drive	Northfield 08225
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive	Buffalo 26
Western Pennsylvania	W3GJY	John F. Wojtkiewicz	*1490 Chaplin St.*	Conway
CENTRAL DIVISION				
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9YYX	Ernest L. Nichols	RFD 7	Bloomington 47403
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauona Trail	Portage 53901
DAKOTA DIVISION				
Minnesota	WØTCK	Herman R. Kopischke, Jr.,	RFD 2	Janesville 56048
North Dakota	WØDM	Harold L. Sheets	21 Euclid Ave.	Grand Forks
South Dakota	KØTXW	Seward P. Holt	Box 58	Clear Lake
DELTA DIVISION				
Arkansas	W5DTR	Curtis R. Williams	Route 3, Box 230	Little Rock 72205
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington
Mississippi	W5EMM	S. H. Hairston	2321-27th Ave.	Meridian
Tennessee	W4UVP	William Scott	115 East Holston Ave.	Johnson City 37601
GREAT LAKES DIVISION				
Kentucky	WA4KFO	Lawrence F. Jeffrey	1605 Antler Ave.	Owensboro 42301
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road	Detroit 48240
Ohio	W8AL	Wilson E. Weckel	1317 Logan Ave., N.W.	Canton 44703
HUDSON DIVISION				
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	K2IDB	Blaine S. Johnson	266 Cypress St.	Massapequa Park, L. I.
Northern New Jersey	W2CVW	Edward F. Erickson	13 Robert Circle	South Amboy 08879
MIDWEST DIVISION				
Iowa	WØNTB	Dennis Burke	1418 Douglas Ave.	Ames 50010
Kansas *	KØBXF	Robert M. Summers	1125 N. 50th Pl.	Kansas City
Missouri	WØTPK	Alfred E. Schwaneke	Edgar Star Rte	Rolla 65401
Nebraska	WØGGP	Frank Allen	Box 272	Gering 69341
NEW ENGLAND DIVISION				
Connecticut	K1GGG	Fred Tamm	485 Romanock Rd.	Fairfield 06432
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine	K1DYG	Herbert A. Davis	Lakes Ln.	Ellsworth Falls 04634
New Hampshire W1SWX/	K1DSA	Robert Mitchell	Box 137-A, RFD	Chester
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	K1MPN	E. Reginald Murray	3 Hillcrest Drive	Montpelier 05601
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.	Westfield 01085
NORTHWESTERN DIVISION				
Alaska *	KL7ENT	Daniel R. Wright	3206 Wyoming Drive	Spenard, Alaska 99503
Idaho	K7ILR	Raymond V. Evans	Route 3	Twin Falls 83301
Montana	W7TYN	Joseph A. D'Arcy	1916 Haggin Ave.	Anaconda
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave	Portland 97266
Washington	W7HMQ	Everett E. Young	3217 Fifth St., S.E.	Puyallup
PACIFIC DIVISION				
East Bay	K6LRN	Richard Wilson	107 Cordova Way	Concord
Hawaii	KH6BZF	Lee R. Wical	45-601 Luluku Rd.	Kaneohe 96744
Nevada	W7PBV	Leonard M. Norman	652 Utah St.	Boulder City 89005
Sacramento Valley	WA6JDT	John F. Minke, III	4613 Rustic Rd.	Carmichael 95608
San Francisco	WA6AUD	*Hugh Cassidy*	*77 Coleman Drive*	*San Rafael 94901*
San Joaquin Valley	W6JTC	Ralph Sarovan	6204 E. Townsend Ave.	Fresno
Santa Clara Valley	W6ZRJ	Jean A. Gmelin	10835 Willowbrook Way	Cupertino
ROANOKE DIVISION				
North Carolina	W4BNU	Barnett S. Dodd	420 West Franklin St.	Salisbury 28144
South Carolina	W4PED	Charles N. Wright	711 Merriwether Dr.	North Augusta 29841
Virginia *	W4SHJ	H. J. Hopkins	8600 Hammett Ave.	Norfolk 23503
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554
ROCKY MOUNTAIN DIVISION				
Colorado	KØTTB	Donald Ray Crumpton	P.O. Box 223	Alamosa
New Mexico *	W5UBW	Lowell Richardson	1518 Lincoln Ave.	Alamogordo
Utah W7MWR/	W7OAD	Marvin C. Zitting	P.O. Box 1813	Salt Lake City 84110
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601
SOUTHEASTERN DIVISION				
Alabama	K4KJD	William S. Crafts	Route 3, Box 233	Athens 35611
Canal Zone	KZ5TD	Thomas B. DeMeis	P.O. Box 1111	Balboa
Eastern Florida	K4SJH	A. L. Hamel	320 N.E. 25th St.	Pompano Beach 33064
Georgia	W4RZL	Howard L. Schonher	P.O. Box 1902	Columbus 31902
West Indies (P.R.-V.I.)	KP4JM	Jose E. Saldaña	Box 223	Hato Rey, P.R.
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.	Fort Walton Beach 32548
SOUTHWESTERN DIVISION				
Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.	Phoenix 85017
Los Angeles	W6BHG	H. G. Garman	3732 Chatwin Ave.	Long Beach 90808
Orange	W6DEY	Roy R. Maxson	1434 South Olive St.	Santa Ana 92707
San Diego	W6LRU	Don Stanslfer	4427 Pescadero	San Diego 92107
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court	Thousand Oaks
WEST GULF DIVISION				
Northern Texas	W5BNG	L. L. Harbin	4515 Calmont	Fort Worth 76107
Oklahoma	K5KTW	Bill F. Lund	1220 S. Owasso	Tulsa 74120
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskridge St.	Houston
CANADIAN DIVISION				
Alberta	VE6TG	Harry Harrold	1834-5th Ave. N.	Lethbridge, Alta.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4JT	John Thomas Stacey	19 Cottonwood Cres.	Brandon
Maritime	VE1WB	D. E. Weeks		Harvey Station, N. B.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2DR	C. W. Skarstedt	62 St. Johns Rd.	Pointe Claire, Montreal 33, P. Q.
Saskatchewan	VE5QC	Mel Mills	P.O. Box 801	Saskatoon

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

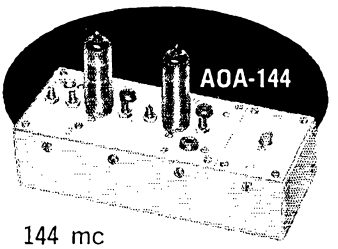
NEW FROM INTERNATIONAL

VHF/UHF UNITIZED TRANSMITTERS 50 mc—420 mc

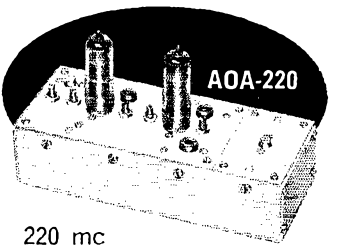
International's new unitized VHF/UHF transmitters make it extremely easy to get on the air in the 50-420 mc range with a solid signal. Start with the basic 50 or 70 mc driver. For higher frequencies add a multiplier-amplifier. All units are completely wired. Plug-in cables are used to interconnect the driver and amplifier.



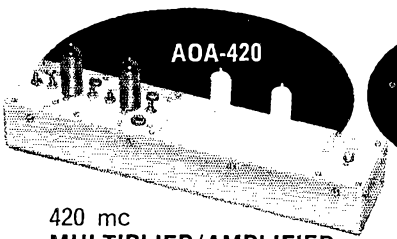
50 or 70 mc
DRIVER/TRANSMITTER
The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma.
AOD-57 complete.....$69.50



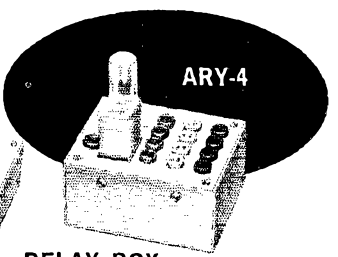
144 mc
MULTIPLIER/AMPLIFIER
The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma.
AOA-144 complete.....$39.50



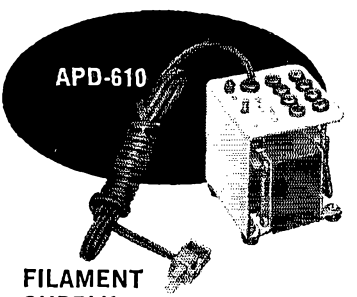
220 mc
MULTIPLIER/AMPLIFIER
The AOA-220 uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma.
AOA-220 complete.....$39.50



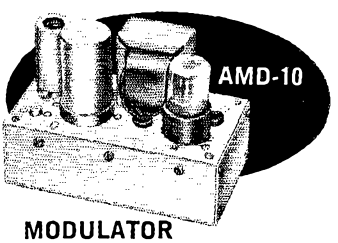
420 mc
MULTIPLIER/AMPLIFIER
The AOA-420 uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma.
AOA-420 complete.....$69.50



RELAY BOX
Four circuit double throw. Includes coil rectifier for 6.3 vac operation.
ARY-4 Relay Box complete $12.50



FILAMENT SUPPLY
The APD-610 provides 6.3 vac @ 10 amperes.
APD-610 complete.....$9.50



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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.

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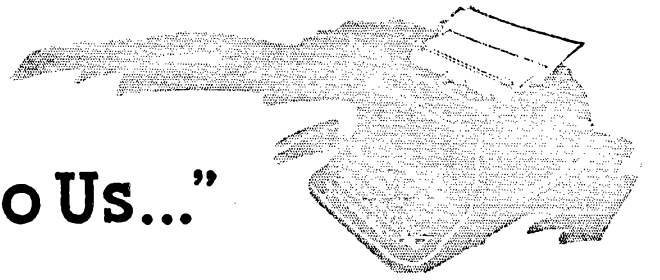


"It Seems to Us..."

100 YEARS FOR ITU

In May, 1865, representatives of twenty European nations met in Paris to form the International Telegraph Union and come to agreement on rates, message form and procedures, technical standards and similar matters to facilitate the inter-country exchange of communications by landwire.

The meeting was particularly significant as a milestone in international cooperation, for most previous councils of nations had been to settle disputes over boundaries or to end wars. Here the states met voluntarily, simply to expand the intercourse between their peoples. This, indeed, has been the theme as the original organization has grown to where it supervises the regulatory aspects of telephone, radio, and now space communications and radioastronomy. Under its more fitting name, the International Telecommunications Union this year commemorates the 100th anniversary of its founding.

Now with nearly 130 nations of the world as members, and a permanent staff of some hundreds at the Geneva headquarters, ITU tackles regulatory and technical problems in the rapidly expanding science of telecommunications. Major conferences are held every several years, to resolve the conflicting needs and desires of individual nations. A landlocked country, for example, has little or no need for marine channels, yet recognizes and agrees to their assignment to meet the requirements of others. A small nation, hardly equipped now to set up its own satellite communications system, still accepts allocation of substantial portions of the spectrum for such service, knowing it will eventually benefit all mankind. A new and developing country accedes (however begrudgingly) to wider amateur bands than its few amateurs can possibly fill, here again recognizing the importance of providing for the needs of others. After weeks and perhaps months of discussion, negotiation and compromise, the delegates sign agreements which regulate the world's telecommunication activities for the years immediately ensuing. Between major conferences, regional and specialized meetings are held which produce regulatory or technical agreements to keep pace with what is perhaps the globe's most dynamic science.

ITU exists because it is needed. Radio does not recognize geographical boundaries, and agreement on usage of most portions of the spectrum is essential to prevent chaos. ITU also exists because it works, because the desire of nations to promote international exchange of communications surpasses any chauvinistic feelings. And, ITU exists because it is progressive; indeed, a major point on the agenda for the Plenipotentiary Conference opening this month in Switzerland is a series of proposals for revamping its structure to fit more adequately the world's current needs for telecommunications regulatory implementation.

We salute the International Telecommunications Union on its one-hundredth anniversary. The span of its electrical communications regulatory activity is well indicated by the title of a centenary publication *From Semaphore to Satellite*. What commenced in Paris in 1865 now covers the globe; with mankind exploring the planets and planning even more distant journeys where communication is vital, who knows but that ITU may soon change its name again to reflect further expansion of its responsibilities in the universe?

"4-TRACK" CALL SIGNS

In the thousands of comments received by ARRL directors and Hq. concerning Docket 15928, a common complaint has been over the FCC-proposed call sign changes. While incentives are provided in the way of frequency privileges, our members say, the proposed call sign setup acts to negate any desire to advance to a higher class. E.g., under the FCC proposal General Class W1LVQ would keep his call; but if he took and passed a First Class exam, he would become, depending on the date of original license, perhaps K1LQ or KA1VQ. And, for advancement to Extra, perhaps W1PK or WA1QT. For most amateurs the glamour of a two-letter call fades with the compulsory change which, as much as changing a name, causes a loss of all the identification built up in years of operating. As many put it, "If I have to change my call each time, I'll stay General and won't even try for a higher grade."

The ARRL Board felt that the proper answer was a system which holds out current calls as the incentive for the highest grade license. Identifying prefixes, rather than wholly new calls as required in many cases under the FCC proposal, would be assigned to

indicate the class of license.

There are currently four prefixes in use on the U.S. mainland — W, K, WA, WB. These the Board proposes be used only for the Amateur Extra Class. The League also asks that an amateur's call sign suffix should not be arbitrarily changed. Putting these two principles together requires a "four track" system, one for each prefix now used.

One "track" of prefixes, from the lowest to the highest grade, for example might be WN (Novice), WT (Technician), WC (Conditional), WG (General, WF (First) and plain W (Extra). The suffix would remain the same during the licensee's progression. But three other tracks must also be provided in order to protect the WA, WB and K calls at the end of the incentive line. For the K series it might simply be, in the same order shown above, KN, KT, KC, KG, KF and K. For WA and WB, other identifying prefixes for each class of license would have to be chosen. We deal here of course only with principles rather than specifics, and our examples are simply illustrative of what might be adopted.

Whether a new call sign arrangement is necessary at all, to assist monitoring activities, can be decided only by the Commission. If such a change is adjudged essential, the League offers the alternative system in lieu of the Commission's proposal, at least parts of which so many of us have found objectionable. The system is not as complex as it seems at first glance. More important, it protects the sanctity of suffix identification and avoids the wholesale changing of entire calls which the FCC proposal would inflict upon most amateurs progressing through the various license classes. QST

COMING A.R.R.L. CONVENTIONS

September 4–5 — Maritime Province, Digby, Nova Scotia
October 1–3 — Ontario Province, Sudbury
January 22–23, 1966 — Southeastern Division, Miami, Florida
March 19–20, 1966 — Michigan State, Saginaw
April 22–24, 1966 — ARRL National, Boston, Massachusetts
May 28–29, 1966 — Roanoke Division, Natural Bridge, Virginia
May 27–29, 1966 — Southwestern Division, Anaheim, California

ONTARIO PROVINCE CONVENTION

Sudbury **October 1–3**

The 1965 Ontario Province ARRL Convention will be held Friday, Saturday and Sunday, October 1-3, at Cassio's Motor Hotel, Copper Cliff Road, Sudbury, Ontario. VE3SRS will be active to guide in mobiles on 3.765 Mc. Advance registration and a dance will take place Friday evening, followed by the Royal Order of the Wouff Hong initiation ceremony at 11:30 P.M.

Saturday activities get underway at 9 A.M. After the lunch break, the official "Welcome to Sudbury" ceremony will be held, followed by the ARRL Forum. Several technical sessions, meetings, exhibits and displays are planned. A tour of the big nickel mine and other activities have been planned especially for the ladies. The convention banquet Saturday evening will include entertainment and an address by ARRL Vice-President Alex Reid, VE2BE. A concluding "send-off" breakfast is scheduled for Sunday.

Registration will be $6 per person, including the banquet. For advance registration or additional information, write the Sudbury and District ARC, Box 1054, Sudbury, Ontario.

OUR COVER

The impressive structure shown on the cover is Cornell University's radioastronomy antenna, the full story on page 24.

Strays

The Headquarters is undertaking a survey of repeater station activity in the amateur radio service. From this will flow a listing in *QST* of all such information compiled. We ask the licensee/trustee of each active repeater operation to send us full information on call sign, frequency channels used, mode of emission, power, and also as much additional information as possible on control systems, logging procedures, etc.

From this study may possibly come recommendations to the FCC for amendment of the amateur rules. Please also, therefore, submit your comment — either with the original basic data or soon thereafter — as to the adequacy of current regulations and how they might be expanded and improved to facilitate more extensive use of repeater service.

The first three articles in this issue deal with a subject that no sideband operator can afford to ignore — testing and adjusting the s.s.b. transmitter for the cleanest possible output. For filter-type transmitters, a two-tone oscillator is indispensable, and the pulsed-output feature of the one described here by W1YDS lets you check your transmitter at maximum peak-envelope power without exceeding its d.c. rating. The immediately-following contributions by W1KLK and W1DX tell you how to interpret the oscilloscope patterns that the pulsed oscillator gives you.

Read, build — and keep your signal sharp!

A Pulsed Two-Tone Test Oscillator

Transistors in a Test Generator for Linear Amplifiers

BY WALTER LANGE,* W1YDS

It has been pointed out that the pulsed two-tone testing of a linear amplifier allows any amplifier to "loaf" along at low average input while being driven to maximum p.e.p. input.[1] The two-tone test pattern is most easily obtained as the double-sideband output from a balanced modulator and a single audio tone. However, nowadays most sideband rigs use a filter to generate the single-sideband signal, and so *two* similar-amplitude audio tones must be fed to the s.s.b. generator if a two-tone test pattern is to be obtained.

Used with an oscilloscope and a dummy load, the generator described here can be used to make most of the necessary checks on a sideband transmitter or amplifier. With a single audio tone the sideband and carrier suppression can be checked, while the two-tone test, steady or pulsed, gives a visual check on the flat-topping level and the linearity of an amplifier.

To be useful, a two-tone test generator must produce signals of low harmonic content. If it doesn't, the harmonics make a 3-, 4- or 5-tone generator out of it, depending upon the number of harmonics that fall within the pass band of the filter. A number of different transistor-oscillator circuits were tried, but we ended up with Colpitts *LC* oscillators as giving the best waveforms.

The final circuit is shown in Fig. 1. Each audio oscillator is followed by an emitter follower, to minimize reaction. Control R_1 is included to permit adjusting the 1800-cycle amplitude to match that of the 800-cycle signal. The matched signals are fed to Q_5, where the setting of an output-level control, R_2, determines the signal that reaches the output jack or, when pulsing is used, the gate transistor, Q_8.

An astable (free-running) multivibrator circuit furnishes the gating pulse. The output approximates a square wave, and the repetition rate can be varied between about 50 and 170 p.p.s. The duty cycle or on-off ratio can be controlled by the setting of R_3; this also has an effect on the pulse rate, and R_4 is included as a vernier control of the pulse rate and duty cycle, as explained later.

Q_8 is a forward-biased shunt gate. The two-tone signal is developed across R_7 and R_8 in series, and the fraction across R_7 is coupled to the output jacks. However, with no multivibrator pulse arriving at the base of Q_8, the gate transistor conducts heavily and effectively short-circuits R_7. A positive pulse from the multivibrator cuts off Q_8 and the two-tone signal appears in the output.

Construction

The two-tone generator is housed in a 5 × 6 × 9-inch utilitycabinet. Battery holders and the two inductors, L_1 and L_2, are mounted on the base of the cabinet, and the jacks and mode switch S_2 are mounted on the top. The frequency selector switch and the four potentiometers are mounted on the front panel. All of the remaining components are mounted on a $7\frac{3}{4} \times 4\frac{13}{16}$-inch sheet of prepunched terminal board (Vector 85G24EP) with push-in terminals (Vector T-28). Six 1-inch 6-32 threaded spacers hold the terminal board behind the front panel. The parts arrangement on the board is not critical, but for simplicity in this version the parts layout more or less resembles the circuit diagram.

Testing

When the unit has been constructed and the wiring checked, install the four flashlight batteries in their holders. Connect a length of shielded cable between either J_2 or J_3 and the vertical input terminals of an oscilloscope. With S_2 in the unpulsed position, turn S_1 to the "800" point. Adjust R_2 for maximum output (at least 0.15 volt peak-to-peak). Switch S_1 to "1800" and advance R_1 for maximum gain (about 0.3 volt peak-to-peak). In both cases the scope should show good quality sine waves of negligible distortion.

Adjust the 1800-cycle signal level to the same amplitude as that of the 800-cycle signal. Switching S_1 to "2 tone" should produce a complex waveform of about 0.3 volt peak-to-peak. Turn S_2 to the pulsed position. R_3 and R_4 will vary the "on" time of the pulse from about 40 to 60 per cent.

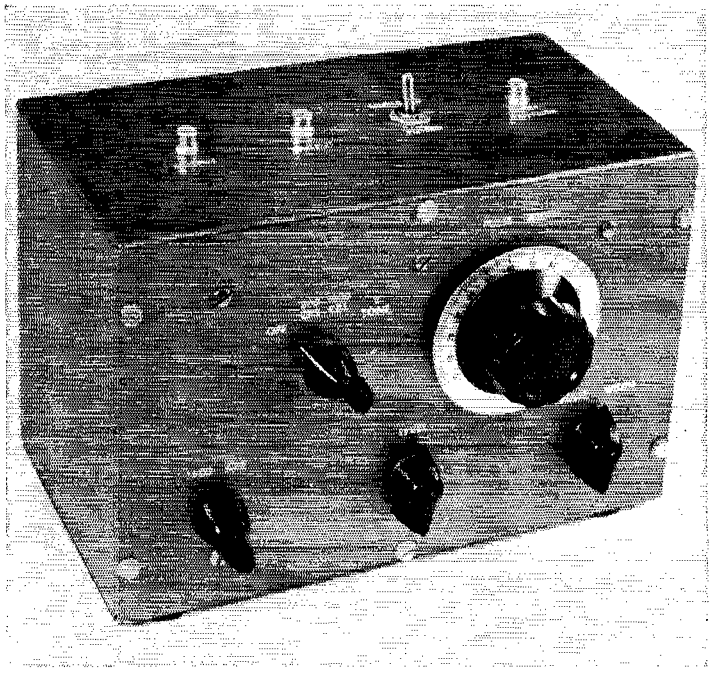
Using the Test Generator

Connect a length of shielded cable between the test oscillator and a sideband exciter. Attach a "T" connector to the transmitter and run a coaxial cable between the dummy load or the Telematch[2]. Connect a suitable tuned circuit to the vertical deflection plates of the scope, and

* ARRL Technical Department.

[1] Goodman, "Linear Amplifiers and Power Ratings", *QST*, August, 1957.

[2] Goodman and Lange, "The Telematch," *QST*, February, 1965.



Front view of the two-tone test oscillator. The generator is completely self-contained. Battery drain is only 4 ma.

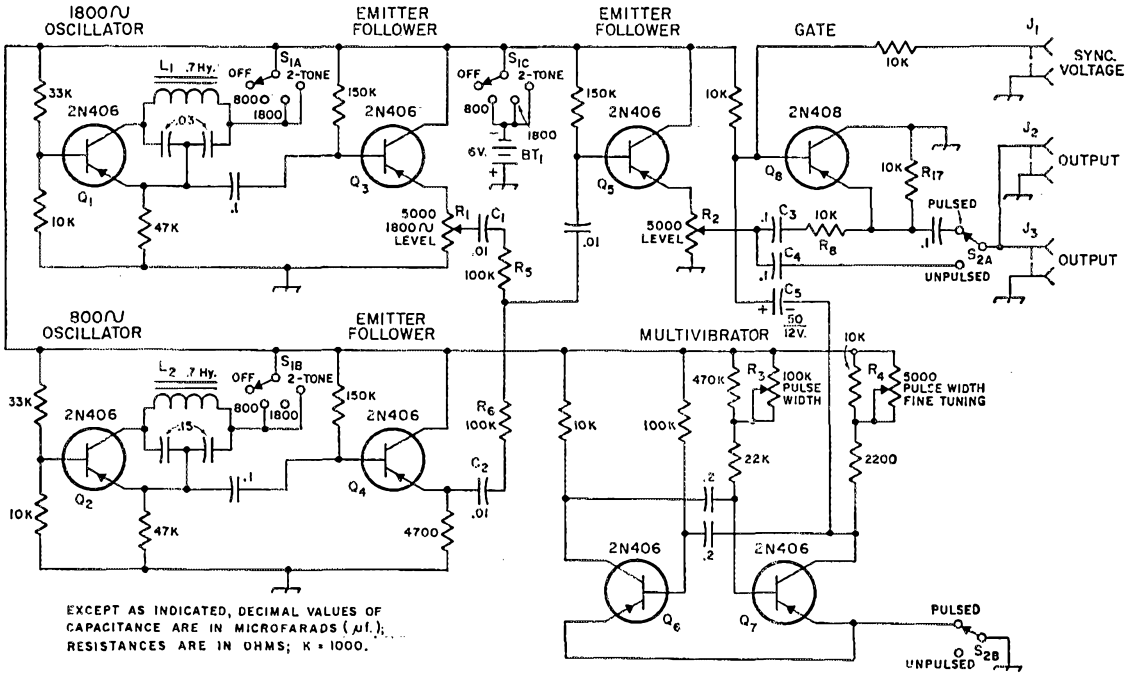
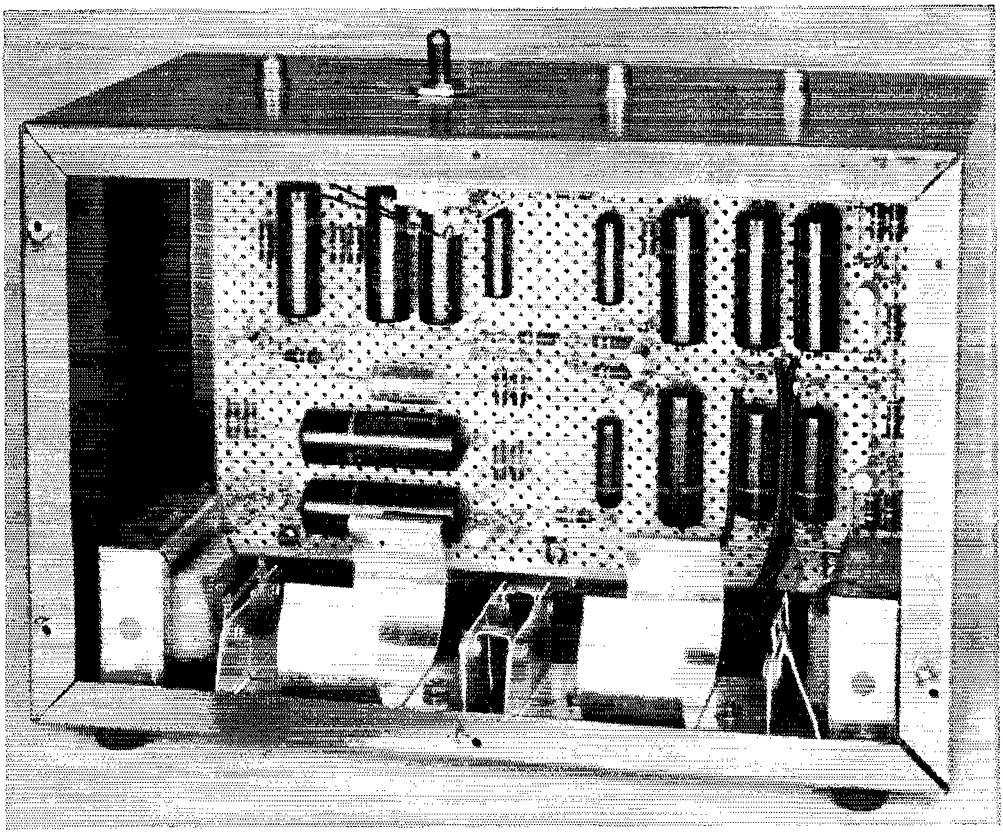


Fig. 1—Circuit diagram of pulsed two-tone test oscillator. All capacitors are tubular paper except C_6, which is a subminiature electrolytic. Resistors are ½ watt, ± 10 per cent.

BT_1—Four 1.5-volt flashlight batteries (size D) in series.
J_1, J_2, J_3—Phono jacks.
L_1, L_2—0.7-henry 290-ma. filter choke (Knight 64 G 703).
R_1, R_2, R_4—5000-ohm control, linear taper.
R_3—100,000-ohm control, linear taper.
S_1—Rotary switch, 3-pole 4-position, shorting type (Mallory 3134J).
S_2—D.p.d.t. toggle switch.



Interior view of the test oscillator. Parts are arranged on the terminal board in a manner similar to the schematic diagram. The oscillator circuitry is on the right with the three emitter followers towards the center. Multivibrator components are located on the lower left corner of the board with the gate parts just above them. The two double battery holders are Keystone type 176.

link couple this circuit to the open connection on the "T" connector.

Switch the test generator to the 800-cycle unpulsed position. Adjust R_2 and/or the exciter audio gain control for a good size scope pattern, being careful not to overdrive the amplifiers or exceed their ratings. Peak the scope tuned circuit. The desired pattern is a simple rectangle, whose top and bottom edges are as straight as possible (without saturation in an amplifier). Any ripple on the top or bottom indicates insufficient carrier and/or sideband suppression and should be minimized before proceeding. (If the 800-cycle signal has too high second- and third-harmonic components, or if distortion is taking place in the audio section of the sideband exciter, ripple will also appear on the pattern.)

Turn S_1 to "1800" and recheck for ripple. The top and bottom edges of the pattern should be straight lines.

Once the suppression has been checked, a two-tone pattern may be used for checking the linearity of the system. Adjust the 1800-cycle signal level with R_1 to the same amplitude as the 800-cycle tone. If the amplifier is being run conservatively, it can be operated with the steady two-tone test signal right up to the flat-topping level. As explained in the *Radio Amateur's Handbook* and *Single Sideband for the Radio Amateur*, the things to avoid are flat-topping and non-linear crossovers. Another pattern that is somewhat common but not discussed in the publications mentioned above is something that, at relatively slow sweep speeds, gives the appearance of low-frequency ripple riding across the top and bottom of the two-tone pattern. The several possible causes include 60- or 120-cycle hum modulation, non linearity in the audio stages, insufficient carrier suppression and insufficient sideband suppression. In other words, the spectrum of the signal includes more than the two frequency components that it should have.

Amplifiers that would be crowded a bit by the steady two-tone test should be checked by the pulse method. Switch the oscilloscope to external sync and connect a length of shielded cable between J_1 and the external sync terminal of the scope. Synchronize the scope sweep to the pulse repetition frequency so that one or two pulses are displayed. The pulse envelopes will stand still, but in all likelihood the two-tone pattern will be "walking through" the pulses. Careful adjustment of R_4 will halt or greatly slow down this

(Continued on page 160)

Testing A Sideband Transmitter

A Primer of Simple Tests and Adjustments

BY DOUGLAS A. BLAKESLEE*, W1KLK

MANY amateurs are still afraid to "lift the lid" on their sideband transmitters. Granted, a sideband rig is the most complex piece of equipment in most ham shacks, but that is no reason why a hands-off attitude should be so dominant. A large number of amateurs just do not take the time to become familiar with sideband techniques. With a small investment in test equipment and a little practice, any amateur can keep his transmitter in top condition.

Even if your transmitter never blows up, component aging, tube changes and the difference in temperature in your shack between Winter and Summer will affect the performance of balanced modulators and phase-shift networks. These circuits *will* require readjustment from time to time. And, too, even a perfect transmitter can be operated in such a way that it sounds horrible. The damage has been done if you wait until others on the band (or the FCC) inform you that something is wrong with your transmitter.

Test Equipment

To observe the rapidly-changing levels in a sideband transmitter an oscilloscope is absolutely necessary. No meter can keep up with the dynamic variations encountered with the human voice. There are monitor scopes sold that will fill the bill completely, or any shop-type scope which has an internal horizontal sweep generator and external vertical deflection-plate connections may be used with the tuning unit to be described. Several inexpensive scope kits are also available.

An audio generator is the other piece of test equipment required. The standard sort of audio generator will do; one often can be borrowed from local RTTYers or high-fi buffs, or a simple audio generator may be constructed to give a selection of frequencies.[1] The generator should have good sine-wave output and low distortion. A two-tone generator makes testing even easier. The unit described by W1YDS[2] is perfect for any of the tests to be described.

For the service-type oscilloscope an r.f. pick up unit is used to sample the output of the transmitter, and a tuned circuit builds up the r.f. voltage to provide adequate vertical deflection for the scope. See Figs. 1 and 2. The pick up unit is constructed in a 4 × 2½ × 2½-inch Minibox. The tuning unit has link-coupled input; each link is made by winding two turns of hook up wire around the center of the coil and cementing it down. Solder lugs are used on the ends of the leads from the Miniductor coil and link to facilitate coil changing. The shaft of the variable capacitor must be insulated from ground. In the unit in the photograph, the capacitor is mounted on a ¾-inch stand-off insulator, as is the terminal strip. The chassis of the tuning unit is made from a 4 × 8-inch piece of aluminum sheet stock, although a wooden block would do just as well, as you would not need to use the stand off insulators.

* Editor, Technical Departments.

[1] Baxter, "A Transistor Audio Oscillator," *QST*, February, 1965.

[2] See the article by Walter Lange elsewhere in this issue.

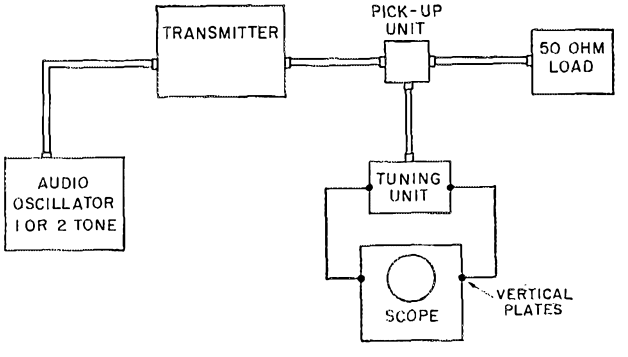


Fig. 1—A typical test setup for a sideband transmitter.

Only a small amount of energy is used by the tuning unit, so the pickup unit may be left in the transmitter output line for on-the-air monitoring.

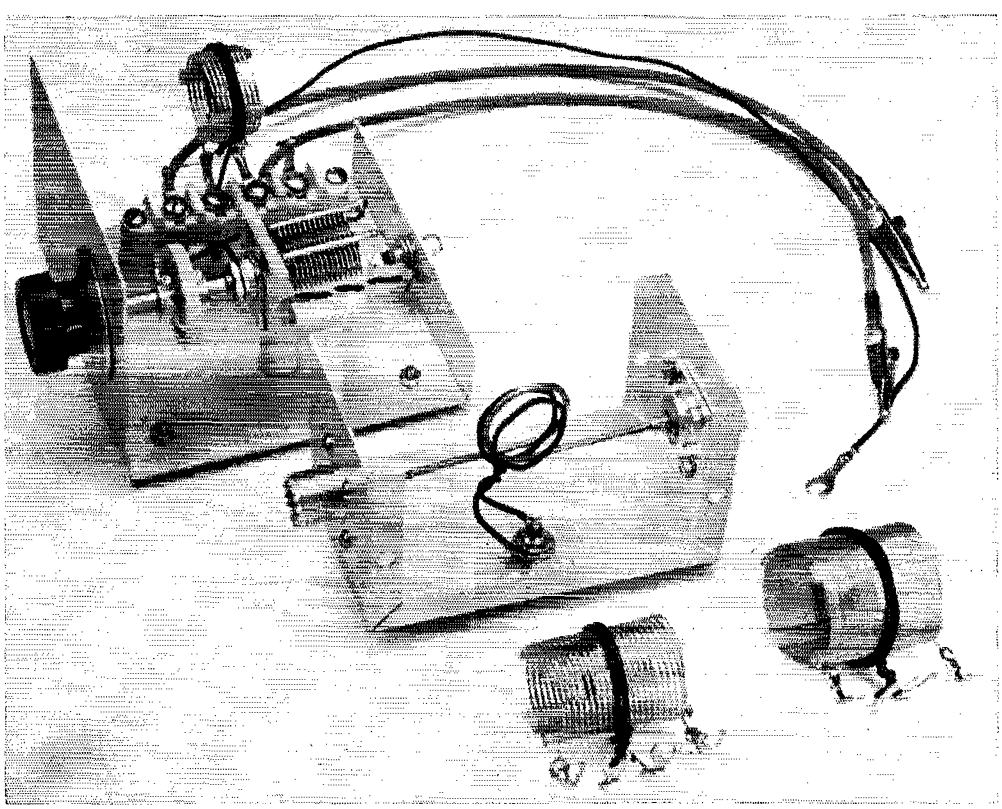
A typical test setup is shown in Fig. 1. All testing should be done with a dummy load, for two-tone tests can make a horrible noise on the air. The audio or two-tone generator is connected to the microphone jack of the transmitter, except when a mike is used for speech patterns. The generator should be adjusted so that its output is about at the level of the microphone you normally use. Gain adjustments should be done at the transmitter with the mike gain control. The pick-up unit is inserted between the transmitter and dummy load, and the tuning unit should be placed so short connections can be made to the scope. Don't forget to ground the scope to the tuning unit. A length of RG-58/U or RG-59/U is used to connect the tuning unit to the pick-up unit.

The transmitter to be tested should be tuned up in the c.w. position, or in the sideband position with a single audio tone injected, for normal input. Then adjust the tuning unit to give about half-scale deflection on the scope face, and turn on the horizontal sweep generator in the oscilloscope. Then you are ready to start testing!

Speech Patterns

Speech patterns offer rather a poor way of telling what is going on in the sideband transmitter because they come and go so fast. Yet with a little experience one can learn to recognize signs of transmitted carrier and flattening. These are useful later in monitoring on-the-air operation with a scope.

Connect a microphone to the transmitter, set the oscilloscope sweep for about 30 c.p.s. and say a few words. The number "five" will produce a "Christmas tree" pattern similar to Fig. 3A. Each different word will produce a different pattern, which is one of the reasons why speech patterns are so hard to interpret. The important thing here is to observe the peaks to see if they are sharp, as in Fig. 3A. Fig. 3B is the number "five" again but this time the mike gain is set way too high; the final stage is being overdriven resulting in clipping of the voice peaks as the final tube reaches plate-current saturation. Underloading the final stage will produce the same result. Operating a transmitter this way will produce a lot of splatter, making you unpopular with your neighbors on the band. Usually, reducing the gain control a little will remove all signs of flattening. Try different settings of the gain



The variable capacitor is used to adjust the vertical deflection on the scope. The tuning unit should be mounted near the oscilloscope so short leads to the deflection plates may be used. An extra lead is provided to ground the tuning unit to the scope.

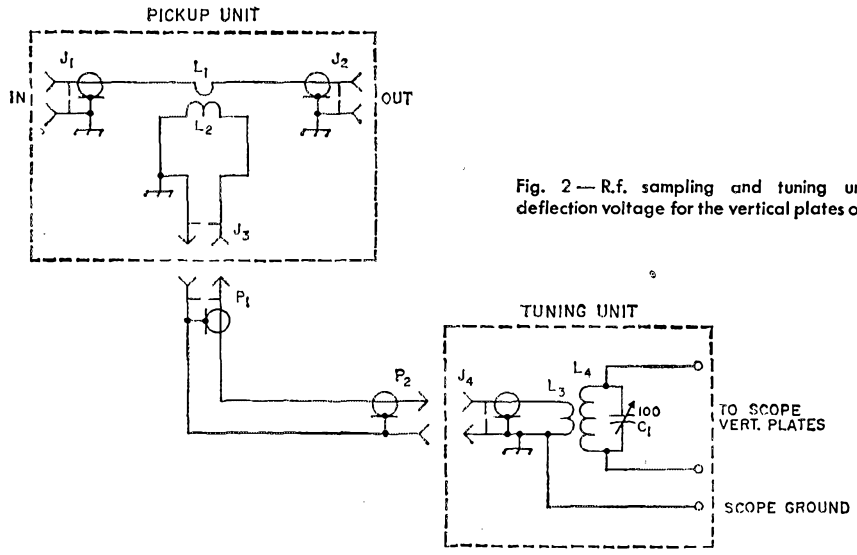


Fig. 2 — R.f. sampling and tuning units to provide deflection voltage for the vertical plates of an oscilloscope.

C_1—100-pf. variable (Hammarlund HF-100).
J_1, J_2—Coaxial receptacle, chassis-mounting.
J_3, J_4—Phono connector
L_1—1 turn No. 14, 1-inch diameter, supported by soldering its leads to the coax receptacles.
L_2—2 turns insulated hook up wire, placed with one turn either side of L_1.
L_3—2 turns of insulated hook up wire wound around the center of L_4 and cemented in place.
L_4—3.5 Mc.: 45 turns No. 24, 1¼-inch diam., 32 turns/inch (B&W Miniductor 3020).
7 Mc.: 22 turns No. 20, 1-inch diam., 16 turns/inch (B&W Miniductor 3015).
14-21 Mc.: 9 turns No. 20, 1-inch diam., 16 turns/inch (B&W Miniductor 3015).
P_1, P_2—Phono plug.

control until you can tell a correct pattern from one showing clipping.

If, when the mike gain is reduced to zero, the scope pattern shows you still have some output, you may be transmitting carrier. Adjustment of the balanced modulator, which is covered later, will be necessary.

Two-Tone Tests

A sideband transmitter should be a linear device from mike jack to output connector — for each audio frequency put in you should get out an r.f. frequency, with no distortion of the waveform. The basis of a two-tone test is that you inject two audio signals, from which you should get out only two r.f. signals. No tube is ever perfectly linear, so some mixing of the two tones will occur, but all of the new signals produced should be so weak in comparison with the main output of the transmitter that you cannot detect their presence in a scope pattern. What you will see is the pattern of two sine-wave signals as they add and subtract, forming peaks and valleys.

A two-tone test's main advantage is that it will produce a stationary pattern that may be examined for defects. It is not easy to tell with your eye exactly what is a pure sine wave on a scope. Complex patterns are even more difficult, so it is a good idea to draw the correct pattern carefully on a piece of tracing paper, which then may be placed over the actual pattern on the scope face for comparison. Remember that this test will show major defects in the transmitter only.

To make the test, apply the output of the two-tone generator to the mike jack, set the 'scope sweep for about 200 c.p.s., and check the pattern to see that both tones are of equal level. If they are not equal level, the valleys of the waveform will not meet at a single point on the zero line. Fig. 4A shows the correct pattern; note that the crossover is in the form of an X. Another way to obtain a two-tone test signal is to use a single audio tone and unbalance the carrier to the point where it forms the pattern shown in Fig. 4A.

Examine closely Fig. 4A — this is the correct pattern. Note the clean rounded peaks and straight sides of the envelopes, and again how an X is formed at the crossover. Fig. 2B shows mild flattening of the peaks, and 4C severe flattening. The cause is the same: an amplifier stage being overdriven or underloaded. Cutting the drive level or increasing the loading should result in the Fig. 4A pattern.

Incorrect bias adjustment can also cause a stage to be nonlinear. This defect will show up as rounding of the crossover points as in Fig. 4D. The manufacturer's instruction manual should be consulted for the proper bias value and the location of the bias control. This control should be adjusted for the proper operating bias. Incorrect bias will also show up as high or low values of resting plate current. If a correct resting current and pattern cannot be obtained the tube may be bad and should be replaced.

Fig. 4E indicates what happens when an external two-tone generator is used and carrier

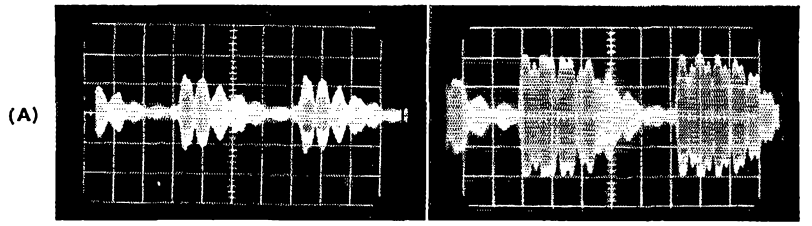


Fig. 3—(A) Speech pattern of a correctly adjusted sideband transmitter. (B) The same transmitter with excessive drive causing peak clipping in the final amplifier.

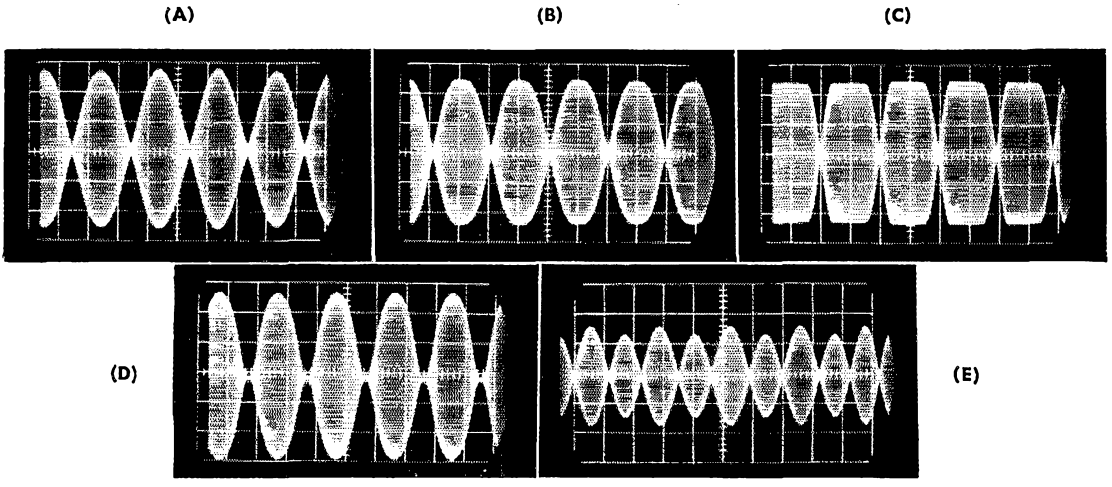


Fig. 4—Sideband two-tone test patterns: (A) a correctly adjusted transmitter, (B) mild peak clipping and (C) severe peak clipping caused by excessive drive or underloading of the amplifier, (D) incorrect amplifier bias causing rounding of the crossover points, (E) pattern with modulation caused by carrier leak-through.

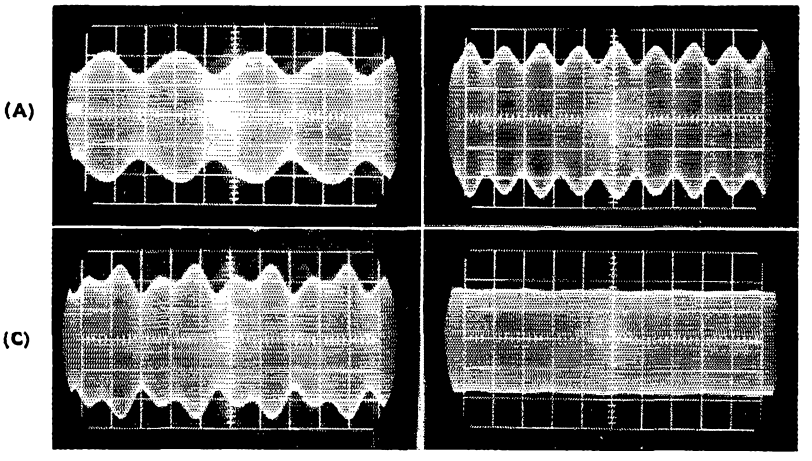


Fig. 5—Phasing-type exciter patterns with single-tone input and constant oscilloscope sweep frequency: (A) carrier leak-through, (B) insufficient unwanted-sideband suppression, (C) both carrier leak-through and unwanted sideband, (D) correct pattern for single-tone input.

leak-through is also present. The carrier causes the peaks of the two-tone pattern to have different heights. If this happens, you should first null out the carrier, then go back to the two-tone testing.

Carrier Balance

For carrier balance adjustments only one tone is used. The pesky carrier shows up as a sine-wave modulation, similar to what you may have seen in a.m. The carrier-balance control(s) should be adjusted until the sine-wave modulation disappears. Fig. 5A shows the single-tone test with sine-wave modulation caused by a partially suppressed carrier, and Fig. 5D shows the pattern after the carrier has been balanced out.

The location of the carrier-balance controls may be found in the instruction manual if they are not located on the front panel. Phasing rigs usually have two controls, while the filter types have one control and a variable capacitor. In either case the action of these adjustments is somewhat interlocking. The first should be adjusted, then the second, repeating in turn until the carrier is nulled out.

Carrier balance may also be adjusted with the aid of a communications receiver if it has an S meter. The receiver should be coupled to the transmitter so you have a strong, S9 signal. Then adjust the balanced modulator as before for the least amount of indicated signal on the S meter. During this test the mike gain should be reduced to zero, so no modulation appears on the carrier.

The Phasing Exciter

With a single-tone input, the phasing-type exciter owner may find he has a pattern resembling Fig. 5C. This pattern is formed when you have carrier leak-through and also the unwanted sideband is only partially suppressed. The unwanted sideband, like the carrier, shows up as sine-wave modulation, but at twice the frequency. For a scope sweep of about 400 c.p.s. Fig. 5A shows carrier unbalance, Fig. 5B insufficient unwanted-sideband suppression, and Fig. 5C is a combination of the two.

If you need to realign a phasing-type exciter, read carefully the manufacturer's instructions. Different models will require different procedures, so we shall only go over the high points.

Use a single-tone test, and null out the carrier. Carrier balance should be checked again during the alignment of the phasing generator, for it will upset your pattern if any carrier creeps in.

The phasing generator will have audio balance and r.f. phasing adjustments, which may number two, three or four. Injecting a single tone, these controls are manipulated until the unwanted sideband is suppressed, as indicated by the disappearance of ripple from the scope pattern. You should achieve a pattern like Fig. 5D. Then the transmitter should be switched to the other sideband and checked again for suppression of the unwanted. No doubt you will see some sign that in this position you do not have complete suppression of the unwanted sideband. This is probably due to the stray effects in the sideband switching. Thus you must reach a compromise in the setting of the audio balance and r.f. phase that gives good suppression of the unwanted when the transmitter is operated on either sideband. If you have achieved a pattern like Fig. 5D you have carrier and unwanted-sideband suppression of 35 to 40 db. This is about the limit of suppression you can see on an oscilloscope.

If your transmitter has passed all the above tests, you can be sure it is working well. Further tests that will show the small distortion that you cannot see on a scope will require much more advanced techniques, and are beyond the scope of this article.[3] In most cases, anything that does not show up in these tests will never be noticed on the air. QST

[3] For more information see *Single Sideband Principles and Circuits*, Pappenfus, Bruene, and Schoenike, McGraw-Hill, Inc., 1964.

Pulsed Signals Through S.S.B. Transmitters

ANYONE who builds Walt Lange's pulsed two-tone test generator [1] is going to see some unusual pictures on his scope, and they can stand a little explaining. For example, sending bursts of 800- and 1800-cycle audio through a phasing-type s.s.b. exciter results in patterns as shown in Fig. 1. Here the sweep has been synchronized with the pulse rate, so that the pulses "stand still." It will be found that the two-tone test pattern "walks through" these pulses, since the pulse rate is not usually an exact sub-multiple of 1000 cycles (the difference between 800 and 1800). The speed of the pattern's walk through the pulse can be controlled by changing the pulse rate and, while the pattern may stand still momentarily, it is not likely to be motionless for more than a few seconds. When testing a linear amplifier, it is the center of the pattern in the burst that is observed, as in the steady two-tone test pattern. However, it is the beginning and ending of the bursts that we found interesting.

Note that the left-hand edge (start of pulse) of Fig. 1 shows a large, sharp spike, of amplitude almost double that of the normal pattern. As the

[1] Lange, "A Pulsed Two-Tone Test Oscillator," elsewhere in this issue.

1000-cycle pattern walks through the pulse, this spike grows larger and smaller. A similar but smaller spike is generated when the pulse is turned off, and some tailing off or "ringing" can be observed. (If the pulse envelope were a perfect rectangle, the spikes would theoretically be of infinite amplitude. The audio phasing network in the exciter was protected by a low-pass filter that "softened" the pulse.) The spikes are the result of trying to transmit too many different frequency components by s.s.b.; at the instant when all of the components are in phase, the instantaneous amplitude must equal their absolute sum. If such an r.f. signal were to be amplified in a subsequent *linear* amplifier (no clipping allowed), the presence of the spike would place a severe restriction on the amplification of the main body of the signal. There is little energy in the spike, but to clip it, to bring up the level of the main body, would be a distortion of the signal.

Feeding the pulsed two-tone test signal to a filter-type s.s.b. generator gave the envelope of Fig. 2. Here the restricted bandwidth of the filter prevents the spike components from passing through, and as a consequence the start and finish of the pulse are different than they were when the phasing exciter was used.

Readers with long memories may recall that the first article on pulse testing of linear amplifiers [2] showed sketches of envelope pictures, and the pulsed signals showed no spikes or distortion at the beginning and end of the pulses. There was a very good reason. In the earlier venture the two-tone test signal was obtained directly from the output of a balanced modulator with a *single* audio tone applied. The resultant r.f. signal, a pulsed two-tone test signal as far as the amplifier was concerned, was a *double*-sideband signal when it was generated. Double-sideband signals, with or without carrier, can be pulsed in the audio circuits before the modulation process, and there will be no spikes on the resultant r.f. signal.

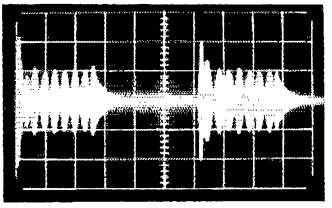


Fig. 1—Pulsed two-tone test pattern obtained with a phasing-type s.s.b. exciter. Note the large spike on the leading edge of the pulse and the lesser one on the trailing edge.

This is easy to see in the case of an a.m. signal (d.s.b. with carrier), because the r.f. envelope of an a.m. signal is identical to the audio signal used for modulation.

(C.w. or A1 transmission is a double-sideband modulation process. When the r.f. is turned on or off too fast, key clicks are produced equally above and below the carrier frequency. An oscilloscope picture of such a signal never shows an instantaneous value greater than the key-down value, except when the power-supply regulation is poor, and this has nothing to do with the subject under discussion.)

In the case of the d.s.b. suppressed-carrier signal there is no obvious direct relationship between the envelope and the modulating signal, but the amplitude of the r.f. envelope is always proportional to the amplitude of the modulating signal.

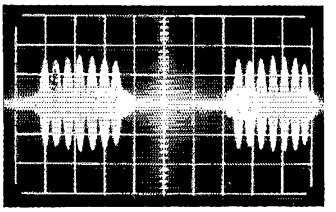


Fig. 2—Pulsed two-tone test pattern obtained with a filter-type s.s.b. exciter.

An s.s.b. signal insists on being different. And this is why only a small amount of audio clipping can be done in an s.s.b. rig before any advantage is lost. As clipping becomes appreciable and the audio acquires additional higher frequencies, one of two things must happen. In a phasing rig spikes will appear if the additional higher audio frequencies can generate an s.s.b. signal. (The case where they can't is where they are much too high for the audio phase-shift network or where they are completely rejected by a protecting audio filter.) The spikes restrict the power output of a linear amplifier. In a filter rig the same thing happens if the bandwidth is great enough to pass the high-frequency components. If the bandwidth is less (ours was 2.1 kc.) the filter rejects the high-frequency components, the effect of clipping is lost, and one ends up back where he started.

With narrow-band filters, advantageous clipping can be accomplished at r.f. *after* the generation of the s.s.b. signal, but the signal must then be reprocessed by passing it through a second filter.[3] — *W1DX*. QST

[2] Goodman, "Linear Amplifiers and Power Ratings," *QST*, August, 1957.

[3] Squires and Clegg, "Speech Clipping for Single Sideband," *QST*, July, 1964.

Strays

Lee Head, W9TTK, sent us a story he clipped from the *Trans-Communicator*. The article is about Private Roger G. Morse who is the 21-year old great-great-grandnephew of the famous Samuel Morse. Private Morse, a National Guardsman from Sacramento, California, is serving his six-month active duty stint with the Army and is attending the radio operator's course at For Ord, California. Quite a change in the state of the art since the elder Morse demonstrated his invention back in 1844!

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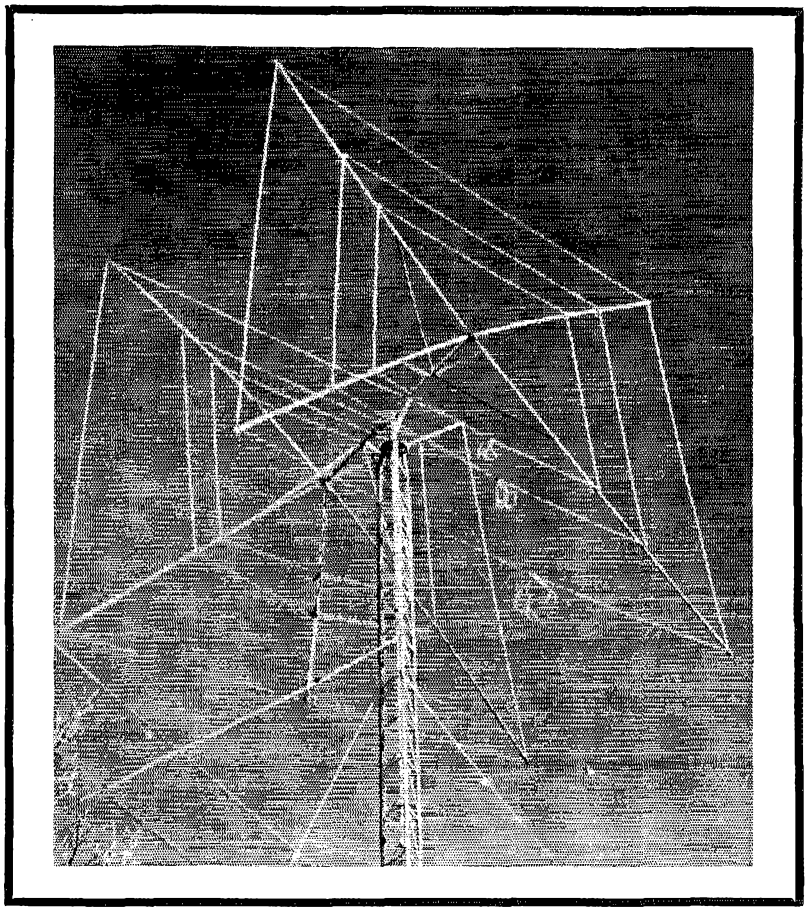
W3ACE, who has been U.S. Ambassador to Lebanon and has operated as OD5AX, is now Ambassador to Iran, and has already received the call EP3AM.



This photo shows how well KØJTP's mechanical design bears up under a half-inch coating of ice!

Quadwrangle

BY HAROLD W. MORGAN, M.D.,* KØJTP

THE cubical quad is a fine antenna. The electrical design is simple and has become more or less standardized;[1] therefore, it will not be reviewed here. A satisfactory mechanical system is something else, however, and many articles have been written describing constructional designs aimed at improving the weathering ability of the structure.

The quad in present use at KØJTP is the latest in a series of four built by the author. It is 45 feet in the air, mounted on a TV-type tower guyed at the 38-foot level with wires broken by insulators at 5-foot intervals. The wind has a two-mile sweep across a lake to the north and west, and about a half-mile sweep to the east and south. This quad has withstood winds up to an official 92 m.p.h., a near miss by a tornado, and four winters of ice storms. Therefore other home-brew constructors may be interested in some of the details.

* 104 Medical Arts Center, Mason City, Iowa.

[1] *The A.R.R.L. Antenna Book.*
Orr, *All About Cubical Quads*, Radio Publications, Wilton, Conn.

If you've been having trouble keeping your quad antenna up in stormy weather, some of the constructional features described here may be your solution.

Spreaders

I used bamboo spreaders for my first quad. These lasted only one winter, in spite of a Fiberglas coating. In the second model, alternate 5-foot sections of electrical conduit and Fiberglas-coated wood were used. This technique fared little better. In the last two quads to be constructed, I have used 10-foot lengths of 1-inch steel electrical conduit, tipped with Fiberglas-coated wood-dowel extenders.

Spreader Mounting

The boom is an 8½-foot length of standard 1½-inch steel pipe, threaded at both ends. (This pipe has an o.d. of 1.9 inches.) The spreaders are mounted at the ends of the boom by means of 5-way rail fittings. Referring to the sketch of Fig. 1, these fittings have a threaded center hole, and four threaded radial holes, all for standard 1½-inch pipe. These fittings are items used in the assembly of pipe fences and scaffolding, and are usually obtainable in various sizes from plumbing establishments.

Since the radial holes are, of course, too large for the 1-inch conduit spreaders, the holes are fitted with 1½-to-¾-inch reducing nipples into which 6-inch lengths of standard ¾-inch steel pipe are threaded. This pipe has an o.d. of 1.05 inches, while the i.d. of 1-inch conduit is 1.049 inches. Depending on tolerances, it may be necessary to turn, or emery, the pipe down slightly so that the conduit will slide easily over the pipe stubs. Bolts or cotter pins should be used to fasten the conduit to the pipe. A hole is drilled in the conduit, close to the end of the dowel, to allow condensed moisture to drain from the lower spreaders and thus discourage rotting of the dowel.

Each spreader is braced against the boom with a 5-foot length of 1-inch conduit. The ends of the conduit braces are flattened. One end is drilled for a ¼-inch bolt for attachment to the boom. The other end is terminated with a hose clamp which passes around the spreader. This end can then be slipped back and forth along the spreader, after the other end has been bolted to the boom, until the spreader is securely braced. I adjusted mine to produce a slightly "dished" effect toward the outside.

Element Mounting

Adjustable standoff insulators for the wire elements were made from 1-inch Plexiglas sheet, as shown in Fig. 2. These insulators are held in place by hose clamps on the spreaders. The element wires can be easily positioned and brought to proper tension by sliding the clamps along the spreaders.

Rotating System

The rotator motor is mounted at the base of the tower, and the antenna is driven through a shaft made of sections of standard 1¼-inch steel pipe. This pipe has an o.d. of 1.66 inches, and an i.d. of 1.38 inches. In joining the sections of pipe, the ends of the sections are threaded for standard 1¼-inch pipe couplings. After the coupling has been threaded onto the end of one section and tightened securely with pipe wrenches, a 1½-foot length of 1-inch pipe is inserted half-way into the section, and two bolt holes at right angles are drilled through both pipes. After these bolts have been fastened in place, the second drive-shaft section is threaded into the coupling, and similar bolt holes drilled in the second section.

Fig. 3 shows the details of the drive-shaft bearing at the top of the tower. A 4 × 5 × 10-inch block of oak is bolted to the tower mounting plate. A ball or roller thrust bearing that will pass the 1¼-inch pipe with a reasonably close fit is countersunk in the block. I used a main-shaft bearing from an automobile transmission.

The 1¼-inch drive shaft passes through the bearing, and then threads into an inverted floor flange for 1¼-inch pipe. The flange, which rests on the rotor of the bearing, bears the weight of the drive shaft and the antenna, thus relieving the driving mechanism of any weight. As a protection against the weather, the top of the block

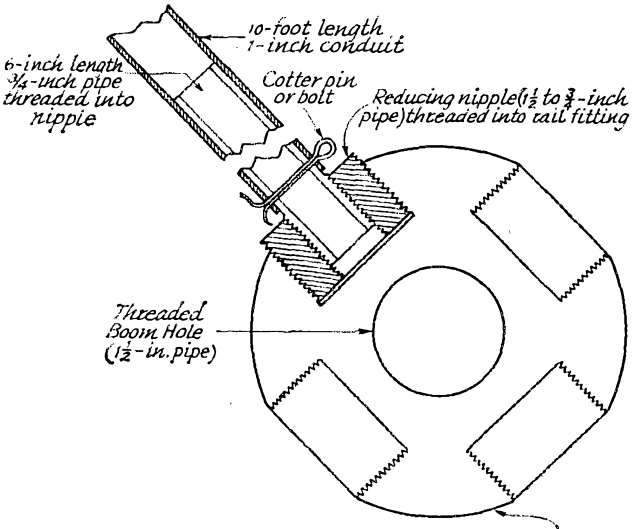


Fig. 1—This sketch shows details of the spreader mounting assembly.

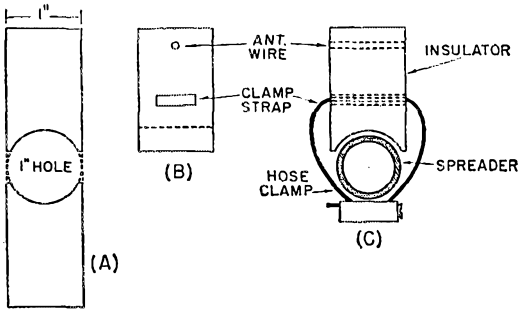


Fig. 2—Sketch showing details of the adjustable element insulators. Two insulators are made by drilling a 1-inch hole in a sheet of 1-inch Plexiglas, and then slicing out a strip 1 inch wide, as shown at A. B indicates the holes for the antenna wire and pipe-clamp strap. C shows how the insulator is attached to the spreader.

is covered with a sheet of lead having a clearance hole at the center for the flange.

Boom Support

The boom is supported by the yoke shown in one of the photographs. This yoke consists of a vertical stem of standard 1-inch steel pipe (o.d. 1.315 inches) topped with a horizontal 20-inch length of 2-inch angle iron. The boom rests in the V of this angle stock, where it is secured by hose clamps and U radiator clamps. The boom support is braced against the stem by two diagonal lengths of 2-inch angle iron. The members of the yoke are welded together.

The 1-inch pipe stem slides inside the 1¼-inch driving shaft, where it is fastened with two bolts at right angles, as shown. A hole for the coax line is drilled near the top end of the 1-inch pipe, and another is drilled in the boom just beyond the end of the supporting angle on the side which will support the driven elements. As the photo shows, I did all of the foregoing operations, (including attachment of the top section of the drive shaft) before mounting the top section of the tower in place.

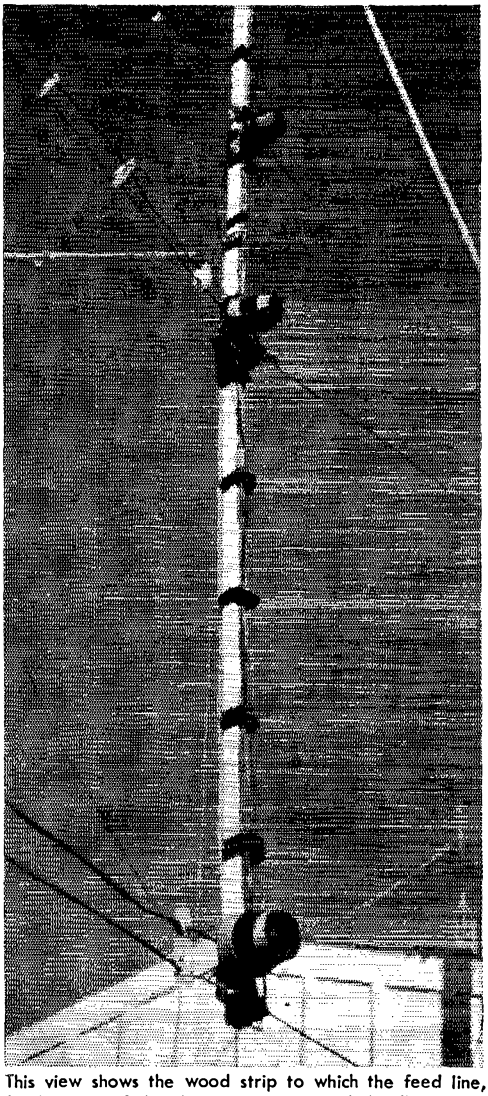
When the rotating mechanism was first tried out, it was found that some "whip" developed in the long length of driving pipe. This was corrected by the use of one or two intermediate "bearings" made by looping heavy wire around the pipe and fastening the ends of the loops to the legs of the tower to keep the pipe central in the tower.

The antenna can be rotated by any standard heavy-duty rotator. I use a ½-h.p. reversible motor with a gear box that reduces the shaft speed to 25 r.p.m. This drives a right-angle gear box having a reduction ratio of 25 to 1. This gearing-down eliminates the need for a braking system. My right-angle drive was a junkyard item, but gears from the bottom of an old washing machine will work.

Feeding the Driven Elements

The three driven elements are fed with a single line of RG-8/U, but through separate gamma matching sections. One end of the line is fed from the hole in the stem of the yoke down through the driving-shaft pipe. It emerges from another hole near the bottom end of the drive shaft where a generous loop is formed (to allow for 360-degree rotation of the pipe) before continuing on into the station. Limit switches should be used, of course, to limit rotation to 360 degrees.

The other end of the coax is fed into the hole in the boom. After emerging from the end of the boom, the line drops down to the feed point of the 15-meter driven element. In the past, the feed-line connections to the antenna elements have been the weakest point in the construction, and every effort was made in this model to avoid broken connections from vibration in the wind. A length of nylon rope, and a strip of ¼-inch wood were dropped from the end of the boom, in



This view shows the wood strip to which the feed line, feed points of the driven elements, and the flowerpots containing the gamma capacitors are bonded.

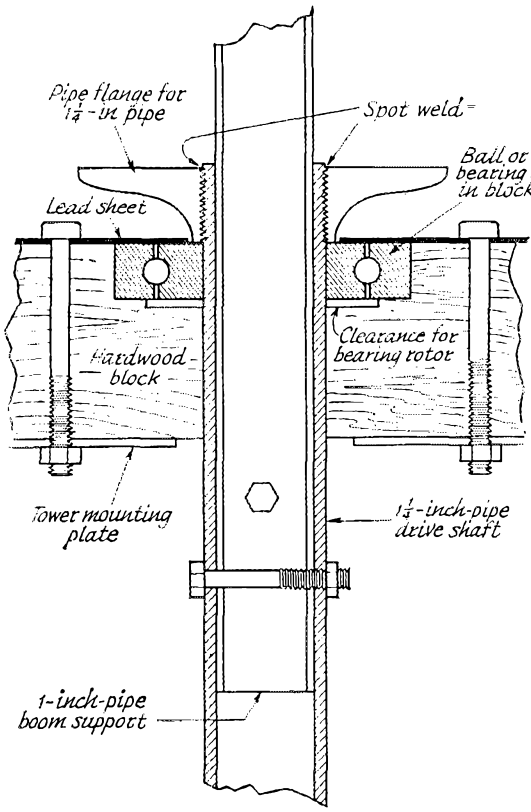


Fig. 3—Antenna drive-shaft and bearing assembly. The 1-inch inner pipe is the lower end of the stem of the boom support.

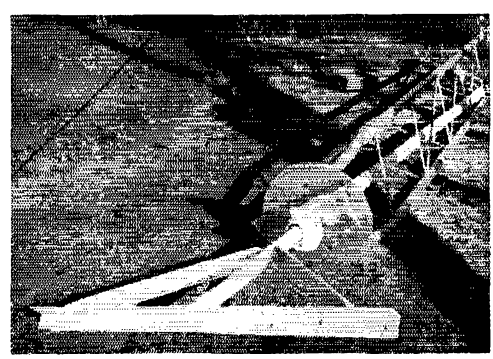
parallel with the coax line, to the 20-meter feed point, and all three were bonded securely together with waterproof plastic tape and a coating of liquid Fiberglas.

The center points of the lower strands of the three driven elements were connected together with a vertical piece of antenna wire. The outer conductor of the coax line was soldered to this wire at the point where it is connected to the 15-meter element. The gamma capacitors were mounted on disks of ¼-inch Plexiglas turned down to fit the open ends of small plastic flowerpots. Another vertical piece of antenna wire connects the rotors of these capacitors together, and the inner conductor of the coax line is soldered to this wire.

The gamma sections are lengths of antenna wire spaced from the driven-element wires by strips of Plexiglas. The inner ends of these sections are connected to the stators of the gamma capacitors. I bridged all connections with short pieces of flexible wire, in case the solid-wire connections should break. After completing all connections, the flowerpots were sealed with epoxy glue (roofing compound might also be suitable), and taped securely to the wood strip and rope.

The tuning-stub wires of the parasitic elements are spaced by plastic rods. After adjustment, they were folded back into loops, and the bottom ends were tied to the element insulators with short lengths of nylon rope treated with Plexiglas compound.

I might mention that, since I am located in the central part of the country, and am interested chiefly in coast-to-coast rag-chewing, I tuned the parasitic elements for minimum front-to-back ratio. Thus I am able to work both coasts simultaneously in a three-way without turning the antenna. QST



Top section of the tower before mounting, with the bearing, antenna yoke and top section of the drive shaft in place.

Strays

WB2GXL sent in this item he found in the catalog of an electronics concern: "Heath-Daystrom 117V AC Model 5 Watt Kit CB Transceiver. Uses 100 cps. mechanical crossover coaxial horn."

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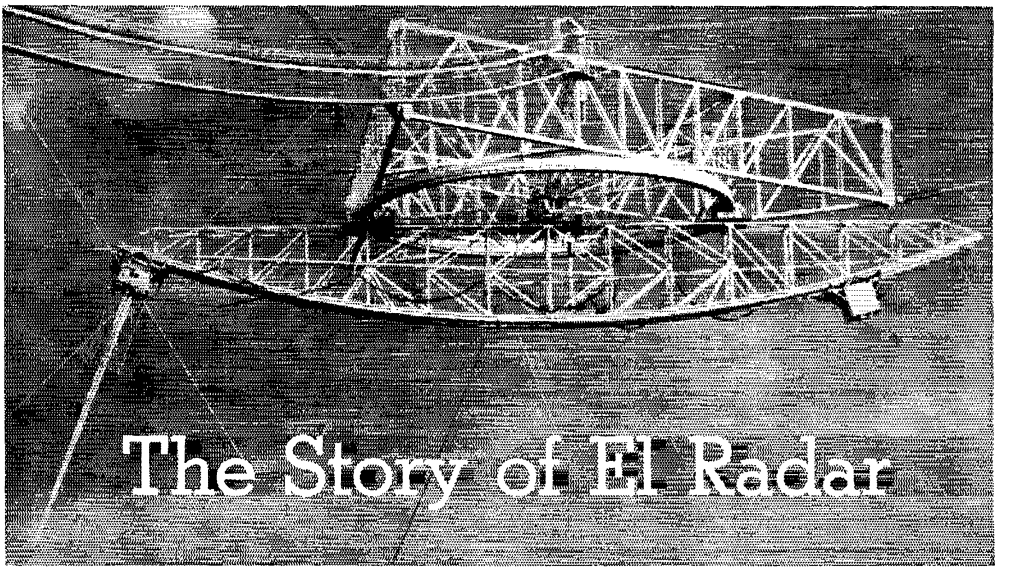
The Scarborough ARC (Canada) will be operating from the Canadian National Exhibition this year from August 20 to September 6 on 80 c.w., 75 phone, 40 c.w. and 2 meters. The call used will be VE3WE/3 and special QSL cards will be sent to those contacting the station.

The Amateur Radio Club of Florida has published a *Florida Ham Directory*. It contains 743 pages and includes listings arranged alphabetically by call with the city and county also given, and alphabetically by name. There is also an awards section, listing of Flora nets, phonetics, s.w.r. chart and a GMT conversion chart. Price of the directory is $3.00. It may be obtained from the Amateur Radio Club of Florida, Box 7326 Euclid Station, St. Petersburg, Fla., 33704.



The Story of El Radar

The Moon and Back on 432 Mc.

BY DOUG DE MAW,* W1CER

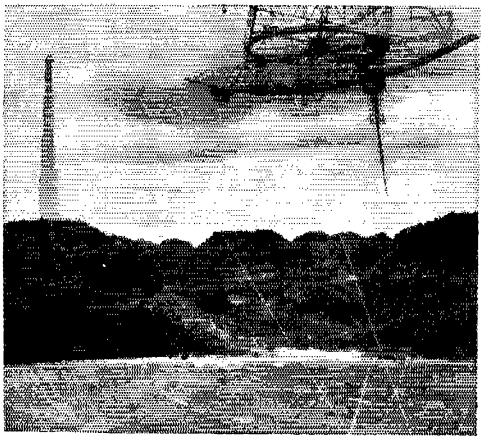
THE natives in Puerto Rico call it "El Rahdahr", but the proper name for the planetary radar installation hidden in the tropical foliage and mountains of Arecibo is: Cornell's Arecibo Ionospheric Observatory. Staffed by a group of dedicated scientists and engineers, El Radar is beyond a doubt the electronic stepping-off place to outer space. Although this author has visited a number of scientific installations throughout the Americas, the site at Arecibo ranks as the most awe-inspiring of them all. In the writer's opinion, Cornell's Arecibo observatory is the electronic parallel to California's Mount Palomar Observatory. Needless to say, the latter is a masterful example of optical and mechanical engineering. The Arecibo site is a tribute to radio astronomy and to the men who conceived the mechanics behind this way-station to scientific progress.

About the Site

The giant 1000-foot diameter reflector, the antenna superstructure, and the laboratory, are nestled between a group of mountains that appear to be about 2000 feet high. A distance of 12 miles separates Arecibo from the observatory site and it is necessary to travel over a narrow, winding, mountain road which is fringed by native dwellings and dense tropical vegetation to reach the installation.

The reflector is situated somewhat below the level of the laboratory and toward the front of building. As one looks down into the reflector, trees, small roads and buildings can be seen through the mesh of the big dish. The effect of looking through a curtain is possible because the reflector is approximately 18 feet off the ground at its lowest point, and is fabricated from cable and other metal hardware which has one-half inch wide gaps in the surface.

The antenna system and its superstructure are suspended some 500 feet above the dish and are held in place by a series of cables which are



The antenna superstructure (upper right), a supporting pylon (upper left) and the 1000-foot diameter reflector (lower). The needle-like structure, pointing down from the convex track, is the 432-Mc. antenna. A 40-Mc. antenna encircles the base of the needle.

* Assistant Technical Editor.

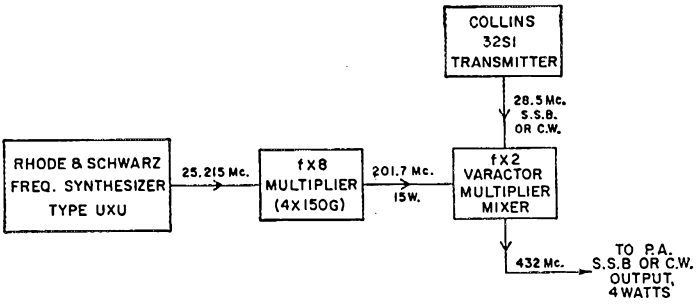


Fig. 1—Block diagram of the exciter system used during the moonbounce tests.

attached to three pylons — located outward from the perimeter of the big reflector. The superstructure, which controls the orientation of the antenna, is accessible by cable car. A catwalk is also available, if one is energetic enough to walk out to the superstructure.

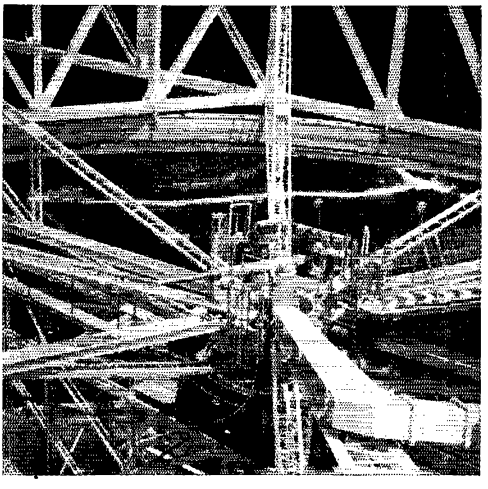
One interesting program which is being carried out at the observatory is the mapping of the surface of the moon and other planets. This is accomplished by securing information from the echos which are bounced back off these celestial bodies. Other advanced forms of radio astronomy are being practiced at Arecibo at the present time.

A Technical Look at El Radar

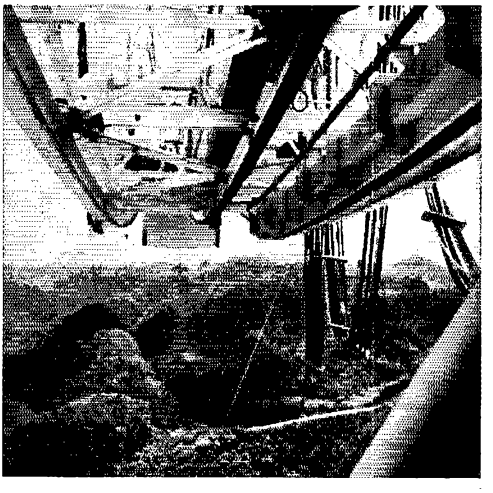
The transmitted and received signals that pass through the antenna system at the observatory are carried to and from the laboratory by transmission lines which are approximately 1800 feet in length. The received signal (at 432 Mc.) is passed through a parametric amplifier, then through a transistorized preamplifier, and into a converter which modifies the signal to 28 Mc. These pieces of equipment are located at the feed point of the antenna — aiding in the reduction of losses at the u.h.f. level. At the 28-Mc. i.f., an 18-decibel loss results from carrying the signal to the lab through the 1800-foot length of coaxial cable: The loss at this frequency is inconsequental however. The noise figure at 432 Mc. is less than 1 decibel, owing to careful design and adjustment of the parametric amplifier.

The transmitted signal is carried to the antenna through 1800 feet of waveguide that exhibits a loss of less than 0.5 decibel. The final amplifier, consisting of a pair of klystrons, and able to operate at 150 kilowatts input for ionospheric observation work, stands well over one story high. The tuning of the amplifier, and its outboard buffer amplifier, is accomplished from a remote point which is situated in the main laboratory. The control console used for this purpose can be seen in the accompanying photographs.

The antenna can be moved along the convex track on which it is mounted, the track being rotatable through full 360 degrees. This flexibility permits the antenna to be aimed at any portion of the dish that is required for a particular experiment. The movement of the antenna during a radioastronomy test is programmed in advance of the test and is controlled by motors. Mathematical calculations are first made, information from them is put on a tape, the tape controls a



A close-up view of the axis of the antenna superstructure. The 432-Mc. waveguide is visible in the lower right foreground.



A view of the bottom of the convex track upon which the antenna moves. The mountains in the background are about 2000 feet high.

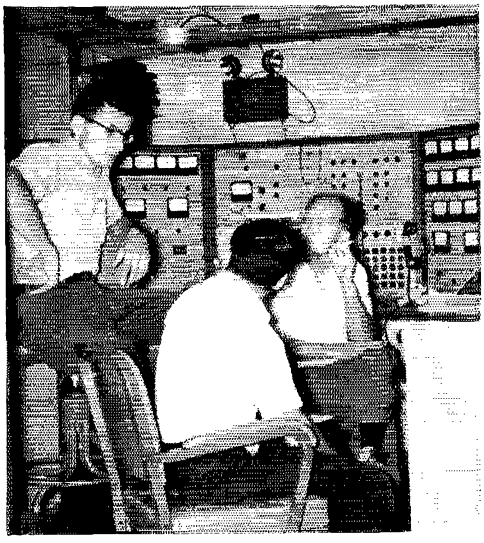
W1FZJ and W1CER appraising the exciter lash-up the night before the scheduled test.

computer in the laboratory and the computer controls the motors.

The beam-width of the transmitted signal at 432 Mc. is 10 minutes of arc, or one-sixth degree. The sharpness of this pattern permits the signal to illuminate only one third of the exposed surface of the moon, minimizing the signal loss that would result from the diffusion of energy common to greater beam-width patterns.

The July 3rd Tests

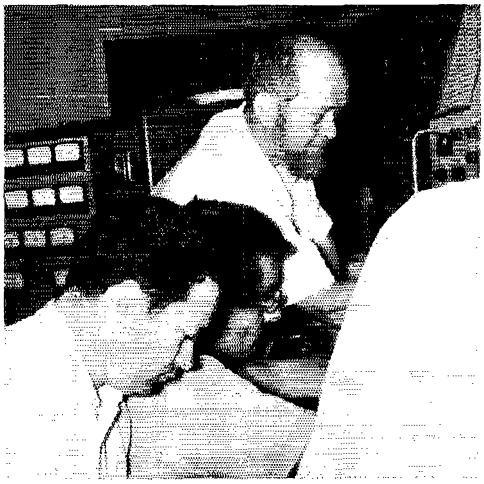
The 432-Mc. moonbounce exercise, carried out on July 3rd from the Arecibo site, was rated



A last minute conference before zero hour. Left to right: Walt Zandi, K2KWL; Andres Sanchez, KP4BEU; and Sam Harris, W1FZJ. The transmitter control console is in the background.

100 per cent successful by the participating staff. The moonbounce station, KP4BPZ, was operated by Dr. Rolf Dyce, KP4CMO (Planetary Radar Specialist); Sam Harris, W1FZJ (Staff Receiver Engineer); Andres Sanchez, KP4BEU (Planetary Radio Program scientist); Walt Zandi, K2KWL (Planetary Radar Program staff); Ray Jurgens, W8MSL (temporary staff member), and Doug DeMaw, W1CER/W8IIHS (ARRL Technical Staff). Dr. Gordon Pettengill was in Massachusettes at the time and took part in the tests while operating as W1OUN/1.

The historical significance connected with this experiment is related not only to the fact that it was carried out on 432 Mc., but also because s.s.b. signals were successfully exchanged across the earth-moon-earth path. Nearly twice as many stations were worked on this 432-Mc. test than were contacted on the previous trial on 144 Mc. A vast number of stations were heard, but

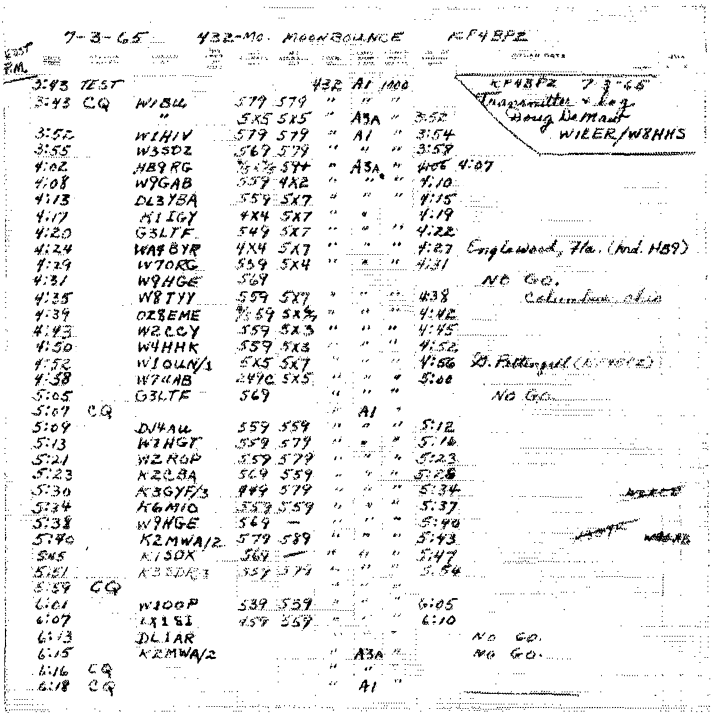


KP4BEU, K2KWL and W1FZJ during the height of the excitement. Sam is energetically tuning in a signal on the Collins R-390A receiver.

not worked, simply because time was a limiting factor. Then, too, QRM became a problem at, and near, 432.0 Mc. because of the pile-up caused by calling-stations. A few minor technical difficulties contributed to the general slowness of the exchange of transmissions. Most of these problems will be resolved before the next tests.

The c.w. and s.s.b. signals were well above the noise level of the receiver at both ends of the path during a number of contacts. HB9RG copied KP4BPZ at Q5 and 20 decibels above S9 (s.s.b. mode). The c.w. signals received at Arecibo varied from RST 249C to RST 579. The s.s.b. signals ranged from Q4 and S4 to Q5 and S5.

The man at the key and microphone was Sam Harris, W1FZJ, (editor of *QST*'s "World Above 50 Mc." column). He uttered a few uncomplimentary words at the keying monitor which was practically unuseable because the stray r.f. energy from the transmitter was disrupting its



7-3-65 432-Mc. MOONBOUNCE KP4BPZ

EST P.M.							
3:43	TEST			432	A1	1000	KP4BPZ 7-3-65 Transmitter + log Doug DeMaw W1CER/W8HHS
3:43	CQ	W1BU	579 579	"	"	"	
		"	5X5 5X5	"	A3A	" 3:52	
3:52		W1HIV	579 579	"	A1	" 3:54	
3:55		W3SDZ	567 579	"	"	" 3:58	
4:02		HB9RG	559 5X7	"	A3A	" 4:06 4:07	
4:08		W9GAB	559 4X2	"	"	" 4:10	
4:13		DL3YBA	559 5X7	"	"	" 4:15	
4:17		K1IGY	4X4 5X7	"	"	" 4:19	
4:20		G3LTF	549 5X7	"	"	" 4:22	
4:24		WA8BYR	4X4 5X7	"	"	" 4:27	Englewood, Fla. (Ind. HB9)
4:29		W1TORG	559 5X4	"	"	" 4:31	
4:31		W9HGE	569				NO GO.
4:35		W8TYY	559 5X7	"	"	" 4:38	Columbus, Ohio
4:39		OZ8EME	559 5X7	"	"	" 4:42	
4:43		W2CCY	559 5X3	"	"	" 4:45	
4:50		W4HHK	559 5X3	"	"	" 4:52	
4:52		W1OWN/1	5X5 5X7	"	"	" 4:56	D. Fitzgerald (K1PQE)
4:58		W7HAB	449C 5X5	"	"	" 5:00	
5:05		G3LTF	569	"	"	"	NO GO.
5:07	CQ			"	A1	"	
5:09		DJ4AU	559 559	"	"	" 5:12	
5:13		W2HGT	559 579	"	"	" 5:16	
5:21		W2ROP	559 579	"	"	" 5:23	
5:23		K2CBA	569 559	"	"	" 5:26	
5:30		K3GYF/3	449 579	"	"	" 5:34	
5:34		K6MIO	559 559	"	"	" 5:37	
5:38		W9HGE	569 —	"	"	" 5:40	
5:40		K2MWA/2	579 589	"	"	" 5:43	
5:45		K1SOX	569 —	"	"	" 5:47	
5:51		K3SDR3	559 579	"	"	" 5:54	
5:59	CQ			"	"	"	
6:01		W100P	539 559	"	"	" 6:05	
6:07		K1IGI	459 559	"	"	" 6:10	
6:13		DL1AR		"	"	"	NO GO.
6:15		K2MWA/2		"	A3A	"	NO GO.
6:16	CQ			"	"	"	
6:18	CQ			"	A1	"	

A copy of the July 3 moonbounce log.

function, but it did a marvelous job despite the problem. Three receivers were used (two Collins R-390As, and a Collins 75S-3) and were operated by KP4BEU, K2KWL and W8MSL. The transmitter operation and logging was handled by KP4CMO and W1CER. Helen Harris, W1HOY, assisted in the operation by supplying the staff with cold soft drinks as they were needed.

A satisfied moonbounce crew following the conclusion of the 432-Mc. test. Left to right: Ray Jurgens, W8MSL; Dr. Rolf Dyce, KP4CMO; Sam Harris, W1FZJ; Andres Sanchez, KP4BEU; and Doug De Maw, W1CER/W8HHS.

The KP4BPZ signal was transmitted with right-hand circular polarization (in space) and the receiving mode was accomplished in the left-hand circular fashion. Because of the complexity of the system at Arecibo, it is not convenient to switch the transmitter or receiver polarization sense. The present polarization scheme at KP4BPZ makes use of a waveguide hybrid to maximize the echo strength from the moon, and also gives about 30 decibels of t.r. action, without switching.

Some Final Remarks

Since the conclusion of the tests letters have been coming in to ARRL Headquarters from such amateur operators as DL9AR, SM7AED, FSTD and others. These letters report that readable signals from KP4BPZ were heard in many European locations which were not actually worked. Most of these fellows were using non-polarized antennas — further proof that complicated equipment is not always necessary to participate in advanced-technique experiments. One station that was worked during the test was reported to be using nothing more than a 16-element collinear array.

It is hoped that the story of "El Radar" will serve to inspire many would-be moonbounce operators to putting together their own equipment and participating in future tests.

The ARRL expresses its sincere thanks for the invitation to have a staff member take active part in the program of July 3rd. Without this courtesy the story told on these pages would would not have been possible. QST

Frequency Measurement with

Ways To Improve Accuracy

THE LM frequency meter, and its Signal-Corps counterpart, the BC-221, are very ruggedly constructed and, when properly used, are quite accurate instruments. However, they do have certain limitations, and an understanding of these limitations is necessary if errors are to be minimized.

General Construction

These meters have three tubes, sometimes varying in type from model to model, but not in function. One of these tubes is in a calibrated v.f.o. circuit covering the dual fundamental frequency ranges of 125 to 250 kc. (195 to 400 kc. in models prior to LM-10), and 2000 to 4000 kc., as determined by the position of a band switch. By using harmonics of the fundamental ranges, continuous coverage from 125 to 20,000 kc. or higher is available. (The calibration book supplied with the frequency meter stops at 20 Mc., but higher harmonics produce signals of usable strength up to as high as 144 Mc.) There are individual screwdriver-adjusted trimmer capacitors for each of the two fundamental ranges, and a third trimmer common to both ranges. The latter has a panel control marked CORRECTOR.

The second tube performs the functions of detector and a 1000-kc. crystal oscillator, the latter used primarily as a reference for the v.f.o. calibration. Most models have a trimmer across the crystal for accurate setting against WWV.

Both oscillators are coupled to a common output terminal (in some models through an attenuator), and both are also coupled to the detector. The output terminal is also the input terminal for external signals whose frequencies are to be measured. In most models, the v.f.o. and crystal oscillators may be switched on or off independently.

Audio output from the detector (as a result of an audio beat between two signals fed to the detector) is amplified in the third tube which feeds a headphone (low-impedance) output jack. In some models, this audio stage may be switched to function as an audio oscillator for modulation purposes.

*Box 3034, Charleston, South Carolina.

Dial Mechanism

The v.f.o. dial mechanism includes a drum numbered from 0 to 50, and a worm-driven dial numbered from 0 to 100 through 360 degrees. One complete revolution of the dial causes the drum to advance one division. This combination results in an equivalent of $50 \times 100 = 5000$ dial divisions for each of the two v.f.o. tuning ranges (plus a small overlap at each end). However, the dial has a vernier readout that gives direct readings in tenths of a dial division, making the total virtually 50,000 dial divisions. Each of these 0.1 divisions is equivalent to about 3 cycles over the low-frequency fundamental range, and about 50 cycles over the high-frequency range.

General Operation

These instruments may be used to transmit a signal on some selected frequency, or to measure the frequency of an external signal. The process involved in setting up the frequency meter to emit a signal at some desired frequency is a simple one. First, tune in one of the WWV standard-frequency signals on a communications receiver. The higher this frequency is, the greater the accuracy will be. Couple the frequency meter to the receiver and turn on the crystal oscillator. The crystal signal should be found at zero beat with WWV, or very close to it. If necessary, adjust the crystal trimmer for exact zero beat.

By referring to the calibration book, determine the v.f.o. dial setting for the desired frequency and, on the same page, find the nearest crystal check point. Set the dial accurately to the reading specified for this check point. With headphones, plugged into the frequency-meter jack, turn on the v.f.o., and the v.f.o. signal should be found at or close to, zero beat with the 1000-kc. crystal fundamental signal, or one of its harmonics. If necessary adjust the v.f.o. CORRECTOR control for an exact zero beat. Turn off the crystal oscillator, set the v.f.o. dial to the desired frequency, and the emitted signal will be on that frequency (subject to possible errors discussed later).

Measurement of the frequency of an external signal is simply a matter of matching the v.f.o.

the LM/BC-221

BY KENNETH N. SAPP,* W4AWY

frequency to that of the external signal, and reading the v.f.o. dial to determine the frequency. If the external signal is sufficiently strong, such as from a local oscillator, or the station transmitter, measurement may be made by feeding the external signal into the input terminal, and listening on the frequency meter itself.

Determine the approximate frequency of the external signal from the receiver calibration or other source. Set up the frequency meter for this approximate frequency, following the same procedure as before. Then adjust the v.f.o. very carefully until the v.f.o. and the external signal are at zero beat. Read the v.f.o. dial, and determine the frequency from the calibration book.

If the external signal is too weak to be heard reliably on the frequency meter, both the signal and the frequency meter should be coupled into a receiver. With the signal tuned in on the receiver, (receiver b.f.o. off) measurement is made in the same manner by adjusting the v.f.o. signal to zero beat. Coupling between the receiver and the frequency meter should be the smallest that will produce satisfactory beat-note strength. Receiver gain and/or the frequency meter attenuator should be adjusted to avoid any possibility of receiver overload. The strongest beat note will be obtained when the external signal and the frequency-meter signal are of the same strength.

