August 1963
50¢

CQ

Watch for the "C.W. Special" Receiver next month.

The Radio Amateur's Journal

OLDTIMER!

An oldtimer? Yes. Still the most modern? Yes! □ In this day and age, four years is a long time for a product to maintain a status quo. No design changes. Few component changes. No spec changes. Yet that's exactly what's happened to the KWM-2 Transceiver. □ How come? When we introduced the KWM-2 four years ago, it included 19 "first-in-the-industry exclusive" features. Today that figure has been reduced because many of the original Collins KWM-2 exclusive features have been incorporated as standard in all amateur equipment. The fact remains, however, that Collins KWM-2 is still the only transceiver available which offers you all those 19 features in one unit. This is the major reason hams still prefer the KWM-2 over all other transceivers on the market. □ And here's something else which accounts for the KWM-2's popularity. Ask your Collins distributor how much a used, four-year-old KWM-2 is worth today. His answer will give you a clear picture of how little it really costs to own the finest. See your Collins distributor and get all the facts on KWM-2 features, performance and price.

COLLINS

For further information, check number 48, on page 110

SUREST WAY TO T9X

PR CRYSTALS give you the finest frequency control that money can buy! PRs are built to PERFORM...under good conditions and bad. They have that extra measure of stability and dependability BUILT-IN . . . that *plus* of rugged precision that means years of unfailing service.

With PRs in your rig, you KNOW your signals are going out clear and strong and right on the frequency. You get longer distance, clearer reception, less drift. Yes, PRs are the SURE ROAD TO