Check Points

A "crystal check point" occurs whenever the v.f.o. fundamental, or a harmonic, coincides with the fundamental, or a harmonic, of the crystal oscillator. As examples, the 4th harmonic of 250 kc. (v.f.o.) coincides with the fundamental of the crystal oscillator (1000 kc.); the fundamental at 2000 kc. (v.f.o.) coincides with the 2nd harmonic of 1000 kc. (crystal); the 4th harmonic of 2750 kc. (v.f.o.) coincides with the 11th harmonic of 1000 kc. (crystal). If the v.f.o. dial is set to the reading corresponding to one of these v.f.o. frequencies, and the reading is accurate, then the crystal and v.f.o. signals should be at zero beat when listening on the frequency meter. If they are not, the v.f.o. corrector knob should be adjusted until they are at zero beat. Then, we know that the calibration is accurate *at this point* on the v.f.o. dial. However, the tuning rate on the v.f.o. may not be exactly linear between one check point and the next, so measurements made in between check points may not be as accurate as those made close to the check points. The calibration book lists only a few of the many possible check points. Additional check points may be determined following the procedure described by W4HH in an earlier issue.[1]

Scale Readability

When using harmonics of the v.f.o., the scale-reading accuracy diminishes in inverse proportion to the order of the harmonic. The figure of 3 cycles per 0.1 dial division over the 125–250-kc. range becomes 6 cycles over the 250–500-kc. range of the second harmonic, 9 cycles over the 375–750-kc. range of the third harmonic, and so on. A similar decrease in accuracy prevails when using harmonics of the 2000–4000-kc. range, so that in the 12,000–24,000-kc. range of the sixth harmonic, for example, each 0.1 dial division represents $6 \times 50 = 300$ cycles.

Frequency Conversion

However, there is a method of measuring frequencies higher than the v.f.o. fundamental ranges that can often be used without resorting to harmonics, or at least harmonics higher than the fourth harmonic of the low-frequency v.f.o. range, thus reducing the dial-reading error at the higher frequencies. The method was described by W1JJY several years ago,[2] and touched upon more recently by W6PM[3].

The principle of the method is as follows: when the crystal oscillator and the v.f.o. are fed into the frequency-meter detector simultaneously, the detector will act as a mixer, and frequencies equal to both the sum of, and the difference between, the two input frequencies will be generated in the mixer, as with any heterodyne system. (The principle is the same as that used in a superhet receiver, where the incoming signal and the signal from a local oscillator combine to produce the i.f. frequency in the output of the mixer.) As an example, the fundamental signals

[1] Countryman, "Calibrating the LM Frequency Meter," *QST*, April, 1965

[2] Riley, "Interpolation Frequency Measurements with the BC-221," *QST*, January, 1956.

[3] Robinson, "Extending the Range of the BC-221 Frequency Meter," *QST*, December, 1964.

If you own, or contemplate the acquisition of, an LM or BC-221 surplus frequency meter, this article should be of more than ordinary interest. It covers the various possible sources of error and suggestions for minimizing inaccuracies. Included is a discussion of circuitry and operation of these versatile instruments.

in the low-frequency range of the v.f.o. (125 to 250 kc.) will beat (heterodyne) with the 6th harmonic of the crystal (6000 kc.) to produce signals in the output of the mixer over the *sum* range of 6125 to 6250 kc., and over the *difference* range of 5875 to 5750 kc. If the unknown frequency lies within either of these segments, it can be measured by feeding the unknown frequency and the heterodyne signal from the frequency meter into a receiver, and adjusting the v.f.o. tuning to zero-beat the heterodyne signal with the unknown. (Or, the signal of unknown frequency may be fed into the frequency meter.) The frequency indicated by the frequency meter dial will then be the difference between the unknown frequency and the crystal-harmonic frequency used as a reference. The unknown frequency may then be found by adding the v.f.o. frequency to, or subtracting it from, the crystal-harmonic frequency. If the unknown lies in the range above the crystal-harmonic frequency, the v.f.o. frequency will be added to the crystal frequency; if the unknown lies in the range below the crystal frequency, the v.f.o. frequency will be subtracted. When the unknown frequency lies within the ranges of 125 to 250 kc. above or below any crystal-harmonic frequency, the frequency can be measured in this manner, and the dial-reading accuracy in cycles will be the same as that of the v.f.o. in its fundamental low-frequency range (approximately 3 cycles per 0.1 dial division).

As an example, the receiver indicates that the unknown frequency is approximately 5850 kc. The nearest crystal harmonic is at 6000 kc., and the unknown is obviously on the low-frequency side of this crystal frequency. Also, since it is approximately 150 kc. removed from the crystal harmonic, it should come within the band covered by the 125-to-250 kc. range of the v.f.o.

Both the signal of the unknown frequency, and the frequency meter are fed into the receiver. Both crystal oscillator and v.f.o. are turned on. The v.f.o. is adjusted to approximately 150 kc. (the approximate difference between the unknown and the crystal-harmonic reference), and then tuned carefully to zero beat with the unknown. The dial reading is taken, and the corresponding frequency taken from the calibration book.

Suppose that the frequency read is 150.187 kc. Since we know that the unknown is on the low-frequency side of 6000 kc., we subtract 150.187 from 6000, and the remainder, 5849.813 kc., is the frequency of the unknown.

It will be noticed from the foregoing that the process described does not give continuous frequency coverage. Using the second harmonic of the v.f.o. low-frequency range will increase the coverage to 250–500-kc. either side of the crystal fundamental, or one of its harmonics, with twice the dial-reading error; using the third v.f.o. harmonic, these ranges become 375 to 750 kc. either side, with three times the dial-reading error at the fundamental. Using the fourth v.f.o. harmonic, the ranges are 500 to 1000 kc. either side, with four times the fundamental dial-reading error. It will be seen that the fourth harmonic gives continuous coverage between adjacent 1000-kc. crystal harmonics, so it should never be necessary to go beyond the fourth v.f.o. harmonic for any measurement.

The fact that the output of both oscillators in the frequency meter are rich in harmonics gives rise to the production of many frequencies other than those of immediate interest in making a given measurement, and distinguishing the wanted beats from the unwanted may require close attention under certain circumstances. Crystal check points resulting from the lower-order harmonics will radiate quite a strong signal on the conversion frequency, and may make it difficult to find the zero point on the signal being measured if it happens to be within a few cycles of the conversion frequency. An example of this is 150 kc. If the meter is coupled fairly closely to the receiver, you can listen on the receiver at 5850 kc. (or any other frequency 150 kc. above or below one of the lower-order crystal harmonics) while you adjust the corrector for zero beat at the 150-kc. crystal check point, and hear the signal as it is zeroed in. If the signal to be measured is only a few cycles removed from the crystal-check conversion frequency, it may be difficult to tell which signal you are measuring. However, with a little practice, you will learn how to separate them. Note that this occurs only at the conversion frequency of a strong crystal check point.

If desired, a separate set of calibration charts can be made up for the heterodyne mode of operation, plotting dial readings against the frequencies that result when the v.f.o. funda-

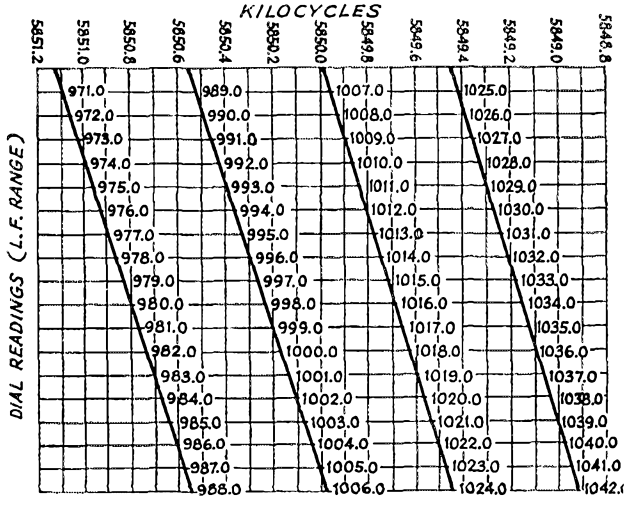


Fig. 1—Sample section of heterodyne calibration covering the range of 5848.8 to 5851.2 kc. Original size is about 9¼ by 7 inches.

mental (or a harmonic) beats against a selected crystal harmonic. The example shown in Fig. 1 is a portion of such a chart, showing the difference frequencies resulting from the combination of the v.f.o. fundamental and the 6th harmonic of the crystal oscillator. To provide good readability, this chart covers only 5851.2 to 5848.8 kc. The actual size of the chart is 9¼ by 7 inches, divided into 1/16-inch squares (standard graph paper). Each square represents 1/5 dial division, or approximately 20 cycles. The chart can easily be read to 1/10 dial division, or 10 cycles, or better.

Circuit Modification

In some models of the LM (but not the BC-221), one section of the crystal-oscillator switch disconnects and grounds the output terminal when the switch is in the "crystal-on" position. If such is the case, this section of the switch must be disconnected and the circuit rewired so as to leave the output terminal connected and ungrounded.

If your model does not have an output attenuator, one can be added, as shown in Fig. 2. This circuit also shows a three-position switch that I have added. In the first position of the switch, the output connection is normal, direct from the attenuator. In the second position, a small series capacitor is inserted to further attenuate the output signal if found desirable. If the third position, a short antenna is added for external-signal pickup.

Sources of Error

No matter which system of measurement is used, there are certain factors which must be given attention if errors are to be minimized. Most of these sources of error will influence the measurement to a smaller degree if the heterodyne system is used.

Thermal Drift: While more pronounced in the v.f.o. section of the meter, there is also thermal drift in the crystal-oscillator section as the meter warms up. The best way to minimize this drift is to leave the meter turned on continuously, if it is to be used frequently, and make frequency readings as quickly as possible after the crystal-check-point correction has been made.

Voltage Changes: Changes in either plate or heater voltage will also affect the frequency. If an a.c. supply is used, it should be as stable as possible with line-voltage variations, and the plate voltage should be regulated. Some meters

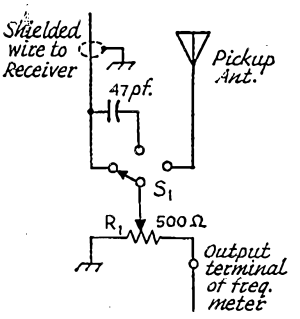


Fig. 2—Added output attenuator and switching system described in the text. S_1 is a 3-position rotary switch. R_1 is a linear control.

have a plate-voltage regulator built in. Be sure that the VR tubes are working. If the line-voltage regulation at your location is poor, increasing the load on the line by turning on the transmitter, for instance, may cause a reduction in heater voltage, resulting in an error in measurement. A small line-voltage regulator (Sola, or similar) may be desirable in such instances.

Dial Backlash: The dial turns a worm gear which engages a spring-loaded gear to turn the v.f.o. variable capacitor. The capacitor shaft should turn freely, with no trace of binding. The worm and gear should be lubricated with a good grade of light oil which will not gum. Be sure that there is lubrication between the two halves of the spring-loaded gear so the two will not stick together. Access may be had by removing the cover from the capacitor compartment.

Nonlinearity: When a meter is new and first calibrated, every crystal check point will fall exactly on the dial reading shown in the calibration book without changing the v.f.o. corrector. But with age, the inductance of the coils, and/or the spacing of the capacitor plates may change, resulting in scale errors. If it is necessary to adjust the corrector knob when moving from one check point to another, there is an error in the calibration between these two points by the amount of correction needed, and a proportionate error at all points in between. For this reason, it is desirable to have a check point as close as possible to the frequency to be measured. QST

Strays

Practically every amateur uses the standard-frequency services from WWV, but only those who go in for frequency measurement in a serious way are likely to realize just how varied those services are. The National Bureau of Standards has just recently issued a new edition of its pamphlet "Standard Frequency and Time Services," describing in detail the transmissions available from WWV, WWVH, WWVB and WWVL, and including a discussion of the accuracy of the various frequencies. The price is 15 cents per copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. Ask for Miscellaneous Publication 236.

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The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

Happenings of the Month

ELECTION NOTICE

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

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1966–1967 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

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

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

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... .....of.....as a candidate for vice-director; from this division for the 1966–1967 term.

(Name Call City Date)

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

All such petitions must be filed at the headquarters office of the League in Newington, Conn. 06111 by noon EDST of the 20th day of September, 1965. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

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

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

Present directors and vice-directors for these divisions are: *Atlantic:* Gilbert L. Crossley, W3YA and Edwin S. Van Deusen, W3ECP. *Canadian:* Noel B. Eaton, VE3CJ and Colin C. Dumbrille, VE2BK. *Dakota:* Charles G. Compton, WØBUO and Charles M. Bove, WØMXC. *Delta:* Philip P. Spencer, W5LDH/W5LXX and Franklin Cassen, W4WBK. *Great Lakes:* Dana E. Cartwright, W8UPB and Charles C. Miller, W8JSU. *Midwest:* Robert W. Denniston, WØNWX and Sumner H. Foster, WØGQ. *Pacific:* Harry M. Engwicht, W6HC and Ronald G. Martin, W6ZF. *Southeastern:* Thomas M. Moss, W4HYW and Charles J. Bolvin, W4LVV.

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

For the Board of Directors:

July 1, 1965 JOHN HUNTOON
Secretary

DOCKET 15928 . . .

ARRL Files Comments. Pursuant to instructions of the Board of Directors formulated at its May meeting, General Counsel Booth filed the comments of ARRL with FCC in Docket 15928, incentive licensing, on July 15. The meeting was extensively discussed in this department last month, and the full text of the Board Meeting minutes were presented at that time. The text of the League's formal comments on the docket appear at the end of this department.

Filing Time Extended. Responsive to requests from several interested parties, FCC has extended the time for filing original comments in Docket 15928 from July 15 to September 1, 1965, and the time for filing reply comments from July 30 to October 1, 1965. The League opposed the extension of time for the filing of original comments, on the grounds that the text of the docket appeared in the May issues of *QST* and *CQ*, many hundreds of amateurs had found the time to comment in the 105 days allowed, and an early settlement of the docket was needed to end uncertainty and allow all concerned to plan on future activities. The League supported a 30-day extension of time for the filing of reply comments, however, feeling that the time could well be justified because of the large numbers of comments to be read by interested parties who might wish to make rebuttal of some points. On the other hand, the requests for extension were mainly for 90-day or longer periods.

FCC DENIES HOBBY LICENSE

In a Memorandum Opinion and Order dated July 7, 1965, the Federal Communications Commission denied the request of International Crystal Mfg. Co., Inc., RM-406, for an additional class of amateur license to be known as the "Hobby License." The proposed license was to have been for channelized operation in the 29-Mc. band with no examination required and 10 watts permitted.

Three paragraphs of the FCC order are of special interest:

"We agree with the petitioner that a large number of licensees in the Citizens Radio Service has indicated an interest in the use of two-way radio as a hobby. It is appropriate, and it has been consistently urged by the Commission, that these licensees secure authorizations for operation in the Amateur Radio Service since

Last month we ran a picture of W3GD presenting a plaque to W1BB. Now it's Ivan's turn: the plaque is tendered by W3RE (left), president of the Foundation for Amateur Radio, in recognition of W3GD's extensive contributions to amateur radio, particularly during his lengthy tenure with FCC.

that service among other things, permits the use of radio as a hobby. To this extent, therefore, we are in accord with the petitioner. However, petitioner's concept of an examination-free license in the Amateur Radio Service for operation in the 29 Mc/s frequency band is quite a different matter.

"Basically, this proposal contravenes Article 41 of the International Radio Regulations (Geneva, 1959). This Article provides that amateur applicants must demonstrate both their ability to send and receive Morse Code and their technical qualifications. In accordance with these regulations, the Commission has established procedures for the administration of code tests and written examinations to amateur applicants. It should be noted that even if examination were not required by International regulations, the Commission would, as a matter of policy, impose such a requirement as being consistent with, and necessary to, the purposes for which the Amateur Radio Service was established. (See Section 97.1 of the Commission's rules governing the Amateur Radio Service.) In fact, we are unable to reconcile petitioner's proposal for an examination-free license with the contention that the "Hobby License" will increase the number of competent career electronic technicians. Such technicians should logically be expected to develop from those individuals who are willing to demonstrate and advance their proficiency and technical knowledge rather than from those who would obtain licenses primarily to engage in two-way conversation.

"The Commission takes this opportunity to again encourage those Citizens Radio Service licensees who desire to operate radio as an activity in and of itself to obtain a license in the Amateur Radio Service. Beginners should consider obtaining the Novice Class Amateur license which is available by a very minimal examination requirement and which will afford an opportunity to acquire the experience necessary for advancement to higher class licenses."

CANADIAN TARIFF MATTER

The Canadian Division of ARRL has filed a brief with the Tariff Board under Tariff Reference No. 134, seeking to exempt amateur band radio equipment from customs duty and Federal sales tax on such articles being imported into Canada. Background information in the brief makes reference to many specific emergencies in which Canadian amateurs took part, to continuing preparation for emergency work, to communications on behalf of the isolated communities of the North, to scientific achievements as embodied by Project Oscar and to the pool of persons skilled in electronics created by amateur radio.

Other points are that there is no local industry requiring protection in the field of amateur radio; no significant loss of tax revenue would be involved; amateur radio is well justified in the public interest and the exemption would stimulate the growth of amateur radio.

AMATEUR EXAMS AT GETTYSBURG

The Federal Communications Commission has established its offices at 334 York Street, Gettysburg, Pennsylvania, 17325 as an additional point where amateur examinations will be given frequently, by appointment. Amateurs in western Maryland and central Pennsylvania, in particular, may find Gettysburg more convenient than other exam points.

REPEATERS IN CANADA

The Telecommunications and Electronics Branch of the Department of Transport will now permit its Regional Superintendents of Radio to authorize the operation of automatic repeater and radio remote-controlled amateur radio stations on a case-by-case basis if certain conditions are met. Amateurs interested in this work may secure further details from the Regional Office having jurisdiction over them.

Minutes of Executive Committee Meeting
No. 305
July 2, 1965

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc, met at the Saint Claire Hotel, San Jose, California, at 10:10 A.M. July 2, 1965. Present: President Herbert Hoover, Jr., in the Chair; First Vice President W. M. Groves; General Manager John Huntoon; and Directors P. Lanier Anderson, Jr., Charles G. Compton, Robert W. Denniston and Noel B. Eaton. Also present were Vice President F. E. Handy, General Counsel Robert M. Booth, Jr. and Directors Harry M. Engwicht, Howard F. Shepherd and Robert B. Thurston.

After a discussion of amateur space communications activities, on motion of Mr. Denniston, unanimously VOTED that, furthering the Board's action in citing Project Oscar for its many accomplishments, the League extends its hearty commendation to Donald E. Norgaard, W6VMH, Edgar A. Hilton, W6VKP, and Lance D. Ginner, K6GSJ, in recognition of their special contributions to the program, particularly in the design and construction of Oscar III.

The General Manager, fulfilling a Board directive, reported on the costs of extending accident insurance coverage to additional League officials and appointees. On motion of Mr. Compton, unanimously VOTED that Section Communications Managers, Section Emergency Coordinators, and officials of the National Traffic System authorized certain travel at League expense, be included in the League's accident insurance coverage.

On motion of Mr. Groves, unanimously VOTED to approve the holding of a Southwestern Division Convention for May 27–30, 1966, in Anaheim, California.

On the request of the San Antonio Radio Club for approval of the specific dates of June 7–9 for a 1968 National Convention, on motion of Mr. Groves unanimously VOTED that the Secretary is instructed to institute a mail vote of directors on this question pursuant to the provisions of Article 7 of the Articles of Association.

On motion of Mr. Anderson, affiliation was unanimously GRANTED to the Catoctin Radio Club, Leesburg, Virginia.

The Committee officially adjourned at 1:05 P.M., but subsequently visited Foothill College in Los Altos, California, for an inspection of the Project Oscar headquarters and briefings by Oscar officials and technical staff, whereupon the Committee informally re-affirmed its wholehearted support of the Oscar program including continuing financial contributions.

During the course of its meeting the Committee discussed, without formal action, public relations, RACES, closer liaison with other IARU societies, Docket 15928, and club filings with the Internal Revenue Service.

JOHN HUNTOON
Secretary

CANADIAN LICENSE FIGURES

Below we present, through the courtesy of Director Eaton, amateur station license figures by Department of Transport regional offices, as of March 31, 1965, with comparison for earlier years:

Region	*1965*	*1964*	*1963*	*1962*
Vancouver	1549	1398	1415	1150
Edmonton	1091	1073	986	939
Winnipeg	1283	1201	1193	1118
Toronto	4149	3907	3742	3417
Montreal	1935	1890	1773	1692
Moncton	1273	1161	1073	1016
Shipboard VEØ	8	10	26	15
TOTALS	11,280	10,640	10,208	9347

AMATEUR RADIO WEEK

The states of Arkansas, Hawaii and Louisiana proclaimed the week ending in Field Day as Amateur Radio Week. The governors of all three mentioned international good will as one of the benefits of amateur radio, and the emergency capability of the amateur as another. Governor John A. Burns of Hawaii, in designating June 20–26 as Amateur Radio Service Week, pointed out his state's need for the "most detailed news of the natural phenomena" and in fulfilling this function when disaster threatens, amateurs "occupy an especially important place." Louisiana Governor John J. McKeithen especially mentioned amateur work in connection with Hurricane Hilda in 1964. Amateur work following tornadoes at Conway, Arkansas, was singled out for special mention by Governor Orval E. Faubus as he named June 21–27 as Amateur Radio Week in Arkansas. Delta Division Director Philip P. Spencer reports that, in

Informality of dress but seriousness of purpose mark the annual West Virginia State Conventions at Jackson's Mill, boyhood home of Stonewall Jackson and now the State 4-H Camp. Net sessions, technical talks, a code contest and the League Forum all are well attended. These three photos capture the spirit of the convention very well indeed. Don Morris, W8JM, Section Communications Manager of West Virginia, acting on behalf of Director P. Lanier Anderson who was attending the ARRL Executive Committee meeting in San Jose, presents the QST Cover Plaque award for April to Francis M. Yancey, W8DRU, for his article, "100 Watts on 6 Meters." In the center, W8JM reads the citation for Harold B. Godwin, K8TPF, chosen as "Outstanding Amateur of the Year" by the State Radio Council. At right, James R. Meeks, WA8AIN, as president, accepts for the Kanawha Radio Club the Field Day Trophy from Carl Nelson, K8BIT on behalf of the State Radio Council.
Charleston Gazette photos by WA8LFZ

addition to New Orleans, several Louisiana cities announced amateur radio week: Baton Rouge, Shreveport, Houma, Thibodaux, Slidell, Lafayette and New Iberia. Up north, the City of Englewood, N. J. once again proclaimed amateur radio week as is now customary there.

REPORT OF THE FINANCE COMMITTEE

To The Board of Directors
American Radio Relay League

During the first quarter of 1965 one change was made in the League's portfolio. In order to increase our income, the Treasurer was instructed to sell $87,000 U. S. Treasury Bonds, 3% due 8-16-66 and purchase a like amount of F.N.M.A. 4¼% bonds due 6-15-73. These transactions were completed.

In reviewing the remaining holdings in our portfolio, it was decided that prudence dictated maintaining our present commitments while awaiting a more obvious trend in the course of equity values. At present there still is not sufficient evidence of a definite trend so that no alternate investment policy is recommended. A continuing study of policy recommendation is being made.

Generally our investments continue to appreciate in value.

Respectfully submitted:
P. L. Anderson, Chairman,
Gilbert L. Crossley,
Roemer O. Best.

REPORT OF THE PUBLIC RELATIONS COMMITTEE

To The Board of Directors
American Radio Relay League

The committee had contact with four firms and individuals active in the field. They prepared oral and written proposals. The proposals covered two general areas of operation.

The first approach was to survey amateurs and non-amateurs and use survey results to determine a course of action. General courses of action would be placing news of amateur radio in various news media for material distribution periodically.

The second approach was to produce a motion picture film or video tape for release and free distribution to theatre and to commercial and educational television stations.

The cost of either of the above programs would be from $50,000 to $100,000. It is the committees' opinion that this expenditure within the next year or so would not be warranted in view of present commitments.

The public relations of our station operators is improving, particularly in the interference problems. However, TVI, as a result principally from six-meter operation, presents the major public relations problem area currently. It is recommended that the Technical Department make particular emphasis on interference remedies in forthcoming articles.

There is much praise by recipients for the assistance given by the Technical Department. However, there were several adverse comments on service given from other departments. It is apparent that one of the League's prime public relations problems is the general image the membership has for the headquarters and representative operation.

It is recommended that the Executive Committee and the successor members of this committee take immediate steps to engage professional assistance to staff at headquarters in relations with the membership and others that the League may contact.

The relationship with the government agencies both in Canada and the United States is very excellent. The working relationship, especially in preparation for an international frequency allocations conference, should greatly assist the League in enhancing the amateur position.

Respectfully submitted:
Charles G. Compton, Chairman,
Philip Haller
Dana Cartwright.

REPORT OF THE MEMBERSHIP & PUBLICATIONS COMMITTEE

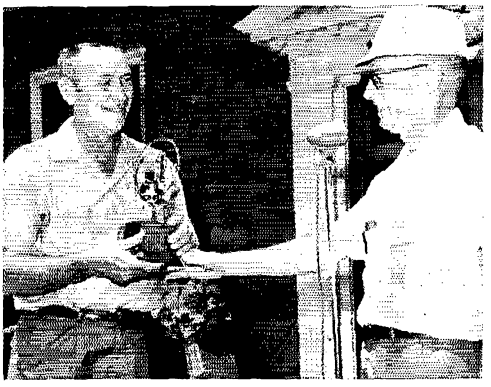
To The Board of Directors
American Radio Relay League

Having had no specific assignment by the Board, nor requests for action by the Membership and Publications Committee, it is a pleasure to report that none of the funds allocated for expenditures by the Committee has been used during the past year.

A final report as to increase or decrease in membership for the year being unavailable at the time of this correspondence, we are not in a position to comment on this subject.

Without question, the publicity in conjunction with efforts of the amateur fraternity during the Alaskan earthquake, East Coast hurricanes, the 50th anniversary of the League, the commemorative stamp, etc., has certainly elevated the image of the amateur, and the League.

Your attention is invited to the fact that the Board, having authorized the publication of a v.h.f. handbook some years ago, is encouraged by the



action taken to insure this publication appears during the ensuing year.

This Committee recommends that every effort be made through affiliated clubs and League members to increase membership in the League.

We are encouraged also by developing plans to produce an operating handbook.

The Chairman, who left the Board at the end of the year, has asked Director Best to submit this report to the May meeting, and suggest to the President that while it is advisable to assign each Director to some committee authorized by the By-Laws, it might be worth considering to name chairmen who are not scheduled to run for re-election prior to the following Board meeting. This will ensure continuity and permit the chairman appointed to carry on should an assignment be made on any of the various committees.

Respectfully submitted,
RAY MEYERS, Chairman
R. O. BEST
PHILIP SPENCER

REPORT OF THE PLANNING COMMITTEE

The consensus is that in the case of any convention, the convention committee should submit its plans, financial status and program first to the Director who would then submit them to the Executive Committee.

Specific time limits for the submittal of this information to the Executive Committee would be set up so that the Executive Committee and Hq. would be kept fully informed as to the development of the program for the convention.

It is recommended that the last line in Section 4 of the Rules and Regulations concerning ARRL conventions (see Article of Association and By-Laws) be made to read "The management program and financial plans for every such convention shall be subject to the joint approval of the Director concerned and the Executive Committee."

Respectfully submitted:
GILBERT L. CROSSLEY, Chairman
ROBERT W. DENNISTON
NOEL B. EATON
HARRY M. ENGWICHT

LEAGUE FILING DOCKET 15928

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Amendment of the Amateur Radio Service Rules to provide for Incentive Licensing and Distinctive Call Signs	DOCKET NO. 15928

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated, a non-profit organization with some 80,000 amateur radio operators licensed by the Federal Communications Commission as voting members, respectfully submits the following comments in general support of the Notice of Proposed Rule Making released April 1, 1965 (FCC 65-252).

Preliminary Statement

The League shares and endorses the Commission's views that a strengthening of the amateur radio license structure is not only desirable but also essential for the continued justification and orderly growth of the amateur radio service. In the weeks following release of the Commission's notice, the League's Directors and Headquarters received many thousand comments from its members and other amateurs. An overwhelming majority of the comments supported the Commission's objective of strengthening the amateur radio service by updating the existing incentive licensing structure. After a thorough study of the comments, the League's Board of Directors, at its annual meeting on May 21st and 22nd, 1965, without a dissenting vote, adopted the following resolution:

> ". . . that the League expresses its appreciation to the Federal Communications Commission for its careful and thorough consideration of the League's incentive licensing proposal, RM-499, and endorses the principles of incentive licensing included in the Notice of Proposed Rule Making in Docket 15928."

This resolution should not be considered, however, as complete support of each facet of the Commission's proposal. A high percentage of those commenting, in excess of eighty percent, took issue with either or both the Commission's proposals with respect to call signs or new examinations for present Advanced Class licensees. The following recommendations are based upon careful analysis of the comments received.

Call Signs

Most amateur radio operators regard their call signs as next in importance to their names. The suffix, in particular, has assumed the character of a person's last name. For many amateurs, years of effort and operating proficiency have earned awards recognized by other amateurs and amateur organizations throughout the world.

The Commission, in its Notice of Proposed Rule Making, has stated that distinctive call signs indicating the class of license held by each licensee are required to aid the Commission in its monitoring activities. This is a determination which only the Commission can make. However, if distinctive call signs are essential, the League respectfully opposes the methods suggested in the Commission's proposals and recommends that the objective be achieved (1) by the use of distinctive prefixes before the district number to indicate the class of license, and (2) the retention of present suffixes.

For example, a General Class licensee with the present call W2ABC might become WG2ABC when the proposal becomes effective. Upon qualifying for First Class, the call might be changed to WF2ABC or some equivalent designator to indicate the class of license. As an incentive to progress to a higher grade of license, namely an Amateur Extra Class, the original prefix would again be made available, and the call W2ABC assigned. The licensee, then, would be assured that the suffix 2ABC would continue throughout his amateur career, with appropriate prefixes to designate the class of license and corresponding operating privileges. Upon qualifying for the Amateur Extra Class at any time in the future, the licensee would regain his original call, both prefix and suffix.

In some districts, the four prefixes W, K, WA and WB are already in use for other than Novice Class licensees. The League's proposal, then, is a "four track" system. Although an amateur now holding the call W2ABC, K2ABC, WA2ABC or WB2ABC may be assigned other combinations of prefixes, he may regain his present prefix by qualifying for the highest class of license. But in any event, the suffix remains unchanged. Such a procedure appears feasible by judicious use of the Commission's

data processing equipment. The League's Board of Directors, therefore, recommended the following principles:

"a) An amateur should retain the same suffix throughout his amateur career, if he so desires, by use of prefixes to denote the class of license.

"b) Amateur Extra Class licenses should bear one of the following prefixes: K, W, WA and WB.

"c) Single-letter suffix calls should be assigned only to special event stations."

Classes of Licenses

The present grades or classes are the Amateur Extra, Advanced, General, Conditional, Technician and Novice. The Commission's proposal is to create a new First Class, to abolish the present Advanced Class, and to "downgrade" all present Advanced Class licensees to General Class unless, by additional examination, they qualify for the Amateur Extra or First Class.

The League's Board of Directors, without a dissent, recommended that the Amateur Extra Class license be retained and continued, and that the League support the proposal to establish the First Class license.

A high percentage of the comments received by the League's Directors and Headquarters strongly opposed elimination of the Advanced Class unless each Advanced Class licensee is issued a First Class license without additional examination. Almost without exception, these amateurs called attention to the fact that they had successfully passed an examination involving advanced theory and amateur practice so as to obtain certain operating privileges only to have those privileges negated by the Commission in 1953 as a result of its Report and Order in Docket 10173 drastically revising the amateur license structure. With no new Advanced Class licenses issued since 1952, it is readily apparent that the 40,000 Advanced Class licensees constitute the largest group of "old timers" which has contributed so significantly to the amateur radio service and the communications field generally. Almost without exception, the Advanced Class licensees sincerely believe that the Commission will "break faith" with them if their licenses are "downgraded" once again to the General Class. Surely, the Commission does not intend that those who have contributed so significantly to the amateur radio service should be penalized. For these reasons, the League's Board of Directors, without a dissent, adopted the following resolution:

"WHEREAS, every present Advanced Class licensee operated for at least one year with a lower class of license and with restricted frequency privileges before becoming eligible for the Advanced Class license, with a limited number of exceptions, every present Advanced Class licensee upgraded his license from General (Class B) to Advanced (Class A) by passing a written examination involving elements more difficult than those of lower classes, and holders of Advanced Class (who formerly held Class A) licenses reached the highest grade license attainable under the incentive licensing system then in effect,

"NOW THEREFORE, BE IT RESOLVED, that the American Radio Relay League, by its Board of Directors assembled, recommends to and requests the Federal Communications Commission to issue First Class licenses to any Advanced Class licensee at his request or at his next application for modification or renewal, and that until such issuance, the Advanced Class should have all privileges of the First Class licensees."

In the 1920s and early 1930s the Commission's predecessor, the Federal Radio Commission, issued a class of license, the Amateur Extra First Class, which corresponded to the present Amateur Extra Class. The League's Board of Directors, without a dissent, adopted the following resolution:

"That, WHEREAS, in 1933 the Federal Radio Commission downgraded Amateur Extra First Class licensees, who had passed a 20-word-per-minute code test and a written examination corresponding to the written examination of the present Amateur Extra Class examination to Class A and later Advanced Class,

"NOW, THEREFORE, BE IT RESOLVED, that the American Radio Relay League, by its Board of Directors assembled, recommends to and requests the Federal Communications Commission to issue Amateur Extra Class licenses to former Amateur Extra First Class licensees who have had continuous amateur service (licensed) since the Amateur Extra First Class license was discontinued, upon appropriate application and payment of a reasonable fee without further examination."

Frequency Privileges

The League's Board of Directors reviewed the sub-allocations in the high frequency (HF) amateur bands proposed by the Commission and noted that some comments received by the League's Directors and Headquarters had suggested radiotelephone privileges for only Amateur Extra Class licensees as an added incentive to acquire that class. Under the Commission's proposal, there would be no incentive, other than call signs, for an amateur interested primarily in radiotelephony to advance from the First Class to the Amateur Extra Class. Accordingly, the League's Board of Directors, without a dissenting vote, adopted the following recommendation:

"That the Federal Communications Commission be requested to modify its proposals concerning operating privileges in the 21-Mc. band to provide that only the Amateur Extra Class be permitted to operate radiotelephony in the band from 21,250 to 21,300 kc. beginning one year after adoption of the new rule, and from 21,250 to 21,350 kc. in addition, beginning two years after adoption of the new rule."

With respect to sub-allocations in the 50 and 144 megacycle (VHF) amateur bands proposed by the Commission, the League's Board noted the recent and anticipated developments in amateur space communications and the fact that Technician Class licensees may operate in those bands but not in lower frequency bands, and unanimously agreed that further study of sub-allocations in those bands is most desirable. Accordingly, the following resolution was adopted:

"That the Federal Communications Commission be requested to postpone the adoption of restrictions on operation in the 50- and 144-Mc. bands, pending further study and recommendations of the League."

The League's Board of Directors also recommended that the Commission's proposal be adopted to increase the term of the Novice Class from one to two years and to eliminate radiotelephony privileges, which now are limited to the 144 megacycle amateur band.

Conclusions

It is apparent from the foregoing comments that the American Radio Relay League generally supports the Commission's proposals and urges that they be adopted with the modifications recommended herein.

Respectfully submitted,

AMERICAN RADIO RELAY LEAGUE, INC.
225 Main Street
Newington, Conn., 06111

ROBERT M. BOOTH, JR.
Its General Counsel

1100 Vermont Avenue, N.W.
Washington, D.C., 20005
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QST

Ho, Hum!

So What Else Is New?

BY W. B. VARNUM,* W2SDZ

THIRTY-five years ago *QST* carried an editorial which, except for the issues involved, could be reprinted in this month's *QST*. In 1930 the Federal Radio Commission was proposing new rules and regulations covering amateur radio. The ARRL went on record in *QST* as favoring the proposed changes. The ether was suddenly filled with pro and con comments, rumors, and untrue assumptions much like we hear on the amateur bands today. Many amateurs were certain that their hobby was headed for extinction all because certain ARRL officials were letting them down. The editorial in October 1930 *QST* makes interesting reading. Here are the first three paragraphs:

THERE'S some dirt in the air these days, fellows. Perhaps we shouldn't lend it the dignity that comes from mentioning it in *QST*'s pages. We've thought that over, though, and it seems to us that discussion of these problems in one of the prime functions of our magazine. Another reason is that the dust seems to have risen entirely over earlier statements in *QST*.

You've probably heard some of the talk yourself. Possibly you've already been informed that the policies of ARRL and its officers are killing amateur radio by leaps and bounds; that the new regulations are a serious blow; that the requirement of d.c. supply is forcing hundreds of stations out of the game; that ARRL accepts the dictation of the Federal Radio Commission, commercial corporations, and wealthy amateurs, as against the interests of the amateur generally; that the compulsory log consumes all an amateur's time in posting; that the League sponsored it either in order to be able to sell a new kind of log-sheet or as one more step in its plans to trap hams, for which its officers doubtless get a rake-off of so much a head from RCA; that ARRL is trying to run 'phone off the air; that the first thing the fellows know their officers will have shoved down their throats a new regulation prohibiting everything except crystal-control; that Headquarters is trying to get the Government to cancel the temporary operator's certificate and confine licenses to those who can travel to the Supervisor's office for examination; that the League used to protect amateur radio but now only howls it down; that things would be better if *QST* would publish some information which would help amateurs instead of trying to kick them off the air. And more to the same general effect.

This, it seems, is what comes of efforts on our part to write "constructive" editorials. There is, of course, the small consolation that is to be derived from the thought that an inactive organization wouldn't get any letters. We could, we suppose, arrange to fill this monthly page with some variety of innocuous pap that would escape comment. We like to think that intelligent comment on League policies is a sign of vitality, of good health in the old organization. But amateur radio would be in for a hard time of it if any considerable percentage of its adherents had the view that their officials were unfaithful to them and, consciously or unconsciously, were selling them out. We must conclude that somehow we have been failing in recent months, to put across our thoughts in an understandable way. Criticism of our operating practices, inside our family pages, takes on the complexion of persecution; suggestions for station improvement, intended to be helpful, are taken as high-handed attempts to dictate an impossible standard; explanations of why the Board considered something wise are considered an endeavor to sell our personal views.

Now let's kick around the issues confronting amateur radio in the 1930 proposal. The increasing number of amateurs was causing severe congestion in our bands. QRM was fierce and, certainly by today's standards, most of the signals were frightful. Although economical and efficient rectifiers were just coming on the scene, all-too-many amateurs used raw a.c. as the plate supply. Few amateurs were able to measure their frequency with sufficient accuracy even to insure that they were operating within the assigned bands. Some didn't care! Most transmitter were self-excited, single-tube, high-power oscillators and were wobbling all over the bands. Frequency stability often was a direct function of the wind velocity on the antenna system!

Something had to be done. The 1930 proposal, if and when adopted, would require that (1) amateur transmitters have adequately filtered d.c. plate supplies, (4) each station have means to assure that operation was within the amateur bands, (3) transmitters have good frequency stability, and (4) to compound the crime, amateurs would be required to keep logs!!

Many old timers will recall how the opponents of the 1930 proposal bent their wrath on the ARRL. The editorial above reminds us that it was much like the situation today. League memberships were not renewed; some were cancelled, so as to keep *QST* away from their shacks. Anti-ARRL clubs and associations were formed and other publications kept the pot boiling by sympathizing with those who were against progress. It is interesting to note, however, that practically all amateurs heartily endorsed the new regulations after they became law. The opponents who dropped out of our ranks "because of the way the ARRL ruined ham radio" haven't been missed by anyone. Even RCA hasn't taken over any of the amateur frequencies as was rumored in 1930.

One cannot help but conjecture on how the present-day proposals will be viewed at the turn of the century. That will be another 35 years from now. If the 1930 proposal had not gone into effect would we have any amateur radio today? Will there be any amateur radio in the year 2000 if action isn't taken now to improve present-day conditions? QST

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An A.M./C.W. Exciter for 144 Mc.

A Clean Signal for the AB_1 Linear

BY DOUG DeMAW,* W1CER

The exciter described in this article will provide a chirp-free, shaped c.w. note and will produce a well-modulated a.m. signal. Used either as a low-power transmitter, or as a driver for an a.m. linear amplifier, this unit can satisfy a host of needs in the v.h.f. station. R.f. isolation protects the speech and modulator stages from the feedback ills that are common to many v.h.f. phone rigs.

A GREAT deal of information has been published with regard to proper operation of linear amplifiers, but some radio amateurs are not aware of the importance of the signal quality required from the exciter unit. Unfortunately, the defects present in the output signal of the exciter are magnified by the linear amplifier. Because of this, a number of somewhat horrendous signals are heard on the various amateur radio bands. For a.m. linear operation, the r.f. output from the exciter must be free from hum, spurious energy and improper modulation characteristics. The c.w. signal, which is used to excite the linear amplifier, must be similarly clean, and without key clicks and thumps.

This article describes a low-power a.m./c.w. exciter, tailored to use with Class AB_1 linear amplifiers, and capable of producing a clean excitation source for this mode of operation. A description of an attenuator box is included in the text. It will permit swamping out of excessive driving power to the amplifier used, and is suitable for a.m. or c.w. operation. It will work well with the equipment described in this article, but can also be used with other exciter/linear-amplifier combinations.

The Circuit

Two 6CX8 tubes are employed in the r.f. section of the exciter (Fig. 2). Sufficient power output is developed to fully excite a 4CX250 tube, operating in the AB_1 mode. A regulated screen voltage is supplied to the oscillator stage (V_{1A}) to prevent chirp, caused by changes in power-supply voltage, during c.w. operation. This same feature contributes to better stability of the a.m. signal. The crystal-v.f.o. switch, S_1, converts V_{1A} from an oscillator to an amplifier when the switch is placed in the v.f.o. position. An external v.f.o. can then be attached at J_1, supplying an 8- or 24-Mc. signal to the exciter. With S_1 in the crystal position (open), standard 8-Mc. crystals can be used for frequency control. The tuned circuits, L_1, L_2, and L_3, have sufficiently broad response to permit output frequency excursions of 1 Mc. without need for retuning the stages. A gimmick capacitor is used to neutralize the p.a. stage (V_{2D}) and is necessary if stable operation is to be secured. The screen-grid capacitor, C_1, is series-resonant at 144 Mc. and aids in stabilization of the output stage. For c.w. operation, the cathodes of V_{2A} and V_{2B} are connected in parallel and keyed at J_2. A shaping network, consisting of a 0.47-μf. capacitor and a 1000-ohm resistor, is connected between the keyed cathodes and the key jack. This network

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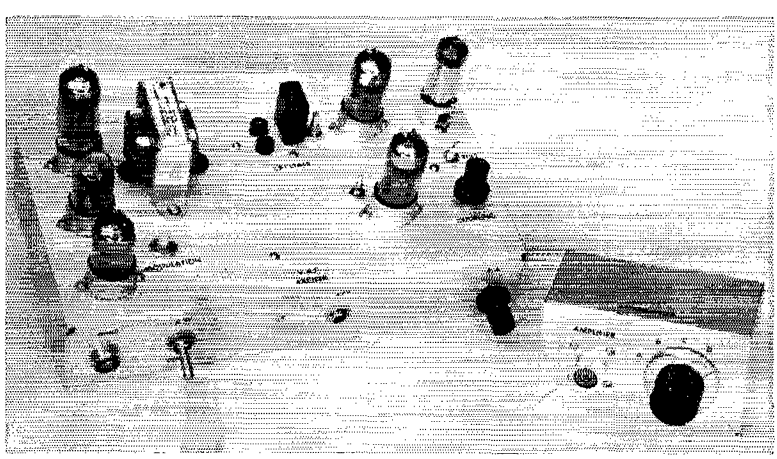


A top-chassis view of the low-power exciter. Shown at the right—a 5-watt step attenuator for reducing the output of the exciter when used with a linear amplifier.

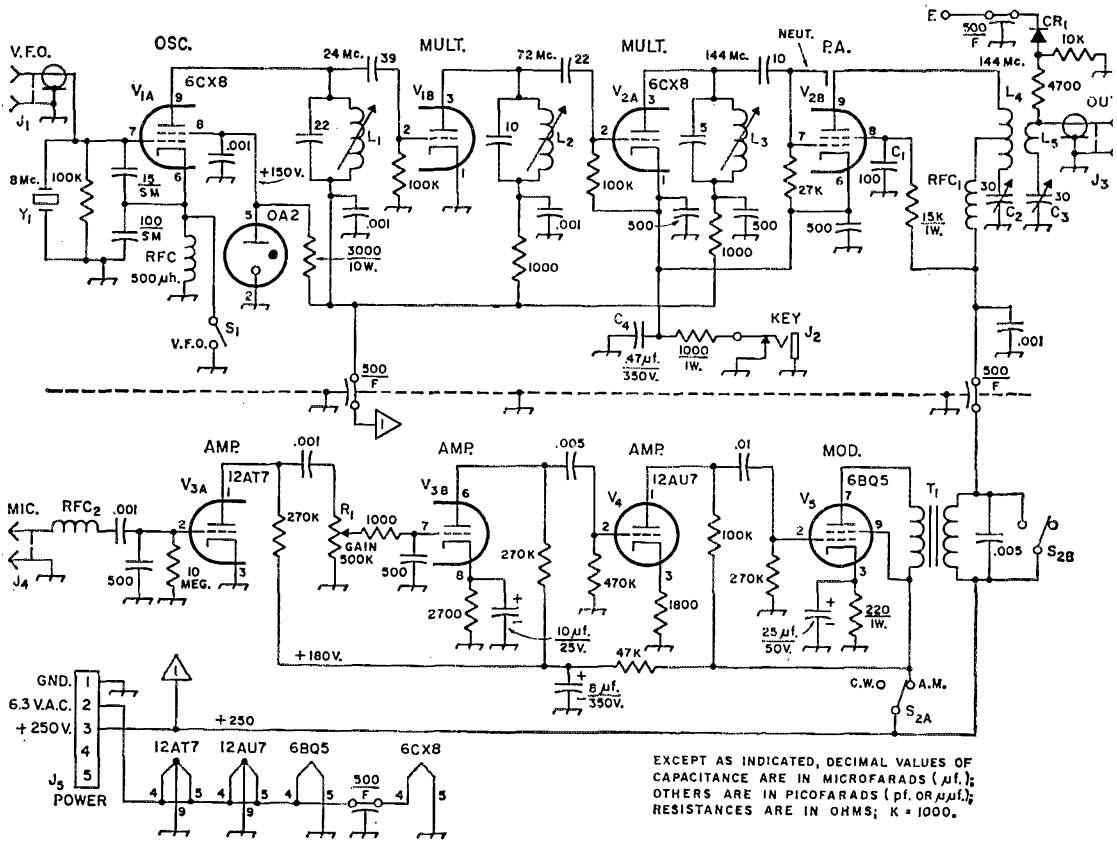


Fig. 2—Schematic diagram of the 2-meter assembly. Resistors are ½-watt composition type unless otherwise noted. Capacitors are disk ceramic except those bearing polarity markings, which are electrolytic. F indicates feedthrough type. SM is silver mica.

C_1—100-pf. disk ceramic with pigtails cut to ¼-inch length.
C_2, C_3—30 pf. variable (Hammarlund MAC-30).
C_4—.47-u. mylar or molded paper capacitor.
CR_1—1N34A.
E—One terminal of feedthrough capacitor.
J_1—BNC chassis receptacle (UG-290/U).
J_2—Closed-circuit key jack.
J_3—Coax chassis connector (SO-239).
J_4—Microphone connector.
J_5—5-pin male chassis connector (Amphenol 86-CP5).
L_1—11 turns No. 24 enam. close-wound on ⅜-inch diam. iron-slug form.
L_2—5 turns No. 24 enam. close-wound on ¼-inch diam. iron-slug form.
L_3—2 turns No. 20 bus wire, spaced to occupy ¼-inch area on ¼-inch dia. iron-slug form.
L_4—6 turns No. 20 bus, ½-inch dia. x 1 inch long, center tapped.
L_5—2 turns No. 22 insulated hook-up wire, ⅜-inch dia. inserted into center of L_4.
R_1—0.5 megohm control, audio taper.
RFC_1, RFC_2—1.8-μh. r.f. choke (Ohmite Z-144).
S_1—S.p.s.t. slide switch.
S_2—D.p.d.t. toggle switch.
T_1—5-watt modulation transformer (Stancor A-3812 using one half of center-tapped winding as primary).
Y_1—8-Mc. fundamental crystal.

eliminates make-and-break clicks, resulting in a well-shaped keying characteristic. An r.f.-sampling test point (*E*) is available for tuneup of the exciter.

Special attention was given to the audio section of the exciter in an effort to reduce distortion to a minimum, while making certain that 100 per cent modulation was possible. The modulator is capable of producing far more audio than is necessary, which permits the 6BQ5 tube to operate below the point where distortion becomes a significant consideration. R.f. filtering is used at J_4, and at the grid of V_{3B}, to prevent the squealing and howling common to many v.h.f. transmitters. Additional r.f. isolation is offered by the shield partition which divides the two halves of the chassis. The intercircuit wiring, which passes through this shield, is routed through FT (feedthrough) capacitors to aid further in decoupling. Three stages of speech amplification are used, to avoid having marginal speech gain—a shortcoming of many v.h.f. transmitters. The values chosen for the coupling capacitors, grid resistors and plate resistors in the modulator will provide optimum response in the 400- to 3000-cycle range. This system

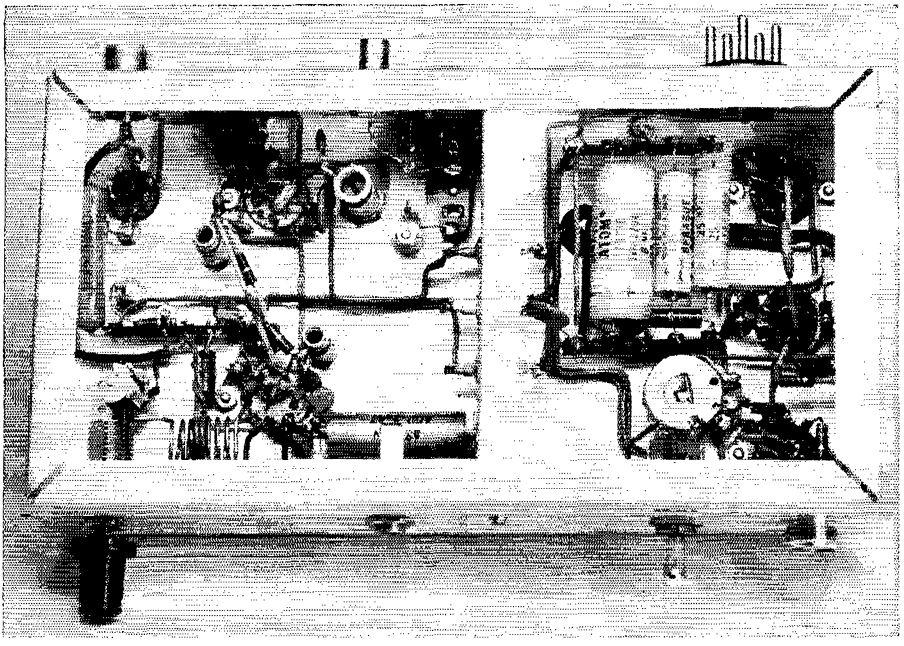


Fig. 3—Under-chassis view of the exciter, showing the r.f. circuitry in the left-hand compartment. The modulator is contained in the boxed-in area on the right.

helps to eliminate the hum component in the signal, while passing the most effective portion of the voice range. Switch S_2 disables the modulator during c w. operation and shorts out the secondary winding of T_1.

The power supply requirements for the exciter are 250 volts at 150 ma. and 6.3 volts at 3 amperes. A measured r.f. power output of 2.1 watts was secured, using a Thruline watt-meter terminated by a 50-ohm non-inductive dummy load.

Construction

The 2-meter exciter is built on a $9\frac{1}{2} \times 5 \times 2$-inch aluminum chassis. The circuit wiring in the r.f. section of the chassis should be carried out in the manner shown in Fig. 3. All leads carrying

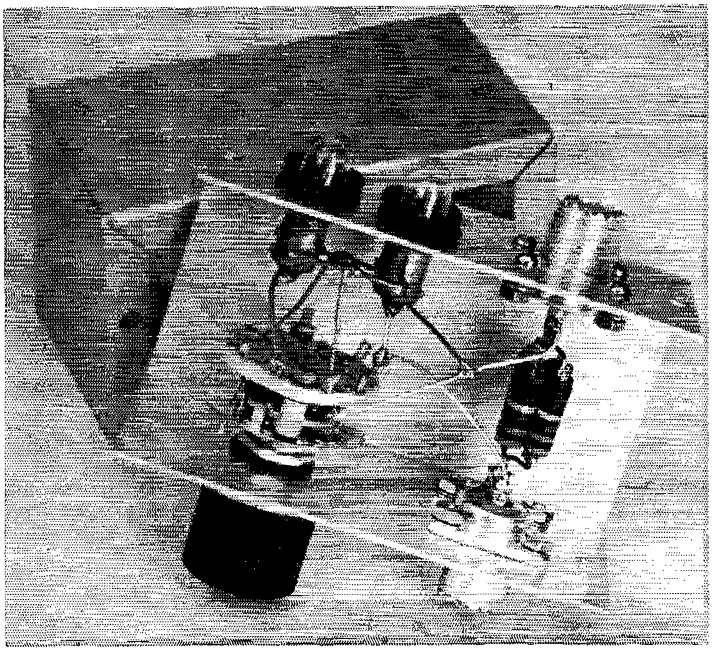


Fig. 4—Close-up view of the r.f. attenuator assembly. The pilot lamps are mounted in ⅜-inch rubber grommets.

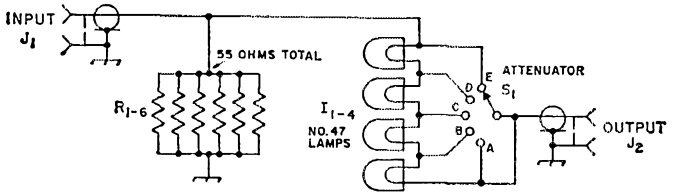


Fig. 5—Schematic diagram of the r.f. attenuator.

I_1–I_4, inc.—No. 47 pilot lamps.
J_1, J_2—Coax chassis connectors (SO-239).
R_1–R_6, inc.—330-ohm, 1-watt carbon resistors.
S_1—Single pole, 5-position ceramic wafer switch, non-shorting.

r.f. should be kept as short and direct as possible, to minimize the possibility of stray inductance. Similar treatment should be given to the leads on the various bypass capacitors and resistors used in the r.f. circuitry.

Two crystal sockets are mounted on the chassis to facilitate using both the popular FT-243 units and the less-common pin size of another war-surplus type crystal. Since the latter was added as a convenience for the author, it is not necessary for the constructor to include the extra socket.

The v.f.o. input jack, J_1, and the crystal/v.f.o. switch are located on the rear apron of the chassis near V_1. Ceramic tube sockets are used at V_1 and V_2, reducing r.f. losses in that part of the circuit. The key jack and its related shaping network are near the front edge of the chassis. The plate-tank inductor and capacitors C_2 and C_3 are to the left of this area (Fig. 3). The r.f. output jack, J_3, is located on the rear of the chassis and is connected to L_5 through a short length of 50-ohm subminax coax cable.

Turning next to the audio portion of the assembly, the microphone connector and phone/c.w. switch are on the front wall of the chassis. The modulation-level control is mounted on the top surface of the chassis and is adjacent to V_3 and S_2. The power-supply connector, J_5, is located on the rear wall of the chassis, near the 6BQ5 modulator tube. Test point E is between C_3 and the 0A2 voltage-regulator tube. An aluminum plate, with four rubber feet attached, is used to enclose the bottom of the chassis after the final testing is completed.

Tune-up and Operation

Prior to applying the B-plus and filament voltages to the completed exciter, place the tubes in their sockets and adjust coils L_1, L_2 and L_3 to resonance with a grid-dip meter. The correct frequency for each of these inductors is shown in Fig. 2. Next, attach a dummy load at J_3 and apply power to the unit, using either crystal or v.f.o. control. The power swamper described later in this article will serve as a dummy load during tuneup and testing. A v.t.v.m., adjusted to read 0–15 volts d.c., can be attached between test point E and ground. Observing the reading on the v.t.v.m. meter, adjust L_1 through L_5 for maximum indication, which should be in the region of 5 volts after all stages are peaked. The spacing between L_4 and L_5 can be adjusted until optimum power output is secured.

The next step will be to neutralize the p.a. stage. Temporarily disconnect the plate and screen voltage from V_{2B} and attach a sensitive r.f. sampling device at J_3. The detector can be a 2-meter field-strength meter connected to the exciter by a short length of coax cable, with a 50- or 100-microampere meter for an indicating device. Instruments of this type are described in the *ARRL Handbook*, under Measurements. Then the neutralizing stub (black wire to the immediate right of L_4 in Fig. 3) is moved back and forth near L_4, with the exciter operating in the c.w. position, until a minimum reading is noted on the neutralizing indicator's meter. The spacing shown between the stub and L_4, in Fig. 3, is typical.

In checking the modulator portion of the circuit, a No. 47 pilot lamp can be substituted for the dummy load at J_3. Tune the transmitter for maximum bulb brilliancy by adjusting C_2 and C_3. With a crystal or ceramic microphone connected to J_4, and with the switch S_2 in the voice position, adjust R_1 while speaking into the microphone. When the bulb shows an increase in brilliancy (about 25 per cent), a suitable setting for R_1 will have been reached. Further adjustment of the audio level can be carried out with the help of other stations after the transmitter is placed in actual on-the-air operation. If an oscilloscope is available, a more satisfactory setting for R_1 can be established and will permit thorough evaluation of the exciter's waveform. This method is recommended if 100 per cent modulation is desired.

Operating conditions for the transmitter are as follows: Oscillator plate current, 18 ma.; tripler plate current, 10 ma.; doubler plate current, 8 ma.; final grid current, 1.5 ma.; amplifier plate and screen current (combined value) 34 ma.; modulator plate current, 50 ma.

The Swamping Device

In some instances it will be desirable to include provision for attenuating the output signal from the exciter before applying it to a linear amplifier. It is better to "swamp out" a portion of the excess r.f. drive than to detune the last stage of the exciter, or grid circuit of the linear, in an effort to reduce the level of signal input to the amplifier. The modulator portion of the exciter should at all times have a proper load to look

(*Continued on page 162*)

Crisis in the Caribbean—I

Amateur Radio Supplies Communications During the Dominican Republic Upheaval

BY FRED LAUN, W9SZR/HI8XAL*

Here is another inspiring story of amateur emergency communications —this time during civil upheaval rather than natural disaster. These summaries are by men closely involved in communications with the Dominican Republic — a U.S. Information Service officer, the SCM of the nearest island supplying relief, and a military unit commander.

SHORTLY after noon on Saturday, April 4, I was on the air with my Hallicrafters SR-150 from my home in Santo Domingo talking to a good friend — Herman Greve, W9EWC — back in my home state of Wisconsin. Suddenly it seemed that all the auto horns in Santo Domingo were honking in unison. The Dominican revolution had begun.

The following day, Sunday, with the first word of Dominican events having reached news media in the U.S., Herman and I set up an emergency channel and proceeded to handle messages and direct communications to relatives and friends of people here in Santo Domingo, just to let everyone know that everything was all right. On Monday, we continued handling messages in this fashion, though the great bulk of message traffic at this time was being handled at this end by Howard Shoemake, HI8XHS, a Baptist missionary here.

On Monday evening, the Embassy asked me to try contact with the Naval fleet steaming toward Santo Domingo. The frequency was some kc. away from the coverage of my SR-150, but fortunately in range of the padder on the v.f.o. Contact was established first from my house on April 26, the day before the evacuation, and again all during the day of the evacuation, on April 27. During this time, I was the only direct link between the carrier *Boxer* and the embassy, and all operations were coordinated in this way.

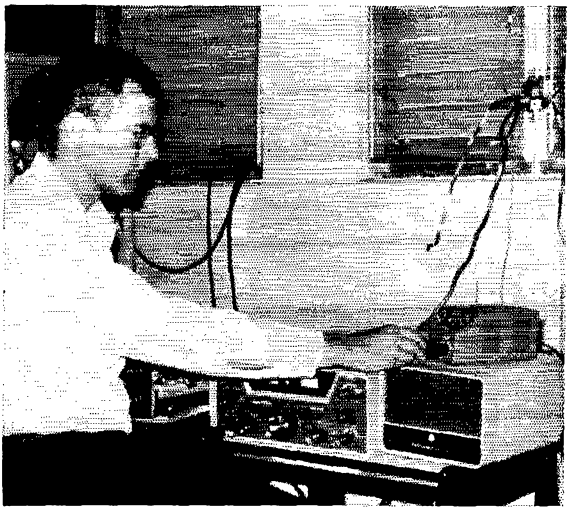
During the day, the National Palace, about six blocks away, was under heavy attack by planes and was also being shelled by Dominican ships, but the electric power somehow stayed on. Local staffer Juan Isidro Jimenez R. was extremely helpful during this time in relaying incoming messages by telephone to the embassy. Finally the necessity for telephone communications was alleviated when I was brought a walkie-talkie, with which I could communicate to the embassy.

Around nightfall, a machine gun opened up only two doors away from my house, and I decided it was time to move. I packed a suitcase and all my radio equipment and headed for Public Affairs Officer Malcolm McLean's house near the U.S. Embassy, to spend the night.

The next day — Wednesday — Peace Corps Director Bob Satin urgently needed to find out if the fleet had drugs available which were required by the Dominican Red Cross. There were still no direct communications with the fleet other than my radio, so he and I set the rig up in my car on the embassy grounds and contact was immediately established.

This went on for four days straight, during which time I went through one battery and was pretty well about to expend another, and during which time my engine ran constantly — including the five minutes each day when we floor-boarded the accelerator and watched the columns of black smoke come out of the exhaust! (The car runs fine today, however — apparently we managed to keep too much carbon from getting deposited on the valves.)

During this time, San Isidro AFB, where all the MATS planes were putting down, and the San Juan Naval Base both entered the net, and this enabled the Embassy to have direct communications with them as well. Everybody from the Ambassador on down was in my car at one time or another conversing with various officials on shipboard, and I was quick to emphasize to all



The author operating from the Dominican Republic.

* Assistant Information Officer, American Embassy, Santo Domingo, Dominican Republic

that were it not for ham radio they would not have been able to depend on the availability of this equipment in times of emergencies — for it would not have been here.

When the Marines arrived on the Embassy grounds with their equipment — about 300 watts p.e.p. and a 30-foot vertical whip —to their great amazement, and mine, the *Boxer* could barely copy them. So, instead of having my rig taken out of service as I had hoped, I was provided with three Marine operators who continued using my rig for most communications. At this point I was rather proud of my home-brew all-band mobile whip. Sniper fire was a normal occurrence each night but fortunately the car was in a fairly well-protected spot.

The station kept on going without a whimper all through the operation, despite the fact that the car was in the sun for most of each day causing the temperature inside the car to soar. And with the car doors open to provide a cooling breeze for the operators, every helicopter touching down on the Embassy grounds inevitably blew all manner of dust and dirt into the car, much of which filtered its way into the SR-150 itself. In light of all of this, performance was fantastic.

I was finally able to shut down on May 2, but by May 7 I again set up the SR-150 in Mr. McLean's house using a hastily-erected antenna when it became evident that if Voice of America correspondent Harry Caicedo was going to file his copy with regularity, a backup circuit was needed. Contact was established with a friend of mine in Washington, Jack Colson, W3TMZ, and regular schedules were initiated. Despite the fact that we have three teletype circuits and the telephone available, on three separate occasions all of those circuits were out and we had to resort to 14-Mc. c.w. to get our press and official traffic through. The Embassy, of course, has a full-time RTTY circuit to Washington, but that circuit, which was overloaded with traffic, was not available to us except for messages of extreme importance. On the Washington end of the circuit, Karl Medrow, W3MCG, Paul Rockwell, W3AFM, and Dick Young, W3PZW, in addition to Jack, were most helpful. I was not putting a very good signal up Washington way with the temporary antenna, but Karl and Dick sat there by the typewriters and did a beautiful job of copying traffic, proving that the contest men can still come through in other situations when the necessity presents itself. (Of course Karl is still very active in NTS work.) To this day, under the direction of Vic Clark, W4KFC, Potomac Valley Radio Club members are taking turns monitoring on sked in case our communications happen to fail. Incidentally, PVRC member Ray Aylor, W3DVO, was on this end helping push traffic with me when his duties as temporary engineer for about eight radio stations down here would permit.

U.S. contacts which provided the greatest service for the Dominican net on 14347 were K. G. Bozo, K4PYV, at W4NTR; W4TDT; W4ESJ; W4SHA; K4WCC with K5JEH operating; K4FFB; K4CG; K4CGC (another PVRC man); W4YPI and W3ZKH (also PVRC). On the minus side, my efforts to use a particular phone net on 14.3 Mc. were met with almost complete frustration in the early part of the crisis — these ops are more interested in checking in stations than they are in handling traffic. And when it came right down to it, c.w. was far more useful than s.s.b. in handling press traffic. We tried pushing a 400-word story to VOA with HI8NSF's kw. of s.s.b., and it took 30 minutes *vs.* about 10 minutes average on c.w. for same from my 150-watter. Short personal remarks are a different thing, of course.

Many hams have fared poorly here. About half in the city of Santo Domingo have lost their equipment to one or the other of the contending factions, who sorely needed it for communications between different units of their respective forces. I lost a Viking Ranger which HI8WSR was using in his home at the time the thing broke out. As I have impressed upon Embassy officials here, my SR-150 would also have been at HI8WSR's house had I not obtained my own call as a result of the reciprocal operating agreement signed here.

One unfortunate incident resulted when an over-eager lieutenant ordered three Dominican radio amateurs to close down. American hams here went off the air at the same time in protest, and notified the Embassy that no longer would any traffic be handled by amateur radio. The Ambassador immediately ordered the military authorities to rescind any such actions that their personnel had taken.

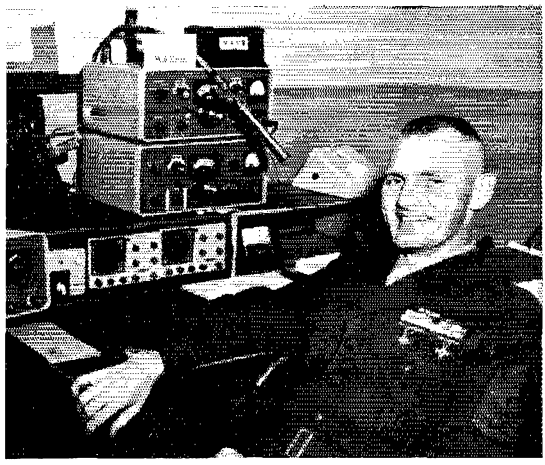
The actions of American hams here — especially HI8XRM, who handled health & welfare messages with the Dominican Republic Embassy in Washington, and HI8XHS — have served to insure that no matter how this event ends up, American applications for operating permits here in the future will be given the most sympathetic consideration. QST

Crisis in the Caribbean — II

BY JOSE E. SALDAÑA, KP4JM*

FROM the very first day, communications were interrupted and a steady stream of refugees began arriving in KP4-land. The needs for communication of a group like this could have been normally handled via commercial means. However, the situation in the Dominican Republic, one of the two nations sharing the island of Hispaniola, was different. Within the country everything came to a standstill. Services, communications, government controls, etc. ceased to

*SCM West Indies, Section, ARRL.



The Stateside anchor for much of the Dominican Republic relief traffic was W4NTR at the Marine Corps headquarters in Arlington, Virginia. One of its operators, shown above, is K4PYV who has furnished us with the calls of additional stations assisting in the crisis: HI8CLU, HI3XRD, YV5BAW, K4AED, W4VBQ, KZ5VR, K4UCF, K4BNY, K4CRU, K4JGU, KP4AXM, KP4BMG, K4DKU, K5DZV and W2CPI.

operate overnight. Telephones were out of order, cable lines loaded with official traffic and press information, radio broadcast stations off the air: in very few words, "king size commo. chaos." What little communications plant was left in operation was used for official purposes only and the Dominican population was depending on amateurs to communicate within the country and with the outside world. By the end of the first week KP4-land was invaded by 5000 refugees all trying at the same time to communicate either with their families back in the Dominican Republic or with friends and relatives elsewhere. Red Cross and other government agencies took over from where the U. S. Navy had left off by providing transportation for these people. A call went out for KP4s to help and immediately amateurs throughout Puerto Rico answered the appeal for assistance and aid in the communication problem. The total mobilization of KP4 amateurs took a matter of hours. From here on the show was on the road and hams all over Puerto Rico and the Dominican Republic started to show what amateur radio can do to serve humanity. Traffic of all kinds poured into KP4-land by the thousands — Red Cross welfare messages, family and personal traffic of all sorts, requests for medical supplies, plasma, blood, surgical teams and field hospitals. With the further deterioration of the situation and the increased military activity urgent Red Cross requests for medical supplies took top priority. Traffic has been handled on an around-the-clock basis on 7240, 3830 and 14,347 through the Dominican Emergency Net. A good deal of the Dominican Red Cross traffic to O.A.S. Washington, D.C., went via amateur radio through KP4-land. So far more than 5,000 messages have been handled by amateurs in Puerto Rico. To KP4 TL, BL, BBN, JM, WR, WT, VH, ZC, DP, AWX, AVB, AXC, AXS, AW, BKP, BKY, ACQ, AST, ANH, CKV, AXM, CV, HM, ES, BY, ARW, KE, ASN, CLC, CKW, RE, AQT, APB, MS, GN and CO; HI8 LGN, JSM, PP, RO, NSF, JBA, RNM, MI, MV, JTG, WPC, XFB, XHS, JDA, AAD, NEP, TEP, CLU, RBG, ELS; HI3 LJP, XDA, FM, NCL, ABB, JR, DAC, XEG, BNL, JBR, AB, PC, XRM; HI4 ARM; HI7 EJM, JR and EJE — a hearty "well done!" QST

COMPANY A {ABN}
313TH ARMY SECURITY AGENCY BATTALION
APO, New York, New York, 09478

25 June 1965

To the Editor, QST:

On behalf of the officers and men of this unit, I would like to commend Mr. Dick Ely, WA4VHM, and Mr. Larry Gresham, WA4HCL, of Memphis, Tennessee for meritorious service.

On 29 April 1965, we were deployed to the Dominican Republic with very little advance notice. Personal affairs of the men were not properly settled and morale was extremely low for many ot the men due to the sudden departure and separation from their families. Mail was very slow in arriving during the early days here, adding to the morale problems. Naturally, every member of this unit desired to talk with his family in the states, and this is where WA4VHM and WA4HCL assisted us so ably.

One of our amateur operators sent a CQ. Dick answered the call and said he would be happy to handle our traffic; he also called Larry on the landline, who checked into the net and stood by in case his assistance was requested. Since that time, these two men have alternated to handle over a hundred messages for this unit. It has taken four hours a day for the past month of both Dick's and Larry's time to do this. Each time an operator or myself would try to thank them they would reply "no thanks required, give me another." Their efforts have been one of the most significant factors in the high morale of this unit and oftentimes a significant stabilizing factor to the families of personnel in this unit.

Any recognition your organization can give them will be greatly appreciated by myself, our amateurs — WA2UTX, K3EHZ, WA4QHZ, and WA0CTZ — and the entire unit.

Sincerely,

HAROLD G. McCOY, WA4YKM 1/LT. AIS
Commanding

An 80- and 40-Meter Transistorized Converter

Low-Cost Reception for Portable Operation

BY LEWIS G. McCOY,* W1ICP

A COMMON request received here at Headquarters is for a simple, battery-powered, receiving setup to be used when hams are away from home on camping trips and so forth. This article describes such a setup for the 80- and 40-meter bands, for listening to a.m., s.s.b., or c.w. It uses a transistorized converter working into an automobile radio, preferably also transistorized for minimum power drain.

For the last year or so, several mail order houses have been selling completely transistorized automobile radios for about $20. Another source of such radios is the automobile junk yard; completely transistorized automobile radios have been in existence for several years now and they can be found in cars hitting the junk yards these days. Such a radio makes a good tunable i.f. for a crystal-controlled converter.

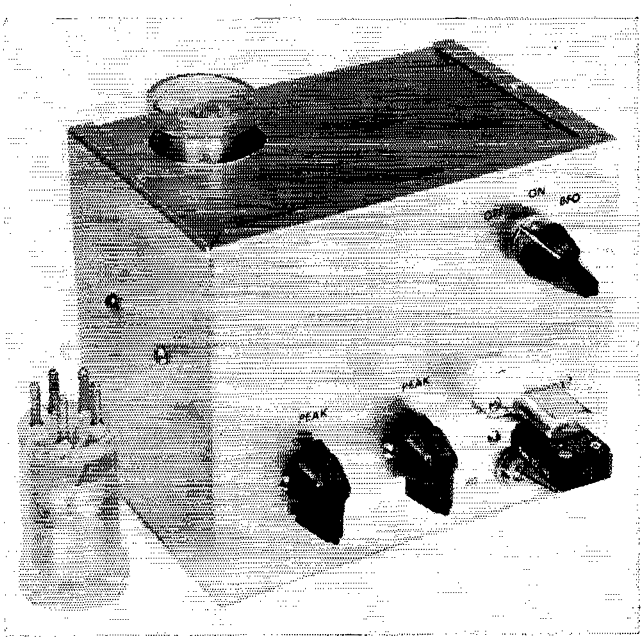
The prices on transistors that can be used in a converter for 80 and 40 have dropped appreciably in the last few years. The SK-3006 used in the converter shown in Fig. 1 is now selling for slightly more than one dollar, and makes an excellent oscillator or mixer. The big advantage in this case is that the converter is powered by a 9-volt battery and the total drain is so low — only a few milliamperes — that the battery should last almost as long as its normal shelf life.

The average transistor type auto radio draws about 300 ma. and can be powered from a 12-volt car battery. If you are not afraid to dig into the auto radio the audio power transistor can be disconnected and headphones used with a total drain from the set of only a few milliamperes. In this case, the radio could be powered from battery pack made up of eight 1½-volt flashlight cells connected in series to provide 12 volts. Such a receiving setup will provide a fairly good communications receiver for 80 and 40, and will be truly portable.

Converter Circuit Description

The converter circuit, Fig. 1, consists of a mixer and crystal-controlled oscillator arrangement. The incoming signal is coupled to the base of Q_1 via a link from the L_2C_1 circuit. A signal from the crystal-controlled oscillator Q_2 is also fed to the mixer and the resulting output is peaked with the C_2L_4 combination and then fed

* Beginner and Novice Editor.



This is what the completed converter looks like. The cover of the Minibox has been cut out at the top to provide access to the top of the coil form for quick changing. At the upper right is the Off-On-B.F.O. switch. Just below the crystals is the power switch.

In answer to many requests, here is a low-cost 80- and 40-meter receiving setup that lends itself to portable or mobile operation — and makes a good home receiver, too.

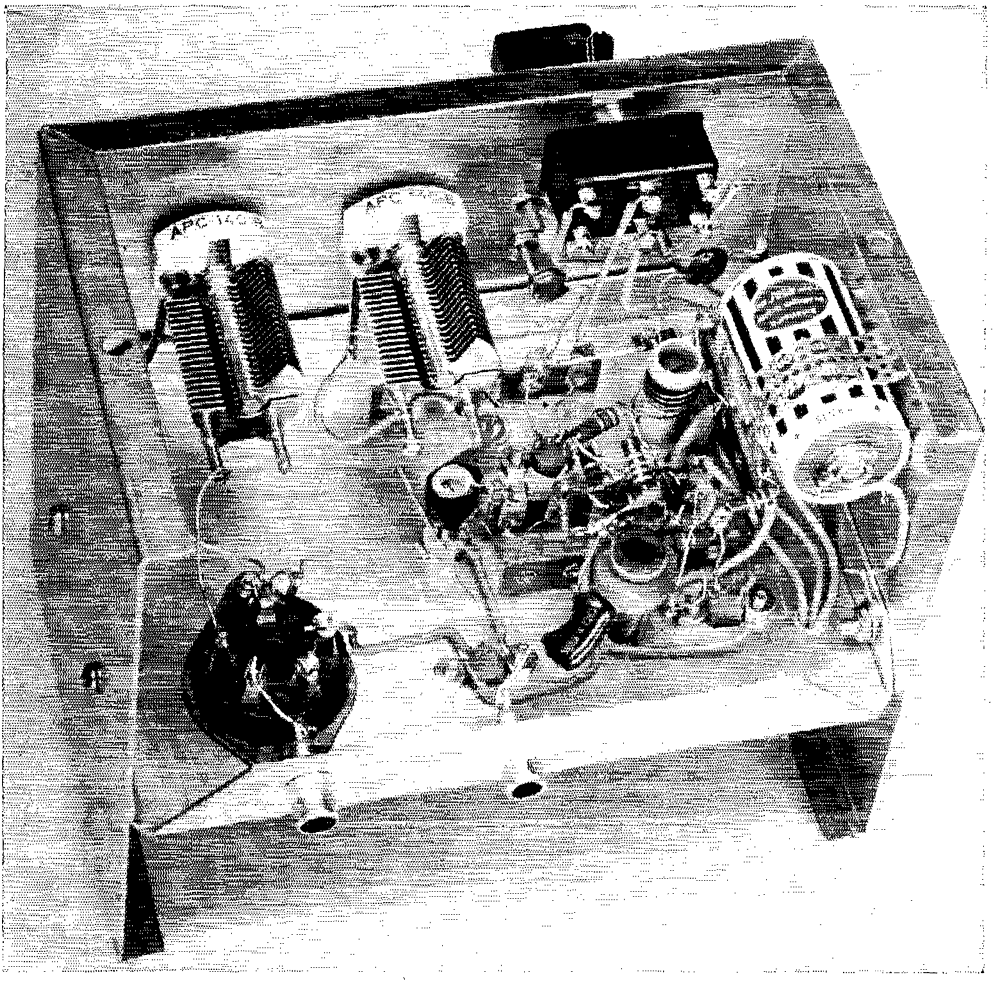
into the b.c. receiver, which can be tuned from 550 to 1050 kc. for 80-meter coverage and from 550 to 850 kc. for 40 meters. Q_3 is the beat-frequency-oscillator transistor which oscillates in the 262 kc. region, the intermediate frequency used in the majority of automobile radios. The output from the b.f.o. can be coupled directly to the input of the b.c. set or, for better b.f.o. action, directly into the i.f. or detector circuit of the b.c. set. Band selection is accomplished by plug-in coils for the input circuit, $L_1L_2L_3$, and by S_1 for switching the oscillator crystals and plate circuit. S_2 is a 2-pole 3-position switch; first position, converter off, next, converter on, and third, b.f.o. on.

Construction Information

As pointed out in previous articles, it is getting more and more difficult to get ordinary parts for building your own gear so we like to include a little information on "where." The Miller slug-tuned coils used for L_4, L_6 and L_8 are available from most of the mail-order houses, as are also the two variable capacitors. Incidentally, *any* of the small variables having a maximum capacitance of 140-pf. can be used, and these are quite common in junk boxes. While a specific type of switch is mentioned for S_2, any 2-pole 3-position switch can be used.

The converter is built into a 4 × 5 × 6-inch Minibox, with most of the components mounted on a shelf made from a piece of aluminum, 4 × 6 inches, fitted into the box. The shelf is mounted three inches from the bottom of the box so that the plug-in coil form projects far enough above the top of the box to be readily accessible for changing.

The layout shown in the photographs should



Mounted on the front wall at the upper left are C_1 and C_2. The battery is held in place on the right side by a small piece of aluminum. In the upper right corner are the oscillator crystal and tank circuit switch.

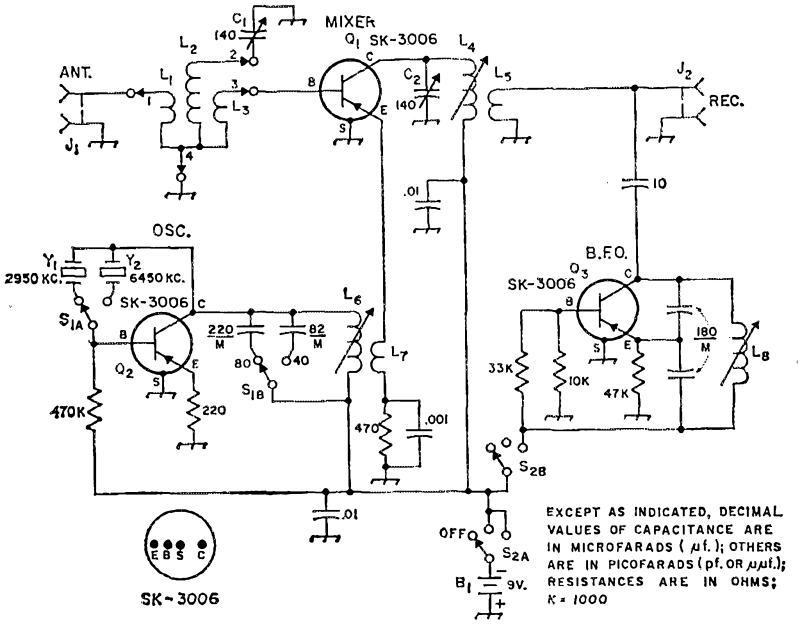


Fig. 1—Circuit diagram of the transistor converter. Fixed capacitors of decimal value are disk ceramic, M = mica. All resistors are ½-watt composition.

C_1, C_2—140-pf. variable (Hammarlund APC-140-B).
B_1—9-volt transistor battery.
J_1, J_2—Phono jacks.
L_1, L_2, L_3—3.5 Mc.: L_1, 9 turns No. 24, 32 turns per inch, 1-inch diam. L_2, 32 turns No. 24, 32 turns per inch, 1-inch diam. (L_1, L_2 made from a single length of B&W Miniductor type 3016; see text). L_3, 10 turns No. 28 or 30 enamel-covered wire, wound on cold end of L_2.
7 Mc.: L_1, 7 turns No. 24, 32 turns per inch, ¾-inch diam. L_2, 20 turns No. 24, 32 turns per inch, ¾-inch diam. (L_1, L_2 made from single length of B&W Miniductor type 3012; see text).
L_3, 7 turns No. 28 or 30 enamel-covered wire, wound on cold end of L_2.
L_4—Slug-tuned coil, 190 to 330 μh. (Miller 4513).
L_5—30 turns No. 30 enamel, wound on cold end of L_4, see text.
L_6—Slug-tuned coil, 6.7 to 15 μh. (Miller 4406).
L_7—Four turns No. 28 enamel wound over L_6.
L_8—Slug-tuned coil, 3.3 to 4.1 mh. (Miller 21A333RBI).
Q_1, Q_2, Q_3—RCA type SK-3006.
S_1—Double-pole, double-throw toggle.
S_2—Double-pole, three position wafer (Mallory 3222J).
Y_1, Y_2—3.5-Mc. band, 2950 kc.; 7-Mc. band, 6450 kc.

be followed, particularly in mounting the plug-in coil socket and C_1. Transistor sockets were used in this unit, since the danger of burning out a transistor when soldering its leads is eliminated by the use of sockets.

If you want to solder the transistor leads directly, certain precautions should be observed. Always use extreme care when soldering transistor or other semiconductor leads or terminals where the leads are attached. Make all solder connections as far from the body of transistor as possible. Always use a heat sink, such as a metal clip, attached to the lead being soldered between the body of the transistor and the solder point. The metal clip will conduct heat away from the body of transistor. In other words, always treat a transistor as a delicate device. By the same token, be sure before applying power that the circuit is wired correctly. Check and double-check your wiring, otherwise you may have an error — and it only takes an instant for a transistor to be ruined.

You'll note in Fig. 1 that we have included a diagram of the leads for an SK-3006 and have also labeled each of the transistor leads in the circuit; B = base, E = emitter, C = collector, and S = internal shield.

Coupling links L_5 and L_7 are made from enameled wire. L_5 consists of 30 turns of wire scramble wound around the cold end (the end bypassed by 0.01 μf.) of L_4. A small piece of electrical tape is wound around over the two coils to hold L_5 in place. When scraping away the enamel be careful that the ends of L_5 don't short to the terminal of L_4. The L_6 winding is first covered with a piece of tape and then L_7 is wound directly over L_6 and positioned near the cold end of L_6.

The $L_1L_2L_3$ combination is made up and then mounted inside a 1¼-inch-diameter coil form. L_1 and L_2 are made from single lengths of coil stock, the coils being separated by the space of a single turn. Unwind about one turn from the end of the coil stock to provide enough lead length to reach through the plug-in coil pin. Next, count off the correct number of turns for L_1 and then cut the wire at the next turn. Unwind the two ends at this point and solder

enough additional lead to each wire to reach through the coil-form pins. Count off the number of turns for L_2, unwind enough lead length, and then trim off the excess. L_3 consists of enamel-covered wire wound between the turns of L_2 at the cold end (ground end in this case), leaving enough lead length to fit down into the pins. The coil assembly is then mounted in the form with the leads fed down through the pins. The leads should be shortened up as much as possible and then soldered.

Tune Up and Adjustments

Use a short lead of shielded cable — about 10 inches of RG-58/U, for example)— to connect the converter to the receiver. Turn on both units and check to make sure that crystal-oscillator is operating. You can tune your regular station receiver to the crystal frequency and you'll hear the oscillator signal. Or a wavemeter or grid dip meter can be coupled to L_6 and tuned to the crystal frequency. If you find that there is no oscillation, adjust the slug in L_6, trying it farther in or out of the form until the stage oscillates. We found that the slug was slightly disengaged (up into the coil form) from the winding when the stage oscillated.

Once you have the stage working on one band, switch S_1 and try the other band. You may have to readjust the slug in L_6 to find the setting that works for both bands. However, we built two versions of the unit and didn't find this particular adjustment critical. As a matter of fact, you may find that with an antenna connected to J_1 you hear signals in the ham bands immediately. If so, tune both C_1 and C_2 for a peak.

You'll have to experiment with the adjustment of the slug in L_4. Tune in a signal on the low end of 80, near 3500 kc., and see if the tuning of C_2 peaks the signal. If it doesn't, adjust the slug so that C_2 does peak at this point. A few minutes experimenting will find the slug setting that permits C_2 to peak any signal across the 80-meter band.

Next, switch S_2 to the b.f.o. position. Tune in a c.w. signal (you may hear just thumps at

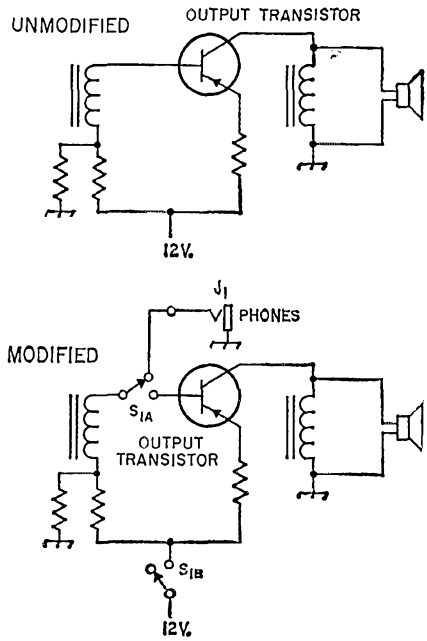
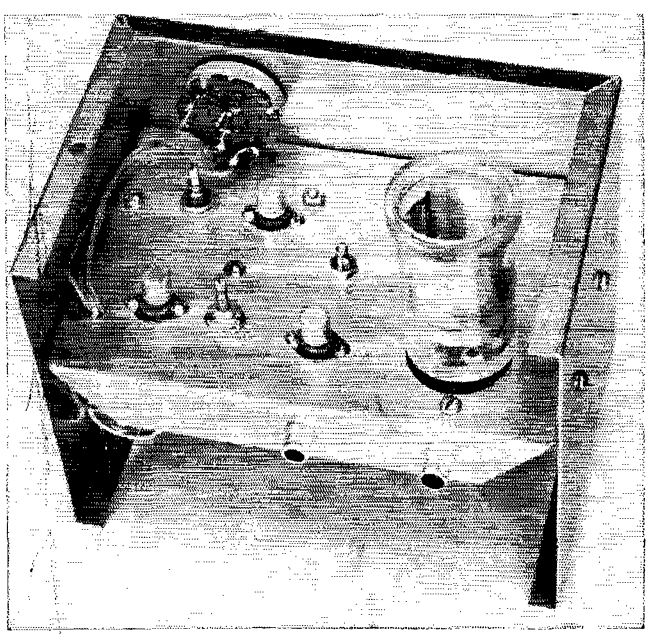


Fig. 2—Circuit of the automobile broadcast-set audio section before and after modification.
J_1—Headphone jack.
S_1—Double-pole, double-throw toggle.



This top view of the inside of the converter shows the parts arrangement. The coil-slug adjustment and transistor near the switch are for the oscillator circuit. At the left rear are the coil and transistor for the b.f.o. The phono jack at the right is J_1 and J_2 to the left. Two holes are drilled in the back of the Minibox cover to clear the two jacks.

first), and adjust the slug in L_8 until you hear the beat note come in. To keep the cost down and the circuit as simple as possible, we didn't put in a b.f.o. pitch control. You set the slug in L_8 once and forget it. However, after you have become familiar with the converter operation the ideal setup is to adjust the slug so that you can copy an s.s.b. signal. Tune in an s.s.b. signal and by adjusting the slug and the tuning dial of the b.c. set you'll find a setting that provides s.s.b. copy. Once you've found the slug setting you can forget it.

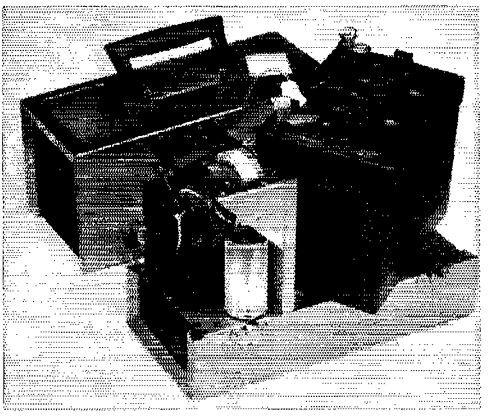
Earlier we said that the b.f.o. output could be connected directly to the b.c. set input. However, this doesn't always provide good b.f.o. signal injection. The best place to put the signal is into the first i.f. stage or detector stage of the b.c. set. Instead of coupling the 10-pf. capacitor directly to the top of L_5, run an insulated lead (ordinary hookup wire is suitable) out of the converter and into the b.c. set. Make a small loop at the end of the hookup wire and place it near any of the transistors that are connected to the set's i.f. transformers, or near the leads going into one of the transformers. A little experimenting will show you the best spot. Once you find a location that provides a good beat note for copying s.s.b. or c.w., tape the lead to that spot. If you plan to use the b.c. set for broadcast listening, as you may do if it is mounted in an automobile, you can mount a phono jack on both the converter and radio for disconnecting the b.f.o. lead.

The power drain on the battery can be reduced for headphone listening. How to do it will of course depend on the circuit in your set. If you don't have a circuit diagram you can locate the audio transistor by tracing back from the speaker leads. They should go from the speaker to an output transformer. The input leads of the transformer will be connected to the audio transistor, which in our case was a large job mounted on a heat sink on the back of the receiver. We rigged up a double-pole switch that opened the leads to the transistor and installed a headphone jack connected to the side of the driver transformer that normally fed the base of the audio transistor. Fig. 2 shows the circuit as modified. The audio level for headsets wasn't overpowering but it was sufficient for pleasant listening.

In conclusion, we found it was a lot of fun building up the converter and getting it working. However, the precautions about wiring transistors was not just idle talk — we burned out two of them by being careless!! QST

• New Apparatus

Trav-Electric Power Pack



This little package is a field source of 120-volt a.c. power in a lunch-box-sized package. The 29-pound unit will supply up to 175 watts of power. The uses of such a device are about unlimited for Field Day, running an electric drill at the top of a tower, or v.h.f. mountain-topping where the car won't go.

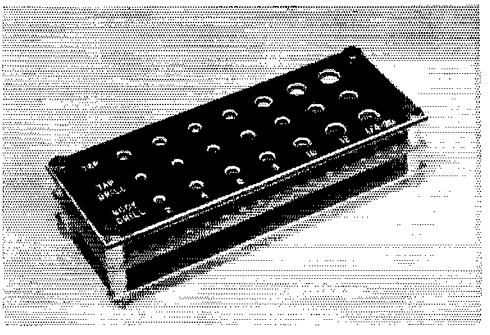
The heart of the Trav-Electric is a 25-amp. 12-volt storage battery, the size used on motorcycles. An inverter transforms the 12 volts d.c. from the battery to 120-volt a.c. power. The frequency of the 60 c.p.s. output is maintained within ½ c.p.s. with loads up to the rated output. After the unit has been in service, an internal charger is used to recharge the battery. This charger may be operated from a 12-volt automobile electrical system by a cord that plugs into the cigarette-lighter receptacle, or from 120-volt a.c.

A meter located on the top of the unit indicates the hours of anticipated output left and the charge rate of the internal battery. The power pack is constructed on a steel chassis and has a copper-clad steel case. The battery is located in a separate compartment to protect the electronics from battery spillage. The Trav-Electric and other inverters are manufactured by the Terado Corporation, 1062½ Raymond Ave., St. Paul, Minnesota 55108. — *W1KLK*

Carter Drill-Tap Holder

The model DH-21 drill and tap holder shown in the photograph is a neat and useful item for the ham workshop. The top panel of the assembly is engraved with white letters on glossy black. The unit will hold 7 taps, 7 body drills, and 7 tap drills — for 2-56, 4-40, 6-32, 8-32, 10-32, 12-24, and ¼-20 screws. It comes in kit form and can be assembled with a screwdriver in about 5 minutes. The unit is manufactured by the Carter Electronics Lab., 737 S. DeQuincy Street, Indianapolis, Indiana 46203. It measures 1¼ inches high, 5-inches wide and 2-inches deep.

— *W1CUT*



Inexpensive NCEF Monitoring

BY JACK GJOVAAG,* W7UKI/Ø

THE proposals set forth in the March 1965 issue of *QST*, for use of the National Calling and Emergency Frequencies (NCEF), can become a worthwhile program. Our public-service endeavors can readily be furthered if all amateur operators will cooperate in the program. The success of such an effort depends on two important things: Voluntarily reserving the full-time NCEFs for calling and emergency work *only* and monitoring these frequencies so that anyone requiring their use can get results.

Since many amateurs do not have a second receiver, monitoring of these channels may present certain problems. Amateur operators having two receivers may find it necessary to have them both tied up, on a full-time basis, as was the case with the author. What is obviously needed is an inexpensive receiver that can be set on the NCEF and turned on whenever we are in the shack. This article describes a simple, low-cost approach to this problem.

Selection and Modification

The monitor discussed in this article was built from an a.c.-d.c. broadcast-band receiver. There may be one of these units gathering dust in your attic, or perhaps you have an old Conelrad receiver that could be modified. On the other hand, radios of this variety can often be purchased from the local Goodwill Store (or similar) for a couple of dollars. The older models may have octal-type tubes, or even the loctal species, while the newer models will have the miniature variety of tubes. Both types are electrically similar and the following discussion applies to either kind.

The 3550-kc. channel was chosen for NCEF monitoring so that stability and image rejection would be less difficult to achieve. Reception of c.w. was made possible by causing the i.f. amplifier to oscillate, thus providing a beat-frequency oscillator.

The first step in modification is to remove the loop antenna, oscillator coil and tuning capacitor from the receiver. Generally, the oscillator coil will be found below the chassis, with the grid-leak network connected to it. The grid-leak resistor should be removed and placed between the cathode and grid No. 1 of the mixer-oscillator tube as shown in Fig. 1. Generally, this stage will contain a 12SA7, 14B8 or 12BE6 tube. Coils L_1 and L_3 are mounted in the space made vacant by the removal of the tuning capacitor. These coils can be wound on ¼-inch diameter iron-slug forms, taken from an old TV

* 7019 Dartmouth, University City, Missouri 63136.

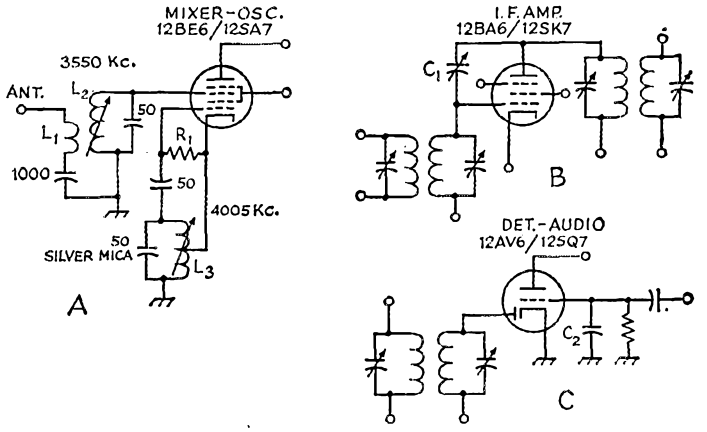


Fig. 1—Schematic diagrams showing the changes made in the circuitry of the a.c.-d.c. receiver. The modification to the mixer-oscillator stage is shown at A; modification to the i.f. stage at B, and changes to the audio amplifier are shown at C. Capacitor values are pf. Do not use chassis for ground return.

C_1—Gimmick capacitor (see text).
C_2—350 pf.
L_1—10 turns No. 28 enam. scramble-wound and spaced ⅛ inch from cold end of L_2 on same form.
L_2—65 turns No. 28 enam., scramble-wound on ¼-inch diam. iron-slug form.
L_3—50 turns No. 28 enam., scramble-wound on ¼-inch diam. iron-slug form. Tap at 15 turns from cold end.
R_1—Original grid-leak resistor (see text).

set. Other form diameters can be used, with appropriate modification to the number of scramble-wound turns used. This would have to be determined experimentally.

The connections to the oscillator coil (L_3) should be made with stiff wire, for best stability. The cold ends of coils L_2 and L_3 are returned to the negative terminal of the B supply, which can be located by tracing back to the negative lead on the filter capacitor. Most well-engineered a.c.-d.c. radios use a "floating" ground buss for reasons of electrical safety, thus preventing the use of the chassis as a return circuit. Next, the feedback capacitor (C_1) can be added to the i.f. stage. A one-inch length of stiff insulated wire is soldered to the grid pin of the i.f.-amplifier tube socket (12SK7 or 12BA6). Bend this gimmick-capacitor wire so that it is near the plate pin on the same tube socket. A 350-pf. capacitor is now added to the first audio-amplifier stage by soldering it between the grid pin of the tube socket (12SQ7 or 12AV6) and the negative return of the B supply. This will be necessary to prevent the r.f. voltage, caused by the oscillating i.f. stage, from biasing the audio amplifier stage to a reduced output level.

Final Adjustment

Final adjustment of the circuit can most easily be accomplished with the aid of a grid-dip meter. First, adjust L_2 to 3500 kc. The oscillator coil, L_3, can be set to resonance at about 4000 kc. Turn the receiver on and adjust the gimmick capacitor (C_1) toward the plate pin of the i.f. amplifier until a slight thump is heard in the receiver's audio output. Bend this lead slightly beyond the point where the thump is heard. Connect the antenna to the receiver and adjust L_3 until the 80-meter c.w. band is located. A calibrated signal generator, such as the BC-221, can be used to set the receiver on 3550 kc. If such a frequency meter is not available, a grid-dip meter can be used by tuning in its signal on the main station receiver at 3550 kc. and then adjusting the NCEF receiver to the same signal. Coil L_2 can now be peaked for maximum signal response.

My monitor is fairly sensitive and has a wide passband which is an advantage in this case. Although the author has yet to hear a station using the NCEF, I am hopeful that the program will catch on and the monitor will receive regular workouts. QST

Strays

This is Glenn F. Van Blaricum, Jr., K9RCT, who was named co-Valedictorian of the June graduating class at the University of Illinois. Glen plans to return to the University in the Fall to study for a Master's Degree in Electrical Engineering on a Hughes Aircraft Fellowship.

WN4TTY sent in a clipping from the Nashville *Tennessean* which reported about a ham who placed a classified newspaper ad offering "home-brew equipment." Response to the ad came from folks wanting apparatus for making moonshine and a typical telephone call went like this: "I'm interested in your home-brew equipment." "Ok, what kind of license do you have." "License? Can you get a license? I've always made it on the sly."

—•••—

W2JPX notes that commercial radiotelephone links the United States with only 88 other countries. Hams aren't doing too badly if the "commercials" can't make DXCC!

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Sorry, but templates are *not* always available for equipment described in *QST* articles. If templates have been made up, we will mention that fact in the article. If the article doesn't mention templates, we haven't got 'em.

Charles Boegel, WØCVU, sent a letter of inquiry to a musical record company and signed his name and amateur call to the letter. The company replied: "I note your signature appears to be a radio station. There is no outlet so designated listed in the government books on broadcasting. Are you a new station?"

K4NAA was operated from the lobby of the Sheraton Park Hotel, Washington, D.C. as the official Armed Forces Communications and Electronics Association amateur radio station during the AFCEA convention in May. Two operating positions were used in conjunction with a display of antique Navy communications equipment. The station was manned by Marine Corps personnel from the Quantico Amateur Station, as well as Navy personnel from K4AA. Shown in the photograph are left to right: Frank Gunther, W2ALS, Col. W. J. Baird, AFCEA General Manager, and Staff Sargent R. E. Connelly. (Official U. S. Navy Photograph by D. S. Peterson, PH1, USN)

June V.H.F. QSO Party Results

COMPILED BY ELLEN WHITE,* W1YYM

***Contest:** Earnest struggle for superiority, victory, defense, etc.* — **Webster's.**

The struggle for superiority is evident in a contest. But what is this superiority? Can a fine operator with poor equipment achieve superior results. Sure, if the competition is inferior or non-existent. The reverse is also true. The elements of a good competition are evident wherever you look in an ARRL V.H.F. QSO Party. In hotly contested big sections it's a really rough race because of the competition; in the scarcely populated remote sections it's tough because of propagation difficulties. The thrill of it all is to match your station and your operating abilities against others in your geographic area and then separate the men from the boys.

THE time was the weekend of June 12-13, 1965. The place was "The World Above 50 Mc." and conditions were . . . well, except for some sketchy sporadic-*E*, they were terrible. What was achieved during this period, is nevertheless, impressive. Without really good openings, hundreds of hams throughout the United States and Canada reported results ranging from a few to hundreds of exchanges on many bands. Those reporting numbered 451 in 61 sections of the ARRL field organization. Whether east or west, the big efforts show the results of intensive planning, organization and very often intense club interest. The really big scores come from versatile operation. Even a few contacts on a new band meant a larger overall multiplier and added appreciably to the score. The chart accompanying this report shows this very eloquently.

Although the chart herein does not permit the break-down of results above 420 Mc., numerous entries did make contacts there, as indicated in the section tabulation.

A surprisingly large number of section leaders from various parts of the country have earned section awards for single-band operation. For example, W3HC, W6ZRR and VE2ZX led their respective sections operating solely on two meters. Section toppers, with solo performances on six only, include: W1HIL W4CAH WA4JZT WA4LTS WA4VLD/6 WA4YFL/4 W5UQR WA7AKI K7QFW/7 K9YGR WAØ-CQG KØUDZ VE4HI and VE6OH. All section leaders are reminded that certificate awards are scheduled for September 15 mailing.

How many bands are you planning to operate in the September ARRL V.H.F. QSO Party?

Soapbox

"Two-meter activity was good with close to 100 contacts in all 9 sections of the state. The new Orange Section added zest in that the southern area of California isn't always contacted. Never before in 5 years of contesting from this area have we seen such activity from Southern California." — *K6TJL/6.* . . . "Equipment problems: Someone turned off the two-meter preamp. and it wasn't noticed for 10 hours; a 4CX250B and socket burned up (sob); the Gonset II driver for 432 quit two minutes before a sked." — *WA2JOQ.* . . . "Conditions were about the poorest I've seen in the last 3 VHF affairs, even the common W2s were a rarity." — *VE3DSE.* . . . "Two opened up for a few hours Saturday night, excellent signals from Southern Virginia, Western N. Y. and Western Penna., but didn't even hear N. C., Ohio or VE3." — *K3ONW/3.* . . . "The best part of *this* contest was the food, band conditions were miserable. — *VE3SAU.* . . . "Never take an air-vane governed generator to high altitudes. All regulation ceases." — *K6OKC/6.* . . . "Most satisfying contact was a new record for me on 432 Mc. to K6OKC/6, Mt. Pinos, Southern California (300 miles). This was not prearranged." — *W6GDO.* . . . "The only time we were really worried was when we were stopped by the police on Saturday morning and asked for a wide load permit for transporting the six-meter beam!" — *WB2FXB.* . . . "The first effort of our Bergen Amateur Radio Association and we couldn't blame a thing on Murphy: just us and the wind." — *WB2ERM/2.* . . . "Noticed more c.w. activity than ever before." — *W5PZ.* . . . "In general, conditions appeared poorer than a year ago, no band openings of any sort." — *VE2ZX.* . . . "One WØ answered me saying 'guess you have some sort of a contest going on up there so I won't keep you.'" — *VE6OH.* . . . "Conditions on 6 were typical of the June parties with sporadic openings." — *K7BJV.* . . . "Best 220 Mc. activity ever, even QRM!" — *W2SEU.* . . . "A good workout for Field Day for us what with mosquitoes, poison oak and run-down batteries." — *WB6KSI/6.* . . . "Contrary to much advice, my stacked halos get out really well on two." — *VE3DAW.*

A little of what goes into a successful group effort is demonstrated by the crew of WA2PZE/2, the Long Island V.H.F. Society putting in a good show on four bands for over 15,600 points.

* Assistant Communications Manager, ARRL.

SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Novice Award Winner.

ATLANTIC DIVISION

Delaware

W3HC 333- 37- 9-B
K3NYG 68- 17- 4-A
W3KOI (12 oprs.) 7878-303-26-AB

Eastern Pennsylvania

K3IPM 17,388-382-42-ABCD
K3EUL 5236-238-22-AB
W3ETB 2145-143-15-A
W3KGI 686- 49-14-AB
K3LWY 90- 30- 3-A
WA3CIJ/3 84- 21- 4-AB
WN3BKE 60- 20- 3-B
K3ZXG 56- 14- 4-B
WA3BGN 20- 10- 2-A
W3CCX/3 (19 oprs.) 35,568-622-52-ABCD
K3ONW/3 (4 oprs.) 13,547-437-31-AB
K3JFL/3 (K3s FRN IPW JFL) 12,540-407-30-ABC
K3YFD (WA3ABZ, W3LUW, WA8WCW) 8613-319-27-AB
W3ARW (W3s ARW, PMG, K3SQO) 5436-135-36-ABCD
K3YGH (4 oprs.) 5208-158-31-ABC
W3VPJ (K3s ARR KBB VTK) 594- 54-11-AB

Md.-D.C.

K3OSZ 2044-146-14-AB
W3LKU 2008-118-17-AB
W3DUL 1770-118-15-A
WA3CBC 1666- 98-17-AB
K3YYP 1356-113-12-AB
WA3AER 1161-129- 9-A
K3MIWQ 1160-116-10-AB
K3FPE 1044-116- 9-AB
K3ZSX 1008-126- 8-A
K3YSI 960-120- 8-A
K3WVJ 860- 86-10-B
K3URE 832-104- 8-A
K3PEJ 702- 78- 9-AB
K3YVC 606-101- 6-A
W3LUL 583- 53-11-B
K3VIR 540- 60- 9-AB
K3YSQ 532- 76- 7-A
K3RWY 420- 70- 6-A
K8KEQ/3 384- 48- 8-B
W3PIH 371- 53- 7-B
K3VGX1 336- 56- 6-AB
WA3AJR 244- 61- 4-AB
K2UOP/3 215- 43- 5-A
K3NCQ 70- 35- 2-A
WA3AJS 60- 30- 2-B
WN3CFK 30- 10- 3-B
K3JUK/3 (K3s VGX VJY, W3HDZ) 8425-337-25-AB
K3NXU (K3s NXU WLK) 1397-127-11-AB
K3VRS (K3s VAE VRS) 1000-100-10-AB
K3WVJ (K3s VFT WVJ) 860- 86-10-B

Southern New Jersey

WA2VBN 1665-109-15-ABD
WB2NOK 650- 65-10-AB
WA2MGV 238- 34- 7-AB
W2MQF/2 198- 22- 9-B
K2YNT/2 (11 oprs.) 16,769-380-41-ABCE
WB2TBQ/2 (5 oprs.) 1008-112- 9-AB
WB2LZW (WB2s GUN LZW RVE) 483- 69- 7-AB

Western New York

WA2VAI 2125-120-17-ABCD
K2YCO 2100-129-15-ABCD
WA2THS/2 1272-106-12-A
WA2KND 602- 86- 7-AB
WA2TEY 413- 59- 7-AB
W2DJL 252- 63- 4-A
WA2EJS 210- 73- 3-A
K2RFO 150- 50- 3-AB
WB2PVS 70- 35- 2-A
K2BBJ 56- 28- 2-AB
WA2QKT 32- 16- 2-AB
W2AGG 14- 7- 2-B
W2RHQ 10- 5- 1-D
WA2EHS 7- 7- 1-A
WA2WEB/2 (10 oprs.) 19,228-407-44-ABCD
K2CEH/2 (6 oprs.) 12,138-273-42-ABCD
K2OVB/2 (5 oprs.) 10,476-283-36-ABC
WA2JOQ (10 oprs.) 3674-163-22-ABC
W2OW (19 oprs.) 3400-200-17-AB
W2MAU/2 (8 oprs.) 2010-121-15-ABCD
K2ERQ (9 oprs.) 1180-118-10-AB
WA2SHE (4 oprs.) 1128- 94-12-AB
K3UIU/2 (4 oprs.) 1128- 94-12-A
W2RTG/2 (7 oprs.) 1092- 91-12-AB
WB2NUQ/2 (WB2NUQ, W3CSG, K3LIA) 648- 72- 9-A

Western Pennsylvania

W3BWU 2010-134-15-AB
W3DJM 216- 36- 6-A
WA3CIA 159- 53- 3-A
K3ZAP 60- 20- 3-A
WN3CSH 32- 8- 4-B
K3HKK/3 (7 oprs.) 5640-187-30-ABC
K3IWK/3 (5 oprs.) 4824-268-18-AB
W3QZF/3 (Multi-opr.) 301- 43- 7-A

CENTRAL DIVISION

Illinois

WA9KAW 1340-134-10-AB
WA9IPJ 1331-121-11-AB
WA9KYE 1161-129- 9-AB
KL7EBB/9 1157- 89-13-AB
WA9FIH 819-117- 7-AB
WA9EEG 584- 73- 8-AB
K9RVG 560-112- 5-B
W9EET 460- 46-10-AB
WA9KAY 198- 33- 6-AB
WA9OOU 156- 39- 4-A
K9FBL 120- 24- 5-AB
W9AXT 84- 21- 4-B
WN9OTN 60- 20- 3-B
WA9KQD 48- 16- 3-B
K9YZG 4- 4- 1-A
K9JAM (7 oprs.) 3624-302-12-AB
K9MFE (4 oprs.) 2951-227-13-AB
WA9MDX (5 oprs.) 2535-195-13-AB
W9AML/9 (4 oprs.) 1708-122-14-AB
K9YHB (5 oprs.) 696- 87- 8-AB
K9TSX (4 oprs.) 357- 51- 7-AB
K9HGX (8 oprs.) 252- 42- 6-AB

Indiana

K9QCB 6750-245-27-ABCDE
K9QXS 4144-257-16-ABDE
K9KFR 605- 55-11-AB
W9HVY 497- 71- 7-AB
K9APH (K9s APH YIE, WA9ASZ) 2784-174-16-AB

Wisconsin

K9YGR 7965-295-27-A
WA9CBP 5035-265-19-AB
WA1BWF/9[2] 1027- 79-13-AB
W9DHQ 406- 58- 7-B
WA9JFM 357- 51- 7-B
W9TQ 28- 7- 4-B
W9CIZ/9 (11 oprs.) 2025-135-15-AB

DAKOTA DIVISION

Minnesota

WA0CQG 112- 28- 4-A
WA0DWM (WA0s DWM HRM JCX) 808-101- 8-AB

South Dakota

K0UDZ 5292-189-28-A
K0CER 1332- 74-18-AB
K0FKJ 1173- 69-17-AB

DELTA DIVISION

Louisiana

W5UQR 1632- 68-24-A
WA5DXA 1368- 76-18-A
K5IFJ 1088- 68-16-A
WA5IBT 215- 43- 5-A

Tennessee

WA4YFL/4 2144-134-16-A
WA4CGA 2128-112-19-AB
K4EJQ 650- 50-13-AB
WA4HGQ 477- 53- 9-A
WA4UKM 216- 27- 8-AB
K4FKO (K4s FKO FSH, W4TZG) 4715-202-23-ABD
W4SKH/4 (8 oprs.) 4640-232-20-AB
WA4VSU/4 (WA4s VAW V8U) 140- 28- 5-A

GREAT LAKES DIVISION

Kentucky

WA4SIQ 1200- 70-16-ABC
WA4SKP 909-101- 9-A
WA4ERT 700- 50-14-A
W4SCC 154- 22- 7-A
K4QPJ/4 (K4QPJ, WAYQVQ) 6048-224-27-AB

Michigan

W8WOG/8 (4 oprs.) 4680-260-18-AB
W8PLP/8 (5 oprs.) 1560-130-12-AB

Ohio

W8JRN 1507-137-11-AB
WA8PAM 819- 91- 9-A
WA8LOW 638- 58-11-AB
WA8CXV 568- 71- 8-A
WA8KRE 510- 85- 6-AB
WN8NJR 345- 69- 5-B
WN8OUB 300- 60- 5-B
W8JIN 145- 29- 5-A
WA8MVD 20- 10- 2-A
W8FAZ 2- 2- 1-B
WA8LEO 2- 1- 1-A
WA8BOA/8 (14 oprs.) 13,225-529-25-AB
W8CCI (6 oprs.) 9604-343-28-AB
K8CJY (5 oprs.) 4180-207-20-ABD
WA8PUY (9 oprs.) 2314-178-13-AB
W8VND (4 oprs.) 1197-133-9-BC
WA8NZL (WA8s GRA NZL) 340- 68- 5-AB
W8UMD (WA8s MGD MGS MHC) 252- 36- 7-AB

HUDSON DIVISION

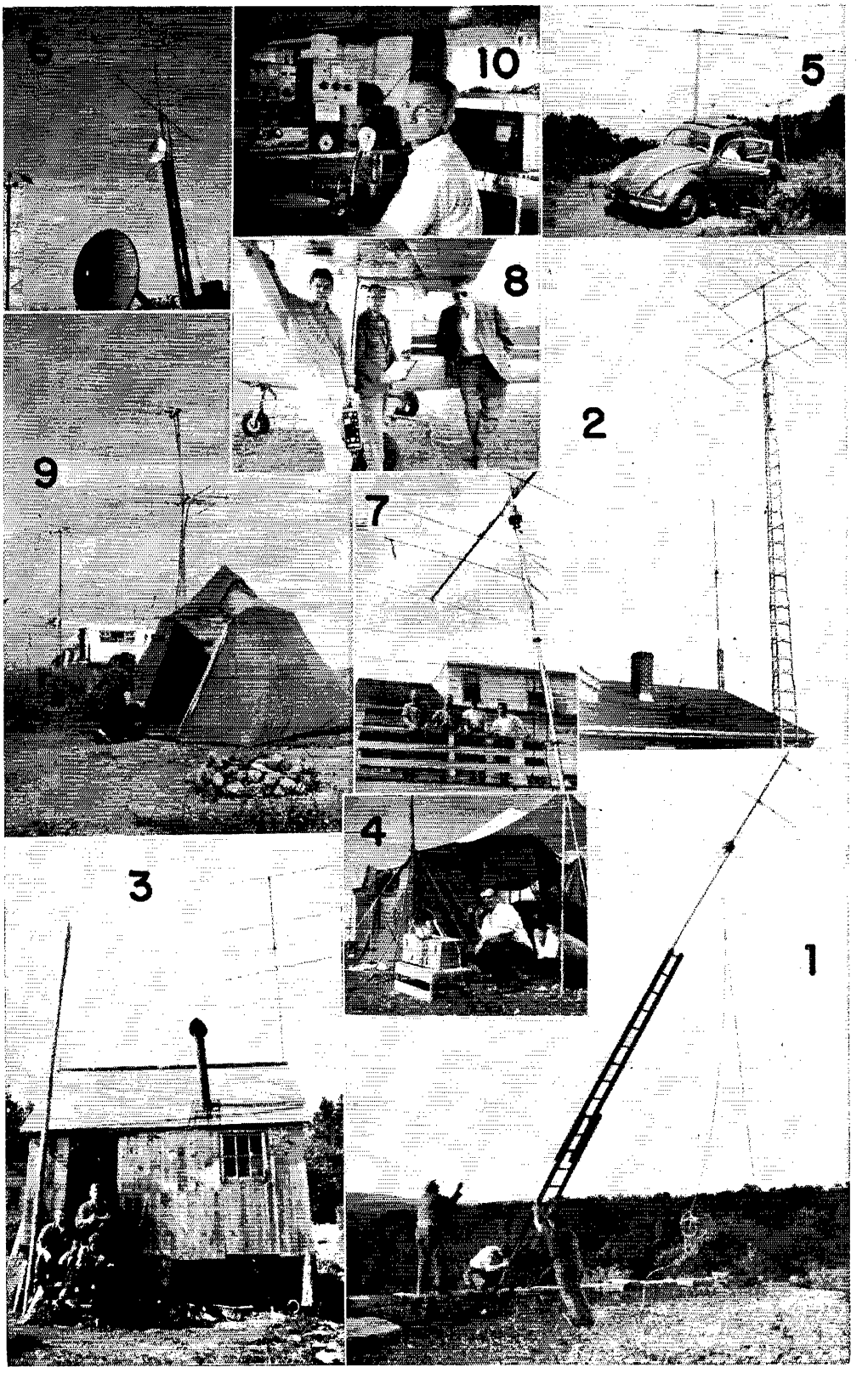
Eastern New York

K2GXJ 1840- 82-20-ABC
WB2MIYY 500- 50-10-AB
W2IP 248- 31- 8-B
WB2LQF 30- 6- 5-B
WB2FKJ/2 (13 oprs.) 22,990-366-55-ABCDE
WA2HRE/2 (6 oprs.) 9472-281-32-ABC
WB2FXB (5 oprs.) 9375-375-25-AB
WA2USG/2 (WA2s USG ZPD) 1000-100-10-B

N.Y.C.-L. I.

W2SEU 6501-168-33-ABC
WA2RTR/2 2880-160-18-AB
WA2OTN 2496-156-16-AB
K2MUB 2200-100-22-A
WB2QJA 1200-100-12-AB
WB2KHO 1134- 81-14-AB
WB2GQZ 876- 73-12-AB
W2KXG 810- 81-10-B
WA2DRK 780- 65-12-B

1. At a 1600-foot elevation in Goshen, Conn., W1LUA/1, the Canaan Amateur Radio Society operated by K1s ORF SVI STM BEN EUQ and WA1BAM amassed 250 contacts on 3 bands. This photo shows three of the crew putting up the array for 220 Mc. **2.** K1TPK tops for R.I. and a leading scorer from New England uses 4 over 4 on six meters, 11 elements on two—all QSOs the hard way, crystal controlled! **3.** The Oak Ridge Amateur Radio Operators Club W4SKH/4, worked two bands for 4640 points. This is the 6 meter crew in front of the Mt. Le Conte Lodge, Tennessee. **4.** VE7ASM/7 operated by VE7ASI shown with the equipment for 10 Kmc. This included a 723AB klystron and polaplexer to 12-inch electric heater parabola, 30 Mc. radar i.f. strip, and v.r. stabilized repeller and cavity power supplies. **5.** Those VW sunroofs are a natural when operating portable! This was well proved out S.C.V. way by WB6KSI/6 operating six and two on top of Black Mountain, about 10 miles west of San José. **6.** Six bands were operated by W2BVU manning the K1JIX station. This shot shows (top to bottom) a 5-L for 50 Mc., 13-L for 220 Mc., a 30-inch dish for 1296 and a four-foot dish for 2415. This much hardware makes that wind instrument a necessity. **7.** WB2FXB was manned by five of the gang out in E.N.Y. in a 6-and 2-meter effort netting 9375 points. **8.** Though not actively participating, VE3AGU mobiled aircraft fashion in an attempt to encourage some extra local activity in the eastern section of Ontario. Participating were (left) VE3CUA the radio operator, VE3AGU logger and navigator and VE3CAU the pilot. **9.** An overall view of the type setup used by popular W6NLO/6 out in San Diego. This time around the group worked four bands for 305 exchanges and an f.b. multiplier of 21. **10.** WA5WAX shown at the neat 50-Mc. position of the multi-op. group doing a great job in Oklahoma.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WN2SQO 765- 85- 9-B
WN2QLP 585- 65- 9-B
WB2PAU 532- 76- 7-B
WA2ZCK 423- 47- 9-B
WB2POY 320- 40- 8-A
WB2MEO 228- 38- 6-B
WB2QXH 135- 27- 5-A
WB2QWZ 80- 20- 4-B
W2HAE 60- 12- 5-A
K2HTX 55- 11- 5-AB
WB2OOJ 7- 7- 1-B
WA2PZE/2 (4 oprs.) 16,514-359-46-ABCD
K2RIW (10 oprs.) 12,046-279-38-ABCD
WA2SLY (WA2s RAT SLY) 2041-157-13-B
W2ZOA/2 (WN2ROZ, WB2RQN) 1215-135- 9-AB

Northern New Jersey

WA2WIL 4669-203-23-AB
WB2GCD 4275-152-25-ABC
W2GKR 3648-192-19-AB
WB2CIN 2329-137-17-AB
WA2OOD 1716-132-13-B
WB2JVE 658- 94- 7-A
WA2PRM 531- 59- 9-AB
WB2RNO 483- 69- 7-A
WA2VTE 336- 28-12-AB
W7PUA/2 288- 18- 8-D
WA2ZRT 216- 36- 6-A
W2QJY 120- 30- 4-B
WN2SYR 8- 4- 2-B
WA2FSQ (6 oprs.) 31,920-665-48-ABCE
K2VAC/2 (8 oprs.) 26,918-593-43-ABCE
K2BJP/2 (14 oprs.) 18,232-380-43-ABCD
W2MFF/2 (7 oprs.) 5520-240-23-AB
WB2ERM/2 (14 oprs.) 3248-203-16-AB
K2DEL (7 oprs.) 3230-190-17-AB
WB2QZZ (5 oprs.) 1440- 96-15-AB
W4CEB/2 (4 oprs.) 780- 78-10-AB

MIDWEST DIVISION

Iowa

WØPFP 2673- 99-27-AB
KØKPQ 902- 82-11-AB

Kansas

KØGIC 645- 43-15-AB
KØPFV 333- 37- 9-A
WAØDZI 30- 10- 3-AB
WAØGOA 11- 11- 1-B

Missouri

KØIJJ 4619-149-31-AB
KØTLM 2268-108-21-AB
WØEKM 1248-104-12-A
WAØITU 18- 9- 2-B
WAØHGK/Ø (4 oprs.) 1920- 96-20-AB
WAØBED (WAØs BED JRJ) 1856-116-16-A
WAØHKP (WAØs HKP LSF) 120- 24- 5-A

NEW ENGLAND DIVISION

Connecticut

WB2DST/1 9048-377-24-AB
K1KKK 6050-110-55-AB
W1WHL 3013-131-23-AB
K1VON 1026- 52-19-ABC
W1BGD[3] 930- 62-15-AB
W1HNF 702- 39-18-AB
K1ZAT 500- 50-10-AB
WA1ANP[3] 192- 32- 6-A
K1PKQ/1 168- 24- 7-B
W1USF 80- 10- 4-D
WN1CWN 40- 20- 2-B
W1HDQ/1[3] 36- 9- 4-A
W1AW[3,4] 28- 14- 2-A
W1LUA/1 (6 oprs.) 7482-250-29-ABC
K1MYG/1 6 oprs.) 6528-198-32-ABC
K1MUJ/1 (12 oprs.) 4950-225-22-AB
W1BAA/1 (8 oprs.) 3036-138-22-AB
WN1CYU (WA1CYM, WN1CYU) 95- 19- 5-B

Eastern Massachusetts

W1HIL 539- 49-11-A
W1BWS 511- 73- 7-A
K1FZE 504- 56- 9-AB
K1EFM 496- 62- 8-B
K1ZGH 315- 35- 9-A
K1VHR 290- 58- 5-A
WA1DBF 95- 19- 5-B
K1ZCU 68- 17- 4-A
W1CTR 66- 22- 3-A
W1CTR/1 51- 17- 3-B
K1NTS/1 24- 8- 3-A
K1QQT (K1QQT, W9DHK, K9VCK) 3700-185-20-AB
WA1CBG (5 oprs.) 1339-103-13-AB
WA1DPX (WA1s DPW DPX) 1008-126- 8-A
WA1EQE (6 oprs.) 801- 89- 9-AB

Maine

W1GKJ 658- 47-14-AB
K1OYB 400- 39-10-ABC
K1TOL 324- 36- 9-A

New Hampshire

W1ALE 2700- 98-25-ABCD
W1FZ/1 2052-101-19-ABCD
K3LNM/1 9- 3- 3-A
W1MHL/1 (11 oprs.) 56,875-793-65-ABCDE

Rhode Island

K1TPK 6096-254-24-AB
W1AJR 4061-107-31-ABCD

Vermont

W1AIM 675- 45-15-AB
K1GYT 522- 58- 9-AB
W1IPJ/1 (12 oprs.) 7770-204-35-ABCD
W1UDT/1 (5 oprs.) 7462-287-26-AB
W2FCL/1 (6 oprs.) 5796-207-28-AB

Western Massachusetts

K1JIX[5] 8496-203-36-ABCDE
K1ULZ 1166-106-11-AB
K1VPD 748- 68-11-B
W1UCB 300- 28-10-ABC
WN1COR 24- 8- 3-B
K1OOR/1 (Multi-opr.) 55,327-828-61-ABCDE
W1UWX (W1s EZD UWX) 2140-107-20-AB

NORTHWESTERN DIVISION

Montana

W7CJN 480- 48-10-AB

Oregon

K7GWE/7 2430-161-15-ABD
W7TYR 1012- 81-11-ABCD
W7JRI/7 12- 12- 1-B
K7QXF/7 (W7AEL, K7QXF 1200- 95-12-ABC

Washington

K7QFW/7 744- 62-12-A
K7BJV 448- 64- 7-A
WA7BTG 96- 24- 4-A
WA7BSN 65- 13- 5-A
W7VGQ (K7s DTH JZP, W7VGQ) 4536-214-21-ABE
W7EK/7 (multi-opr.) 612- 68- 9-AB

PACIFIC DIVISION

East Bay

K6KLY 1598- 94-17-ABD
WB6FGM/6 505-101- 5-B
WA6NEL 413- 59- 7-AB
WB6GUG/6 (5 oprs.) 5472-296-18-ABC

Nevada

K7ICW 1848- 77-24-AB

Sacramento Valley

W6GDO 4650-136-31-ABCD
WB6LRE 159- 53- 3-B
WA6JDT 39- 13- 3-B
W6HBU/6 (5 oprs.) 825- 73-11-ABC
K6CFF/6 (4 oprs.) 756-126- 6-B

San Francisco

K6VXI 504- 56- 9-AB
WA6STS/6 (6 oprs.) 1472- 91-16-ABC

San Joaquin Valley

K6UJG 507- 39-13-AB

Santa Clara Valley

WB6DUB/6 2002-154-13-AB
WB6KSI/6 1116- 93-12-AB
WB6HFR 732- 60-12-ABC
W6OST 560- 70- 8-A
K6TJL/6 (4 oprs.) 1704-154-28-ABCDE
K6BJ/6 (multi-opr.) 2656-166-16-AB

ROANOKE DIVISION

North Carolina

WA4BVW/4 1368- 71-19-ABC
W4HJZ 660- 55-12-AB
WA4NED/4 328- 41- 8-AB
WA4FJM 203- 29- 7-AB
WA4UJI 123- 41- 3-B
WA4SHA/4 (6 oprs.) 1935-129-15-AB
WA4VCC/4 (WA4s BNX VCC) 1092- 78-14-AB

South Carolina

WA4LTS 812- 58-14-A
WA4ZLQ 300- 30-10-A

Virginia

W4UBY 1344- 78-16-ABCD
W4LTU 923- 71-13-B
WB4ABJ 801- 89- 9-A
WA4ZGW/4 (9 oprs.) 3171-151-21-AB
WA4TNN (4 oprs.) K4AJA, W4DOE) 1708-122-14-AB
K4FJW/4 (K4FJW, WA4WYP) 1131- 87-13-AB
WA4TYZ (K4AXF, WA4TYZ) 657- 73- 9-AB
W4GG/4 (11 oprs.) 360- 60- 6-AB

West Virginia

K8WVP 240- 24-10-AB
WA8FSE/8 (13 oprs.) 6448-248-26-AB
K8WWW (WA8DAU, K8WMQ) 910- 70-13-A

ROCKY MOUNTAIN DIVISION

Colorado

KØJSD 3354-129-26-AB
WAØIQN 1311- 57-23-A
WØIJR 1197- 63-19-A
WAØBBP 1023- 93-11-AB
WØICG 936- 52-18-A
WA2LQA/Ø 128- 32- 4-AB
WAØKIN 88- 44- 2-B
WØBPT 65- 8- 5-ABCDE
WØWYZ 45- 5- 5-ABCDE
WØWYX 34- 17- 2-B
WNØKIU 20- 20- 1-B
WAØKOQ 1- 1- 1-A
WØDK/Ø (KØs DNW ETN, WØITB) 2889-107-27-AB
W5NWG/Ø (W5NWG, KØYUM) 96- 48- 2-B

New Mexico

W5CK 3692-142-26-AB
WA5ETF 17- 17- 1-B
K5HMN (K5s EVH HMN PGI) 1729- 91-19-AB
K5HRI/5 (K2ODL, K5HRI) 1054- 62-17-AB
K5WYY/5 (K5s WYY YRQ) 20- 20- 1-B

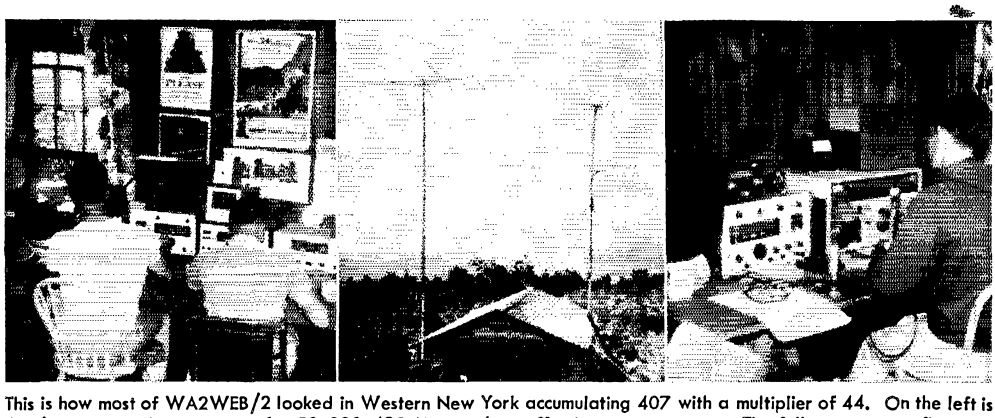
Utah

WA7AKI 12- 6- 2-A

SOUTHEASTERN DIVISION

Alabama

K4WHW 1148- 82-14-AB
WA4DBQ 513- 57- 9-A
WA4KMA 333- 37- 9-AB
K3WQI/4 168- 28- 6-A



This is how most of WA2WEB/2 looked in Western New York accumulating 407 with a multiplier of 44. On the left is the 6-meter position, antennas for 50–220–432 Mc., and an effective two-meter post. The fellows report a fine time by all members of the East Coast V.H.F. Society.

K4TUT 125- 25- 5-A
WA4WGF 10- 10- 1-A

Eastern Florida

WA4JZT
11,026-298-37-A
K4VSN 10,440-290-36-A
W4GJO 6970-166-41-ABD
WA4STJ 3348-108-31-A
WA4TZC 1748- 76-23-A
WA4IDK 1680- 70-24-A
W4JTA 864- 54-16-A
K4VJI 663- 39-17-AB
WA4QVW 624- 52-12-A
WA4WCV 126- 14- 9-AB
K3KEL/4 24- 6- 4-A

Georgia

W4CAH 198- 33- 6-A
K4YZE 144- 47- 3-BC
K4TXK/4 15- 15- 1-B
W4FWH/4 (W4s FWH VHH) 5330-205-26-AB
WA4QPL/4 (8 oprs.)
3519-207-17-AB
WA4VMV (WA4s VMF VMV WQC)
2178-121-18-AB

SOUTHWESTERN DIVISION

Arizona

K7YSE 1152- 72-16-AB
W7AYY 456- 57- 8-AB
W7GNP/7 (4 oprs.)
682- 62-11-AB
WA7BBM (4 oprs.)
190- 38- 5-AB

Los Angeles

W6NLZ 648- 26-18-ABCD
WN6PKA 376- 94- 4-B
WB6CGZ 248- 62- 4-A
WB6KGK 93- 31- 3-B
KA6AP/6 36- 12- 3-A
K6UMV 5- 5- 1-B
K6BPC/6 (19 oprs.)
15,678-571-26-ABCDE
W6SD/6 (4 oprs.)
1377-153- 9-AB

Orange

W6HPH 585- 40- 9-BDE
WB6ERG 308- 77- 4-B
WB6PHO 102- 17- 6-A
WA6TAG/6 87- 29- 3-B
WB6CGM 50- 10- 5-AB
W6ULL/6 (8 oprs.)
13,275-468-25-ABCDE
WB6CDF/6 (8 oprs.)
1815-165-11-AB

San Diego

WA4VLD/6
336- 48- 7-A
WB6JCC/6 (5 oprs.)
2286-127-18-AB
W6NLO/6 (7 oprs.)
6783-305-21-ABCD
WA6UUO/6 (WA6TAD, WB6CAZ) 5- 5- 1-B

Santa Barbara

W6ZRR 60- 20- 3-B
WA6CPK 34- 17- 2-B
K6OKC/6 (K6s ANZ OKC, WA6YJZ)
7176-312-23-ABD

WEST GULF DIVISION

Northern Texas

K4RLX/5
5148-132-39-AB
K5IVB 4500-180-25-A
WA5LPA 1022- 73-14-A
WA2PYU/5
200- 20-10-A

Oklahoma

W5LOW 750- 50-15-AB
WA5BXX 450- 45-10-AB
W5PZ 130- 26- 5-B
W5WAX (WA5DQA, W5s VTM WAX)
2139- 93-23-AB
K5VOZ/5 (4 oprs.)
814- 74-11-AB

Southern Texas

KØZZM/5
5250-172-30-ABCE
WA5AUA 3634-158-23-A
W5ZNM 1740- 87-20-A
W5BRR 816- 51-16-A
WA5JPZ 540- 45-12-A
K5HUT 448- 32-14-A

CANADIAN DIVISION

Alberta

VE6OH 288- 36- 8-A
VE6AJY 30- 15- 2-A
VE6MC 12- 6- 2-A

British Columbia

VE7ASM/7[6]
1290- 82-15-ABE

Manitoba

VE4HI 12- 12- 1-A

Ontario

VE3BPR 1332- 70-18-ABCD
VE3AIB 721-100- 7-ABCD
VE3AQG 420-105- 4-B
VE3DSE 309-103- 3-B
VE3CUA 204- 34- 6-AB
VE3TO 88- 44- 2-B
VE3FXN 84- 21- 4-A
VE3AGU 75- 25- 3-AB
VE3DAW 74- 37- 2-B
VE3DNR 66- 33- 2-B
VE3DTV 48- 24- 2-B
VE3GAF 28- 14- 2-A
VE3CIT 24- 12- 2-AB
VE3BNH 4- 4- 1-A
VE3ZZZ (VE3s AGW BQN)
1760-104-16-ABCD
VE3SAU (10 oprs.)
1700-100-17-AB
VE3UHF/3 (6 oprs.)
780-130- 6-AB
VE3DFB/3 (VE3s DFB FNV GCF) 528- 88- 8-AB
VE3FSQ/3 (VE3s FSQ GAG)
41- 41- 1-B

Quebec

VE2ZX 312- 52- 6-B
VE2BMQ 280- 39- 7-ABD
VE2BTZ 108- 27- 4-AB
VE2AUD 42- 21- 2-B
VE2UN/2 (VE2s APN AQA BBW) 75- 25- 3-B

[1] K3YNF, Opr.[2] W9GJJ, Opr. [3] Headquarters staff, not eligible for award. [4] W1QIS, Opr.[5] W2BVU, Opr [6] VE7ASI, Opr. Check logs: WA4IRX, W4ISS, WA5KYO, WA5KYP, WA6GYD, WA7CVQ, VE3AGU/3.

Division Highs		*Shown are number of contacts and sections per band*			
		50 Mc.	*144 Mc.*	*220 Mc.*	*420 Mc.*
ATLANTIC	K3IPM	246-19	104-14	23-5	9-4
	W3CCX/3*	309-17	251-16	41-12	21-7
CENTRAL	K9QCB	218-20	23-4	2-1	1-1
	K9JAM*	140-6	162-6		
DAKOTA	KØUDZ	189-28			
	WAØDWM*	89-6	12-2		6
DELTA	WA4YFL/4	134-16			
	K4FKO/4*	183-16	16-6		3-1
GR. LAKES	W8JRN	115-8	22-3		
	WA8BCA/8*	432-19	97-6		
HUDSON	W2SEU	70-11	69-11	29-11	
	WA2FSQ*	301-20	302-15	50-9	
MIDWEST	KØIJJ	133-27	16-4		
	WAØHGK/Ø*	91-19	5-1		
NEW ENG.	WB2DST/1	186-15	191-9		
	W1MHL/1*	472-22	251-15	38-16	20-7
N.W.	K7GWE/7	98-12	62-2		
	W7VGQ*	139-17	74-3		
PACIFIC	W6GDO	54-14	68-8	8-4	6-5
	WB6GUG/6*	127-9	161-5	8-4	
ROANOKE	WA4BVW/4	53-12	17-6	1-1	
	WA8FSE/8*	145-16	103-10		
ROCKY MT.	W5CK	133-25	9-1		
	WØDK/Ø*	105-26	2-1		
S.E.	WA4JZT	298-37			
	W4FWH/4*	159-16	46-10		
S.W.	K7YSE	68-15	1-1		
	K6BPC*	362-13	180-4	8-3	18-4
WEST GULF	KØZZM/5	169-27	1-1	1-1	
	W5WAX*	66-18	27-5		
CANADIAN	VE3BPR	22- 8	44-7	1-1	3-2
	VE3ZZZ*	42-7	56-5	3-2	3-2

* Multioperator Station.

HIGH SPEED CODE TEST

The Connecticut Wireless Assn. recorded 44 copies of the March High Speed Code Test received, of which 27 qualified at one of the speeds from 40 through 60 w.p.m.

The following received certificates at 40 w.p.m.: W1BGD, WA4CTD, WA4BAW, W6VNQ, K7LUV, WA8GYT, WA8KPO, WAØENI.

At 45 w.p.m.: K1DZG, K2KD, W4CCC, W4CQI, W4KR, WA7AFQ.

At 50 w.p.m.: W2CVW, W3GJY, W3RMI, K5QVH, W7LQH.

At 55 w.p.m.: W2SEI.

At 60 w.p.m. (get *this* list!): K1RYT, W3CXX, K4ASU, K4TUA, W6OZ, W7FKK, WØZJO.

Transmission was made by four stations on six frequencies: W1EIA on 3637 and 7120 kc.; K6DYX on 3690 kc.; W6EOT on 3640 and 7005 kc.; WØFA on 3541 kc. W9IQW, who was scheduled to participate as a transmitting station, was unable to be with us.

The next High Speed Test is scheduled for Sept. 20, call up starting at 0115 GMT. We hope to have the same four transmitting stations, plus perhaps one additional to complete the coverage. Frequencies and station calls will be announced at the beginning of CWA code practice starting at 0130 GMT each Monday commencing August 16, on 3637 and 7120 kc., or one of these two frequencies. At this point it is safe to say that W1EIA will be on 3637 and 7120, as usual, and probably K6DYX will be on 3690, W6EOT on 3640 and some 7 Mc. band frequency (not 7005 this time); WØFA will be on 3541 kc. W5QMJ will put his rock crusher on the air, too. But plans have not been completed at this writing, so watch for announcements from W1EIA and all the above stations.

The above times and dates are *all according to GMT*. For those still slugging along on local times, note that both practice and test are on *Sunday evening*, not Monday. Get a copy of Operating Aid No. 10 if you don't know how to convert. — *W1NJM*.

The Fatal Current

BY CHARLES O. BRAINARD,* WAØJBU

STRANGE as it may seem, most fatal electric shocks happen to people who should know better. Here are some electro-medical facts that should make you think twice before taking that last chance.

It's the CURRENT that kills

Offhand, it would seem that a shock of 10,000 volts would be more deadly than 100 volts. But this is not so. Individuals have been electrocuted by appliances using ordinary house currents of 110 volts and by electrical apparatus in industry using as little as 42 volts direct current. The real measure of a shock's intensity lies in the amount of current forced through the body, and not the voltage. Any electrical device used on house wiring can, under certain conditions, transmit a fatal current.

While any amount of current over 10 ma. is capable of producing painful to severe shock, currents between 100 and 200 ma. are absolutely lethal. There is no known medical procedure that will revive the victim.

Currents above 200 ma., while producing severe burns and unconsciousness, do not usually cause death if the victim is given immediate attention. Resuscitation, consisting of artificial respiration, will usually revive the victim.

From a practical viewpoint, after a person is knocked out by an electric shock, it is impossible to tell how much current has passed through the vital organs of his body. Artificial respiration must be applied immediately if breathing has stopped.

The Physiological Effects of Electric Shock

Voltage is not a consideration in the physiological effects of various current densities. Although it takes a voltage to make the current flow, the amount of shock-current will vary, depending on the body resistance between the points of contact.

Shock is relatively more severe as the current rises. At values as low as 30 ma., breathing becomes labored, finally ceasing completely even at values below 75 ma.

As the current approaches 100 ma., ventricular fibrillation of the heart occurs (an uncoordinated twitching of the walls of the heart's ventricles). There's no worldly help for the victim.

Above 200 ma., muscular contractions are so severe that the heart is forcibly clamped during the shock. This clamping protects the heart from going into ventricular fibrillation, and the victim's chances for survival are good.

Danger — LOW VOLTAGE

It is common knowledge that the victims of high-voltage shock usually respond to artificial respiration more readily than the victims of low-voltage shock. The reason may be the merciful clamping of the heart, due to the high current densities associated with high voltages. However, lest these details be misinterpreted, the only reasonable conclusion that can be drawn is that 75 volts are just as lethal as 750 volts.

The actual resistance of the body varies, depending upon the points of contact and the skin condition (moist or dry). Between the ears, for example, the internal resistance (less than skin resistance) is only 100 ohms, while from hand to foot it's closer to 500 ohms. The skin resistance may vary from 1000 ohms for wet skin to more than 500,000 ohms for dry skin.

General Safety Precautions For You

When working around electrical equipment, move slowly. Make sure your feet are firmly placed for good balance. Don't lunge after falling tools. Kill all power and ground all high voltage points before touching wiring. Make sure that power cannot be accidentally restored. Do not work on ungrounded equipment.

Don't examine live equipment when physically or mentally fatigued. Keep one hand in your pocket while investigating live electrical equipment. Above all, do not touch electrical equipment while standing on metal floors, damp concrete, or other well grounded surfaces. Do not handle electrical equipment while wearing damp clothing (particularly wet shoes) or while skin surfaces are damp.

Remember, the more you know about electrical equipment, the more heedless you're apt to become. Don't take unnecessary risk.

What To Do For Victims

Cut voltage and/or remove victim from contact as quickly as possible, but without endangering your own safety. Use a length of dry wood, rope, blanket, etc., to pry or pull the victim loose. Don't waste valuable time looking for the power switch. The resistance of the victim's contact decreases with time. The fatal 100 to 200 ma. level may be reached if action is delayed.

If the victim is unconscious and has stopped breathing, start artificial respiration at once. Do not stop resuscitation until medical authority pronounces the victim beyond help. It may take as long as eight hours to revive the patient. There may be no pulse, and a condition similar to rigor mortis may be present; however, these are the manifestations of shock and are not an indication that the victim has died. QST

* 32C, 1800 Watrous Ave., Des Moines, Iowa 50315

SWITCH
TO SAFETY

I.A.R.U. News

JAPANESE AMATEUR LICENSING

In Japan the licensing authority for amateur radio is the Ministry of Posts and Telecommunications; amateur licenses are issued in cooperation with the Japan Amateur Radio League, the national society. Four distinct five-year renewable amateur licenses are available to Japanese citizens, or to radio clubs composed of Japanese citizens, who satisfy the requirements.

All of the applicants for any JA amateur license must pass a written examination covering the amateur radio regulations and radio-engineering theory. The theory for the Telephone and Telegraph licenses is rather elementary and becomes progressively more difficult for the Second Class and the First Class licenses. The Telephone license requires no code test but limits the licensee to 10 watts *output*, phone only, on all bands except 20 and 160 meters. The Telegraph licensee must pass a 5 w.p.m. code test and is limited to 10 watts *output*, c.w. only, on all bands except 20 and 160 meters. The Second Class licensee has to pass a 9 w.p.m. c.w. test and may use up to 100 watts *output*, any mode, on all bands except 160 meters. The top license, the First Class, may have a maximum *output* of 500 watts on all bands when permitted.

The amateur examinations are usually given only twice each year; usually in April and October, at examination points designated by the Minister of Posts and Telecommunications. The graduated fees range from $.60 for the Telephone and the Telegraph licenses to $1.10 for the First Class license. The Radio Operator certificate is an additional $.60.

The Japanese draw their frequency assignments from the International Telecommunications Union, Region III, allocations and the result is the following: 200 watts c.w. between 1.8–2.0; 500 watts c.w., a.m., s.s.b. on 3.5–3.575, 7.0–7.1, 14.0–14.35 and 21.0–21.45; 50 watts c.w., a.m., s.s.b., and f.m on 28.0–29.7, 50.0–54.0, and 144–146; 50 watts a.m., t.v., and f.m. on 430.0–440.0; 1 watt c.w., a.m., t.v., f.m., and pulse on 1215–1300, 2300–2450, 5650–5850, 10,000–10,500, and, 21,000–22,000 Mc. In addition; in the event of an emergency, 500 watts may be used on c.w. on 4.63 Mc.

Call signs are issued systematically by prefectures with JA1 going to Tokyo, Kanagawa, Chiba, Ibaragi, Saitama, Gunma, Tochigi, and Yamanashi; JA2 to Aich, Mie, Shizuoka, and Gifu; JA3 to Osaka, Kyoto, Hyogo, Nara, Shiga and Wakayama; JA4 to Hiroshima, Tottori, Okayama, Yamaguchi, and Shimane; JA5 to Tokushima, Kagawa, Ehime, and Koochi; JA6 to Kumamoto, Nagasaki, Fukuoka, Ooita, Saga, Miyazaki, and Kogoshima; JA7 to Miyagi, Fukushima, Iwate, Aomori, Yamagata, and Akita; JA8 to Hokkaido; JA9 to Ishikawa, Fukui, and Toyama; and JAØ to Nagano and Nigata. Club stations are generally assigned a suffix from the YAA to ZZZ block preceded by the appropriate prefix.

Mobile operation is permitted but the output may not exceed 50 watts; and, 160 meters and the 430–440 Mc. band may not be used. Amateur t.v. is permitted above 430 Mc. but only to First or Second Class license holders.

Japanese citizens wishing to obtain the amateur license must first make an application to the Ministry of Posts and Telecommunications. If this is acceptable, the applicant may sit at one of the examination points. If successful, the applicant may secure the radio operator certificate. The licensee may then operate at one of the club stations. If the individual wants his own station, he must make out an application for a construction permit specifying the location, the equipment, the frequencies to be used; the mode of emission to be used along with the power output, the operating hours, and the time needed for completion of the station. Extensions of time may be secured if necessary. Upon completion the station must be inspected by the PT and approved for operation. Call signs are then issued and operation may proceed. The PT requires that an accurate time piece be available, and a radio inspection book and radio log must be kept at all times. If a change of equipment or location is desired, it must receive the prior approval of the Telecommunications Ministry.

At present there are 13,200 licensed radio amateurs among the 16,100 members of the Japan Amateur Radio League with a total of around 38,000 licensed radio amateurs in all of Japan.

Negotiations are currently under way between the Japanese government and the JARL for reciprocal operating agreements with foreign nations but none have been signed to date. Inquiries for information may be sent to Mr. Takeo Kuwahara, Overseas Communications Officer, Japan Amateur Radio League, Inc. P. O. Box 377, Tokyo, Japan.

NETHERLANDS

The delay in and even failure of delivery of incorrectly addressed QSL cards, intended for Dutch amateurs, has given VERON some concern and is the reason for asking your cooperation, in order to improve the situation.

Attention is first drawn to the fact that VERON QSL Service via the General QSL manager, P.O. Box 400, Rotterdam, is more than complying with Article 3 of the Miscellaneous Rules, adopted by the IARU; further, its functioning can be summarized as follows.

VERON-members (numbering ¾ of the total of all Dutch licensed amateurs) receive their QSL cards automatically, without any request, action or envelopes, from the district QSL managers or from the General QSL manager (when they do not live in a district).

Non-members receive their cards direct from our General QSL manager: frequently, when they send in addressed envelopes provided with stamps, twice a year when they do not take action. In the latter case expenses and efforts are for VERON.

Every foreign amateur, addressing QSL cards for Dutch amateurs to P.O. Box 400, Rotterdam, can therefore be assured that these cards reach their destination, irrespective of membership.

Cards for members, not addressed to P.O. Box 400 or to the home address fail to arrive, because they are not automatically delivered and are not claimed either.

It is hoped that you will give VERON your assistance in further promotion of QSL delivery. Except for personal arrangements made during QSOs, all cards for Dutch amateurs should be sent to P.O. Box 400, Rotterdam.

CANADA

In order to help study meteor backscatter and other ionospheric phenomena VE2AQX, a Canadian beacon station, is now operating 24 hours each day on 52.273 Mc. The station is located on Sept Iles, Province of Quebec, with 60 watts of c.w. input. It has a solid carrier for nine minutes with identification in the tenth minute. All reports will be acknowledged and should be sent to Curt Grey, VE2AQX, 95 Blouin, Sept Iles, P.Q., Canada. The station will be operating until December 31, 1966.

PERU

In many areas amateur radio licensing barriers are rapidly dissolving. Peru reports that a resolution passed by the "Junta Permanente Nacional de Telecommunicaciones" now authorizes operating privileges for citizens of Bolivia, Uruguay, Chile, Canada, West Germany, Switzerland and Spain. An agreement with the U.S. is hoped for soon.

DX OPERATING NOTES

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belgium; Bolivia, Canada, Costa Rica, Dominican Republic, Ecuador and Portugal. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by **U.S.** radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela. **Canadian** radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Mexico, Peru, U.S., and Venezuela.

DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunications Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia (including West New Guinea), Thailand and Viet Nam forbid radio communication between their amateur stations and amateur stations in other countries. **Canadian** amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Viet Nam and Jordan.

Strays

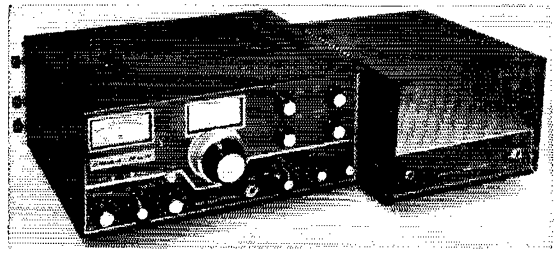
An International Ham Convention will be held September 17 to September 19 in Knokke, Belgium which is located just a few miles from the port of Ostend, on the North Sea on the Belgian-Holland border. The convention should be of special interest to those in the north-west portion of Europe. There will be simultaneous translations in English for all lectures and the meetings will be conducted in French. Tours will be taken around the area and to Brugge, one of the most beautiful and historic cities in Belgium. Price for three days including room with bath and transportation to and from Ostend and Brugge is $20.00. For full information write L. Vervaecke, ON4LV, Lippenslaam 284, Knokke 1, W.V., Belgium.

—···—

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

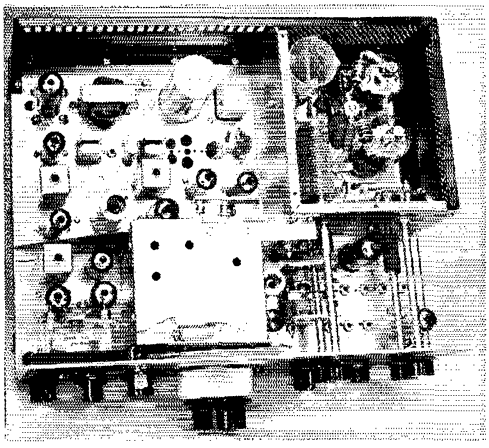
• Recent Equipment —

The Swan 350 Transceiver



THE majority of s.s.b. transceivers are all brothers as far as circuitry is concerned, so it is refreshing when a manufacturer uses a different design approach. The Swan 350 is a five-band rig for fixed-station or mobile use. The difference between the 350 and others on the market is that only one frequency conversion is used, transmit or receive, on any band.

In designing an s.s.b. transmitter or transceiver, there are several mixing schemes one can follow. The popular approach is to use a single-range v.f.o. which is mixed with the output of an s.s.b. generator, and then mixed again with a crystal oscillator's output to arrive at the desired output frequency. This system easily provides the stability required for sideband because the v.f.o. is at medium frequency — v.f.o. drift can be considered a function of frequency — and all the high-frequency oscillators are crystal controlled. You never get something for nothing, for with two, or sometimes three, frequency conversions mixer products pop up like an army of ants. Careful choice of frequencies will put most of these products away from the operating frequency, and any troublesome beats left can be attenuated with traps and filters, or so it says in the books.



The sideband generator is located at the bottom center, with the final amplifier at the right. The v.f.o. is braced to the chassis for extra rigidity. The large chrome knob on the front is the fast tuning control, and the plastic knob beyond it the slow-rate tuning. The small chrome knob is the calibration re-set control mentioned in the text.

The engineers at Swan have taken a different approach. The v.f.o.'s frequency range is changed for each band so only one frequency conversion is required. The s.s.b. generator in the 350 is 5 Mc., and its output is mixed with the output of the v.f.o. to produce the operating frequency. Sounds simple, but severe requirements are placed on the v.f.o. It must be stable on rather high frequencies, have a series of frequency ranges (each of which must be temperature compensated) and cover 500-kc. increments on each range so the calibration remains the same regardless of band selected. However, the difficulties in building a v.f.o. for the job are more than offset by the simplicity and reduction in cost that can be obtained with single conversion.

The advantages (and problems) of single conversion are the same in a receiver. The virtues of single conversion receivers have been pointed out recently by W1DX, so we won't repeat them here.[1]

The 350's v.f.o. is shown in Fig. 1. A 2N706, Q_1, functions as a grounded-base Colpitts oscillator. The oscillator is tapped down on the tuned circuit by means of a capacitive divider for high stability. Heating in the v.f.o. is compensated for by C_1 through C_4, the temperature compensating capacitors. Each one has the same capacitance value, but a different temperature coefficient. For maximum stability, the oscillator is run at very low level and a 6EW6 voltage amplifier used to build up sufficient injection levels for the mixers. To insure the stability of this v.f.o. amplifier an 82-ohm grid return resistor is used. An emitter follower, Q_2, is used to match the high impedance of the oscillator output to the low-impedance input of the v.f.o. amplifier.

The basic v.f.o. frequency is 8673–9173 kc., and this range is used for both 80 and 20 meters. Other tank coils are switched in to provide proper injection frequencies for 40, 15, and 10 meters — 12, 16, and 23 Mc. respectively. In the model tested, 500-kc. coverage was provided on each band. Coils L_1 through L_3 are tapped windings with an adjustment slug at either end to provide trimming of the high and low ends of the tuning range.

[1] Goodman, "Some Thoughts on Home Receiver Design," *QST*, May, 1965

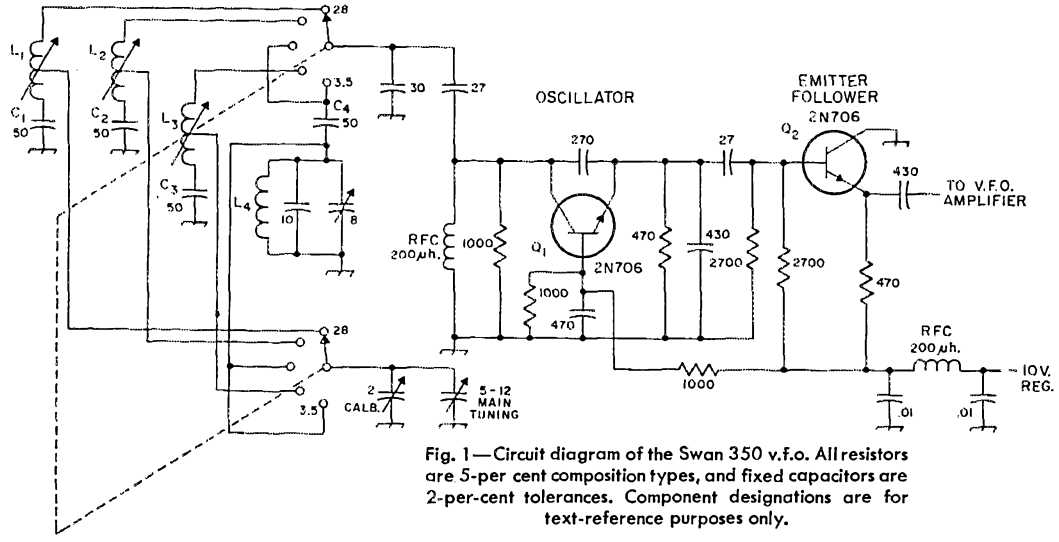


Fig. 1—Circuit diagram of the Swan 350 v.f.o. All resistors are 5-per cent composition types, and fixed capacitors are 2-per-cent tolerances. Component designations are for text-reference purposes only.

The v.f.o. drift during warm-up is about 1 kc. on 80, 40, and 20 meters, and about 2 kc. on 15 and 10. After warm-up, the drift rate is very slow. These drift figures are not as good as some of the multi-conversion rigs, but are certainly acceptable for normal operating. The v.f.o. is quite insensitive to line-voltage changes, no doubt because the transistor's supply voltage is Zener regulated.

Swan has made two changes in the v.f.o. in current production models. A trimmer capacitor has been installed close to the main dial to allow calibration of the v.f.o. with a crystal calibrator which is sold as an accessory. This calibration capacitor was in the unit we tested, but owners of earlier models may wish to obtain a modification kit from Swan, or return the 350 to the factory to have the change made. We would recommend the latter course, as it is quite a job to dismantle the v.f.o., mount the capacitor, and re-align the v.f.o. The other change provides full 10-meter coverage rather than just 500 kc. The v.f.o. coil for 10 and the dial are replaced. Again, a modification kit is available from Swan.

Receiving

For clarity, the block diagram, Fig. 2, shows the receiving and transmitting functions of the 350 separately, except for the v.f.o. The pi-network output circuit of the transmitter section is also used as the input tuned circuit for the receiver r.f. amplifier. This system simplifies switching and construction, but the pi network must be resonated before you hear anything. This may not be a draw-back as the transmitter final will be close to the proper adjustment before drive is applied to the final amplifier. A 12BZ6 is used as the r.f. amplifier. R.f. gain is controlled by changing the cathode resistance in the r.f. and two i.f. amplifier circuits. Oscillator injection for the mixer, a 12BE6, is obtained from the v.f.o. amplifier. The mixer is followed directly by the high-selectivity section, a crystal filter with a center frequency of 5174.5 kc. A trap is included in the input of the receiver to provide extra attenuation of 5-Mc. signals so they will not get in and bother the i.f. Two i.f. amplifiers are used, a 6EW6 and a 12BA6. The i.f. signal and b.f.o. provided by the carrier oscillator are grid-leak detected by one-half of a 12AX7, and the second half is used as an audio amplifier. A 6GK6 audio power amplifier drives a 3 × 5-inch speaker located in the power supply. With the mixing scheme used, lower sideband is received and transmitted on 80 and 40, and upper on 20, 15 and 10. There is no provision for sideband switching.

The triode section of a 6BN8 amplifies some of the audio signal, which is in turn rectified by the diode sections of the same tube, providing an audio-derived a.g.c. voltage. A.g.c. control voltage is applied to the grids of the r.f. stage, mixer, and second i.f. amplifier. The a.g.c. system in the Swan is quite good, as it has none of the thumps and pops on strong signals often heard with simple gain control systems. In fact, the strong-signal handling capability of the 350 is very good — something one needs in this day of big signals.

Transmitting

The filter in the Swan is a two-section crystal type, with an extra shunt crystal to give the filter a steep-sided response on the carrier side, and a sloping response on the other side. With the carrier positioned well down on the filter response extra attenuation of the carrier is obtained, while the audio response is more pleasing to the ear than can be obtained with symmetrical filters. The 350's filter has a nominal response of 3 kc. at −6 db., and 5.7 kc. at −60 db.

The transmitter section begins with a 12AX7

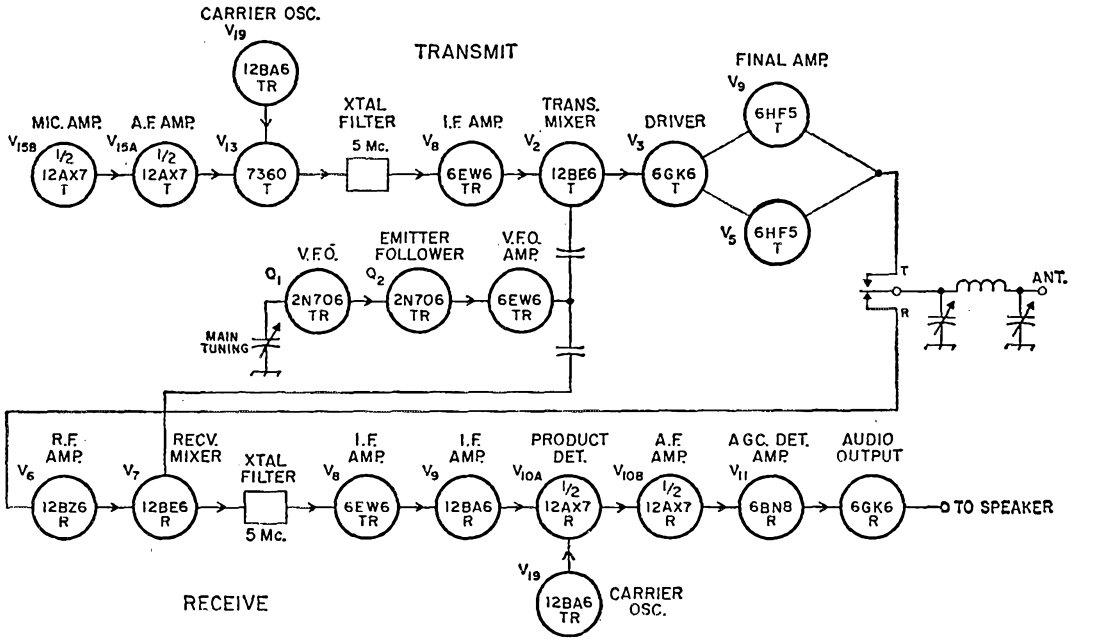


Fig. 2—Block diagram of the transceiver. Transmit and receive functions are shown separately except for the v.f.o. Stages that function on both transmit and receive are marked TR, those functioning only on transmit T, and those only on receive R.

speech amplifier, with the audio capacitively-coupled to one deflection plate of the 7360 balanced modulator. Output of the carrier generator, a 12BA6, is applied to the 7360 grid, and the carrier is balanced out in the push-pull output circuit. On s.s.b. equal voltages are applied to the deflection electrodes; a front-panel control permits balance of these two voltages for best carrier suppression. On c.w. one deflection electrode is grounded to upset the balance, permitting full-carrier transmission. On s.s.b. the carrier oscillator is positioned 300 c.p.s. outside the crystal filter's nominal passband, but on c.w. the oscillator is shifted 500 c.p.s. to place it inside the filter passband so no attenuation of the carrier takes place in the filter.

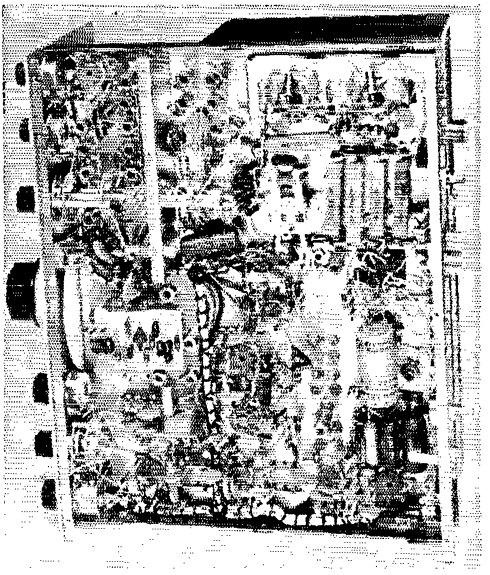
The filter attenuates the unwanted sideband at least 40 db. The wanted sideband is amplified by a 6EW6 after its passage through the filter, and then mixed with the v.f.o. output in a 12BE6, heterodyning it to the band selected. A 6GK6 driver amplifies the signal to sufficient level to drive two 6HF5s to 400 watts p.e.p. on s.s.b., and 320 watts on c.w. An audio-derived a.l.c. system provides a negative voltage to the i.f. amplifier on transmit, reducing the level of drive when the 6HF5s are driven into grid current. As the instruction book points out, this is a *protection* system, and does not remove the responsibility from the operator to set the microphone level correctly — a good point to remember about any s.s.b. transmitter.

Some eyebrows were raised over the 400-watt p.e.p. input figure for the 350. The 6HF5s are color television sweep tubes, so no ratings are published for AB_1-s.s.b. service. The limitation of this type of tube in sideband service is bulb temperature, which in the case of the 6HF5s is 225 degrees C. Obviously, a high-peak, low-average power type of emission like s.s.b. is not going to heat the tubes very much. Thus the real question was whether the tubes could reach the required peak current before saturation. A two-tone test showed that the p.e.p. capability of the 350 was well *beyond* 400 watts.

These sweep tubes will draw current, make no mistake about that. It is the operator's responsibility to see that the tubes are not overheated by long tune-up periods. Having the plate circuit out of resonance results in plate currents of 600–700 ma., so real care is necessary when adjusting the transmitter. If your final tube's life is short, you may not have appreciated the limitations of these sweep tubes, and taken necessary precautions.

The pi-network output circuit will match resistive loads between 50–300 ohms. Fixed capacitors are switched in parallel with a variable to provide a wide range of loading adjustments. Operators will find this adds to the versatility of the rig as compared with the fixed 50-ohm output transceivers.

C.w. has not been forgotten either. Grid-block keying is used with a shaping network to eliminate clicks, resulting in an excellent c.w. note. With a 23-Mc. v.f.o., one might expect some chirp on 10 meters, but there was none when running the transmitter at full c.w. input.



The bottom view reveals no crowding or stacking of parts that make some compact rigs so hard to service. The small printed board at the center is the v.f.o. circuitry. The octal socket at the bottom end of the rear apron is the receptacle for the auxiliary VOX unit.

Other Details

The Swan cabinet assembly is interesting because both the top and bottom covers can be easily removed to work on the unit. The front and rear panels are permanently attached to the chassis. The bottom plate is attached to the chassis with sheet-metal screws. The three-sided top cover is fastened with three screws on either side to Tinnerman fasteners on the sides of the chassis.

An accessory VOX unit is available for plugging into a chassis receptacle on the rear apron. This little transistorized unit has VOX sensitivity, anti-VOX, and delay controls that may be adjusted from the side of the 350. This mounting arrangement of the VOX is fine in fixed-station use, but would be about impossible to reach in an under-the-dash mobile mount. A front-panel switch selects either VOX or push-to-talk operation.

The power supply uses a bridge rectifier for the high voltage, and medium voltage is obtained from a center tap on the high-voltage winding. A half-wave rectifier is used to obtain bias voltage, and another half-wave rectifier on the filament line provides −12 volts for the transistor stages.

The regular readers of this column may have gotten the idea in the past that we throw a lot of rocks at manufacturer's instruction books. The fact is that many of these manuals do not give enough information to enable the owner to familiarize himself with his new piece of equipment. Proper operating instructions are sometimes lacking, and no information on circuitry or maintenance is given. This is definitely not the case with Swan! The instruction book for the 350 gives very complete operating and alignment instructions, in addition to a run-down on the circuits used. The parts list has a description of the part, rather than just a manufacturer's number. With an instruction book like this a ham has a chance to understand his rig, and has the information on hand for servicing it. It is good to know someone still feels the amateur is capable of understanding and repairing his own equipment. — *W1KLK*

Swan 350 Transceiver

Height: 5½ inches.
Width: 13 inches
Depth: 11 inches
Weight: 17 pounds
Power Requirements: 12.6 volts, 5.5 amps., a.c. or d.c.; 12 volts d.c., 250 ma.; — 110 volts d.c., 100 ma.; 275 volts d.c., 150 ma.; and 800 volts d.c., 500 ma.
Price Class: 350 transceiver, $400; a.c. power supply $85.

Strays

Cleveland has a popular hero — with the public and with amateur radio operators alike. He's Edward J. Antoniak, K8PYT, chairman of Cleveland's TVI Committee. Ed has inaugurated a weekly six-meter net called "The TVI Clinic" where TVI problems are discussed, and questions and answer sessions held. Ed also trains volunteers to serve on the TVI committee. Congratulations to this busy and dedicated Cleveland amateur.

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For all who have a copy of "CQ YL", supplement pages are now available upon request to Louisa Sandro, W5RZJ, 4417 Eleventh St., N.W., Albuquerque, N. Mex. Please include a five cent stamp to cover the cost of mailing. This supplement brings the book up to date with YLRL officers through 1965. "CQ YL" is the only book about the YLs and can also be purchased through Louisa.

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The K. F. Triggs Amateur Radio Station was recently dedicated in the J. L. Brenn Hall of Science at Huntington College, Indiana. In memory of her late husband, W9UJK, Mrs. Triggs presented her husband's station and valuable back issues of amateur radio magazines to the radio club which bears his name.

Simple Adjustable Voltage Regulator

Compact Unit for Screen-Supply and Other Low-Current Applications

BY JESSE L. MEREDITH, JR.,* K6KWX/7

In connection with the construction of an AB_1 linear amplifier recently, a simple screen-voltage regulator was designed which I believe will be of interest to others.

The requirements in my case were 310 volts with a screen-current swing of 2 to 40 ma., and a minimum of chassis space. A diligent search of the tube manuals revealed a compactron designated as 6G11, a beam tube and sharp-cutoff pentode encased in an envelope 1¾ inches high by 1⅛ inches in diameter. The usual circuit doodling on paper and bench fiddling produced this regulator circuit of rather surprising characteristics, shown in Fig. 1.

A 400-volt input supply, which should be filtered, produced a regulated voltage variable over an 80-volt range from 250 volts to 330 volts. The ripple content was less than 30 millivolts and noise content consisted of a few 10-millivolt spikes which seemed to vary with several different reference tubes tried. Varying the current from 0 to 40 ma. instantaneously, as with an s.s.b. signal, caused about 0.1-volt change for a few milliseconds. The output voltage was observed on a Tektronix scope for all measurements.

* 180 East 21st St., Idaho Falls, Idaho.

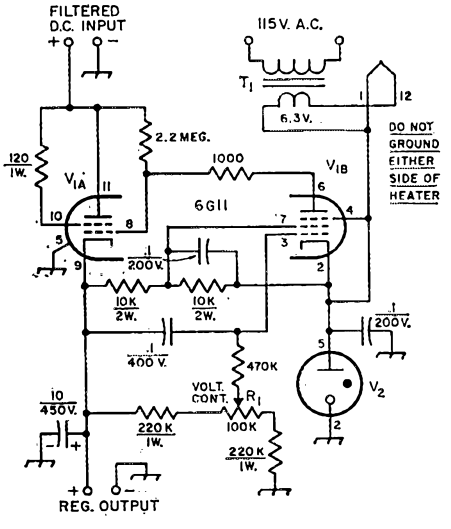
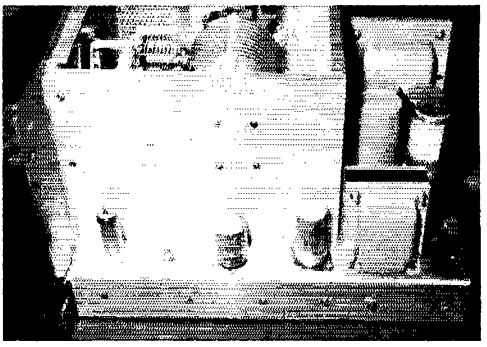


Fig. 1—Circuit of the compact voltage regulator. Capacitances are in μf., resistances are in ohms (K = 1000). Except where polarity indicates electrolytic, capacitors are paper. Resistors are ½-watt unless indicated otherwise. R_1 is a linear control. T_1 is a 6.3-volt filament transformer, 1.2 amperes minimum. *Neither side of the secondary may be grounded.* V_2 is a VR tube, the type to be selected as described in the text.



From left to right across the end of the amplifier chassis are the VR tube, voltage control (screwdriver-adjusted), the 6G11, and the 10-μf. electrolytic capacitor.

Swinging the current up to 60 ma., as an experiment, showed substantially no change from the 40-ma. load. It must be pointed out that with this increase in load current, the current and dissipation ratings for continuous operation of the beam section are exceeded. However, it is interesting to note that it might be possible to use this circuit for some rather high current control in applications where the average current is going to be relatively low, as in single-sideband operation. The rated plate dissipation for the beam section is 6.5 watts.

Some further bench fiddling yielded very interesting data. Utilizing the 0A2 reference-voltage tube and a 400-volt filtered supply gave the original design requirements very nicely. Inserting an 0B2 in place of the 0A2, and reducing the input voltage to 300 allowed the regulated voltage to be varied from 180 to 260 volts. Again, the ripple content and current control were as for the 0A2. Going still further and replacing the 0A2 with an 0C2, and using a supply of 250 volts, the regulated output could be varied from 125 volts to 175 volts, again with the same ripple and current figures. The 0C2 is also a miniature VR tube, but not very well known. It regulates at 75 volts with the same current ratings as the 0A2 or 0B2.

Note that neither side of the heater supply may be grounded but must be floating at the potential of the VR reference tube above ground. If this precaution is not observed, the cathode-to-heater insulation may break down because of the potential difference.

This control circuit is now firmly embedded in the AB_1 linear here and doing a very nice job. QST

The International Telecommunication Union

Portions of an address to the 1965 ARRL National Convention

BY GERALD C. GROSS,* W3GG/HB9IA

MAY I first say how pleased I am to be with you today. I take particular pleasure in greeting you on behalf of the International Telecommunication Union, the United Nations' Specialized Agency for Telecommunications, a group of 127 nations of the world, which is this year celebrating its centennial. One hundred years of successful uninterrupted international cooperation. While one hundred years is not long compared with the time span of civilization, the remarkable advance over the last hundred years lies in the speed and variety of our communications. It is a happy coincidence that the centenary falls in 1965 — a year which has been designated as International Cooperation Year by the United Nations. A year in which the United Nations itself, here in California, has just celebrated its 20th Anniversary. In San Francisco, I was deeply moved by the atmosphere of international understanding and the hope for world improvement. We here today all know that communication is essential for the economic, social and political betterment of mankind.

I underline the efforts, the friendship and the world-wide understanding that the amateur-radio fraternity has now achieved, of which we can all feel proud. But may I encourage you to further these efforts in the spirit of communication cooperation? As many of you may know, the Radio-Amateur Service is defined in the ITU Radio Regulations, and are prepared and agreed upon by ITU conferences. These radio conferences also draw up the Radio Frequency Allocation Table, which sets forth the band limits for the frequencies to be used by all the radio services. The first of these conferences after World War II was held at Atlantic City in 1947. The radio regulations then adopted were modified in 1959 at the Geneva Radio Conference. The new regulations, band allocations and other provisions of the Amateur Radio Service are setout in the Radio Regulations which were printed after the 1959 conference. These regulations, including the particular way in which the band allocations are to be used by amateurs, are prepared by the delegates of the National Administrations. However, between radio conferences, specialized meetings of different committees of the ITU are convened. The CCIR and the ITU panel of experts, have dealt with the question of better utilizations of the frequency spectrums to be achieved by the use of single sideband (s.s.b.), directive antennas and other modern techniques. These new techniques make it possible to realize considerably better frequency sharing and improved reception. However, still further and well coordinated efforts must be made to bring about full and proper use of all frequencies available.

With relation to this point, you all know most of the men who first discovered new radio techniques, successfully explored ways of harnessing natural phenomena and contributed to the enormous communications industry which we have today, were amateurs. Amateurs have continued to contribute new ideas and techniques in the radio field. It is for this reason that I want to put in a challenge before you. How can we find ways to increase the usefulness of our frequency spectrum? Today, amateurs are using and experimenting not only with high frequencies but with frequencies throughout the whole spectrum, including u.h.f. which is used for space communications.

In order that amateur-radio operators who come to Geneva could have a home away from home, the International Amateur Radio Club was established in 1962. The IARC, which has its stations 4U1ITU in the headquarters of the ITU building, manages this home and encourages world-wide amateur radio activity. The

* Secretary-General International Telecommunication Union, Geneva, Switzerland.

W3GG/HB9IA

IARC has many visitors and all are welcome — any licensed amateur from any part of the world may operate from this station. IARC promotes its ideas and international amateur radio through the media of its monthly and special meetings, and its annual convention. A quarterly newsletter and an annual magazine, *4U1ITU Calling*, are published. The special ITU centenary edition, which is the third issue of this international radio journal, will soon be available. If you are interested in becoming a member, obtaining the magazine, attending the convention, coming to Geneva via IARC charter airplane or in any other way participating, I urge you to write IARC, Geneva, promptly. The amateur convention will be held on September 17, 18 and 19.

The International Amateur Radio Club has asked me to make the point that IARC is not a national or a supranational organization. It does not compete with any national society, nor with International Amateur Radio Union. We would welcome an IARU liason officer in Geneva. What it wants to do is to align its activities and programmes with those of other amateur organizations and to help in the development of amateur radio as an instrument of understanding, friendship and education.

May I close by again emphasizing how pleased I am, as a radio amateur, and as Secretary-General of The International Telecommunication Union, to be with you on this occasion. If there is any way in which we, at ITU Headquarters, Geneva, can be of personal service as a fellow amateur, please let me know. QST

Strays

The Jamaica (New York) Amateur UHF Club bulletin, *Grid Leaks*, for May 1964, reprinted the following tabulation which they got from the Bulletin of the Lockheed Employees' Radio Club. The list gives the explanations for the abbreviations given to military electronic equipment. Example: ARC-5 is Airborn Radio Communications; APX-6 is Airborne Radar Identification/Recognition. The number gives the stage of development. The list is a comparatively recent scheme and doesn't apply to the older gear such as SCR (Signal Corps Radio).

First Letter (Installation)
A — Airborne
B — Mobile-Submarine
C — Air Transportable
D — Pilotless Carrier
F — Fixed
G — Ground
K — Amphibious
M — Ground-Mobile
P — Pack or Portable
S — Surface Craft
T — Ground-Transportable
U — General Utility
V — Ground-Vehicle
W — Water (Surface and Subsurface)

Second Letter (Equipment)
A — Infrared
B — Pigeon
C — Carrier
D — Radiac
E — Nupac
F — Photographic
G — Telegraph/Teletype
I — Interphone
K — Telemetry
L — Countermeasure
M — Meterological
N — Ground-To-Air
P — Radar
Q — Sonar
R — Radio
S — Special types
T — Telephone, Wire
V — Visible Light
X — Facsimile (Wirephoto or TV)
Y — Data Processing

Third Letter (Purpose)
A — Auxiliary Assembly
B — Bombing
C — Communications
D — Direction Finding/Recon.
E — Ejection/Release
G — Fire Control
H — Recording/Reproducing
K — Computing
M — Maintenance/Test
N — Navigation Aids
Q — Special Purpose
R — Receiving/Detecting
S — Detecting/Ranging/Bearing
T — Transmitting
W — Control
X — Identification/Recognition

W4ZXV, station of the Lexington (Ky.) Veterans Administration Hospital ARC, recently received an ARRL Public Service Award for its work during Hurricane Cleo in August of 1964. In the photo above, Dr. C. I. Schwartz, Hospital Chief of Staff, presents the award to W4SHN (r.), station trustee. At the left is WA4GHQ, who, during the ceremonies, received a commission as a Kentucky Admiral for his work with the club.

Hints and Kinks For the Experimenter

C.W. AUDIO SELECTIVITY

MANY of the selective audio circuits for the c.w. man require special choke coils and additional tubes. Yet, a simple but effective audio filter may be constructed from a TV-flyback transformer and a 0.01- or 0.02-μf. capacitor, and the modification won't require much digging around in your receiver.

Secure a flyback transformer and place the capacitor in parallel with the transformer. This resonant circuit is connected between the grid of the first audio amplifier stage in your receiver and ground. Then, while listening to incoming signals, try different taps on the transformer with one capacitor lead until the filter is resonant at about your favorate beat-note for c.w. reception.

The *Q* of the flyback transformer is high enough to give a good peak in audio response at the beat-note you wish, while noise and other audio-frequency notes are attenuated. — *Bill Medler, W1HRT*

THE TELEMATCH REVISITED

THE end result of my construction of the Telematch from *QST* for February 1965 seems to be a logical development of the original, and may be of interest to others. The two photographs show almost everything but the work involved. An extra switch was added to connect the meter to either the Telematch circuit, or, through an appropriate series resistor, to the diode circuit of a Heath Cantenna.

Although my unit is not complex, some care is required in assembly. One of the problems is in mounting the Cantenna: the mounting bolts go through the bottom of the can and should be carefully soldered after assembly. This soldering inside the Cantenna pail is a bit hard to do but worth some care because of the mess you will have if the job isn't successful. The other problem is the sheet-metal and four-bearings-in-line structure of the big r.f. switch. This can be worked out with some careful marks scratched in the back of the panel and in the chassis. The switch assembly is mounted by four 8-32 bolts threaded into the aluminum, put down through holes in the chassis, and fastened on the bottom with nuts and lockwashers.

By installing them in proper order, the bearings can be placed well enough to avoid trouble with binding. The order is this: The panel bearing is installed, and the switch assembly without end plates. With the switch bolted in place the shaft is put in. The rear end plate is slipped over it and screwed down tight, located by the shaft. Then the switch assembly is removed and the front plate installed, again fitting it over the shaft. Finally, the whole thing is put together again. Don't forget to grease the bearings!

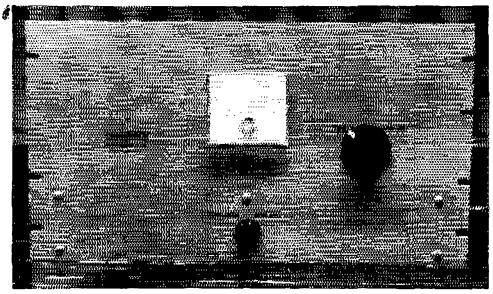


Fig. 1—Front view of the completed Telematch for mounting in a standard 19-inch rack. The switch below the meter selects either the s.w.r. reading from the Telematch bridge or relative power at the Cantenna.

It may be desirable to put some good epoxy at the base of each of the coax connectors. The ones I used — new, and good quality — were not stable enough to guarantee the location of the clips soldered on them. The epoxy cured that and now they stay put whether or not there's a connector on them. They will stay where they are put for sure when the epoxy hardens!

If you have trouble finding the clips, try Arrow Electronics or Harrison Radio, as they both carry Grayhill. — *James Ashe, W2DXH*

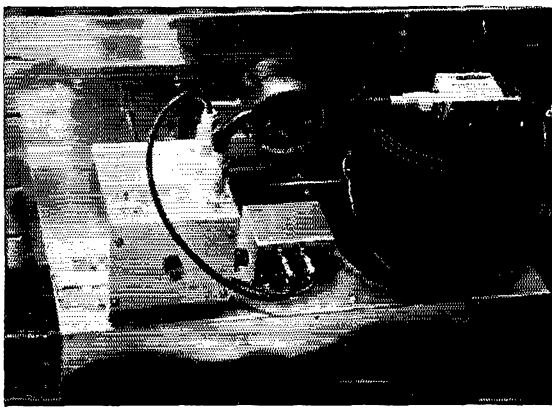


Fig. 2—The Cantenna is mounted by bolting a piece of plywood across the bottom of the chassis, and then bolting the Cantenna to the board. The mounting bolts are soldered to the inside of the can to prevent oil leaks.

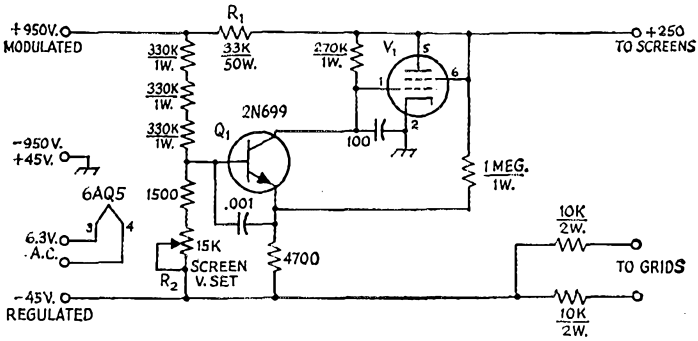


Fig. 3—Circuit diagram of the screen regulator/modulator. Resistances are in ohms and fixed resistors are ½-watt composition unless otherwise noted. Capacitors are disk ceramics; decimal values of capacitance are in microfarads (μf.); others are in picofarads (pf.). K = 1000.

Q_1—N.p.n. transistor, 2N699 or 2N2108.
R_1—33,000-ohm 50-watt wire-wound resistor (see text).
R_2—15,000-ohm 2-watt linear taper control.
V_1—6AQ5, 6BQ5, or 6CL6.

4 X 150 SCREEN MODULATOR/ REGULATOR

THE circuit shown in Fig. 3 is what I use for the screen supply of an amplifier using a pair of 4X150As on a.m., s.s.b., and c.w. The plus B for the screen is taken from the modulated plate supply, and on a.m. this circuit provides modulated screen voltage. On s.s.b. and c.w. the circuit is a regulator which will absorb reverse screen current so the tubes do not "run away."

In other amplifier configurations, R_1 could be made lower, and two 6AQ5s used, or a separate regulator used on each screen. A 6CL6 or 6BQ5 may be substituted for the 6AQ5. — *H. H. Cross, W1OOP*

A NEW RUBBER CEMENT

GENERAL ELECTRIC is marketing a new silicone rubber cement, called Clear Seal, that will find many applications in the ham shack. It is sold in 3-ounce tubes and will seal anything but vinyl and polyethylene. I have sealed the ends of coax and beam connections with it. Also, when I wound a transformer, I coated each layer of wire before wrapping the insulating paper, making a completely sealed unit. The wire ends were practically impossible to pull out, and the cement will stand 500 degrees F.

For r.f. applications, I tried the cement on the plate tank coil for an amplifier with a pair of 813s. This coil shows no sign of deterioration after six months of use. — *Ross F. Fox, W8PZX*

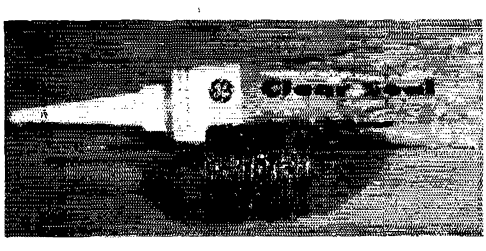


Fig. 4—W8PZX's tank coil. The turns are cemented in place so the coil will hold its shape.

TWO-CIRCUIT CONNECTORS

HANDY two-circuit connectors can be obtained for nothing but a little labor. Collect a number of dead 9-volt transistor radio batteries — the teenagers in the neighborhood are the best source. Hacksawing off the top of the batteries will provide excellent connectors when used back-to-back. — *Thomas M. Casey, WA0DFS*

REGULATOR-TUBE PROTECTION

ELECTRONIC-regulated power supplies usually use low-mu triodes or triode-connected pentodes as control tubes. Dial lamps may be used as self-adjusting resistances placed in the cathodes of these tubes to prevent damage from heavy currents. The brilliance of each lamp will give an idea of the relative current through each section or tube. If an overload becomes extreme, the lamps are a good fuse. The lamp type is determined by the resistance desired in the cathode and the normal current drawn. Type Nos. 47 and 44 are useful with the 6AS7 or 6L6 tubes.

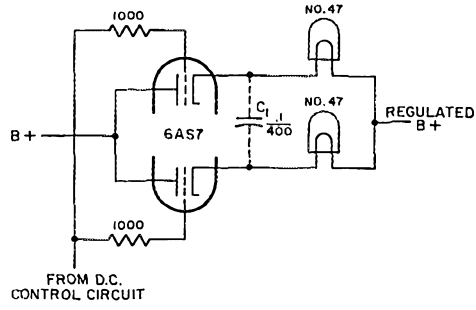


Fig. 5—A protection circuit for regulator tubes by placing a pilot lamp in each cathode. If oscillation occurs, it may be cured with C_1, typically a 0.1-μf. paper capacitor of sufficient voltage rating for the power supply used.

Since the thermal change in the bulbs is sluggish, motorboating will sometimes occur. This trouble can be cured with a capacitor connected as shown by the dotted lines in Fig. 5. — *Liz Deck, K6MTQ*

Correspondence From Members-

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

VHF MANUAL KUDOS

I received my copy of the League's new *V.H.F. Manual* and am so enthusiastic about it that I had to write. It may have been a long time in coming, but was well worth the wait. This manual is perfect for the newcomer to the v.h.f. bands as well as a wonderful reference for the oldtimers. The manual was extremely well written and very up to date in all respects.

It is in the typical Tilton tradition of highest quality v.h.f. articles. Thank you for another superb amateur radio manual. — *K4EJQ*

Mr. Tilton has done it again!
I don't know when I have enjoyed a publication as much. Congratulations to Ed are in order for editing what I believe will be the "King James" edition of all v.h.f. handbooks. — *W2QOC*.

Congratulations . . . a long standing void has been filled. Although I have by no means read it completely, I have already seen enough to know that it is well worth the $2.00.

I was particularly pleased at finding a preponderance of new articles in contrast to many handbooks which are often a retread of old articles that have been previously published. The early portions which told of the development and highlight accomplishments of v.h.f. pioneers was most interesting and informative.

I am looking forward to many evenings of enjoyment spent digesting this excellent publication.. — *K8AOE*

In my opinion, it is the most complete text on this subject in the field. I have found it to be of inestimable value. Keep up the good work.— *W.12SUY*

EDITORIAL COMMENT

Your editorial by WB2JQC in the July issue of *QST*, reminds me of a fellow who had so much education that he felt that no one else was intelligent enough to carry on a conversation with him, so he sat in the corner at socials and talked to himself. Let the Novice QSL es cul DX es 73. Sounds as tho you're trying to take all the pleasure out of growing up. — *K5PMC*

I too have found embarrassing the question, "What do you hams talk about?"

I have had many an interesting QSO with the help of a simple device that taps the conversational wells. I ask, "What's your occupation?" If it's the same as mine, advertising copywriting, we can talk 'till the skip goes out. If it isn't the same as my occupation, the conversation is equally, if not more interesting. — *W9PXA*

Far be it from me to claim that I rag-chew 100% of my QSOs — far from it. In one area, however, I do find a very good way to keep the QSO alive, and I thought I'd pass it on for what it might be worth!

The JAs generally roll into Hawaii on 40 c.w. 5-7/9-9 in the evenings here. I have a National Geographic Map of Japan and Korea (N.G.S. Atlas Plate 51), and when a JA comes back and says" . . . QTH is Shizuoka," I start the bit off by remarking, ". . . OK on QTH being on Suruga Wan": — this generally gets the JA's curiosity up, and we begin yakking about Japanese geography. Or I end up working another JA in Kushiro . . . so with the map handy, I begin a conversation by remarking that I see where he is on the island of Hokkaido, and ask if there *is* snow on the mountains north of his QTH.

So not only do I find myself learning more about geography, but — by marking the map with a yellow felt marking pen — I can very easily keep track of the QTHs of the numerous JAs I've worked. You'd be surprised at how a rag-chew can get off the ground if you begin talking about the other guy's neighborhood!

From other QTHs, perhaps Europe rolls in consistently — or perhaps the VKs and ZLs — or this works equally well even for areas of the U.S.! Have a few maps handy of the areas in which you expect to make contacts — and then begin commenting on the guy's QTH! — *KH6FMF*

Tell WB2JQC he should try 2 meters. My log shows the last 4 contacts on the band totaled 2 hr. 30 min. Those fellows are real helpful (for the most part). Last contact, 1 hr., K1UZA, checked out a m.c.w. set up for me (even taped it, and played it back), a real scream, hi, and checked out a higher freq xtal. Seems he recently got wiped out by lightning; I now disconnect the AC power cord beside grounding antennas. What's more, no crowding up there plenty of room. — *WN1EBD*.

H-A-M

In connection with your editorial comments in the latest issue of *QST* magazine with respect to the origin of the word "ham," I thought you would be interested to know that I read your comments to Mr. H. C. Gawler, who was the radio inspector "up Boston way" in 1912.

Harry tells me that he is completely unaware of three young operators who manned the joint station at that time, whose initials would coin the word "ham," and further confirmed that in those days a ham operator usually referred to a railroad telegrapher whose code speed was approximately 10 words per minute and no more.

It would seem that these comments add further strength to your comment that the New York physician story is indeed a myth. — *W2PXR*

It has piqued me through the long years that, widely, we are "Hams." To the Morse expert, the theatrical-minded — and, I fear, the public at large — the term is derogatory. Even so, we seem to be stuck with it (See Webster). Too bad! Constructively, there's so very much more to the activity than Morse, alone; and I don't mean phone.

Along about the summer of 1907 "Cock-eye" Guard and I were manning Western Union's Indianapolis-Chicago duplex "bonus" circuit. On the receiving side at the time, "Cock-eye" had referred to his transmitting counterpart as a "ham," and, then, called in the Wire Chief for a circuit "balance." As, momentarily, we relaxed, I asked the old-timer the derivation of the appellation. "He's got a ham for a 'fist'!", he said. And there you have it — *Time* magazine, and all others, to the contrary notwithstanding. — *Paul Godley, Ex-2ZE.*

CHAOS?

There is something bad wrong around here. With Docket No. 15928 still only a proposal or a threat, as you wish, I detect much unrest among the troops. I have seen a holder of the Ph. D. degree in Electrical Engineering at the code machine! I have seen a "thirty year" c.w. man at the books! I have seen a forty year old man, with shaking hands, taking his first code test since age fifteen! If there is a God in Heaven, he will put an end to this nonsense before the entire Amateur Radio Service is upgraded. — *WØOJW.*

HARD NEWS

I wonder how many readers of the July issue of *QST* took the time to read carefully and completely the minutes of the Meeting of the Board of Directors on pages 40 through 47? It is my firm belief that if more amateurs would read *QST* entries such as this and other articles pertaining directly to League affairs, there would be in the amateur community a much more thorough and complete understanding of what the League is trying to do for amateur radio. Every League member should, in particular, however, read and re-read the minutes of the Meeting of the Board of Directors, not only to learn the "hard news" of what has actually transpired, but to gain a real and revealing insight into the workings of the amateur's organization — an insight that, if fully comprehended, should somewhat stem the flow of foul-mouthed vituperation across League desks. — *WB2JOK.*

FD, COMMUNITY SUCCESS

Our club won't know the point score of Field Day for several days (while checking logs, etc.), but we already know what a great success we had!

Many thanks to ARRL advance publicity material, of which we made much use. Our Field Day exercise was witnessed by nearly 200 visitors from the general public! This public relations endeavor was highly successful, and also accomplished one of the goals of our radio club in that we interested many newcomers to find out more about the service.

We located our FD site on the Diablo Valley College campus, which was easily accessible by the public. We served coffee to all, and asked that visitors sign a guest book. We had sufficient operators available to take visitors on "guided tours," and answer questions for them. (We're pretty sure, too, that we will make as high a score from this FD site as we have from any mountain!)

The ARRL advance publicity material was used by every newspaper we sent it to (five) and also by the local radio station KWUN, Concord. On Sunday morning, a representative from KCRA-TV (Channel 3, Sacramento) came to our area and took pictures of the FD activities for one of the station's news broadcasts (KCRA is an affiliate of NBC).

You will receive the official FD report through the proper channels of our club, but I couldn't resist adding this two cents in appreciation for the assistance from ARRL in making up the news releases, which contributed significantly to the overall success of public participation in Field Day for us this year. Thank you. — *W6PIR*

KNOWING THE RULES

Maybe I'm wrong and 95% of the Field Day phone operators are right, or maybe I am right and they are wrong. But how could that be?

Paragraph 97.87 requires that stations operating portable — shall give their approximate location. The word "shall" can be considered mandatory. The meaning of "approximate location" is also defined.

Typical of the majority of phone operators were:

a) K4JVA slant 4
b) W4EM Tennessee Section
c) W9BFO Southern Illinois
d) W2NSD Portable, New Hampshire

. . . and most of the 95% never took the trouble to say "this is" or "from," which is also required.

Three stations which I contacted during Field Day were quite indignant when I tactfully raised the question. Needless to say, I switched to c.w. where "7/8" is perfectly legal.

My hat is off to the Field Day operators who know enough of the regulations to identify themselves properly. Unfortunately, and to the slight discredit of ham radio, there were not enough. — *W4WBK*

INVENTORS FEEDBACK

There have been some changes in the handling of submitted inventions that will be of interest to inventors. I found out about these changes when I wrote to the National Inventors Council about some aeronautical systems I have with patent pending.

The National Inventors Council has ceased to evaluate inventions. The change is described in the booklet *How to Submit Ideas and Inventions to the United States Government.*

"For many years a government staff associated with the National Inventors Council evaluated inventions for government use. However this evaluation function has been discontinued. In its place an invention referral service has been instituted as an activity of the Office of Invention and Innovation in the National Bureau of Standards. No attempt is made to evaluate the inventions. They are simply referred to an appropriate agency for evaluation there."

Also, the publication of the booklets *Inventions Wanted by the Armed Services* and *Facts About the National Inventors Council* has been discontinued. Apparently "Inventions Wanted" was cancelled for security reasons. It showed rather clearly the weak spots in our defense system. — *Nickolous E. Leggett.*

WAIT YOUR TURN

It is the first time in my 38 years of hamming that I am requesting the publication in our magazine *QST* of the following energetic protest against the procedure of great many U. S. hams.

I devote my operating entirely to DX-c.w. in the 20- and 40-meter bands. I am not interested at all in communicating with hams in our continent. Whenever I am lucky to raise any good DX station

(Continued on page 166)

The Anatomy of Public Service Communication

Part 4: Putting the TCC to Work

BY GEORGE HART*, W1NJM

Emergencies aren't usually nationwide, but a communications emergency situation might easily develop affecting the entire nation. John Hamm finds himself plunged from a local to a nationwide perspective in his dual capacity as EC and TCC director.

LAST month we left our hero, John Hamm, WA0XIII, struggling to get his Southport group in the swing of things. Despite the careful pre-organization that had taken place, there were still problems. Some of the gang were unavailable because of business or family commitments. There were equipment failures. Some agencies who had previously turned down John's offer of cooperation now wanted to avail themselves of the AREC's services. Amateurs who had taken no part in preparedness activities importuned John with offers to assist. The CB'ers were making a lot of noise and wanted to coordinate. In the midst of all this, with tornadoes wreaking havoc all over the midwest in one of the most widespread tornadic conditions in history, the NTS Central Area Net manager officially requested John to activate his Central Area TCC to help handle the large volume of health and welfare traffic being generated.

Precedences

Central Area Net was meeting continuously. Net control changed every two hours and the call up of Regions and TCC representatives occurred every hour on the hour, just to keep check on what traffic they held and who was in the net.

Once in a while someone appeared on the frequency with a message classified EMERGENCY. When that happened, NCS stopped all activity, assigned someone to clear the message and take it immediately to its destination, or as close to its destination as possible. For the most part, he had to play it by ear; *he* didn't know when such a message was going to show up, or what its destination would be. All he knew was that when one did show up it had to be handled *pronto*.

Precedences can throw a large monkey wrench into the well-oiled NTS machinery, if they are not properly handled. Let's review them briefly:

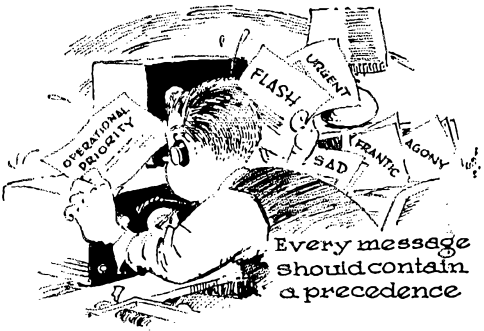
EMERGENCY — Essentially, messages concerned only with life-or-death matters of the utmost urgency. They can concern many people or only one person. Examples: Request for a doctor to perform an emergency appendectomy; information on situation of refugees and requirements for their survival; requirements for equipment, food or facilities to insure the survival of groups of people in the emergency area. Such traffic is *not* handled by amateur radio if regular commercial facilities are available. If more than one EMERGENCY message is on a net at once, no further traffic is dispatched until they are all cleared.

EMERGENCY precedence traffic receives handling by the swiftest and most direct route, regardless of NTS channels, if possible by stations specifically designated for this purpose. There is no abbreviation for this precedence.

Priority — Generally speaking, this is traffic that does not qualify as EMERGENCY but is still emergency-connected. No further definition is really necessary: if it is not EMERGENCY traffic but has to do with the emergency situation, then it is Priority traffic and rates second handling. However, in order to distinguish between messages coming out of the disaster area and personal welfare messages going *into* the disaster area, the latter are classified "Priority Two (P2)" and are handled after priority messages are cleared.

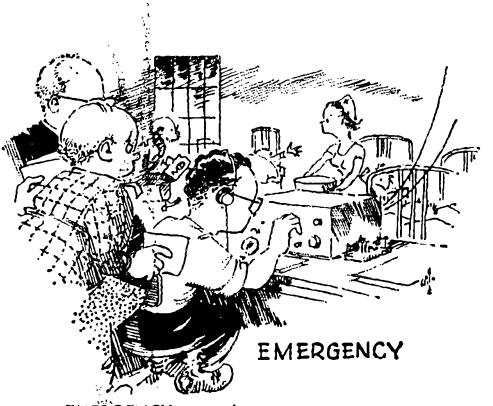
In "normal" times, a message might be classified P if it contains important matter with a time deadline, but usually this classification, like EMERGENCY, will appear only during emergency operations.

Priority traffic is cleared via normal channels but before Routine traffic. The NCS uses his judgment as to whether to interrupt the transmission of a Routine message in progress in order to clear Priority traffic. This is not usually done.



A standard set of precedences rather than a number of different standards avoids confusion.

* National Emergency Coordinator, ARRL.



EMERGENCY precedence concerns matters of life and death.

Routine — All traffic not connected with an emergency operation and having no emergency connotation. Nearly all traffic on the amateur bands in normal times will be of this nature. During emergencies, traffic with this precedence is not always banned; nets can be kept busy handling it when or if no traffic of a higher precedence is present.

Activating the TCC

The National Traffic System operates one cycle daily. This includes *every* day, weekends, holidays, Sundays and all. In an emergency, depending on its severity, its extent and the emergency communications requirement, the number of cycles can be doubled, tripled, or operation can be made continuous, as was the case with the example emergency with which we are now dealing.

This was a severe emergency indeed. Inquiry traffic from other areas started coming into CAN on a free-lance basis, and the TCC was needed both to bring it in and to handle the replies going back. John Hamm was forced to turn his local Southport troubles over to assistants and get his TCC crew going.

You might at this point ask the following question: If commercial communication was out, how could the CAN manager, located perhaps in Illinois, request John to activate his TCC group? The fact is that in between times, whenever he got a chance, John was monitoring the Central Area Net on 3670 kc. and the National Calling and Emergency Frequency of 3550 kc. The need for TCC became evident, so John made his presence known to the CAN manager and was immediately requested to activate the TCC to handle the overload of inquiry and notification traffic.

How did the need become evident? Just from the fact that there was much traffic coming from the Eastern and Pacific Areas for storm-devastated points inside the Central Area. True, most of them were inquiry messages, rating only P2 precedence; but this made no difference. This traffic had to be handled too. John started rounding up his boys. How? By amateur radio, how else? Most of them were already part of CAN, others were expecting to be called and were on the alert. Wherever telephones were still operating, they could be used, but TCC personnel are supposed to be standing by for call up if needed.

John's TCC staff numbered 21 amateurs. Not all of these, of course, could make themselves immediately available on a 24-hour basis. Let's say that 16 of them reported for duty; the rest were tied up. (This is a pretty optimistic estimate, considering that most of these operators signed up for just one night a week normally, and many of them had other NTS commitments as well.) Only two functions (C and E) were needed on a continuous basis, because the other one (F) was for bringing traffic *in* to the Central Area. With 16 operators, including himself, John could have both outgoing functions represented in CAN 24 hours per day if each operator worked a three hour shift once each day. This was quite a chore, considering that normally they work a one-hour shift once per week. But an emergency is an emergency, and they all agreed to do their stuff.

John staggered the shifts so that a new TCC station reported in every hour-and-a-half. That is, let's say that Station C reported in at 1100 GMT to clear traffic for the Eastern Area. At 1230, station E reported in to clear traffic for the Pacific Area. At 1400, a new Station C relieved the one who came on at 1100, who then took his load of traffic to his TCC counterpart on the East Coast. At 1530, a new Station E relieved the one who reported at 1230, who then went off for his schedule with his west coast counterpart.

This took care of all outgoing traffic, which is more important because it consists of health and welfare *reports*, not inquiries. The inquiries came through without any particular channeling. On his daily mission, TCC station A brought a big load of them, but often they piled up because CAN was busy handling P traffic (as distinguished from the P2 inquiries). A lot more filtered into the lower echelons in the Central Area, and more still were brought to CAN by free lancers in the east and midwest. Then, of course, station F was also loaded every night, having picked up a big bunch from his west coast counterpart.

Within and without the system, there was no dearth of personal inquiry traffic. There never is. This can build up to tremendous proportions, but it *is* emergency traffic and must be handled. The boys in CAN did the best they could, but the buildup of P2 traffic continued, and much of it had to be deferred. Great quantities of it were handled and answers obtained by the Red Cross from within the disaster areas. In many cases, inquiries could be answered without search, simply by stating that the area in question was not affected. People panic very easily. But answering the messages was the job of the Red Cross or other agency, not of the amateurs. All the amateurs did was handle the traffic generated, keeping their own originations to a minimum.

One thing we should point out is that when any TCC Area is activated, it becomes necessary for the other two TCC Areas also to activate to a certain extent. Thus, when John put his TCC gang to work on a continuous basis, the other two TCC directors (Eastern and Pacific) also had to man certain of their functions in order to give John's boys counterpart stations to whom to send their traffic. Otherwise, P traffic would pile up and be dumped on the regular schedule once daily.

Nearly all incoming traffic was P2, so TCC functions bringing traffic in from other Areas or handling traffic only between Eastern and Pacific Areas remained on a daily cycle; this included stations A, B, D, F, H, I and J. All other functions had to operate continuously, because there was a continuous flow of P traffic out of the Central Area which had to be distributed as quickly as possible to destination; this included stations on both ends of such circuits, specifically C, E, G and K.

Keep in mind that this is merely how it would work out in our example situation. Should extra receiving stations be available in the Central Area, the number of cycles per day could be stepped up in other functions as well, in order to handle some of the P2 traffic.

This all sounds tremendously complicated, we know, but a nationwide communications emergency is a complicated concept. NTS could not hope to carry the full load. Only a few long telephone lines were disrupted, and some of these were successfully bypassed by standard telephone company procedures. There were some towns and cities in the affected areas in which the amateurs supplied the only contact with the "outside" for a couple days. Other lines were hopelessly overloaded, so NTS circuits received some use from this condition.

Our job is to back up and supplement, not to replace. No one expects us to be able to carry normal commercial circuit loads, even in an emergency. Normal facilities do an adequate job, but all systems are subject to breakdown and overload, and that's what we are here for — to maintain *essential* communications until regular service can be restored.

Long Distance Hot Lines

Long distance "hot lines" are seldom necessary, but let's for the sake of example assume that the Red Cross urgently needed a circuit for EMERGENCY and Priority traffic between Washington, its national headquarters, and St. Loo, its regional office supplying the affected emergency area, and that no TWX was available because they were all overloaded. The RC invoked its agreement with ARRL, and League headquarters notified the respective Eastern and Central NTS TCC directors of the need. It was up to these two officials to produce, because the points involved were in different NTS Areas.

The Eastern Area director quickly alerted a station near Washington who set up the necessary arrangements with the RC national office. In fact, the RC installed a TWX machine temporarily in his shack, and volunteer operators were summoned to man both the amateur station and the TWX machine around the clock.

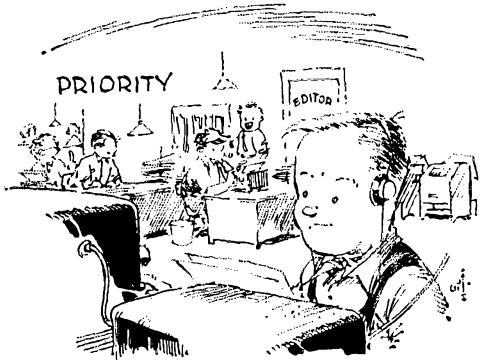
In the Central Area, John Hamm had a little trouble, because none of his TCC crew happened to be located near St. Loo. So John appealed to the TEN manager, who came up with a qualified station in Kirkwood. The same sort of arrangement was set up — TWX from Kirkwood to the RC regional office in St. Loo, volunteers to man both the amateur station and the TWX machine so that traffic flowing over the line could immediately be relayed in either direction.

The set up operated for two days, then was closed down when traffic diminished and commercial circuits again became available. Some 1500 Priority and a couple of EMERGENCY messages were handled. Some of the operators worked long hours, because volunteers to man a station continuously for 48 hours aren't always easy to come by. Occasionally changing conditions necessitated a change of bands. Despite the fact that c.w. was used exclusively, on two occasions contact was lost completely for over an hour. If RTTY equipment had been available it would not have enhanced the continuity of contact, but it would have enabled a greater volume of traffic flow when conditions were good.

Precedence Troubles

One of the biggest troubles John experienced was with the message precedences. Being NCS of a high-echelon NTS net itself is a tough job; when you have to pay attention to precedences, it's just plain murder. But in an emergency operation, precedences are most important. Trouble was, John found, that dyed-in-the-wool traffic men have a tendency to handle the traffic as it comes, without paying much attention to the precedences. On two occasions, John found one of his functionaries sending P and P2 traffic intermixed, and once an EMERGENCY message appeared in the middle of a batch of P's. When questioned about it, the operator said it didn't sound like much of an emergency to him.

The precedence of a message is set by the



Official dispatches are one kind of "priority" (P) precedence.

operator of the originating station. He is the one who has contact with the originating person and first hand knowledge of the message's actual importance. Once that precedence is set and transmitted, operators along its route handle it accordingly, *regardless* of their personal evaluation of its importance. They can argue with the originator later if they disagree (originating operators can be wrong), but a message of high precedence should be handled first, argued about afterward.

Each handling station should keep traffic sorted both as to precedence and destination in accordance with the rules of the net in which he is operating, and when sending traffic he should be very careful to send it in order of precedence — Priority first, then Priority Two, then Routine (if any). EMERGENCY traffic, of course, stops all other activity until it is cleared.

Comes an Emergency Message

Let's assume a situation for the handling of an EMERGENCY message. The Central Area Net is rolling along smoothly, handling P and P2 traffic in stride, with now and then a Routine whenever higher precedence temporarily runs out. Into the net suddenly pops KØXBA with an EMERGENCY message for Houston. The NCS immediately sends QNE (entire net stand by).

Houston is in the Fifth NTS Region, the representative for which is at the moment on a side frequency copying some P traffic from the Tenth Region representative. NCS calmly instructs KØXBA to go to that frequency, break in and send the message to the RN5 man. This he attempts to do but cannot find them and comes back to the net, again breaking in. NCS then, without further ado, picks one of the stations standing by in the net and instructs him to copy the message and get it to its destination immediately. Let's say this is WØXFA, an old hand at the game who knows his way around. WØXFA QSLs the message, and KØXBA goes back to his emergency group. WØXFA then leaves the net also, and CAN returns to handling its P and P2 traffic.

Now what does WØXFA do with this vital message? Remember, it's a matter of life and death; seconds may make the difference. One must assume that landline circuits to Houston from KØXBA are out, otherwise the message would have been delivered by him. Nevertheless, the first thing to do is find out if this is still the case, from WØXFA's location. He finds that it is. Depending on a number of circumstances, WØXFA might adopt any one of the following procedures, in this order of preference:

(1) Report directly into the Texas NTS Section Net and stop its operation. Its NCS will find someone close to Houston who can make prompt delivery.

(2) Go directly to RN5 and stop its operation, giving the message to the Texas representative, who will carry the ball from there.

(3) Get on the National Calling and Emergency Frequency (3550 kc. is probably best, although if no answer there 3875 might be tried) and raise someone who *can* contact Houston by landline.

This kind of traffic rates "priority two" (P2) precedence.

Maybe TEX is not operating at that particular time; after all, Texas is not in the disaster area. So he goes to RN5; chances are the Texas representative can telephone Houston. Should there temporarily be no Texas representative on RN5, he shouldn't waste time waiting around, but go immediately to the NCEF and start yelling for help. This is a hot message and can brook no delay. An hour is too long. He should get rid of it within minutes of receiving it — not just to anyone, but to someone who can make prompt delivery.

The Aftermath

An emergency situation lingers for some time after the actual cause of it has ceased to exist. In this case, the tornadic condition passed on in a couple of days, but a couple more days were required before things returned to normal, communications-wise. Hot lines gradually ceased operation. Activated NTS nets reduced the number of cycles from bi-hourly (continuous, in effect) to six-hourly, twice daily and finally to normal. AREC nets secured. ECs, SECs, NTS net managers in the affected areas sighed and hit the sack.

One thing more was left to do. No particular rush, but it ought to be done before Father Time sweeps his scythe to cut off the links to memory. The public memory is a short one, and while they may sing your praises temporarily, they will soon forget all about what you did. Therefore, it is most important to reduce all possible to paper and work it into some kind of narrative report to be sent to headquarters so a lucid account of what happened can be written up in QST for posterity. Local newspapers will also be interested in a public relations version of who did what locally; put your "assistant EC for publicity" to work on this.

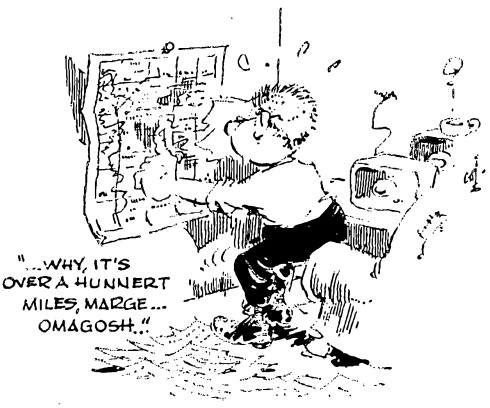
Whither John Hamm?

For John Hamm, this is only the beginning of an illustrious amateur radio career. True, he is a fictitious character, but he is the epitome of the

(Continued on page 166)

Key Kwivers— —and— —Pencil Pulses

BY JOHN G. TROSTER,* W6ISQ



"MARGE . . . Marge . . . I did it . . . I did it . . ."

"You caught the mouse in the garage?"

"Noooooo . . . no . . . I talked to a fella with my radio . . . my first QSO . . . that means 'talk'. Oh boyohboyohboy, still kinda shaky. Hope they're all not like this."

"Who was it? What did he say?"

"Just a minute. Lemme get all the papers I wrote it down on."

"Easy now . . . easy. I'll get you a cup of coffee."

"Well, I went out and started practicin' my CQs like always. But *this* morning, I put on the aerial instead of the light bulb. It's legal now, see? Absolutely legal since I got my license. Understand?"

"Here's your coffee."

"So I call CQ maybe half an hour or so . . . and practice sending my new call . . . WN6ISQ. So finally I got tired sending, so I started tuning the receiver around a bit and . . . and here comes my call, real, real weak . . . like as if my little whistle is comin' back from outer space 'er something'. Real weird . . . I got all clammy."

"Then what?"

"Well, finally the code changed from my call to something else. So *thececnn* I realize, by George, here is a fella calling my call and signing his call. Omagosh! . . . get all excited again just thinkin' about it."

"What was his call?"

"Ahhhh . . . well . . . I wrote it all down right here . . . just like it came . . . over . . . the . . . airwaves . . . wheew . . . well. Let's see . . . 'ditdahdah . . . 'W' . . . 'dahdit . . . 'N' . . . dahditditditdit . . . '6' . . . ditdit . . . 'I' . . . dahdahditdit . . . 'D', no that's 'Z' . . . ditditdahdit' . . . 'L' or 'F' . . . can't keep them two straight. Guess it's 'F'. Anyway, his call was WN6IZ and I guess 'F' . . . 'er somethin'."

"What did you do?"

"Well, I just kinda sat there. I was . . . well . . . I got the Key Kwivers a bit, I guess. Believe I kinda froze there. I had hold of the key but it wouldn't move. Then here he comes on callin' my call again. So this time I guessed it was me he was callin' OK and not some other station with the same identical call letters. So I call him WN6IZ . . . F . . . I think that's the call I called . . . and then I signed my call, WN6ISQ about 25 times just to make sure it was me he was callin'."

"And what did you tell him?"

"Well . . . I . . . ahh . . . I didn't have anything written down on paper to send him — you know, I mostly practice out of books and things. But I remembered some of the examples they gave. So I said, 'TU . . . RST 599x . . . ' . . . that means, 'thank you, you are very loud'."

"I thought you said you could barely hear him."

"Sure, I know, but I haven't learned them other numbers yet. Besides this is my first call and I don't want to make him think I can't hear him any better than real loud! So then I said, 'I live in Atherton' . . . and, well . . . I got all clammy again, so I just sent 'K' which means somethin' like, 'I Kwit, you send a while'. Any cream?"

"What did he send you?"

"Yeeeeeeaaaahh . . . what *did* he send? Ahhh . . . well, I wrote it all down right here. Every letter just like he sent it. At least all the letters I could get . . . 'TUOMR—T35—INBINGNITYMY NAMEED'. Wheew . . . wow. Now let's see . . . 'TU' . . . that's 'Thank you' . . . hams is always real polite to each other. 'OM' . . . that's me . . . calls me OM because I forgot to send him my name, I guess. Then 'R something T 35 something' . . . that's my report, but I guess I copied it wrong 'cause it should of been '599x' like I gave him."

"Where was he?"

"Well, next he says 'IN' . . . and then his place . . . I guess that should be next just like in the examples. I'll just divide up these letters here . . . 'BINGNITY' . . . ever heard of Bignity, California?"

"I'll get the map."

"Then . . . lessee . . . 'MYNA' . . . that's a . . . a . . . talking bird? Hmmmmmm. Maybe my signals sound like a bird call. Wonder if

*45 Laurel Ave., Atherton, Calif.

that's good? Guess I'm still a little excited. Can't *hardly hold* this pencil to divvy up the words. Any more coffee?"

"I don't find any Bingnity in California. Are you sure you have all the right letters?"

"Sure. I got 'em all down right here! I mean . . . after all . . . I copied 'em down . . . see, right here! Then he goes on . . . 'MEED'. Dunno . . . think maybe he put in a extra 'E' . . . maybe. Yeah . . . that's it. He's saying he's a 'Med' . . . a medic . . . a *doctor*! I should of called him 'Doc' . . . haw. See how ya can deduct these things? Oh yeah, Marge, ya get so's ya can figure these things out pretty good after a while . . . I guess."

"I don't see how he could say all that in just those few letters."

"Ohhhh Marge, us hams use abbreviations and 'Q' signals and all kinds of short cuts. Think I'll just lie down a minute. I don't see how anybody ever works more than one QSO a day . . ."

"Let me see those letters you wrote down. Hmmmmm."

"Hope he sends me his QSL so's I can find out his call."

"I think you divided the letters wrong in all this business you copied. Look at the last part. Nothing here about a myna bird *or* a doctor. He says 'MY NAME ED'."

"Well . . . ahh . . . he was sendin' pretty fast and I didn't have a chance to divvy up the words too good."

"And you put down here that he's 'IN BINGNITY'. That can't be right . . . no such town in California."

"I dunno Marge. With *all* them new houses going in around here all the time, they make new little cities all the . . ."

"That's it . . . the last part is *city* . . . Bing City . . . Bing City . . . that's *King City* . . . *not* Bingnity?"

"Ohmagosh . . . where's the map . . . hold the cup . . . that's all the way down . . . you realize how far that is? Must be 25 miles to San Jose . . . another 75 to Salinas . . . and at least 50 miles more to Bingnit . . . errrr . . . King City . . . Why, it's way over a hunnert miles! Omagosh, a hunnert miles with this poor little one tube . . . gotta lie down again. Ohmyomyomyomyo . . . gets me kinda clammy and excited just thinkin' about it again."

"I can tell you're still excited."

"How?"

"You're drinking the cream."

"Ahhhh . . . oooooo . . . thought it was a new brand of instant . . . heeeuuuwweeee . . . just hope all QSO's aren't as tough as the first one."

"Give me the cream pitcher."

"I dunno Marge . . . that other fella *could* be a doctor! Ya know, they *do* have 'em a way down there in Bingnity." QST

Strays

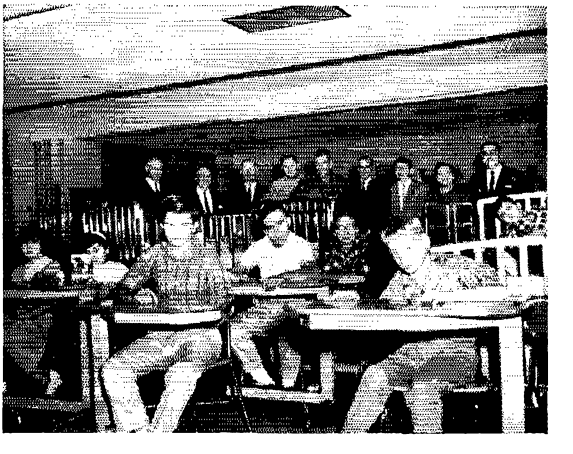
This group, assembled during the Dayton Hamvention this year, represents a total of 209 years of amateur radio! Shown are W8DG, W8JOV, K8UZ and W8TE—all members of the ARRL, QCWA OOTC and AWA.

Stolen Equipment

On June 30, the following equipment was stolen from the New York University Radio Club: Collins 75A-1 receiver (serial No. 1400), Viking Valiant transmitter (serial No. 31694), Tecraft Criterion 6-meter converter (serial No. 17458). Anyone with information should write W2DSC, NYU ARC, University Heights, Bronx 53, New York.

The Amateur Radio First-Day Covers are still available. They are all singles, unaddressed but carrying the amateur radio stamp and the official first-day cancellation, and they will be mailed to you in an envelope. Prices are 35¢ each, three for a dollar. Send your orders to ARRL Headquarters, 225 Main Street, Newington, Conn., 06111.

W3ELI, who is ARRL's SEC for Eastern Pennsylvania, has, together with a group of other hams, set up a training class for Novices at the Shriners Crippled Childrens Hospital in Philadelphia. Hams shown l. to r. in the photo above are K3KTY, K3WEU, W3ELI, K3EOD, K3NSN, K3TKA, WA3BIS, K3FYS, and W3GPO.



AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

Down The Flagpole

IN May and June *QST*, this column, we ran a number of flags up the flagpole and asked if anybody wanted to salute them. Not a single flag got by without both a salute and being shot at. Some were completely shot down. In this month's column, we want not only to "count the votes," but also, which is more important, to review the comments received.

We approach the latter with some trepidation. It would have been easy if we had instructed everybody to vote yes, no, or no opinion. But you all know by this time that we never do things the easy way. We wanted discussion and opinions, and brother, we got 'em! Often, if was impossible to determine, from the discussion generated, whether the particular correspondent was "fer" or "agin" a particular question. Sometimes, of course, he didn't know himself, because he was partly in favor and partly against or totally undecided. Some commented in general, without answering specific questions.

For example, one correspondent said it was *all* a lot of hot air, and that ARPSC should be changed to ATNAC (All Talk and No Action). Another expressed astonishment that at last we were proposing some improvement instead of "belabored, puerile, affectatious complications." Others tried to answer the questions by *asking* questions, but we were too dense to get definitive answers this way. A couple gave us "Yes, but . . ." answers in which the "but" clause completely negated the initial affirmative.

But this is the sort of thing you have to contend with when you ask for comments and discussion, and we were prepared for it. Let's take each of the eleven questions from June *QST* (see p. 84). (Hardly anyone commented on the May *QST* items.) We'll give the count as *in favor, opposed,* and *indeterminate,* then follow with discussion, without identification. Those counted as "indeterminate" are the ones who expressed opinions we were not able to classify, who indicated they were undecided, or who misunderstood the question, complicated it so much with "ifs" and "buts" or made incorrect assumptions that it was impossible to classify the answer any other way. "No comments" were not counted at all. Here goes:

(1) *Reduce EC reporting to quarterly.* In favor: six. Opposed; three. Indeterminate: one.

Comments: "I would settle for a card every other month." "Yes, and cancel appointments of any EC or SEC who misses more than one report a year." "Better let the ECs decide." "Hooray! Those reports seem to come around more often than fund-drive collecters." "Most ECs would then forget reports entirely." "Will result in the decay of much AREC activity." "I have serious doubts that this would improve percentages." "It sounds more convenient that way." "Excellent, but require written report for every emergency." "EC and SEC reporting should parallel ORS and RM reporting."

(2) *Reduce SEC reports to card size and require them quarterly.* This was really *two* proposals, and results were accordingly hard to tabulate. However, in favor: six. Opposed: four.

Comments: "Any SEC worth his salt can find time to make a monthly report." "Let the SECs decide this one." "Get 'em down to realistic size and frequency." "Agree on card, but we need monthly reports."

(3) *Abolish OPS and PAM, make phone operators eligible for ORS and RM.* In favor: nine. Opposed: six.

Comments: "They cover identical services even though by different modes." "I would not like to see strictly-phone traffic men get ORS appointments." "I kinda *like* the distinction, myself." "A relay is a relay, whether by c.w., phone or RTTY." "Any idiot can hold OPS (I do); make 'em more traffic conscious." "Why require an appointee to be *both* a phone and c.w. man?" "I don't really think it would help break down phone-c.w. barriers." "Who *wants* to break down the barrier?" "We need unity between phone and c.w. operators now as we never needed it before." "There's a lot of difference between c.w. and phone traffic handling." "The suggested change would weld us together as one group." "ORS could certainly include OPS and RM could include PAM."

(4) *Change RM and PAM appointments to NM* (net manager). In favor: twelve, Opposed: two. Indeterminate: two. Some said this depended on the previous question. We intended each matter to be on its own merits. Separate mail inquiry to 74 SCMs found a majority opposed to this one.

On July 13, members of the Schenectady and Poughkeepsie, N.Y. AREC provided communications for the third annual Albany to New York City Motorboat Marathon. Pictured here are (l. to r.) W2EWY, WA2UBO, WB2ICP and W2MEK, operating from the Castleton, N.Y. set up.

*National Emergency Coordinator.

Comments: "We need *some* kind of a change." "A nicer *and more descriptive* title." "How about making TCC operators CD appointees?" "The substitution of NM would do away with a lot of petty phone-c.w. harping." "A NM appointee is indicated for each ARPSC net in the Section." "NM sounds better." "What's the eventual effect intended?" "RMs and PAMs have functions other than net managing." "The term is too general." "It might weed out some of the 'prestige' RMs." "They both do about the same jobs." "The term 'route manager' is rather meaningless anyway."

(5) *Point system for ARPSC Honor Roll, replacing BPL.* Those who were in favor of the idea but didn't like the number of points assigned to various functions were counted as being "in favor." Thus, in favor: eight. Opposed: eight. Indeterminate: three.

Comments: "This will encourage operators to take a more active part in NTS." "This would downgrade the confirmed traffic handler." "There is too much difference between the time, energy and/or work in compiling the points." "Very complex." "I like BPL the way it is." "I'm a snob; I want more points than the guy that runs the 'lower' nets." "Amen! More recognition of the hams who *really* make NTS what it is." "You're right, it's a dilly. Will the League hire me a full time secretary?" "Anything as extensive as this would be a real burden to handle." "Would the casual guy bother with it?" "This is obviously a step in eliminating the identity of the NTS and AREC in favor of this ARPSC thing." "BPL is a *traffic* award; let's not replace or change it." "Replace BPL? Waaah!" "It won't work." "I'm not sure what you propose is the answer, but the idea is good." "It would serve to unite AREC and NTS, but the values might be changed." "It would be difficult to administer."

We had hoped that we could adequately cover this subject this month, but we are going to have to cover the rest of the proposals in the next issue. Of the above, we can see that no question received an overwhelmingly favorable response. What this means is that more careful consideration will have to be given prior to any implementation. More next month. — *W1NJM.*

Diary of the ARPSC

On Apr. 10, a tornado struck Conway, Ark., causing extensive damage. The RACES net was activated to handle local communication, excluding health and welfare traffic, and WA5JKO, a club station, operated by W5DTR, Ark. SCM, K5WMS and WA5CAI, was used to handle the welfare traffic, so the RACES net wouldn't be bothered with the lower precedence traffic. The H&W net operated for over fifteen hours and handled better than 150 messages. WA5GPO and W5NTV/5 assisted with relays when necessary and keeping the net frequency clear of stations who were unaware of the emergency operation. W5AUU and WA5JZV handled the phone calls. — *W5VFW.*

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Speaking of tornadoes, we want to point out that the series of tornadoes that hit Ill.-Ind.-Mich.-Ohio areas on Palm Sunday provoked so much amateur activity that they are still in the throes of being written up. We had hoped to have the information ready for this issue, but it was not to be. Please bear with us.

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On May 6 through 8, the Minneapolis, Minn., area was hit by several tornadoes that brought amateurs and Red Cross into action. *WAØCQG* acted as *NCS* for the emergency net, receiving damage reports from the disaster area and telephoning them to Red Cross headquarters. Bad weather and darkness precluded the setting up of a station at R.C. headquarters until the following day. At first, a mobile unit was stationed at the Red Cross, but when effective communications couldn't be realized a permanent antenna was set up. *KØs RHM DRN DUM, WAØs CCD EKA* and *FDH* operated from surrounding towns, police headquarters and emergency shelters, relaying information to Red Cross in Minneapolis. In addition to the emergency traffic, numerous health and welfare messages were handled,

The Villa Park, Ill., RACES gang posed for this shot after their successfully assisting the police with the July Fourth parade. Left to right we have K9MYD, WA9FZE, K9YKU, WA9BCW, K9IUO, WA9MYS, K9VGN and WA9JST.

and a total of 32 amateurs participated in the operation. — *WAØCQG, PAM Minn.*

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A severe wind and rain storm on May 17 disrupted power and communications facilities in East Central Alberta. VE6YN, operating mobile in Provost, was handling traffic for the Calgary Power district crews to the Calgary office, relayed by VE6TE and VE6AGT to VE6ADQ at Calgary. When VE6ADQ had to QRT, VE6DY broke in and offered to handle traffic. The operation lasted two hours. — *VE6SB.*

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During a contact between VE8MD and VE6HM on May 6, the former advised that VE8CS was urgently requesting advice from a doctor because one of his party, some 100 miles away doing research work in the Arctic, was ill. VE6ML advised VE6HM that VE6KF was a doctor. VE6KF was called on the telephone and told of the situation. He joined the group on the air, and after being given the sick man's symptoms, it was deemed advisable that he should be flown to the nearest hospital, some 100 miles from the party, for observation. — *VE6HM.*

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On the afternoon of June 19, WØDAU/5 was notified by Kitt Carson Council of the Boy Scouts of America that amateur communication could be of help in contacting the Philmont, N. Mex., Scout Ranch, since flooding the previous night had destroyed the wire communications to the camp. Scout groups from all over the country were heading for the camp site, and these groups would have to be notified of the impassable roads in the Red River area. WØDAU contacted K5CXN, Bernallilo Co. EC, and after discussion with the scout group, W5DGW and K5ORQ, both mobile, were dispatched to the scout camp. Joined by K5DQI, the group set up a station at Philmont and handled traffic until telephone communication was restored. At first, traffic was being handled directly on 75-meters between Philmont and Albuquerque, with a 2-meter link, provided by W5LQM, to the Kitt Carson Council. When conditions on 75 became less reliable, W5PDO and W5OHX were used as relays. Once it became known that the amateurs were providing communications to the isolated area, other agencies, including the Corps of Engineers and police, channeled their communications through the net. The group received praise from the National BSA Council and the Kitt Carson Council, and was presented the "Extra Service" award for their efforts. — *K5CXN, EC Bernallilo Co., N. Mex.*

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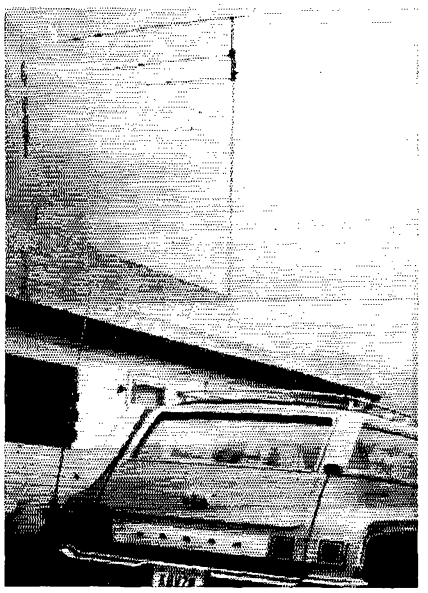
W6DIK, on a trip with some Eagle Scouts in the High Sierra Mountains on June 27, was operating "mule back" portable when one of the scouts suddenly collapsed from over-exertion. The call was answered by W6JLL, W6DG and W6ZKP, who called a doctor to get medical advice. While emergency first aid was being administered, W6VBN took over as net control. W6DG drove to the park service headquarters to report the problem. One of their vehicles with radio was dispatched to W6DG's cabin, and a



KØWZN was the first station on from Palmer Lake, Colo. after a tornado hit. No, that's not a new style beam, the driven element was bent by the winds. (See Diary of the AREC for details). (Photo by WØGCH).

helicopter to where the hikers were. After making a very difficult landing, the helicopter crew had to be left behind so the boy could be flown to the hospital. Despite the efforts of the entire group, the boy died en route to the hospital. As a result of this unfortunate happening, daily schedules were maintained with W6DHK, so he could report on the progress of the hikers. — *W6TDW.*

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While driving near Bakersfield, Calif., W6KYG's trailer developed engine trouble. He checked into the West Coast Amateur Radio Service Net, and after relays by WB6LIS and W6VX, WA6MOV (NCS) finally got the location and nature of the problem, and called the Highway Patrol who dispatched a car to the scene. — *W6VX.*

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"It couldn't happen in Colorado . . . but it did!" Floods, hail, wind and tornadoes kept AREC members all over the state hopping for five full days. They weren't totally unprepared, but even though they all functioned to the best of their abilities, it wasn't surprising to find that they had no operators experienced in this sort of operation. The last flood out there occurred 30 years ago.

On June 14, the water was three feet deep and two inch hail was hitting the Stratton Meadows area. AREC members were alerted, but since Red Cross was able to maintain communications via telephone, the amateurs weren't needed. On June 16, WØGCH, EC, held a hurried telephone conference with the Red Cross director, discussing flood possibilities and procedures. Two hours after the conversation, a tornado ripped through Palmer Lake and headed for Denver, leaving the former town almost helpless. Minutes after alerting his assistants, WØGCH went to Palmer Lake where he helped KØWZN get on the air with emergency power, and despite the lightning, she established contact with other Colorado stations and began to handle the torrent of emergency and health and welfare messages. In Colorado Springs, the two-meter net, under KØJXQ, was in full swing, and the Colorado Emergency Phone Net, under KØWMD, was handling the traffic coming from the disaster areas.

By June 17, amateur activity increased to a peak as town after town was hit by the downpour. AREC members stood watch, mobiles roamed streets, looking for trouble spots, reporting river levels and checking for downed power lines, and reporting the information to their respective headquarters.

The little town of Deer Trail was completely isolated and was without electricity, water (except for the flood), gas and had two open roads. WØGVT was flown in by the CAP, and after setting up an emergency station, provided communication to the outside world until regular telephone service could be re-established.

As one EC summed up the operation, everything went quite well, despite the lack of emergency operating experience on the part of most of the participants, and what a baptism for the new ECs!

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Forty SEC reports were received for May, representing 18,574 AREC members. This is one more SEC report and about 600 more AREC members than last year. How's about some more reports, fellows? Those sections heard from this month are: N.NJ., N.C., Ind., Iowa, Nebr., N.Y.C.-L.I., Los A., Miss., Alta., Sask., E. Pa., Man., La., W.N.Y., Del., Ga., N. Dak., Hawaii, E. Mass., Ariz., W. Fla., Kans., Wyo., Maine, Mich., Ala., E. Fla., Wash., Nev., Ohio., Utah, Mo., Ont., N. Mex., Ark., S. Tex., Va., Colo., S. Dak., Okla.

Sanderson Flood

On the morning of June 11 an unexpected flash flood hit the town of Sanderson, in West Texas. Normally dry Sanderson Creek spilled a 15-foot wall of water through the southern edge of the town, destroying homes, businesses, even a cemetery. The first word of the disaster came from Midland, where a number of amateurs reported K5HCQ was transmitting on 3885 kc. reporting the flood and asking for help, but that he could not receive. However, rain and high water prevented help from arriving in Sanderson for several hours. When it did arrive, W5GVQ arrived with it, with his portable s.s.b. rig, to handle both operational and welfare traffice.

K5CDV of Alpine was cleared into the area to assist in operating W5GVQ. WA5FDL was also cleared into the Sanderson area. W5GVQ set up in a school building and handled traffic until 1630 Sunday, June 13. He was assisted by K5CDV and his wife. The three of them were supported by hundreds of other Texas amateurs. Principal among those serving were W5ϰ BQZ REM, K5JLM and WA5GEZ, but this does not begin to tell the story of others who monitored quietly until called by the NCS. Operation was on the state RACES frequency, and there was no QRM to speak of. State C.D. Communications Officer K5TRY speaks in high praise of the entire operation.

As it turned out, the first call for help from K5HCQ was made by an unlicensed operator in the absence of the licensee. Power was furnished by an emergency generator with insufficient power to operate both the transmitter and receiver. This call was heard by many amateurs who

W4UJX is the main operator at WA6MOV, the NCS for the West Coast Amateur Radio Service net which meets on 7225 kc., daily. This net provides a continuous monitoring Service of the net frequency, and its members have been involved in several emergency operations, some of which have been reported in the Diary of the AREC.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

FULL TIME

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

PART TIME

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

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

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

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

Full details on this program are included in an article in the March 1965 issue of *QST*, page 60.

alerted many relief agencies and assistance was forthcoming from all directions at once.

One of the groups to receive the emergency call was the 7290 Traffic Net. NCS WA5BHF reports that W5BCD was sent to Sanderson, arriving there about 1715 and giving a complete report of conditions.

We also have W5CVQ's report, which is of some interest. He left for Sanderson at 1400, arriving there at 1515. The emergency generator and transceiver were set up at the elementary school, using the tailgate of the pickup as an operating table. K5CDV, W5BCD and W5AUM assisted. W5BCD, however, was the first to establish two-way communication out of Sanderson with his mobile, handling welfare messages to San Angelo. Later, frequency was moved to the RACES channel of 3987.5 kc. and W5CVQ took over, assisted by K5CDV, for 23 hours, until 1500 Sunday. W5VOH set up at 3900 kc. at Red Cross headquarters and WA5FDL handled traffic at the county courthouse. On June 12 and 13 W5IKT, W5BSM and WA5IFT operated from their emergency vehicle.

Altogether, W5GVQ handled 70 messages, plus a large number of informal inquiries about equipment and supplies and over 100 inquiries concerning people. The operation, he says, turned out to be somewhat of a joint one between STEN, NTEN, RACES and other nets. He mentions the following additional amateurs as having assisted: *K5s* ODH MVC UCT MIF TRY HZR JYF, *W5s* KGS JXA FIR FJU RSV.

National Traffic System

The recent national convention in San Jose, Calif., was rich in both NTS people and NTS meetings. Many of the latter were combined with general ARPSC meetings. We dare say that this convention gave more emphasis to the public service aspects of amateur radio than any previous convention has done.

Among those present were TCC Director W7DZX, PAN Manager WB6JUH, RN6 Manager WB6BBO, RN7 Manager K7JHA, TWN Manager K7NHL and PAS Chairman W6HC. Also active in the group were former RN6 Manager W6ZRJ (who ramrodded the entire program as a member of the convention committee), former NTS-actives W6VZT, W6UTV, W6CMN and many others.

This was a four-day convention, although the Friday and Monday programs were not extensive. The ARPSC people started trickling in on Friday and more arrived Saturday, until by the time of the first ARPSC meeting at 1:00 P.M. (oops — 2000 GMT, but let's go "local" for the purpose of this discussion) most of the NTS "brass" was present. Room 207 of the Hotel St. Claire was then occupied almost continuously for the next two days. During the nights, the ARRL Hospitality Room bulged with NTSers and other ARPSCers engaged in earnest, sometimes heated, discussion. On Saturday night, PAN was NCSed from the sixth floor of the hotel, once the NTS gang had figured out how to get the convention rig on c.w.

The LO meeting at 1300 was followed by a general traffic panel at 1400, an NTS managers meeting at 1500 and a general emergency session at 1600. On Sunday, WB6BBO threw a traffic breakfast. Sunday at 1300 there was a general ARPSC meeting. Finally, Monday morning, there was a general wind-up breakfast at which W1LVQ, W1NJM and W4MLE spoke on ARPSC subjects, which ended up in a pretty spirited question-and-answer session.

Every one of these meetings was well attended. At times the small room in which most of them were held consisted partially of standees. Questions asked and answered were cogent ones, indicating that for the most part the questioners knew what they were talking about.

Some conventioners were heard to grumble that there was too much emphasis on public service organizations in the convention program. Not the ARPSC element, though. *They* didn't get *enough* of it! Their complaint was that there wasn't enough time in the meetings for full discussion.

We are sure that this convention introduced the National Traffic System to many people, that many who never before heard of it were now mildly surprised to know that such a thing exists, that it is tightly and efficiently organized, that it operates daily right under their noses. Some of them asked questions that indicated they did not understand, others asked questions indicating they disagreed, and still others were just curious and anxious to know.

We have often said that those who come to traffic and emergency meetings at conventions are those to whom we need the least to sell the idea of public service. What we really need is to get a crack at general convention attendance, make our pitch and pass out literature, then wait for net attendance to pick up. The number and variety of ARPSC events at the national convention is the closest thing we have seen to this yet.

Is there a convention being planned in your area in the near future? If so, we suggest you offer your services to the committee in setting up the public service part of the program. Everybody is in favor of public service — or says he is, anyway. Find an experienced speaker who can be convincing and entertaining and try to get a spot in the program to sell the idea to all and sundry in attendance. It's worth a try, can do no harm.

And you traffic men, stop sitting at home all the time. Get out and circulate with the rest of hamdom and interest them in what you are doing as something solid and worthwhile and progressive in amateur radio. — *W1NJM.*

June reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	57	434	.324	7.4	81.5
2RN	60	564	.793	9.4	99.6
3RN	60	476	.432	7.9	98.3
4RN	56	619	.241	11.1	94.6
RN5	60	942	.378	15.7	96.0
RN6	60	749	.626	10.8	99.2
RN7	30	566	.585	18.9	66.2
8RN	60	417	.343	6.9	87.3
9RN	30	406	.558	13.5	89.2
TEN	59	802	.717	13.5	69.9
ECN	28	97	.187	3.5	78.5
EAN	30	1268	.984	42.3	99.4
CAN	30	1141	.759	38.0	100
PAN	30	1480	.819	40.4	97.8
Sections	1188	5318			
TCC Eastern	120	573			
TCC Central	90	1026			
TCC Pacific	120	936			
Totals	1838	17,814	EAN	8.3	CAN
Records	1865	19,944	.991	15.9	100

[1] Representation based on one or less sessions per day.

[2] Section nets reporting (43): MTN (Man.); MDDS (Md.-D.C.-Del); OQN (Ont.-Que.); NLS, NLI, NLIVF (N.Y.C.-L.I.); QMN, Wolverine (Mich.); SCN, NCN, SCVN (Calif.); TSN, TSSBN, ETPN, TN, TPN (Tenn.); CN (Conn.); WSBN (Wisc.); NCCW, NCNL (N.C.);

(Continued on page 162)

• Technical Correspondence

MORE ON THE "BUGLESS BUG"

Technical Editor, *QST*:

I am writing with reference to the article by G. L. Boelke, W2EUP, "The Bugless Bug," (*QST*, September, 1963). The problems encountered by Hedgecock, K4KXK, ("Bugless Bug Modifications," *QST*, January, 1965) would not have been caused by an inability to enable the dash flip-flop quickly enough, as was suggested in his article.

As you are no doubt aware, any bistable multivibrator, when in the idle state, will always have the *same* transistor "off" and the other "on." This is because of the inherently different parameters in each side of the flip-flop.

The *OR* gate (Q_5, in the article by W2EUP) requires positive-going energy from the dot flip-flop at the proper time. In other words, the connection from the *OR* gate and the first d.c. amplifier (Q_8) must be made to the collector of the normally "off" transistor in the dot flip-flop. The correct connection can only be determined after the construction of the dot flip-flop is complete, and then it must be done empirically.

In the event that the *OR* gate is coupled to the normally "on" side of the flip-flop, each string of dashes will be preceded by one dot, the dashes will be too short in relation to the dots, and they will be only partially self-completing.

An additional point on the W2EUP article is that the polarity of connections to the blocking oscillator transformer must be determined experimentally. If the connections are reversed on the primary, the oscillator will not produce any pulses.

I feel that these points should be brought out as an addenda to the article by Hedgecock so that prospective builders of W2EUP's fine design will not be needlessly worried by the problems encountered by K6KXK. If the two points mentioned above are followed, the construction of W2EUP's keyer will indeed produce a "bugless" bug. — *M. V. Patriarche, VE4EP, Box 90, Rivers Camp, Manitoba, Canada*

MICROWAVE PULSE COMMUNICATION

Technical Editor, *QST*:

The series of articles describing easily constructed but effective pulse-communication equipment for the 2300 Mc. band, which appeared in *QST* in early 1963, revealed a considerable amount of interest. As a result of further experience with the equipment and correspondence with numerous amateurs of varied experience who have constructed the gear, additional information on the operation of the equipment is available which should be of interest.

The receiver sensitivity is appreciably better than was thought. The receiver noise figure was rated as no worse than 15 db. in lieu of an actual measurement. This was because (a) as the receiver article was being written, the "pot"-type mixer described was put together in a few hours to replace a commercial coaxial mixer which had been in use, and (b) a microwave design engineer assured the authors that any reasonable crystal mixer should have a noise figure as low as 15 db. As it turned out, the homemade mixer outperformed the original one handily, as determined by radar-style operation. Subsequently, careful noise-figure measurements showed the noise figure to be less than 10 db. with a type 1N21C crystal in the mixer. A further check was made by using a calibrated pulsed signal generator to determine the minimum detectable signal level at the receiver input. The lowest level which gave a readable output from the receiver threshold circuit was found to be 134 db. below one watt (this is the pulse power; the average power corresponding to this is 164 db. below a watt). This level is about equal to the receiver input noise level. Since the transmitter peak output power is 30 db. above one watt and four-foot-diameter parabolic dishes will provide over 25 db. of antenna gain at each end of a path, this means that a total path loss of over 214 db. is permissible. Even at 2300 Mc., this means DX, being equivalent to about a 180-mile over-the-horizon tropospheric scatter path.

Little trouble has been encountered with the r.f. assemblies by those constructing the equipment from scratch. All in all, the contention that this microwave equipment is no more difficult to construct than 432-Mc. equipment seems to have been proven out. The only "bug" which has turned up in the design concerns the modulator; there is a tendency for some thyratrons to remain in the fired state after a trigger pulse, thus conducting continuously and over heating if the high voltage is not turned off. This condition is usually due to a mismatched load on the modulator output or by improper component values in the pulse-forming network, but it can be caused by the thyratron itself, also. In such a case, it has been found helpful to substitute a 1- to 3-mh. inductance for the 47K resistor (R_{12}) on the grid of the thyratron.

Although this microwave equipment works quite well, it should be realized that it is a modest system, being roughly equivalent in complexity and range capability to a Gonset Communicator on two meters with a 13-db. gain antenna. There are many opportunities for enterprising hams to do much more with pulse, such as to use magnetrons having peak powers of several hundred kilowatts. With several hundred watts of average power, and antennas having apertures comparable to those used at lower frequencies, some 30 to 40 db. could be added to the permissible path loss. This would make possible over-the-horizon scatter ranges of over 400 miles — without a band opening! It has been suggested that amateurs should consider establishing a microwave relay system in the tradition of the original ARRL; pulse is ideally suited for this since it is very readily adaptable to radioteletype keying. The hardest part of such a project would probably be to get together in one group a microwave enthusiast, a traffic handler and an RTTY man!

All in all, the surface of amateur-microwave-pulse possibilities has been hardly scratched.

— *John T. Zimmer, W2BVU, 22 Ridgeview Road, Poughkeepsie, New York.*

CONTACTING THE POWER COMPANY

Technical Editor, *QST*:

I am forced to comment on the letter on power-line noise, by G. L. Countryman, in March 1965 *QST*. Perhaps I can prevent some hard feelings and promote a bit of cooperation as well as adding a bit of technical advice.

Suggestion (1) is true, but it needs amplification.

A pre-investigation by the ham is of great importance for he is in a position to determine many factors having a bearing on the problem. Careful use of the rotatable direction antenna can often pinpoint the trouble area. Noise often tends to peak at certain frequencies, so all bands should be tried. At times, a 50-Mc. beam will definitely point to the spot where 21 Mc. or 14 Mc. will not, yet at other times the lower frequencies are most directive. The actual cause of the noise seems to be involved in these frequency characteristics, but we have not yet been able to establish direct relationship.

Contrary to popular belief, the transformer almost never is the cause of radio interference. However, a transformer installation involves much more hardware than a simple tangent structure, so there is always a possibility of trouble at that spot. Lightning arresters are often the cause of a continuous discharge with relatively constant level and tone. Whether the noise is prevalent in wet or dry weather is also of great importance.

Now let me discuss suggestion (2). I do *not* recommend writing to the president of the power company. The president will not understand your problem and will merely pass the letter on, through channels, taking more time and stirring up more feelings. I *do* recommend that your letter be sent to the division operating superintendent. He is close to the problem, receives such complaints regularly, and is equipped to do something about them. It is not necessary to list everything you have found in your letter, since if you really desire to cooperate in elimination of the interference you will make an appointment to meet the company representatives at your home or other designated location. The personnel who meet with you will have the knowledge to speak in your terms. Just as in cases of TVI, cooperation and good will are imperative if a satisfactory solution is to be obtained, and starting out on the right foot without ruffling any feathers is the best approach. Incidentally, the amount of money you have invested is of no consequence. We are just as anxious to satisfy a Novice with a $50 investment as a ham with $10,000 in fancy gear. A television set in trouble is enough to start an investigation.

Suggestion (3) also can be amplified a bit. Friends are wonderful to have, anywhere and any time, and if you can cultivate them within the power company, you should certainly do so. You will probably find them of great value in many other ways, some known only to hams. But having a personal friend is certainly not a requirement for obtaining immediate action on interference.

It is often very expensive to eliminate a source of radio interference, but more than that, it often requires many man hours of work time which usually is harder to obtain than money. Hence, more reason for making the personal contact with the group who will actually have to do the work. It is not unusual to tie up a whole line crew for a week clearing a single case of trouble. Also, it isn't necessary, and probably would do little good, to bring the Federal Communications Commission into the picture. They and the power company both prefer it to be kept on a local and cooperative level.

I cannot speak for every power company, but I know that the majority will echo my statements. The art, and I believe it can be so named, of isolating the cause of radio and television interference is really a quite new and developing business. I will be most happy to correspond with anyone interested in the problem, be he ham or power-company representative, and will gladly share my experience and knowledge with him. Also, I welcome any suggestions and experiences you may have had and are willing to share for the common good. Just remember, the better way to approach any problem is without a chip on the shoulder. — *G. T. DeLa-Matyr, W5BRR, Operating Supervisor, Beaumont Division, Gulf States Utilities Company, Beaumont, Texas.*

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Technical Editor, *QST*:

I read with interest G. L. Countryman's letter on power-line noise in March 1965 *QST*. Part of my work with the Northern States Power Company, before retiring, was checking radio and TV interference. I found that most of the complaints were caused by customers' equipment, some of which were blamed on the power company.

This brings up a point mentioned by Mr. Countryman under (3), the statement that one should write to the FCC if no cooperation is given by the public utility. *When this is done one should be sure that it is power-line interference and not some customer's equipment.* I know that most of the private and public utilities are interested in preventing interference. Their trade magazines have articles every so often on this subject.

There is a fine idea in (1) of his letter — "Thoroughly investigate your problem." One party was so certain that our substation was the cause of his TVI that he said he could find it if the company would hire him. It turned out that the trouble was caused by his neighbor's gas-fired room heater. The thermostat on the blower motor was defective. When I went back to him to explain what we found he said, "I suppose you would like to 'razz' me." Being an employee of a utility I couldn't, much as I would have liked to! — *C. A. Sampson, WØGBF, 317 N. 9th St., Montevideo, Minnesota 56265.*

NOTE ON CROSS MODULATION

Technical Editor, *QST*:

The measurement techniques involved when checking for cross modulation are fairly well defined basically, but it is up to the individual designer as to the method he prefers when it comes to the refinements. For example, one source calls for a method of testing where the desired signal is modulated at 1 per cent, 400 cycles, and the undesired signal is modulated at 30 per cent, 400 cycles. Another source calls for 30 per cent modulation of the desired signal and 80 per cent for the undesired. Still a third specifies 30 per cent modulation of both the desired and undesired signals.

Again, the amplitudes of the two signals usually vary depending upon the designer. For instance, an input of 100 μv. for the desired signal and 100,000 μv. for the undesired would approximate a rural field condition. Conversely, an input of 5000 μv. for the desired and 1.0-volt input for the undesired signal is used to approximate an urban field condition.

Any combination of inputs aud modulation percentages could be used when evaluating cross modulation. Each designer, whether by experience or direction, chooses his own method for making the cross-modulation check.

The IEEE in 1948 published a standard on methods of testing a.m. receivers, but the standard does not specify the interfering-signal modulation percentage in the section devoted to cross modulation.

Tests for cross modulation may be taken at frequencies on both sides of the carrier as far away as 100 kc., and as close as 10 kc. Little is gained by taking measurements closer than 10 kc. as beat-note interference may occur that is more severe than cross

modulation. — *S. Davis, W2WPN, Lansdale Div., Philco Corporation, Lansdale, Penna.*

POLAR MOUNTS FOR MOON TRACKING

Technical Editor, *QST*:

"How High the Moon?" in July 1965 *QST* was an excellent article on el-az antenna aiming, but there is one statement that gives me concern: "Az-el is the simplest type of mounting for an amateur to build and align. Also, because of the moon's rapid motion in declination, other types of mountings do not offer the advantage for the moon. . . ."

In my article (January 1965 *QST*), a discussion of designing and building a polar mount for moon tracking was discussed. While certainly condensed, it was complete enough for the serious amateur to get started on design work.

So let's compare mount methods. First of all, two movements are required for either type of mount, and they are made essentially the same way. The only real difference in a polar mount is that its axis is inclined to point at the North Star (northern latitudes). So there is practically no difference in the construction materials or work required to construct a polar mount.

The mention of alignment, I assume, means calibration of the mount. Here is where you can begin to appreciate the polar mount. Large high-gain antennas with sharp patterns don't always point electrically where you think they do by bore-sighting methods. Nature has provided us with the sun to find out where the antenna is pointing electrically. (If you can't hear sun noise, you don't have enough gain to work moonbounce, except possibly KP4BPZ.)

The *Nautical Almanac* (which is cheaper than the *Ephemeris & Nautical Almanac* mentioned in "How High the Moon?") has a simple hourly table which tells you in astronomical coordinates exactly where the antenna is pointing, once you have found the sun with the antenna. You simply calibrate your readouts to these figures. Now any time you want to find the moon, a check of the table will give you the exact settings for your mount.

If automatic tracking is desired, a simple clock-controlled drive on the hour-angle axis will keep your antenna on the moon from horizon to horizon. A change in the declination is required once a day, as the moon only moves about 2 degrees per day in declination.

In contrast, an el-az mount requires that two corrections, for both elevation and azimuth, must be constantly fed to the antenna. The corrections must be made manually, as no simple way is available to make an el-az mount auto-track, short of an IBM computer. — *Victor A. Michael, W3SDZ, Box 345, Milton, Penna.*

POWER INPUT

Technical Editor, *QST*:

It is my contention that many amateurs who believe they are operating at the maximum legal power input are actually exceeding this limit.

First, the amateur running a kilowatt on c.w. calculates his power input by multiplying his final plate voltage by plate current with the key down. This is the steady-state power input. If the power supply to his final amplifier has better dynamic than static regulation (and most of the power supplies in present-day commercial kilowatt linear amplifiers have this characteristic) the power input during the dots and dashes will actually be greater than a kilowatt. This is because the voltage from such a power supply during keying is higher than it is during continuous key-down conditions. If the final uses a triode, the plate current will also be higher and input is further increased.

Secondly, a typical comment I have frequently heard is: "My kilowatt grounded-grid linear is only 60 per cent efficient, but about 100 watts of exciter power feeds through so my output power is 600 + 100, or 700 watts." The operator evidently is not aware that the total power input to a grounded-grid linear *and* its exciter may not exceed one kilowatt. If it takes 200 watts input to an exciter to drive a grounded-grid linear, the linear power input may not exceed 800 watts. The instruction manuals often tell the operator to operate the linear at one kilowatt input without mentioning the exciter input power at all.

Any ham who operates a kilowatt should be familiar with the regulations and his rig. He should not blindly follow the "appliance" manual. — *James H. Okubo, WA6TKQ, 1018-6 Minnie St., Santa Ana, California 92701.*

Strays

The following was taken from the Hamilton (Ontario) Amateur Radio Club Bulletin: Some everyday tubes used in receivers and transmitters contain radioactive materials. The more common of these are regulator tubes such as the 0A2, 0B2, etc. Caution in handling them cannot be overemphasized.

The danger is similar to that experienced with early fluorescent lamps. When intact, the bulb unbroken, there is no real hazard, as the amount of radioactivity is below the level that is considered dangerous. But should the bulb be broken, the radioactive material (cobalt 60 and nickel 63) may get into the body through breathing, eating, drinking, or through wounds in the skin. These radioactive isotopes emit alpha, geta, and gamma particles which can cause injury or destroy organs and tissue. Internal radiation of this type may show an effect in a few weeks or it may take years, since the material fixes itself in the tissue and its removal from the body is very slow. If you should break one of these tubes remember —

Don't let any part of the tube touch the body, use rubber gloves.

Don't bring any food into the contaminated area. Always wash the contaminated area thoroughly.

Don't let children play with old unbroken tubes.

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History of Communications — Electronics in the United States Navy is a government publication that might be of interest to radio amateurs. There are numerous references in its 600 pages to the efforts of radio amateurs and it contains pictures and schematics of early Navy-radio facilities. Price is $4.75 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Radioastronomers Chafe Under Chaff

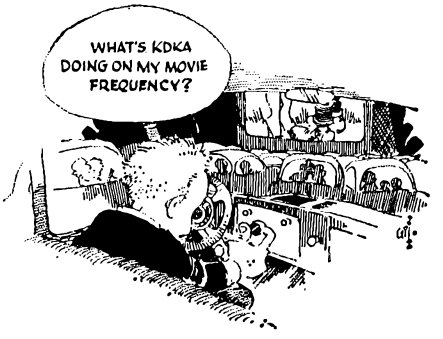
The Philadelphia FCC monitoring unit, in investigating interference to sensitive radiotelescope receivers at Ohio State University, found that the annoying signals were arriving from a source well above the horizon. This led to determination that sideband frequencies generated by radar operation were being reflected back to earth by chaff dropped by Air Force bombers to disrupt radar tracking during training missions. This resulted in ink-line recordings of the radioastronomical observations being driven completely off the chart. As a result, the Air Force is endeavoring to protect the University's observations in future chaff-dropping exercises.

FCC Monitoring Aids In Marine Emergency

The U. S. Coast Guard asked the FCC monitoring network to help decipher an emergency radiotelegraph message from a then unidentified vessel. By expertly straining their ears and reflexes to sift bits of the repeatedly transmitted message amid other transmissions, the listeners puzzled out that it was a call for medical aid for a crewman with acute appendicitis. It enabled help to be sent an oceanography ship operated by the University of Rhode Island.

Silent Movies, Anyone?

The Pasadena police and the FCC Los Angeles office cooperated in identifying and apprehending an unlicensed radio operation. They found that a



young man repairing a radio transmitter at a drive-in theater had added an unlicensed 10-watt transmitter of his own so that, by parking outside the theater where he could see the screen, he hoped to tune in the audio portion of the movie on his auto radio. However, he admitted that it didn't work. He received 6 months' probation on conviction of trespassing.

Chicago Police Get Quick Service

It took less than an hour for the FCC Allegan, Mich., monitoring station to clear up a case of interference to the Chicago police radio system. Frequency measurements and direction-finding techniques traced it to a radio printer at a U.S. Government installation.

Shorter-Term Interference

Only 13 minutes elapsed between complaint to the FCC and removal of an interference to a Civil Air Patrol station at Raleigh, N. C. The CAP control station's hurricane emergency communications were being interfered with by a steady noise. Bearings placed the origin near Indiantown Gap, Pa., and the culprit proved to be a transmitter operated by an Army Reserve facility.

Concrete Interference to Air Safety

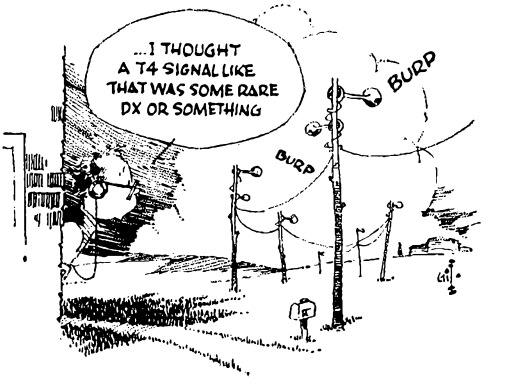
It took longer to trace interference to an aviation instrument landing system at Oakland, Calif. An engineer from the FCC San Francisco office was unable to hear the offending signal at the airport. Joint flights confirmed that severe interference did exist and indicated it came from a nearby concrete supply company plant. Mobile equipment and further checks led to auxiliary gasoline engines used to rotate mixing drums on trucks transporting concrete. The cooperative firm eliminated the difficulty by changing ignition cables.

NOTES FROM FCC REPORTS

• From time to time we print as Strays bits and pieces of the General Information reports of the FCC. This time, however, we'll print the whole thing. As you read it, you'll probably get a few chuckles; and you'll get an idea of the multifaceted life of FCC field engineering and monitoring stations.

Horns Aplenty

In another case, radio interference in a Pacific coast locality was determined by an FCC marine office engineer to come from 30 horns, mounted on 17 power poles, used to signal key employees working in a nearby oil field. A switchboard operator could transmit a series of blasts in coded sequence to in-



dicate the particular employee wanted. Radio frequency interference resulted from arcing of the relay contacts vibrating in unison with the sounding horns. The manufacturer of the horns promptly installed filters which eliminated the trouble.

Protracted TV Trouble Shooting

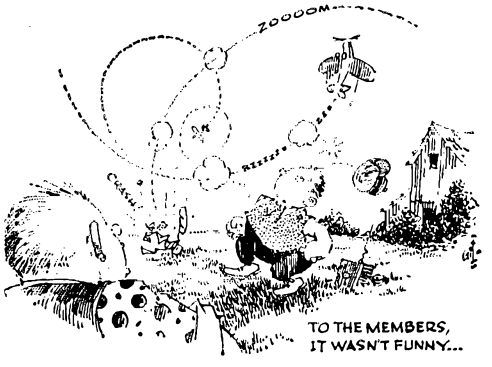
Engineers from the FCC San Francisco office spent considerable time in resolving interference involving a TV viewer and his neighbor. When the case first came to light, the neighbor was operating a citizens radio station with an antenna higher than that authorized. He was served a notice of violation and the complainant was advised of ways to prevent pick up of unwanted signals. This should have concluded the matter, but along came a second complaint. This time it was found that the neighbor was now operating an amateur station. Meanwhile, the complainant had purchased a new TV receiver. But he continued to receive interference from his neighbor. Acting on FCC advice, the TV viewer installed a high-pass filter in his set. No further complaint has been received.

Ultimatum To FCC

An amateur in the Detroit area abruptly terminated action on complaint about his operation. Investigation led to his being cited for noncompliance with the rules and imposition of quiet hours. But the interference continued and he was directed to appear for reexamination as to his qualifications to hold a ham license. In a tart letter to the FCC Detroit office, he issued an ultimatum that all charges be dropped or his license cancelled. One guess as to what the FCC did!

Citizens Stations Interfere With Aircraft (Model)

Class-C citizens radio stations are authorized for the remote control of objects or devices, generally model aircraft. A model aircraft club in the Midwest, which used radio for model flight control, complained that a thousand dollars worth of its planes were lost in crashes caused by interfering signals from Class-D citizens stations. The club claimed that the jamming was deliberate. The FCC Chicago office was investigating, at last report.



Not So Low Power

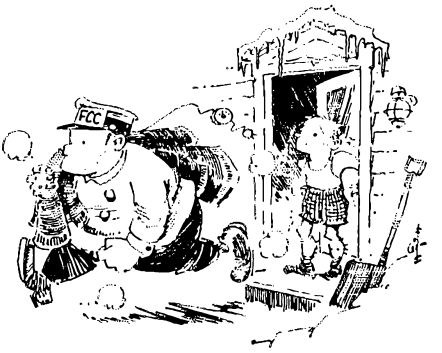
A Hastings, Nebr., amateur complained to the FCC Grand Island monitoring station about strong harmonics from an unknown radio station. The intrusions were too weak for the monitoring station to pick up so FCC engineers took mobile equipment to Hastings. There the signals were found to come from within a local college area. Friendly entry was made into the suspect's room where a transmitter was found on the air. The engineering student avowed his intent was to operate under the low-power communications devices provisions and expressed surprise when told of the extent of his radiation. He was warned verbally and by letter.

Complaints Boomerang

A complainant, irate because of interference to her radio and TV reception, telephoned the FCC New Orleans office that her entire neighborhood was affected and threatened to originate a petition for action. An investigative engineer quickly traced the trouble to the complainant's own refrigerator. He made a minor adjustment and the trouble ceased. The embarrassed woman, devoid of petition-filing intent, expressed her gratitude.

Blanket Interference

Complaint to the FCC San Francisco office that radio and TV reception was blacked out in Oakland prompted like on-the-scene action. A faulty electric blanket was discovered — in the apartment building



occupied by the complainant. A defective control caused it to transmit radiation over the block. The complainant agreed to sleep under an extra blanket (non-electric).

Interference Knows No Geographic Borders

The FCC Seattle office received an urgent request from the U. S. Border Patrol for assistance in tracing interference to the latter's radio communication link across northern Montana. The errant signal was being picked up by the patrol's repeater station atop a 7000-foot mountain. It was of sufficient strength to open squelch circuits and activate the transmitter, completely disrupting communication between the patrol's mobile units and base stations.

Although the investigative trip required approximately five days' travel time, and winter conditions made access to the repeater station difficult, the undertaking was essential because of the nature of the communication service affected. After many bearings and observations, the source was found to be across the border in Canada, and a fix indicated the transmitter responsible. The investigative engineer obtained the name of the licensee and arranged with the Border Patrol to cooperate with the Canadian authorities in whatever efforts might be necessary to remedy the matter. A letter of appreciation was subsequently received from the Border Patrol.

FCC Aids Russia Eliminate Interference

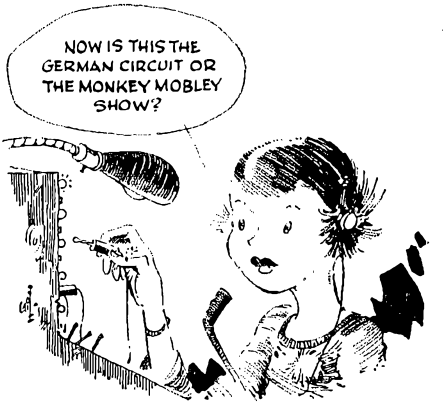
A troublesome signal in an amateur radio band was found to occur whenever two particular Russian short-wave broadcast stations transmitted the same program simultaneously on channels close to one another. This caused a phantom signal that plagued U.S. "hams." Russia was notified and a radiogram was later received from Moscow stating that steps had been taken to prevent a recurrence.

Rock-'n-Roll Unacceptable to German Station

Another case with a foreign aspect resulted from interference to military transatlantic radio circuits between Washington and Germany. Complaint was that rock-'n-roll music from a U.S. broadcast station was invading the traffic destined for Germany. The FCC Laurel, Md., monitoring station detected no such signal. But at the receiving end, the operators reported hearing the music and, to prove it, piped it back to Washington. In the face of such evidence, the signal was identified definitely as originating from a broadcast station in the Washington area. Shortly afterward, however, FCC monitoring control received an apologetic call from the German complainant, who explained that a switchboard operator on the landline feeding the Washington terminal was listening to the program on a broadcast receiver and had somehow plugged an audio line into the multiplexing circuits. The line was unplugged and so was the "interference."

German Hazard To U.S. Air Safety

The tables were turned when the FCC monitoring network, when called upon to intervene in a case involving interference to aircraft communication at New York, identified the spurious emission as coming from a German broadcast station where a transmitter had developed a split personality.



Cooperation At The Grass-Skirts Level

The FCC monitoring station at Waipahu, Hawaii, received a message of appreciation from a local Air Force unit which said in part:

> This facility employs synthesized operations requiring transmitted signals correct to the nearest cycle. Due to a possibility of inaccurate test equipment, I requested a check by your station to ascertain the exact frequency of the transmitted signal. Mr. ——— accepted my request and within a very few minutes gave me an exact reading on the transmitting station's frequency. This information made possible the restoration of an inoperative circuit. The expeditious and effective manner in which Mr. ——— performed this service reflects highly on your station and its personnel. QST

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 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. **Changes are shown in heavy type.**

W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4 — **F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.**
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.
W7, K7, WA7 — **Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.**
W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1215 E. 187th St., Cleveland, Ohio 44110.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn. 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thorn Crest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria B. C.
VE8 — George T. Kondo, VE8RX, W Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902
KH6—John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska 99502
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
(Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y. 12020 QST

Save That Bug!

Automatic Dash-Maker for Use with Semi-Automatic Keys

BY L. M. TEMPLE,* W1DI

The hard work in bug sending is making the dashes. The gadget described here represents about the simplest way to get fully automatic dashes: the key itself continues to make the dots.

EVEN in this age of sophisticated electronic automatic keyers there is no reason to discard that good old bug key which has served you so well for many years.

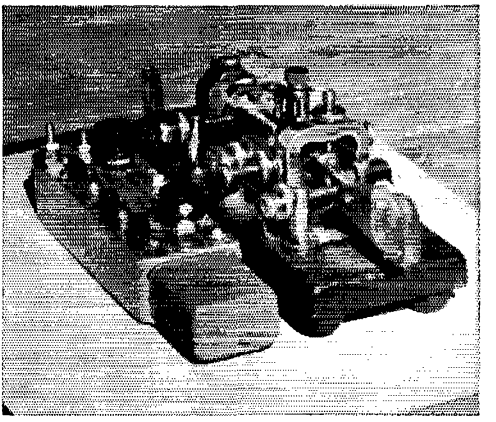
There are lots of good fists on the air still using bug keys. There also are some that are *not* so good. When mistakes are made, they most always occur with the manually-made dashes. With a mechanical key that makes dots so perfectly, it occurred to me that an automatic "dasher," using the bug as is, might make an inexpensive automatic keyer. The bug is used just as always, except that the dashes could be formed electrically by simply holding the dash contact of the bug closed for the required number of dashes.

A review of keyers in *QST* suggested Montgomery's article on "Corkey" [1] as a starting point. His circuit used two relays, three capacitors, two potentiometers and two semiconductor rectifiers. Adapting his basic circuit to the "dasher" resulted in considerable simplification, as it uses only one relay, one capacitor, and two potentiometers. Most of the features that he lists as desirable have been maintained, such as the grounded paddle bar, self-completing dashes, and independent control of dash speed and dash length.

Circuit

Referring to the circuit diagram, Fig. 1, there is nothing too special about the components except that potentiometer R_2 for dash speed control should be one with a log taper, and the relay should be of good quality and the contacts should be adjustable. Adjustment of armature tension would also be a desirable feature. Such relays are hard to come by, as most manufacturers rivet the contacts for cost reasons. However, Sigma, North Electric and Hart Manufacturing Co. do have such relays. Adjustable contacts are a must feature if you want the best sounding code.

Three s.p.d.t. switches have been included. S_1 turns off the battery when the "Dasher" is not being used. S_2 is for disconnecting the self-completing circuit and S_3 permits the operator to return to manually-made dashes if he wishes. When the dash contact on the key is closed, the battery charges the capacitor, and this voltage is applied across the relay coil and potentiometers. The relay then closes for a length of time determined by the combination of capacitance and the effective resistance of the relay coil and the potentiometers, along with the adjustment of the normally-closed timing contact of the relay. The relay continues to close and open as long as the dash contact on the bug is held closed, with the cycle repeating at a speed depending on the settings of R_2 and R_1.



The "Dasher" chassis mounts on the side of the bug, using mounting straps which also make electrical connections to the bug frame (common or ground), dot contact, and dash contact. The battery is external. The current drain is only a few milliamperes, so the battery life is practically its shelf life.

Layout

In the keyer shown in the photograph, the parts are mounted on 1/16-inch aluminum right-angle strip so dimensioned that it is a companion part of the bug rather than a separate piece of gear on the operating table. The chassis measures 1½ by 1 by 4 inches long but can be made six inches long if you desire to house the relay. It is fastened to the bug by three metal connecting straps which are mounted underneath

* Stratton Mt. Road, West Wardsboro, Vt.

[1] Montgomery, "'Corkey'—A Tubeless Automatic Key," *QST*, November, 1950.

the bug — under the screw holding the damper bracket (for ground), under the screw holding the dot contact post, and under the screw holding the dash contact post — *after* the wire connecting the dot and dash contact posts has been either cut off or moved to one side. Be sure to tape the bare end of this wire so it will not short against the frame if you do not cut it off. Leave the dot contact post connected to the terminal for your keyed circuit. It's that simple.

Operation

Operation with the "Dasher" is much the same as with most automatic keyers. But because you are using your favorite bug key you have several adjustments available to make the code sound as you like it to sound, and thus achieve some individuality. With the dot contact you can have either light or heavy dots, depending on how you adjust the dwell time of the contacts. With the "Dasher" you can control, by means of the potentiometers, both the speed and length of the dashes. Some leeway is also available with the adjustable contacts of the relay; how they are adjusted makes a big difference. This degree of flexibility is not available in other types of automatic keyers, to my knowledge. You handle your bug just as you always have, adjusting the weights on the dot bar for the dot speed you want, then simply turning the dash-speed potentiometer knob to match the speed of the dashes to the dots. The "Dasher" will send dashes at any speed at which you can get good dots from your bug.

As most authors of automatic-keyer articles suggest, start out slowly at first and do not increase speed until you can send for a few minutes with no mistakes. Then step up the speed a notch. After a while you will begin to wonder why you have been beating that dash contact post so long by hand.

Not being used to automatic keyers, my first attempts at operating the "Dasher" were most frustrating until S_2 was installed. Set on contact *B*, this switch permits the operator to put in a

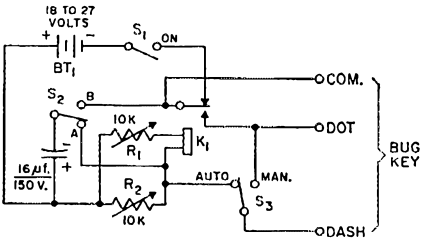


Fig. 1—Circuit of the automatic dash generator.

BT_1—Two or three 9-volt transistor batteries, or a 22.5-volt block for external use.

K_1—S.p.d.t. relay, coil resistance 5000 ohms or more, with adjustable contacts (North Electric 226).

R_1—10,000-ohm control, linear or log taper.

R_2—10,000-ohm control, log taper.

S_1, S_2, S_3—S.p.s.t. toggle.

Note: A less sensitive relay will require greater battery voltage and larger capacitance for equivalent performance.

little more space by cutting the length of the last dash in a character. Although right about now the brethren will rise up and yell that you can't go clipping that last dash, the very small interval of time that you gain permits you to start sending some decent-sounding code almost at once. If you are careful, the shortening will be imperceptible. (If the dash *is* clipped perceptibly, it simply means that you've been doing it with your manually-formed dashes.) Then when you get so that you can handle your bug and the "Dasher" with surety and at a good speed without mistakes, it is time to move S_2 to the other contact (*A*) for self-completing dashes. When you can now maintain your previous speed with no mistakes you have not only arrived — you have graduated *cum laude*. However, if you should tire of perfectly-formed dashes and want to go back for a change to that old "Lake Erie Swing," pushing S_3 to the other contact restores your bug to manual operation.

For a price around the tab for a new paddle key for automatic keyers, you can bring that good old bug up to date and step along with most of them. Good sending! QST

Strays

Mobile operators all over the world are invited to take part in the Amateur Radio Mobile Society Mobile Activity Event on Sunday, September 5. This is your chance to work new countries from your mobile station. Here are the details:

Activity period: 0800 to 2000 GMT

Frequencies: Plus or minus 10 kc. 3740, 3880, 7040, 7230, and 14320 kc., plus or minus 20 kc. 21350 kc., and plus or minus 50 kc. 28550 kc.

Modes: S.s.b. and a.m.

Scoring: 20 points mobile-to-mobile contact outside your own continent. New prefix multiplier × 10.

10 points mobile-to-mobile contact within your own continent but outside your own country. New prefix multiplier × 2.

10 points mobile-to-fixed contacts outside your own continent. New prefix multiplier × 2.

2 points mobile-to-fixed contacts within your own continent but outside your own country. No multiplier.

Maritime mobile or aeronautical mobile count as fixed contacts. W, VE, VK, ZS, and PY call areas count as separate countries. Mobile stations may be stationary, but must be able to move immediately. No portable beams or groundplanes, or external power supplies are allowed.

Logs should be presented as follows: TIME STATION BAND RPT-IN RPT-OUT POINTS-CLAIMED MULTIPLIER. Logs for the even should be sent to the Contest Manager, A.R.M.S., 95 Collinwood Gardens, Clayhall Ilford, Essex, England by not later than September 30.

Hamfest Calendar

California — The Western Single-Sideband Association is holding its annual Convention in Fresno, California, September 4, at the Del Webb Towne House.

District of Columbia — The Foundation For Amateur Radio, Inc., with headquarters in Washington, D.C., will hold a Hamfest on September 19 at The Engineer Center, at Ft. Belvoir, Va., about 17 miles south of Washington. Activities for ladies and children, auctions, picnics, contests and many awards are included in the program. For additional details, contact William Russell, W3BOS, 1022 17th Street, N.W., Washington, D.C.

Georgia — The Griffin Ham Picnic will be held September 13.

Illinois — The Egyptian Radio Club will hold its annual Hamboree on Sunday, September 26, at the Club House, one-half mile south of the Chain of Rocks Canal Bridge (Hy. 66 bypass) near Granite City, Ill. Games and contests for the entire family. Ample parking space. Soft drinks, coffee and sandwiches. For details write Cletus Woodard, W9IHE, P.O. Box 402, Granite City, Illinois.

Illinois — The Peoria Area ARC Hamfest will be held Sunday, September 19, at The Exposition Gardens which is located on the Northwest edge of Peoria, Ill. Lunch will be available at the site. There will be a free swap section, parking, contest and cartoons for the kiddies. Free coffee and donuts from 9:00 to 9:30 A.M. CDT. Registration is $1.00 in advance, $1.50 at the gate. Write Ferrel Lytle, W9DHE, 419 Stonegate Rd., Peoria, Illinois 61614.

Louisiana — The Slidell Hamfest is scheduled for Labor Day weekend.

Missouri — See the Egyptian Radio Club announcement under "Illinois."

New Jersey — The South Jersey Radio Association will sponsor its Annual Hamfest on September 12 at Molia Farms, Malaga, New Jersey. Rain date will be September 26. Advance registration for non-club members is $2.00, with the deadline September 6. General admission at the gate is $3.00. The day's activities will include 2- and 6-meter hidden transmitter hunts, new and larger swap shop, pony rides, games and swimming for the children. Talk-in frequencies on 6 and 2 meters (K2AA). All are invited to bring lunch baskets, swapping gear, and to come and enjoy a day of fun and excitement. Registrations and information from Joe Duffin, W2ORA, 247 King's Highway West, Haddonfield, New Jersey.

New Jersey — The Southern Counties ARA will hold its Second Annual Hamfest on Sunday, August 29, at Lake Lenape Park, Mays Landing, New Jersey. Rain date is September 5. There will be free rides for the children, free use of the picnic and camping areas, swimming beach, games for all ages, food, refreshments, and a watermelon contest for the kiddies. Traffic control station will monitor 2, 6, and 75 meters beginning at 9:00 P.M. Saturday. Registration time is 9:00 A.M. and is $2.00, with children under 12 admitted free. Tickets may be purchased at the park entrance or in advance from Charles Bengal, W2TUR, 815 Seaside Avenue, Absecon, New Jersey 08201.

North Carolina — The Annual Shelby Hamfest will be held September 5 at Cedar Park, 14 miles north of Shelby on State Highway 10. Entertainment for the whole family lunch will be served. For details and map write Malcolm E. Spangler, K4KUT, P.O. Box 481, Shelby, N.C.

Ohio — The 27th Annual STAG Hamfest, sponsored by the Greater Cincinnati ARA will be held on Sunday, September 26 at Stricker's Grove, on Compton Road, Mt. Healthy, Cincinnati, Ohio. Coffee and donuts, two picnic meals and all refreshments are provided in the gate fee of $4.00. Radio-controlled air show, transmitter hunt, equipment and surplus displays. Talk-in on 20- and 40-meter s.s.b. and 6-meter a.m. For further information write Bill Goodrich, W8LNL, 1417 Covedale Avenue, Cincinnati, Ohio 45238.

Ohio — The Findlay ARC Hamfest will be held on Sunday, September 12, at Riverside Park in Findlay, Ohio.

Pennsylvania — The Four York County Radio Clubs will hold its annual Hamfest at the Adams County Fair Grounds, September 5, 14 miles west of York, Penna., starting at 9:30 A.M. A complete program for the entire family. Tickets $2.00. Mobile talk-in on 50.6 and 145.6 Mc. For more information, contact LeRoy Frey, K3POR, 170 S. Albemarle St., York, Penna.

Pennsylvania — The Uniontown ARC will hold its 16th Annual Gabfest Saturday afternoon and evening, September 18, on the club grounds on the Old Pittsburgh Road, north of Uniontown and 1½ miles from the Cities Service Station on the corner of Route 51 and the Old Pittsburgh Road. There will be the usual facilities for food and refreshments. Registration is $2.00. This will be a stag affair. For information, write Joseph M. Sofranko, W3UUZ, 438 Braddock Ave., Uniontown, Pa. 15401.

Pennsylvania — On Sunday, September 19, beginning at 1:00 P.M., the Metropolitan Erie VHF Society will hold its annual Hamfest at the Brookside Fire Hall. There will be an auction, 6-meter transmitter hunt, a number of contests and a smorgasbord, all for $3.00 in advance before September 10 or $3.75 at the door. Reservations, tickets and information from Walter B. Woodbridge, WA3ANA, 4300 Cooper Rd., Erie, Pa. 16510.

Washington — The Puget Sound Council of ARCs plan their Annual Banquet for Sunday, September 12, at Waller Rd. Grange.

Washington — The Walla Walla Valley ARC will hold its 19th Annual All-family Picnic and Hamfest September 18 and 19 at Jefferson Park in Walla Walla. Saturday activities include the Northwest Sideband Asso. Banquet in the evening. Sunday program includes W7DP museum display, swap shop, contests, games and awards. The annual meeting of the MINOW gals will be on Sunday. Lunch will be at 12:30 P.M. and will be potluck, coffee, pop and dessert. Live musical entertainment after lunch. Registration 9:00 A.M. to noon is free. Talk-in frequencies: 29.6 and 3.920 Mc. For more information contact Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, Washington.

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25 Years Ago this month

September 1940

. . . The opening article in this issue tells of a visit to the world's largest receiving and transmitting stations at Riverhead and Rocky Point. *QST*'s editorial staff made the trip to Long Island and came back with a seven-page story full of interesting facts on the long-wave, short-wave, and centimeter activities at these famous radio locations.

. . . Technical articles included "A Low-Frequency Converter," by Raymond Woodward, W1EAO, which described a receiving converter that tuned 500 to 3300 meters; "F.M. Limiter Performance," by G. H. Browning; "The T-Matched Antenna," by John Kraus, W8JK, and Stocker Sturgeon, W8MPH, which showed how to feed a radiator with an untuned line; and "Automatic Tuning for the Amateur Transmitter," by W. M. Atkins, W9TJ and C. T. Read, W9AA, which contained a scheme for mechanical alignment for all types of circuit layouts.

. . . N. Smith and S. S. Kirby of the National Bureau of Standards collaborated on "Predictions of Useful Distances for Amateur Communication" which gave predictions of minimum and maximum distances of transmission in some of the amateur bands. This was the first of a series of radio prediction articles to appear in *QST*.

. . . "On the Ultra Highs" column reported a new DX record for 112 Mc. W6BJI and W6KIN worked 255 miles. QST

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

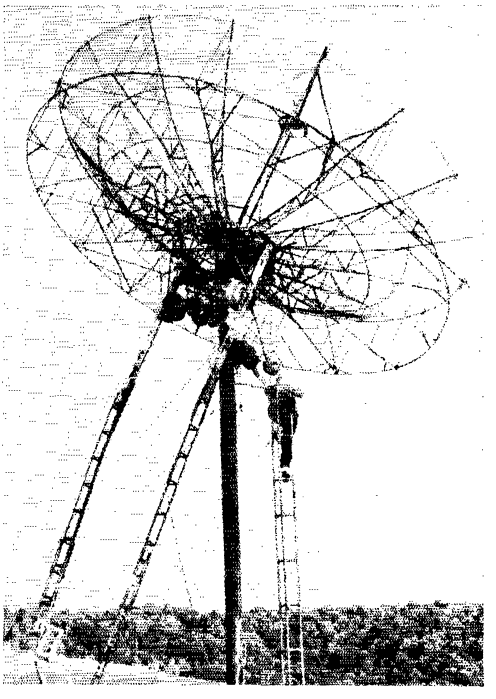
Operation Big Dish

USING the 1000-foot reflector at Cornell's Arecibo Ionospheric Observatory, the amateur group connected with the installation conducted a second set of moonbounce tests on July 3 and July 24, 1965. The first tests on June 13 and 14, 1964, using 144 Mc. and 432 Mc. indicated a surprising amount of interest in amateur moonbounce. A total of 20 contacts was logged on the two bands (August 1964 *QST*). During the ensuing year, it became obvious that a considerable build-up in the number of stations interested in moonbounce was accruing. The interest peaked on the 432-Mc. band with 144 Mc. running a poor second and 1296 Mc. far behind. As a result this year's tests were planned for 432-Mc. operation only. With slightly more than a month's advance notice for the first test, a flurry of activity was required to get KP4BPZ rebuilt to provide for generating s.s.b. Gordon (W1OUN/KP4BPZ) made the arrangements for the July 3 and July 24 dish time and promptly took off for an extended trip which put him in Massachusetts on the 3rd of July. Dr. Rolf Dyce, KP4CMO; Walt Zandi, K2KWL; Andres Sanchez, KP4BEU; Ray Jurgens, W8MSL and W1FZJ set up the equipment on the appointed day and festivities started on time. Official log keeper was Doug De Maw, W1CER, who was on hand from ARRL Hq. to observe and report.

The first listen on the band after our initial "CQ Moon" gave us all a shock. First of all we heard our own echo come back from the moon with a definite buzz on it. It was obvious that we had some 60- and 120-c.p.s. f.m. on our signal but nothing short of scratching the test could be done. Second we were appalled at the number of replies to our CQ. Despite the use of three receivers; two with 100-c.p.s. filter and one with 2.1 kc. for s.s.b., we were hard pressed to pick out calls from the various pile ups. We held contacts to a maximum of two minutes but an average of four minutes between contacts was spent deciding on the next call. We noticed a considerable amount of useless repetition of our call and a minimum of information about the other fellow's call. In any event a total of 28 two-way contacts was accomplished in the two-hour and fifteen-minute period when the moon was available to us. We estimated that at least twice that many stations were calling us.

The second test scheduled for July 24 found us (and everyone else) better prepared. The f.m. hum in our exciter was eliminated. The operating position was better planned and Gordon was back to ride herd on the key. An addition to our setup was a recorder which recorded a 125-kc. section of the band before detection. This device didn't help to work more people but it allowed us to tune and retune the band to find all the identifiable signals that were calling us. (Too late for a contact but great for heard reports.) The band was just as crowded as on the first test and as an added attraction the Stanford Radio Club (WA6LET) was there with a 150-foot dish to provide additional DX possibilities for everyone. At least one contact between WA6LET and K2MWA/2 (the station of the Crawford Hill V.H.F. Club using a 60-foot parabola) was recorded on our tape. WA6LET was heard calling DJØLO and sending an S2 report. K2MWA/2 in addition to working KP4BPZ and WA6LET on both c.w. and n.b.f.m. also identified moonbounce signals from W1BU and W3SDZ.

KP4BPZ racked up 39 two-way contacts and two near misses in the two-hour and fifty-minute time period. Twenty-one of these were stations not previously worked. Two-way s.s.b. con-



That's Vic, W3SDZ, aiming at Puerto Rico via a 20-foot dish and the moon.

*P.O. Box 1738, Arecibo, Puerto Rico 00613.

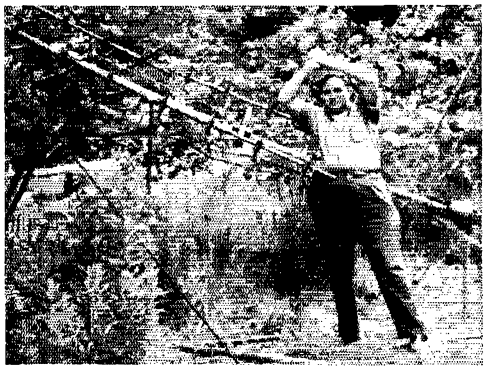
tacts were recorded with W1BU, HB9RG and WA4BYR on July 3. Many more were made on the 24th. The box score on page 93 lists stations worked, the mode, the antenna and the power output. The separate listing of stations heard was compiled from the recording after the fact. Although no contact was established the stations listed all had readability 3 or better signals and would have been worked had time permitted.

Heard reports have been received from G6XM, DLØRR, W5KGO, W9VPU, W5SLL, W1FRR, K1BRO, WØDHP, W1CER and K9UIF.

Tape recordings for the July 3 test are being handled by W3SDZ. Vic kindly volunteered to make excerpts available to participants who request them. The July 24 tapes are still in process and no arrangements have been made. Schedules between K2MWA/2, W1BU and W3SDZ are in progress. Information by writing to W3SDZ, 65 Bound Ave., Milton, Pennsylvania.

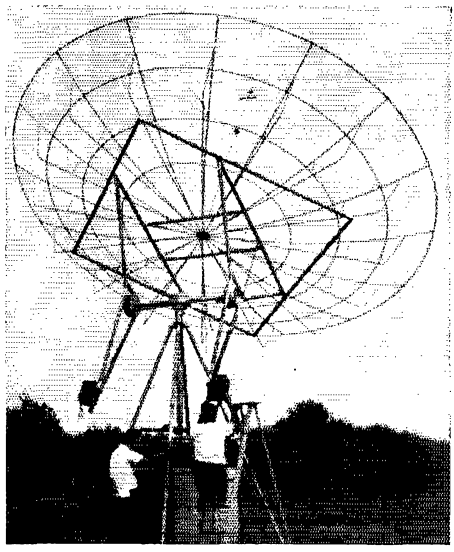
144 Mc. and Up

Interesting things have been happening up in Nashua, New Hampshire according to Rolly, W1QKA. On May 14 Rolly and Jim, W1DUB had



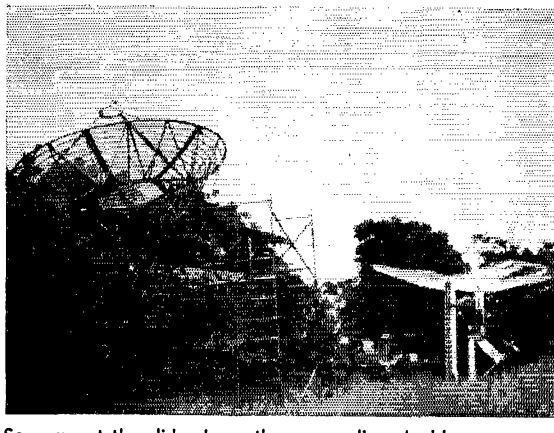
The Winnah! That's Hank, W1OOP, with a satisfied smirk proving that the 64 elements are ready to go on 432-Mc. Moonbounce.

the following contacts: Both stations on a.m. on 432 Mc.; W1QKA on 1296-Mc. a.m. and W1DUB on 432-Mc. a.m.; W1QKA on 1296-Mc. a.m. and W1DUB on 2415-Mc. pulse-c.w.; W1QKA on 2415-Mc. pulse-c.w. and W1DUB on 2415-Mc. pulse-c.w. for the first in Nashua. On the 29th of May Rolly and Jim set up equipment at the QTH of W1OMZ (350 feet above sea level) and established their first two-way QSO on 2415-Mc. pulsed-c.w. between Nashua, New Hampshire and Harvard, Massachusetts with K1JIX. Signals were bounced against Pack Monadnock rather than a direct path because of heavy foliage and intervening hills. However a direct path try will be made soon. "Signals in both directions were steady and running about 30 db. above the noise via the 48-mile long path. Pulsing a 1 kc. rep. rate, 1 microsecond pulse width, and keyed, modified APG-5 cavities were used at both ends running a measured 1.5 kw peak power output to 4-foot dishes at each end of the path. Superhet. receivers at each end consisted of a crystal-mixer cavity, 30-Mc. cascode preamp., APG-5 LO cavity, 4-stage main i.f.-threshold detector. Following the 2415-Mc. QSO, the gear was rearranged as a radar system at the Nashua end with two separate dishes, and echoes or targets were observed out to 50 miles on a range scope." Congratulations, fellows! Nice to see more pioneering done on the v.h.f. and u.h.f. bands.



The 20-foot dish at W8TYY's QTH is homebrew and 300 pounds of welded minwall steel conduit and chicken wire. Combination el-az and polar mount. K8URO is tuning, W8DAU aiming. W8TYY is taking photo.

Los Angeles seems to be high up in 1296-Mc. activity these days. WB6IOM tells us that there are approximately ten stations active with most of them running a.m. or n.b.f.m. However Pete (WB6IOM) and Del (W6UID) have had frequent-s.s.b. contacts with signals 40 db. above the noise over a seven-mile path. W6UID is using a 2C43-Mixer with 28-Mc. s.s.b. injection and input is 200 watts into a 2C39. WB6IOM uses a varactor mixer also with 28-Mc. injection. Antenna at Del's is a 29-inch dish and at Pete's a 5-foot helix. Pete sez he just got his 7650 for a high-power 1296-Mc. amplifier and wonders whether somebody might have information for a



So you put the dish above the surrounding shrubbery, etc.! This is the 18-foot dish installed at W1TQZ's QTH in West Bridgewater, Mass.

Stations worked from KP4BPZ

Call	*Mode*	*Antenna*	*Power*
W1BU	c.w./s.s.b.	30-foot parabola	800 w.
W1HIV	c.w./s.s.b.	28-foot parabola	600 w.
W1OOP	c.w.	64-el. colinear	300 w.
W1TQZ	c.w.	18-foot parabola	200 w.
K2CBA	c.w./a.m.		1 kw.
K2MWA/2	c.w./n.b.f.m.	60-foot parabola	500 w.
W2CCY	c.w.	413-el. Yagis	1 kw.
W7PUA/2	c.w.	10-foot parabola	500 w.
W2AOP	c.w.		
W3SDZ	c.w.	28-foot parabola	500 w.
K3HOC	c.w.	32-el. expanded	600 w.
WA4BYR	s.s.b.	32-el. Yagi	500 w.
W4HHK	c.w.	18-foot parabola	200 w.
W5LUU	c.w.		
K6MIQ	c.w.	8-foot parabola	500 w.
WA6LET	c.w./s.s.b.	150-foot parabola	100 w.
WB6FSC	c.w.	64-el. expanded	1 kw.
W6YK	c.w.		150 w.
K6TSK	c.w.	10-foot parabola	135 w.
K6RIL	c.w.	64-el. expanded	1 kw.
W6DQJ	c.w.		
K6JLZ	c.w		
W7JRG	c.w.	80-el. colinear	900 w.
W7UAB	c.w.	16 el. w/screen	300 w.
W7UDM	c.w.	16 el. w/screen	300 w.
K7ZIR	c.w.		
K7MMT	c.w.	32-el. expanded	800 w.
W8TYY	c.w.	20-foot parabola	600 w.
W9GAB	c.w.	18-foot parabola	500 w.
W9HGE	c.w.	23-foot parabola	500 w.
KØDOK	c.w.	413-el. Yagis	1 kw.
DL9AR	c.w.	2 x 22 Yagi	250 w.
DJ4AU	s.s.b.	80-el. colinear	400-w. out
DJØLO	s.s.b.	10-foot parabola	400-w. out
DL3YBA	c.w./s.s.b.	88-el. colinear	300-w. out
DL1EI	c.w.		
DL6IQ	s.s.b.	84-el. Yagi	1 kw.
G3LTF	c.w.	10-foot parabola	150 w.
G3CCH	c.w.		
HB9RG	s.s.b.	20-foot parabola	600 w.
LX1SI	c.w.	2 x 20 Yagi	400 w.-out
OZ8EME	c.w./s.s.b.		
PI1PL	c.w.		
SM7OSC	c.w.	4 x 15 Yagi	500-w. out
SM6CSO	c.w.	25-foot parabola	500-w. out
VE2LI	c.w.	96-el. colinear	600 w.

1296-Mc. cavity. He'd appreciate receiving same. Well, our 1296ers seem to be fairly well scattered this month WA9FUH writes from Milwaukee that his APX-6 is in operation on the bench and that it works OK. Now all that needs doing is installation of the corner reflector which works well in the basement but needs must go UP.

432 Mc. has been getting a real workout for the past several months and we hear from W3RUE that he has upped his states worked on the band to 9. Way last September Ted worked W9ZIH for #8 and what was probably the first Pennsylvania-to-Illinois contact on 432 Mc. On May 22, VE3AIB was worked for the first Pittsburgh/Canada two-way on 432 Mc. and on the 24th VE3AIB and VE3BQN were worked plus K2ACQ at Lockport, New York who made state #9 for Ted. W5RCI reports that June 20 brought him state #16 when he worked WØIDY in Iowa whose signal was peaking S4 and fading almost into the noise on 432 Mc., while on 144 Mc. he was peaking only S5 and fading about the same. 432-Mc. gear at Marks, Mississippi (W5RCI) consists of 300 watts input to 4C250B in a coax cavity, 64-element colinear at 75 feet fed with ½-inch gas filled coax. The converter uses a grounded grid 8058 in the front end. Glad to see Mississippi still in thar fightin', Rex! The first communications in Nevada on 432 Mc. were made on June 28 between W7RKH and K7ICW. You might know it would be those two who would do it too! We hear from K8UHC in West Virginia that he now has closed-circuit TV using a closed-circuit TV camera with a 7038 Vidicon and a.m. in progress. Larry is converting an APQ-2 for 440-Mc. TV work. July 5 was a good opening on 432 Mc. into Elmhurst, Illinois when WA9HUV worked VE3AIB, VE3EMT and VE3DSU on phone. Norm sez that K8TJP and K8AIY in Detroit were like locals along with W8YIO in Manchester and W8FWF in Garden City. All phone contacts. WA9HUV is looking for skeds on 432 Mc. for Tuesday nights between 2000–2300 EST. Frequency is 432.044 Mc. and he's running about 500-watt s.s.b. on upper side band. Thanks to Jay, W5JWL, Bill Lewis, WØIDY, nabbed state #8 on 432 Mc. on June 19. No, it wasn't Jay that got the contact for himself but he alerted Rex, W5RCI that conditions were good and Rex and Bill (WØIDY) were able to make a QSO. Out in Galion, Ohio, Sid, K8ZES sez that all Ohio and surrounding states are welcome on 220 Mc. each evening between 7:30 and 8:30 EST when nightly skeds with W9HLY, W8DQU and W8CSW are being held. K8RSC and W8MKF frequently call in also. All stations are between 220.03 and 220.09 Mc. K1POP in Stratford, Connecticut is new on 220 Mc. and is looking for contacts. Fred, W2SEU, sez that during the June contest 220 Mc.-activity was the highest he's ever seen. Now he's hoping that some of the boys will stay on the band and keep it active. 220-Mc. activity is also the aim of K2SVB/7 in Washington. Joe is hoping that anyone in the Seattle/Tacoma/Olympia region who has gear for this band will get in touch with him at 4620 E. 143rd St., Tacoma, Washington 98446.

A number of the 432-Mc. boys have been building bigger and better antennas, some with Moonbounce in mind. W3BDP, K6JYO and K7NII are all putting up 32 elements on this band. WA6STS sez he has repaired and tuned up his two eleven element beams for 432 Mc., W9VPU is constructing a "new antenna system" for the Moonbounce Project and we understand that W9ZIH is now running a kw. on 432.007 to an 80-element colinear. K4QIF reports working W4HJZ (105 miles) on 432 Mc. with S5 signals and Carl's antenna 4 feet off the ground. (Now just think what the signal would be if it were 20 feet off the ground, fellas!) Construction note from W4HHK: "Recently I installed a Varicap diode across the 42.5 Mc.-oscillator in the 432 Mc.-converter. A shielded cable carries voltage from the

Heard and recorded on tape at KP4BPZ

Call	*Mode*	*Frequency*
G3EGV	c.w.	.059
W1CTW	c.w.	.0289
SM6PU	c.w.	.0356
GM3FYB	c.w.	.032
VE3BPR/1	c.w.	.045
G3DMZ	c.w.	.017
PAØKJ	s.s.b.	.0123
W4UWH	c.w.	.0243
VE5??	c.w.	.0289
K2LZP	c.w.	.028
W3VSB/1	c.w.	.0123
K6IMZ/6	c.w.	.027
WØIDY	c.w.	.0138
K3BHY	c.w.	.002
W1NZP	c.w.	.0672
W6FZA	c.w.	.0229

operating position to the varicap circuit. A ten turn Helipot dial at the operating position varies the voltage applied to the capacitance diode. A 9 volt battery is the voltage source. With the circuit values employed, ten turns of the Helipot dial produces approxmately 3-kc. of tuning. This provides very slow tuning that is necessary when using extreme selectivity in c.w. work and in s.s.b." W4WQZ writes that he is thinking of going along with others in his area who will soon be on 432 Mc. with varactor triplers. From Garden City, Michigan, W8FWF sez that 432 Mc. has been good to him in his first seven months on the band with four states plus Canada to his credit. George sez that w.b.f.m. is still going strong on 432.9 with sixteen stations from Detroit and suburban areas checking in. They'd like to hear from others in near-by areas. WA9IUV has been bringing up his totals on 432 Mc. and at present count has seven states and 450 miles. Norm tells us that all of his contacts have been made by listening and calling, no prearranged skeds. Jesse, W4MVB sez to keep an eye out for him on 432 Mc. He is presently constructing a transmitter for this band using a 6CL6 osc/tripler, 6CL6 doubler, 6360 tripler, 5894 tripler and 5894 amplifier. Out in Watervliet, Michigan, W8PT writes that during the tropo conditions of June 9 he worked WØIDY, W8FWF, W8YIO, and K8TJP. At Marshall, Michigan, WA8DXW sez that he and Randy, WA8NTO have been working on antennas for 440-Mc. ATV. Their QTHs are located about a mile apart so the boys are hoping for good communication via TV. John Chambers, W6NLZ sez that although he admittedly has somewhat neglected v.h.f. the past few years he has kept in contact via 221.6-Mc. local ragchews; 8:00 A.M. 50-Mc. Saturday scatter skeds and 9:30 P.M. Friday 144-Mc. skeds to San Francisco. You admit it's been fun, John. Write more often and let us in on the fun too. John does say that he has a 15-foot dish up and working and it yields roughly 6 db. more than his old 32-element extended and expanded antenna.

We understand that a group of Jacksonville (Florida) amateurs have been planning a v.h.f. u.h.f. DX-pedition to Mt. Mitchell, North Caro ina for August 14 and 15. Regrettably we did not receive the notice in time to include it in last month's column but we surely hope the boys had lots of luck and that they will let us know the results. Operation was to be on 432 and 145.200 Mc. K6UMV is also planning an expedition out of state to try for some new v.h.f. u.h.f. records. Operation will be on 50 Mc., 144 Mc., 220 Mc., 432 Mc. and 1296 Mc. and members of the San Fernando Valley Radio Club will be the participants. The boys expect to go in January of 1966 but there is a possibility that it will be earlier. They'd like to set up skeds, and addressee for same should be W6SD, Box 3151, Vay Nuys, California 91407.

144-Mc. f.m. seems to be gathering new customers around the country. In Connecticut W1LUL, K1VGF and K1IIG are operating on 146.940 in the New London area and are looking for others interested in the same mode and for skeds. WA2FGK and K2LNS have been building, erecting, comparing and tearing down antennas for 144 Mc. for the past several months. Results follow: "We had 4 8-element beams up but could not get the s.w.r. down. We compared a 15-element beam with the 32 and it was down 3 db. over a 400-mile path to W8KAY. Now we have a 20-element Yagi up on a 22 foot boom. This has the exact gain of the 15 elements on a 28 foot boom. Conclusion, we will have 4 20-element beams (80 el.) up 70 feet and perhaps tiltable. Power will be 1 kw. We will be looking for anyone interested in meteor shower skeds." Sounds like you fellows have been working. Greg, WA2OOD mentions that he occasionally gets the urge to work on one of two unfinished s.s.b. rigs and that the time is now. QST

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

W1FC, Rulof H. Fowler, Bridgeport, Conn.
W1GSQ, Harold W. Alford, Danvers, Mass.
W1HFJ, Francis W. Mc Eachern, Winthrop, Mass.
K2AEQ, Oliver Penny, Greenlawn, L. I., N. Y.
W2BZM, Joseph Koenig, East Paterson, N. J.
W2CKO, Edward D. Gray, East Islip, N. Y.
K2DD, Benjamin A. Mayhew, Pennington, N. J.
W2MNY, Richard L. Walker, Peekskill, N. Y.
WB2MRM, Jan L. Marcus, Westbury, N. Y.
W2NZC, Frederick Kienzlen, Ocean Grove, N. J.
W2ON, Edward F. Bona, Bayonne, N. J.
W2OW, Fred B. Portertield, Vestal, N. Y.
K2RHH, Robert A. McNichols, Jr., Bergenfield, N. J.
W3BCK, Allan Avery, Pittsburgh, Pa.
W3LNZ, Harry P. Pierce, State College, Pa.
K3VLA, William F. Lehn, York, Pa.
W4IO, James S. Morris, Atlanta, Ga.
W4IW, R. Lynn Kalmbach, Hopkins, S. C.
K4KJQ, Dix E. Newton, Lexington, Ky.
W4NLX, Verlan E. Lloyd, Cocoa, Florida
K5BIB, John T. Clinesmith, New Orleans, La.
K5GJI, Ronald Smallwood, Karnes City, Tex.
WA5JQO, Peter C. Hedlund, Ardmore, Okla.
K5OPQ, Byron E. Hybarger, Groves, Tex.
W5PJA, William O. Griffin, Madisonville, Tex.
W5PZS, Samuel D. Salt, Midland, Tex.
W6BZW, Clarence H. Pugh, Adelanto, Calif.
W6CLV, Lloyd V. Broderson, Sacramento, Calif.
K6DUF, Ronald G. Clarke, Los Gatos, Calif.
WA6DWH, Charles D. Apon, San Diego, Calif.
W6FGJ, Edmond Nies, Manteca, Calif.
W6FZD, Richard L. Mockbee, Los Angeles, Calif.
K6IRE, Stephen P. Temby, Oakland, Calif.
W6IVL, Mario Maury, Montclair, Calif.
K6LEO, Mervyn C. Dixon, Davis, Calif.
W6QBH, Russell B. Nelson, Ojai, Calif.
ex-W7CVA, Andrew B. Fuller, Bainbridge Island, Wash.
W7PLM, George F. Hood, Tucson, Ariz.
WA8BLF, Ralph E. Reed, Newcomerstown, Ohio
W8CAC, Alfred M. Weniger, Grafton, Ohio
W8GFI, Roland Callahan, Franklin, Ohio
WA8JAI, William J. Ronaldson, Canton, Ohio
W8JYJ, Cyrus C. Jenks, Ypsilanti, Mich.
W8LIZ, Louis G. Ward, Kent, Ohio
WN8PEG, Wade M. Willey, Bay Village, Ohio
W8VT, William T. Nelson, Royal Oak, Mich.
WA9EOU, Thor E. Olsen, Roselle, Ill.
KØDME, Alvin L. Ness, Wayzata, Minn.
WØDXD, Merl R. Jones, Anthon, Iowa
WØLB, Frank N. Reichenecker, Kansas City, Kan.
EI4B, J. P. Campbell, Dublin, Ireland
VE3APF, William B. Blackhall, Caledon, Ont.
VE3DCZ, Joseph Fowler, Chapleau, Ont.
VE3RP, Reginald O. Popham, St. Thomas, Ont.
VE4RO, George C. Behrends, Pine Ridge, Man.
VE5JK, John M. Kyle, Regina, Sask.
VE6YM, Frederick Burwell, Edmonton, Alta.
VK3AGK, A. G. Kirmsse, Heathmont, Victoria
VK5JE, E. J. Cawthorn, Somerton Park, South Australia
VO1BU, J. J. Ezechiel, St. John's, Newfoundland

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

So Far — Yet So Near

THE tremendous potential of amateur radio may occur to everyone of us at the exact same moment — the minute we first receive our call letters. Bubbling with enthusiasm, which seldom, if ever ceases, you want so very much to have everyone you know share this same thrill. You may particularly want to interest other members of your family. In this, some succeed, some do not.

Perhaps somewhere there are statistics which tell how many children from one family settle down near their original home town in today's society. The family who can point to the house on the corner as being that of their grandfather, across the street to an aunt's, and to their mother's next door, is now rare. Pinpointing the QTHs of your close relatives today takes not a street map, but a map of at least the U.S.A., if not the entire world. No matter what the distance may be, it would never seem quite so great were they to take advantage of amateur radio's opportunities.

From time to time, stories of ham families have been reported on these pages and it's now a pleasure to bring you news of two sisters who can now be included.

Amateur radio is not new to the Nelsons in South Charleston, W. Va. Carl, K8BIT, is the OM of Alice, K8MQB, who has been licensed since 1958 as a Novice, and as a General since April in 1959. An all-around ham, Alice operates on all bands from 80 meters to 10 meters, both s.s.b. and c.w. She holds a 5-year continuous membership certificate for YLRL, is a CHCer, and is very active in civil defense and RACES work.

Through the courtesy of W3LPO in Bradford, Pa., Alice used to talk with her sister, Martha, once a week. It didn't take too many such skeds for Martha to become as enthusiastic about amateur radio as Alice, and as a result, Martha now wo-mans her own station.

The miles between Martha Milks, K3FRQ, of Bradford, Pa. and her sister Alice, K8MQB, no longer seem so great since Martha joined the amateur radio ranks.

It was with great pride that Alice first contacted Martha, K3FRQ, when she became a Novice. Since that time, many family skeds have taken place as Martha has progressed to Technician, and very soon will be heard on all bands. Martha is already an active member of AREC, which she has added to a long list of other activities. She is the mother of two, does bookkeeping for her OM's electrical business, and is a registered nurse.

We often hear of how amateur radio is a wonderful way for making new friends. It should also be noted, as in the case of Alice and Martha, that it's an equally fitting means of keeping families close though distant.

14th ARRL National Convention

YLs attending the National Convention in San Jose, Calif. during the July 4 weekend, will long remember the event as most enjoyable. The beautiful Santa Clara Valley, often referred to as the Valley of Heart's Delight, proved to be just that for the more than 200 YLs in attendance.

Saturday's activities were highlighted by a bus

* YL Editor, *QST*. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.

Alice Nelson, K8MQB, of South Charleston, W. Va. makes good use of this Collins gear. You will hear her operating on all bands.

The well attended ladies' luncheon at the National Convention shows many smiling faces. Seated in the foreground with her two children, is Elaine Carter, K6SZT. Elaine is past president of Baylarc and their present Certificate Custodian.

tour for all YLs which enabled them to see many points of interest, enjoy a fine luncheon, and to visit the University of Santa Clara. YL activities also included the 9th Annual SWOOP party, a ladies' breakfast with prizes for all on Sunday, flower arranging, styrofoam and chenille, and swisstraw demonstrations. The YL Forum conducted by Martha Edwards, W6QYL, President of YLRL, was well attended by more than 50-licensed YLs.

From the convention's start, to its close on July 5, there were no dull moments. Who made this all possible? Congratulations go to Caroline Gmelin K6BGM, who served as Ladies' Chairman for the convention committee.

Liz Zandonini, W3CDQ, Honored at Retirement Dinner

Liz Zandonini, or Emzie as she is affectionately known, grew up in Washington, D. C. She is a graduate of McKinley Manual Training and The National Radio School in Wireless Telegraphy and Morse Telegraphy, which she taught for seven months.

Following World War I, via Public Health, under the Treasury Dept., she served as reconstruction aide for the reeducation of disabled soldiers at Camp Meade and Fort McHenry, teaching code in the army hospitals. After separation from the Treasury Dept., and a stint at the Italian Embassy in the Special Office of Emigration as a Clerk and Translator, she became a radio aide at the National Bureau of Standards (NBS).

At the time of her retirement, she functioned as an administration clerk in the Radio Activity Section. Emzie speaks Italian, French, Spanish, and German and has many times been pressed into service as a translator of scientific articles and as an interpreter for visitors from other countries.

During World War II, she was assistant radio aide in the War Emergency Radio Service and taught code at the Women's Defense Training School. After the war, she taught a Civil Defense Communications course at the NBS Graduate School.

In 1963, she received an outstanding performance rating. At NBS there are only five others with more years of service than Emzie.

Throughout the years, she has also been a most active amateur radio operator as W3CDQ. She has held the post of Assistant Director of the Atlantic Division of ARRL. Her license (obtained in 1922) entitles her to operate all bands. Hams throughout the world have learned to look for Emzie as soon as she signs her call. She has a multitude of friends, many of whom she has had the opportunity to meet on her many trips throughout the U.S. and Europe. She has also helped many a fledgling operator get his start.

A testimonial dinner was held at the Sheraton Silver Spring Motor Inn on June 29 as some of her many friends paid her honor.

Mr. W. S. Hinman, former Deputy Assistant Secretary of the Army for Research and Development, was toastmaster. John Huntoon, Editor of *QST*, delivered a telegram from Herbert Hoover Jr., W6ZH, President of ARRL.

Maynard Briggs, Consulting Engineer for Westinghouse Electric Corp. and representative of the Foundation Amateur Radio, presented Emzie with a certificate on behalf of her years of service and cooperation.

Dr. R. W. Hayward, Chief of the Nuclear Spectroscopy Section presented a number of gifts to Emzie and also spoke briefly on her contribution to the Radio Activity Section.

Alan P. Stansbury, formerly project leader at NBS in charge of supplying ionosphere field stations of CRPL, now chief engineer of Quan Tech. Co., reminisced.

At the evening's end, Sam Garfinkel, at the time acting chief of the Radio Activity Section, read a letter to Emzie from President Johnson.

This report of the many outstanding accomplishments of W3CDQ was issued by the National Bureau of Standards. A picture of this YL whose activities certainly have enriched the field of amateur radio can be found in August 1964 *QST*, page 97. Congratulations and all best wishes, Emzie!

Howdy Days for all YLs Sept. 21, 22, 23

With more than 10,000-licensed women radio amateurs in the world today, there should be great activity during Howdy Days. For YLRL members,

At their annual picnic at Lewis and Clark Trail State Park near Dayton, Wash., the Minow YLs planned their annual QSO Party to take place concurrent with Howdy Days — Sept. 21 to 23. Shown l. to r. are: (front row) K7RAM, K7VSG, W7NJS, K7MRX; (second row) K7KSF, K7YDO, W7FDE, W7IXR, K7TWQ; (back row) WN7CCZ, K7PVG, K7UHF, W7JRB.

here's a fine chance to familiarize non-members with YLRL and its activities. For non-members, you'll find this an excellent opportunity to learn more about YLRL, to ask any questions you may have and to make many new friends. Let's break all records with YL activity this year!

Starts: September 21, 1965, 1700 GMT
Ends: September 23, 1965, 1700 GMT

Rules: Score will be based on licensed YL contacts only. All bands and modes of emission may be used. Only one contact with each station will be counted Contacts on nets do not count.

Scoring: Score 2 points for each YLRL member and 1 point for a non-YLRL member. No multipliers. Logs not required. Submit a list stating date, time, call, name, QTH and whether YLRL member or not.

Awards: Top scoring YLRL member will receive a choice of a pin, charm, or YLRL stationery. Top scoring non-member receives 1 year paid membership in YLRL.

Score sheets must be received by October 15, 1965. Submit them to Kayla Bloom, WØHJL, 175 South Jasmine St., Denver, Colorado 80222.

All YL Contest
26th YLRL Anniversary Party

Contest Period — c.w.
Starts: October 20, 1965, 1700 GMT
Ends: October 21, 1965, 2300 GMT
phone
Starts: November 3, 1965, 1700 GMT
Ends: November 4, 1965, 2300 GMT

Eligibility: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members only are eligible for cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs will not count.

Operation: All bands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

Procedure: Call CQ YL.

Exchange: Station worked, QSO number, RS or RST, ARRL section or country. Entries in log should show the time, band, date, transmitter and power.

Scoring: (a) c.w. and phone sections will be scored as separate contests. Submit separate logs for each contest.

(b) IMPORTANT! NOTE CHANGE IN SCORING FROM PREVIOUS YEARS! All YLs located within an ARRL section, score 1 point for each QSO with another station located within an ARRL section. Score 2 points for each QSO with a station not located in an ARRL section, i.e., DX. DX YLs (by definition, all stations not located within an ARRL section) shall score 2 points for each contact with a station located in an ARRL section. Score 1 point for each contact with another DX station. Note: It is imperative that each YL know her section. Do not use the name of the country if it is an ARRL section. Hawaii, Puerto Rico, KG4 land, Virgin Islands, Alaska, etc. are not DX as they are in ARRL sections. Section lists are available from the Vice President of YLRL. Send s.a.s.e. to receive one.

Multiply number of contact points by total number of ARRL sections or countries worked.

(c) Contestants running no more than 150 watts d.c. input at any time, may multiply this score by 1.25 (low power multiplier).

(d) S.s.b. contestants running 300 watts p.e.p., or less, at all times may use the low power multiplier.

Awards:

But we were only fooling! Shown making a clean sweep of all that junk in the hamshack are: (l. to r.) Frieda Baughman, xyl of WA6OKK; Helen Mejdrich, WØOPX/6; and Esther Given, W6BDE. This burst of activity occurred during the SWOOP party at San Jose.

Highest c.w. score — Gold Cup (YLRL member only).

Highest phone score — Gold Cup (YLRL member only).

Highest phone and highest c.w. score in each district and country will receive a certificate.

Highest *combined* phone and c.w. score (YLRL member only) in each district and country will receive the Corcoran award.

DX Awards: Given by Arlie Hager, W4HLF for highest *combined* phone and c.w. scores.

From North and Central America, including Greater and Lesser Antilles — Cup.

DX YL from any other part of the world — Cup.

Note: DX YLs please send logs airmail to be sure of qualifying.

Logs: Copies of all logs must show claimed score, be signed by the operator, postmarked no later than November 24, 1965, and received no later than December 10, 1965, or they will be disqualified. Send copies of logs to the Vice President of YLRL, Kayla Bloom, WØHJL, 175 South Jasmine Street, Denver, Colorado 80222. No logs will be returned. Be sure it is a copy of your log that you send. Carbon copies which are smudged in mailing and handling and become unreadable will be disqualified.

YL Club and Net News

The San Diego Young Ladies Radio Club announces the following new officers for 1965–1966: Pres., K6AWP, Kathy Kreysler; V. Pres., K6UTO, Betty Kuegeman; Treas., WA6MOC, Rawlings White; Corres. Secy., WA6CQS, Martha Meehan; Rec. Secy., WA6SKT, Karen Decker. Cert. Cust. (Missions to Missiles Cert.), K6UTO, Betty Kuegeman, 8802 Glenhave, San Diego, Calif. 92111.

The Chix on Six have elected the following new officers for 1965–1966: Pres., K8VMY, Pat Dennis; V. Pres., K8ZEV, Marge Blose, Secy., WA8EBS, Eila Russell; Treas., WA8IJW, Dorothy Baumgardner.

The Minow YLs announced the following new officers: Pres., K7RBE, Velda Klein; V. Pres., K7YDO, Gerry Johnson; Secy-Treas., K7KQC, Nancy Wilson; Cert. Cust., K7RBC, Mary Ruckman. Comm. Chairmen are: Hosp., K7TWQ, Jessie Brabb, DX Correspondence, W7JRB, Marie Eden; Bazaar, K7PVG, Frieda Raymond; Pub., K7KSF, Phillis Shanks. QST

September V.H.F. QSO Party

September 11–12

"QQ CONTEST" on the v.h.f. bands the week end of September 11–12 will mark another popular ARRL V.H.F. QSO Party. This contest which gets under way at 2 P.M. (1400) your local standard (*not* daylight) time Saturday, September 11, and runs through 10 P.M. Sunday, September 12, is open to all amateurs in the ARRL field organization who can work 50 Mc. or above. For purposes of the contest Yukon-N.W.T. (VE8) will count as a separate multiplier. Contacts count only when the contest is in progress at both ends of the QSO.

Just exchange ARRL section (see page 6, this *QST*) and count one point for completed exchanges on either 50 or 144 Mc.; two points for contacts on 220 or 420 Mc.; and three points for contacts on higher bands. The sum of these points multiplied by the number of different ARRL Sections worked per band gives you your final score. Therefore, it pays to contact the same stations on different bands to increase both contact points and multiplier. **Portables are urged to sign properly to avoid possible disqualifications.**

Reports must include your call, section, times in GMT, call and section of station worked, postmarked by Oct. 5, 1965.

Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, Sept. 11, and ends at 10:00 P.M. Local Standard Time, Sunday, Sept. 12. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the time zones concerned.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed-, portable- or mobile-station operation *under one call*, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently 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/DOT).

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

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

3) Scoring: *1 point* for completed two-way section exchanges on 50 or 144 Mc.; *2 points* for such exchanges on 220 or 420 Mc.; *3 points* for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of *different* ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

4b) Foreign entries: all contacts with foreign countries (such as Mexico and the Bahamas) count for *score*. All foreign countries are grouped together as one, and a section multiplier of *no more than one* (per band) may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

5) A contact *per band* may be counted for each station worked. Example: W2BLV (S.N.J.) works K1CRQ (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2BLV 4 points (1 — 1 — 2) and also 3 section-multiplier credits. (If W2BLV contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires a complete exchange with *at least* one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multi-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to top Novice in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than Oct. 5, 1965, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience. QST

SUMMARY OF CONTACTS, V.H.F. QSO PARTY

STATION W1AW ARRL SECTION CONN

Freq. Band (Mc.)	GMT Date Time	Station Worked	Section	Record of new Sections for each band: 50	144	220	420	other 1215	Contact Points
50	1701	W1MEA	CONN	1					1
	1705	WA2BAH/2	ENY	2					1
	1715	W1MHL/1	N.H.	3					1
	1720	W1YDS	CONN						1
144	2000	W2GKR	NNJ		1				1
	2005	W1MHL/1	NH		2				1
420	2200	W1YDS	CONN				1		2
1215	2300	W1HDQ	" "					1	3

(Enter below on last sheet used)

Band	Contacts	Points	Mult.
50 Mc.	4	4	3
144 Mc.	2	2	2
220 Mc.			
420 Mc.	1	2	1
Other 1215 Mc	1	3	1
TOTALS	8	11	7

Check one: ☐ Single operator ☑ Multiple operator

Calls of operators having a share in above work: W1s QIS WPR, K1QNF

Power input:

Transmitter:

Receiver:

Antenna:

CLAIMED SCORE: 11 (Points) x 7 (Mult.) = 77 FINAL SCORE

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

Signature Call Address

Sample log and summary form giving an example of how to score. You can obtain these log forms free by writing to ARRL Communications Dept., 225 Main Street, Newington, Conn. 06111.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Stew hot and steamy to undertake an involved dissertation this month. Even our DX bands seem to have sagged in the crackly humidity. So, in lieu of the usual sermon, let's dispose of an odd and an end or two.

Here's one via W9HPJ and the APCO *Bulletin* about a DX man who was a sad and very sorry operator. Finally made DXCC using the morose code. [You're pretty pathetic, too, Boss. — *Jeeves*]

W8PHZ forwards a gem that should appeal to those mathematically inclined. This is Ralph's formula for making the Century Club (countries per year):

$$\text{DXCC} = \frac{\text{PHET}}{\text{I.Q.} \times 10}$$

where P = watts of power input, H = feet of antenna height, E = number of antenna elements, T = daily hours spent in pile-ups, and $I.Q.$ = I.Q. It can easily be shown that the more intelligent operator is likely to have the least countries worked. [*You* can sure use that multiplier, Boss. — *Jeeves*]

Finally, from K8VWN we have an irate DXHPDS-like comment on the monthly work of *QST* cartoonist W1CJD:

> Phil Gil is a whiz at lampoon.
> But I think he's a prejudiced goon,
> For *always* he leaves
> The Boss of old Jeeves
> Off the edge of the dagnabbed cartoon.

(Jeeves, please — no comment.)

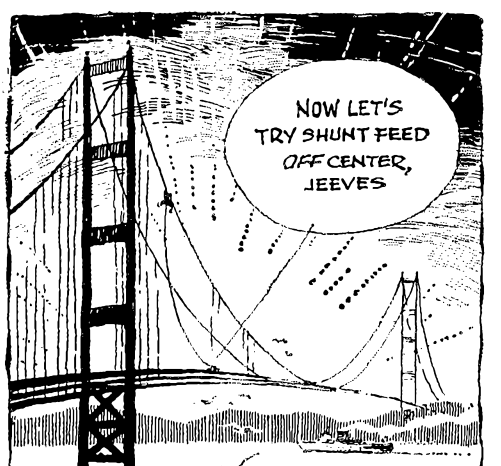
What:

Ahhh — the threshold of another DX autumn, good readers, and *this* one will be on the solar-cyclic upbeat. You 28-Mc. men got the cobwebs scraped off those beams? You 21-Mc. buffs well stocked with extra logsheets and QSLs? You 14-Mc. jaspers all set for extended nighttime action? Time's a-wastin', lads, for the game is already afoot. Our widespread "How's" operatives paint us a DX picture on the multiband motif. . . .

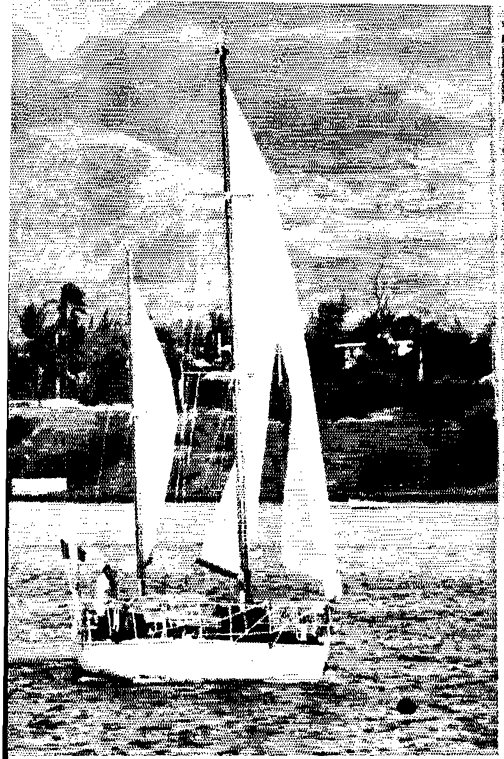
10 phone finds advance scouts **W1YNE, K3SLP, WAs** 1DJC 4QBX 5HS and 9BGK turning up **CE3EW, CR6EW, CXs** 1AAM 4CS 6BC, **GM3s** RFR SKX, KH6CH/**KW6, KP4AEB, KZ5s** BT CT* (28,*650*) 2100 GMT. **LUs** 1CS 2DED 3BAC* 3DCU (370) 18, 4DM 5DJZ 5MG 8DSF*, **PX1AF, PZ1AX***, **TI2JH***, **UA0SAC, VK4CK, VP9EP** (600) 22, **VS6FK, XE1CCW***, **YO2VA, ZC4WR, ZE2JA, 5N2FMP** (270) 18, **9G1FR** (350) 18, **9J2s** DT and WR* (550) 18, the asterisks for s.s.b.ers . . . . . K5MHG, **WA5IIS** and club sources list **28-Mc. c.w.** activity by **EL8X, F8KJ,** beacon **GB3LER, TI2RK, XE1AX** (40) 17, **YOs** 2DD 6KEA, **YV3KX, ZC4CZ, 4X1WF** (50) 20–21 and **9Q5QR.**

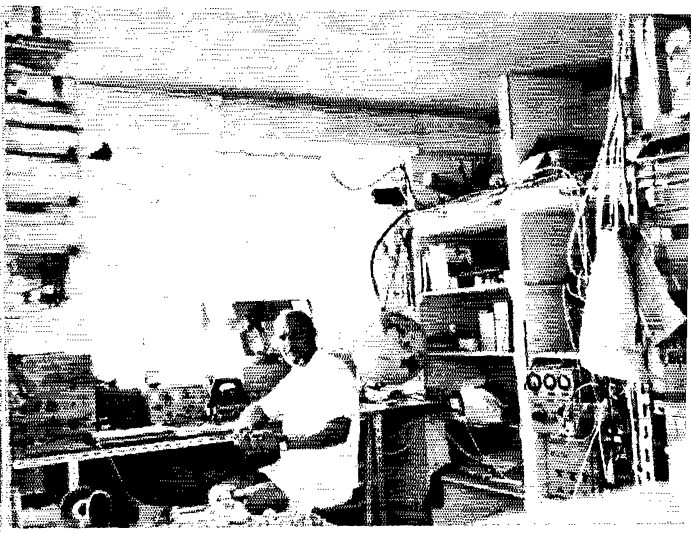
15 c.w. is popular with **Ws** 1BDI 1ECH 3HNK 7DJU 8YGR 8ZCQ 9RCJ, **Ks** 1MJC 1QGC 5MHG, **WAs** 2WIJ 3AZI 3BAE 4HVC 4KXC 4QBX 4SQI 4SRS 5EID 5HJK 5IIS 6JOT 6TGH 6VAT 6WTD 7BOA 7BOB, **WBs** 2JGI 2LDX 2LSV 6FRP 6KBN 6KPN and 6NXK, mainly because of **CEs** 3BQ 4CE, **CN8RU, CO2FA** (125) 18, **CRs** 4AE 6EI 6HH 6JL 7IZ 8AF, **CP5AQ, CT1IT, CXs** 8AAW 9PP, **EA9EN** (65) 18, **ELs** 2A 2AD 8X (60)14, **FG7s** XP XX, **GCs** 2FMV 3KCE 4LI, **HC2s** RT SB (43) 19, **HIs** 3AGS 8XAL, **HKs** 3AVK 3RQ (120), 4ALE 5CR 7UL ØAI (69) 22, **HP1s** AC IE ME (44) 19, **HR2GK** (105), **IT1AI, IS1s** FIC VEA ZEI (72) 22, **JAs** 1ADN 1CBJ 1CYV 1HZN 1KSO 1NUU 1VX 8BAB, **K3YMP/KM6, KG4AM, KS6BO, KV4s** CJ CX, **KZ5s** CU MEN (152), S8 23, TV (105) 1, **LUs** 1DAW 9DL, **LX1CF, OAs** 4AO (54) 20, 4FM (23) 20, 4FU 4FW/8 6W, **OD5AX** (33) 16, **PJs** 2AA 3CB 3CD, **PYs** 1FH 2ARB 2BGL 2BZ 2CSS 3AZ, **PZ1s** BD BH CM, **SL1CF, UAs** 2BZ ØKKB, **UB5BC** (40) 3, **UI8LB** (88) 19, **UO5AA, VKs** 2GW 3EQ 4TY (111) 1, 5NO 1, 7SM 110) 2, **VP9BY, VR6TC, VS9AMD,** WA5ECN/**5N2** (20) 18, WB2PXZ/**VP9, WH6s** FOO (151) 3, FMS, **WP4CLB, XE1s** OE PJ, **YN1MAN, YU3AT** (50) 22, **YVs** 1AB 2AH 5BNR, **ZB2s** A (34) 16, AM (5) 20, **ZC4TX** (71) 19, **ZDs** 5M 7IP (9) 15, **ZEs** 1BO 8JW, **ZLs** 1HW (125) 1IS 3JO (160), **ZS6s** BG (33) 7, OS, **4W1I, 4X4MR, 5A3s** TT TX (60) 22, **5H3JJ, 5R8s** AL CB, **6O6BW, 6W8BF, 6Y5AK** (125), **7Q7EQ, 7X2AH, 7Z3AB, 9H1s** AD (80) 16, Q (60) 11, W, **9J2s** GJ IE WR, **9K2AD** (35) 15, **9L1TL** (71) 18–19, **9N1MM, 9Q5s** AR (56) 20, PA(40)19, PN (88) 18, QR and TJ.

15 phone is a fertile field for **Ws** 3HNK 8YGR 8ZCQ, **Ks** 1QGC 3SLP 6OVF, **WAs** 2WIJ 4KXC 4QBX 4SRS 5IIS 6JOT 6VAT 6WTD 9BGK 9GZH 9IBT, **WBs** 2LDX 2MJD 2NHX 6CGL 6CWD 6KPN and 6LCS who reap a succulent crop of **CEs** 3CT* (408), 3DM* (432) 22, 3GA 3GM* (440) 18, 3GS* (410) 23, 3RC 4HL 4HP, **CO8s** CO YC, **CP8AM, CRs** 4AG (240) 20, 4AS 4BC 5SP (253) 18, 6BX* 6JT, **CT3AQ, CXs** 2GM* (398) 0, 3BH* (410) 16, 4AAQ* 4BI 5AF* (435) 22, 8AAW* (360) 23-0, 9PP* (410) 18, **DU1MR** (400) 1–2, **EA8CR, EI2AV, ELs** 2O (405) 18, 6E* (400) 17, F9RY/**FC***, **FG7s** XL* XW, **GCs** 2FMV (340) 11, 3KAV (340) 11, **HCs** 1JJ (440) 21–22, 1JQ 1SM 1WG 2EH* (388) 20, 2KG 7DO*, **HIs** 4ARM 8JXL* (434) 20, 8XHS* (447) 20, **HK0s** AI QA* (410) 22, **HRs** 1CP 1RP* 2ABC (444) 0, 9EB, **JAs** 1LPZ* 1MYR* 2CBZ* 2CMQ* 3COX* 3EMD* 4BEX* 4BFT* 5BDZ 6BI* 6DCE* 6GT* 7YT 8AZI 8PD 9AMW ØBFO, **KGs** 4AN* 4CI* 6APH* (400) 0, 6IG*, **KR6s** MB* (425) 0, MD*, **KS6s** BO* BQ (400) 23, **KV4CX*** (388) 13, **KW6EJ*** (400) 23, **KX6s** BQ* BU (400) 23, DB* DC* (400) 23, **KZ5s** AB* (400) 19, BE BI CT NS* (370) 20, SN, **LUs** 7DGM* (396) 23, 8DSF* (422) 23, **OAs** 4CS* (425) 23, 4J* 4MM* (392) 21, 6AM* 7Z* 8T* (386) 22, **PJs** 2CE 2CZ 2SD 3CD* (410) 16, **PY2s** CFM* (400) 0, CMS* (413) 16, **PZ1CM, SVØWO** (240) 20, **TG9DR***, **TI2AWL*** (445) 20, **TN8BK, TR8AD** (360) 17, **UB5KJE, VKs** 2AVY (240) 1–2, 2BKM* (390) 0, 8KK* (390) 0–1, 9TG* (425) 1, **VO1HR, VPs** 1IIB* 1WY 2AX 2GAC 2SM* 2SY 3AA* (422) 22, 3HAG* (380) 16, 4CP (290) 17, 4LE 4LF 4VP 4VT (360) 17, **7BI*** 7DD*, **VR4CN** (290) 3–4, **XEs** 1CF* (388) 22, 1DW*



*7862-B West Lawrence Ave., Chicago, Ill. 60656.





FR7ZI leads an obviously enviable DX life on remote Reunion island. When DX fishing is slow in his land-based ham shack Jan Jac sets sail in Alalila, a 32-ft. ketch well equipped as FR7ZI/mm, for visits to even rarer islands. (Photos via KØEZH)

1HD* (370) 21, 2PET 2ZO 3JL 0, YJ8BG (200) 2, YNs 1JOE 6HH, YSIs FSE RRD, YVs 1EE* (362) 16, 2IF 4MV*, ZDs 7GP* (410) 16, 7SE* (411) 17, 8BB* 8HL* (430) 17, 8JL* 8TV* (410) 17, 8PDR* (375) 16-17, ZE7JZ* (394) 16, ZLs 1AGO* (400) 1, 1AJD* 1CA (240) 19-20, 1RI (340) 19-20, 2UD (245) 19-20, 3FV 3JO* (225) 1, ZPs 5CN* (429) 22, 5EE* (431), 5JV 5KT* (400) 16, 9AY* (380) 22, ZSs 3BS* 4F* (395) 16, 4OI* 6NM*, 4X4BL* (412) 19, 5H3JR* (425)20, 5N2AAF (230) 17, 6Y5LT, 9HIR, 9J2WR* (410) 19, 9Lis JR* JW* MJ* (400) 18, WN (255), 9M4LX* (210), 9Q5s DL DM* (385) 18, DQ FB* (415) 18-19, GG (310) 18, RB, 9U5s IB and KU, the stars going for single-sideband senders.

15 Novice news survives the summer slack season well, WNs 1CGB 2PFD 3BSV 5KYH 7BOA 7BOB 9NSR and ØKDS coming through with CE3BQ, CX9PP, DJs 6SW 9GU, EL2AP 15, F2RW, HA3MA, HC2s RT SW, HI8LC, HKs 3RQ 7AMJ, HP1AC 23, I1BUD, JAs 1KSO 1MCU 3BCC, K5YXO/HI8, KH6FLN, KP4JM, KZ5s CU MEN, LUs 1AD 2DZ 6DI, OA4s NTJ PY, OE1GFW, OK2KGW, ON4NQ, PJ3CB, PYs 1CGU 1NEW 3AZ 3BOQ 4BO 5ASM 5AUC, SV1BK 15, UB5KIX, VK7SM, VO1AU, WA6YGU/KG6, WB2PXZ/VP9, WH6FPO, WP4s CCP CLB CLK COF, XE1s NL S SS (135), YO1IS, YV2FB, ZL1s AMO 1, HW (117) 2, IL, 5A3TT and 9Q5PA. Won't be long now until newer Novice generations have good shots at DXCC!

40 c.w. ought to stay in solid for years to come, enabling Ws 1BGD 1ECH 1YNE 3HNK 6TYM 7DJU, Ks 1MJC 5JVF 7WQO 8YSO, WAs 2FUL 3AZI 4KXC 4OYX 4SQI 5EID 5HJK 5IPM 6TGH 6WTD 8IJI 9BGK, WBs 2CUU 2JGI 2LDX 2MJD 2NLH 6BFR 6ITM 6KPN 6KVA 6MOS and 6NXK to catch more trophies like BV3HPT, CMs 2BD (20) 2, 2PI (15) 4, 6AV, COs 2EJ 2PY (10), CR7CI (50) 5, CT1UT, DMs 2ACC 2AJE 2AQL 2ASJ 2BCJ 2CEL 3PBO 3RXG 3VYO, DUs 1HR (5) 12, 6TY (10) 12, 9VL (4) 12, EAs 1GJ 7KE (12) 6, EIs 2AR 9AR, EL2AD, F2MA, FB8s WW XX, FG7XC (10) 11, FK8AT, GC2FMV (20) 4, HAs 1KSA 1VB (20) 3, 5DJ, HIs 3PC (10) 10, 8RVD, HKs 3AOW 3ASJ 3AV 4EX 5CR 7AMJ 7PH, HM5s BF CO CP (9) 11, CY (10) 10, IT1AGA, 54 JAIs, JAs 2AHT 2BLG 2BVS 2DCN 2DKI 2DWZ 2DXB 2DZS 2EDG 2ENG 2EUG 2EPZ 2EUZ 2FHG 2FMO 2PY 3AAL 3BFJ 3DAU 3DHH 3DPW 3EBL 3EMI 3FBG 3FDG 3FIP 3GBX 3GER 3HGL 3SL 4BIY 4BRV/3 4DMU 5ADR 5ALA 5AUO 5BEI 5BIN 6AK 6CDI/1 6CLO 6EBY 6EGL 6YB 7AAP 7ACM/mm 7ACP 7AEB/1 7AKQ 7AZL 7BEG 7BEO 7BEQ 7BVA 7BWT 7BYH 7CDY 7CLE 7KP 8AAA 8ADC 8BFT 8BKO 8BTJ 8BUX 8HB 8UX 9AAV 9AQE 9BAP ØASS ØBHJ ØBWD ØCCE ØDR ØHC ØSI ØVI, KA2KS, KC4USN (18) 11, KGs 4AM (17) 6, 6ALU (10) 11, KL7CYU 7, KM6BI (162) 6, KR6s FG (6) 11, NAG, KV4CX, LUs 1ACP/mm 2DAW 8DLK, LZs 1KDZ 1KRS 1KSD 2KBA, MP4TBQ, OA9VJ (160) 4, OEs 1GFW 3FS, PJ2AA, PYs 1CIP 4, 1MCY 5, 2CQ 6, 2GFK (20) 1, 2NE 4B1M (20) 3, 5OE (25) 3, 7ANQ (21) 3, 7PO 9, 7VKZ 8TK (9) 5, PZ1CM, SPs 3AKR 3KFR 4ATU (10) 3, 6ALD 9YP, SV1YY, TI2s RK WD/8 (15) 5, UAs 2BZ 23, ØEE (8) 11, ØER ØGF (8) 21, ØIZ (9) 12, ØKCW (10*) 12, ØKFG ØKZB ØKZD ØLS, UB5s ET KBA KJE KKM QS, UC2KSB, UR2IP 23, UT5DG (11) 0, UY5MU 0, VE8s NO (5), RG (15) 5, VKs 1QL 2AGI 2DN 2IO 2QL 2SA 3AKS 3JF 3MR 3SR 3RW 4ACW 4DP 4NO 4PK 4TE 4YP 5TC 9CJ (40) 10-11, VO1HQ, VPs 1WH (7) 2, 2SC 6BW (3, 20) 10-11, 7TA 6, 9BO (5) 9, 9BY 9EU (20) 15, 9FO (20) 6, VR4ED (11) 7, WB2OEL/KP4 (40) 3, WP4CNO (160), XE2s JS SS, YOs YUs and YVs in quantity, ZE2JS (18) 5, ZLs 1AQ 1HV 4GA (5) 12, ZS5JM (2) 4, 6Y5FH 11, 9Ms 4MT (20) 13, 6JW and 6LX . . . . . **Forty phone** slumped this summer, though WAs 4OYX 9BGK and WB6MOS ran across TG9EP, TI2QKX, VK3BM, XEs 1HE 2WU, YV5BRJ and ZL2WS, mostly single-sideband stuff.

80 c.w.'s DX days are numbered as sunspot activity increases but there still are hot seasons ahead for 3.5-Mc. DX diggers. W7DJU, Ks 2QBW 5JVF, WAs 8IJI and 9IXF scraped up DJ7LQ (6) 3, JAs 1CBF 1CEU 1BHG 1DSW 1FDF 1JUQ 1KAU 1LCU 2CIR 2DXZ 5TX 7ACM/mm 7XF 8BHK 9AMW ØRC, PY1BTX (3, 5) 3, VKs 2BCI 3AKN 3SR 3XY, YN4AB (2) 11, ZD8BC (15) 2, ZLs 1DI 3AAY 3ABV 3JD 3TM and 4GA . . . . . WA7AVI and friends foiled the static on **75 phone** for TG9EP, UC2DR, UY5ZA and ZL2LH (3892 kc.) 2, mostly using s.s.b.

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Next month, while we tabulate returns on other bands, we'll dwell on 20-meter developments with the aid of (c.w.) Ws 1BDI 1BGD 1ECH 1TS 1YNE 3HNK 7DJU 7VRO 8TRN 8YGR 8ZCQ, Ks 3SLP 5MHG 6STZ ØRHK, WAs 2WOR 3BAE 4CZM 4KXC 4QBX 5EID 5IJK 5IIS 5IPM 5JEY 6JDT 6JOT 6VAT 7BOA 7BOB 8MAT 9AQE 9BGK 9FMQ 9IBT ØHYG, WBs 2LNH 2LSV 2NLH 6CWD 6FRP 6ILH 6ITM 6KPN 6MEQ 6MWY 6NBU 6NXK, VE6AJC; (phone) Ws 3HNK 8YGR 8ZCQ ØPAN/KH6, K3SLP, WAs 2WIJ 2WOR 3BAE 4CZM 4QBX 4SRS 5IIS 5IPM 6JDT 6VAT 9BGK 9IBT, WBs 2LSV 6CWD 6ILH, s.w.l.s. W. P. Kilroy and L. Stewart, plus subsequent reporters checking in. Looks like a *jine* season ahead!

Where:

ASIA — KA2QX takes over as QSL manager at FEARL (M), and in that society's *News* we read, "Since the amateur world in general, and U. S. Forces Japan Fifth Air Force in particular, expect us to operate a QSL bureau for all KA stations, we're expanding our operation to do just that. We'll continue to distribute cards to FEARL members automatically, the usual FEARL service associated with membership. We'll also receive cards for non-members and will forward them if self-addressed stamped envelopes are provided. If not we'll hold them for six months and, if they're still not claimed, we'll have to discard them." . . . . . MP4TBO confirms, "My W/VE

QSL manager, VE1AKZ, gets my log each month for all North and South America QSOs." Roger, who himself once did QSL chores for MP4s MAB QAO and TAE, points out that all MP4T stations can be QSLd c/o P.O. Box 8, Sharjah, Trucial Oman, Persian Gulf, or via MP4-BBW . . . . . W1RAN declares that all HZ3TYQ/8Z4/-8Z5 cards were cleared via bureaus by mid-June. "I'm sending duplicates as requested until bureau distribution cuts off demand." . . . . . "The normal courtesy of return postage and self-addressed envelope is greatly appreciated," states VE3ACD, new QSL agent for 4X4TP. Mort also confirms VP2KD QSOs . . . . . W4BPD's contacts from 9N1MM may be verified through Hammarlund DXpedition, Box 7388, GPO, New York, N. Y. 10001, according to W8YGR and others . . . . . K3SWW/KG6 remarks, "I rate Japan's hams among the world's best QSLers although their bureau route is slow, some card exchanges taking six months or more."

AFRICA — Family illness curtails K7UCH's DX activities, so W7TDK takes over QSL obligations for ET3USA, FL8AK, 9E3USA and 9M2EF . . . . . ZD5R's XYL encourages the OM's DXing pursuits because it adds to her stamp collection. Not a bad arrangement to keep the peace in a DX man's family. (Quick, Jeeves, the commemoratives!)

OCEANIA — "The ZL1AEA, ZL2AEA, etc., series of calls is not available to amateurs in general. They are used for civil defense work," reveals ZL2LB, turning thumbs down on "ZM7AE" QSL possibilities. Bill runs NZART's bureau in Wellington . . . . . VK9WE of Papua promises W1TS thorough QSLing via bureaus when his blanks come through from Australia . . . . . "I have no KC6BO logs dating after September 10, 1963," reiterates W4YHD, "yet I continue to receive a number of cards for later KC6BO operation which I have to forward to Koror with consequent extra delay for the chaps who are awaiting their KC6BO QSLs. Cards for QSOs after that date should go directly to the station's *Callbook* address. I am current on replying to all cards received for my own QSOs from KC6BO (August 27 to September 9, 1963) and I still have logs for the period." . . . . . "I know several stations here on Guam who have no QSLs and I doubt if they will ever QSL," deplores 100-percenter K3SWW/KG6. "As for me, I try my best to make sure that everyone who asks for my card gets one." . . . . . "I'm QSL manager for DU1MR," announces VE4OX. "S.a.s.e., or s.a.e. plus postage, is a must." Don't glue down those U.S. stamps, either, for then they're of no use to Ed. VE4OX's four 9G1 QSL clients have all closed shop . . . . . YJ1DL throws doubt on the authorizational status of YJ8BG, testifying that the first and only legitimate YJ8 call is held by W6KG (YJ8YY) . . . . . "While I don't ask for s.a.s.e. or IRCs they are appreciated," hints K3SWW/KG6. "I QSL DX stations via their bureaus if they omit IRCs." Conrad nears the 3000-QSL mark outbound.

EUROPE — W4VPD has difficulty keeping the QSL record straight on his managership in behalf of I1TAI-IS1TAI-9A1TAI. Enos does *not* QSL for IT1TAI and IT1ZGY operation from their home stations, only for their DXpeditionary QSOs, the customary s.a.s.e., or s.a.e. plus International Reply Coupons, required . . . . . K7BFY learns from EA6AM that somebody intermittently pirates the latter's call. "Antonio is returning QSLs and IRCs for this spurious operation as fast as possible but it is difficult for him to explain the situation as he does not use English. Please pass the word along so those whose cards and stamps are returned will understand." . . . . . "Greenwich Mean Time *must* be used," cautions the West Gulf DX Club's *DX Bulletin* with reference to QSLs bound for PX1EQ (DJs 5PA 8EQ and DL9JL). Also s.a.s.e., or s.a.e. plus IRC, of course . . . . . W1YNE, QSL aide to SM6-AMD, schedules that station weekly for QSO data. "I do not understand why 75 per cent of cards received are not accompanied by s.a.s.e. My policy is to send radiograms via ARRL's National Traffic System requesting self-addressed stamped envelopes. If none is received, each QSL is simply forwarded to SM6AMD unanswered." . . . . . "I'm a solid QSLer who answers every card received," avers OE1FF, one of Europe's outstanding old-time DXers. "But I send out a lot of cards that are not answered, including many to stations who say 'you are my first OE.'"

SOUTH AMERICA — ARRL Assistant Communications Manager W1YYM hears from VP3YG: "During the last few years I've been noting receipt of many QSLs for unlicensed VP3 stations. I can only presume that quite a bit of pirating has been taking place. A recent check with B.G. licensing authorities discloses the following as the only legitimate amateur stations in VP3-land: VP3s AA AD BG CZ EFG ER FM GW HAG JB JR TY VN WM WO and YG." . . . . . K3SLP's results run counter to those described earlier herein by W1YNE. Bill says, "Out of about 250 QSLs received last week for YV5BIG/7's Margarita island June operation only 8 or 10 failed to supply s.a.s.e. or IRC. This certainly is a credit to the DX gang, both W/Ks and DX. YV5BIG's operating produces a flood of QSLs for me to handle, and I find clients most courteous and patient. They surely make the task lighter and more enjoyable." . . . . . As you probably have ascertained, the 4M and 5J prefixes are now occasionally employed by amateurs in Venezuela and Colombia, respectively . . . . . VERON's *DXpress* lists August 1st as the target date for clearance of all CE0XA San Felix confirmations.

HEREABOUTS — Fine crop of "QSLers of the Month" this month: CE0s AG XA, CT1MC, CXs 2GM 5AF, DU1OR, EA6AM, EI9J, EL2AE, ET3USA, GI3JIM, GM3s CHX JDR, GW3TKG, HB0AFM, HKs 3AVK 3RQ 0QA, HL9KB, HRs 1MD 2ABC, I1s MMG ROK, JAs 1ADN 1KFU 1MOH 2EFG, KGs 1BX 6AAY 6AIG, KH6OR, KJ6DA, KP4AXC, KR6s JZ MB, KS6BO, KZ5TV, LA5BA, LZ2KRS, MP4BCC, OA4KY, OD5BZ, PA0SNG, PJ2AA, TG9YM, UC2WP, VK9s NT TL, VO1CE, VPs 2LS 2SK 3AA 7NQ, VS6FF, VU2s GW NRA, WB2PXZ/VP9, XE1s FV YZ, XW8AZ, YAs 3TNC 4A, YN3KM, YS1RSE, YU2NZ, ZC4CZ, ZL1AJW, ZS6BKV, 5A3TX and 5H3JR, plus QSL agents Ws 2CTN 2GHK & Co., 2SNM 3HNK 4ANE 4DQS 8ZCQ, Ks 1IMP 3SLP 4KMIX 4WVX 9ECE 0RZJ and WA6OET, all sponsored by "How's" correspondents Ws 3HNK 8TRN 0GIL 0PAN/KH6, Ks 2MYR 3YYT 4MJT 6POC 6STZ 8YSO, WAs 2WIJ 3AZI 4CZM 4QBX 5HJK 6VAT 7BOA 7BOB, WBs 2LSV 2MJD 2LNH 6ILH 6KPN and J. Meirose for prompt production of pasteboards. Any candidates for this recognition in *your* files? . . . . . Help! W1JNV wants to run down VQ8AMR, W3HNK will settle for EP2AU, WA3AZI needs data on CO6JH, WA4-QBX hunts FY7YJ and KC6BK scoop, and WB6NBU yearns for UA0IE information. Any help? . . . . . VE2-BPT, Ks 2MYR 4MJT, WA9JDV, WB6s ITM and NBU offer their services as QSL helpers for overseas ops in need of such assistance. WB6ITM's new address: J. Morrice, Rte. 3, Box 171, Carmel, Calif., 93921 . . . . . WB6BSJ, managing EA3OT's cards, also took on TI2DX QSL duties as of June 20, 1965 . . . . . "Returns in QSLs are very disappointing," opines W8TRN, K2MYR agrees, commenting, "I am frankly appalled by the lack of interest shown by many DX stations in meeting QSL requests." . . . . . Oh, well, perhaps use of one or more of the following suggested addresses will help matters. Be advised that each entry is necessarily neither accurate, complete nor "official." . . .

CR8AF, Luis M. sa Lopes, Nova Ourique, Portuguese Timor
CX9AAK (via RCU)
DU1MR (via VE4OX)
ET3USA-FL8AK-9E3USA (via W7TDK)
F0AB (to ON5DO)
GB2YC, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
HB0XCV (to DJ6SW)
HR1CGT (via WA5CNP)
I1TAI-IS1TAI-IU1TAI-9A1TAI (via W4VPD)
JA1CJF, Y. Itoyama, 86-1 Horinoubi, Suginamiku, Tokyo, Japan
K6QXF/KH6 (to K6QXF)
KA2EE (via K7KID)
ex-KA3CY, Capt. E. Worrell, jr. (W3MIDI), Hq. U.K. Comm. Region, Box 832, APO, New York, N.Y., 09125
KC6BO (see preceding text)
KS6BN, R. York, Bendix Field Eng. Copr., 3131 Nimitz Hwy., Suite 210, Honolulu, Hawaii, 96819
LX1DO, P.O. Box 26, Esch, Luxembourg
OH0AB, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
PJ4AA, T. van der Hoeven, Maxwell St. 6, Aruba, N.A.
PX1EQ (via DARC)
PY4BIM (via LABRE)
SV1YY, 74 Syngrou Av., Athens 403, Greece
SV0WBB, 138th Ord. Co., APO, New York, N.Y., 09223
TI2AWL, c/o U.S. Embassy, San Jose, C.R.
TI2DX (via WB6BSJ)
TI2SLM, Box 4035, San Jose, C.R.
TI2WD/8 (via W2CTN)
VK9WE, W. Easterling, P.O. Box 56, Port Moresby, P.T. Aus.
VP2GL (via W5QMJ)
VP2MN (VK/ZLs via VK3AUP; others to W6FET)
VP7DL, Box 28, Nassau, Bahamas
ex-VR1B (to VK3IB)
VS9OSC (via RSGB)
W6FHM/DU1, B. Brunemeier, New Tribes Mission, Box 2570, Manila, P.I.
W0PAN/KH6, L. Shima, ComServPac Staff, Box 22, FPO, San Francisco, Calif., 96610
WB2PXZ/VP9, J. Marchitto, Box 3161, 1604th Svc. Sqdn., APO, New York, N.Y.
YS1FSE (via CRAS)
ex-ZB1A (now 9H1A)
ex-ZB1HKO (now 9H1W)
ex-ZB1RM (now 9H1R)
ZB2AM-VR1M-YJ1MA (via W1HGT)
ZB2AO (via RSGB)
ZD9BC (via ZS1VD)

ZP5CN, U.S. Army Mission to Paraguay, State Dept., Washington, D.C.
4M5A-4M7A, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
4X1DK, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
4X4TP (via VE3ACD)
5J4RCA (via LCRA, Colombia)
7G1Q (via W3ZBG)
9M2EF (via W7TDK)
9M4MJ, C. Mitchell, 17 Jalan Malu-Malu; Sembawang, Singapore
9M4MS, D. Mather, 8H-3, St. Thomas Walk (9), Singapore
9M4MT, F/Lt. H. Pain, 5 Eden Grove (19), Singapore
9M4MU, C. Ward, 11 Terang Bulan Av. (16), Singapore
9M4MV, Sgt. B. Aspinwall, 329A Bedok Rd., (16), Singapore
9M4MW, Ng Chian Soon, 74 JalanGirang (13), Singapore
9M4MX, W. Tennant, RAF Changi ARC, 84/3 Manston Rd., RAF Changi, Singapore
9M4RS, W/O-II J. Francis, RSAC, Keiktila Bks., Dover Rd. (5) Singapore
9M6AG (via W7PHO)
9M6BM (via W2CTN)
9N1MM (see preceding text)
9X5CE, P.O. Box 272, Kigale, Ruanda

Contributors of the preceding glossary are **Ws** 1BGD 1ECH 1TS 1UED 1WPO 1YYM 3HNK 3PVZ 4ANY 6AAO 7UVR 8YGR 9PAN/KH6, **Ks** 1AFC 1MJC 6KII 6STZ 8YSO, **WAs** 3AZI 4KXC 5EID 5HJK 6VAT 7BOA 7BOB 8MAT 9HYG, **WBs** 2BYF 2LSV 2MJD 2NLH 6LII, VE6AJC, L. Stewart, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Florida DX Club *DX Report* (W4LVV), International Short Wave League *Monitor* (12 Gladwell Rd., London, N.8, England), Japan *DX* Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2FGD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* (K1SHN, W1BPW), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif.), Ontario DX Association (VE3FXR), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU VDV WWP) and West Gulf DX Club *Bulletin* (W5IGJ). Ship a tip or two, OM.

Whence:

EUROPE — NRRL (Norway) welcomes world-wide participation in the 1965 Scandinavian Activity Contest scheduled for (c.w.) the period 1500 on the 18th of this month to 1800 the 19th, and (phone) on the 25th-26th, same times, on 3.5 through 28 Mc. Non-Scandinavians will *scare up* as *many* LA LA/p OH OHØ OX OY OZ and SM/SL stations as possible, swapping the usual RS- or RST001, RST002, etc., serials. Scores are calculated at one point per completed QSO, this total multiplied for final score by the number of Scandinavian band-prefixes collected (40 the possible maximum). Your log transcript listing date, GMT, station worked, serials sent-received, band and notation of each new multiplier claimed, should be submitted with a summary sheet to NRRL Traffic Dept., P.O. Box 6594, Rodelakka, Oslo 5, Norway, postmarked no later than October 15, 1965. Good chance to close in on such certifications as OHA, OZCCA, WALA, WASM, etc. See you on that North Atlantic path! . . . . . DARC's WAE DX Contest phone week end is slated for the 11th-12th of this month. See August "How's" for entry details . . . . . East Germany's 1965 WADM Contest, a c.w.-only deal, takes place from 2000 GMT the 2nd of October to 2000 the 3rd, on 3.5 through 28 Mc. Non-DMs will work DM stations, exchanging the usual RST001, RST002, etc., serials. Each DM may be worked once per band at 3 points per QSO, this total to be multiplied by the number of DM band-districts worked for final score (the last letter of a DM's call indicates his district, A through O, 15 possible per band). October 30, 1965, is the deadline date for entries mailed to Contest Bureau, Radio Club of the GDR, P.O. Box 30, 1055 Berlin, G.D.R. . . . . CT1UT tells WA8IJI of a need for 4-125As, so don't throw any away . . . . . Eight thousand of 11FO's 19 kiloQSOs have been with W/Ks. Sil began working DX 'way back in 1926, 11FO sticks to c.w. with a triband vertical fed by a 6146 at 100 watts or so . . . . . According to W1HGT, ZB2AM (G3JFF) will augment 7-, 14- and 21-Mc. c.w. doings with s.s.b. output soon. He formerly signed VR1M and YJ1MA . . . . . WA8MAT finds DJ2WY, visiting our shores, answering to the address 45-48 Auburndale, Flushing, N.Y., 11358 . . . . . *"For three years I've been trying to get a license* for Albania, but no dice," bemoans OE1FF, "I speak several languages fluently, so if some DXpeditioner needs company for a rare spot just let me know." Frank's travels around Europe as a musician cause him to miss a rare one now and then. W2SAW was a recent visitor to OE1FF's Vienna QTH . . . . . Via K7BFY: EA6AM, active mostly on 15- and 20-meter c.w., finally confirmed Wyoming but still needs Utah and Nevada for WAS. Anyone on out *there?* . . . . . W4VPD learns that IT1s TAI and LOP scored 1500 QSOs in their early-July stint as IS1TAI with a KWM-2, 2B and dipole atop a Sardinian mountain. IT1TAI would like to try his DX luck from Monaco but Italy as yet has no reciprocal licensing arrangement with that country.

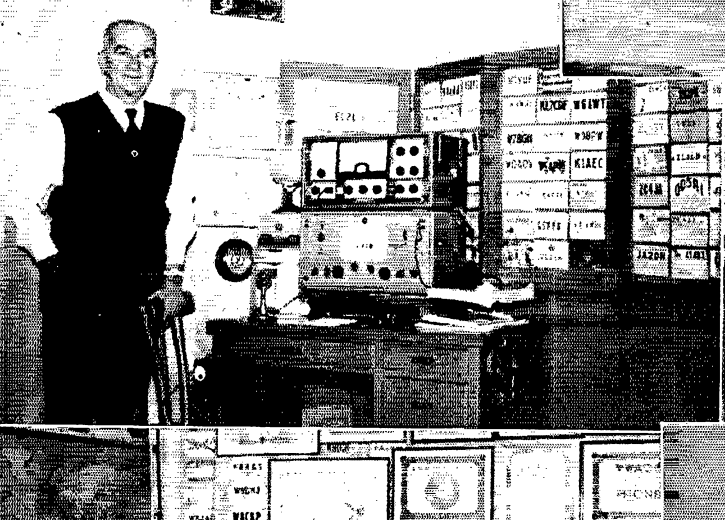
AFRICA — "Following a suggestion by 7Q7PBD, we are organizing a Mobile DX Activity Sunday for the 5th of September," goes notice from G3EPK in behalf of London's Amateur Radio Mobile Society. "Mobile amateur radio operators all over the world are invited to take part. To provide added interest in the event 7Q7PBD has offered to donate a handsome beer mug, suitably engraved, to be presented to the winner." This voice-only affair runs from 0800 to 2000 GMT and operation within ten kc. of 3740, 3880, 7040, 7230, 14,130 and 14,320 kc.; within 20 kc. of 21,350 kc.; and within 50 kc. of 28,550 kc. is recommended. For each mobile-to-mobile QSO with a station (a) outside one's own continent, 20 points, a 10-point multiplier for each prefix worked; (b) inside one's own continent but outside one's own country, 10 points, a 2-point multiplier for each prefix. Each mobile-to-fixed QSO with a station (c) outside one's own continent, 10 points, a 2-point prefix multiplier; and (d) within your own continent but outside your own country, 2 points, no prefix multiplier. Ships and aircraft count as fixed stations, W VE VK ZS and PY call areas count as separate countries. Multiply all QSO points by the sum of prefix multipliers for final score. Entries should be sent to Contest Manager, ARAIS, 95 Collinwood Gardens, Clayhall, Ilford, Essex, England, not later than September 20, 1965. *You* take the wheel, Jeeves . . . . . 5A3TX still does booming business at 2030 GMT, Sundays and Tuesdays, on 14,070 kc., according to W3HNK . . . . . EA2CA and TI2HP intend Ifni emanations around the middle of this month.

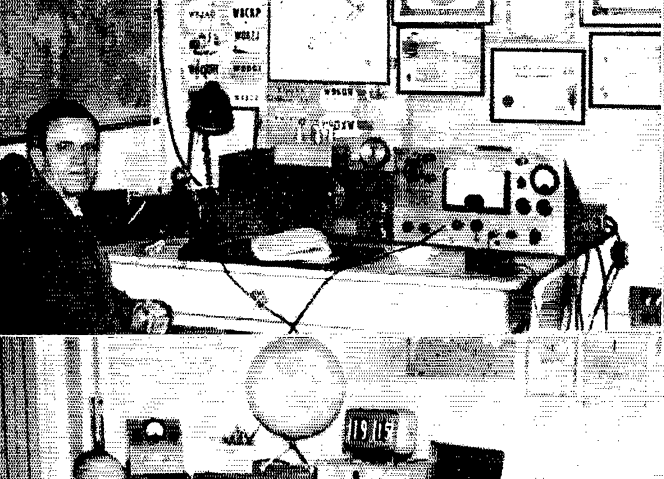
ASIA — Next "How's" we'll offer participation specs for the 1965 VU2/4/8/7 DX Contest jointly sponsored by ARSI (India) and RSC (Ceylon). The phone session comes off October 23rd-24th, the c.w. division on the 30th-31st . . . . . According to W1YYM of Hq., ex-OD5AX (W3ACE) lost little time hitting the air as EP3AM upon taking up duties as U.S. ambassador to Iran. He finds the Tehran ham population most friendly and courteous . . . . . MP4TBO of the Trucial Oman Scouts renewed activity last month with his KW-2000 transceiver and dipole on 14,050-14,060-kc. c.w., 14,250-kc. voice, and 7045-kc. s.s.b./c.w. When conditions are favorable Roger also tries 3798-kc. sideband, listening just above 3800, and he intends c.w. skeds with W6ULS on 7005 kc. "Others active here include MP4s TBA on c.w. and a.m., TBM and TBP on 14-Mc. s.s.b. At present I'm probably the most active Trucial Oman DXer." . . . . . W1TS mentions the 3000-QSO Asian collection of OT W2AIW . . . . . Check with The Beam, P.O. Box 46, Setagaya, Tokyo, Japan, for info on that club's certification for proof of QSOs with a certain 25 Asian prefixes . . . . . A UM8 QSL will give W8YGR all U.S.S.R. DXCC countries confirmed . . . . . W1RAN says W1TYQ returns to HZ3TYQ this month. Be alert! . . . . . Oddments from Japan: "On a month's trip to JA-land I found a great deal of ham interest," reports WB6BFR. "Many young students are active as well as old-timers. JA7ACM/mm is on a regular run from VK4 to Osaka and is widely worked." . . . Ex-KA3CY (W3MIDI), now stationed in England, helped work 71 countries from RAF's GB3USA during special July 4th activities with an HT-37, SR-150, 51J and TA-33. Everett indicates that a reciprocal licensing arrangement appears imminent. . . . WB6EPJ enjoyed a recent personal visit by JA1OXC. Unfamiliar with each other's lingo, Ray and Yasuji conversed successfully in Spanish. Beats *Q*-signals! . . . KA2EE (W4WNY) says, "I've been hanging around 14,025 kc. and I really enjoy those solid c.w. QSOs with the gang back home."

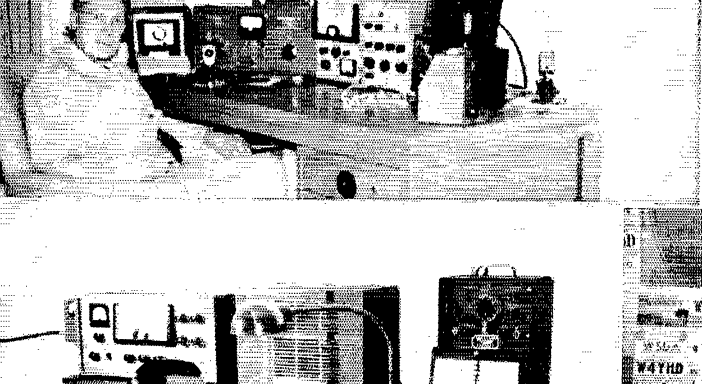
OCEANIA — YJ1DL signs in for some word from Espirito Santo: "I've been licensed since 1946 as VK4DL, VK2DE and ZC3AB. My current call dates from 1955. I'm very QRL with work although I have my own power source, rig and NC-303. I like DX tests but for the last three years I've had the misfortune of having to work right through the ARRL affairs, knocking off only a few

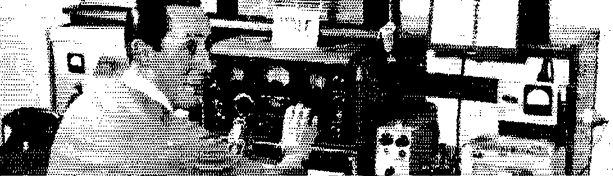
(*Continued on page 164*)

Italy was on the amateur radio map 'way back in the 1890s when the immortal Marconi began getting out of his back yard in sensational style. This month we journey to his homeland for photographic visits with (clockwise, beginning top left) I1s FO RIF AGI MAH, IT1AGA, I1s BNU BLF AB FT and TJD. I1MAH is Mrs. I1PPI. (Photos via Ws 1WPO 1YYM 5RU 7DJU 7QYA, K2UYG and WA2EFN)










WØPRZ W2WZ
W7HYW W9LHM
W4YHD W5TPC
W5VNL

1965 VE/W Contest Announcement

September 25–27

THE Montreal Amateur Radio Club invites all W and VE amateurs to participate in the 1965 VE/W Contest. This year the contest period will run from 2300 GMT Saturday, September 25 to 0200 GMT Monday, September 27.

The overall winner of the contest receives a handsome trophy, and a certificate goes to the high scorer in each ARRL section.

There are several changes in the rules for this year's contest so please read them carefully. It is felt that these changes will increase activity in and enjoyment of the contest.

In addition to changes in multipliers, Canadian geographical areas will be used instead of call areas. These areas are listed in the rules. The area called "Vancouver and Queen Charlotte Islands" has been arbitrarily created to equalize as nearly as possible the distribution of Canadian areas in order that stations in the western U.S. have a chance to compete with those in the East. VE8 has been broken into Yukon and Northwest Territories for the same reason. VE stations on the island of Vancouver or on the Queen Charlotte Islands sign "VQC." The city of Vancouver is "B.C." Awards to VEs will go to the winner in each ARRL section (not area).

How about more phone activity this year? It is suggested that phone stations look for each other near the following frequencies: 3810, 7210, 14,280, 21,400 and 28,600 kc. The highest phone only and c.w. only scores will be listed in the results.

All entrants are requested to follow the log format shown below. MARC regrets that preprinted log forms are not available from the club or ARRL. Come on, VEs and Ws, let's have more activity and more logs this year.

Rules

1) *Eligibility:* The contest is open to all amateurs located in the ARRL sections listed on page 6 of this *QST*. Multiple operator stations may enter, however their scores will be listed separately and will not be eligible for awards.

2) *Contest period:* All contacts must be made during the period from 2300 GMT Sept. 25 to 0200 GMT Sept. 27. Only 20 hours total operating time may be used in this period, however. Times on and off the air must be shown in the log. Time spent listening counts as operating time.

3) *Bands:* All bands and modes for which the participant is licensed may be used. A station may be worked once on phone and once on c.w. on each frequency band.

4) *QSO:* W/Ks will work only VE/VO stations and vice-versa. W to W, and VE to VE QSOs do not count. Valid points can be scored by contacting stations not working the contest if complete exchanges are made. The exchange consists of QSO number, RS or RST report, and ARRL section for W/Ks, geographical areas as listed below for VE/VOs.

5) *Scoring:* Count two points for each completed exchange. Incomplete contacts do not count. For final score: VE/VOs multiply: total points × ARRL sections × power multiplier.

W/Ks multiply: total points × Canadian areas × power multiplier × 20 (The factor of 20 has been arrived at by multiplying the ratio of U.S. sections/Canadian areas by the ratio of U.S. logs/VE logs received for the last two contests.

6) *Power multiplier:* All stations using power inputs of 200 watts or less during the entire contest use 1.5; all others use 1.

7) *Canadian Geographical Areas:*

Area	*Prefix*	*Abbreviation*
Newfoundland and Labrador	VO1, VO2	NFLD, LAB
Prince Edward Island	VE1	PEI
Nova Scotia	VE1	NS
New Brunswick	VE1	NB
Quebec	VE2	QUE
Ontario	VE3	ONT

(Continued on page 160)

VE/W CONTEST LOG 1965

Call....W4SVJ.... *C.W. or Phone*....C.W..... *ARRL Section*....GA.....
Power Input....150 W.....

Freq. Mc.	*Times On/Off GMT*	*Time of QSO*	*Sent (1 Point)*				*Received (1 Point)*				*New Sec. Wkd.*
			Nr.	*Station*	*RST*	*Section*	*Nr.*	*Station*	*RST*	*Section*	
14.050	on 2300	2300	1	W4SVJ	579	Ga.	1	VE2NE	579	Que	1
"	"	2302	2	"	589	"	2	VO1CA	589	Nfld.	2
"	"	2308	3	"	569	"	1	VE8MA	559	NWT	3
"	off 2313	2312	4	"	559	"	1	VE7AIC	549	VQC	4

Total Operating time: 13 min. Bands used: 14 Mc. Sec. 4 Points 8

Claimed score: 4 QSOs × 2 (points per contact) × 4 (different sections worked) × 1.5 (power multiplier) × 20 (ratio of U.S./Canadian sections by logs received during last two contests) = 960 points.

I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations, and I agree that the decision of the contest committee of the Montreal Amateur Radio Club, Inc. shall be final in all cases of dispute.

Signature..... Call.....

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ROBERT L. WHITE, W1WPO, DXCC Awards
GERALD PINARD, Club Training Aids
GEORGE HART, W1NJM, National Emergency Coordinator
ELLEN WHITE, W1YYM, Ass't. Communications Mgr.
PETER CHAMALIAN, W1BGD, Communications Asst.

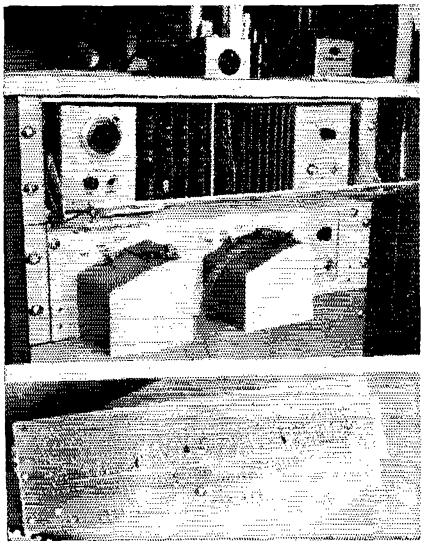
The superior man ranks *the effort above the prize*, and worthiness to be known above being known.
The superior man thinks of his character, the inferior of his position.
The superior man desires justice, the inferior, favor.
The superior man makes demands on himself, the inferior, on others.
The superior man is not concerned that he has no place, but rather that he may fit himself for one.
— *Analects of Confucius.*

THE prizes and certificates in amateur radio range from DXCC to BPL work and include, of course, the whole field of ARRL Appointments. The above precepts are a reminder that ones standing or quality in amateur radio depends on how we play the game, our dedication and sincerity of performance, *not merely* the certificate that the League or our SCM awards in *token* of accomplishment.

ARRL Patterns; for Service and Recognition. Station and leadership appointments are available from SCMs to those who qualify. Awards such as those in the Code Proficiency, WAS, and DXCC programs and in the spot activities that are operating highlights, each year, all should be regarded as stepping stones, special objectives to help us fit ourselves to live the most rewarding amateur lives. To give your station status and get recognition get in the swim! Our Public Service Corps has a traffic (NTS) division and an emergency (AREC) division; whether you work phone, c.w. or RTTY, whether you're Tech. or Extra Class, there's an appointment for you and a place in these dedicated operating groups. To help you find it send a postcard or radiogram for our (gratis) booklet *Operating an Amateur Radio Station*. Become identified with the appointment, v.h.f. or h.f. that best fits you.

September Activities. All amateurs are invited to follow the Activities Calendar presented in these pages each month during the year to make sure you do not miss any of the spot activities which are given special announcement in *QST* throughout the year. We give the dates of our activities for some months ahead. This month for example, you will see that there's an ARRL Frequency Measuring Test (Sept. 9th) open to everybody who looks for W1AW and sends in his results. Also the week end of the 11th–12th there will be another V.h.f. QSO Party. There are code-qualifying runs from W6OWP Sept. 3rd and W1AW Sept. 17th. Since all time-and-date information is in Greenwich (by Board order) remember, if you will, to look for these Thursday evening Sept. 2nd and Thursday evening Sept. 16th.

New W1AW Features. There has been a marked step up in visiting at W1AW since the first of the year. During June and July the guest register shows we topped the 100-per-month record. A greatly enlarged operating room has light-



One of the features that makes most W1AW visitors bug-eyed is a demonstration of the especially modified 660A teleprinter-to-Morse converter, presented to us by Vic Poor, K3NIO, and Frederick Electronics Corporation. This takes five-level teletype Baudot tape and turns out eloquent code without any intermediate conversion. The input time base is crystal controlled and the unit has two tape readers so there can be, when desired, automatic transfer from one to the other. The equipment permits a "combination key" to fashion almost any special code combinations to be punched. Vic also overcame our reluctance to abandon our long time special character spacing (for 5 and 7½ w.p.m. at a character rate of about 15 w.p.m.) by redesigning some of the modules and circuit boards to properly trigger the character release of the sending device so this is still possible! Someone took some additional time and figured out that the unit has 225 transistors, 171 capacitors, 929 diodes and 1156 resistors! Each of those circuit boards contains over 100 diodes with the largest containing 160.

ing and air-conditioning in every way equal to the standards of the new Hq. offices. Entrance is through a new memorial lobby that displays the 1AW of the spark days. There are three separate rotary beams and a variety of other antennas, some with remotely controlled transmatches. Any particular antenna may be connected through an antenna switching center to equipment in the two consoles, or to the add-a-racks, or to the TMC SBT-1K transmitter, a gift from the Thorne Donnelley, (W9PZ-K7KYV-K7LJA) estate. Both consoles have occasionally been in use at the same time. As equipment has been reinstalled, we have been able to announce expansion of W1AW services to six bands. More installing of some new final amplifiers will still be in progress during these fall months. We're most proud of the fact, however, that by operating from a basement position during the transition, full service to members both through bulletins and code practice was maintained. Please note elsewhere in these columns the frequencies and times for bulletins for the two daily sessions of tape-sent code practice so as to make full use of these services. As mentioned last month, we have expanded the number of code practice runs in response to requests for this.

OBS Service and RTTY; Radioteletype OB's Start Sept. 6th from W1AW. Each of the 74 ARRL Sections may have ten to fifteen SCM-appointed Official Bulletin Stations. These disseminate the hot news of the amateur world in transmissions addressed "to all amateurs," a way of using our amateur radio to beat the printed word. SCMs (address p. 6 *QST*) will welcome more such member-stations to add to the present roster of some 425 stations that agree to send the bulletins three or four times, at least, each week. Bulletins are sent on agreed upon schedules. *Service* is the criteria for appointment. Especially welcome are more OBS applicants who will cover the v.h.f.'s and RTTY. SCMs favor higher power applicants for h.f. band coverage, of course. There are several OBS already who use RTTY, but stations are desired that might transmit on any RTTY net that does not now have such coverage to reach those who operate most by this mode.

RTTY enthusiasts will be glad to note *a new W1AW service* starting with this fall season — radioprinter bulletins! W1AW official and special bulletins will be sent at 60 w.p.m., 850 cycle shift. The transmissions will run per the following schedule. Note that this is starting 15 minutes before our mid-evening code practice, and again 15 minutes before our midnight-EDST c.w. bulletins. For the present we'll use "80" and "20" alternately. The OBS messages will follow a call up of about 3½ minutes:

Sun.	(GMT)	3625 kc. 0345 GMT
Mon.	(GMT)	14095 kc. 0115 GMT
Tues.	(GMT)	3625 kc. 0115 GMT and 0345 GMT
Wed.	(GMT)	14095 kc. 0115 GMT and 0345 GMT
Thurs.	(GMT)	3625 kc. 0115 GMT and 0345 GMT
Fri.	(GMT)	14095 kc. 0115 GMT
		3625 kc. 0345 GMT
Sat.	(GMT)	14095 kc. 0115 GMT
		3625 kc. 0345 GMT

N.B.: Sun (Greenwich) is Sat. evening, U.S.A.

Pre-SET Success in N.J. The SCM (W2CVW) passes along some useful observations for

FREQUENCY MEASURING TEST

SEPTEMBER 9

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0130 GMT, Sept. 9. *CAUTION:* Note that since the date is given in Greenwich Mean Time the early run of the frequency measuring test actually falls on the evening previous to the date given. *Example:* In converting, 0130 GMT, Sept. 9 becomes 2130 EDST Sept. 8. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3505, 7060 and 14,047 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0136. It is suggested that frequencies be measured *in the order listed.* Transmission will be found within 5 or 10 kc. of the suggested frequencies.

At 0430 GMT, September 9 W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3512, 7020 and 14,065.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on overall *average* accuracy, as compared with readings made by a professional lab.

other good organizers who may find an *advance* Simulated Emergency Test useful ahead of the national exercise in October. He thanks a score of his ECs and ROs and the managers of NJN, NJPN, 2RN, NJ 6 & 2, ESS and NYC-LI Phone Nets for their extra effort and hours of operation in his May test. SECs and SCMs in sections that might have a pre-SET in September should work out detailed instructions for each *group* in the exercise to assure starting the fullest volume of meaningful test traffic; ECs with imagination should set the pattern for others and each file a fistful. Each test should establish a full working together of AREC and NTS personnel

P—P–R

By: James (Doc) W. Thomas, M. D. — K5HRR

NEWSPAPER reports profanity on the air by an amateur; city tells amateurs to remove antenna; indignant citizens demand amateur to stop TV interference, and on and on and on. Fighting back, the amateur proves the TVI is not his responsibility, later it's proved the profanity did not come from an amateur, but the damage is done and away we go on another merry-go-round.

This involvement of amateur radio in the field of press and public relations is like the old saying of the "pot calling the kettle black" or "clean your own house before telling others how to clean theirs." The moral, or point, is quite clear and simple: Amateur radio has reached a crossroads. It can proceed as it is or it can take a long critical look at itself and take stock of its position, which in many areas falls short of amateur ideals and traditions. A definite goal needs to be programmed.

Every amateur must take a share in the over-all responsibility and constantly strive for improvement and efficiency while on the air, as well as displaying a helpful and understanding attitude toward complaints and derogatory remarks directed toward them. A large part of John Q. Public still thinks that anybody with a big antenna or whip on his car is "some kinda nut" and it becomes quite natural for these antiquated opinions to foster new life when an amateur uses bad technique or improper language while transmitting, or to ignore or be unconcerned about a citizen's complaint of interference.

It is a pity that all newspapers are not front pages and all reporters are not mind readers, or that every deed by an amateur is not an Alaskan Earthquake or Hurricane Carla operation, then there would be no press problem. Where have we gone wrong and what can be done about it? Could it be the lackadaisical attitude in the past setting such patterns as the lack of proper reporting or lack of news sense? The majority of newspapers are and will be fair minded when presented with factual and newsworthy material, presented in the right manner. This does not mean that we should expect page-one coverage on club meetings and other events, but it does mean that even a club meeting, when properly written and presented can be newsworthy. Do not expect the newspaper to send reporters and photographers to cover a story with all the trimmings, neither should they be swamped with different accounts from every individual about the same story. The better approach would be to submit well written factual reports with pictures, if available, that would be interesting to the reading public, before the newspaper deadline. Races, field test, meetings, events and any number of other items of interest can be made interesting when written properly. So: we have a good report, but it is not used, and repeated efforts fail, then it is time we took a closer look at our public relations.

Hard work is usually considered a prerequisite to success and if amateurs everywhere were to concentrate on advancing the standards of communication so it will be a greater service to the general public, all aspects of amateur radio would vastly improve. Take time to explain that amateur radio is a public service, take every opportunity to go before local groups, put on demonstrations at fairs and shows and get into the act by being there, losing no opportunity to tell the amateur story. Work at the problem, forgetting the pronoun "I", using "we" and "our" instead. By using human interest, and proving to the public that our services can be invaluable, that our work is primarily in their interest, that this is not solely a hobby, then and only then will public relations improve and John Q. Public will try to help us with our problems, and be the first to come to our defense when the chips are down. (If any amateur needs proof that his license is for service rather than a hobby, let him read the regulations.)

This acceptance of individual reponsibility will, in time, create a new school of thought surrounding our activity. After all, would it not be a pleasure to overhear two people airing a complaint and one say, "Oh, no, it couldn't be done by an amateur, it had to be one of those untrained, irresponsible . . . . . , those amateurs are like the professional broadcasters." So, no matter if you have been hamming 20 years or just bought a new transmitter, let's all shoulder up to our share of the responsibility and clean our own house, then it will be easy to help others to clean theirs. Only then can PRESS and PUBLIC RELATIONS improve and reach an all-time high. QST

C. D. ARTICLE CONTEST

A new Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 800–1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1965 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map. Our September winner, Dr. James W. Thomas, K5HRR, has chosen public relations as his subject, and the article appears above.

For those who might otherwise say that NTS handlings are not always speedy, let us quote W2CVW as to its values. "Any such minor deficiency is outweighed by the National Traffic System's *daily dependability* which was evidenced in our pre-SET. I thought I would get the jump on NTS (by another routing). Because of poor propagation, noise and general confusion this did not work. EAN cleared me into CAN and Tenn . . . The case shows the beauty of the NTS section-region-area organization, available to meet all circumstances whether due to propagation troubles or traffic load. A direct contact may on occasion give speedier delivery, but NTS is there when things get rough: direct contact is more called for to take NTS overloads *if* a station is available and under good conditions.

Code Proficiency Certificate Issuances (Jan. '65-June '65) Letters of honest appreciation for the efforts in running a 'proficiency' schedule continue to come to ARRL in surprising numbers. *It gives us pleasure again to report the calls of all those achieving the full* 30- *and* 35-*w.p.m. certifications* in this League program Over 46,000 different persons have now been certified! The practice tapes start at five words per minute, certifications on the monthly runs at ten w.p.m. 71½% of the 3,000 submitting copy last year "made it" at 10- and 15-w.p.m. With the impetus of Docket 15928 the number of copies aiming at the higher speeds is picking up! We invite anyone interested to copy a W1AW or W6OWP monthly qualifying run. Send in and mark the 'perfect copy' for at least one full minute. There are endorsement stickers, for each progressive step above your 10-15-20-25- or 30-w.p.m. *initial* certified speed. This month we want especially to commend those who have won certificates and endorsements at the 30- and 35-w.p.m. levels.

ARRL certified at 35 w.p.m.

K1DZG	WB2JWS*	K6GMA	W8CRM	KØWWL
K1GAX*	WB2MKD*	WB6IWS*	W8CWS*	VE1YQ
W1MFJ	W2RF	WB6MGC*	WA8GYT*	VE2ZK*
W1WAJ	K3JEL*	WA6PMW*	K8VFR*	VE3CKU
K2BVS*	W3NWB*	W6QNJ	WN9LNS*	VE6BR*
K2BZX*	K3WWP*	W6VNQ	W9PQO	VE7AC*
WB2CFV*	WA4FNQ*	WA6WTX*	W9QQQ	VE7BAW*
W2CPE*	W4GYP*	W6YHT*	K9ZMS*	HB9XJ*
WB2DRB	K4SCL	W7DNL	WØDAK*	KZ5TD
K2EIU/5*	K4TKM*	W7GYF*	WØMBY	VP9CX
WB2GMN*	W6ECP*	K7TLD	WØVBE	

ARRL certified at 30 w.p.m.

K1FQT*	WA2VWI*	WA4SSB	K6KA	WA8OHX
K1SLJ*	K3BSY	K4TKM*	W6RT*	K8TDJ*
K1VMQ	W3EEK*	K4WOP*	K6TWE*	W8ZJY
W2CPE	K3HLC*	W4YAU*	W7AWH*	W9ETM*
WB2FNX	W3LBC*	W4YOH	WA7BDF	W9IZR*
K2HWI*	K3LCK	W5BUE	W7BKK	WA9MMT*
WB2HYA*	K3NJW*	WA5GHF*	W7QHE*	K9OHI*
WB2JGD*	W3NWB	WA5HNN	W7UXP/1	K9YNG
K2LBB/ W3NT*	W3PLK*	WA5IIS*	K7ZPM*	WA0CXI*
	K3RIW/3*	WA5IMU	K7ZUP*	KØJAU
WB2LZF*	WA4BRS*	WA5KAJ	WA8BQK*	KØZPZ/
WB2MKD*	W4DR	K6AVR*	K8CPQ*	WØEMA*
WB2NDS	WA4IWO*	K6CB	W8CXM	VE1AJT*
K2RQT	WA4MKG*	W6ECP	WA8HVR*	VE2BRD*
K2SNZ*	WA4NBT*	WA6HAI*	K8INA*	VE3DQB*
WA2TGL*	K4RNH*	WA6JSA*	WA8KUW*	VE3FOV*
WA2THY*	WA4SRS		WA8LKC*	

Joe S. Dickerson, Fort Allen, Ponce, Puerto Rico: Darrell Gagnon, Flagstaff, Arizona; John F. Imsand, Palo Alto, California.

* Endorsement sticker.

On the Matter of Learning the Code All those who can presently copy but five to seven w.p.m. should listen regularly we think, not only to the slowest code speeds but also to practice definitely *faster than their copying ability*. We're inclined to believe that many who feel they aren't gaining speed are simply not practicing enough at speeds that initially are well over their heads. Learning code is in part a matter of getting practice in speeding up the mental ability to correlate what is heard with what is written down. Practice, and more practice is the surest road to code success. Use of one's code on the air is the happy way to get results at the same time we gain proficiency.

The same principle should require those who hope to pass a 16 w.p.m. test to be able to take down the 20 w.p.m. runs successfully. Those going for 20 w.p.m. should, we think, assure themselves of their ability to follow the 25 w.p.m. speeds. Only in this way can one be assured of the ability to surmount any slight nervousness when in the presence of the representatives of the FCC or DOT —*F.E.H.*

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for June Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	81	1979	1900	79	4039
W3CUL	271	1349	1156	173	2949
W7BA	8	1459	1350	105	2922
KØONK	193	1020	972	32	2217
WØLGG	10	1107	983	41	2141
W7DZX	12	844	762	45	1663
WØOHJ	26	557	540	17	1140
K5TEX	5	566	532	9	1112
K6EPT	28	517	365	152	1062
W1PEX	204	424	346	42	1016
WA2RUE	30	511	443	29	1012
W9JOZ	35	473	472	1	981
WA9CCP	33	468	419	9	929
K7TCY	6	443	368	69	886
K9IVG	14	405	359	8	786
W3EML	25	407	317	6	755
W4KIS	14	344	329	15	702
W6VNQ	127	216	350	9	702
WA4BMC	149	102	104	14	669
K6YVN	8	329	309	21	667
K7TWD	9	311	241	70	631
W6R8Y	36	288	188	93	605
W4TUB	8	296	286	7	597
WA9FKD	39	275	258	11	583
W3VR	64	256	241	6	567
K6IWV	2	282	268	14	566
WB6BBO	53	278	230	3	564
W1BGD	25	243	202	78	548
WB6JUH	152	189	150	39	530
WA4RQR/9	123	200	195	3	521
Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6WPF	12	254	223	31	520
K9KZB	18	214	224	20	506
K2KQC	7	247	238	11	503
W6GYH	181	161	157	2	501
Late Reports:					
W4NTR (May)	75	280	228	47	630

More-Than-One-Operator Stations

W6YDK	6254	634	545	87	7520
W6IAB	785	1524	1200	414	3923
W4LEV	36	864	807	57	1764
K6JCC/6	1287	0	0	0	1287

BPL for 100 or more *originations-plus-deliveries*

W7APS 189	WA9GJU 115	W9NNZ 104	
W2OE 128	K3ZYP 114	WA9EBT 103	
WA8FIC 123	W1TXL 112	K4SJH 102	
WB6GMM 118	W2EW 108	Late Reports:	
WA8IMY 118	WA4LHK 104	WA9CCQ (May)	121
WA5INZ 116	W4RHA 104	WA4PDS (May)	101

More-Than-One-Operator Stations

KR6D1 271	W5QEG/5 201	KR6MH 112
	W4NTR 114	

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: K2KQC, K3ZYP, WA4LCH, WA4NEV, WA4OAO, K5DLP, WA8DFT, K8TFE, W9YHZ, K9GSY.

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.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Sept. 17 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Sept. 3 at 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT Sept. 17 becomes 2130 EDST Sept. 16.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 0130 and 2330 GMT, simultaneously on all listed c.w. frequencies. At 0130 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sunday, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 2330 GMT daily, speeds are 10 13 and 15 w.p.m. The 0130 — 0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130-0220 GMT practice on those dates:

Date Subject of Practice Text July *QST*.
July 8: *It Seems to Us*, p. 9
July 14: *A Slow-Scan Vidicon Camera*, p. 15
July 23: *The Anatomy of Public Service Communications*, p. 26

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
July 27: *Plate Efficiency*, p. 32
July 29: *Making Tubes Work*, p. 33

W1AW SCHEDULES

Operating-Visiting Hours

Monday through Friday: 7 P.M.–1 A.M. EDST.
Saturday: 7 P.M.–2.30 A.M. EDST.
Sunday: 3 P.M.–10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent on request. The station will be closed Sept. 6, in observance of Labor Day.

Operating Frequencies

RTTY: 3625 14,095
C.W.: 1805 3555 7080 14,100 50.7 145.6
Voice: 1820 3945 7255 14,280 50.7 145.6

Frequencies may vary slightly from round figures given, they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

RTTY: 0115 GMT TTh,; 14,095 MWFSat. 0345 GMT Sun.TThFSat.; 14,095 W.
C.W.: Mon. through Sat., 0000; Tues. through Sun. 0400.
Voice Mon. through Sat. 0100; Tues. through Sun. 0330.

Caution: Note that in the U.S. and Canada bulletin hours nally fall on the evening of the previous day by local time.

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

During July the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1DGK	W5BUK
K1RYT	WN5LFA
W1VCE	WB6ADY
WB2GMU	WA6UUS
WB2OTT	W8FX
WN2SLI	HZ3TYQ
K2VNL	KH6EPW
WA4AVM	VE3CYR
WA4CTT	VE3DRF
K4KCB	GUS

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are in GMT)

Sept. 3: CP Qualifying Run — W6OWP
Sept. 9: Frequency Measuring Test
Sept. 11–12: V.H.F. QSO Party
Sept. 17: CP Qualifying Run — W1AW
Oct. 7: CP Qualifying Run — W6OWP
Oct. 9–10: Simulated Emergency Test
Oct. 16–18: CD Party (phone)
Oct. 16: CP Qualifying Run — W1AW
Oct. 23–25: CD Party (c.w.)
Nov. 5: CP Qualifying Run — W6OWP
Nov. 16: CP Qualifying Run — W1AW
Nov. 13–15: Sweepstakes Contest (phone)
Nov. 20–22: Sweepstakes Contest (c.w.)

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Sept. 11–12: WAE phone, DARC (p. 83, last month).

Sept. 18–20: Eighth Pennsylvania QSO Party, Nittany, ARC (p. 112, this issue).

Sept. 18–19, 25–26; Scandinavian Activity Contest, SSA (p. 102, this issue).

Sept. 20; W1EIA High Speed Code Test, C. W. A. (p. 57, this issue).

Sept. 25–26: W/VE Contest, Montreal ARC (p. 101, this issue).

Oct. 2–3: WADM (p. 102, this issue).

Oct. 2–3: Massachusetts QSO Party, M.I.T. Radio Society (p. 132, this issue).

Oct. 2–3, 9–10; VK/ZL Oceania DX Contest, NZART and WIA (next month).

Oct 23–24, 30–31: VU2/4S7 Contest, ARSI and RSC (next month).

Oct. 30–31: New Hampshire QSO Party (next month).

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through June 30, 1965.

W1FH.....313/339
W4DQH....313/337
CX2CO....313/334
W2AGW....313/337
W3GHD....313/337
W1GKK....313/338
4X4DK....313/331
W8PQQ....313/330
G2PL.....313/336
W9RBI....313/338
W2TQC....313/332
W8BRA....313/336
W8UAS....313/334
W8JIN....313/338
W6CUQ....313/338
W7GUV....313/336
W8EWS....313/337
PY2CK....313/336
W8HGW....313/338
HB9J.....313/337
W4GD.....313/334
W2LV.....312/331
W2JT.....312/331
W2BXA....312/336
W2LPE....312/333
W8BF.....312/333
W3KT.....312/336
W9HUZ....312/332
W8MPW....312/330
W1JYH....312/335
W6YY.....312/332
W9NDA....312/336
W9YEV....312/336
W7PHO....312/330
W4QCW....312/329

W1BIH....312/336
W2ZX.....312/331
W8KIA....312/336
G3FKM....312/329
W0DU.....312/334
W3GAU....312/335
W6AM.....312/337
W0QVZ....312/333
W4AIT....312/335
G4CP.....311/335
G3AAM....311/335
W8DMD....311/333
W3LMA....311/333
W2SUC....311/328
W2BOK....311/328
K3UPG....311/335
DJ1BZ....311/379
DL3LL....311/327
GE3AG....311/335
W1CLX....311/334
W5MMK....311/332
W9LNM....311/334
W8KML....311/332
W8JBI....311/330
W4ML.....311/331
W3JNN....311/335
LU6DJX...311/335
W0A1W....311/334
W5KC.....311/334
W5CKY....311/330
W8LKH....311/331
W6EBG....311/336
W6GPB....311/332
W5AFX....311/336
W7GBW....311,335

KV4AA....310/334
W2DEC....310/326
W1ME.....310/333
OE1ER....310/332
K2DCA....310/327
W5ABY....310/327
W0BFB....310/328
W0ELA....310/333
5Z4AQ....310/328
VE7ZM....310/334
W4OPM....310/325
W4LYV....310/330
K2BZT....309/326
G8KS.....309/327
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W5UX.....308/323

W0SYK....308/326
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W2FZY....308/321
W4PLL....308/323
DJ2BW....308/325
K6EVR....308/325
HAMU....308/327
K6ENX....308/325
W3JTC....307/330
W2FXN....307/321
W8IRN....307/325
W4GXB....307/328
G3FXB....307/325
W3WGH....307/322
K2LWR....307/320
K4AIM....307/321
W5OLG....307/328
W4MR.....307/327
DL6EN....307/322
W2SSC....307/323
W2HTI....307/322
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W4OM.....307/329
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W2NUT....306/322
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W4DQH....312/334
W2ZX.....312/331
5Z4ERR...311/333
W6YY.....311/331
PY4TK....311/328
W8KML....310/331
W1FH.....310/331

W2JT.....310/324
W9JJF....310/327
W3JNN....310/331
W0AIW....310/331
W8PQQ....309/322
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W6AM.....307/313
HAMU....307/326
W4QCW....306/319
ON4DM....306/325
G3FKM....306/320
TI2HP....305/327
G2PL.....305/325
W9NDA....304/324

K4AIM....304/318
DL3LL....304/320
G3KS.....304/318
W3KT.....303/322
K4TJL....303/312
W0QVZ....303/318
W2HTI....303/318
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New Members

From June 1, through June 30, 1965, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

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W2BQM....300
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K2QDT.....111
K3LJP.....111
WB2CDZ...110
K9KKU....110

W3A4QBX...107
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ZS5BA.....102
K7PFU.....101
W7QB.....101
PA0BZH....101

5B4JF.....101
K1CEC.....100
WA2LGX...100
K3AHN.....100
WA4RAK...100
W5AKI.....100
WA6NON...100

W8QXP....100
K7KBN....100
WA8EZW...100
WA9AIB...100
VE7BEA...100
HM1AP....100
SP8ARY....100
ZS6BL.....100

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K6KII.....153
DJ2ZJ.....147

KH6FJL....122
ZS5TC.....113
HB9US.....112

WB6AJH....108
K8RDE....105

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W1BGW....300
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G3HCT....300
G3HDA....300
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W4IKL....265
W4HKJ....262
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W6PLK....260
VK3AHQ...260
W8KSR....252
K6EXO....241

LA5YE.....241
DJ3BB....239
W9LIU.....233
K1IGQ.....231
W1YYM....230
W2CZF....230
K0IKL.....230
VE3AGC...230
W5ACL....229
W4VMS....222
WA5CBL...220
K8VUR....217
OH5UQ....213
K4RZK....210
W9QON....210
WA2NWW..209
K4CLT.....204
K9JJR.....203
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W0WRO....201
VE3DDR...201
K4ISV.....200
K8AJK.....200
OK1MP.....200
W0NGF....199
DL3AR.....199
K4YFQ.....195
W1BPY.....191
W0CKC....191
W2FLD.....190
K2KBI.....190
K2YMD....190
W5LJT.....190
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W1QQV....171
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W2AAU....167
K2LBB.....164
VE3EUU....164
DJ0KQ....164
W7TDK....162
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W6GSV....160
W6RGG....160
W8LZV....160
W4VWW....152
K5GOT.....151
W7NNF....150
W0PAH....150
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OZ1TL.....142
K7CVL.....141
K9JJS.....141
K2AFY.....140
W4DVT.....140
K4YYL.....140
W7OEB.....140
W9MAK....140
K9TRP.....140
DL5DU....140
ZE1BK....140
F8SM.....136
VV2AH....136
W1RLV....134
DJ4VU....133
W3ZAQ....132
JA8GR.....132

WB2AYU...131
K7CAD....131
WA2HJF...130
W2TKG....130
WA2ZKO...130
K3MCO....130
WA8GUN...130
W7NPU....128
DL4GS....127
W3GQF....124
SM5ARQ...121
K4LRX....120
WB6CFO...120
K8BPX....120
W9FRS....120
DL0BT....113
K4GSX....110
W4RZN....110
K9DWG....110

Radiotelephone

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WA2IZS....290
W1HX.....283
W4RLS.....274
HJUA.....271
G3HDA....260
W4PJG....250
E3DJ.....250
LA5YE.....241
W4HUE....233
EA1GH....232

W4HKJ....222
W4ESP.....221
EA4GZ.....221
W2CZF.....220
WB2FSW...220
W8EVZ.....220
W7QPK.....213
K8VUR.....211
W6USG.....203
W3BSC.....201

W4NI.....201
W0QUU....200
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DL5AO.....190
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K4CAH.....171
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K9JJR.....170
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W2FXA.....160
K8AJK.....155
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W9QQN....152

K5GOT.....151
W6TGB....150
W9JT.....150
W1EJ.....149
W2EVV....148
K8AXG....145
K4CLT.....143
K3HHY....141
K9JJS.....141
K9TRP.....140

W1BAB....139
K4FA.....134
W6ABA....133
W5LGG....130
K8GOP....130
HJUA.....130
W0PNQ....125
W4UAF/KH6
.....114
W2RIR.....110
WA5KBK...110

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. PAM: W3CFA, V.H.F. PAM: K3OBU. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1800 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Dover 6 and 2 meets Wed. on 50.4 Mc. at 2000 local time. Kent County Emergency Net meets Sun. on 3905 kc. at 1300 local time. Renewals: K3YZF as ORS; K3GKF as OBS. W3HKS was in Nicaragua for the month of June. W3TGF is back in Delaware after living in near-by Pennsylvania. Traffic: (June) W3EEB 135, K3YZF 81, K3YHR/3 14, W3IYE 7. (May) WA3CDV 4.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML. K3MVO, K3YVG. PAMs: W3SAO, K3LSV. New appointments: WA3BBI as EC for Union county. K3KKO as ORS and K3MPN as OES. New Gear Dept.: W3EML acquired a new HQ-170 receiver. W3NOH installed and painted the new crank-up tower. K3MSG added a new v.f.o. An NCX-5 has been added at K3UWO. W3MHR and K3KKO are Extra Class. K3FZD, WA3CBL and WA3CFV are now General Class. W3CDY is the new editor of Philmont's *Blurb*. K3YVG is operating from New Hampshire for the summer. The Abington ARC Net meets nightly at 1250Z on 28.63 and 50.44 Mc. K3WEU is teaching Novice and Tech. courses at summer camp in Maine. The Lehigh Valley Phone Net meets Fri. at 1800 EST on 3865 kc. W3ID has given up summer operating activity in favor of the beach blondes. New officers of the Mt. Airy V.H.F. Club are K3GAS, pres.; W2EIF, vice-pres.; W3SAO, secy.; W3MVF, treas. K3HTZ visited K3RUQ in Maryland and celebrated his 21st birthday. W3KEK's antenna blew down and he had to erect another for his OO work. Communications for the Annual Soap Box Derby in Tamaqua were handled by K3HXS, K3KNO, K3SRQ, K3NYX, K3NZD, WN3DDI, WN3DDK and W3ZRQ. 1965 Field Day is now history. We thank the various clubs for their Field Day messages. However, the greater percentage of them could not be counted as official at this office because of lack of a complete preamble. About 50% chose to mail their message to me. There was complete lack of adherence to our National Traffic System, which operated full time during Field Day week end. Should the telephone suddenly stop ringing or the mail man be unable to make it to your door during an actual emergency, please note the following: The EPA C.W. Net operates on 3610 kc. at 2330Z. The PTTN Training Net operates on 3610 kc. at 2230Z. The Eastern Pennsylvania Emergency Phone and Traffic Net operates on 3915 kc. at 2200Z. Each net operates 365 days of the year. Traffic: W3CUL 2949, W3EML 755, W3VR 567, K3MVO 290, W3AIZ 221, K3FHR 179, K3MYS 127, K3ZUN 115, W3ZRQ 103, W3ELI 100, K3YVG 91, K3RZE 75, WA3BHN 56, K3ZSK 48, K3WEU 47, W3RV 46, K3HKW 44, K3PWM 38, K3MHD 35, W3VAP 34, WA3BYH 30, K3PIE 22, K3YQJ 20, W3CBH 14, K3KKO 12, W3OY 8, W3BKF 7, W3JKX 4, W3KJJ 4, W3BFF 2, W3ID 2, K3MPN 2, K3OGX 2, K3RLO 2, K3HTZ 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3QCW, W3ZNW. PAMs: W3JZY, K3LFD.

Net	*Kc.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave.*
MDD	3643	0000Z	Daily	30	205	6.5
MEPN	3820	2200Z	M-W-F	23	24	1
MEPN	3820	1700Z	S-S			
MDDS	28200	0130Z	Daily			
MSTN	50150	0100Z	Daily	30	40	1.3

Congratulations on two new Extra First tickets, K3GUR and W3QCW. New gear and improvements: K3IPX/3 has a new Swan 240; K3LLR has a new trap vertical for 40-10; K3GZK is working 400 miles with his 100-milliwatt rig on 80; W3MCG has four new 80-meter sloping dipoles to snare DX and gave his emergency generator a good workout on Field Day; W3EOV cut down a tree to improve his antenna performance; K3LFD is putting up a 40-ft. tower to hold a new 80-meter dipole; WA3BAE has new HX-20 and HR-20 for s.s.b. and c.w. giving good results on his vertical; W3MSR has separate five-element beams on 20 and 15 and a Justin 40-meter rig in his car. Traveling near and far: K3VCG was mobile VE3 in July; K3ZYP had a week-end in New York and visited K2US; W3AKB and W3BWT vacationed in Florida and watched a couple of "birds" go up; W3AKD/VE8 sent his traffic report via W9NZZ from Cape Christian, N.W.T.; W3HQE spent three weeks on the job in Spain; K3OAE, home again with a new antenna, is working NCS Fri. on MDD this summer; W3ECP reports that ex-K3NHC has been transferred to Washington. W3PQ regrets having to move from his present FB QTH. Best wishes to W3CDQ on her retirement this month after 45 years at the NBS. K3ZSX worked 2 new states in the V.H.F. QSO Party. W3JZY worked some new states and counties on 6 meters. K3NCM helped the Frederick ARC make a "go" of Field Day. WA3CXY wishes her OM (K3ZSX) would give her a turn on MSTN. W3WTW is trying to find time to get emergency facilities organized in Montgomery County. WA3AZI learned to run a bug on Field Day and improved his code speed. Yes, Mike, there will be a Maryland QSO Party this year. Traffic: (June) K3ZYP 171, W3AKD/VE8 81, W3PQ 77, K3GZK 55, W3QCW 46, W3LBC 36, W3EOV 32, K3LFD 31, K3IPX/3 28, K3LLR 22, W3MCG 19, K3ZSX 18, W3ECP 17, K3VCG 7, K3OAE 6, K3QDD 5, WA3BAE 2, WA3CXY 1, W3WTW 1. (May) W3MCG 16, K3ZSX 16, WA3CXY 5.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RM: WA2BLV. The following clubs reported their Field Day activities: Burlington Amateur Radio Society, Gloucester County ARC, Medford Wireless Assn., Southern Counties AR Assn., South Jersey Radio Assn., and W2JVG/2 operating at Florence. DVRA secretary K2PGB reports the club operated FD near Hopewell. In its recent Novice course 12 received licenses. The club net is on 146.7 at 1 P.M. local time Sun. Trenton's mobile and calling frequency is 145.47 Mc. W2AQM is instructor Fri. nights at the Hardingville Radio Club, N.J. Phone & Traffic Net totals for June: 30 sessions, QNI 527 and traffic 140. No report was received on NJN activities. The SJRA operated Field Day at the Burlington County c.d. site in Marlton. The SJRA is making plans for its 50th anniversary, which will be held during 1966. Club papers are a fine source of information for your SCM. Put him on your mailing list. All appointees are required to report their activities to keep their appointment in effect. Check the date on your certificate. A more active AREC is needed in this section. At present an Emergency Coordinator is needed in Camden, Cumberland and Mercer Counties. The Burlington County Radio Club meets the 2nd Mon. in Moorestown. W2ZVW, Beverly, is the club's president. Traffic: (June) W2RG 112, WA2KIP 76, W2ZI 34, W2GIW 17, W2EEI 4. (May) WA2KIP 100.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB and W2FEB. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 2200 GMT, NYS C.D. on 3510.5 kc. and 3993 (s.s.b.) at 0900 Sun. and 3510.5 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT, NYS County Net on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. Congratulations to BPLers K2KQC and W2OE. The Penn-York Hamfest was well attended in Big Flats, N.Y. W2YIY*K2CPI, EC for Steuben County, assisted by K2UMY, K2EBD, WB2GVF and K2IUT, has plans for a 6-meter f.m. repeater in his area, with a link into Buffalo and Syracuse at a later date. The wide-band 6- and 2-meter nets are growing by leaps and bounds in both New York State and the coast down to Virginia. Five repeaters are in operation in our section alone. Listen on 146.94 and 52.525 Mc. WB2MAC received section net CP for NYSPTEN. K2KBK has been

• 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.

appointed OO, WB2GAL and WA2TUI were endorsed as OPSs. W2PZI, K2LGJ, K2KTK, W2GOR and W2-BLP participated in the May FMT. Plan now for the Sept. 9 FMT, check *Operating News* this issue. W2QQ reports he's back on his feet and operating again. He has a license dated 11/9/15 #7680 call sign "8PU." Can you top this? WB2EDU has an SR-500. WB2NZA has a new NCL-2000. W2EMW reports 135 DX QSOs in May with 90 watts including 30 Asians such as CR9AH, HZ5, UJ8, HM5, etc. K2HUK finally is back in business with a KWM-1 and a new tower and beam. Many of you make the mistake of notifying the SCM when you will be portable or mobile while vacation, but it is the FCC that should be notified. Send your cards to FCC, Post Office Bldg., Buffalo, N.Y. 14203. GRAMS set up a communications system organized by K2IAQ for a sports car rally. Other participants included W2HAI, K2MDS, W2CUY and W2CWB. Navigators of the cars were students of the New York State School for The Blind. K2IAQ reports that seeing the thrill the kids get out of the event makes it well worth the Sun. afternoon devoted to Public Service. Traffic: K2KQC 503, W2OE 364. WA2UFI 244, W2RUF 232, W2GVH 222, W2HYM 97, W2LYG 95, WB2GAL 84, WA2TUI 72, WB2EPG 58, WB2HLV 53, K2JBX 51, WA2IHP 49, K2AYQ 40, K2-OFV 39, W2FEB 38, K2KTK 32, WB2NZA 31, W2RQF 28, W2FCG 26, K2MQN 23, WA2FOJ 22, K2IMI 20, W2MTA 17, W2PNW 14, K2MIP 13, WA2RLV 13, K2-BWK 10, K2DNN 9, K2HOH 9, WB2NNA 6, WB2ERK 5, K2RYH 4, W2ANE 3, WB2EDU 2, WA2GLA 1.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3-NEM. SEC: K3ZMH. PAMs: W3TOC, K3VPI (v.h.f.). RMs: W3KUN, W3MFB, W3UHN, K3OOU. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. Well, fall operating activity is on the way. Are you ready? This year's W3PIE Gabfest will be held Sept. 18. WN3-DHH is a new licensee in the Uniontown area. K3AUE enters Pitt this fall. At Connellsville K3PLW runs for school director and K3BTF city council. W3QCP and his XYL have a new "harmonic." K3AML, W3UTT and W3HSY lost antennas in a major windstorm. K3-JCC, in Germany, now signs DL4DN and AT3IE. W3TVW still is convalescing after his accident. Everyone wishes Bert a very speedy recovery. A new Novice at MARS is WN3DUF. Former W3RXT is now W3ATS again. Thanks to the following contributors to the W3NUG Memorial Award Fund: W3TOC, W3KWL, W3SMV, W3KUN and the membership of the Etna Radio Club. $33 has been accumulated to date. The Fort Venango Mike & Key Club took part in the Oil City 4th of July celebration. W3KQD received his 1st-class radiotelephone license. The Altoona Radio Club plans to build a new club house. Section stations should turn out en masse in support of the Pennsylvania QSO Party sponsored by the Nittany ARC Sept. 18. If you don't win an award, you still will have fun. W3AUD is active with RTTY. K3GEO and K3FFJ do fine jobs as OOs. K3CFA is rebuilding an old S-38. K3KAP worked W8CUL on 144 Mc. K3WWP works for awards. W3UQG tries out a new tower and beam. New hams up Erie way are WA3DJT and WA3DLS, former Nov ce. W3-SMV did a lot of rebuilding during the summer months. W3UHN and the Friendly Amateur Radio Transmitting Society poured out contacts during the past Field Day. W3GJY is now DXCC 302/296. The Keystone Slow Speed Traffic Net will reactivate Oct. 1 on 3585 kc. at 2330 GMT. If you want traffic-handling know-how, this is the net to start in. Endorsements: W3OEO as ORS. New appointments: WN3DCN as OES. *Watch the expiration date on your license.* Traffic: (June) W3KUN 77, W3LOS 39, W3UHN 15, K3SMB 10, W3GJY 8, W3-KQD 7, W3OEO 7, K3EDO 5, K3ZMH 5, WA3BNO 4, W3YA 4, W3JHG 2. (May) W3NEM 265, W3MFB 195, W3KUN 134, K3ZMH 14, W3YA 10, K3OOU 5.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM, George Nesbed, W9LQF. SEC: W9RYU. RM: WA9DXA. PAMs: W9VWJ, WA9CCP and WA9-KLB. Cook County EC: W9HPG.

Net	Freq.	Time	June Tfc.	Mgr.
IEN	3940	1400Z Sun.		W9VWJ
ILN	3515	0100Z Daily		WA9DXA
NCPN	3915	1300Z Mon.-Sat.	386	W9VWJ
NCPN	3915	1800Z Mon.-Sat.		WA9CCP
ILL PON	3925	2200Z Mon.-Sat.	131	K9WYX

W9NWK reports that the 75-Meter Interstate Single Sideband Net's traffic for the month was 254 messages. The final reports on Field Day activities have been received and from all indications most of the clubs have scored considerably better than previous years. W9WYB, W9EEP, W9GFF, W9ING, W9JUV, W9NPC, K9RAS, W9REC, K9QLC, W9PNE and W9HPG participated in the League's latest Frequency Measuring Test. A new Novice heard was WN9OQS. WN9MQU is back operating after a two-week stint in the hospital. WA9PCB is the call of the new Worth Township Amateur Radio Club's station. WN9OBT has passed the General Class exam. W9RSV, WA9AHZ, K9FZB, WA9-MED and W9YVP are building an f.m. 2-meter repeater station for the southwest side of Chicago. The Ninth Regional Net had a traffic count of 406 for the month. W9AZP and W9HJM were appointed Official Observers, while K9VJB was appointed an Official Experimental Station. W9UBI is working on his Ph.D. in Physics at the University of Michigan and operating phone on club station K8TIG. Members of the Northwest ARC supplied communications for the Evanston Council Boy Scouts during its Annual Camporee at Illinois Beach State Park. W9VBV has a new Hallicrafters SX-117. W9WYB has worked his 302nd country on his DXCC venture. WN9PQO is a new call in the Rockford area. WA9GUM is working c.w. harder these days with a homebrew electronic keyer. WN9PDN, a licensee of two months, is working his DX with an EICO 720 and a Drake R-4. New officers of the Chicago Suburban Radio Association are WA9EXZ, WA9JLQ and Bruce McIntyre. K9RCT is spending his summer vacation working for Hughes Aircraft in W6-Land. WA9PSI is a new call in Princeton. K9WYX has a new Swan 350 transceiver. K9FMQ is WØGFG during the vacation near Moose Lake, Minn. WA9GCM has built a new Heath SB-400. The July issue of *QST* lists WA9CNL as a BPL recipient; it should have read WA9CNV. WA9CCP, K9KZB and WA9EBT are BPL certificate recipients for June traffic. Traffic: (June) WA9CCP 929, K9KZB 506, WA9CNV 343, W9EVJ 309, WA9EBT 234, WA9GUM 164, K9RTE 50, K9WMP 49, K9BQQ 29, W9DOQ 27, W9JXV 26, W9PRN 20, W9SKR 20, W9HOT 16, WA9AJF 14, W9IDY 10, K9CYZ 8, W9LNQ 8, WA9FIH 4, WA9KKA 4, K9HSK 2, K9RAS 2, K9TVA 2, WA9KLB 1, K9ZPZ 1. (May) WA9CCQ 151, K9WMP 55, W9EET 24.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET.

Net	Freq.	Time	June Tfc.	Mgr.
IFN	3910	1330Z daily, 2300 M-F	307	K9IVG
ISN	3910	0000Z daily, 2130 M-Sat.	573	K9CRS
QIN	3656	0000Z daily	121	WA9BWY
RFN	3656	1300Z Sun.	69	WA9IZR

K9GLL, PAM of Hoosier v.h.f. nets reports June traffic of 56. W9QLW, RM of 9RN, reports 100% representation by Indiana in June. New appointments: K9TKE as EC for Warrick Co., W9HRB and K9VHY as ORSs, WA4RQR/9 as OPS. BPL winners: W9JOZ, K9IVG, WA4RQR/9 and W9NZZ. QIN Honor Roll: K9HYV, K9-VHY, WA9FDQ and W9HRB. New officers of the

(*Continued on page 118*)

EIGHTH PENNSYLVANIA QSO PARTY

Sept. 18-20, 1965

The Eighth Annual Pennsylvania QSO Party, sponsored by the Nittany Amateur Radio Club, offers all out of state stations an opportunity to earn credits for the Pennsylvania Counties Award, Keystone Award, USA-CA Award, and others.

Rules: (1) *Time*: The contest begins at 2300 GMT Saturday Sept. 18 and ends at 0400 GMT Monday, Sept. 20. (2) *Suggested Frequencies*: 3575 3875 7075 7275 14075 14275 21075 21325. Look for portable stations from the rare counties. (3) Each station may be worked once on each band and mode. (4) *General call*: CQ PA and Pennsylvania stations sign de PA. (5) *Exchange:* Pennsylvania stations send QSO number, (RS(T), and ARRL Section or country. (6) *Awards:* Certificates will be awarded to the first place stations in each ARRL Section and country with second and third place certificates where justified. (7) *Scoring:* Pennsylvania stations 3 points per out of State QSO, 1 point per Pennsylvania QSO multiplied by the number of ARRL sections and other countries. Out of state stations, 1 point per QSO multiplied by the number of Pennsylvania counties (8) *Entry:* A copy of the log, showing QSO number, station, date, time band, mode and station worked should be submitted to the Nittany Amateur Radio Club, P. O. Box 60, State College, Pennsylvania, 16801. Entries must be postmarked no later than October 18, 1965.

BECAUSE THE HRO-500 solid state receiver is in such demand by government and industrial organizations as well as by critical amateurs, we have recently published a reliability prediction for the HRO.

THE OVERALL index of equipment reliability is its predicted MTBF — Mean Time Before Failure. There are a number of Mil-approved MTBF prediction techniques, and one of the most conservative is the U. S. Navy Bushipsmethod which utilizes failure rate data per NAVSHIPS 93820. This prediction is based upon circuit complexity, the total number of circuit elements in the equipment, and the degree of electrical or thermal stress on *each* element — down to the last resistor and capacitor.

THE BUSHIPS-APPROVED technique was used for the HRO-500 MTBF calculation, and it should be noted, incidentally, that an MTBF (per NAVSHIPS 93820) in the area of 1000 hours is very common for highly sophisticated, fully Mil-Spec receivers.

OBVIOUSLY, with all this build-up, the HRO-500 MTBF is good. In fact, its MTBF is *3820 hours!* This is, of course, a remarkable number for a receiver with the degree of performance which the HRO-500 provides its owner. It results from intelligent circuit design to do the job properly without needless and over-critical circuitry, and from the unbeatable advantages of total transistorization — so little internal heat generation that the prime source of BTU's is the pilot lamp string . . . miniscule current flow through components since the 38 transistors and 20 diodes in the HRO pull a grand total of only 200 ma. from a 12 V.D.C. source . . . total absence of "high voltage" . . . and the far longer life of transistors as compared with vacuum tubes.

THE SOLID STATE design of the HRO-500 offers other benefits besides high reliability. For example, there is no gradual performance deterioration resulting from vacuum tube aging or long-term changes in emission. Along the same lines, stability is greater from the very instant of turn-on because the long-term drift characteristic of tube-type oscillators (resulting from expansion of tube element structures with heat) is eliminated. You'll also get a kick out of the fact that the HRO-500 starts playing as soon as the switch is thrown — no warm-up time!

WHEN YOU spend $1295 for an HRO-500 you get a couple of extras. One is a sterling silver miniature of the famous HRO dial which is provided as an owner's lapel insignia to every amateur who registers his HRO-500 with us. The other is reliability . . . proven not just by a high MTBF, but by over 50 years of manufacturing experience and an unchallenged reputation for building gear that lasts (and as our Service Manager sighs when confronted with a 1933 AGS in for a check-up . . . "and lasts, and lasts, and lasts . . .").

MIKE FERBER, W1GKX

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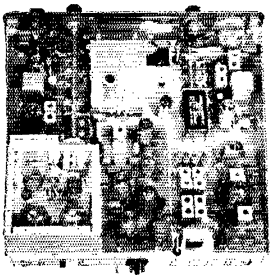
SB-110 SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 uv for 10 db signal plus noise-to-noise ratio. **Selectivity:** 2.1 kc @ 6 db down, 5 kc max. @ 60 db down. **Image rejection:** 50 db or better. **IF rejection:** 50 db or better. **Audio output impedance:** Speaker, 8 ohms; Headphones, 600 ohms or higher. **AGC characteristics:** Audio output level varies less than 12 db for 50 db change of input signal level (0.5 uv to 150 uv). **TRANSMITTER SECTION: DC power input:** SSB, 180 watts PEP; CW, 150 watts. **RF power output:** SSB, 100 watts PEP; CW, 90 watts (50 ohm non-reactive load). **Output impedance:** 50 ohm nominal with not more than 2:1 SWR. **Carrier suppression:** 55 db down from rated output. **Unwanted sideband suppression:** 55 db down from rated output at 1000 cps & higher. **Distortion products:** 30 db down from rated PEP output. **Hum & noise:** 40 db or better below rated carrier. **GENERAL: Frequency coverage:** 49.5-54.0 mc in 500 kc segments (50.0-52.0 mc with crystals supplied). **Frequency selection:** Built-in LMO or crystal control. **Frequency stability:** Less than 100 cps drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 cps drift for ±10% supply voltage variations. **Dial accuracy:** Electrical, within 400 cps on all band segments, after calibration at nearest 100 kc point. Visual, within 200 cps. **Dial backlash:** No more than 50 cps. **Calibration:** Every 100 kc. **Power requirements:** High voltage, +700 v. DC @ 250 ma with 1% max. ripple. Low voltage, +250 v. DC @ 100 ma with .05% max. ripple. Bias voltage, —115 v. DC @ 10 ma with .5% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps.

Write for complete SB-110 specifications and schematic.



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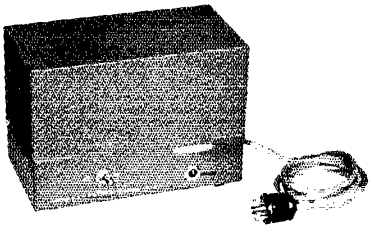

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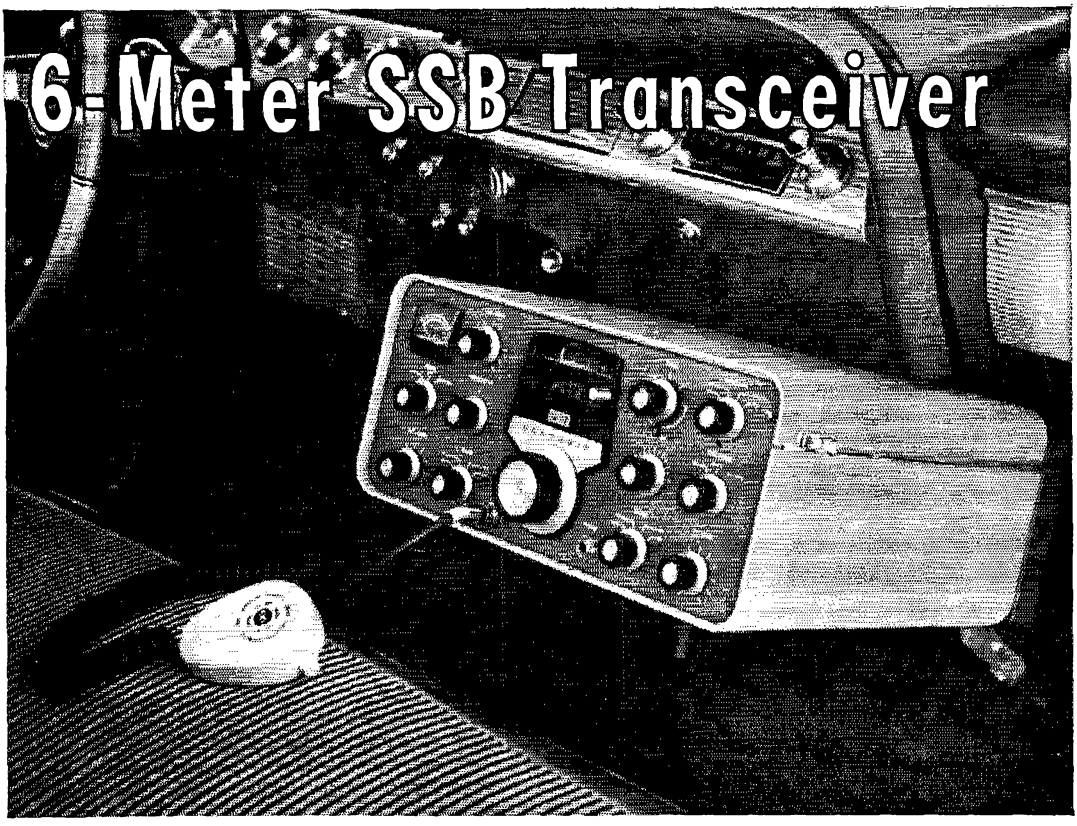

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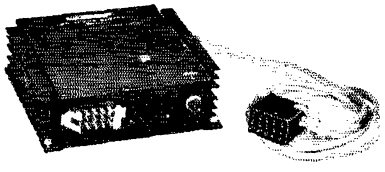

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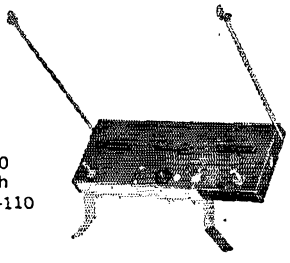
• Allows direct plug-in of entire SB-110



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DC Plate Current	210 ma
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Drive Power	3 watts
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(Continued from page 112)

Greenwood ARC; K9VXV, pres.; WA9CQR vice-pres.; WA9HLW, secy.-treas. Wedding bells rang for K9ULW and K9INF. W9FJR and WA9IZR were given RFN certificates by the Weather Bureau. WA4RQR/9 and K9IVG have new R-4 receivers. W9HRB is CAN representative for 9RN on Tue. and Fri. WN9PPX became the first YL amateur in Jay Co. WA9KWH and W9VJX have new HW-12 mobiles. WA9CYG uses a Ranger and is active on the nets. As president of the Indiana School for the Blind Radio Club he reports consistent progress and a fine station, W9JPX, there. The club will be glad to answer questions to help other blind groups form successful clubs. Address the club at 7725 N. College Ave., Indianapolis, Ind. 46240. *Amateur radio exists because of the service it renders.* Traffic: (June) W9JOZ 981, K9IVG 786, WA4RQR/9 521, W9HRB 337, W9QLW 199, WA9BWY 170, W9NZZ 168, WA9FDQ 138, K9DHN 129, K9HYV 121, WA9IZR 87, W9YYX 79, W9ZYK 68, K9CRS 55, WA9BRD 52, W9FZW 49, W9BUQ 45, WA9CYG 42, K9GLL 41, K9YFG 36, K9ZLB 32, K9RWQ 26, W9RTH 25, W9SNQ 25, K9VHY 25, W9DOK 19, K9UEO 17, W9FWH 15, W9CC 11, WA9BGI 10, W9BDP 9, K9WWJ 9, K9ILK 8, WA9AXF 6, K9BSL 6, W9DGA 5, WA9CFW 4, K9KTL 3, W9SWM 2, WA9-JWL 1, (May) WA9BWT 30, W9BZI 21, W9JSV 4.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. PAMs: K9IMR, W9NRP, K9HJS and WA9EZT. RM: Looking for one. New appointments: W9AIWQ as ORS. Welcome back, Wid. Renewed appointments: W9NLJ and W9APB as ORSs, W9NRP as OPS, W9FBC as OES, K9GSC and W9KRP as OOs, W9VHA and W9LQC as ECs. At this time less than half our counties have ECs. If you think you can fill this post, please drop a line to the SCM. Net certificates were sent to WAØJKT for WSBN; K9ZMU and WA9-CEQ for WIN; K9YTS, K9LJM, WA9DXG, WA9NJT and WA9CIY for SWRN. Net reports:

Net	*Freq.*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr.*
BEN AM	3985 kc.	1800Z M-Sat.	24	180	39	W9NRP
BEN N	3985 kc.	1700Z Daily	30	496	162	K9HJS
WSBN	3985 kc.	2215Z Daily	30	982	328	K9IMR
WIN	3535 kc.	2345Z Daily	29	182	46	W9KQB
SWRN	50.4 Mc.	0200Z M-Sat.	22	249	6	WA9EZT

Racine mobiles are operating on 29.6-Mc. f.m. W9QJE has completed his 3500 mobile QSO and received several awards including DXCC, WAC, WAS and first MCA (Mobile Century Award) in the U.S.A. 9RN is in bad need of more Wisconsin representation. If you can help you will be welcome on 3840 kc. at 2330Z. WA9GJU made the BPL in June. Traffic: (June) WA9GJU 426, W9DYG 253, K9IMR 240, W9CBE 69, K9HJS 68, W9-NRP 63, W9KQB 56, W9YT 48, W9HWQ 46, WA9LWJ 41, W9IBM 32, WA9FAB 25, K9GSC 25, K9UTQ 22, K9DBR 14, W9AYK 12, W9HPC 11, K9WIE 10, W9RTP 8, WA9MRG 2, W9OTL 1. (May) W9NRP 54, W9CBE 41, W9HHX 21, WA9EDZ 15, K9ERD 12, K9ZMU 3.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØBZG. RMs: WØISJ, WAØJDG. PAMs: KØFLT, KØVPJ, WØHEN, WAØCQG. MSPN meets M-Sat. on 3820 kc. at 1805Z and 2100Z, Sun. and Holidays at 1500Z. MSSB meets M-F on 3805 kc. at 1730Z and on 3812 kc. at 0045Z. MSN meets daily on 3595 kc. at 0030Z. MJN (slow speed c.w.) meets on 3595 kc. at 0010Z. MSTN meets S-F at 0430Z and Sat. at 0200Z on 50.4 Mc. North Star YL nets on 3820 kc. at 1500Z each Tue. During DST all nets meet one hour earlier by GMT. Same local time. Appointments renewed: WAØBZG as SEC; WØZOB as ORS; WØGCR, KØLWK, KØVPJ and WAØBZG as OPSs. Congrats to KØUXQ, who received his bachelor's degree in Electrical Engineering at UOM. Ron will start for his Masters in Sept. It appears that the St. Paul Radio Club had a typical Field Day. The tent blew down, a hole was ripped in it and someone tipped over the operating table full of equipment. The equipment came through without damage! WAØFCJ says his new HR-10 is working fine. Eighteen amateurs and their families enjoyed the Winona Radio Club Picnic. KØIGY joined Navy MARS. Jim has a new vertical for 40 through 10. WAØDKP tested his improved mobile antenna system while mobiling to Michigan. Chris averaged a .1 part per million error in the Feb. FMT. His largest error was 1 cycle! WØLUX attended the World's Fair. WØZSA has a new beam and is working on a kw. final. WØUWG worked 65 countries on s.s.b. last winter. KØYOF is vacationing in Canada. OES WAØIDB worked Texas, La., Ma., Arizona and a mobile in Wyo. on 6-meter f.m. in June. Winona Co. AREC has 5 members active on its 6-meter net. Traffic: WAØJKT 129, KØZZR 108, WØISJ 82, WAØEPX 80, WØSYD 74, WØSYD/Ø 69, WAØIAW 66, WAØFIK 62, WØHEN 48, KØFLT 42, WAØBYO 41, WØTCK 38, WAØEDN 25, KØVPJ 24, WAØFUR 21, WAØIIJ 21, WAØBZG 16, WAØDVH 16, WAØDKP 11, WAØFCJ 11, WØUMX 11, KØIGZ 9, WAØFQI 8, WØFKC 7, WØPET 6, WAØIUJ 5, KØSRK 4, WAØDFT 1.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. RM: KØGSY. Many thanks go to WØRRN, retiring SCM, for a job well done. The Watertown Amateur Radio Club held a state-wide picnic Aug. 22. WØDIY is now portable from his summer home at Wall Lake. WAØBWJ is attending summer school at Yankton. WNØMFZ is a new call located at Pierre. KØHIID is operating from his sister's QTH in Denver until fall. A new call in Lake Norden is WNØ-MQK. WA6YAL was among those who helped with tower-raising for KØTXW. WAØAOY successfully operated portable from Guard Camp at Camp Ripley, Minn. Amateurs from the Mitchell and Yankton areas had Field Day exercises at their respective locations. Traffic: KØGSY 333, KØVYY 128, WØSCT 78, WØDIY 36, WAØAOY 34, KØZBJ 18, WØDJO 17, KØYJF 12, KØBSW 10, WØCOE 6, KØFQH 6, WAØJCV 6, WNØ-MFZ 5, KØKOY 4, WAØDJE 3, KØJGM 3, WAØBMG 2, WØZAL 2, WAØDNG 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NMs: K5IPS, WA5IIS, WA5HNN. The following stations are to be commended for their excellent performance on the Arkansas Single Sideband Net during June: WA5IIS 24, WA5IEQ 22, W5VFW 21, WA5GPO 20. Congratulations to K5HYB on his new OPS appointment. The following were awarded Section Net certificates for 50 check-ins: On ASBN—W5VFW, WA5FHR, WA5JZV. On OZK—W5NCT, WA5IZR, WA5FHR. The following took top honors on OZK: W5NND 26, W5FUD 24, WA5BDU 24, WA5IIS 22, WA5HNN 22 and WA5AVO 16. Net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave. Tfc.*
OZK	3790	0100Z	Daily	29	225	289	7.8
RN	3815	0001Z	Daily	30	100	423	3.3
APN	3885	1200Z	Mon.-Sat.		(no report)		

WA5IIS has assumed the duties of net manager of the S.S.B. Net and WA5HNN takes over the OZK reports. Please help these hams in their public service work by reporting into the nets and sending net reports promptly. W5NND reports that his rig was damaged by lightning just after the OZK. Traffic: WA5HNN 291, W5NPM 216, W5NND 133, WA5IIS 128, W5DTR 64, K5VBF 45, W5OBD 44, K5TCK 37, K5HYB 27, WA5-GPO 21, WA5IEQ 13, WA5KUD 2.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. PAM: W5TAV. V.H.F. PAMs: WA5KHE and W5UQR. WA5JVL reports that 6 meters was open frequently in June. He also states that the Greater New Orleans Amateur Radio Club has formed a new net on 50.25 Mc. and meets Wed. at 0200 GMT (2000 CST). K5HFI also reports that 2 meters was exceptionally good during June with Texas and North La. stations good copy. W5UQR reports that 2-meter activity from the New Orleans area was very intense, especially during the V.H.F. QSO Party. W5JFB also reports 6-meter activity continues as the summer passes along. WA5DRP reports into the Eye Bank Net daily. K5FYI is striving to come up with an s.s.b. rig. The newly-formed Chetimachi ARC is going full blast with W5TAO, pres.; W5SWS, vice-pres.; W5TDY, treas.; K5KQG, secy. WA5HGX works the Jefferson Net and Navy MARS. WA5KAJ has a new Warrior and K5MWG a new Galaxy. W5EA reports summer doldrums has him. K5OKR has a nice traffic total. W5CEZ spent two weeks in summer camp with his Scout troop. Communications for the Scout camp is provided by the Southwest LA ARC on 2 meters. K5WOD reports participation in FD by the SARC. W5MXQ has been sticking to traffic both phone and c.w. The Lafayette Amateur Radio Club held a successful FD with nice signals on c.w. and s.s.b. W5NQR is proudly showing his first-place 5th district certificate won in the YL-OM Contest and Bill was third in National Competition. Twenty-five of the BRARC gang operated at Forest Park during FD. WA5EID had barrels of fun on FD with an L4AVS working 15, 20 and 40. W5BUK spent most of June on the road. W5CEW reports some good results toward forming a La. Chapter of QCWA. Send him a line if interested. Yours truly spent two weeks at Glenburnie on Lake George in upper New York State. WA5DES continues to do an FB job with OBS and sent 21 bulletins on 40-meter c.w. W5GHP claims a poor month with bad

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Oceanside, California

conditions on 80. WA5BLO has been tied down with a bad work schedule. WA5ITW, after many repairs and new installation, is back on LAN. Traffic: W5GHP 270, W5QEG/5 231, W5CEZ 177, K5OKR 68, WA5EID 22, WA5DES 21, W5MXQ 21, W5EA 18, K5KQG 8, WA5-BLO 6, K5FYI 6.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. I was glad to hear so many of the Mississippi clubs and individuals participating on Field Day with good scores. To mention a few: Jackson, Meridian, Old Natchez. WA5INZ made the BPL for the fourth straight month. WA5CAM just built a new antenna coupler. K5VBA is back in Charleston with new antennas, s.w.r. bridge and antenna tuner—all home-brew. W5SHX still has an FB signal from Jackson. W5JHS still is going strong on the Gulf Coast Sideband Net. Sorry to lose W5OSQ's mother—a fine person. K5-PPI is now net manager for the Magnolia Net. K5RGG is back in Madison and very active. New officers of the Columbia ARC are WN5KMF, pres.; WA5ETL, vice-pres.; K5TAH, secy.-treas. There are some appointments open. Send in your qualifications. W5DYJ had one of the best FMT reports I've seen in years. Traffic: WA5INZ 302, W5JDF 236, W5WZ 80, K5VBA 46, W5EMM 10, WA5CAM 2.

TENNESSEE—SCM, William Scott, W4UVP—SEC: W4RRV. RM: W4MXF. PAMs: WA4GQM, W4PFP.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
TSSB	3980	1830C	M-Sat.	26	1144	118
TPN	3980	0645C 0800C	M-Sat. Sun.	30	878	159
ETPN	3980	0640E	M-F	22		43
TN	3635	1900C 2030C	M-Sun.	60	380	79
TSN	3635	1900E	M-W-F	13	55	32

Sorry to learn of WA4TKI joining the Silent Keys as the result of a June 25th auto accident near Sparta. K4TQO, ex-ETPN member, was missing on a Key West-Miami flight. OOs W4ZBQ and W4WBK had 30 and 21 p.p.m. error in the May FMT. W4HHK reports KP4 moonbounce for another first for Paul for Tennessee. Sorry to report the resignation of WA4AIS as PAM for ETPN because of increased workload. TSN will become a nightly net in the fall if interest continues. Received 12 Field Day messages with 140 operators. Johnson City RC will be reactivated. W4WQZ is looking for 432-Mc. activity. K4SXD has the quad up again and is looking for DX. Traffic: K4SXD 238, WA4IBZ 217, W4OGG 201, WA4GQM 189, W4FX 183, W4ZJY 126, W4MXF 86, W4PQP 81, W4WBK 65, K4-UWH 48, W4TZJ 39, W4PFP 33, W4UVP 32, W4TZB 24, WA4KHD 22, K4WWQ 22, W4JVM 19, WA4NUJ 14, K4RCT 11, W4TYV 8, K4UMW 8, K4ZWL 8, W4VTS 7, W4SGI 6, WA4TPG 4, W4VJ 4, K4FZJ 2, WA4YFE 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4-QIO—SEC: K4URX. PAMs: W4BEJ, WA4RDE, K4-YZU. V.H.F. PAMs: K4KZH, WA4IUW. Acting RM: W4RHZ. Appointments in June: WA4TNH as ORS, WA4ELG as OPS. Endorsements: K4JOP as ORS and OPS, W4JUI as OO, W4ISF as OPS and OES.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	M-Sat.	0630	26	383	61
MKPN	3960	Daily	0830	30	450	38
KTN (May)	3960	Daily	1900	31	511	343
KTN	3960	Daily	1900	27	783	192
KYN	3600	Daily	1900			

Owensboro amateurs helped in the search for a lost boy, who unfortunately, was found drowned. WA4LCH has resigned as RM for KYN, also as NCS for various nets because of doctor's orders. We hate to lose him, but he promises to QNI when possible. The Acting RM is W4RHZ. Field Day was fun, tiring, etc.—take your pick. I received eight messages from active groups or clubs. W4BAZ finally took the big step and was married June 24. Sorry to lose K4KJQ to Silent Keys. He was V.H.F. PAM for several years. The Mammouth Cave Hamfest had a good attendance. W4MFI is moving to Bloomington, Ind. The new SCM for Kentucky, WA4KFO, of Owensboro, took office Aug. 20. Traffic: WA4AGH 243, W4RHZ 213, K4YZU 175, WA4LCH 126, WB4ABF 107, K4DZM 89, WA4HJM 85, W4BAZ 82, WA4RDE 63, K4-QIO 52, WA4GMA 50, WA4KFO 49, WA4AUZ 42, W4-BTA 39, W4OYI 37, W4AST 29, K4LOA 28, W4KJP 23, WA4CTD 22, W4CDA 20, K4TQZ 17, K4HOE 6, WA4GHQ 2, W4JUI 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8ELW, K8-KMQ. PAMs: W8CQU, K8LQA, K8IED. V.H.F. PAM: W8PT. Appointments: K8DCS, K8VPC, W8VKM as ECs; K8NHC, W8WVL as ORSs; WA8MEE as OPS; W8CJP as OBS; K8AQA as OES. Silent Keys: W8NHT, ex-W8PTN, W8JYJ and W8VT. W8JYJ was 8AAF in 1916 in Ann Arbor and 8AEL in 1921 in Detroit. 8VT was issued to W. T. Nelson, 1-6-1923 in Royal Oak, Mich. There are only 321 two-letter calls left in the 8th district, out of a possible 1352—we are truly approaching the end of an era fast! W8ZLK married Mildred Taylor of Traverse City May 29 and they will live in Elk Rapids. WA8MCQ made General. He is in Paw Paw and needs some help. W8HK has sold his photo business in Marquette and now lives in Florida. W8LSZ and K8MJK made General. K8MQO and his XYL are moving to Lower Peninsula. The W8KECs were up at the cottage in Brevort over two "long" week ends. W8FLW has a new NCX-5. W8WUD and WA8CVH showed the Soo gang how ham TV works. W8QOE will have an HR prefix in Honduras. W2RIE/8 and W8BEP are going RTTY. Mrs. W2RIE/8 is WN8ODJ working for her General Class license. W8FGB and XYL W8EMS now are in Escanaba. We hope W8HAU's mother is out of the hospital. W8AKR has a new SR-150 and W8HKH has a new 70-ft tilt-over mast, Rohn crank-up. WA8DEX —What is a "Swiss Quad"? WA8IAQ has a folded-dipole "torroidal" driven antenna. K8PBA better explain this one. K8AIY worked W8UCT on 1296 Mc—9-mile DX for this band. New officers of the Michigan Six-Meter Club are K8JGF, pres.; K8BOU, vice-pres.; K8SPE, secy.; K8PCN, treas. W8EU is home from the hospital recovering from a heart attack. There are 20 new hams from the Adrian ARC classes. W8DQL is building a new shack, and waiting for the new jr. operator. W8GA, W8SS and W8RLT are all back from Europe. K9RHU/8 has a new Drake R-4 and T-4X. WA8GRI visited ARRL Hq. Traffic: (June) K8NJW 215, K8KMQ 199, K9RHU/8 178, WA8BQK 135, K8EBX 113, WA8KXO 105, W8ELW 78, K8TIG 75, W8EJR 73, W8BEZ 62, K8JED 52, W8FX 47, K8HLR 47, W8YAN 28, K8LQA 25, WA8GRI 20, WA8CTE 16, W8IBB 16, W8TBP 16, W8NOH/8 11, WA8PIM 11, W8HKT 10, W8-UFS 10, W8FWQ 9, WA8MCQ 9, WA8MEE 9, W8AUD 7, WA8HDM 6, K8VDA 6, K8NHC 3, W8AAM 2, WA8-DZP 2. (May) K8EBX 68, K8GKX 33, W8EU 24, W8-TBP 23, K8BYX 19, K8KQV 13, W8IUC 8, W8DQL 4, WA8HYR 4, WA8GBN 1.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ, K8BAP and K8-UBK. All the club bulletins told about the preparations for Field Day, so there is very little news. Tusco RC's *The Beam* tells us that W8EUK has a new Drake R-4, WA8FDL has a new baby boy, WA8CWU and WA8FOL put up K8ANA's three-element 20-meter beam and W2GHK gave his presentation of "A Progress Report on the DX-Pedition of the Month". Canton ARC's *Feedline* says WA8JAI joined the Silent Keys, ex-K5-DNQ, now W8GRP, moved to Canton. Mr. Hickman told and showed slides about the operations of Western Union Co., Mr. Fultz, of Ohio Bell Telephone, spoke on the Amazing Laser, WA8NCK erected a four-element tri-bander beam with K8NJH, K8JZN, W8YHU, K8QNT and W8OYL in attendance, W8AL received Cardinal V.H.F. Ohio certificate and a 50-year award from OOTC. Findlay RC's *W8ET News* announces that W8GMJ has a new baby girl. The United States Information Agency has loaned its model of the Satellite Oscar 2 to Cleveland's Apricot Net. Toledo's *Ham Shack Gossip* states that W8PGI joined the Silent Keys. WA8QAIS received his General Class license, WN8QCO, WN8QDL and WN8QJN are new Novices, WA8QNB, WA8QJQ and K8DFD are new Technicians, WA8QNB holds Conditional Class and is with the Air Force somewhere in France. K8UVO and W8KIX have new baby girls. Buckeye Shortwave RA's 1965 officers are WA8AUZ, pres.; K8ORL, vice-pres.; WA8QES, secy.; WA8FQW, treas. Mt. Vernon ARC's *K8EEN Newsletter* informs us that K8SOI graduated from Indiana Technical Institute and WN8QBY, WN8QHO and WA8QIJ are new hams. Massillon ARC's *MARC News* says that W8VYU received his Amateur Extra Class license. K8RPO moved to Texas. W8LAG reports the Lake Geagua ARC provided communications for the Painesville Flag Day Parade and for the Fairport Mardi Gras Parade. The Ohio S.S.B. Net had 1649 QNIs, 522 QTCs with 9.3 per cent. Mark Sept. 26 as the date for Greater Cincinnati ARA's Stag Hamfest. Columbus ARA's *Carascope* says K8WFP moved to Florida. The following bulletins were received: South East ARC's *Ham Fax*, Parma RC's *P.R.C. Bulletin*, Lancaster & Fairfield County ARC's *The Rag Chewer*, Springfield ARC's *The Qser*, Queen City Emergency Net's *The Listening Post*, Warren ARA's *Q-Match* and Six Meter Nomads' *The Amateur Extra*. WA8CFJ has a new 75A-3

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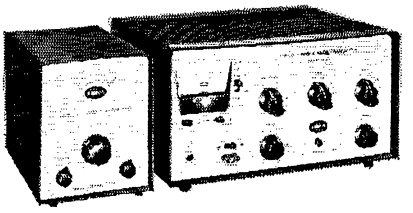

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SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.
Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
Meter reads final cathode current, final grid current and RF output.
Solid state power supply.
Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
Potentiometer type drive control. Audio gain control.
Additional connections in rear for key and relay.

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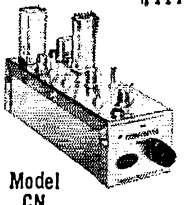
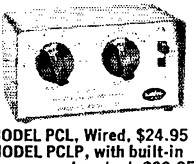
NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) **$49.95.** Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) **$34.95**

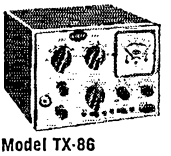
ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, $24.95
MODEL PCLP, with built-in power-supply, wired, $32.95

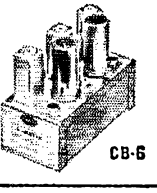
2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required—120 V. at 7 ma. and 6.3 V. at .27 A. —can be taken from receiver or Ameco PS-1 supply. Size: 3″x5″x3″.

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5″ x 7″ 7 7″ — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W, $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**



CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested ... $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix, 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 50**
PS-1W — Wired $11.50

EASY TO UNDERSTAND AMECO BOOKS

Amateur Radio Theory Course	$3.95		
Amateur License Guide	.50		
Radio Operators' Lic. Guide, EL 1-2	.75		
EL 3	1.75	EL 4	1.25
Amateur Log Book	.50		
Radio Electronics Made Simple	1.95		

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Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4″ speaker and can be converted to a CW monitor.

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and is wondering if anyone has an 800 c.p.s. c.w. filter for sale. WN8PEG joined the Silent Keys. K8CVS moved to Lima. K8CEP received his General Class license. Traffic: (June) WA8CCD 231, W8DAE 218, W8RYP 170, WA8GYX 122. W8FSX 121, W8BZX 106, K8LGA 95, W8FSM 80, K8UBK 69, WA8CXY 64, W8SYD/8 64, WA8AJZ 46, WA8CFJ 43, K8RYR 42, W8QCU 39, K8DHJ 33, K8CKR 30, W8NAL 25, W8LAG 24, WA8ETX 22, W8FGD 22, WA8FKD 17, K8VMI 17, K8PBE 16, W8TV 16, W8MOK 15, K8LGB 11, WA8LBR 8, WA8QES 5, K8BNL 4, W8ERD 4, W8WEG 2, W8IBX 1. (May) W8RYP 127, WA8KKE 99. (Apr.) WA8KKE 150.

HUDSON DIVISION

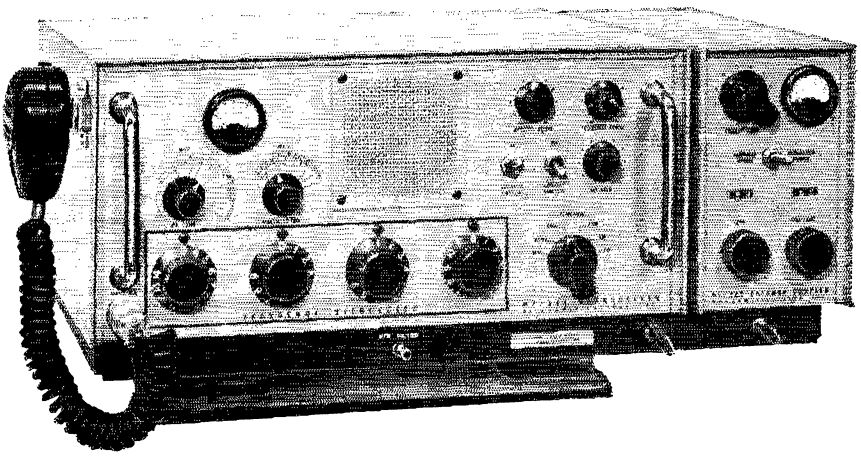
EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,500 kc. Fri. at 0130 GMT. Appointments: K2CBA as OES and WB2DXL as ORS. Endorsement: WA2HYA as ORS. WA2JWL was elected mgr. of NYSPTEN and K2MPK is 1st asst. mgr. The Albany to N.Y.C. Boat Races on June 13 were capably handled by K2IOW, WA2BLC, W2EWY, WB2ICP, W2ODC, W2GHR, K2SDP, K2GCH, W2HES, W2MEK, WA2UBO, K2ONF, K2HUX, W2LWX, WB2AJM and K2TYS. Two meters f.m. with repeaters was used with 75-meter s.s.b. as support during the 131-mile race. All AREC groups performed splendidly. The Albany Club held its annual auction. Operating in USSR was described by W8NRB before the Schenectady Club, its "family night" program. At Schenectady, K2ONF received the Broughton Award for service to community, club and amateur radio Field Day Messages were received from K2AE/2, WB2DXL/2, W2HCS/2 and K2YCJ/2, all club groups. K2LSX and K2UTC participated in the May FMT. W2URP reports emergency power available at his QTH with push-button start. WB2FXB has a new Drake 2B and 2BQ. A new WAS certificate is displayed by WA2WGS. WB2HYA reports a new SX-117. Nice to hear from WA2ZPD, who is home from college. Vice-Director K2SJO gave a slide presentation to the Westchester Club. Traffic: WA2VYS 192, WA2HGB 58, WB2HZY 36, W2ANV 27, K2SJN 26, W2URP 22, WA2WGS 22, WB2FXB 21, WA2JWL 19, W2PKY 16, WB2JYV 15, WB2FZC 12, WB2HYA 9, W2BXP 8, WB2DXL 8, WB2FVD 1.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc	1915 Nightly	WA2EXP-RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSuM	W2EW-PAM
NYCLIPN	3932 kc.	1600 Daily	WB2HWB-PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE-RM

NYC-LI AREC Nets: *See Dec. 1964 column for schedules.*

Well, the summer is just about over and I don't believe I've seen a shorter one. I sincerely hope that yours was a most enjoyable one anyway. Now that the fall operating season is upon us and the cobwebs are off the rig, what about that application you were going to make for ORS, OBS, OO, OPS, OES or was it AREC? Now is the time to do it! New appointments: WB2DXM as ORS; WA2ICV, W2IIU, WB2QXF as OBSs; WA2RUE, WB2DXM, WB2MDH as OPSs; WA2RAT, WB2OCF as OESs. A net certificate was awarded to WB2NGZ of the NYSPTEN. BPL certificates were awarded to WA2RUE and W2EW. W2KTG, of Hempstead, is now K4DJN, of Merritt Island, Fla. K2DKK, WB2DBW, WA2RUE and WA2EXP stopped by this QTH for an eyeball. Among other things, K2DKK fixed a couple of gassy 807s and proved you can't roller skate with a buffalo herd! WB2OTT says his *Handbook* keyer is playing now. WB2EUH toiled in the Uplands for the summer. WB2LUK says the school club, WB2PNP, just launched a Swan 350 on a beam! WB2DZZ trains for the school swimming team between stints with three traffic nets. Met K2RPW over at K2US and he claims the 5-Towns beat Lake Success in Field Day again, but we'll see. WB2NGZ is building a new house and the plans include a 10/15/20-meter beam, 80-meter inverted "V" and a quad for 6 and 2. Hope the XYL doesn't hear about it. W2PF completed the revision of his book "Basic Carrier Telephony" and is now going back on s.s.b. WB2BKS was working the boys in England and Italy for most of the summer. WB2EMJ finished antennas for 75 and 40 meters. WA2TKS went to the evening session of Brooklyn College this summer, if you were wondering where he was. WB2NWL has gone and got her General. Isn't that swell! WB2EXI went after his CP-20 and nailed it! WB2HJT switched from the



This HF Single Sideband Transceiver meets Full Military Requirements and is available off-the-shelf at a commercial price.

It is the RF Communications Model RF-301

Now nomenclatured AN/URC-58

The Model RF-301, SSB Transceiver was designed by RF Communications as a company product without government support. It was designed to be used by military customers in military applications. Now in production, it can be bought in quantities from one unit up with short delivery (averaging 30 to 90 days) at a very modest price. The RF-301 costs about one-third of that normally paid for military transceivers with similar characteristics.

RF-301, SSB TRANSCEIVER
Brief Specifications

Frequency Range: 2 to 15 Mc
Synthesizer: Can be tuned to 1 Kc increments. Provisions for unlocking synthesizer and tuning continuously.
Power Output: 100 watts p.e.p. and average
Stability: 1 part 10^6 standard, 5 parts 10^9 optional
Modes: USB, LSB, AM, CW. Also FSK with adapter.
Power Input: 115/230 volts, 50/60 cycles standard. 12 or 24 volt DC with additional built-in module.
Size: 7¾ x 17 x 14¾ inches • **Weight:** 59 pounds

Please contact us for further details.

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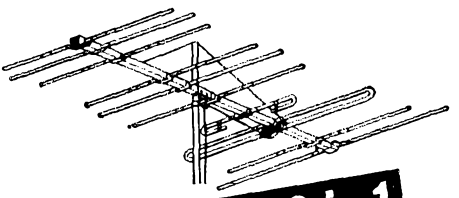
FINCO 6 & 2 Meter
Combination Beam Antennas

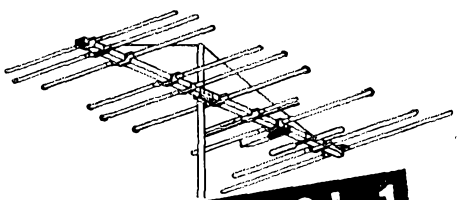


2 ANTENNAS in 1

MODEL A-62 · 300 OHM

On 2 Meters:	On 6 Meters:
18 Elements	Full 4 Elements
1-Folded Dipole Plus Special Phasing Stub	1-Folded Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net $33.00
Stacking Kit $2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:	On 6 Meters:
Equivalent to 18 Elements	4 Elements
1-Gamma-Matched Dipole	1-Gamma-Matched Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net $34.50
Stacking Kit $18.00

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On 2 Meters:	On 6 Meters:
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G-76 to the HT-40 for the summer. WA2PMW says the National Awards Hunters Net has fired up on 50.4 Mc. on Sun. at 1000R. A Model 15 teletypewriter came WB2LXQ's way so he's aiming it at 2 meters. WA2-RKK spent the summer at KICGZ in Maine and will shortly enter the N.Y. Institute of Technology. WB2-ART reports that the boys at Calhoun HS got WA2-KCW going and working North Carolina right away. K2DDK built a keyer and a 500-watt c.w. rig, but didn't like the keyer so went back to the faithful old bug. WA2WAO completed the supply for the mobile. K2-UMM, who also is W2AVX, is now on 6 meters with an HX-50, home-brew heterodyne unit, Filter King, 75S-3B and four-element beam. The president of the Queens County Astronomy Club is planning a course on *Electronics in Astronomy* for this fall. He invites hams to get in on this—also is looking for an instructor. More information can be had by contacting John Goldsmith, WB2LSP, 67 Dartmouth St., Forest Hills 75, N.Y. Traffic: (June) WA2RUE 1012, WB2MHT 497, W2EW 169, WB2DBW 154, WA2EXP 82, K2AAS 66, WB2OTT 62, WB2AEK 54, WB2EUH 54, WA2LJS 54, WB2LUK 29, W2DBQ 26, K2UAT 26, WB2DZZ 25, WB2NGZ 24, WA2QJU 17, W2EC 15, WB2MLN 6, WB2AWX 5, W2PF 4, WB2BKS 3, WB2EGV 2, WA2DTY 1, WB2EMJ 1.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-LQP. SEC: K2ZFI. NNJ ARPSC nets:

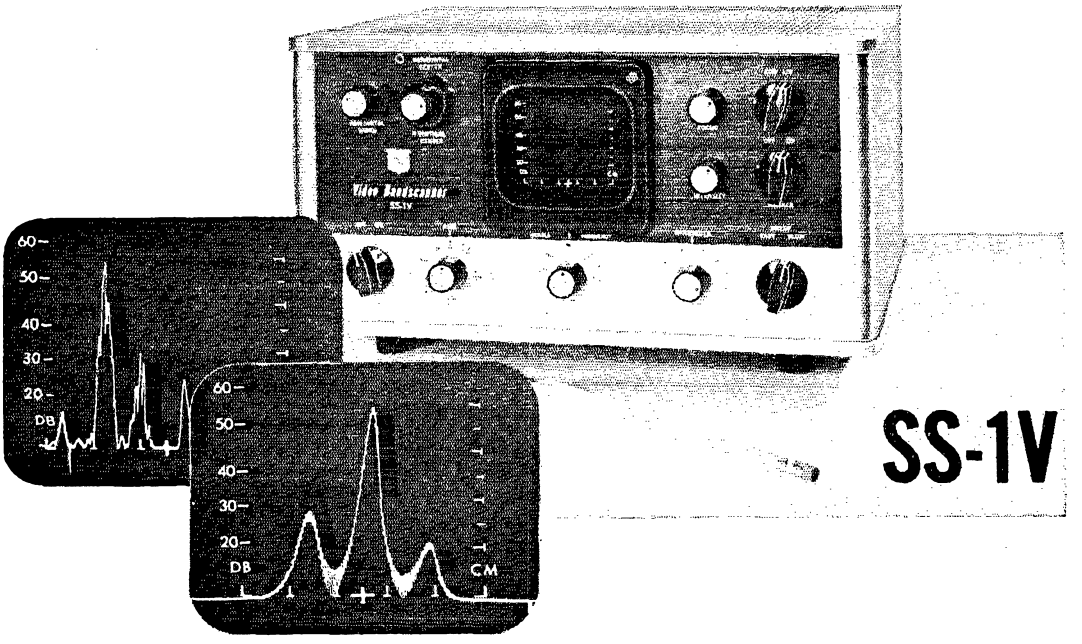
NJN	3695 kc.	7:00 P.M.	Daily	WA2BLV-RM
NJ Phone	3900 kc.	8:00 P.M.	Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZI-PAM
NJ 6&2	51.150 kc.	11:00 P.M.	M W Sat.	K2VNL-PAM
NJ 6&2	146.700 kc.	10:00 P.M.	Tu. Sat.	K2VNL-PAM
NJNN	3725 kc.	7:20 P.M.	MTWTh	WB2KXG-RM

All times local. AREC skeds are available from K2-ZFI. New appointments: WB2QLF as OPS. WA2NJB replaces K2BEV as EC for South Amboy. WB2-BCS has an auto-start working on RTTY. WB2FVO has joined the Air Force and hopes to get on the air from Texas. WB2QGB has been appointed pres. of the Saddle Brook HSRC and WN2TFH is vice-pres. WA2ZOW has an ARC-3 running 20 watts on 2 meters. WA2WHZ has a new NCX-3. Congratulations to WB2NIN on the receipt of his General Class license. K2RDX has rebuilt his varactor frequency multiplier for the third time. WB2KLD and WA2UDT held a QSO on 5650 Mc. The Central N.J.V.H.F. Society has a 1296-Mc. group; WB2KLD is chairman. WB2GKF worked North Dakota on 50 Mc. WB2MXZ worked VP7NX on 50 Mc. Most OESs report good openings. K2UKQ's DXCC standing is 275/263 and 125/120 on 40 meters. Your SCM received Field Day reports or messages from K2REY, W2AIM, WA2CCF, WB2CIN, K2GE, W2OF, WB2FIT, W2OR, WB2HLH, K2YNT, K2ODP, W2GLQ, W2GSA, K2GQ and K2ZSS. Approximately 100 AREC and/or c.d. members were represented by these reports. WB2-GFY's AREC group is conducting a recruiting drive with a prize offered to the member who gets the most additional members. This group also will conduct a demonstration of ham radio in Donaldson Park, Highland Park on Labor Day. WB2JWB is summer manager of the TCRN New England Net, 7042 kc. 12 noon daily. WB2SYY is a member of MARS. K2KDQ mobiled through the South on FD. WA2KHL sold ice cream over the summer. WB2MAJ has a Gonset I and an SR-42 on 2 and 6 meters. WB2FIT ran a demonstration of ham radio July 4. K2LNS is experimenting with antennas on 2 meters and will be looking for meteor scatter schedules. We hope WA2BNF will be fully recovered by the time we read this. We are sorry to report that the new "Schedules of Operating Activities" did not come off the presses because of a mixup. WA2-VMS was rescued by amateur radio and MARS when he became stranded because of car trouble. Your SCM has started another 2-year term in that office. K2ZFI and W2LQP will continue in their capacities as SEC and Asst. SCM. ECs, RMs and PAMs will be hearing from us soon on plans for the nation-wide Simulated Emergency Test to be held Oct. 9 and 10. Traffic: (June) K2VNL 346, WB2AEJ 295, WA2TEK 216, K2KDQ 190, WB2GFY 125, WB2JWB 98, WB2ALF 96, WB2KSG 90, WB2ICH 66, W2CVW 43, WB2HLH 41, WA2SRQ 38, WA2MYB 27, WB2KLD 19, W2PEV 19, W2DRV 18, WB2QLF 18, WB2BCS 16, K2ZFI 16, WA2SRK 13, WA2UOO 12, WB2FIT 11, WB2MAT 10, WA2CCF 9, WB2MAJ 8, K2MFX 6, WA2DEW 5, K2SLG 5, K2EQP 4, WA2PWI 4, WB2FVO 2, WA2KHL 2, W2NIY 2, WB2-QGB 2, W2EWZ 1, WB2IYO 1. (May) WA2UOO 17, WA2ZOW 3, WA2WHZ 2.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. The SEC appointment

NEW Dimension in Amateur Reception from SS



THE SS-IV Video Bandscanner adds a completely new dimension for enjoyment of amateur reception, while simultaneously providing a capability for operating efficiency and precision that has heretofore been possible only through the use of extensive laboratory equipment.

Used with the SS-1R, the SS-1V shows all signals in the band in use. Alternatively, any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the signals displayed do not move as the receiver is tuned, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier (see inset).

A turn of the SS-1R bandswitch allows monitoring of "dead" bands at a glance without de-tuning the receiver. DX chasing can become almost a science – "pile-ups" can be detected visually; with practice it is possible to "work" one DX station while observing the behavior of another (or several) at different frequencies. The motor tuning feature of the SS-1R is a real aid in moving up or down the band quickly to copy signals detected with the SS-1V.

In addition to providing these unique operating advantages, the SS-1V is truly a precise instrument capable of many oscilloscope measurements both with the SS-1R and alone, including complete monitoring of a transmitter (RF envelope, "Christmas tree", trapezoidal patterns, etc.) analysis of received signals (overmodulation and distortion products, carrier shift in both amplitude and frequency, audio harmonic distortion, intermodulation distortion, parasitics, etc.) as well as use of the SS-1V as a general purpose oscilloscope.

In this case, one picture is worth a thousand words! Operators' who have once used the Bandscanner "don't know how they got along without it." See the one picture at your favorite distributor.

SPECIFICATIONS

Frequency Coverage: Same as SS-1R, 500 kc segments
Dispersion: (display bandwidth) 500 kc max. 4 kc min.
Resolution: less than 2 kc; nominally 1 kc in slow sweep and min. dispersion
Sweep Rates: Nominally 30 and 15 cps.
Sensitivity: With SS-1R, less than 1 μv for 1/2 cm. deflection
Dynamic Range: Log 60 db, Lin 20 db
Input Frequency: 5.0 - 5.5 MC (SS-1R first i.f.)
Acceleration Potential: 2,500 V., dynam. regulated
Auxiliary Inputs and Outputs: (all connectors phono)
a) 6.0 - 6.5 MC (SS-1R VLO) for marker
b) Vertical plates
c) Envelope detected horizontal R.F. input
d) Vertical video amplifier input
e) Video out (for aural monitoring)
Size and Weight: 7½" H x 13¼" W x 13" D; 18 lbs.
Power Input: 50 W 115 VAC 50/60 cps
Tubes and Diodes: 14 tubes, 5 silicon diodes, 4 germanium diodes, 1 Zener diode, 2 varactor diodes

AMATEUR NET $395.00

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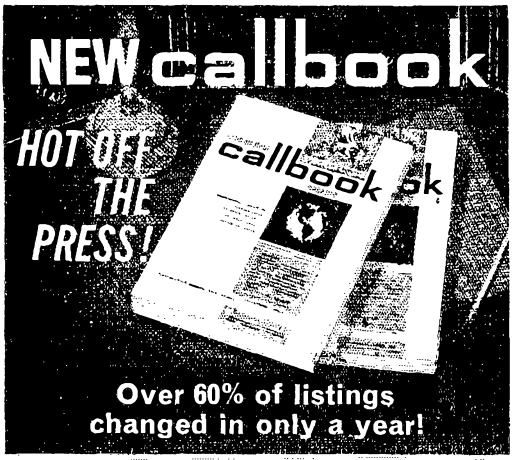

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is pending. PAM: WØNGS. The election for SCM will be over by the time this reaches you and the matter of appointments can be resolved forthwith. WØNTA entertained the elite of the DXCC Honor Roll at his home in Des Moines recently. WØQVZ, WØBFB and WØQGI, as well as the host, are all on the Honor Roll. WITYQ/HZ3TYQ/8Z4/8Z5 was guest of honor. The Midwest Section of the ARMS met in Ames with KØQKJ as the host station. This is a thoroughly dedicated group. Best wishes, boys. Our net picnics have been well attended and the usual good time was had by all. It is reported that the SCARA of Sioux City has accepted the challenge of the SCAREC of Ames to a three-year contest of Field Day activities for a handsome gold trophy to the winner. May I live to see the result. The Sioux City ARA has elected KØEXN as pres. and also to the board of directors. This will be a difficult and important task for Ron. Fourteen clubs sent Field Day messages to the SCM; there should have been more. The 160 Meter Net reports QNI 440, QTC 2, sessions 30; 75 Meter Net, QNI 1221, QTC 188, sessions 28; the Talleorn, 15 sessions, QNI 45; Hamilton County, QNI 186, QTC 3, sessions 31. Traffic: WØLGG 2141, WØNTB 99, KØQKD 30, WAØDYV 29, WØBLH 20, WØPTL 14, WØNGS 12, WØBKR 11, KØTDO 11, WØQVZ 7, WAØJSD 6.

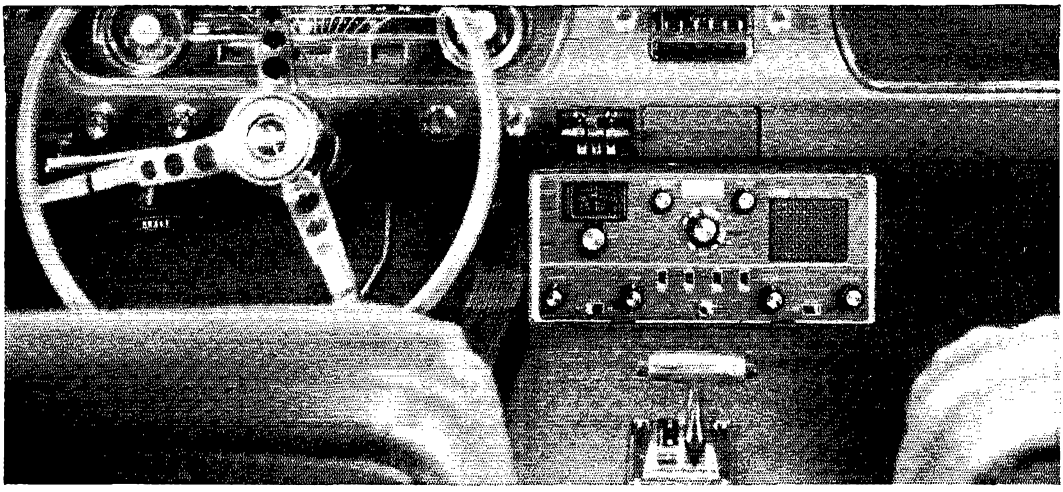
KANSAS—Acting SCM/SEC: Robert M. Summers, KØBXF—PAMs: KØEFL, WØBOR. V.H.F. PAMs: KØVHP, WØHAJ.

Net	*Freq.*	*Time*	*Days*
KPN	3920 kc.	0645 CST	Mon.-Wed.-Fri.
		0800 CST	Sun.
NCS WØORB, KØGII, KØUER, KØEFL			
QKS	3610 kc.	1830 CST	Mon. through Fri.
NCS WØRYV, WØVBQ, KØBXF			
KWN	3920 kc.	1830 CST	Mon. through Sat.
NCS KØEMB, WAØCCW			

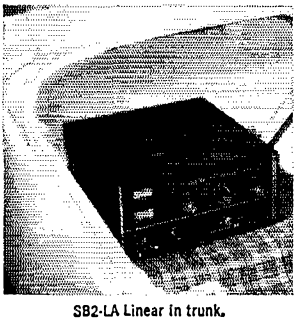
KWN—1 emergency—flood watch, 203 QNI. Emergency stations: WØKOL, WOOSY, KØATL, KØCKP/M, KØEMB, KØEKN/M, KØHAD, KØJWY, KØPHI, KØTGR/M, KØUAX/M, KØYHI, KØYWT/M. 00 WØPFG reported on June activity. OES WAØDZI reported Apr., May and June activity. The Jayhawk Amateur Radio Society, Inc., mourns the death of its president, WØLB. WAØDZI is working 6-meter DX and making plans for a new linear. The Kansas C.W. Net is perking up. Several new stations now are checking in. Congratulations to WØVBQ on passing the Amateur Extra Class exam. Garden City, Dodge City and Kinsley, Kans. areas were flooded. Hams in the area helped clean up. The water was six feet deep in the park at Dodge City where the hamfest are held. Traffic: (June) WØOHJ 1140, KØGII 389, KØLHF 49, KØBXF 42, KØGZP 34, WAØCCW 25, KØLPE 23, KØVQC 15, WØZUX 12, KØEMB 11, KØEFL 10, WØFDJ 9, WØBMW 5. (May) KØLHF 14, WØVBQ 7. (Apr.) WØVBQ 9.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. New appointments: WAØKNW as EC of Lafayette County; WØJBK as ORS (KØLGZ at Dixon); WØWGB as ORS and OPS; WAØFKD as OPS; KØAEM as RM, manager of the Show-Me-Net (SMN). Appointments were endorsed for WØYHT as EC; KØYIP as OPS/ORS; KØAEM as OPS and WØHHG as OES. WAØHSP and WAØIYL are managers of HBN, replacing KØEQY, who has moved to Oklahoma. Over 220 registered at the HBN Picnic at Warsaw. KØRWG's XYL passed the Novice Class test and is now WNØMLG. SEC WØBUL received FD messages from the following portable stations: WAØILQ, WØDRC, WØBRN, WØGWX, WAØFYA, KØOYM, WAØJBX, WØEAO, WØEBE, WØJLE, WØCBL, WØGYU, KØHEB, WØSXY, WAØCTV, WAØDYK, WAØBHY. The SCM received FD messages from the following portable stations: WØKY, WØRFU, KØLIR, WØZLN, WAØCTV. KØAEM is NCS for TEN (NTS) on Wed. Results of the Mo. QSO Party show WAØEMS, WØQWS and WØGNX first, second and third in the section, respectively. WØAMO reports working 7 stations in 2; 4-, 5- and 8-Land in 1½ hours on 6 meters. KØONK has a new antenna up. KØJPL placed 1st for Mo. in the Ga. QSO Contest. WAØEMX will go to Graceland College, Ia., in Sept. WAØDJG will attend Carnegie Tech in the fall. Net reports for June:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	13	287	63	WØBUL
MON	3580	0100Z	Tu.-Sun.	26	165	211	WØWYJ
MNN	3580	1900Z	M-Sat.	25	74	23	WØOUD
SMN	3580	2200Z	Sun.	3	8	2	KØAEM



1000 watts...neatly tucked in



SB2-LA Linear in trunk.

The small size of the new **SB-34** four-band SSB transceiver really proves its importance when installed in the lively 1965 small cars. In fact, using only standard available SBE equipment, it's no trick at all to tuck in a complete 1000 watt p.e.p. station. Observe in the photo that the **SB-34** fits under the dash—and blends with the interior of this well-appointed car like it was specially tailored. The exceptionally compact **SB-2LA Linear Amplifier** arranges easily in a corner of the rear trunk. Happily too, the **SBE Inverter** that powers this linear finds a made-to-order—and well ventilated—mounting space in the front section of the engine compartment of this popular car. Need we mention that SB-34 has its own **built-in 12V DC and 117V AC universal power supply** thereby simplifying greatly the problem of finding mounting space in a compact car? And if you're wondering how to mount an antenna on that really snug, contoured bumper—don't. Band-spanner H-215 contour mount makes it easy, supports the short-column model of the Band-spanner "Topsider" with its KW coil.

SB-3DCP Inverter in engine compartment.

SB-34 and **SB-2LA** combo add up to the best KW p.e.p. value on the market!

SB-34 Transceiver
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SB-3DCP Inverter
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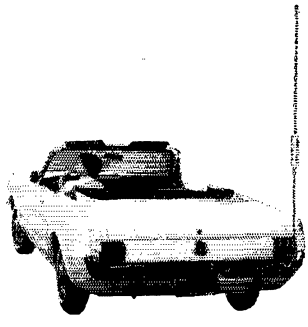

HIGHLIGHTS: 135 watts p.e.p. input. (Slightly lower on 15). **Frequency range:** 3775-4025 kc.—7050-7300 kc.—14.1-14.35 mc.—21.2-21.45 mc. • 23 transistors, 18 diodes, 1-zener diode, 1-varactor diode, 2—6GB5's PA, 1—12DQ7 driver. **Speaker built in** (external speaker provisions). Pre-wired receptacles on rear of set accept VOX and 100 kc. calibrator—both items being optionally available. **Size:** 5" high, 11¼" wide, 10" deep. Weight, approx. 20 pounds.

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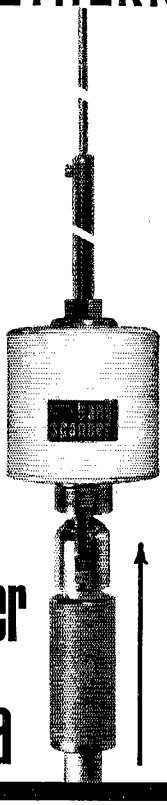

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H-215 MOBILE mount

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Top-sider column assembly features precision machined yoke normally locked in vertical position by knurled brass collar but capable of 90° hinging when released. Stainless steel top whip telescopes allowing 10" change in length for exact resonance . . . set-screw lock.

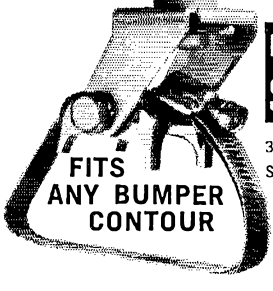
Two column lengths:

H-218R, 93" max. and **H-218S**, 77" max. (less inductors). Low loss coils are sealed in protective white plastic . . . . can be quickly changed for different bands.

Standard coils rated at 300 watts p.e.p. available 160 to 10 meters. 1KW p.e.p. coils, 80/15 meters.

Stainless steel strap needs only 1/16" clearance between bumper and car body, installs in 5 minutes using screwdriver!

H-215 MOUNT . . $8.50



webster band-spanner.

317 ROEBLING ROAD,
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CALIFORNIA

MoSSB	3963	2400Z	M-Sat.	24	441	81	WØOMM
PON	3810	2100Z	M-F	19	215	161	WØHVJ
TEEN	3935	2315Z	M-W-F	6	20	5	WAØEMX
HBN	3880	1805Z	M-F	22	622	215	WAØHSP WAØIYL

Traffic: KØONK 2217, WAØFKD 583, WØWYJ 143, WØOUD 124, KØAEM 118, WØHVJ 71, KØYGR 49, WØTPK 38, KØYIP 34, WAØEMX 28, WØBUL 22, WAØDJG 20, KØHNE 15, KØLGZ 14, WØRTO 14, KØVNB 14, WAØKNW 13, WØKIK 10, KØWOP 10, WAØDGT 6, WØGBJ 6, WØGQR 6, WØBVL 4, WØAMO 2.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Endorsements: KØJXN as SEC. Monthly net reports: Nebr. Emergency Phone Net, WAØBID, QNI 1020, QTC 118. Nebr. Morning Phone Net, WAØIXD reporting for KØUWK who is in the hospital, QNI 492, QTC 29. Nebr. AREC Net, WØIRZ, QNI 101, QTC 8. Nebr. AREC C.W. Net, WAØEEI, QNI 11, QTC 2. Nebr. C.W. Net, WAØGHZ .1st session QNI 134, QTC 76, 2nd sessions QNI 103. West Nbr. Phone Net, WØNIK, QNI 476, QTC 112. Nebr. Storm Net, KØJXN, 1st session QNI 545, QTC 15, 2nd session QNI 369, QTC 4. Nebraska had a very good representation during Field Day activities. Remember, the AREC Emergency Net frequency is 3982.5 kc. WØFQB has adapted a new English "Joystick" vertical for portable operation. WØNYÜ is working on arrangements for OBS skeds on tape, c.w. and RTTY. Traffic: WAØGHZ 303, WØLOD 211, WAØBID 110, WAØBYK 102, WØNIK 58, WØVEA 38, WØFQB 32, WAØBOK 25, KØJFN 24, WAØIXD 23, WØGGP 21, WAØBIE 20, KØHNT 20, WAØEUM 18, WAØEEI 12, KØJFO 12, WAØERN 9, WØVRE 9, KØJXN 8, WØFBY 6, KØBYK/Ø 5, WØBFV 4, WAØGVJ 4, WAØAES 3, WØEGQ 3, WAØJAV 3, WØMTI 2, WØWKP 2, WØYFR 2.

NEW ENGLAND DIVISION

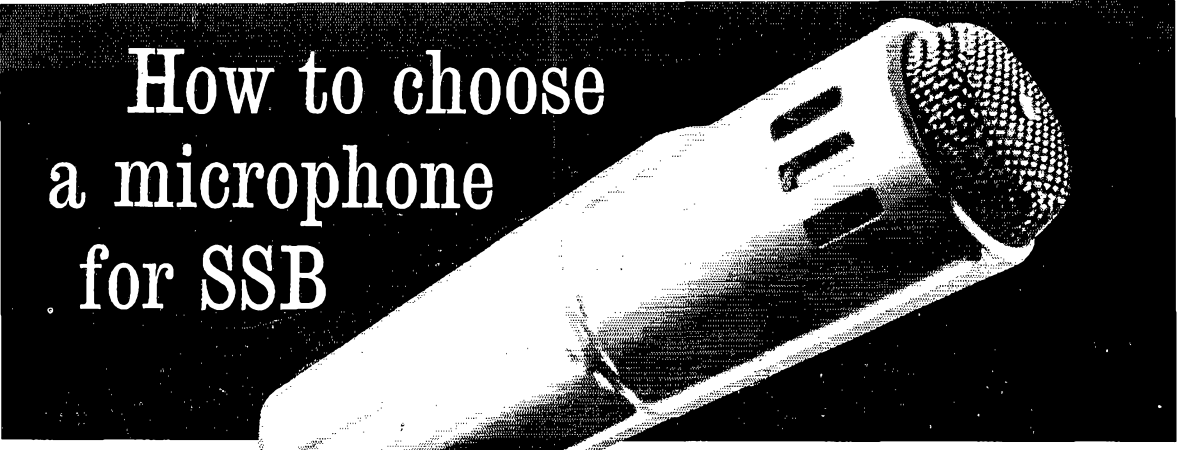
CONNECTICUT—SCM, Fred Tamm, K1GGG—SEC: W1EKJ. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1RTS. Net reports:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845	30	291	259
CPN	3880	M-S	1800	29	317	106
		Sun.	1000			

High attendance: CN—W1ZFM, K1STM, K1LMS, W1RFJ. CPN—W1FVU, K1EIC, K1SRF, W1LUH, W1YBH, K1YGS, K1EYY, K1OJZ. Reminder to newcomers: CTN still is on 3640 kc. Sun. at 1800 with Net Manager W1RFJ as NCS. Stratford ARC participation in the 1965 Barnum Festival in Bridgeport was a success: W1ORS/1 handled 196 QTC with K1FQT, K1EIR, K1NIC, K1WKK, WA1ALZ and yours truly as operators. The exhibit, under the able direction of W1URC and featuring a workable 1921 spark-gap station, detailed as completely as to the wallpaper of that period, various collections of new and historical gear, QSL collections, etc., drew appreciable crowds. The project committee and chairman included W1URC, W1ASO, WA1CUT, K1ICD, K1EPT, K1FSO, WA1CNB, WN1EHF and K1GGG as chairman. The center's 40-ft. tower was transported to the site by K1LAW. How? On a VW of course. How else? New officers—Shoreline ARC: K1WWU, pres.; K1LEG, vice-pres.; K1OJZ jr., vice-pres.; K1VII, secy.; K1VEA, treas.; W1ERM, trustee. Tri-City ARC—K1RVU, pres.; K1ZNQ, vice-pres.; W1WAZ, treas.; K1PNS, rec. secy.; WA1AIP, corr. secy.; W1WHQ, activities. Recent travelers: W1QV and W1BLI at the National Convention on the West Coast, K1UYZ in Florida. New OO: W1BGD. Appointments endorsed: K1UYZ as ORS. WA1BER as OES. Reports: WA1AIP, WA1CPU, K1QNF as OESs, K1QGC as OO, K1BEN, W1FAJ, W1GEA, W1HHR, W1PRT, K1RPQ, K1SJG, W1WAZ as ECs. FD messages: K1LOM/1, W1FWH/1, K1OGC/1, K1MUJ/1, W1FHW/1, WA1CRX/1, W2AMK/1. The Sub Base ARC in Groton reports a 100% AREC membership as per K9PXX, manager of WA1DIU. K1LAW participated in the FMT. A happy note: K1OQG and K1STM consolidated their stations. Congratulations. Traffic: W1ZFM 268, K1STM 170, K1FQT 143, W1EFW 141, K1EIR 121, K1EIC 102, W1BDI 65, K1GGG 61, W1RFJ 61, K1LMS 57, W1YBH 45, W1CTI 36, WA1APY 25, K1SRF 20, W1QV 15, W1FVU 13, W1CUH 8, K1UYZ 5, W1BNB 4.

EASTERN MASSACHUSETTS—Frank L. Baker Jr., W1ALP—W1AOG, our SEC, received reports from W1s STX, JVZ, K1s PNB and ICJ. W1JVZ's group went into action after an explosion in a shopping center in his city, supplying communications to the Red Cross,

How to choose a microphone for SSB



Model 664
$51.00 Amateur Net

Hand us a blank check. Tell us you want the best microphone you can buy for SSB — with price no object. We'll hand you the Model 664 dynamic cardioid microphone. We'd like to tell you why the 664 is so uniquely suited to SSB operation.

Let's start with the transmitter. Almost every quality SSB transmitter, commercial or home-brew, incorporates an automatic level control circuit. And the general practice in transmitter design is to assume that the microphone response will be flat. On this assumption, the audio input circuits are designed to shape your speech characteristics, in conjunction with the ALC control, so that proper transmitter setup gives you maximum PEP.

Anything less than flat microphone response limits your ability to obtain maximum PEP, and your effective radiated power will be reduced. To satisfy this basic requirement, the 664 is unusually free from peaks or dips in response. It allows maximum PEP while retaining your natural voice characteristics.

Another important SSB feature, found in almost every modern transmitter, is voice operation. The 664 flat response, plus the effective Variable-D® cardioid pattern, reduces the possibility of accidentally opening the VOX circuit when speaker level is high. That's because the 664 rejects sound from the back and sides of the microphone. You can operate with higher receiver volume with complete safety. And noise, reverberation and echoes in the ham shack are reduced by the cardioid pattern to give you better intelligibility on the air.

Despite the performance advantages of the 664, this is not a fragile microphone, far from it. It's rugged, almost indestructible. The dynamic design meets the most rigorous tests for quality and service. And at the heart of 664 dependability is the diaphragm, made of Acoustalloy®; a unique plastic material available only from Electro-Voice. Acoustalloy is virtually impervious to shock, temperature extremes, humidity and the countless other environmental conditions that gradually destroy less rugged instruments.

But there's more to the list of 664 advantages: High output level, handsome appearance, and the guaranteed backing of a manufacturer of unquestioned integrity and wide experience in electro-acoustics.

While we manufacture microphones ranging from the communications units in the Gemini space program to professional models that have won an Academy Award for their contribution to motion picture sound, no field is closer to our hearts than amateur communications. And the engineers and hams in our organization are particularly responsive to the needs of the amateur fraternity. They insist on good value for every product, in every price range.

But when price is no object, their choice is the 664 for SSB. Outstanding in performance and value for even the most critical amateur radio operator. We urge you to try the 664 in your own shack soon. We guarantee your satisfaction, or your money back.

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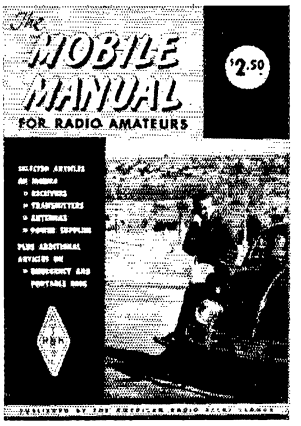

3rd Edition

In addition to a wealth of mobile material, the Third Edition of The Mobile Manual for Radio Amateurs includes numerous articles on Emergency and Portable gear, thus making it useful not only to mobileers but to all amateurs interested in lightweight, compact gear designed for field and emergency operation.

The Mobile Manual assembles under one cover the most noteworthy articles on mobile and portable operation that have appeared in past issues of *QST*. It includes articles on construction of receiving converters, transmitters, antennas, power supplies and suppression of noise in vehicles; contains excerpts from FCC regulations governing portable and mobile operation. A valuable "how to do it" manual for all amateurs.

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W1s AYG, WAJ, BB, DFS and WJD took part in the May FMT. W1HFJ/W1GSQ is a Silent Key. K1USE moved to Quincy. W1AAI is going to the South Pole. W1OFK has a new QTH in Somerville. WN1DRO is mobile on 2. K1UCT is on 6 RTTY. WA1DGG is on several bands. Congrats to K1PLP on winning an award for his article in May *QST*. EM2MN had 22 sessions, 206 QNIs, 95 traffic. The 6-Meter Crossband Net had 18 sessions, 243 QNIs, 6 traffic. W1GEK is in the hospital. WN1CRT has his General Class license. Ex-K6JWN is working in the Boston Area. New Novices in Sharon: WN1s EPU, EPV, EPW, EPX, EPY, EPZ. Many Field Day messages were received, one from the W1ZST group through K1UCT. W1ALP attended a meeting of the Capeway Radio Club at the QTH of W1UOH. New officers of the Bedford Radio Club are W1DTA, pres.; W1LJP, vice-pres.; W1EIQ, secy.-treas. W1AUQ's son is home after two years in Germany. W1CDN put an SB-300 receiver together. W1NF worked RAEM on 20, also VK3AXK. WA1DJC says the DX-40 on c.w. works fine. WN1EHY is on 40-80 c.w. The Bedford Club Net meets on Mon. at 2000 on 29.12 Mc. W1UE had two QSOs with his brother-in-law in France, F3DY. K1CCL is busy with several other activities. K1VPJ worked Arizona and Texas on 6. W1OSQ is on 6 some. W1FSN spoke at the Quannapowitt Club on a product detector that he designed for s.s.b. for HRO receivers. W1SHV moved to Vermont. W1BB is in Maine and on 80 for the summer. New officers of the Yankee RC: K1VOM, pres.; WN1DTI, vice-pres.; K1SMP, treas.; K1WXF, secy.; K1UVX, W1ONW, W1OFY, K1YJD, directors; W1TY, ham tamer. Don Kent, of WBZ-TV, spoke at the club's annual banquet. WA1s DRC and EKV are on 75. W1RST is studying for the Extra Class exam. W1AEC had a group of 20 operators with six rigs on phone and c.w. on FD. WA1COE has his General Class license. K1DZG visited quite a few VOIs on a trip up there and worked DX on 20. WA1CNO's XYL gave birth to a baby girl during Field Day. WA1DHQ has his General Class license. K1NWS is s.s.b. W1DIR is back on the air. K1TLB now is active in New Bedford. W1PEX made the BPL again. K1ESG has an A-1 Operator certificate. K1VOK had a virus bug. W1ALP has his 2-meter beam up again. WA1DED is WA1EIQ's sister. W1BVP is house-hunting. Appointments endorsed: W1UIR, K1VPJ, K1SCJ and K1MOD as OBSs, W1UIR as PAM for 75, W1OSQ and K1CCL as OOs, W1DWY as EC, W1UE as EC and ORS. K1YUB is pres. of a new amateur radio club for teenagers sponsored by the YMCA in Somerville which meets at 1900 on Thurs. Contact him at 19 Cambria St. W1HXK passed the Extra 1st exam. W1QXX has a new house trailer. W1QQV is moving to Oregon. W1CDN is in several of our nets. W1HIL is working for the Extra Class license and worked FP8CV and KA2USF. W1FJJ has a new Drake R4 receiver and is going to Europe on a trip. W1ATX/W1CZB is in Mattapoisett for the summer. K1PNB had his AREC/RACES setup out on FD. Our EMINN on 3733 kc. had 13 sessions, QNI 60, 30 traffic with 7 new stations. Traffic: (June) W1PEX 1016, WA1DAG 182, W1EMG 153, W1DOM 98, K1PNB 92, K1ESG 72, W1LES 68, K1VOK 64, K1VPJ 63, W1ZSS 43, W1AOG 42, K1WJD 26, WA1ATX 22, WA1CRR 22, W1OFK 15, K1ZHS 13, W1SIV 11, W1CTR 10, WA1DED 8, K1GKA 8, K1LCQ 7, WA1DLT 6, W1CDN 5, W1CZB 4, W1FJJ 4, K1BGK 3, W1BVP 2, WA1DEC 2. (May) WA1DAG 291, W1EMG 116, K1ESG 113, K1ZHS 39, W1ATX 35, K1WJD 27, WA1DLT 16, W1CZB 9, W4YAC/1 8.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1BXI, K1ZVN. RM: WA2NPU: V.H.F. PAM: K1OYB. Traffic nets: Sea Gull Net, 3940 kc. 1700 to 1800 and 2000 to 2100 local time Mon. through Sat.; Pine Tree Net C.W., daily on 3596 kc.; Two-Meter Phone and Traffic Net, 145.08 Mc. Thurs. 1930 to 2030 hours. Following is a list of stations that hold one or more appointments as OPS, ORS, OO, OBS, OBS: K1GPJ, K1GUP, K1INL, K1LHE, K1MDM, K1MTJ, K1MZB, K1OYB, K1RQE, K1TEV, K1TMK, K1UXZ, K1ZVN, W1DPJ, W1EFR, W1FJP, W1FNI, W1FV, W1GKJ, W1ISO, W1OTQ, W1UOT, WA1ADK. Any of these appointments are available to qualified stations. There were many portable stations operating during Field Day with good results from all. To correct an error in print of a month or so before, K1WQI, is a net control station and has helped out very much in all our nets. Traffic: K1TMK 130, K1TMJ 62, WA1ADK 27.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2300Z and Sun. at 1330Z. VTNH Net meets on 3685 kc. Mon. through Fri. at 2230Z. Endorsements: W1ET as OPS; K1MOZ as OBS. K1IIK has a new NCX-5 and BS degree and is going to Finland. W1-

SIX BANDS IN TWO MINUTES!

This is the performance that K4KXR of Gotham can demonstrate, using his Gotham V-80 antenna with 35 foot feed-line connected to the coil at the antenna's base, and his HT-40 transmitter. Neither the antenna nor the coil is touched. Without worrying about the standing wave ratio on various bands, Bob merely switches his rig to the desired band (80-40-20-15-10-6 meters), plugs in the crystal, tunes grid drive, plate tuning and plate loading, and he is on the air. No TVI at any time even with TV receiver in the same room. Contacts vary from local ragchews to DX thousands of miles away.

GOTHAM VERTICALS DELIVER THE CONTACTS

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71
"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159
"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248
"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111
"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613
"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483
"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146
"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555
"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84
"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

ALSO AVAILABLE AT
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AN ANTENNA THAT SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED.

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THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA FOR YOU

- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
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- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

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☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS..... $14.95

THE V40 IS ALSO MADE FOR CITIZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS. DESIGNATE CB-11 ANTENNA. PRICE SAME AS THE V40

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS..... $16.95

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Why settle for less than the best?

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TWO CATEGORIES TO CHOOSE FROM

Standard Duty Guyed in Heights of 37 - 54 - 88 - 105 and 122 feet

Heavy Duty Self Supporting and Guyed in Heights of 37 — 54 feet (SS) 71 — 88 feet (guyed)

ROHN has these 6 IMPORTANT POINTS:

Ease of Operation—roller guides between sections assure easy, safe, friction-free raising and lowering. **Strength**—welded tubular steel sections overlap 3 feet at maximum height for extra sturdiness and strength. Unique ROHN raising procedure **raises all sections together**—uniformly with an equal section overlap at **all** heights! **Versatility**—designed to support the largest antennae with complete safety and assurance **at any height desired! Simple Installation**—install it yourself—use either flat base or special tilting base (illustrated above) depending on your needs. **Rated and Tested**—entire line engineered so you can get exactly the **right** size and properly rated tower for **your** antenna. The ROHN line of towers is **complete. Zinc Galvanized**—hot dipped galvanizing a standard—not an extra—with all ROHN towers! Prices start at less than $100.

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"World's Largest EXCLUSIVE Manufacturer of Towers: designers, engineers, and installers of complete communication tower systems."

QGU/K2BH is no more. Keith is now K1AC, Snowville. K1ZRM did FB in the May FMT. GSPN had 432/55 for the month and K1APQ is trying for 500 check-ins. W1BYS is on 20 meters. New officers at Dartmouth are KØMRS, pres.; WA2MXO, secy.; WB2CAS, treas. Expres. K7APJ is going to the Philippines. W1TFS is on vacation. VTNHN reports 59 check-ins and 21 traffic with a full because of summer activites. W1SWX received his 3.5-Mc. WAC award. Stations active on Field Day were W1ASZ/1, WA1CPQ/1, W1EAW/1, W1HPM/1 and W1TA/1. Where was W1OC/1? GSPN certificates were issued to K1JFQ, W1LOO and WA1BKG. W1IKK/1 is on the air from his "ship" on Lake Winnipesaukee. K1DWK reports 30 check-ins and 1 traffic for Merrimack Valley AREC. Our thanks to the net managers, net controls and all you folks who check into the N.H. nets for your fine support. Traffic: (June) K1BGI 109, W1DYE 91, K1IIK 11, K1APQ 1, W1ET 1, W1SWX 1. (May) K1IIK 8.

MASSACHUSETTS QSO PARTY

October 2-4

All Amateurs are invited to participate in the annual Massachusetts QSO Party, sponsored by the M.I.T. Radio Society, W1MX, in order to promote friendship and operating ability among the radio amateurs of the world.

Rules: (1) Party will begin at 2300 GMT on Saturday, October 2, 1965, and will end at 0500 GMT on Monday, October 4. There are no time restrictions, and all or any portion of the 30 hour period may be used. (2) A station may be contacted only once per band. Each phone and c.w. segment shall be considered a separate band. Crossband contacts are not allowed. (3) The general call will be "CQ MASS"; and Massachusetts stations will identify themselves by signing "DE MASS, DE W1MX." (4) Each exchange shall consist of: a QSO number, RSCT report, and county (for Massachusetts stations), state, or province. (5) Logs should show: date and time of contact, station worked, signal report sent and received, QSO numbers sent and received, county state or province, frequency and type of emission.

Scoring: (6) Count one point for each report received and one point for each report sent and QSLd, for a total of two points for each completed exchange. Massachusetts Stations multiply the number of QSO points by the number of different states and Canadian provinces worked to determine TOTAL score. Outside stations multiply the number of QSO points by the number of different Massachusetts counties worked (maximum of 14) to determine TOTAL score.

Awards: (7) Certificates will be awarded to the highest scoring station in each state, province, and Massachusetts county. Additional awards will be issued, if, in the opinion of the Contest Committee, the number of entries from an area warrants them. (8) All logs must be postmarked by Monday, October 25, 1965, and mailed to: M.I.T. Radio Society, W1MX, Box 558, 3 Ames Street, Cambridge, Mass. 02139. Each entry must include a signed statement that the operator observed all regulations of his country and that the decisions of the Contest Committee will be accepted as final. Logs cannot be returned.

Suggested Frequencies: C.w. 3560 7060 14060 21,060, 28.060, A.m.: 3990 7260 14,230 21,310, Ssb: 3960 7220 14,290 14,290 21,410. Novices: 3735 7175 21,110.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE, PAM: W1TXL, RM: W1BTV, V.H.F. PAM: K1TPK. New appointments: K1USD as ORS and K1JSG/W1FVY as EC. Endorsements: W1QLT as EC. Field Day messages to the SCM were received from the following clubs: K1WEW/1 at Candia, N.H.; W1SYE/1 at Newport, R.I.; W W1DDD/1 at North Smithfield, R.I.; W1VSL/1 at Cranston, R.I.; W1OP/1 at Johnston, R.I., and W1AW/1 at Lincoln, R.I. The NCRC Club of Newport supplied auxiliary communications for the Police Department during the recent Jazz Festival. W1TXL, W1WLG and WN1CSV set up the system and operators were W1s TXL, JFF, WLG, AWG, WA1s CSO, BLC, AUL, k1s MCT, VPK, WN1s DCJ, CSU, also Roy Smith and Ed Sturtevant with State e.d. licenses. The SEC requests that all hams interested in participating in AREC activites contact the SEC or SCM. The R.I. Emergency Net meets every Mon. at 2000

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High Power HUSTLER

Watch for the NEW high Power HUSTLER . . . **Another First from New-Tronics.**

Specially designed for high power mobiles.

Mobiles who have enjoyed the outstanding performance of New-Tronics Hustler antennas will be happy to know that we have developed a new Super Hustler for high power mobiling. **Hams who have seen and tested it say it's great.**

Now you can enjoy all the benefits of going Hustler plus the high power capability.

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NOW . . . MINIATURIZED, QUALITY ANTENNAS FOR . . .

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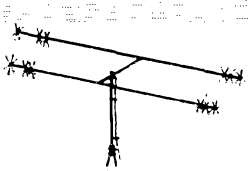
featuring heavy wall aluminum and stainless steel construction throughout



6 - 10 - 15 - 20 METERS

The time proved B-24 4-Band antenna combines maximum efficiency and compact design to provide an excellent antenna where space is a factor. New end loading for maximum radiation efficiency. No center loading.

Oper. Freq.	6-10-15-20 Meters
Power Rating	600 Watts AM
Turn. Radius	7'
Total Weight	11 lbs.
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

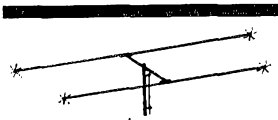
Model B-24
Net $59.95

MULTIBAND COAXIAL ANTENNA

For 6 - 10 - 15 - 20 METERS
Needs no ground plane radials. Full electrical ½ wave on each band. Excellent quality construction. Mount with inexpensive TV hardware.

Power Rating	600 Watts AM
Total Weight	6 lbs.
Height	12'
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

Model C4 Net $34.95



40 plus 10 METERS

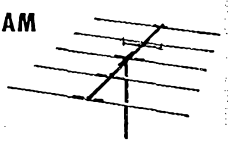
Oper. Freq.	40 and 10 Meters
Power Rating	1000 Watts AM
Single Feed Line	52 ohm coax.
SWR at Resonance	1.5 to 1.0 max.
Total Weight	22 lbs.

New end loading for maximum radiation efficiency. No center loading employed. Element length only 20' . . . boom 10'.

Model B 4010 Net $79.50

RUGGED 6 METER BEAM

Rugged construction with no holes in elements or boom to weaken antenna. Heavy wall aluminum and stainless steel throughout.



Power Rating	1000 Watts AM
SWR at Resonance	1.4 to 1.0 max.
Impedance	52 ohms
Longest Element	9'8"
Boom	12'

Model B6M5
Net $24.95 each
Two for $44.50

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If there is no stocking distributor near you . . . order direct from factory. Free shipping to your QTH and we will prepay the costs in continental U.S.A.

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• LEADERS IN COMPACT ANTENNAS •

hours local time on 51.5 Mc. K1VYC contacted K6ODV in California with 50 watts on 6 meters. R1N members include W1s BTV, YNE, YKQ, K1s YYI, BRY, USD, YVN and QZW. K1USD has received his Extra Class ticket. Traffic: W1TXL 351, W1YKQ 65, W1BTV 62, K1-USD 49, K1VYC 47, K1TPK 34, K1YEV 34, K1BRJ 27, WA1CSO 3.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: W1WFZ. Because this report had to be written prior to the end of the month, I regret it is impossible to include net and traffic reports for June. However, next month we'll be back on schedule. The Vt. C.D. RACES Net has shifted to 3990.5 kc., the frequency assigned to our state. The net meets at 1400Z. K1OXG got his 50th state recently. Central Vt. ARC will sponsor another Vt. QSO Party next February. In view of incentive licensing proposals, it would be prudent for all clubs to consider increased activity this fall in areas of code and theory classes. The Tri-State Club is looking for members. Contact W1FPS in Brattleboro. K1PQN was aeronautical *mobile recently with* W1MMN as pilot. Don't forget to QNI the nets: Green Mt. 3855 kc. at 2130Z; Vt. Fone, Sun. at 1300Z; VTNH, Mon.-Fri. 3685 kc. at 2230Z; Vt. C.D. RACES at 3990.5 kc. Sun. at 1400Z.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—C.W. Route Manager: K1IJV. 10 Meter Traffic Net Manager: K1PKZ. With the summer season in full swing, reports are rather scarce this month. Route Manager K1IJV and family are at East Orleans for the summer, and W1BVR and his XYL are busy in Lanesboro getting a new summer log cabin in liveable shape. Our thanks to W1ZPB especially for keeping WMN controlled and for his representation to 1RN. WMN (3560 kc. nightly at 7:00 P.M.) handled 111 messages during the *month with the following stations in attendance (listed* according to activity): K1IJV, K1WZY, W1ZPB, K1-SSH, W1BVR, K1LBB, W1DWA, K1VPN, W1DVW, K1YMS, WA1ABW, W1QKX. W1ZPB is very active on 6. K1ZQB received his B.S. Ed. degree from Westfield State College, and K1NGL his B.S.E.E. from the University of Massachusetts. Congrats to you both. W1NY and XYL and W1BVR and XYL were guests at the First Annual Banquet of the Valley Amateur Radio Club, at which time the club received its charter of affiliation with the ARRL. WA1CSZ and brother WA1CSW are on from *Williamstown using a* DX-40 and a Collins 75S-1. New members of the Berkshire County Amateur Radio Assn. are K1NWO, K1TLS and K1SGK. Traffic: W1BVR 91, K1IJV 75, K1WZY 61, K1SSH 44, W1ZPB 42, K1LBB 19.

NORTHWESTERN DIVISION

ALASKA—Acting SCM, Daniel R. Wright, KL7ENT—The Anchorage Radio Club is conducting but one meeting per month in the summer, and will resume two meetings per month in the fall. During the cutover of the Anchorage phone system June 19, amateurs did an admirable job on 2 meters covering vital nerve centers of the city. As of late June, 14 members were enrolled here in a class working for General Class FCC license. The SCM will welcome reports for this column from Fairbanks, Anchorage and all Alaskan points, as well as applications for ORS-OPS-OES and leadership posts.

IDAHO—SCM, Raymond V. Evans, K7HLR—PAM: W7GGV, W7GMC, Lewiston, is the new Asst. Director for the Northwestern section. The Pocatello Amateur Radio Club and the Eagle Rock Radio Club hosted a talk by W1ICP July 14. W7DHD and W7BAR operated Field Day from Ogden. Their original plans for an antenna experiment in the Bonneville Salt Flats were cancelled because the area was too muddy. K7IAR is sporting a new SB-200. Many thanks to all the hams who are at the time of this writing assisting with communications at the Girl Scout Roundup at Farragut. FARM Net: 21 sessions, 151 QNI, 151 traffic. Traffic: W7GMC 31, K7NEY 12.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAM: W7YHS.

Montana S.S.B. Net	3910 kc.	1800 MST	M-F
Missoula AREC Net	3895 kc.	0900 MST	Sun.
Montana State Net	3520 kc.	1900 MST	T-Thurs.
Montana PON	3885 kc.	0815 MST	Sun.

Endorsements: K7SVR as OO. We are sorry to report the resignation of W7KUH as Montana SEC. Walt has done a good job, both as your SCM and SEC, and his talents will be missed. Our Asst. SCM, W7RZY of Harlowton, has agreed to take over the job of SEC. All ECs should send their reports to Harry. Let's all give him our support. The Old Faithful Radio Club and the

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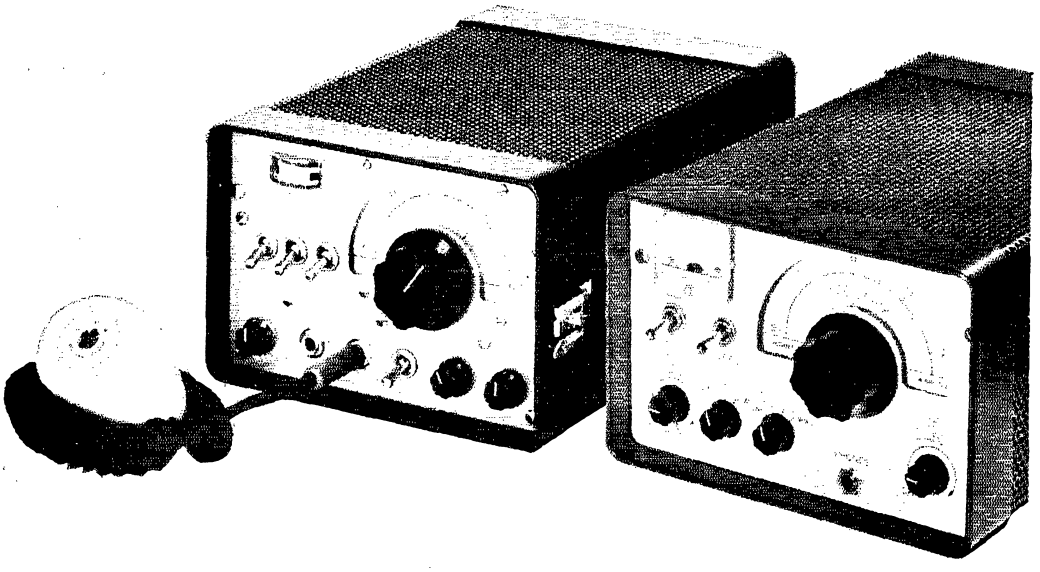

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Montana Post Office Net put on a real great picnic July 4. Dr. Weaver, ex-W6VQL, developer of the Quadrature method of s.s.b. generation, is on in Bozeman with his new call, WA7DLW. Other new calls in the Bozeman area are WN7DON and W7GDM. Among Field Day groups on in Montana were W7ED and W7YB, from Bozeman. WA7CAC is on with a new Swan 350. W7NPV and W7OOY are on 75-meter s.s.b. with a new two-element beam. Word has been received that Herb Bassett, W6SS, will visit the Butte area the middle of Sept. If you are not subscribing to any or all of the five club newspaper publicities you are missing out on some of the events happening in and around the state. As part of the Boy Scout Camporee W7ZOD/7 was put on the air and traffic was handled for the Scouts. Stations active in this Public Service would include: K7PWY, SVR, QLP, TGR, ECF, YPC, BON, UON, QKN, QVD, W7NPV, YHS, OIQ, LPL, TIM, TTC, WA7ARA, VE6FK, K7EFA/M, club station of the Yellowstone ARC also was on. Traffic: K7SVR 74, K7UPH 26, W7NPV 8.

OREGON—SCM, Everett H. France, W7AJN—RM: W7ZFH. New appointment: W7LNG as Official Observer.

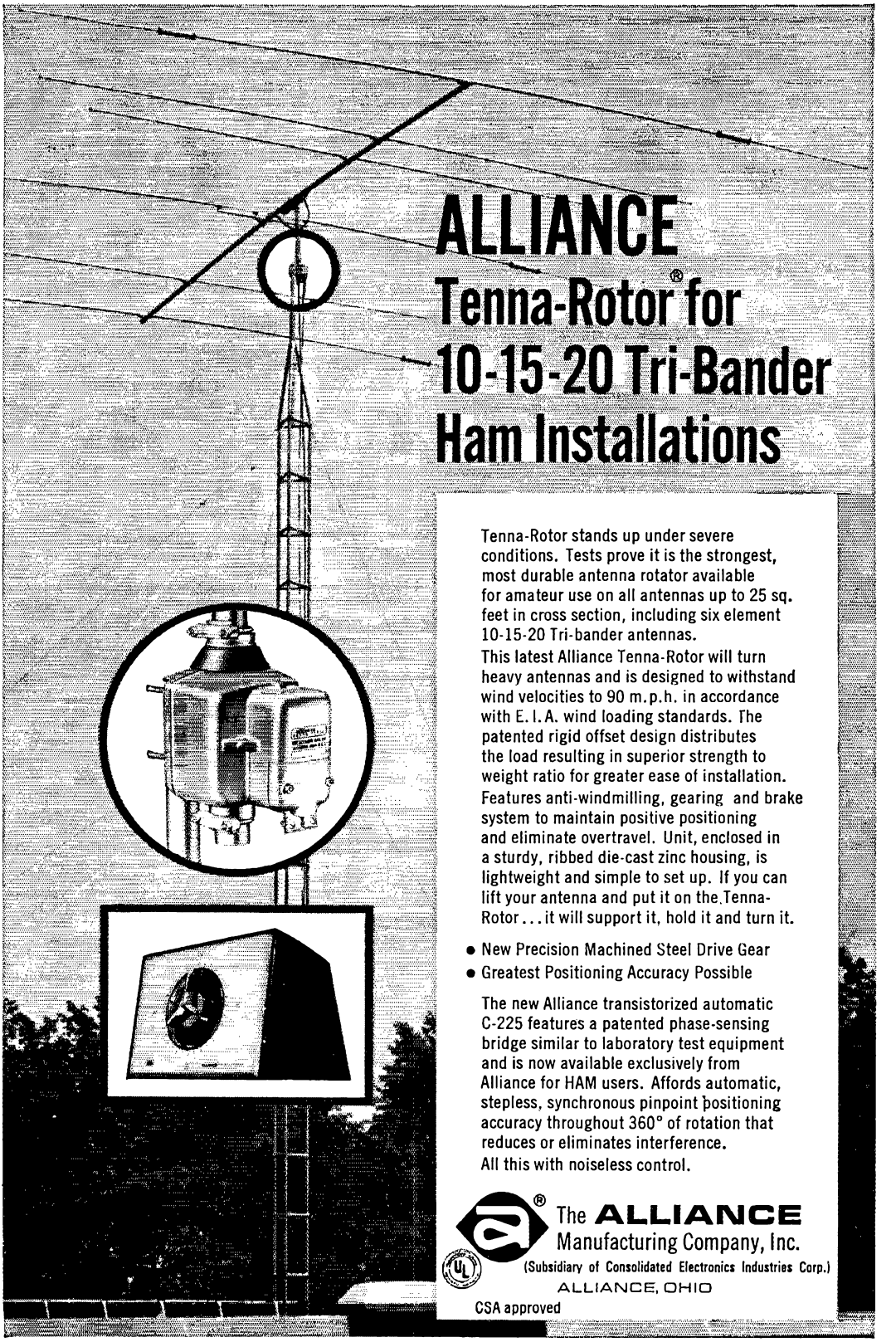
OSN	3585 kc.	Mon. through Fri. 0130 GMT-NTS
OEN	3840 kc.	Daily 0100-0200 GMT 1800-1900 PDT
AREC	3875 kc.	Daily 0200 GMT 1900 PDT

Field Day reports: WA7ABW/7, near Aloha, Oreg., 2 operators. K7JIY/7, Plum Ridge, Klamath Falls Basin, 20 operators. 16 AREC members. W7PXL/7, Reynolds Hill, s.w. of Eugene, 3 stations, 12 operators. Clackamas Radio Society, near Oregon City, 4 transmitters, 20 operators. W7NYG Field Day chairman. W7DEM reports that K7VMV, electronics graduate, has moved to San Jose, Calif., to work for IBM in the computer section. WA7ADY moved to the Portland area and hopes to go in the Navy. K7VNO is using his Twoer as fixed station and as mobile. K7PMB has missed out on hamming while adding a room on his house. Forty-five hams attended the Southern Oregon Radio Club's Annual Picnic in Grants Pass, total attendance 86 adults. W7GWT reports the Portland Area AREC 2-meter group furnished communications for the Kiwanis Club Speed Boat Races June 27. W7NGW and K7SHD headed the group. Oregon Navy MARS has a repeater station on 2 meters. W7LNG says he enjoyed Field Day, using a Gonset III at 7500 feet on Mount Ashland. K7TWD made the BPL. K7IFG, net manager of OSN, reports sessions 22, attendance 182, traffic 44 high 7. BRAT awards to W7ZFH, K7IFG, K7IWD. Traffic: K7TWD 631, K7IWD 413, K7IFG 383, W7ZFH 36, W7AJN 17, W7DEM 17.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7HMQ. RM: W7OEB. PAM: W7LFA. PAM V.H.F.: W7PGY.
NTS nets:

WSN	0200Z	Daily	3535 kc.	No report
WARTS	0230Z	X Sunday	3970 kc.	No report

RN7 now 0330Z—3560 kc. W7DZX, ORS-OPS, joined W7PGY, N.W. Division Director to attend the ARRL Convention. W7IKG and K7ATD are new EC and Asst. EC for Tacoma. K7WTG and K7PZX are the new EC and Asst. EC for the Puget Sound Emergency Net on 50.85 Mc. ORS W7GYF reports Moses Lake has a new Novice WN7DNN. ORS W7AIB as lodge officer hosted more than 3000 Eagles at State Convention, four days and nights but never missed a session on WSN or RN7. ORS-OBS W7AMC traveled 2080 miles to W6-Land and never met a ham. OPS W7EVW is heard on 3970 kc. and 144.65 Mc. ORS W7JC was out of work with a sore arm. W7LQ now is on duty at Kennedy Airport. QCWA lost a good net member, YLRL EC K7NZO has a new YLRL AREC Net each Tue. at 10:30 A.M. on 3.979 Mc. She also checks into Mason County RACES and is active with the YL INT. S.S.B.ers communications system 1800-0030 Mon. 14.331 Mc. OBS K7CHH repaired the transmitter and now is on sked with Bulletins. K7CHV now is at KC6BY on Yap Island. W7AYT/BDT was appointed Asst. EC for BEARS. W7AXT was hospitalized in Minneapolis because of a car accident. W7NPK is QNO making hay. W7BTB wonders what to do about foreign C.W. and RTTY operation daily on 14.2-14.215 Mc. Anybody with an answer. His congratulatory remarks re April-July *Parasite* must be joined by all dedicated Washington section amateurs. How long can Jerry keep it up? WARTS members better get help for W7BUN. It's a big job, but a professional job done by an amateur. We need the *Parasite*—the *Parasite* needs you. K7LED is active on the Puget Sound Emergency Net and reports "Brown on the Sound" is ready for visitors just north of Gig Harbor. EC K7RAO. Walla Walla County, now is on the air after some transmitter trouble. K7BLW is working for a radio station in



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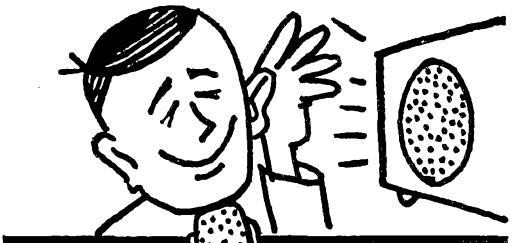

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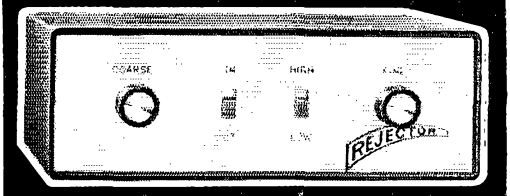

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Prosser, K7SKP and K7WTA are heard on 20-meter c.w. almost daily. W7YBF and W7NSU are both installing gear in new trailers. W7DP rolled to 729 contacts in FD with 15 operators. W7DK as usual is not talking, but the RC of T will be among the leaders. W7CHI is heard on with an NCX-5. W7GZK has installed Sonar in his T bird for 29.6 Mc. W7AZI, with XYL W7WLX, is back from an air trip to Hawaii. New calls in W.W.-Land are WA7BSU and WA7CBX. EC K7KJB, Grays Harbor, reports net activity is down some for the summer. W7MCU is nearing the charmed DXCC group. W7UWT, Kitsap County EC, lists 28.674 and 50.38 Mc. for local frequencies with a direct tie-in to WARTS. The Noon Time, which meets daily on 3970 kc., reports QTC 508, QNI 810, 30 sess. Traffic: (June) W7BA 2922, W7DZN 1663, K7TCY 886, K7JUA 423, W7APS 256, K7CTP 145, W7BTB 113, W7HMQ 47, K7-MGA 31, W7GYF 23, W7AIB 16, W7AMC 14, W7EVW 8, W7JC 5. (May) W7EVW 8.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—SEC, WA6OLE. *Appointees as of June 30 are* RM: WA6WNG/WB6CRC. OESs: WA6VAT, W6NDR, WA6MXI. OPS: K6TFT. OBSs: WA6VAT, W6DUB, W6LGW, W6UB, WA6FBS, K6TFT. ORSs: WB6ETY, WA6WNG/WB6-CRC, WA6MIE, WA6FBS, WB6ILH, W6IPW. OOs: W6OJW, W6CBF, WA6KLL, W6TYM, W6BEZ Class I, K6LRN Class II, K6TFT Class III. ECs: WA6FFF, K6TFT, WA6ANE. If you think you should have been included drop me a card or a radiogram. A few people have chided me for emphasizing public service and traffic in what is supposed to be a station activities column. I wouldn't be stressing it if I didn't think it was important. I should make one point clear. You don't have to tie up every operating minute with nets, c.d. or whatever. Most traffic nets are in session for approximately ten to twenty minutes. That means if you are ragchewing on 40, for instance, you can QSY to 75/80 meters, QNI your local or section net and be back in the conversation before you are even missed. DXing on twenty maybe—in 10 or 15 minutes the pile-up would thin a little. Be versatile; a true amateur should be acquainted with all types and modes of operation. There may be a time when you might be the vital link. The Livermore Klub operated FD in class 13A and made over 15k points. K6LRN tagged along and enjoyed the hospitality. WB6APK moved his ham shack to the third floor and is working swingshift. W6CUS/6, the EBRC, made 900 QSOs on FD and the MDARC made over 1k. WB6ILH worked NW8AZ on s.s.b. for No. 50. W6OJW made another trip to Alpine County. New officers of the Livermore Amateur Radio Klub are WA6WHY pres.; W6QEY, vice-pres.; W6-TYM, secy.; WA6SQV, treas.; WA6RSG, act. chmn. Any inquiries about this club may be directed to the secy. at Box 488 in Livermore. WA6WNG is on as WB6-CRC at Cobb in Lake County. WA6ZTY operated K6-JHV in the Spring CQ V.H.F. Test and won first place for single operator in California. WB6ETY worked FD with the Livermore HS Radio Club on Mt. Diablo. WB6IHZ has the new Heath S/Line and WA6YXP has the Monitoe Scope. K6TFT, Napa County EC, reminds us to monitor 145.35, the 2-meter NCEF when we can.

NCN	0300	Daily	3.635
SCVSN	0300	Daily	146.7
NCTN	0100	Daily	2.905

The first two are NTS and the last has good coverage of Northern California and just may have NTS outlet before long. Traffic: K6LRN 139, WA6WNG 129, K6GK 85, WB6APK 7, WB6ETY 6, WA6ZTY/6 6, WB6ILH 5.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6ATS; RM: KH6EWD, V.H.F. PAM: KH6ECT. Kudos to W6HJT/KH6EPW, on the swell job he did in organizing the Field Day venture for the Honolulu ARC. Congratulations to KH6CMM, our newly-appointed OO and OES. KH6EXI also has applied for an OO appointment. Pat is on Maui and holds down a steady spot on the 50th State Net. KG6APJ, down Guam way, also was appointed an OES. George has been active with Oscar III attempts. Our thanks to departing OESs KH6BAS who QSYed for studying and c.d. activities, and KH6UK who becomes W2UK. KH6FLN got his General Class license. He reports that he's using an HX-10 on 15 and 40. KG6AIG, QSL Mgr. for KG6-Land, still has time to be active on 20 and 75 telephone relaying from the "remote" islands of the Pacific into Guam and onto the Mainland. WG6APM is a new Novice on Guam. KH6AKZ, of Typhoon Karen fame is running a Henry HK final to his Telrex TM-30C up 70 feet. KG6AJI just replaced his rotator damaged by Typhoon Karen. W6SLF/KA called me on the landline

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TEXAS-SIZE TRADES AND TIME PAY'T. PLAN.

for a QSO prior to his departure from KH6-Land back to Tachikawa A.B. He's with the 6100 OPS Sq. His wife, Sybil, also is a ham. KH6BB has been knocking off those European DX stations as if they were locals. Traffic: KG6AIG 108, KH6BZF 27, KH6FLN 5.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU. W7FBL, EC for Churchill County, has W7BQQ as Asst. EC. W7JOS is running NCX-3 mobile while his XYL W7PAR is running HW-22 mobile. W7TGK was in Denver but kept dry during the flood. W7KVJ and K7QPK are new amateurs in Boulder City. W7HWL and family, from Sparks, are residents of Las Vegas running an NCX-3. W7CTK has a 75S3C for a hearing aid. 20th anniversary present from the XYL. He also is running Dual-diversity on RTTY with an AN/URA8A. W7BOG is a new call in Reno. W7NRU held open house on his 25 years of collection of ham gear. K7ZRR has his 2nd-class license. W6ASU moved to 6-Land. WA7CWM and W7CMV are new amateurs in Las Vegas. W7ANW has a new DX-Ant. K7CMI was issued certificate No. 90 from the Southern Nevada Amateur Radio Club. K7PVF is now pres. of Boulder City Rotary. W7YRY now is EC for Henderson. K7-NYU is EC for North Las Vegas. Traffic: K7RBM 235, W7AAF 165, W7ANW 55, W7JU/K7JU 15, W7PBV 10.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—ECs: W6JDN, W6LSW, W6SMU, WA6TQJ. RM: W6CMA. PAM: K6RHW. ORSs: W6CMA, W6-OFK, K6ORT, K6YZU. OPSs: WA6TQJ, WA6YKR. OBSs: W6AF, WB6EFM, K6HHD, WA6SLU, WA6TQJ, WA6YKR. OOs: WA6DBL, W6GDO, W6WLI, WA6YQS, W6ZJW. OESs: WA6FWU, W6GDO, K6HEZ, W6PIV, WA6YKR. W6ZJW was nominated Operator of the Month for May. Dick is one of our OOs and finds time to participate as an appointee during his limited schedule. During the May Frequency Measuring Test W6-GDO had an average error in parts per million of 0.1! Congratulations, Jay. New OO WA6YQS had 15.9, well within the 71.43 maximum for Class I OO. W6TEE and WB6PHQ were married the eve of the National Convention. They would have been married a week earlier but it would have interfered with Field Day. W6MIX (El Dorado Co. ARC) is quite pleased with its FD results, especially with 6 and 2 meter scores of 405 and 513 points, respectively. WA6FWU has been monitoring 6 meters for band openings and has heard 10 states. W6SMU has been busy signing up new AREC members in the Sacramento area. WA6SLU is painting houses to finance a DXpedition this December. For those of you who have t.m. broadcast receivers tune in KPFA 94.1 Mc. on Sun. mornings at 10.15 for a program directed to amateur radio. Traffic: (June) W6CMA 35, W6LNZ 18, WA6JDT 13, WB6FOP 4, WB6EAG 3. (May) W6CMA 22.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF, who is hailing the Form 5s received from the ECs, submitted an SEC report for June. Many members from the section were at the National ARRL Convention in San Jose but only W6BIP and K6ANP came home with prizes. The Tamalpais Radio Club provided communication for the festivities and parade in Novato during Western Week End June 17. W6KHH is a new EC for Novato and Northern Marin County. W6GQA scored a fine 1.4 average parts per million in the May FMT. Another active OO, WA6RXM, has been monitoring the c.w. bands and sending notices. The San Francisco Radio Club held its July meeting at Hamm's Brewery. A cool time was enjoyed. There was much activity during Field Day with the Hi-Frequency Mobile Society, the Marin Amateur Radio Club, the Tamalpais Radio Club, the Treasure Island Radio Club, the San Francisco Radio Club and the Sonoma Radio Club among those active from Field Day locations. The 2-meter repeater, K6GWE, is operative from the new location in San Rafael with input on 146.6 Mc. and output on 145.1 Mc. WA6IVM and W6UDL made the Mission Trail Round-Up in Bakersfield June 19. WB6GVI has been traveling to VE7-Land during summer vacations. W6CYO has ordered a Waters compressor after seeing one demonstrated at the ARRL Convention. The San Francisco Section Net started operation June 21. The net meets Mon. and Fri. at 1830 local time on 3900 kc. WA6NDZ has his facsimile working and is receiving press and weather reports. WA6STS has been finding a lot of 6-meter openings up and down the West Coast. W6HST has been working the Europeans on 20 around midnight almost every night. WA6STS is looking for 2-meter skeds with the Fresno/Bakersfield and Santa Barbara areas and figures the new 20-element beam will do some good. W6OPL has gotten his crank-up almost to full height—a foot a week. WA6ALK visited KØPQC, her son, while on a trip to her folks. Traffic: WB6GLD 136, W6UDL 56, W6KVQ 32, WA6IVM 12, WB6GVI 11, WA6AUD 7, W6CYO 7, K6TZN 7, W6BIP 4, WA6QXV 4, WA6RXM 3, WB6-KHI 2.

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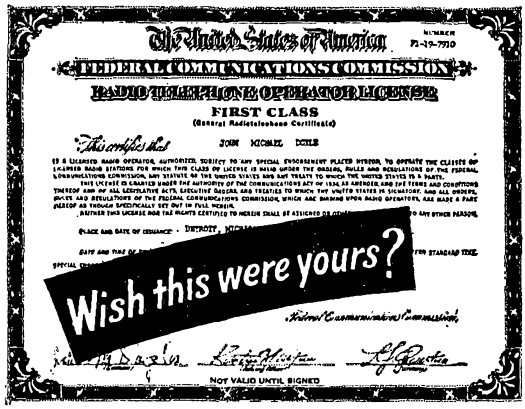

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SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The new officers of the Fresno Amateur Radio Club are WA6BUH, pres.; WB6MZU, vice-pres.; WB6KUG, secy. The following attended the ARRL National Convention in San Jose, July 4-5-6, 1965: WA6LPW, WA6EDQ, WA6TQL, WA6ONZ, WB6AWY, W6OHT, WA6WXP, W6HKV, WA6HWA, WB6MZU, WN6NFZ, WB6HVA, W6ADB, W6OWL, WA6TZN and W6JPU. WN6KUG won a Golden Key for code proficiency. WN6NFZ also won a Golden Key. The Fresno Amateur Radio Club held Field Day at Kearney Park with 12 operators. The Turlock Radio Club held Field Day at Hatfield Park with 25 operators. WN6PSC, the daughter of WB6HVA, is a new Novice in Fresno. The San Joaquin Valley Net had 754 check-ins, 224 visitors, 112 contacts, traffic count of 73 and 7 QSTs. W6KTW has a new R-4 receiver. W6OWL won a Heath KW amplifier at the convention. W6FXV has a Drake R-4 receiver. The Central California Single Side-Band Association reports 35 members. WA6EDQ is the president. K6BKZ is back on 75 with his NCX-3. WB6ETQ also attended the convention with WA8ZGQ. During FD K6IXA, on 20-meter s.s.b., won the Club Trophy with 605 contacts. W6JPS is getting equipment installed in his station wagon for use during his vacation. Anyone wanting to handle traffic might check in NCN on 3635 kc. at 0300Z, or RN6 on 3606 kc. at 0315Z. Traffic: (June) WA6DB 88, WB6HVA 54. (May) WA6VPN 115. (Apr.) WA6VPN 100.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NYO. SEC: WA6HVN. RM: W6QMO. V.H.F. PAM: WA6RRH. Eight stations reported active on the ARRL Field Day this year, with a total of 31 transmitters between them. From our own operation, we know that there were many more who did not report to the SCM this year. In general we made a good showing for the section. Major plans for the month other than FD were for the 14th National ARRL Convention held in San Jose July 4th week end. W6QMO, RM, took a very active part in preparing the traffic booth, assisted by several of the section appointees. Your SCM and SEC were both committee members. W6RSY made the BPL in June. W6AGR is active on NTS nets and spends some time flying. W6YBV feels that there is too much emphasis on "iron men" in traffic nets and not enough on getting new blood into the system. We feel the same way. W6DEF is working NCN and tried SCVSN but found the net not operating much of the time. Hal worked at W6WWJ/6 during FD, operating on 20 meters. K6DYX took a long vacation to Ohio during June and July. WB6FHH is back in the section and working NCN. W6PLS is active on several nets and working on emergency traffic work and planning. W6AUC is active as OO and works DX including a sked each week end with KA2GE. WA6TKE has a Communicator II on v.h.f. and is busy making repairs. W6OII is now working MTN. W6AIT has been busy with school but finds some time for NCN. W6SAW is busy with OO work, OBS and Navy MARS. W6RFF renews as ORS. WB6IZF, from King City, reports activity on 2 meters including observations of propagation. Ed works the Weather Net. K6EQE works 2 meters. Traffic: (June) W6RSY 605, W6AGR 176, W6YBV 120, W6DEF 115, K6DYX 90, WB6FHH 77, W6PLS 38, W6QMO 29, W6ZRJ 22, W6AUC 10, W6OII 9, WA6TKE 9, W6AIT 6, W6RFF 5, W6SAW 5, WB6IZF 2. (Apr.) W6SAW 8.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: K4CDZ, WA4ANH. PAMs: W4AJT, WA4LWE. V.H.F. PAM: W4HJZ. The new CHOP at W4LEV, the Camp LeJeune club station, is W8AAZ, who sent in an FB report. W4HJZ says the ITT Kellogg non-club group in Raleigh operated FD as W4UWS/4 and made approximately 200 QSOs in the 2-transmitter 150-watt class. WA4EVN says he operated FD in the E. N.Y. section while en route to Massachusetts mobile 2 meters, and that there is plenty of v.h.f. activity up that way. W4BDU reports that his vertical antenna is overhauled and up again. K4EO says he is putting up a new 80-meter antenna. K4TTN says he operated FD both at home and at the club site. WA4CY says the Greensboro Club, W4GG, was active on two of the June week ends, the V.H.F. Party and FD. Activity *was good and FD was good this year. WA4PDS made* the BPL for May, as did W4LEV for June. WA4EJM says the Triangle ARC included 6 and 2 at its FD station, W4LEN/4.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	2300Z	Daily	181	K4CDZ
NCN(L)	3573 kc.	0300Z	Daily	123	WA4ANH
THEN	3865 kc.	0030Z	Daily	31	K4WLV

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SX71	99	GONSET 3 6MTR	149
SX96	139	GONSET 4 6NTR	199
SX100	149	EICO 720	59
SX110	89	EICO 722 VFO	39
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SX117	289	GPR90	249
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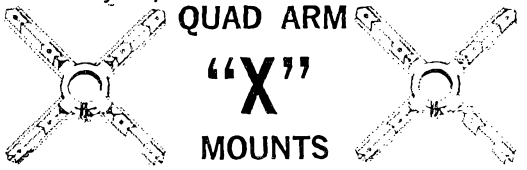

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SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. Asst. SEC: W4WQM. RM: WA4PFQ. PAMs: K4WQA (s.s.b.), K4OCU (a.m.).

Net	*Freq.*	*Time*	*Sess.*	*QTC*	*QNI*
SCN	3795 kc.	Daily 0000Z, 0300Z	57	81	311
SCEN	3930 kc.	Daily 0030Z, Sun. 1130Z, 2030Z	29	13	216
SCSB	3915 kc.	Daily 0100Z	30	151	1056

South Carolina hams mourned the death of W4IW, in June. Lynn was general manager of the South Carolina Educational Television network, a national leader in ETV, and a dedicated ham. K4PJE is recovering from his recent illness and we wish him a speedy return to full activity. Nine club groups, two non-club groups and one individual participated in Field Day activities. Competition will be rough for the State Council trophy! W4NTO, participating in 11 Frequency Measuring Tests in the past three years, in 35 measurements has averaged 3.6 parts per million error. Traffic: K4LNJ 68, WA4PFQ 52, W4WQM 44, K4OCU 42, W4NTO 32, W4PED 26, WA4JHD 25, WA4OAZ 11, WA4ICF 10, K4ZHV 7, WA4HFA 2.

VIRGINIA—Acting SCM, H. J. Hopkins, W4SHJ—PAM: W5VZO/4. RMs: W4QDV, W4SHJ, W4ZM, WA4EUL. Phone net managers: W4OKN, K4SCL, WA4UXL. Most nets are reporting summer conditions in and attendance down. FD messages received at the SCM's office indicate some handlers need practice in standard message form. OESs W4UIS and W2UZN/4 report some very good U.S. and DX openings on 6 meters during June. W4ZM and W4MWH report attendance at the National Convention. WA4EUL has plans to continue issuance of *Virginia Ham*. Let's hope his plans materialize. PAM Bob continues his visits to clubs and groups in the No. Virginia-D.C. area. K4SCL has a new hobby which interferes with hamming somewhat—boating. WA4AYP has joined the ranks of the many making personal phone calls for folks in South and Central America. W4ZAU reports passing the Extra Class exam while W4DVT, one of the older Extra Class holders, submitted his comments to FCC on the current issue. Perennial contester W4JUJ took section honors in the Mo. & Ga. QSO Parties. W6GGR/4 moved to El Salvador and WA4REU to Michigan. Rumor has it that W4THM also has left the section permanently. Some report they are taking advantage of the summer slack to rebuild and remodel. Traffic: (June) W4DVT 208, W4NTR 207, W4ZM 194, W4NLC 188, W4RTA 183, WA4EUL 162, WA4EDG 156, K4SCL 153, W5VZO 84, WA4PZF 64, WA4DAI 60, K4FSS 42, W4SHJ 39, W4OKN 37, K4QIY 31, K4SDS 28, WA4AYP 27, K4LMB 23, K4YCH 20, WA4FCS 19, W4ZAU 16, K4GRZ 11, WA4KVR 11, W4PTR 9, WA4EHM 7, W4JUJ 7, K4RAV 6, K4VCY 6, W4LK 4, W4KX 3, K4PIK 3, K4NOV 2. (May) W4NTR 630, WA5JNS 448.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: W8LAIF. PAM: K8CHW. S.S.B. Net Mgr.: K8SHP. W. Va. nets meet on 3570, 3890, 3903 and 3905 kc. Congratulations to W1UED on the excellent representation for ARRL at the State Convention, Jackson's Mill. Reelected as Phone Net Mgr.: K8CHW. New C.W. Net Mgr.: W8CKX. Mary, W8ZHH, reports the 29.6-F.M. Net in the Wheeling area is very effective and growing. K8MYU activity was down because of summer school. WVN Phone reports 22 sessions, 489 stations and 87 messages, the C.W. Net, 20 sessions, 97 stations, traffic 144. First place in the Code Speed Contest, sponsored by the Elkins Radio Club at the Mill, was won by W8HZA. WA8OVT is a new OES. W1QVF and W1RNT visited state amateurs and attended the convention. WVPON combined report: 27 sessions, 177 stations, 251 messages. Congratulations to K8TPF, the "Outstanding Amateur of the Year in West Virginia." WA8EKC, WA8APZ and K8GEP are competition for W8WHQ in the high-powered mobile s.s.b. field. WA8CRW, W8RFD and WA8BXW have new amplifiers, with "big" signals. The Black Diamond ARC held another successful Ham-Picnic Aug. 29 at Bluefield City Park. Traffic: WA8EIC 321, WA8IMY 228, K8TPF 223, W8CKX 102, WA8KUW 97, WA8MRK 62, W8KCO 51, K8WWW 48, WA8KOX 44, W8HZA 30, W8JM 11, WA8GGI 10, K8BIT 6, W8CZT 4, WA8ALI 2, K8MHR 2, WA8FIE 1, K8NNF 1, W8VOI 1.

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COLORADO—SCM, Donald Ray Crumpton, KØ-

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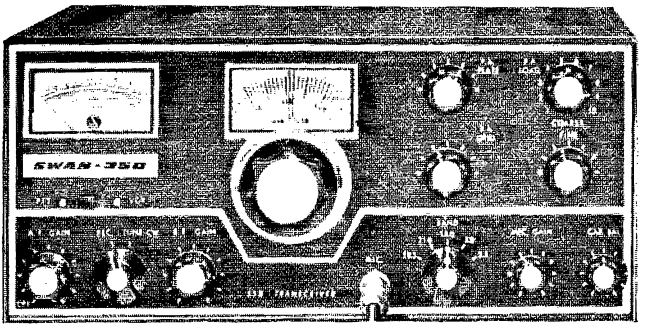

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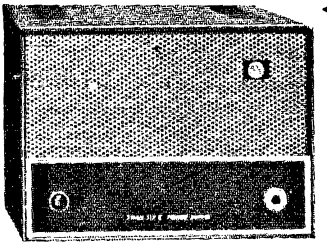

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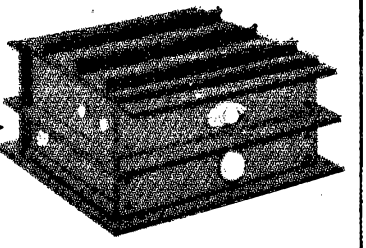

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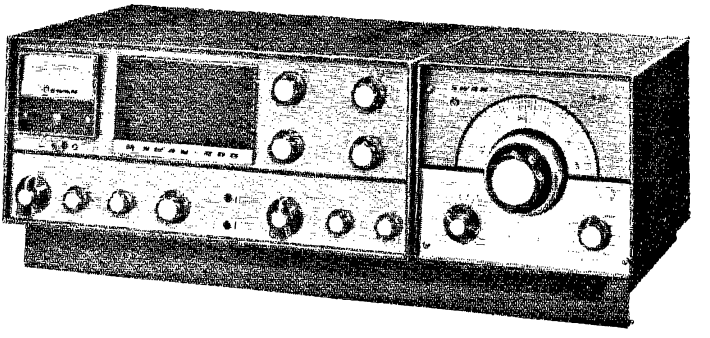

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TTB—SEC: WØSIN. The recent floods and wind storms in Southern Colorado brought out many hams to assist in the emergency. Regular means of communications were at a standstill, but in a matter of minutes several stations were on the air with emergency power in the flood area and many more were standing by in the safe area to assist in vital traffic. Emergency incoming traffic was handled on one frequency while outgoing emergency traffic on another. The same applied to welfare traffic. Top efficiency was accomplished by all stations with ease and the cooperation was great. Stations in various areas stood by on a monitor basis to accept traffic. None of this could have been accomplished with band segregation. Many amateurs of all grades participated in this emergency and showed that they are the real top class of amateur ranks. Every one was a modern minuteman. Congratulations to the more than 100 participating stations. Net traffic: Columbine Net 184, High Noon Net 164. Traffic: WØYQ 183, KØDCW 102, KØJSD 72, KØZSQ 48, WAØJTB 16.

NEW MEXICO—Acting SCM, Lowell E. Richardson, W5UBW—Asst. SCM: Kenneth D. Mills, W5WZK. SEC: K5QIN. K5VXJ now sports a new Swan 400 from Raton. With the new talk power Owen helped pass some emergency traffic during the recent flash floods in the Raton area. W4WZK has moved from Albuquerque to Las Cruces to take a new job at White Sands Missile Range. Another mover, W5CMK, has taken to the cool mountain town of High Rolls from Alamogordo. K5ONE now operates a new Corvair with his new SB-34. WA4IVW and K5RQL are dusting the air waves with a new NCX-5. Mac and Ken are a further-son team in Alamogordo. Mac is acting postmaster until a new postmaster can be named. WA5FLG is mobile with an SBE-33. The White Sands ARC held its annual swimming party. A good time was had by all. W5HJ has been spending time traveling between Albuquerque and Nevada. Traffic: WA5FLG 157, WA5DUH 107, W5UBW 63, WA5FFL 34, K5VXJ 34, WA5LZX 3.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7WKF. Section nets: BUN meets daily on 7272 kc. at 1930Z, UARN meets each Sat. and Sun. in 3525.5 kc. at 1430Z and on 3987.5 kc. at 1500Z. Utah finally has a Worked All Counties award. It is available to all amateurs who can show proof of having worked an amateur in each of Utah's 29 counties. QSLs and one dollar to cover expenses should be sent to W7ZC, Springdale, Utah. Activity on BUN and UARN has been very good with more than average traffic moving for the summer months. Field Day was a big event in the state this year with at least four groups operating from high mountain-top locations. Almost everyone had a ball (and a snowball, too!). Traffic: W7OCX 253, W7VTJ 62, W7MWR 33, W7LOE 30, K7COM 25, K7SDF 18, WA7ADK 5, W7BAJ 1, K7RAJ 1.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: K7IAY. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0800; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. The Cheyenne Club won the Field Day trophy presented by your SCM. So, start getting ready now to attempt to take it away next year. Remember, whoever wins it 3 times gets to keep it. The hamfest is over and was enjoyed by all. W7IDO is in the hospital recovering rapidly and may be home any day now. K7IVK is back on the air again after surgery. It's nice to hear her voice again. K7SLM has a new daughter-in-law. K7AHO has a new son-in-law. W7VB was elected chairman of the 1966 Wyoming Hamfest with W7QPP as assistant. Traffic: K7POX 33, K7QJW 20, K7WRS 11, K7SLM 3, W7VNJ 3, WA7BPO 2, W7TZK 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. K4WWP has agreed to be NM of the AENP evening session until Sept., when he leaves for Arizona. New officers of the Birmingham Club are K4HAL, pres.; K4WOP, 1st vice-pres.; WA4HKZ, 2nd vice-pres.; WA4MHG, secy.; K4WOQ, treas. Officers of the Huntsville Club are WA4KMA, pres.; W4WLG, vice-pres.; WA4DBQ, secy.-treas.; K4VJL, asst. secy.-treas. W4YXW was voted Amateur of the Year by the Huntsville Club. June section reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100	Daily	31	2	6.4
AENM	3965	0030	Daily	30	3.4	41.2
AENP	3955	1230	Mon.-Sat.	26	1.2	13.8
AENP	3955	2400	Daily	34	1.5	13.7
AENR	50.55	0115	Wed./Fri.	9	.22	16
AENT	3970	2230	Daily	29	1.06	5.7

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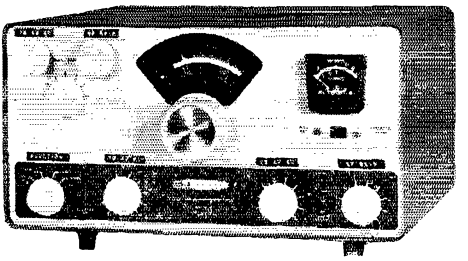

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WA4SBD is in a new QTH. W4HFU has a TR-3. Glad to see all who attended the K4KJD picnic. Everyone will be getting set for the Sweepstakes; remember the trophies for Alabama winners. I have had good response to my request for OO applicants; if you are qualified and willing to serve let me know. K4FJZ is planning to get together with other OESs to try to coordinate their efforts. Traffic: (June) W4NML 111, WA4EXA 77, WA4DYD 51, WA4JWS 39. K4KJD 32, K4WWP 31, K4NUW 29, K4BSK 26, K4GXS 17, K4WHW 14, K4WOP 14, K4NSU 12. W4YNG 12. WA4RES 9, W4YRM 7. K4ANB 6. K4FZQ 5. WA4EBS 2. W4DGH 1. (May) WA4TID 70, WA4HKZ 38, WA4AML 6.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAM 40: W4SDR. PAM 80: W4TUB. PAM V.H.F.: WA4BMC. At this writing K4SJH is on vacation up Connecticut way with a side trip to ARRL Hq. and W1AW. Your SEC has the honor of writing this column. W4UF and W4VWL were busy logging OO reports this month. W4UF turned in over 50 and not a one in Florida. W4MVB, in Jacksonville, plus 5 others had a v.h.f./u.h.f. DXpedition to Mt. Mitchell, N.C. Aug. 14 and 15. They used c.w./s.s.b. on 432 and 145.2 Mc. Details later. WA4STJ, Hollywood, worked KP4JM with .9 watts on 6 meters with a transistorized rig. Can anyone top this? About 18 Florida clubs participated in FD. Traffic is down this month but according to reports participation in our Florida ARPSC nets remain high. The hurricane season is upon us once again. Are you ready? Sign up in AREC with your EC and stand by for action. K4FMA, Miami is off for ET3-Land. Look for him on 20-meter s.s.b. W4DFZ, Vero Beach is back on GN/QFN after an eye operation. The So. Fla. V.H.F. Tfc. Net is going full blast with improved v.h.f. coverage. It meets at 0100Z on 50.200 Mc. Many stations report vacations to the north-land. E. Fla. SEC reports an all-time high AREC-wise with 1640 members. Welcome to new ECs W4FPC, W4DVR, W4CKB, WA4SCK, WA4UUW, W4KRC and K4KRG. Public Service is here to stay. Are you doing your part? Traffic: (June) W4KIS 702, WA4BMC 669, W4TUB 597, WA4SCK 454, WA4LHK 406, K4YSN 261, K4SJH 184, WA4BAW 141, W4SDR 102, W4URX 94, W4NBE 80, WA4FGH 76, WA4TZC 61, K4HJB 58, K4KDN 56, W4EHW 53, W4AKB 52, K4BY 48, WA4NBT 42, WA4BGW 34, WA4JYB 34, WA4QLZ 31, WA4RHL 31, W4IYT 26, W4TJM 19, K4DAX 18, W4BAV 17, W4BKC 16, WA4CIQ 16, WA4IYG 14, W4IE 13, K4MTP 12, W4GUJ 11, WA4ABH 9, W4FP 8, W4DFZ 7, K4EBE 7, WA4NEM 7, W4KRC 6, K4VNF 4, WA4NEM 2. (May) K4IAD 126, W4GUJ 31, WA4HDH 26.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4SAZ. RM: W4DDY. PAMs: K4PKK, K4YZE, WA4HSN, WA4JSU, WA4IQD received a Thomas Jefferson Fellowship in Political Economy at the U. of Va. W4HOS, now in Miami, is planning a de luxe station at the new location. The Georgia Training Net welcomes new members on 3718 kc. at 1700 EST. Will tune for rockbound stations. W4SAZ injured his keying hand. WA4GYO has a new SB-300. See you at the Griffin Ham Picnic Sept. 13. WA4PSA is DXing with an electronic keyer. W4NT has a new HT-37. WA4LMY a new SB-200 linear and WA4PRZ a TR-3. K4AIP had a bad fall from a cliff while exploring a north Georgia cave. The Athens Radio Club is back in its quarters after steam damage, but the club station is not on the air as yet. K4NFP converted a t.r. switch to a 6-meter receiver. Best use I have heard for one yet! WA4TYW is on 432 Mc. with a 6AF4. WN4AIU has a new 60-ft. tower and an eleven-element beam for 2. W4TFL/4 now is operating all bands with inverted "Vs" and quads. WN4UQW is using a Swiss quad. K4TKM is acting as net manager of GSN for July and August. Many operators are reporting summer vacations rather than traffic. Traffic: W4DDY 141, W4SAZ 141, WA4CJN 101, WA4UYT 95, WA4GAY 81, K4NFP 59, K4TKM 54, WA4PSA 52, WA4JSU 43, W4TFL/4 41, WA4LLI 31, K4YZE 31, K4BVD 26, WA4HSN 26, W4RZL 22, W4YE 15, WA4TYW 12, WN4AIU 10, WA4BVD 7, WA4WKZ 4, WA4AJU 3, WA4JXL 1.

WEST INDIES—SCM, Jose E. Saldaña, KP4JM—CD Radio Officer: KP4MC QSL Mgr.: KP4YT. OBS: KP4BBN. KP4BRM is now EC. Tony will organize an AREC net on 80 and is also giving weekly c.w. and technical instruction to a group of local boys. KP4BAN will organize the 6- and 2-Meter Net on 50.150 Mc. Fri. at 0300 GMT. KP4ID, the PRARC station, will be back in business at Red Cross Hq. Bldg. with a complete Hallicrafters line, a Gonset G-50 on 6 meters, Tri-ex 60-ft. tower, emergency power plant and a Telrex Tribander beam. U.S. Airforce MARS is very active on 6 meters with nets on Sat. at 1100 GMT on

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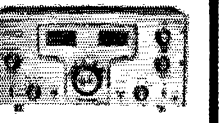

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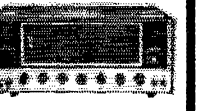

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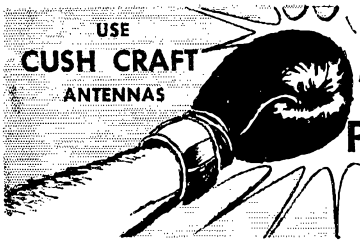

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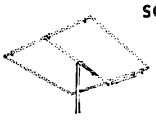

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49,980 Mc. KP4s KE, BRI, BRJ, ANG, BPE and JM are always present at roll call. KP4CH is using a GSB-201, HT-32, Drake 2A and a new 3-band quad antenna and is on 21,442 kc. at 2200 to 2300 GMT nightly. KP4-LA is Heath all the way with SB-200, 300 and 400. The four-element quad is being reworked to include two elements for 10 and 15 meters. Also RTTY is being permanently installed. KP4CNU operates 7010-kc./14,-020-kc. c.w. 500 watts. 14, 275, s.s.b. and intermittently signs KP4CNU/KV4 from V.I. on 7006-kc./14,012-kc. c.w., 750 watts. Traffic from HI-Land still is coming through with KP4s BBN, TL, BL, JM and BKP taking care of traffic for the San Juan area. HI8LGN came to S.J. for a visit; she is the only XYL in Santo Domingo handling traffic on a permanent round-the-clock basis. HI8JSM, HI8KHS, HI8RO, HI8JDA and HI3DAC are the most active hams constantly on the air. KP4BBN recently was visited by HI3JR. HI3FM, HI3ABB and HI8ONZ. KP4BAN has a new 6-meter linear. KP4WR is on s.s.b. KP4BJU is off to study engineering at Georgia Tech, and KP4BJD is doing likewise in Ann Arbor, Mich. KP4BJG is inactive at present.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Section net report:

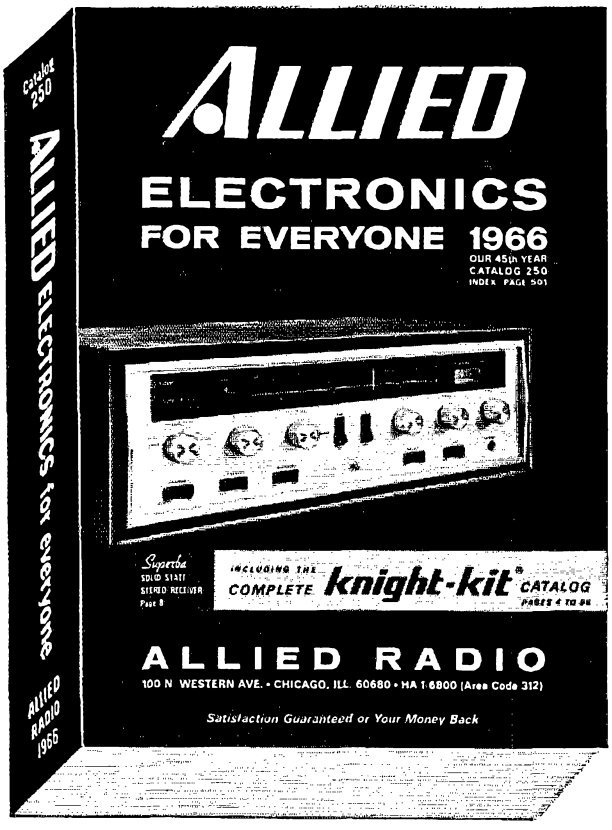
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3836 kc.	2300Z	Daily	30	542	95

Club groups from Pensacola, Ft. Walton, Panama City and Tallahassee competed in Field Day. Pensacola: W4FDL has a new TR-3; W4MUX has a Swan 350. K4HYL moved to a new QTH across town. WN4AJN is a new ham with a DX-20 and HQ-150. W4UL and the V.H.F. Club demonstrated s.s.b. at the USO Hobby Show. The PARC, W4UC, operated in FD from Bayou Grande with S/Line. K4QOJ/BDF operated FD from Santa Rosa Island, aided by K4LAN, K4VND and K4SGR. WA4WKL is interested in 220-Mc. skeds. Fort Walton: The July 4th 2-meter transmitter hunt was won by WA4OFN. New antennas for 10 and 2 meters were installed at City Hall C.D. Hq. W4RKH scaled a 150-ft. water tower to install the 10-meter ground plane! The EARS, W4SRX, put its new Swan 350 to good use during Field Day. K4CUC has a new 75S-3B. W4BVE gets latest weather bulletins via RTTY from Miami. Chipley: WN4ZIM is on 3730 kc. with a home-brew 6146 rig. WA4WUV has moved to Marianna. Panama City: K4MAC passed the Extra Class exam. K4-MZA has a Swan 240. Tallahassee: WA4DCN is mobile with a Twoer. WN4YGO and WN9NEW/4 are two new Novices. W4MLE took in the National ARRL Convention in California. Traffic: (June) W4BVE 170, K4-BSS/4 131, WA4EOQ 59, WA4WKL 29, WA4NRP 22, K4SOI 5. (May) K4NMZ 92.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. RMs: K7NHL, K7TNW. PAM: W5CAF. Appointments: K7NHL as RM. W7QHE received the ARRL Code Proficiency certificate for 30 w.p.m. K7-UTF has been awarded membership in the SCN. Congratulations to K7NHL on his appointment as manager of the Twelfth Area Traffic Net. Members of the AARC were privileged to hear a very fine talk on v.h.f. presented by W1HDQ, V.H.F. Editor of *QST*. We wish to thank K7VOR for making arrangements for this fine program. K7RUR reports that 15 QCWA members and their XYLs enjoyed a fine picnic at Prescott, Ariz. K7NII has a new 432-Mc. 32-element colinear antenna completed, along with a 2C39 amplifier for 432 Mc. It is with deep regret that we report that W7PLM, of Tucson, has become a Silent Key. Very fine activity reports were received from Official Experimental Stations W7AYY, K7NII and K7OFL. W7AYY has put up a 144-Mc. three-element vertical beam. The Scottsdale Amateur Radio Club, Inc., WA7APE, has a new 60-ft. tower ready to be erected at its new station site. Also, thanks to the hard work of K7GPS, K7MJC and K7-KAV the club has a new constitution. Traffic: K7NHL 360, W7FKK 36, W7QHE 9, K7RUR 2.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: John A. Vaidean, WB6JGA. PAM: W6ORS. RMs: WB6BBO, W6QAE, W6BHG. BPL regulars plus new addition K6IWV were K6EPT, K6YVN, WB6BBO, W6WPF and W6GYH. WB6BBO made the BPL even though busy with convention planning. WB6KVA received the W6OZ 22-w.p.m. certificate trying for 25 w.p.m. The San Fernando Valley Radio Club reports good coverage on 2, 6 and 10 meters and has the 220-Mc. Net on Sun. at 8 P.M. local time. WA6-NUA reports 5 states confirmed on 50 Mc. with low power, still working on 220-Mc. gear. WA6OWZ has a home-designed and constructed 6- and 2-meter rig, a



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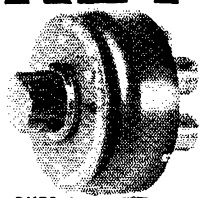
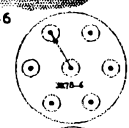
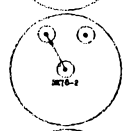
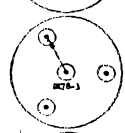
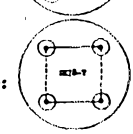


DK78-6









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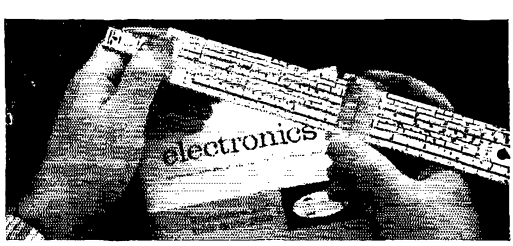

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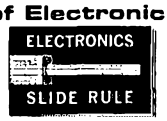

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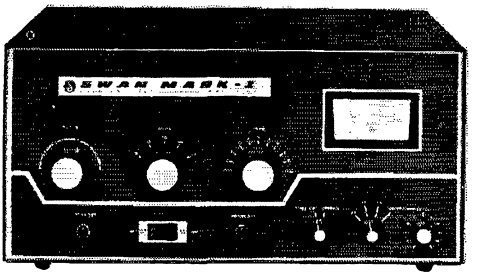
rarity these days. K6UMV received his 2nd-class phone license. K6HV reports a good time on Field Day. W6NKR is recovering from a hectic month with the XYL and jr. operator in G-Land. W6HUJ is rebuilding. W6SRE is changing QTH to Belmont Shore. W6OZ still is chasing "shadows" from 80-meter harmonics. WA6YMY had a field day on Field Day with OO *monitoring*. W6PUZ now has Extra Class. W6IBD is putting up a 10/15-meter quad. WA6GAG has the repeater in operation on 2- and 6-meter input. Thanks to WA6KVS, WA6VHC, WA6WIZ, K6YUL, W6FNE and, of course, WA6GAG for the help in this project. The Salvation Army Disaster net again will be at the L.A. Fair in Pomona. WA6DTG reports that EARN "SET" results were very successful and covered Central California and Western Nevada and had a good coverage of Southern California. Palisades Amateur Radio Club officials are K6RFU, pres.; W6LDA, vice-pres.; WB6GOX, secy.; K6MVX, treas.; K6HV, editor. Inglewood Amateur Radio Club officers are WA6OKZ, pres.; WA6BNB, vice-pres.; K6ZTI, rec. secy.; WB6GHM, corr. secy.; WB6ETG, treas.; WB6AKZ, sgt. at arms. It is gratifying to see more Form 1s coming in but in order to give better service to you it is requested that you put your full QTH including Zip code in your return address on the card. Support your AREC group, it is interesting and inspiring work. The Southern California Net (SCN) operates on 3600 kc. at 0300Z daily with W6AQE as net mgr. The address of SEC WB6JGA is 6271 Dayman Street, Long Beach, Calif. 90815. Traffic: (June) K6EPT 1062, K6YVN 667, K6IWV 566, WB6BBO 564, W6WPF 520, W6GYH 501, K6MDD 290, W6QAE 209, WB6JGA 151, W6FD 129, WA6TWS 104, WB6KGK 100, K6WAH 88, WA6WKF 47, W6KMJ 46, WB6GGL 45, WB6KVA 33, WB6BBH 28, K6VVT 26, K6LJ 24, W6SD 23, W6USY 18, WB6FPQ 15, W6PCP 14, WA6NUA 13, WA6OWZ 13, WB6AEL 11, K6HV 11, K6UMV 11, W6YRA 8, WB6GXI 7, W6BHG 5, W6FSJ 3, W6HUJ 3, W6NKR 3, W6AM 2, W6SRE 2. (May) W6OZ 21, WN6MPF 12, K2PHF/6 8, W6LVQ 4.

ORANGE—SCM, Roy R. Maxson, W6DEY—Nets: SoCal 6, 50.4 Mc., messages 347, check-ins 1174, per K6DLM; 246 Net, 145.08 Mc., messages 101, check-ins 640, per WA6CXB; Orange County Traffic Net, 145.62 Mc., messages 30, check-ins 311; with liaison between 246 and OCTN by WØZUV/6 and W6DNA and WB6ERG, net mgr. AREC forms were received from WN6PDD Redlands, W6RGM Yucca Valley, K4PXY/6 Fountain Valley, K6ZBQ Huntington Beach, WA6GQJ Olancha, WB6NBF, WB6JQF Buena Park, WB6AXT Anaheim, WB6LGO Garden Grove, WB6GFZ Los Alamitos and WA6STC Lakewood. W6FB got a "150" sticker for DXCC and visited WØFQY and WØHN in St. Louis. EC K6LJA reports 31 members and 3 test runs for Orange County AREC. Some National ARRL Convention goers from Orange were WØOPX/6 Eagle Mtn.; WB6OJT, WB6JHL Anaheim; W6OHK Tustin; W6TIN, WA6QWN, W6PJU, W6DEY and Doc Kahn, Santa Ana; K6YCX Ontario; WA6TAG Idyllwild; W6JY Laguna Beach; WA6ROF, WA6YWN Orange; K6GMA Garden Grove; W6NGN Buena Park. W6CK now is on from Idyllwild. Traffic: WA6ROF 112, W6DNA 80, WA6KVA 50, K6IME 39, W6WRJ 37, WA6CXB 13, W6CK 6.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Between June 25 and July 5 members of the San Diego County AREC, ARPSC and RACES manned the c.d. mobile van at the San Diego County Fair and handled nearly 1300 pieces of traffic. Doing yeoman duty as outlets were W6VNQ, K6BPI, W6EWU, WB6JUH and W6BGF. New officers of the V.H.F. Club are W6NLO, pres.; and WA6OSB, vice-pres. WA6ZXJ resigned as pres. because of military orders. WIHDQ, Mr. V.H.F. from ARRL, Spoke at a special v.h.f. meeting in late June. WB6MXA received a Section Net certificate for his work on SCN. Asst. SCM W6EWU and his XYL have left for a tour of the Orient. W6VNM replaces him on the 3825 kc. Sun. morning net. OES W6IEY reports many short-skip openings on 6 meters. WB6GMM earned BPL for the first time in June. WN6MSE graduated from Fallbrook High in June. WA6BUX was home during the summer from his studies at Stanford. This column will appear in *QST* at about the same time you receive ballots for an SCM election. All ARRL members are reminded it is their duty and privilege to vote for the candidate of their choice. Traffic: W6YDK 7520, K6BPI 4039, W6IAB 3923, K6JCC/6 1287, W6VNQ 702, WB6JUH 530, WB6GMM 210, WA6ZWR 51, W6BGF 32, WB6KNN 30, K6LKD 17, WA6UUO 15, WA6TAD 11, W6LRU 8.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—RM: W7WST/6. Field Day has passed and the best reports of activity in the section are coming from W6AB, the Vandenberg group. Bands operated were 75, 40, 20 and 2 with the location at Orcutt Hill. In addition, this very active club participated in a hobby

A WINNING PAIR . . .



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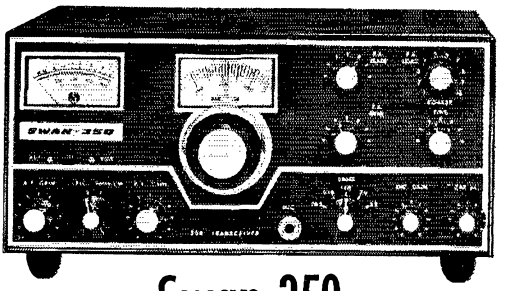

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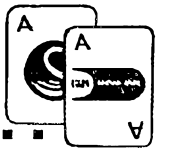

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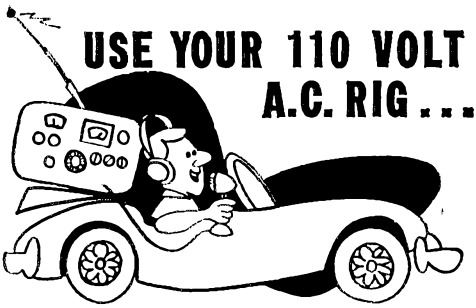

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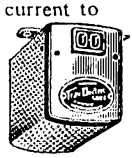

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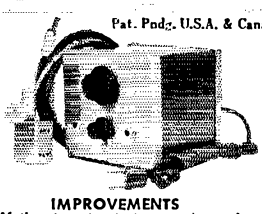

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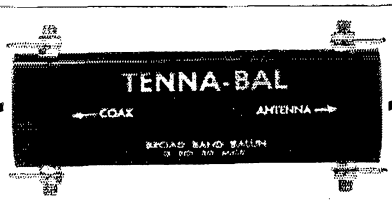

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show recently in Santa Maria where amateur radio was the highlight except for a brief period of QRM from a 500,000-volt Tesla spark demonstration. K6AAK apparently got the word after buying a new linear and a new tower because he turned up with a new car for the XYL. Your SCM spent the month in Boston attending a special summer session at M.I.T. and as a result has very little news this month. Traffic: WB6DPV 30.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. W5PYI has accepted the appointment as SEC for Northern Texas effective June 1. James served as SEC under W5TFP and has been EC for Parker County for the past eight years and has done a fine job in both positions. I had intended to make this announcement last month but as many of you know I was hospitalized and unable to make a report. I want to thank each of you for the many cards and well wishes I received. W5GNE and KA5JIJ relayed your messages as did the nurse in charge of the evening trick, who is the beautiful daughter of W5VLF. Field Day '65 is history and from reports all went well. Field Day messages were received from W5ABF, W5AW, WA5CKF, W5EAX, W5FC, W5GZG, W5NCE, W5SJZ, K5SLD, W5TSV and K5WAT. W5QKF, West Gulf Division Director, was guest speaker at the Dallas ARC Dinner Meeting July 6. More than 80 amateurs from the Dallas area enjoyed the fine dinner and program. I regret not being able to furnish a report of the activities of various amateurs in the recent tornadoes and floods in this section but I understand a fine job was done by all. Traffic: (June) K5DBJ 111, W5VFM 109, WA5EVS 79, W5LR 10, W5BCB 6. (May) W5CVB 132, W5VFM 122, WA5EVS 67, K2EIU/5 30, K5UOR 28, WA5IIJ 10.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. K5VOZ/5 made over 1000 QSOs during Field Day using 4 transmitters. K5MBK is back from DL-Land and WN5NAP is a new Novice in Lawton. W5NBI advises a very slow check-in on OLZ and SSZ and would like to see more check-ins. It looks like K5TEY has been carrying the whole load for Oklahoma as she had a traffic total of 1112 for June. This shows that there still are some who believe in and practice what their amateur license means to them. WA5MJA has a new Ameco TX-62. W5UYQ, K5VWQ and W5EHC all are eagerly awaiting delivery of new Drake TR-4s. W5UZX is rebuilding his 833 final amplifier. K5BBA reports that WA5MSL is a new General and WN5MXO a new Novice in Bartlesville. At the June meeting of the Bartlesville Amateur Radio Club, the following were elected: W5NML, pres.; W5NKY, vice-pres.; WA5JSE, secy.-treas. K5UZL has added a new kw. final to his NCX-3. W8CXX/5, a student at Central Pilgram College, acquired an XYL and his father, WA5LET, tied the knot. I would like to take this time to thank K5BBA for his faithful reports each month. Bill has worn out four SCMs, but without his fine reporting, the SCM's job would be much harder. Again thanks, Bill. Traffic: K5TEY 1112, W5NBI 38, W5UYQ 28, K5DLP 25, K5KTW 23, W5MFX 23, W5PML 22, W5EHC 14, KØBWN/5 13, K5MTC 7, K5OCX 3.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5RDP. PAM: W5ZPD. RM: K5ANS. Again amateur radio came to the front as many stations in West Texas furnished communication during the Sanderson Flood. Congratulations, fellows, on a job well done. K5HZR, W5GL and W5EZY, all San Antonio, have been working the Eye Bank Net. A worthy cause. WA5MOE is on vacation in Europe with his family. K5ANS now has an antenna at his apartment. Frank was doing a good job with a wire hanging out of the window. W5TUU moved to Dallas. K5KSE is the new president for W5AC at College Station. A nice job was done by K5BDC during the last year. W5ABQ is busy with traffic and emergency nets. W5AUM advises you to check your gear and antenna. He was trying to help out during the Sanderson Flood and found his antenna tooled up. Good advice for all. Check your gear and emergency power supplies. The hurricane season is here. WA6OHP/5 and WN5NEP are the proud parents of an 8-lb. girl delivered by Doc K5MSQ. It appears that all hands have recovered from Field Day operations. You amateurs who have not had the fun of operating a Field Day, plan to do so next year. It's great fun. K5RYS is back on his schedules after a trout-fishing vacation. W5ZPD has a new KWM-1 putting out a terrific signal. Attendance is off some in the South Texas and West Gulf Emergency Nets because of vacation time but both nets are keeping close watch on weather conditions. Traffic: K5HZR 176, K5ANS 35, W5ABQ 22, K5ZSC 3.

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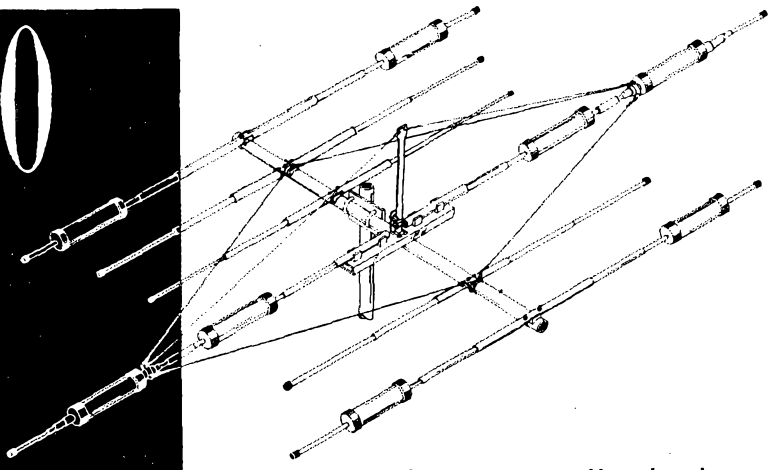

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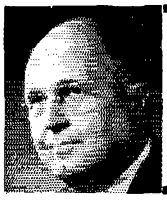

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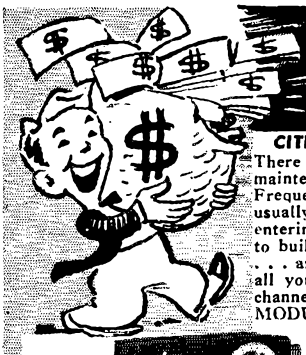

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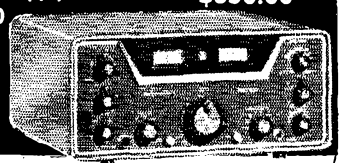

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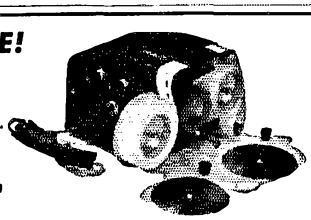

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ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. Asst. PAM: VE6SS. ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE8ALL. ORS: VE6BR. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA, VE6ADS. OOs: VE6HM, VE6NX, VE6TW, VE6TY. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. Summer soon will be gone and the boys will become active again, then the reports should start to come in on time. Vulcan has started another class which should be ready for exams this fall. All 19 members are ARRL members. The ECs are doing very well, but some are very poor at sending in their reports. Reports should be sent in not later than the 28th of each month so that they are received on time so take note, fellows. Calgary and Vulcan are very good at reporting all phases. Lethbridge, Medicine Hat, Edmonton, Red Deer and the S.S.B. Club are all dead issues. Don't any of these clubs have any lively members? The APN will be going back on its winter sked in Oct. Don't forget to watch for the date of the Provincial AREC Test in Oct. We are looking for a new SCM for this section; any takers just drop me a line. Traffic: VE6FK 55, VE6XC 44, VE6SS 7, VE6TG 3.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—Field Day in B.C. turned out more clubs and much more activity yet the only report I received is that the weather was wonderful with no rain and lots of sunshine. VE7ACJ, with an HQ-129X and an Apache, is making big holes in 20 meters. VE7DH lost his son (leukemia). VE7AKE has moved to Calvert Island and is busy with traffic-handling. VE7AAF up and got married in June and he and Margaret have moved into a suite which another amateur vacated and left Brent his antennas. VE7BBB won a soldering iron from the club and a wall ornament for bowling. Has she collected all the certificates of the CHC and turned to this? VE7AC is too busy in the orchard to ham, that is why he is missing from the frequencies. This is summer time and no one has time to report any activities. But traffic and AREC are moving full ahead. Have you filed a Form 7? Traffic: VE7BJV 136, VE7BHH 38, VE7BLO 28, VE7AKE 15, VE7BDN 12, VE7BBB 11, VE7BHW 11, VE7BCJ 6, VE7BOG 5, VE7DH 5.

MANITOBA—Acting SCM, M. S. Watson, VE4JY—John Thomas Stacey, VE4JT, 19 Cottonwood Cres., Brandon, has been elected as SCM for Manitoba. It is to be hoped that he will receive the full cooperation of the amateurs in Manitoba. Field Day reports were received from WARA, the Winnipeg DX Club and a group at Big Island Lake. WARA was located at Pine Ridge with VE4UC and VE4BB/4 in charge with 9 operators which included 8 AREC members. The DX Club was located at Falcon Lake and had 7 operators, VE4JC, VE4SA, VE4TJ, VE4XO, VE4BJ, VE4XJ and VE4MP. The group at the south end of Big Island Lake, with 6 operators including 2 AREC members, was in charge of VE4EO and VE4DF/4. Results have not yet been tabulated. VE5HP, mobile, on a visit was active in Winnipeg and vicinity. Traffic: VE4JT 93, VE4QX 45, VE4LG 32, VE4NE 12, VE4EI 11, VE4JA 11, VE4JY 11, VE4QJ 6, VE4EW 4, VE4QD 4, VE4UX 4, VE4EX 3, VE4SC 3, VE4MK 2, VE4TM 1, VE4XN 1.

ONTARIO—SCM, Richard W. Roberts, VE3NG—Your SCM visited some of the local FD sites this year and is beginning to wonder why some operators go to Field Day at all. One can party at home a lot easier. However, the majority are serious in their FD efforts. VE3DSG is on vacation in England and Norway. Your SCM is on s.s.b. with an HW12C on 75. VE3BD reported a fine trip to Mexico. The SEC, VE3EUM, reports an excellent AREC display in Hamilton during Safety Week. ECs are urged to report each and every month to the SEC. Failure means you will lose your appointment. The South Waterloo ARC has its own call now, VE3SWA. The club had its first Field Day Test this year. Cooksville held its FD effort near Brampton and worked hard to get a good score in the 3-transmitter class. The DX Assn. of Ontario racked up a fine score on 7-Mc. s.s.b. We mourn the loss of VE3APF, of Caledon Mountain, who became a Silent Key in June. Bill had a small cottage in Caledon and while he was being laid to rest his very high-priced gear was stolen. Police are working on it and I expect to have a description and list of the stolen gear soon. This will be mailed to all clubs in Ontario. VE3FSQ and VE3GAE are looking for contacts on 432-Mc. TV in N.Y.-Mich.-Penn.-Ohio, etc. The Nortown ARC, Toronto, elected VE3CXC, pres.; VE3AAW, vice-pres.; VE3FTS, treas.; VE3EAK, secy. VE3TC, Mr. Jones of the D.O.T., has been posted to the London area. VE3GG is in Branson Hospital, Toronto. Cards would be

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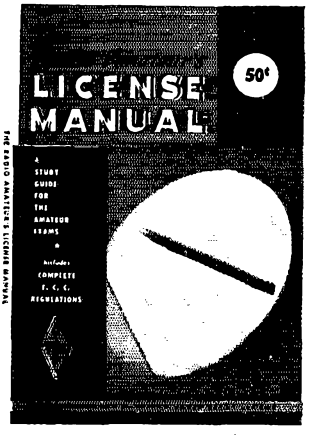

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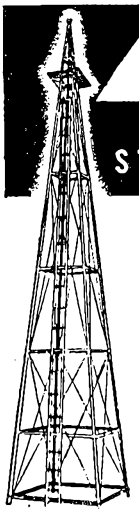

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welcomed by our oldest ham. Albert is home again but his call, VE3DUU, is not heard too much. He monitors a lot on 75. Traffic: VE3CYR 104, VE3NG 82, VE3DPO 62, VE3GI 62, VE3EAM 57, VE3DAIU 51, VE3BII 47, VE3HW 44, VE3EUM 28, VE3FGV 28, VE3CFI 25, VE3DRF 25, VE3EHL 20, VE3TT 17, VE3BUR 16, VE3AFU 14, K1CLM 13, VE3BWM 10, VE3AKQ 7, VE3ETM 7, VE3EWN 7, VE3AWE 5, VE3DWN 5, VE3BTU 3, VE3VD 3.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Claude DuBerger, VE2ALH. During a large scale Scout Jamboree at Drummondville the AREC group organized a station to handle traffic and to acquaint the young scouts with our hobby. VE2BFZ, EC of the district, with the aid of VE2AUU and others operated daily between 1800 and 0200Z. W2GJR/VE2 and VE2AFM installed a closed circuit amateur TV which showed the station in operation. Any Quebec hams associated with the police, please contact VE3CQC, 335 Stephen St., Byron, Ont. VE3IPA, International Police Assn., is trying to get representation from Quebec. VE2NE scored heavily again with some 1800 contacts during Field Day. VE2AKF and VE2TU operate 100 watts on 432 Mc. VE2BSG keeps 3765 kc. hot from Shawinigan. If you want a QSO with VE2BSP listen on 3.7 Mc. from 1 to 5 A.M. VE2ED is active again. VE2ALH is going to the Arctic on icebreaker *D'Iberville* and will report news by radiogram. This month he reports: VE2RB opere un nouveau NCL 2000 qui lui donne de très bons resultats sur 20 m. VE2TJ et VE2AGH font du camping aux Etats-Unis avec un SR-150. VE2YB, ex-VEØML, est maintenant de retour dans sont pays Ottawa. VE2BUY sera bientôt en s.s.b. avec un puissant signal. VE2s BLL, BVH et BVY sont très actifs sur le nouveau reseau RTQ tous les soirs sur 3581 kc. Yogi L'ours VE2AIR/2 sera de retour à l'Universite Laval en septembre et operera une doublet de 125 pieds de haut. VE2HB a terminé sa camera de TV et les résultats semblent très satisfaisants. Traffic: VE2AGQ/3 84, VE2OJ 83, VE2DR 41, VE2EC 39, VE2TA 37, VE2AUU 28, VE2ALH 24, VE2CP 18, VE2SD 18, VE2BRT 17, VE2BG 12, VE2AAW 8, VE2AZQ 7.

SASKATCHEWAN—SCM, Mel W. Mills, VE5QC—Hamfest '65 was a success! Technical success was achieved during the hamfest when on Sat. afternoon signals via the moon were received and recorded from KP4BPZ in both c.w. and s.s.b., with the c.w. the clearest. Hats off to VE5MG, VE5XP and VE5DK and the Saskatoon Club's Technical Dept. VE5HP was re-elected pres. of the Sask. Amateur Radio League Inc., with VE5LG elected vice-pres. The Art Driver Proficiency Award went to VE5BO. Congrats to the University Boys at VE5US for winning the "QC" Field Day trophy. VE5JT took the Gus Cox Memorial C.W. trophy *again!* The CKBI Tech. Contest was won by John VE5 Zyla. VE5EA won the Hammond trophy for a very FB home-brew s.s.b. transmitter as well as the fur-lined buttonholes in the Liar's Contest! The Thunderjug, of course, went to VE5OT. The QST Contest went to VE5IP. Thanks to the large number of VE4s and VE6s who attended as well as VO1s to VE7s. Traffic: VE5HP 119, VE5LM 63, VE5FA 4, VE5PZ 4, VE5TP 4, VE5YR 3, VE5HQ 2.

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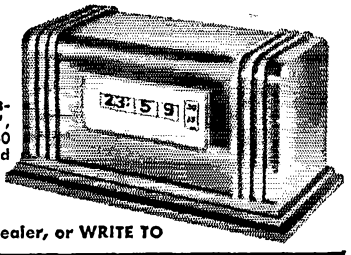

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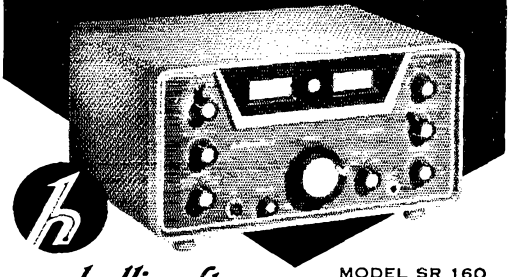

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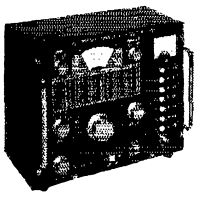

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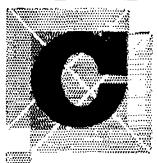

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Two-Tone Test Oscillator

(Continued from page 13)

movement, but of course readjustment from time to time may be necessary.

The beginning and end of each pulse of two-tone test signal will show some distortion.[3] However, the low pulse repetition rate used in this test generator allows the passage of several clean waveforms between the extremes of each pulse, for amplifier linearity evaluation.

The pulse duty cycle and the number of two-tone waveforms within each pulse can be varied by adjusting R_3. The peak envelope input power can be approximated by the following:

$$\text{P.E.P. Input} \cong \frac{E_b I_b}{n}\left[1.57 - \frac{.57 I_o}{I_b}\right]$$

where E_b = D.c. plate voltage
I_b = D.c. plate current (meter reading)
I_o = Zero-signal d.c. plate current
n = Pulse duty cycle (=1.0 for steady two-tone test)

In the easiest case to set up, where the pulse is on half the time and off half the time, $n = 0.5$. It should be apparent that the amplifier will appear to be loafing, insofar as meter readings are concerned, while still hitting some high peaks. Normal tuning can be carried out under these conditions, and the exact point of "flat-topping" can be found, with little or no danger of overheating in the amplifier. QST

[3] Goodman, "Pulsed Signals Through S.S.B. Transmitters," elsewhere in this issue.

VE/W Contest

(Continued from page 104)

Manitoba	VE4	MAN
Saskatchewan	VE5	SASK
Alberta	VE6	ALTA
British Columbia	VE7	BC
Vancouver Island and Queen Charlotte Islands	VE7	VQC
Yukon	VE8	YU
Northwest Territories	VE8	NWT

8) *Reporting:* Follow the sample log shown below. Log forms are not available from MARC or ARRL. Single operator stations may not have assistance from any other person during the contest.

9) *Awards:* The overall contest winner wins a handsome trophy. In addition the winner in each ARRL section receives a certificate. Awards to Canadian winners will be to the section leaders. The top phone only score and top c.w. only score will be listed separately. The section certificate will go to the highest score.

10) *Deadline:* All logs must be postmarked no later than midnight, November 8th, to be eligible for awards. Please make sure that your call and section is printed on each page and on the top left hand corner of your envelope. Logs cannot be returned. Mail logs to R. A. Eberts, VE2AE, 1535 St. Croix Blvd., St. Laurent 9, Quebec, Canada.

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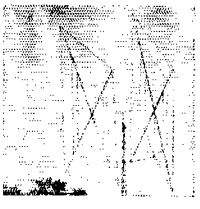

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(*Continued from page 42*)

into, which can only be maintained by permitting the p.a. stage to draw normal plate current. Do not reduce the coupling between L_4 and L_5 in an attempt to lower the output from the exciter unless the level of modulation is similarly altered.

If too much drive is available for your linear amplifier, the unit shown in Fig. 5 can be used. The swamper is housed in a 2¼ × 2¼ × 4-inch Minibox and has a step-attenuator switch which places as many as four No. 47 bulbs in series with the exciter's output. A 55-ohm dummy load, consisting of six 330-ohm 1-watt resistors, is permanently bridged across the input terminals of the swamper. This provides the exciter with a constant load and further attenuates the output signal. Depending upon the efficiency of the grid circuit in your linear amplifier, this accessory may or may not be required. The circuit for the swamper is given in Fig. 4. A more sophisticated version of this device, suitable for s.s.b. operation as well, can be found in the 1965 edition of the *ARRL Single Sideband Manual*, page 228.

Some Final Thoughts

The a.m./c.w. exciter can also be used as a low-power 2-meter transmitter for local operation, portable work, or during field-day activities. As an exciter, it will lend itself nicely to application with the 4CX250 2-meter linear amplifier described on page 11, February 1964 *QST*. Other tubes, such as the 4X150A, operated Class AB_1 can be driven to full rated input by this little exciter. By making appropriate modifications to the heater wiring, this unit will serve as a mobile transmitter. If you're interested in generating a clean a.m./c.w. signal for amplification by a linear amplifier — try this one. The usual circuit "bugs" have been eliminated. QST

ARPSC

(*Continued from page 81*)

BUN (Utah); GBN (Ont.); PTTN (Pa.); OSSBN (Ohio); SCEN (S.C.); AENB, AENH, AENM, AENP, AENP (late), AENR, AENT (Ala.); VSBN, VSBN (late), ODSSBN, VSN (Va.); RIN, RISPN (R.I.); OZK (Ark.); MSN, MSPN, MSPN (late), (Minn.).

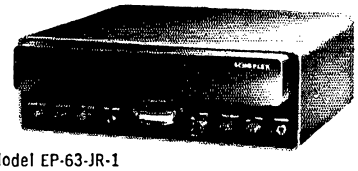
[3] TCC functions not counted as net sessions.

No new records this month, although we came mighty close to breaking the old rate record. As usual, traffic has dropped off for the summer, and so has the activity, but don't forget the SET next month. As usual, NTS will be used, and some of the nets will probably handle as much traffic that weekend as they have in one month.

K3MVO remarks that there isn't much new, except a few subs for those boys on vacation. RN5's totals took a large drop, owing to vacations, QRN and the like, reports K5IBZ. We had a nice but short visit from K7JHA in July. W8CHT attended a convention in W. Va., and hopes his trip will result in better W. Va. representation on 8RN. The roof fell in on 9RN, sez W9QLW, representation went to pot, and traffic wasn't so hot either. A 9RN certificate was issued to WA9EBT. WØLGG sez that representation from Kans. and Minn. is poor. K1WJD continues to issue EAN certificates, this time to W3EEB and W4NLC. W9DYG comments that CAN has been having a rough go of it at times, with QRN, long skip, short skip, you name it. One more month to go, and CAN will have one year of

(*Continued on page 164*)

ECHOPLEX...



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- Signal-to-noise gain of 5-to-1 makes a 1 kw SSB transmitter produce the same signal/noise as a 5 kw SSB transmitter.
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- Allows you to identify your signal from non-echoplex signals thus easier to read through QRM.
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CODE

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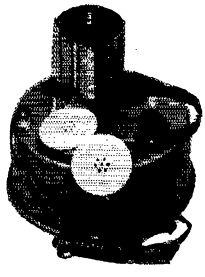

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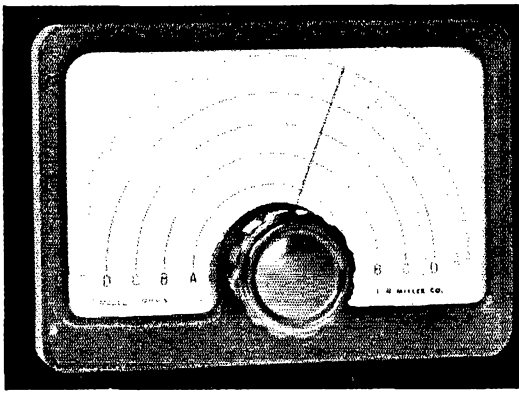

VERNIER DIALS—9 to 1 and Combination 36 to 1 & 6 to 1

MODEL NUMBER	TURNS RATIO	NO. OF SCALES	NET PRICE
MD-5	9 to 1	4	$ 8.25
MD-6	9 to 1	6	$ 9.00
MD-7*	36 to 1 & 6 to 1	6	$15.00
MD-8*	36 to 1 & 6 to 1	6	$15.00

*Dial allows fast tuning at a 6 to 1 ratio with fine tuning at the 36 to 1 ratio over any 6-division portion of the scale.

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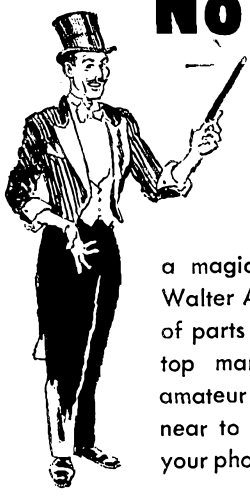

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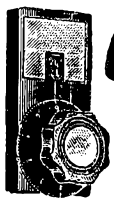

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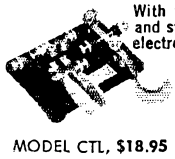

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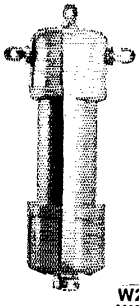

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. . . with built-in lightning arrester —center hang-up hook for inverted vees, doublets, etc., eliminates center insulator—broadband 3 to 32 Mc. rated 2 Kw. P.E.P.—Two models: 1 to 1 Model goes from 50 or 75 ohm **UNBALANCED** coax, to 50 or 75 ohm **BALANCED** beam or antenna—1 to 4 model goes from 50 to 75 ohm **UNBALANCED** coax to 200 or 300 ohm **BALANCED** load.

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100% representation under its belt. Anyone else like to take a crack at that one? WB6JUH is becoming rather concerned about the lack of new faces on PAN in recent months.

Transcontinental Corps: W3EML reports a fair month with traffic up about 10% over last year. Conditions seem to be giving a few of the skeds a rough time, but the boys keep rolling along. W5PPE notes lots of fair traffic being handled, mostly by WØOHJ. W7DZX went to the National Convention.

June reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	120	86.7	1499	573
Central	90	88.9	2065	1026
Pacific	120	80.9	1860	936
Summary	330	85.2	5424	2535

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EMG NJM, W2GVH, K2SIL, *WA2s* BLV RUE UFI, *WB2s* AEJ HWB, *W3s* EML NEM, *K3s* FHR MVO, W4DVT, K4CDL, *WA4PDS*, W8CHT, *K8s* KMQ NJW. Central Area (W5PPE, Dir.) — *W4s* OGG ZJY, WA4AVM, W5PPE, *W9s* DYG JOZ VAY ZYK, *WA9s* AUM BWY, WØOHJ, KØGSY.

Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
20 Meter SSB	22	408	1223
North American SSB	26	560	445
75 Meter Interstate	30	735	254
7290	44	1143	649
Northeast Area Barnyard	26	639	17

QST

How's DX?

(*Continued from page 103*)

QSOs at odd moments." Dave hopes W6KG and XYL will soon take some of the DX pressure off YJ-Land with extensive YJ8YY action . . . . . KS6BN, awaiting his KB6 credentials, intends heavy c.w. QSO output from Canton . . . . . W1WPO of the ARRL DXCC Desk notes that CR8AF is the son of CT1TX . . . . . VK3IB shut down VR1B in July, says W1YYM . . . . . Guam goings-on courtesy K3SWW/KG6: "We lost a couple of good operators when KH6BFZ/KG6 returned to Hawaii, and when WA9KLO/KG6 transferred to Ohio. KG6ALT is now on s.s.b. with a Japanese FL-100B rig. Club station KG6AAY has two or three operators banging away on c.w. K9LOS/KG6 awaits his KG6 call with a new tower and beam." K3SWW/KG6, DXCC in the bag, now concentrates on WAS with his SB-400 and SB-300 . . . . . W9PAN/KH6 enjoys DXing from the Pacific with an NCX-5 and TA-33-jr. . . . . The Oceania-Asia DX junket of W9WNV and K7LMU may hit about ten really juicy spots and extend into autumn.

SOUTH AMERICA — K3SLP points out the DX rarity of YV7s, most of whom prefer local 40-meter rag-chews in Spanish. Hence the lively response to YV5BIG/7's early-summer Margarita island DXcursion . . . . . WB2MJD finds CX5AF signing CX5ZAF aboard his private plane when he commutes between his Montevideo home and his ranch QTH (CX2GM) . . . . . OA4KY's 80-meter inverted Vee has accounted for all continents on that band . . . . . WA1DJC wants to try 10-meter skeds with some CE in Santiago. Tom has friends in school down that way.

HEREABOUTS — W5NGW and others vote for more DXpeditions to Anguilla, Grenada, St. Lucia, the B.V.I. and Martinique. So near and yet so rare . . . . . Brother WN7s BOA and BOB graduated to WA7 status after respectively working 25 and 28 countries on 21 Mc. . . . . W1RAN's note to W1YYM shows how one c.w. man got even. W9SFR asked HZ3TYQ on s.s.b. to please listen for his c.w. Vic did, too VP2GL (WA5KQF)

(*Continued on page 166*)

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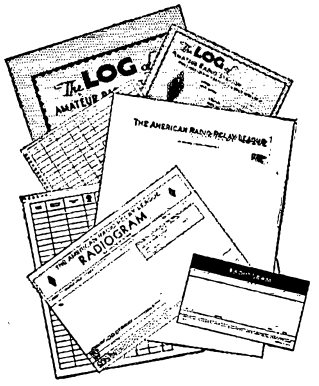
For The Busy Operating Season Ahead . . .



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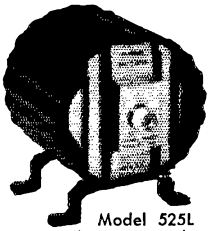

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And now, a new model 525L

	Model 525	525L
Impedance (ohms)	50	50
Power—Steady State	125	125
Power—ICAS	250	250
VSWR—Less than (DC to over 250 MC)	1.1/1.0	1.05/1.0
Price	$11.95	$19.95

Model 525L Gentec Dummy Antennas permit transmitter adjustments under electrical conditions duplicating actual antenna conditions, but converting and dissipating electrical power as heat, preventing radiation and eliminating TVI, QRM and associated problems. Transmitters readily peaked for top DX operation.

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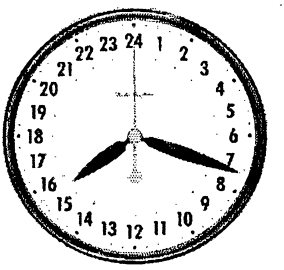

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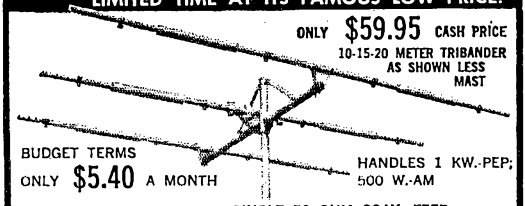

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☐ Rush my TB-500. Full payment is enclosed (ship prepaid within Continental USA)
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☐ Send information on the complete line of Hornet Amateur Antennas.
☐ I am especially interested in the Hornet TB-10004 Four Element Tribander (Only $112.50).

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YOUR TB-500 WILL BE SHIPPED PREPAID IF CASH ACCOMPANIES ORDER

emphatically broke the Grenada c.w. drouth in June, according to WB2NLH . . . . . Ws 1WPO 2GHK and 9JJF were on the star-studded program at the 11th Northwest DX Convention, Portland, last month . . . . . "DX activity here is at a standstill," broods W4YHD, onetime KC6BO staffer. "I'm hoping to locate a good station away from the new house, a set-up for contests only." QST

Anatomy of Public Service Comm.

(Continued from page 76)

kind of amateur we need to make our service a valuable one so that our use of precious spectrum space will be fully justified in the eyes of ourselves, the public, our government, and even foreign governments, who after all have much to say about whether or not we amateurs shall continue to occupy spectrum space. John Hamm is the kind of versatile, broadminded, intelligent and farsighted amateur of which top ARRL officials such as SCMs and directors are made.

* * *

This series of articles on John Hamm, WAØXHH, of which this is the final installment, has been based principally on a slide collection now being put together at ARRL headquarters for distribution as a Training Aid to affiliated clubs and ARPSC officials. Watch for the announcement of its availability in the ARPSC column and in *Operating News*. QST

Correspondence From Members

(Continued from page 71)

I am immediately called by dozens of U. S. hams who never have the elementary courtesy of waiting until I get through with my DX contact. Naturally, I never answer their calls since I am already engaged in a QSO, but, nevertheless, they keep on calling me on the frequency and as a last resort to ruin my DX contact they start calling CQ DX on top of my frequency.

The above, happens to me every time I try DX QSO's and every day of the year for that matter, and I am tired of such ridiculous and unethical procedure. If they need my card, they can wait until I finish my QSO. — *XE1TQ*

SASE

¶ Thank you for a copy of your financial report. One thing irks me: your postage expenses for the year. I'm a member of the League. Why not require non-members who write to the League to include at least a stamp for a reply? — *K3FIK*

QSL DILEMMA

¶ Five or six years ago I had several hundred QSL cards printed showing a picture of my shack — with me seated with a mike on the desk and a key in my hand. Background was a six-foot relay rack full of homemade gear. I was proud to send this picture to the hams I contacted.

Now I have a lot of these picture QSL cards left but not a piece of the equipment remains. Some of it has changed several times. Recently, I swept the room clean and traded for a powerful little third of a kilowatt about the size of my hat. Pardon a nostalgic tear or two, but I ask you — what is unique about a picture of my shack today? Maybe I should just send pictures of my bald old head with its bifocal glasses. My XYL says there's not another like it. — *WØLJO* QST

CONVERTER SALE

New series 300 with 3 VHF-UHF transistors, crystal-controlled oscillator, tuned R.F. stage and low noise mixer. One microvolt sensitivity. More than 30 high quality parts carefully assembled and tested. Measures only 3" x 2¼" x 2". Operates at 12 volts DC 4-5 ma. Available in the following models:

	Model	Input mc.	Output mc.	Price
2M	300-D	144-148	50-54	$12.95 ppd.
	300-E	144-145	.6-1.6	$12.95 ppd.
	300-F	144-146	28-30	$12.95 ppd.
	300-Q	144-148	14-18	$12.95 ppd.
6M	300-B	50-51	.6-1.6	$12.95 ppd.
	300-C	50-54	14-18	$12.95 ppd.
	300-J	50-52	28-30	$12.95 ppd.
20M	300-G	14.0-14.35	1.0-1.35	$11.95 ppd.
CB	300-A	26.965-27.255	1.0-1.29	$11.95 ppd.
WWV	300-H	5.0	1.0	$11.95 ppd.
Int'l.	300-I	9.0-10.0	.6-1.6	$11.95 ppd.
CHU	300-K	7.3	1.0	$11.95 ppd.
CHU	300-L	3.35	1.0	$11.95 ppd.
Marine	300-M	2-3	.6-1.6	$11.95 ppd.
Aircraft	300-N4	121-122	.6-1.6	$13.95 ppd.
	300-N5	122-123	.6-1.6	$13.95 ppd.
Fire, Police etc.	300-P	155-156	.6-1.6	$13.95 ppd.

All above converters are supplied with Motorola type connectors. For two SO-239 connectors instead, add 75¢.

For prompt shipment of stock models include postal money order or cashier's check. Special models shipped within six weeks. Personal checks must clear before shipment. For C.O.D.'s include 20% deposit. New York City Residents add 5% sales tax. New York State residents add 2% sales tax.

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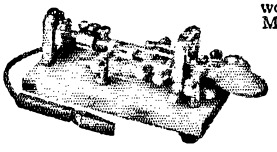

Sending becomes fun instead of work with the SEMI-AUTOMATIC Vibroplex. It actually does all the arm-tiring nerve wrecking work for you. Adjustable to any desired speed. Standard models have polished Chromium top parts and gray base. DeLuxe models also include Chromium Base and red finger and thumb pieces. Five models to choose from, priced at **$17.95** to the 24K Gold Plated Base "Presentation" at **$33.95.**

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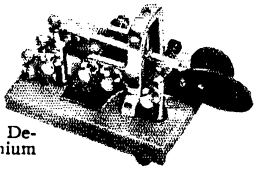

Works perfectly with any Electronic Transmitting Unit. Weighs 2¾ lbs., with a base 3⅛" by 4½". Has Vibroplex's finely polished parts, red knob and finger, and thumb pieces. Standard model **$17.95**; DeLuxe model includes Chromium Plated Base at only **$22.45.**

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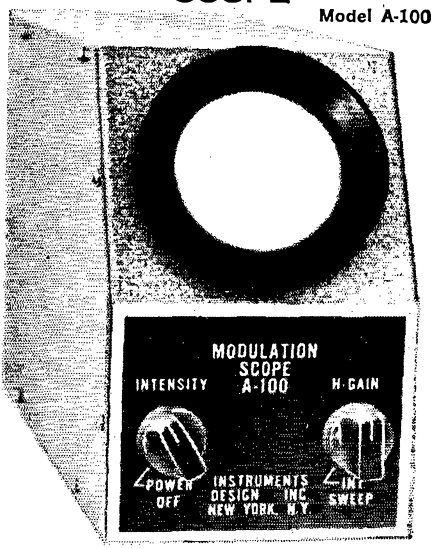
HAM MODULATION SCOPE

Model A-100



- AM, CW or SSB
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- Will handle 5W to 1 KW
- Uses standard connectors
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- Size: 9½" deep, x 5½" high, x 3½" wide Weight: approx. 5 lbs.

ORDER NOW, LIMITED QUANTITIES AVAILABLE **$29.95**

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RADIO TELETYPE EQUIPMENT

Teletype Models 14, 15, 19, 20, FRXD, 28, Kleinschmidt printers. Boehme CW keyers R-390, R-391. Radio Receivers Collins 51J-3, 51J-4, R-390A. Hammarlund SP-600JX. Telewriter Model L Frequency Shift Converter.

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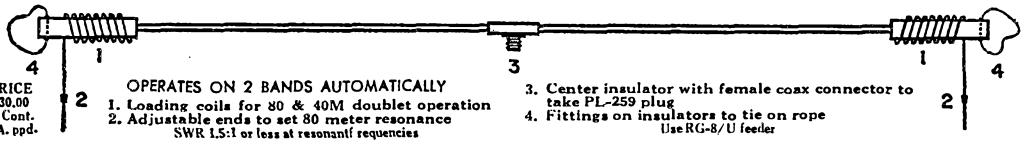
LRL-70 ANTENNA

70' LONG, 80 & 40 M • Power rating 2 Kw. P.E.P. or over



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OPERATES ON 2 BANDS AUTOMATICALLY
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HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-Ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
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(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.
(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) Because error is more easily avoided, it is requested 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 issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

SYRACUSE VHF Roundup in its 11th year will be held Saturday, Oct. 2nd, at Three Rivers Inn, Liverpool, N.Y. Speakers! Mfgrs. displays! Dinner for only $6.00 pre-registration and $6.50 at door. Tickets: Reine Maavere, 2217 E. Colvin St., Syracuse, N.Y. 13210.

MISSOURI-Illinois. The Egyptian Radio Club will hold its annual Hamboree on Sunday Sept. 26, 1965 at the Club House. One half mile south of the Chain of Rocks Canal Bridge (HY 66 by-pass) near Granite City, Ill. Games and contests for the entire family. Ample parking space. Soft drinks, coffee and sandwiches. For details, write Cletus Woodard, W9IHE, P.O. Box 402, Granite City, Ill.

PEORIA Hamfest September 19. Exposition Gardens, Peoria Area Amateur Radio Club. Advance registration $1.00 until Sept. 11, Ferrel Lytle, W9DHF, 419 Stonegate Rd., Peoria, Ill.

GREATER Bay Area Hamfest, Peacock Gap Country Club, San Rafael, Calif. October 16-17. Write to Box 113, Hayward, Calif.

BIGGEST? Nope. Best? Heck, yes! Warren ARA Hamfest August 29th, Newton Falls. Arrows from Rt. 534 and Turnpike Warren Exit 14. Details: WARA Hamfest, Box 809, Warren, Ohio.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor Michigan. Tel. NOrmandy 8-8262.

WANTED: All types of aircraft on ground radios. 17L 618F or S388, 390, GRC, PRC, 51 JRVX. Collins linear amplifier, Type 204; especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.J.

SELL swap or buy ancient radio set and parts magazines. Lavertv, 118 N. Wycombie, Landsdowne, Penna.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 17, Binghamton, N.Y. Tel: 724-5785.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Asoen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

304TL tubes wanted. Also other xmtg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

WANTED: Collins Parts, BC-610, GRC-27, Autodyne, Bethpage, L.I., N.Y.

INTERESTING Offers galore in the new combined "Equipment Exchange-Ham Trader". Next 12 issues $1.00. Sample free. Brand, Sycamore, Ill.

NOVICE Crystals 80-40 M. $1.05 each. Others, 75¢. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

QSLS? SWLS? WPES? Personalized made-to-order. Fast service! Largest variety samples, 25¢. DeLuxe, 35¢. Religious, 25¢. Sakkers, W8DED, Box 218, Holland, Mich.

QSLS, samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60303.

QSLS "Brownie" W3CJ1, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

C. FRITZ back on the job! Bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

QSLS-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLS, See our new "Eye-Binder" cards. Extra high visibility. Samples 5¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

QSLS, SWLs XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!), Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

DISCONTINUING QSL Printing. Prices reduced to use up remaining card stocks. Send for samples, prices. Gariepy, 2624 Kroemer Road, Fort Wayne, Indiana.

CREATIVE QSL Cards—25¢ for catalog samples, 50¢ coupon. Personal attention given. Wilkins Printing, Box 787-1, Atascadero, Calif. 83422.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSLS Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL, SWLS, WPE, Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

ZIP Code Rubber Stamp. Call, name, address, with ink pad. $1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 300 for $4.35. Samples 10¢, W9SKR. "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegel Ridge, Milford, N.J.

QSLS Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

3-D QSL Cards have that prestige look, with glittering colors and metallics in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois, 60639.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CUSTOMIZED QSLS with your autographed photo. Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland, 21207.

QSLS New cartoons, Top quality, fast service. Samples 20¢. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651.

QSLS, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable, Joe Harms, WA4FJE, W2JME Edgewater, Fla. 32032.

PICTURE QSL cards of your shack, etc. Made from your photograph. 1000, $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSL Cards: free samples, catalog 20¢. Knight Printing Co., 1550 Downey, Indianapolis, Ind.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1033 Utica Ave., Brooklyn, N.Y. 11203.

QSLS. Twenty exclusive designs in 3 colors. Rush $3.00 for 100 or $5.00 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

"GOLDEN CALL" QSLS (Only QSL) crafted by Samco for 1965. Samples 10¢. Samco, Box 203, Wynantskill, N.Y. 12198.

QSLS: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

PLASTIC Holder frames and displays 20 QSL cards, 3 for $1.00 or 10 for $3.00. Prepaid Tepabco, Box 198, Gallatin, Tenn.

QSLS. WA6QAY Press, Box 17112, San Diego, Calif. 92117.

HUNDRED QSLS: $1.00. Samples, dime. Meininger, Jesup, Iowa.

QSLS. 18 samples. 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSL. 3-color glossy. Samples, 10¢. Gates Print Shop, 317-11th Ave., Juniata, Altoona, Penna. 16601.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS. Free offer with samples. 10¢. "Jack", W3PRU, Rice's Lane, Baltimore, Md. 21207.

"GOLDEN Calls" (Only QSL) crafted by Samco for 1965. Sample, 10¢. "Compare if you care". Samco, Box 203, Wynantskill, N.Y. 12198.

QSLS, YLRL specials, QM's. Engraved badges, reasonable. Samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

RUBBER STAMPS $1.00. Call and address. Clint's Radio W2UDO. 32 Cumberland Ave., Verona, N.J.

3-LINE Rubber stamp of 1000 address labels. Only $1.00. Betty Harms, W1JWW, Mystery Hill, No. Salem, N.H.

CANADIANS: Sell Exchange Invader 2000, Valiant, R-390 recvr, TBS50D, BC375E, 696A, APR4, ART-13, Edison cylinder gramaphone, Atwater Kent antique, G4ZU antenna, many others. Parts, etc. VE3BVX, 11 Sussex St., N., Lindsay, Ont. P., Canada.

WANTED: Manual Hickok 188X generator, $5.00. Bob Green, RR #1, Ridgetown, Ont., Canada.

HALLICRAFTERS SR-75, 10-watt transceiver. $50.00 cash. I to pay shipping. W5KKH, Box 7382, Austin, Texas.

NCX-3 plus A.C. power unit, new, in original boxes. Never sent a word. $355.00. P.O. Box 267, Croton Falls, N.Y. Baumgartner.

SELL: Ranger II factory-wired w/PTT, $200: SX-100 w/spkr, $150.00. Both are in exclnt condx. Will sell as a package deal for $330.00. Bob O'Connell, K1JBS, Apt. 24, Washington Gardens, West Haven, Conn.

HAMMARLUND HW-100, $125.00: Lafayette Crystal converter, HE-56, 6-meter 7 Mc.-11 Mc. input, $20.00. Nathan Rosen, 2945 White Plains Road, New York 67, N.Y.

RADIO Antiques. W2FW. DX-40 For sale, $50.00. Includes extra 6146; Mohican GC-1A also for sale, $75.00, including AC power supply. K4VDE, Richard Bergen, 710 Lincoln Ave., Bedford, Ind. 47421.

HONEYWELL W612B transistorized mobile power supplies in original cartons, $20 each. Jim Warren, KØVLC, 4956 Clear Springs Rd., Minnetonka, Minn. 55345.

SELL: Four tubes: 4-125A, RCA, used, exclnt condx. Make offer! P. O'Brien, WA2QDR, 63 Second St., New Rochelle, N.Y. 10801.

SWAN 400, 406-VFO, 117B, AC supply, flawless, w/cartons, manuals, $400. Davis, 675 Sierra Meadow, Sierra Madre, Calif.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 74 Willoughby St., Brooklyn 1, N.Y. 11021. Tel. UL5-2615.

WANTED: For personal collection: QST, May 1916, W1CUT, 18 Mohawk Dr., Unionville, Conn.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GArfield Area code 201-471-2020.

FOR Sale: Plate Transformers, 3600-0-3600 VAC @ 1000 ma. CCS, with 130/240 VAC primary. Commercial quality units carry one year unconditional guarantee. Price $35.00. 4-1000A filament transformers 7.5 V.C.T. @ 21 amps., pri 110, 117, 125 VAC @ cps, fully enclosed unit fits under 4" chassis, net wt. 9#. $12.00. Write us for free estimates on any of your special transformer needs. Dummy loads, 52 ohm 1000 watt capacity, SWR below 1.3 to 1 from D.C. to 54 Mc. $8.95 plus pp. net wt. 7#. Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55414

THEORY Test. Refresher for Technician, General exam. Your work corrected by licensed instructor and returned with comments. $3.00. Schoening, 10040 Brookside, Bloomington, Minn. 55431.

PHILADELPHIA Area: 250-watt 813 AM/CW 80-10 meters, home brew, professionally built. Many extras. Phone W3PUV, LEhigh 2-7137.

SELLING Out: Collins 32S3, 516F-2, 75S3, CE600L. Eldico 100-E kever and many other items. Stamp for list. 75A4 late ser., W9IQW, 930 Second St., Port Edwards, Wis.

4-1000A linear shielded, metered, 3600 V. 1A supply. $375; PP-813 linear 1 KW DC continuous. $135; 75A-4, $400; GC1A, $80. Perera, K2DCY, 410 Riverside Dr., NYC, N.Y.

COLLINS KWS 1, $700: 51J4, $500.00. K5ELK, 1630 South Columbia, Tulsa, Oklahoma. (Area code 918) 918-WE-6-2943.

HALLICRAFTERS S-108 for sale; barely used. Goes to best offer. Send offer to H. Leuchtman, 338 East 19th St., New York 3, N.Y. Call: 212-GR-5-5994.

NATIONAL 183-D and speaker, in perf. condx, best offer over $125.00. QSTs, 1953 through 1964, make an offer. Will deliver within 200 miles of QTH. J. Herb, W3SHP, 123 S. Market, Selinsgrove, Penna. Tel: 717-374-0362.

HANGING 'Em up. Complete Collins station for sale: 75S-3, 32S-3, 30L-1, 312 B-4, 516F-2. All rack-mounted in Collins rack mounts, on 61 in. Bud Deluxe relay rack with Trans-Aire blower mounted in top. Complete KW station, will roll right in closet. Not just good but the best. A $2400 value! Best offer over $1800 f.o.b. Also KWM-2, MP-1, PM-2, CC-2, 351D-2. $1050. J. B. Holmes, Jr., P.O. Box 36146, Houston, Texas 77036.

FOR Sale: Viking Ranger II. $195.00. WB2ADW, 17 Fleetwood Ave., Spring Valley, N.Y. 10977. Tel: 914-E16-3489.

COLLINS 75A-4 owners! Don't trade up! Investigate our conversion that makes the 75A-4 a dream. Stankus, W2VCZ, 30 Pitcairn Ave., Ho-Ho-Kus, N.J.

FOR Sale cheap QSTs or CQS, any quantity. Send your list for quotation. Cash for Callbooks before 1942. Want early radio gear and publications. Erv Rasmussen, Box 612, Redwood City, Calif.

CASH For Your Gear. We buy sell and trade. Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

WANTED: FR-2409 bandpass filter, State price. Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

CASH, Sony Transistor TVs, etc., swapped for G-R, H-P, L&N, etc. equipment, special tubes, manuals, military electronics. Engineering Associates, 434A Patterson Rd., Dayton, Ohio 45419.

WANT: Two SP-600JX-17 receivers, set up for diversity/master oscillator operation. Shepherdheim, 99 Water, Millinocket, Me.

WANTED: Instruction manual for Model 324. Dumont oscilloscope. W6EH.

DXer Beware: A real bomb. York 5000 transmitter, 1 kw. using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep 6 ft high. Further details. Bill Brown, WØSYK, 28 Marine Lane, Hazelwood, Mo. Tel.: HEmpstead 4-5440.

CASH For Callbooks, U.S. Government Amateur Callbooks wanted. W8EF, 801 Lakeshore, Grosse Pointe 36, Mich.

HAM Discount House. Latest amateur equipment. Factory-sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

RTTY Gear for sale. Write for list. 88 or 44 mhy toroids, five for $1.75 ppd. Elliot Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Ellzabeth, N.J. Tel: 354-3141.

WANTED: Commercial or military, airborne or ground. Equipment and test sets. Collins, Bendix, others. We pay freight. RITCO, Box 156, Annandale, Va.

FOR Sale: Gonset Type GSB-201 linear amplifier, 1500 watt P.E.P. input, like new, $190.00: Model 15 teletype trans/receive page machine, clean and in excellent condition, with table, $125.00: Type CV-71 RCA made for Navy, new surplus, radioteletype receiving terminal unit, $185.00: unused surplus, med. size prop-pitch rotator motor converted, ready to use, $35.00: all equipment guaranteed. Will ship as requested. S.E. Hernandez, W2BSA/1, River Road, RFD #1, Essex, Conn. Tel: 203-SO-7-1410.

GONSET G-76, 12 vdc power supply, exclnt condx. $220 includes all for mobile use, antenna. K1LJJ, Currier, Simsbury, Conn. Tel: 658-6428

TELETYPE Machines, converters, R-388, 51J3 and 51J4, R-390 HQ-180 spkr, $269.00, R-390A receivers, mechanical filters for R-390A (455 IF). Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

HALLICRAFTERS HT-44, SX-117, AC power supply and speaker, all cables and extra crystals in mint condx. Now on the air. $525.00 takes the lot. Niedeck, W3MRW, 450 East Goepp St., Bethlehem, Penna.

SELL: 4-El 6M beam, $10: Alliance Tenna-Rotor, $10; 6 M Saturn halo and bumper mount, $10. Will include 2M halo package deal. F.o.b. WA1BGF.

WILL Sell entire 2 year old station now on air or will consider offers for units. HT-32B, SX-115, 30L-1, Ta-33 Jr, 2-band Cliffdweller and misc. smaller units. Art, WA9IQP, 811 Franklin, River Forest, Ill.

KICK High cost of going to full KW. Powerhouse KW SSB linear or Class C CW final. Quality construction in enclosed 30" cabinet with casters. Variac controlled HV supply with bias and screen supplies. Fully metered (5). Uses 4-400A in grounded grid. Driven with any popular 75-100 watt exciter. $125.00 cash and carry. Will arrange sked to let you hear rig on air. Two new 4-400A at $35.00 for pair. New HV transformer, 3600-0-3600 at 1 amp., 110 or 220 ac primary, $30. Two 2 mfd., 4000 DC working capacitors, $10.00 for both. F. W. Rockwood, W1IOB, 186 N. Rolling Acres, Cheshire, Conn. Phone 272-8559. Area code 203.

MUST Sell! Going to college. Collins 32V-2, $150.00. Spaulding 32 ft. tower, AR-22, TA-33 Jr., $100, Hal Melville, WA4CPO, 500 Gondoliere Ave., Coral Gables, Fla. Tel: MO-7-3286.

FIRST $500 check buys brand new TR-3 with 110 VAC power supply. Never been used. Lee G. Davy, 1532 Belmeade Drive, Kingsport, Tenn. 37664.

SELL: Heath DX-60. $55.00. Richard Butler, 403 Metropolitan Ave., Boston, Mass. Tel: 617-361-3764.

QSTS 21-62; CQ's 45-63. Sale swap, SASE for list. K3IUV, 8582 Benton, Phila., Penna. 19152.

FOR Sale: G-77A with power pack. Want: Seneca 6 & 2. Will consider trade. Beacon Motel 9900 Pine Ave., Niagara Falls, N.Y. Sam Zito.

SP-600 JX-17 receiver. Rack mounting. Professionally aligned. Have gone SSB. Make offer. Will ship freight collect. Don O'Hallaron. 13 N. Gore, Webster Groves, Mo. 63119.

SOUTHERN California! Complete SSB station for sale. GSB-100, GSB-201, Drake 2B, G tower, TA-33 beam, tower, new Ham-M rotor. All like new and not a scratch! Many extras. First $750.00 takes it all. K6YQW at 554-6278 after 6:00 PM, or you can see at 18232 Beneta Way, Tustin.

ATTENTION: Bargain Hunters! Brand new factory-sealed Hammarlund SSB xmtrs, HX-500, $295.00: HX-50, $275.00: low prices on used gear: SW-240, $265.00: Sonar 80, $150.00: Galaxy 300, $295.00; SR-160, $319.00: KWM-2, $825.00: Invader 2000, $795.00: Ranger II, $295.00: Valiants, $175.00: Apaches, $160.00: HX-20, $319.00: Drake 2B, $189.00: SX-101A, $199.00. We give big trades on the NCX-5 and NCL-2000. Try us on your next trade. 35 years in the business. Write Tenny Freck, W4WL, and Bill Beck, K4QOK, Freck Radio & Supply Co., 38 Biltmore Ave., Asheville, N.C.

COLLINS 75A3 with vernier knob and Universal Service product detector, $310: Apache in excellent working condx: $160.00. W8GQP, 22700 Alexandrine, Dearborn, Mich.

SELLING Out ham-shack. Many tubes and parts. Base station, mobile rig; rare tubes. Send for free list. K9AFU, 1825 So. Muskego Ave., Milwaukee, Wis. 53204.

BUILDING? Fast service from the center of the nation! Bud, LBM, Triplett, Johnson, National and Air Dux components, plus others. Electronics, Inc. 227 North Santa Fe, Salina, Kans.

LOG Books. Log 7,000 stations per book, $1.00 postpaid. Doyle Owens, K4MUR, Box 926, Scottsboro, Ala. 35768.

FOR Sale: P&H La400C linear amplifier, original carton for shipping. One year old with 12 spare new 837 tubes. $125.00. Will sell linear and tubes separately. Vernard Rush, Box 187, New Concord, Ohio. W8DMZ.

GOING FM. Sell perfect Twoer, $40. Roger Moser, KØKGY, Box 532, Hector, Minn. 55342.

WANTED: Back issues of IRE or IEEE professional Group Transactions (Not Proceedings). Most groups wanted, single issues or runs. Please list what you have and price desired. Also need Convention Records and similar Journals. J. D. Ahlgren, W4YHD, 6800 Hampshire Rd., McLean, Virginia 22101.

RETIRING. For sale: Complete Collins station with KWS-1, 75A-4, *both with vernier dials; speaker cabinet with 24-hour* clock and running-time meter; LP filter relays, etc. Collins 302C-3 wattmeter; new spare 4X250B; Hallicrafters HA-1 T/O keyer with Vibroplex key, 2 KW dummy antenna; Telrex TM30-C Tribander; Astatic mike D-104; TG-34 A keyer with tapes. Manuals and instructions. All equipment bought new and in excint condx. Package price $1000 F.o.b. Princeton, N.J. E. W. Luginbuhl, W2YFB, P.O. Box 653, Princeton, N.J.

SELL A-1 *mint* condx. Hallicrafters SR-46, 6-meter transceiver with MR-40 mobile kit. Fifteen hours of use. Firm $150.00. K2GUV, 61 Grant St., Auburn, N.Y.

SELL: Collins 75A-4 receiver, excint condx, $380.00. You pay shipping. Josef Schilling, 1409 S.W. 66th St., Oklahoma City, Okla., 73159.

WANTED: QSTS January 1917 and August 1919. Will pay top dollar. W2TAM, 140 Summit Avenue, Trenton, N.J.

HEATH SB-400 exciter, Hy-Gain TH-4 CDR TR-44, Brush BA-200-2, misc. ham station parts. Money-back guarantee. Make offer or send for price list. W9FMW, 1567 Southfield Road, Evansville, Ind. 47715.

INVADER 2000, $650.00. In excint condx, complete, with cables. Will demonstrate for local pick-up or ship F.o.b. factory cartons. W8FWJ, 225 Hillcrest Drive, Cincinnati, Ohio. Phone 513-761-8896.

MUST sell: SBE-33 in perfect condx. First reasonable offer takes it. Dan Pierce, KØQCT, 1930 Avenue 8, Kearney, Nebraska.

SELL PH-565 Ham-TV camera 90 MK raptar lens, converted, airtested, $60.00. Prepaid. K7VQI, 5018 East Copper St., Tucson, Ariz. 85711.

VALIANT f/w with blower, $200.00. Heath HW-12 with AC p/s. $115.00. Both in excint condx. K3GNI, 549 Green, Royersford, Penna.

COLLINS VFO's, new, unopened cartons 70E-24 for 75A-4, $49.00; 70E-23 for KWS-1, $39.00; 70E-12 for 75A-2 and 75A-3, $39.00; 70 K-1 for KWM-1, $29.00; 70J-3 for R-390A BFO, $39.00; 399B-1 DX adaptor for KWM-1, $19.00; 399R-3 Novice adaptor, $9.00. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

AMPEX Momorail tape-recorder, $75.00. Dwight Kalita, Carpenter Road, Defiance, Ohio.

WANTED: Bendix Ultrasonic cleaning tank, any size or condition. Cash for leads. Also Wheatstone perforator for Bohme keyer. K8TJP, Ray Newsome, 2670 Pinetree, Trenton, Mich.

FOR Sale: HQ-110C, $120.00; "Sixer", $45. Will ship collect on receipt of certified check or money-order. K4OGV, Holland McPeake, 315 Johnson, Apartment B-2, Cape Canaveral, Fla.

BLUE Book Used List free! Check our low prices. Over 1000 items. Includes: KWM-2, Eico 720, AF-68, PMR-8, Galaxy 300, 755A VFO, Communicator 3/6, SX-42, SX-101A, SX-117, SR-150, SB-400, Invader 2000, Viking 500, CM1, 32V-1, 22'er, 2A, Champ 350, Globe 602. Free 1965 Catalog. World Radio Laboratories, Box 919, Council Bluffs, Iowa.

SALE: SB-300, new, $300. Will wire any kit reasonably, radio, hi-fi, etc. (20 year Navy experience, retired). Will repair any of your gear. Lan Richter, 131 Florence Dr., Harrisburg, Penna.

ELECTRONICS Equipment repaired, overhauled, modernized, or special gear made up to order for parts cost plus time, by communications engineer with 26 years commercial experience who can't stand retirement. Also have many surplus parts on hand for your own projects at much less than regular net prices. Inquiries invited. W5KRU, P.O. Box 88, Keithville, Louisiana. 71047.

VHF Finco 6-2 beam, coax, Ameco CN144 f/w converter, $60.00. Hugh Williams, 25 Pheasant Lane, Orchard Park, N.Y.

QSTS: 1950 thru 1954 except June, September 1953; 1959 thru 1962 complete, plus other issues of QST and CQ from 1928. 15 cents copy plus postage or make offer. W2TJZ, 101 Christie St., Tenafly, N.J. 201-568-1267.

FOR Sale: DC-3 mobile power supply for TR-3 transceiver, used approximately 10 hours; $100.00. H. Hollenbeck, W2CMV, 4873 Creek Rd., Lewiston, N.Y.

COLLINS 32S-1/516F-2 power supply, in excint condx: $450.00. WB6FHH, 157 Glenwood, Atherton, Calif.

SELL: HT-37, in excint condx, $275.00; Telrex inverted "V" antenna for 40-20-15 meters, complete with traps, balun and 50 ft. of coax, $25.00. Pick-up deal only. sri. Ed Abbott, 127-04 109th Ave., South Ozone Park, Queens, N.Y. Tel: MI 1-0502.

I Need QST from June 1919 to July 1921 to round out my file. Copies must have both covers. What do you have? What do you want? Elmore Fitz, Lanesboro, Mass.

SELL: New Heath Model HG-10 VFO, $25.00. Heath AT-1 35-watt c.w. xmtr. $15.00. Heath AC-1 antenna coupler, $5.00. W1OER, 135 Barbara Rd., Waltham, Mass.

WANTED: Two Gordon Specialties Co. Chicago, Ill. or equal DPDT KW r.f. antenna relays. Your price. W1BB.

SELL RME-6900 receiver, in excint condx, $160.00. WA4SBD, 2804 Broadview Dr., Huntsville, Ala. 35810.

HQ-180C w/spkr. in mint condx, $250.00. Rev. E. J. Wynne, 903 S. Beverwyck Rd. Parsippany, N.J. Tel: 201-887-4657.

CHRISTIAN Ham Fellowship now being organized among Christian hams for fellowship, tract ministry, missionary efforts among hams. Christian Ham Callbook, $1.00 donation. Write Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, Mich.

WANTED: Collins 312B-5 console. WØFGZ, 5333 Waterman Blvd., St. Louis 12, Mo.

SELL: DX-100, modified to DX-100B with built-in SWR meter, FSK, and antenna relay. In mint condx. W8NRE, 1598 Van Gesten Rd., Caro, Mich.

HAVE Too much equipment, all like-new: 7553, $400.00; 75A-4, 3 Kc 800 cycle filters, $400; KWS-1, latest, $650.00; KWM-1 noise blanker 516F-1, 516E-1. Supplies mobile mount, $500.00. W2BBV, 49 Frum Ave., Yonkers, N.Y.

BANDIT 2000A Linear ser. No. 439, complete with Hunter bias modification in excint condx, $375.00. Also New-Tronics 80-40 meter Cliff Dweller, ser. No. 503, gud condx, $50.00. Both units F.o.b. Milt de Reyna, K4ZJF, 4030 Hallmark Drive, Pensacola, Fla. Phone: 433-6552.

COLLEGE Bound! Must sell entire station: HT-32 modified to HT-32A, in like-new condition with 2 extra xtals for 10-meter band, $325.00; SX-101A, latest model, with spinner knob. Cannot be told from new: $275.00; for the VHFer, two less than year old, home or mobile transceivers, Utica 650A with matching VFO, mobile power cord, mounting brackets, $155.00; Gonset GC-105 with xtals, mobile cord, a beautiful rig, $175.00. Will sell two or more rigs as package, $50.00 off. Craig Pitcher, 580 Crooked Lane, Barrington, Ill. Tel: 381-2436.

SELL Or swap for linear Sonar 20 meter transceiver, 180 watts DC SSB and tone c.w. Best cash offer over $300.00. Dwight McCall, Route 1, Young Harris, Ga.

NEVADA Prices. We pass the savings on to you. Fantastic prices on Swan, Transcom, Galaxy, Hallicrafters, Hammarlund, Johnson. Drop us a line on what you have to trade. No honest deal refused. Write Sierra Electronics, P.O. Box 212, Sparks, Nev.

SALE: 32V-3, $220.00; NC-300 plus speaker, $195.00. Cash & carry. W2VCX, Taylor, 1128 W. Valleybrook Rd., Cherry Hill, N.J. 08034. Tel: HA-9-3280.

NCX-3 and NCX-A, perfect factory condx; $325.00. Randy, WA2PPE, *tel: 914-337-6401*, 25 Parkview Ave., Bronxville, N.Y.

TRADE: SR-150, AC and DC power supplies, mobile rack, new SB-200 linear for travel trailer. Trade even or will pay difference. Maj. Eden, Box 13, Bolling AFB, D.C.

SUPER-PRO BC-794, with R.F.s., product detector and oscillator modifications, $65.00; HQ-100-C, $100.00; RCA AVT-112A transmitter, $20.00, 2 Link FMTR-6 F.M. mobile units, $20.00 each. C. D. McCarthy, W1UJF, 128 Forest Ave., Hudson, Mass. 01749.

FOR Sale: Model 26 teletype $50; W2JAV converter, $50.00; Martin Bleiweiss, 381 North Forest Ave., Rockville Centre, N.Y. 11570.

NC-303, $235.00; SuperPro, $50.00; AF67-PMR7, both for $115.00; Ranger I, $115.00; SB-10, $60.00 Natl. 6/2VFO, A54H, $22.00; Bug, $7.00; J130 Mic., $6; Communicator IV, 2M, $210.00; 6M, $175.00; Norelco 401 tape-recorder, new, $190. J. A. Kakstiis, 18 Hillcrest Ter., Linden, N.J. Tel: HU-6-6917.

POSITION Wanted: Communications Sales, 15 years' experience —radio ham, radio station engineer, aircraft, marine, two-way, CB radio sales, communications sales manager, distributor and manufacturer levels. First class phone, ship radar, radiotelegraph, CB, pilot's licenses. 28 years old. Seeking better position. Will relocate. Milton Mann, W9PRH, 1613 Central, Evanston, Ill. *60201*.

NCX-3, AC and DC power supplies, mike. One year old. In excint condx. Firm $400.00. WA3AGP, 607 Holiday Drive, Pocomoke, Maryland.

SELL: Eimac 4X250B tubes. Guaranteed gud. $6.50 each, $10.00 pr. Prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr. W5TLQ, 722 South 30th, Muskogee, Okla.

FOR Sale: Hy-Gain HT-18 Hytower, $50.00; Hy-Gain model 203, 3-el. 20-m. beam, $25.00. Telrex 8-el. 2-m. beam, model 2-m, 814, $8.00. W2UGM, 66 Columbus Ave., Closter, N.J.

WANTED For my private collection, de Forest audion detector unit, also two and three element de Forest tubes. Interested in early equipment by Duck and E.I. Co. and early QSTs, government amateur call-books and catalogs up to 1922. Quote your best price only. I'm no dealer and won't bargain. Will be liberal. W4MB, John E. Cain, Jr., 1101 Belle Meade Blvd., Nashville, Tenn.

SX-115 Hallicrafters receiver, in like new condx. No trades. $400.00. F.o.b. Denver, Colorado. All inquiries will be answered. WAØGUN, Kaufman, 231 So. Jasmine St., Denver, Colorado, 80222.

WINTER Building project? We carry parts by all major manufacturers. Write for fast service from the center of the nation! Electronics, Inc., 227 North Santa Fe, Salina, Kans.

MUST Save marriage. Sell entire station. Collins 32S-3 and a.c. supply; 312-4, R-390-A receiver (like-new condx); SX-101A, 4-1000A final, in 3 ft. wheeled rack, with V.A.C. var. tuning, 4½ in. meters (no junk); DN-HI*Z mike and stand, Johnson T-R switch, Hy-Gain tape dipole, many extra parts and tubes. No trades or shipping. You pick up all for $1900. E. Johnson, 100 Austin Place, Ft. Bragg, N.C. WA4KWA.

HOSPITAL Bills require quick sale! Heath HW-32 20M SSB and HP-13 mobile power supply, Gonset G-63 receiver; Eico HF-12 hi-fi amplifier, and HF-92 AM-FM tuner (both in walnut cabinets) and Viking 85 stereo tape recorder. All in gud shape. No reasonable offer will be refused. W4OPB, Box 1392, Atlanta, Georgia 30301.

MUST Sell: HT-32A, SX-101 MK-III, 811A's linear, in vy gud condx. Make an offer. Also: Eico 723, VFO HG-10, SX-111. K2LAI, 427 E. 69th St., New York City, N.Y. 10021. Tel: 212-TR-9-8087.

COLLINS: A-75S3, 32S-1, 516F-2, 312-B4 or a KWM-2, 516F-2, 312B-2, 312B-5. First check for $1000 takes choice, I keep the other. Also 30S-1, $950.00. L. Macomber, 2 Plumtree, Huntington Station, N.Y.

500 Watt plate modulated transmitter, $100.00; PMR-6A receiver, $25.00. Also assorted surplus. WN8OGF, 616 Church, Ann Arbor, Mich.

COLLEGE-Bound. Must sell: NC-300 receiver, in perf. wkg. order. Globe Chief Deluxe, 90W xmttr; Globe 755A VFO; R-55 receiver, WA4MRE, 19431 N.E. 19th, Court, Miami, Fla. 33162.

SWAP Leica M-3 with case and meter, never used, for KWM-2. Will pay difference. E. Erdoss, 831 Ashmore, Schenectady, N.Y. 12309.

POLYCOM Six with mike, brackets, AC/DC cables, Saturn 6 with matching transformer complete, $223.00. Excint condx. Stanley Jay, 2456 Bryden Road, Columbus, Ohio.

KEYER: Hammarlund HK-1B, $30.00. Ranger, (needs work) $75.00. WA5AXS, 618-18th Ave. North, Texas City, Texas 77590.

SWAN SW-175, 75-meters, $118.00; Drake 2-B, $170. Both in like-new condx. Priced for quick sale. Robert Pierce, 57 Gifford, West Hartford, Conn.

TR-3, TR-4 power supplies, like new condx. DC-3, $85.00; AC-3, $55.00. Both $130.00. Prepaid. Bruce, W7JMS/5, 2844A Quay Loop, Holloman AFB, New Mexico 88330.

COLLINS: 75S-3, in excint condx, $465.00 or your best offer. Write or call W9IYU, 626A S. Milwaukee Ave., Libertyville, Ill. 60048. Phone 312-362-7346.

WANTED: SP-600. Condx? Price? PFC Robert E. Hayes, RA 11 435 752: A CO, 8th RRU, APO SF 96308.

APACHE TX-1, $135.00; SB-10, $55.00. Both are in xclnt condx. W7BQG, 5447-48th Ave. S.W., Seattle, Wash. 98116.

TRANSFORMERS Sec. 2400 VCT, 400 Ma., 2.5 VCT, 10A. 10V, 5A, Pri. 106, 112, 118, 124, 200 or 220 Vac, 60 cy. Cleaning house. Two for $10.00. Write for list. W2HUN, William Moentner, 90-51-54 Ave., Elmhurst 73, L.I., N.Y.

JENNINGS UCS, 10-400 pf., 10 kv., vacuum variable, Johnson rotary inductor, 226-1, 13.5 microhenry, Cardwell variable output capacitor, XR-1000PS, counter dials, $55.00. New 4-400A tube, air socket, chimney, blower; filament transformer; $32.00. L. Berman, 1020 Laguna Ave., Burlingame, Calif.

TRI-BAND beam: Hy-Gain TH-4. Guaranteed. Cost $120.00 new. Asking $55.00. Will deliver New England area. W1VRK, 28 Forest Ave., Swampscott, Mass.

MANUALS for surplus electronics. List, 10¢. S. Consalvo, 4905 Roanne Dr., Washington, D.C. 20021.

DRAKE TR-3, AC-3 p/s, 9 months old, perfect, $465.00; Hallicrafters HT-33A, 2 kw. linear, excint condx, $275.00; Ameco PCL preamp, $20.00; RME DB-23 preamp., $22.00; B&W 852 Kw. coil, $25.00; Jennings UCL 1000 vacuum variable 10-1000 mmfd. 3000 v., $20.00; unused Eimac 4-250A, $10.00; DX-100B cabinet, $10.00; RCA Fleetfone FM xmtr/rcvr 30 watt, for 6 meters, $60.00. D. M. Burns, 1663 Meriline Ave., Dayton, Ohio 45410, tel: 513-256-0345.

SLIDE Rule nut needs cash. K & E Cooke Radio Rule, $12.50; Picket Electronic, N-16-ES, $12.50; Pickett log log, N-500-ES, $9.00; Picket six inch pocket log log, N-600-ES, $6.00; Micronta 551 six inch pocket log log, bamboo, $3.00; Otis King calculator, Model K, tubular, $5.50. All rules used less than one hour, with cases and instructions. Milan Leggett, W5LR1, 9531 Riverton Road, Dallas, Texas.

HEATHKIT: Cheyenne, Comanche with AC, DC power supplies, mike, brackets, everything. $145.00. Joe Hink, 3500 Arroyo Drive, Casper, Wyoming.

KWM-2, PM-2, MM-2, like new condx, in original factory cartons: $975.00. Write or phone. P.O. Box 84, Hazelwood, Mo. Tel: 314-HA-9-0510.

SELL: Vibroplex Deluxe "Original" with case and wedge, brand new, $21.00 postpaid. D-104 with spare cartridge, brand new, $15.50 postpaid. W3KWO, Box 900, Sharon, Penna. 16147.

"HOSS TRADER" Ed Moory offers demonstrater equipment "factory warranty", Swan 350, $339.00; SBE-34, $329.00; SB-2 linear, $229.00; Galaxy V, $319.00; TR-4, $499.00; New TH-6 DX beam and demonstrator Ham-M rotor, $189.00; one left at the old price, NCX-5, $586.00; NCI-2000, $585.00; SR-500, $339.00; Reconditioned gear: SB-33, $219.00; HT-37, $249.00; 200-V, $439.00; 2-B, $195.00; factory reconditioned KWS-1, $649.00; Drake R-4, $265.00; Swan 350, $279.00; GSB-100, $189.00; HT-32, $269.00; 20-A, $109.00; Johnson Ranger II, $179.00; Viking Valiant, $159.00; Swan 240, $229.00; PL-259 Connectors, 39¢; new TR-44 rotor, $48.95. Branch office: Ray Coker Electronics, 724 Lawrence Road, Jackson, Miss. Home office: Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Tel: WHitney 6-2820.

RELIABLE DX-100 in original condx, professionally wired by 1st class engineer: $90 steals it! Thomas Wunsch, Lake Garda, Unionville, Conn.

EXCELLENT Condition: Complete SSB station, DX-100-B and SB-10, $165.00; HQ-170-C, recently professionally aligned, $185.00. W1MBX, 2389 Winsted Road, Torrington, Conn.

VALIANT (f/w), SX-101 Mk III, SX-42, SB-10, LP filter, SWR bridge, TR switch. All in mint condx and appearance with cables and manuals. See them or let's sked. First $600 certified check or m.o., plus shipping, takes all. Will separate. W.R. Percival, W2GCV, 621 Belgrove Dr., Kearny, N.J. Tel: 201 991-8077.

WANTED: SSB filter, McCoy 48B-1 or 32B-1. K3YOF, 2532 Bristol Rd., Holland, Penna. 18966.

SBE-34 for sale. Also Johnson Matchbox, R. L. Walden, WA8PIR, 222 Sychar Rd., Mt. Vernon, Ohio. Tel: 393-5686.

HQ-160, best offer. Gud condx, new tubes. No shipping, sry. L. G. Frierson, 108 East 86th St., New York, N.Y. 10028.

EXCHANGE Or sell Marine transceiver, Sonar Model 30, never used or mounted. 35W input, 2 to 6 M/c, with three sets of xtals, antenna and accessories for a transceiver. Valiant, Globe Champ in vy gud condx. Harold Topham, Pocono Lake, Penna. 18347.

COLLINS 30L1. Under ten hours logged, $390.00. HA-1 electronic keyer with El-Key, $85.00. Deliver within 300 miles. Jack Paar, Clearview Ave., Chalfont, Penna. Tel: 215-822-3132.

COLLINS 75S-1, 32S-1, like new, power supply for same; Drake low pass filter, extra 10 meter xtals plus c.b. xtals included, $700. Complete station includes above, plus 160 M converter, 25-watt AM xmtr with xtals, Shure 440 SL mike, dynamic mike, J-44 key. Mars SWR bridge, 6 position ant. switch, Hornet model 500B Triband ant., 75 & 40 meter V ant. with 200 ft. coax, $800. No separate sales, no other bids. Richard Baldwin, 5505 Harschel Dr., Toledo, Ohio 43623.

FOR Sale: QSTs dated 1923-1960. Write or call 865-5-5303, Mrs. Walter Wakeman, 22 South St., Walton, N.Y.

HAMMARLUND HQ-100C rcvr, $110; Johnson Ranger xmtr w/built-in VFO, plus mike, directional coupler, 50 ft. RG/8-U with connectors, $125.00. All in like new condx. Dave Friedman, 41 Campo Ave., Selden, L.I., N.Y.

TRADE Heavy duty prop pitch motor and/or CDR rotator for Ham-M or Heath Twoer. Will deliver within 100 miles radius. W8DZC, Redding Pharmacy, 7110 Blue Ash, Cincinnati, Ohio 45236.

COMPLETE Legal power, all models: Johnson equipment including Johnson KW with RH desk, Johnson Ranger, Johnson Invader for complete all-band all-mode coverage. Easily capable of maximum power all bands. Package: $1600.00. K8ZVD, 253 S. Wells, Sistersville, W. Va. 26175.

FOR Sale: Collins 75A-2 receiver, in excint condx, not a scratch, works like new: $200.00. George S. Low, 92 Maple St., Dobbs Ferry, N.Y. K2KPP.

RANGER II. In perf. condx. Virtually new, used under 20 hours: $220.00. Dan Franklin, Rte. 7, Box 401, Tallahassee, Fla.

GALAXY III, AC PS, spkr, VOX, calibrator, Shure 444 mic., $350.00. Heath Monitor scope, $45.00; Hallicrafters HA-1 keyer, Deluxe Vibrokeyer, $75.00. Numechron 24-hr. clock, $10. All for $450.00. All in like new condx. Will ship. Craig Fastenow, 5 FIS, Box 124, Minot AFB, North Dakota.

FOR Sale: SX-117, $250; Ranger I, $125; HQ-129X, $75; Pico 460K AC DC scope, $70; Vibroplex Deluxe Original $10; Ameco BIU indicator bridge, $15.00; 2-meter Ameco Nuvistor converter with p/s, $30. Tecraft 2-meter xmtr, $40. I will ship within 200 miles. Emil Switzer, K2SCD, 56 Rose St., Metuchen, N.J. Tel: LI-9-3044.

SELL: Apache and HQ-150. Best offer. Allan Stein, 153 Cambridge Ave., Englewood, N.J.

ADVENTURER w/screen mod., VF-1 VFO, $45.00. Jim King, K8GUN, 3124 Sussex St., Lansing, Mich.

BOOST Reception: 3.4-30 megacycle SK-20 Preselector Kit, $18.98. Boost modulation: AAA-1 clipper-filter kit, $10.99. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

HEATH Pawnee transceiver professionally wired, $175.00; clean Clegg 99'er, Johnson 6N2 VFO, p/s, NBFM modulator, $110.00. Roy Norby, K2COG, 2514 Crompond Road, Yorktown Heights, N.Y. Phone 914-962-7297.

WANTED: BC-794B, HRO (all coils) or comparable general coverage rcvr. Gud optg. condx and appearance. State final price. (W2HPW), Bob Vierling, 573 Terhune St., Teaneck, N.J. 07666.

SELL: QSTs 1930 to 1950. Make offer. Also old R9, Radio, CQ. W3CFD, Boye Hagerty, Honesdale, Penna.

G-E Square Wave generator 5 cps to 125 Kc. Hewlett-Packard noise and distortion analyzer. Both in gud condx. Best offer takes one or both. F.o.b. Philadelphia, K3ZPN, Box 6001, Philly 14, Pa.

SELL: Johnson Ranger, Hammarlund HQ-110 w/spkr, in mint condx: $15.00 each. New Johnson Matchbox, $65.00; sry, no shipping. Coltman, 170 Sandy Hollow Road, Northport, N.Y. Tel: 516-AN1-4129.

SELL: Hy-Gain vertical tower antenna with all coax feed line, $80. Difficult to ship. Prefer pick-up deal. Dr. C. R. Crosby, R.D. 1, Chatham, Mass. W1QP.

FACTORY Wired Viking II, VFO, Signal Sentry, mike, HRO-60, seven coils, Selecto-O-Ject, SSB, Hammarlund HC-10, spkr, Telrex 3-el. 20M and 6 el. 10-M beams with 12 ft. and 24 ft. masts. W9FNO, F.o.b. Naperville, Ill. 852 Tulip Lane. $250.00.

SB-330 receiver, with SSB and CW filters, professionally wired and like-new, $250.00 or best offer. Want good 75A-4. W4PRO, 15 Willow Road, Hampton, Va.

CLEGG 99'er, $99.00; CDR-AR22 rotator/100 ft. cable, $20.00; Shure 440 mic/stand, $12.00; 6-el. Telrex 100 ft. RG/8-U, $25.00. All in excint condx. Kellersman, Stoney Brook Road, Darien, Conn.

AMAZING "DX-ER" Swiss global wrist watches feature 24-hour time conversion dial/bezel for time in any world zone, plus 12-hour local dial. $14.96 each. Free brochure. Nordlund, 7635 West Irving Park, Chicago, Illinois 60634.

PAIR 4-400A, $20.00 each postpaid. K6SGQ, 1870 Petaluma, Long Beach, Calif. 90815.

FILAMENT Xfrmr for that 4-1000 or 3-1000Z G.G. linear, 120 v 60 cyc. pri. 2 sec. 7.6 v. @ 21 amp and 5.1 v @ 13 amp. Herm. sealed. Mtg. studs. Stand-off terms. Unused (new). Wt. 14 lb., $4.50 plus postage. A.R.C. Sales, P.O. Box 12, Worthington, Ohio.

SCOPE, Knight KG-2000, 10/1 probe, $250.00; Tube-Transistor Tester, B & K model 650 Dyna-Quik, $150. Swap for SSB gear, 2911 W. 134 Place, Gardena, Calif.

ESTATE Sale to highest bidders: BC-1004 Super-Pro new BC-453; Hickok 288AX TV sweep generator; RCA signal generator; Collins mech. filters. Send SASE for complete list of equipment and numerous new components. John Alexander, 5525 Paseo de Pablo, Torrance, Calif.

MOHAWK Receiver RX-1 for sale: $140.00. Bob Radkey, K9RPX, 220 Marquette, Park Forest, Ill.

COLLINS 32V-2 and Mosley CM-1, in gud condx, no longer used. Will accept reasonable offer. M. B. Johnson, 1135 Tamarack Trail, Chattanooga, Tenn.

NCX-3, NCX-A power supply and RST-599 180 cycle audio filter; $310.00. GSB-101 with Drake lo-pass, $175.00. All equip in xcint condx, no scratches. WA6PIC.

2KW National NCL-2000 for sale. Used less than 10 hours: $495.00. W8GMO, 6743 Camaridge Place, Cincinnati, Ohio. Tel: 561-5593.

RANGER: Perf. condx, $150.00. Bob Tabke, WA2SKY, 100 Vail Rd., Apt. H-22, Parsippany, New Jersey.

APACHE TX-1, $160.00; SB-10 SSB adapter, $70. Both: $220.00. HQ-110-C receiver, $135.00. In A-1 operating condx and in appearance. W. Grove, W2BZJ, P.O. Box 212, Pennington, N.J.

MARAUDER HX-10, xclnt condx. Included sideband microphone, $250. WA9EWN, 1921 Lincolnway East, Mishawaka, Ind.

NCX-3 and NCXA, exclnt, $250.00. Ned Thornton, Rte. 1, Versailles, Ind.

COLLINS Type 30K Model 1 transmitter, using type 310A-3 exciter available. Like-new condx. Write to John Fischer, Radio Station KFUO, 801 DeMun Avenue, St. Louis, Missouri 63105.

CASH Wanted for Ranger w/ptt, $99; SX-101A, $225; TA-36 beam, $75; TR-44 rotor $50; HA-1 keyer w/Vibroplex key and case, $75. John Crawford, K1VLN, 108 Park Avenue, Greenwich, Conn.

VIKING II and VFO, HQ-150, Astatic JT-30 mike, 3-el. Tribander, CDR rotator 100 ft. cord and control, Heath GD meter, Heath 5" scope; $295. You pay to ship. K6CZK, 1501 Spencer, Santa Rosa, Calif.

CIRCUITS From Handbook, QST, CQ, etc., constructed. All work guaranteed. Reasonable. Free information. WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif. 95051. Tel: 248-2637.

WANTED: SB-34 xcvr. Cash waiting for FB unit. Reasonable PSE. Sell: complete Heath station HW12 xcvr. w/xtal calibr., AC/DC supplies, PTT mike, Hustler mast and 75m resonator. Brand new, test time only: $235.00. HA-1 keyer and Vibroplex, perf., $65.00. Elec. eye burglar alarm by G-E, completely weatherproof, new, $75. R. Lumachi, 73 Bay 26th St., Brooklyn 14, N.Y.

TR-4, $480: AC-3, $66.00; DC-3, $108.00, all factory sealed, never unboxed. Warranty, naturally! Sell separately. Or my used TR-3 #3491 A and AC-3, both for $450.00. K4LGR, Box 10021, Greensboro, N.C.

JOHNSON Pacemaker, gud xmtr, SSB-AM-CW VFO 10 through 80. Complete xtals. Best offer over $100. F.o.b. Elverson, Cordioli, Main St., Elverson, Penna.

SELL: Collins 32V-3, $225.00; Hallicratters SX-117, almost new, $330.00. HA-10 tuner, $20.00. Ben Hassell, W8VPC.

GUARANTEED A-1 reconditioned equipment on approval. Terms. Collins 75A-2 $159.00, 32V-3 $159.00, 75S-1 $299.00, 30L-1 $349.00, 75S-3 $449.00, 32S-3 $599.00, 30S-1 $795.00. Drake 2-B $189.00, TR-3 $399.00. Hallicrafters SX-99 $79.00, SX-88 $219.00. SX-101A $219.00. HT-44 $199.00. HT-37 $269.-00. Johnson Ranger $99.00. Valiant $159.00. National NCX-3 $249.00. NCL-2000 $395.00. NCX-5 $495.00. Swan SW-240 $229.00. SW-400 $269.00. Much other equipment. Write for lists. Henry Radio, Butler, Missouri.

WANTED: Three element Tribander; rotor, tower. Entman, WB2OTT/1, 150 Chace Ave., Providence, R.I. 02906.

F/W Thunderbolt KW in all original packing. Like new with 2 new spare 4-400As and 3B28s. $325.00. K8IKB, 1414 Tiffin Rd., Findlay, Ohio.

JOB Location changed! Selling modern ranch home, double garage, blacktop drive, large lot, 10 minutes drive from Portland, nice residential area on bus line. Includes antennas 80-40 meters, TA-33, Ham-M mounted on permanently guyed 52 ft. Tri-Ex tower. Move in and you're on the air. Also sell Drake 2S w/O-multip.-spkr, $199; Model 15 printer w/homebrew TU, $125.00; NCL-2000, $525.00; KWM-2, AC and DC p/ss, $850. Wendell Lewis, K1RPE, 72 Pleasant St., Yarmouth, Maine, 04096.

WANTED: Drake 1A, Vibroplex, Rohssler, WB2DLA, 3501-Foster Ave., Brooklyn, N.Y. 11203.

SELLING for college: SX-110 with speaker, $110 and T-150, $70.00. WA9JZL.

SELL: Hot DX-100 250 c.w., 200 AM watts; NC-155, both in exclnt condx. Best reasonable offer. Dave Wood, WA0IIT, 301 Oak, Olivia, Minn.

SELL: HQ-145X, xtal calibr., clock. Used vy little by SWL. In xclnt condx: $195.00 plus shipping. Richard Allison, RD 2, Franklin, Penna.

COLLINS: KWM-2, S/N 10978, with 516F-2, p/s, $700.00 F.o.b. Priced for quick sale. Both are in xclnt condx. K3KFP, 7 Eastwood Court, Ellicott City, Md.

WANTED: Hy-Gain Roto-brake rotator, indicator. State condition. W9JT, 343 W. Windsor, Lombard, Ill.

CE-20A with OTI and Deluxe 458 VFO, xclnt, $135.00; CE-10A, $55.00; 2 Eimac 100TH, never used, $5.00 each. Certified checks. Bernard 5537-12 Ave. South, Minneapolis 17, Minn.

COMPLETE Station TR-3, $450.00; AC-3, $60; DC-3, $90; RV-3, $65.00; TR-3 spkr, $15.00; SB-200, $180.00; Eico, $75.00; Heath VTVM, $20. $1200 value. $900 cash. Will deliver within 300 miles radius of Chicago at no cost. Ken Heckman, K9FSI, 18424 Oakley Ave., Lansing, Ill. 60438.

JOHNSON Invader 2000, in vy xclnt condx; $775.00, original cartons. Like-new Gonset model 3350, 12 VDC power supply with cable for G-76 transceiver, $50.00 Karl Lipscomb, 87 Canterbury Ln, Joplin, Mo.

TR-3 Factory modified to TR3-A in Feb. 1965; $429.00: AC power supply, $59.00; speaker cabinet, $12.00. Will sell together only. Dr. Clyde Owings, W4IHV/8, 2660 Pittsfield Blvd., Ann Arbor, Mich.

COLLEGE Expenses force sale of my beautiful HQ-170AC. Only two years old and in perfect shape. $285.00. Richard Surrett, WA0ITO, 425 Thurston, Manhattan, Kans.

MOBILOCK! Incomparable theft protection exclusively for KWM-2 owners. Stop worrying! Write Transistics Co., 4452 N. 20th Rd., Arlington, Va.

CRYSTAL Filters: 3.0 Mc, center frequency, 2.8 kc bw at 3 db, 7.8 kc bw at 50 db, loss 1 db. 3.9 K termination 1 9/16L x 1⅜W x 1¾H, $17.50. CC Electronics, 12017 W. 92nd St., Lenexa, Kansas.

WANTED To Buy: HRO-60 coil set. AC for 15-meter bandspread. Cash or trade. Don Hall, W5OBS, 813 Northlake Dr., Richardson, Texas 75080.

WANTED: HA-1, HA-5. Mark Murray, Grace Valley, Butler, N.J. 07405.

SELL: SX-100, $100; HW-32, mobile supply, mike, calibrator, Topper antenna, all manuals and cables: $165.00. K1YGS, 142 Torrington Heights Road, Torrington, Conn. 06790.

WARRIOR Linear, $200; SX-100, $180.00; DX-60 Heath VFO, Mod. VF-1; Eico 730 plate modulated, $115.00. Dow-Key ant. relay, 110v, AC $10. Prefer to sell complete. Gud condx. K4SZY, Liberty, N.C.

WANTED: Tower 60 ft. or taller, Vesto or crank-up; must be reasonably priced. Don, K8WZX, 4908 Lefferson Rd., Middletown, Ohio.

SELL: BC-312N, $50; RME DB23, $29; ASB5, $9.00; SASE for list of parts, chassis, manuals, etc. M. Marshall, 46 Lincoln Pl., Waldwick, N.J.

SELL: Knight T-150A; Instructograph with osc., key and phones; Eico 666 tube-tester; Mosley 3-el. beam, 10-11 meters. All in likenew condx. Frans, 743 Cardington Rd., W., Marion, Ohio.

WANTED: Guyed tower. HQ-129X, spkr, $75.00. Will trade. WB6CIR, 5963 Flambeau, Palos Verdes, Calif.

KNIGHT T-60 60-watt 80-6 transmitter, $40.00. K2MBU, 293 Saw Mill, Yonkers, N.Y.

EICO 720 xmtr, $65.00; Eico 722 VFO, $40.00. Both for $100. WB2ICH, 406 South First, Highland Park, N.J.

SELL: Recently realigned NC-300, $155.00; DX-100, $90; DX-20, $18.00. All with manuals. WB2DGG, 108 Sheldon Rd., Ithaca, N.Y.

HW-32 Transceiver, HP-23AC supply, Turner 454x mike. In xclnt condx. Practically new: $150.00. Complete. Delivered. WA3BDK, 6025 Rossmore Dr., Bethesda, Md.

POWER Trans., for Gonset 101 linear, 1900-0-1900, 500 ma., new, $25.00. 35 lbs. F.o.b. Fullerton, Calif. W6PLK, 1715 West Southgate Ave.

HALLICRAFTERS SX-101, Mk III, R-46B speaker. Superior product detector added. Tip-top condx, $165.00. Gerry Bean, W8KBJ, 613 Asbury Rd., Cincinnati, Ohio 45230.

COLLINS KWM-2 serial No. 660 (updated by Collins in October 1962) with 516F-2 p/s, $650.00; 30L-1 serial No. 12668, $325.00; 312B-5, $150.00; SM-2 mic., $25.00. All units in exceptionally fine operating and physical condx. Prefer local sale or you pay crating and shipping costs. Phone W6WRU, Al Bergland. Tel: 408-354-8952. P.O. Box 685, Los Gatos, Calif. 95031.

SELL: Collins 75A-1, $150.00; Lakeshore Phasemaster IIA, $160.00. Both for $300. WB2CVH, John Loewenstein, 75-08 168 St., Flushing, N.Y. 11366.

DE'TVI'd BC-610E, in perf. condx, extra tubes, accessories. Four EL-10 3 el. 15 and 20 Hy-Gain beam, coax, Rotobrake, map indicator. 40 ft. SS steel tower. All for $250.00 or your best offer. Will split. F.o.b. Littleton, Colorado. K9QSG.

CRYSTALS Airmailed: MARS, Marine, SSB, Nets, Novice, etc., Custom finished etch stabilized FT-243 any kilocycle .01% 3500 to 8600 $1.90, (five or more $1.70) (Ten or more same frequency $1.35 each). 1700 to 3499 and 8601 to 20,000 $2.50. Overtones supplied above 10,000 kilocycles. Add 50¢ each for .005%. Add 75¢ each for HC-6/U miniature above 200. ARRL kits; Crystals for "DCS-500", "IMP" $9.95. Low frequency filter and oscillator crystals and other kits and crystals. Inquire, be specific. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

VALIANT, $145.00; SX-96, $80: J. Kunin, 3810 Alsace, L L.A., Calif. 90008. Tel: 213-295-0105.

JOHNSON Desk kilowatt plate transformer 3100-1550-0-1550-3100 at 500 Ma. Like new condx, $100. Heath Tunnel Dipper, new, $30.00. You pay shipg. J. Shope, KØTRG, 3527 Longwood, Kansas City, Kans.

HALLICRAFTERS SX-101A receiver, $175.00; HT-32B transmitter, $275.00; Johnson KW Matchbox w/SWR bridge, $80.00; all equipment little used and in guaranteed mint condx. Contact George Hawrysko, WB2GWU, 115 South 2nd St., Brooklyn, N.Y. 11211. Tel: EV-8-1893 after 5 PM.

SELL CN-50 Ameco 6M, converter, factory-wired. Instructions, $33.00. K2JSA, 113 Henderson Blvd., Syracuse, N.Y. 13209.

WANTED: HRO coil sets, particularly 15 meter "AC". Also old model HRO rcvr. W2DYU, 277 Herrick Ave., Teaneck, N.J.

SALE: 55 ft. tower TA-33, Ham-M rotor with guys and anchors, $175.00: HQ-170A VHF, $300; 5100B with SSB, $250.00: Warrior Linear, $150.00. Write for list. J. Avery, W1IYI, RFD #3, Vernon, Conn.

VHF Equipment. Clegg 62T10 170-watt AM/CW transmitter for 10, 6, and 2 meters. $200.00. Gonset No. 3226 VFO, $40.00; Tapetone XC-50 converter, $35.00; DX-144C4 converter, $45.00; PSR-150 power supply, $30.00; Ameco 50 Mc. pre-amp., $8.00; Gonset 12-volt FM tuner, $35.00. All equipment in perfect operating condx and appearance. Will pack and ship and sell on guaranteed basis. W5TGQ, 11735 Winshire Circle, Houston, Texas 77024.

GONSET Transceiver #3121—143.90 to 149 Mc., $150.00; Gonset Linear amplifier No. 3062, $75.00; Poly Comm 6 & 2, $240.00. Donald K. Szatkowski, 706 West Wylie, Bloomington, Ind. K9UOD.

COLLINS KWM-2, 75S-3, 30L1-312B5 and 516F-2, 30% off list. Tri-Ex HR-471-N tower with all accessories. Tripod, etc., $600. Ham-M rotator, $75; E-V 664 mic, $35; Hy-Gain antennas TH-4, $50; DB-24, $50; 3-el, 10-meter, $20. New-Tronics 75 meter rotatable dipole, $60 Phone 812-476-3426, handle Curtis. Eve. Week-ends.

COLLINS 312B-5, $225.00; NCL-2000, $475. Henry 2K desk, 1 week old, $625.00. Got 30S-1. W9CKF, Phone 812-42-59857 eve. or week-ends. Day: 424-8875.

HT-32B, $450. SX-115, $375; Gonset Linear, $250. Like new condx. K2HEA, 12 Elm, Lynbrook, N.Y.

CLEVELAND Deal: can finance over 12 months: HT-37, $250.00 or $21.93; HQ-170, $200 or $17.54; Both: $425.00 or $37.27. F/W Thunderbolt, $250.00 or $21.93. All low mileage, and in mint condx. Have no time at home station. Glad to demonstrate. Inspect log. Len Benson, K8RJO, 23320 Fairmount Blvd., Tel: HO-9-1834.

VALIANT: $185; 6N2, $85.00; CN144W/PS, $40.00. All in xclnt condx. W3NRG, 48 St. Andrews, Severna Park, Md.

HALLICRAFTERS HT-37 transmitter for sale: $225.00, in xclnt condx. Prefer pick-up deal. Robert A. Ecker, W2EKZ, Box 644, Martinsville, N.J. Tel: 201-EL-6-5802.

SALE: Clegg Thor, Ameco CN50 FW, new, ARC-3, Super Pro rcvr. More. Operate in my shack. K2HFL, Art Lawler, 507 Colonia Blvd., Colonia, N.J.

FOR Sale: Drake 2B, in mint condx and in orig. factory carton: $190.00; Gonset 2-meter Communicator transceiver, perf. condx, $100. WB2DVU, 23 William St., Gomez, Bethpage, L.I. N.Y. 11714, or Tel: 935-7417 after 6 PM.

INSULATORS: Series feed your tower on 40/80. One will support average 35 ft. guyed tower. Three or four for large tower. Have four surplus, $20 for the lot. 15 lbs. each. W5HJ, 6500 Mossman, N.E., Albuquerque, N.M.

HW12, 22, 32 owners complete Triband transceiver conversion plans: $10.00 ppd. Tribander, Box 18, Queens Village, N.Y. 11427.

SR-34 Hallicrafters AC/DC six and two transceiver. Best offer. Hal Judd, WA8KNM, 929 Gardner Road, Dayton, Ohio 45429.

SR-34 Hallicrafters AC/DC six and two transceiver. Best offer. Hal Judd, WA8KNM, 929 Gardner Rd., Dayton, Ohio 45429

TELREX Beam: 4-el. op. spaced Super Deluxe Model 20 M-436, like new. Price reasonable or will swap for tower with or without small beam. K1PNL.

FOR SALE: SB-10 with p/s, $70; Central Electronics RF analyzer Model MM-2, $40; Heath 25-watt audio amp, Model A9, $20; KW mod. xfrmr UTC, CVM5, $35.00; Hy-Gain TH4, $60; Thunderbolt PR 4-400 $295; 810s ea. $5.00; Shure 55S dynamic microphone with stand, $20. W3GHS, 420 S. Lewis Rd., Royersford, Penna. (nr. Valley Forge).

75A-4 with 2 filters, $425.00 and 32S-2 with supply, $375.00. Both for $700. C. Ham, W2KDC, 38 Radcliff Huntington, N.Y. 11743.

WANTED: Valiant II, late model F/W, 200 watts AM, for cash. Must be in A-1 mint condx with PTT. Allan Murphey, W4IAG, 306 E. Waller St., Morganfield, Ky.

BARGAIN: National NC-173, $130.00; Hallicrafters SX-140, $55.00; Knight T-150A, $90.00; Heath HX-11, $35.00. WA9-MCJ, John Megee, 1917 Cedar, South Bend, Ind.

SWAP Ham gear for old Graphotype machine which makes Addressograph plates. Send details and sample plate, also what you might want in exchange. Gene Hubbell, W9ERU, Box 350, RR #4, Rockford, Ill.

SELLING: DX-60A and HG-10VFO, $110.00. Both used few hours and in xclnt condx. 18 ft. vertical, $15.00. C. L. Wolsiefer, Jr. WA1CML, 60 Fire Station Rd., Osterville, Mass.

75A-4 800 cycle filter, $39.00; Model 80/TS-467B signal generator, $250.00. Boehme CW tape equipment, $100. W8RMH, 1910 Longpoint, Pontiac, Mich.

GONSET G-76, A.C. & D.C. supplies, New-Tronics Hustler w/all resonators, professional mobile mike. Best cash offer. H. Fine, 210-34 Grand Central Pkwy, Queens Village, L.I., N.Y.

SELL: NC-109 and matching speaker. Best offer. K1VQJ, 95 Stillwold Drive, Wethersfield, Conn. 06109.

GONSET 2-meter Communicator IV, $210.00; Gonset VPO 6-meter, 2-meter, 220 Mc. like new condx, $65.00; 2-meter skeleton slot J-beam 16-element 14 db gain, $20. W6QQB, 1643 Rotary Dr., Los Angeles 26, Calif.

SBE-33 and SB1-LA linear. This equipment is in absolutely perfect condx, cabinets unscratched, etc. Also other equipment including G-76, GPR-90 and more. John Wilson, R.R. 1, Carmel, Indiana.

SELLING Out: SX-101 Mk III, $165.00; Matchbox, bug; SB-175 xmtr, VFO, many others. Write or call for list. Murphy, 35 Fairlawn Ave., Albany, N.Y. Tel: 482-8122.

VALIANT For sale. Very gud condx. No lower price: $110.00. Save money!! Mike Compton, W6VUZ, 620 Miller Ave., Pomona, Calif.

COMPLETE Hallicrafters station. Won at Swampscott Hamfest: SX-117, HT-44, P-150 AC, in original boxes, never used, $550.00. H. A. Hutchinson, W1EV, 90 Dogwood Dr., New Britain, Conn.

SEND Us your requirements for RTTY material. Model 14, 15, 19, 28, motors, converters, keyers, repeaters, regenerator, transmitter-distributors, power supplies, covers, bases, parts, etc. Send for catalog! Atlantic Surplus Sales, 250 Columbia St., Brooklyn, N.Y. 11231.

WANTED: HRO coil set "A" (14-30 Mcs.). Hugh Pettis, W3QCW, 702 Justin Way, Silver Spring, Md.

TRADE 300 back issues of QST from 1939 for Tunnel Dipper or GDO. W9IHN, Box 73, Suring, Wisconsin 54174.

COLLINS 75A4 s/n 3476, $400; Ranger F/W $125.00; Johnson T-R switch, $15.00. All in xclnt condx. K4YVL, 4613—33 Ave. North, St. Petersburg, Fla.

FOR Sale: HRO-5OT with 5 coils and SSB xtal osc. plug-in adaptor, Heath HX-10 exciter-transmitter, Heath HA-10 linear, Heath HO-10 scope. All wired and tested by an engineer. Any reasonable offer considered. Wells Chapin, 2775 Seminole Rd., Ann Arbor Michigan 48104. Tel: 313-663-1337.

NC-190 National general coverage receiver. Guaranteed to look and operate like-new: $150.00. Shipped prepaid Continental U.S.A. WA5DZP, 314 E. Main, Ada, Okla.

HEATH DX-60 xmtr with HG-10 VFO and Novice xtals. Heath HR-10 rcvr. All in new condx, complete, for $160.00. Will mail prepaid insured. A. E. Wilson, Box 392, East Brewster, Mass.

75A-4 SN3956 w/vernier, $375.00; 4-1000A linear w/3600 v. 1 aps. $295;Millen GDO, $35;EV664, $33.00;Dumont 304A DC-AC laboratory oscilloscope, $75; Tektronix 511, $95; 513, $175.00; 1 KW continuous linear w/power supp., $115.00; Bogen DB-20 hi-fi amplifier, $32.00; 250V 500 Ma. regulated p/s, $19.00. All perf. condx. Tom Perera, K2DCY, 410 Riverside Dr., NYC, N.Y. 10025.

DRAKE 2-B, used 2 hours, $215.00; calibrator, $10; HT-41 kilowatt with new 7094 tubes, $269; HT-33 kilowatt, $239.00. Elvin Miller, 3845 Kipling Ave. So., Minneapolis, Minn.

ATTENTION Novices! Eico 723 c.w. xmtr, 60 watts, in gud condx. Will ship, $37.00. Al Togut, 5 Meadow Woods Rd., Lake Success, N.Y. 11020.

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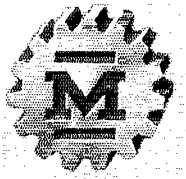
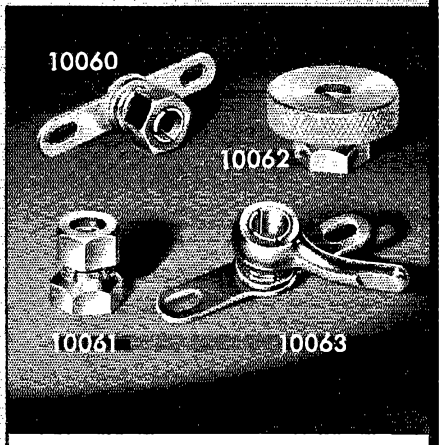


Application



SHAFT LOCKS

The MILLEN line of stock conventional and miniature shaft locks provides wrench-operated or thumb-operated shaft locks for ¼" or ⅛" shafts. These instantly convert any plain shaft potentiometer, capacitor, etc. from "plain" to "shaft locked" type. Also available are a lock for ⅜" shaft, dome locking nuts, and water tight glands for ¼" shafts.

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NOW! A TRI-BAND SSB TRANSCEIVER KIT FOR 179.95

NEW EICO 753 SSB/AM/CW TRI-BAND TRANSCEIVER

Build the finest of SSB/AM/CW tri-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards, plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that **only the 753 has all these important features:**

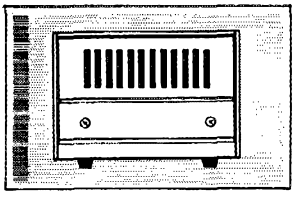
■ Full band coverage on 80, 40 and 20 meters. ■ Receiver offset tuning (up to ±10kc) without altering transmitter frequency. ■ Built-in VOX. ■ Panel selected VOX, PTT & STANDBY. ■ High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier. ■ Automatic carrier level adjustment on CW and AM. ■ Dual ratio ball drive permits single knob 6:1 rapid tuning and 30:1 vernier bandspread (over 10 degrees of scale). ■ Position of hairline adjustable on panel. ■ Illuminated S-meter/PA Cathode Current Meter and tuning dial. ■ Fast attack, slow decay AGC. ■ Grid-block break-in CW keying. ■ Product detector for SSB and CW, triode detector for AM. ■ TR relay with auxiliary contacts for use with high power linear amplifier. ■ Includes mobile mounting bracket.

ADDITIONAL SPECIFICATIONS

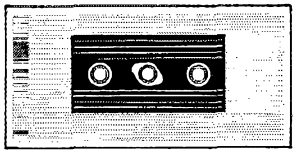
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMISSIONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio: selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hairline Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5 13/16" x 14 1/4" x 11 1/4". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at $299.95.

Power Supplies Tailored for Optimum Performance of the 753.



Model 751 Solid State AC Supply/Speaker Console.
Matching table-top companion unit. Built-in PM speaker.
Kit $79.95 Wired $109.95



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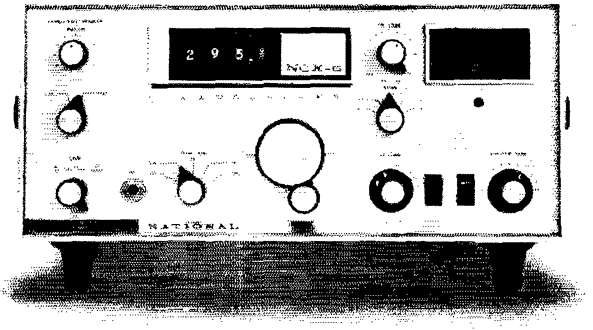

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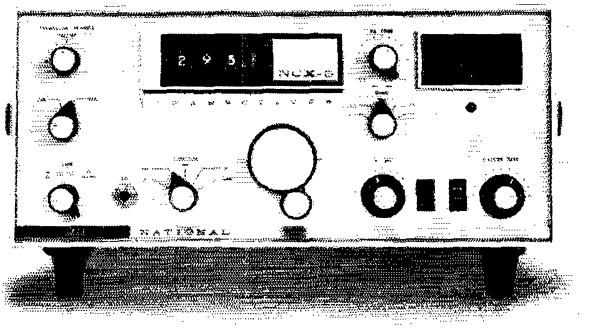

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Type	Cooling	Maximum Plate Dissipation (watts)	Plate Voltage (volts)	Frequency (Mc)	Useful Power Output (watts)
8072	Conduction	100*	700	50 175 470	11 10 8
8121	Forced-air	150	1500	50 470	27 23
8122	Forced-air	400	2000	50 470	37 30
8462 (Quick-heating)	Conduction	100*	700	50 175 470	11 10 8

*May be higher, depending on heat-sink design

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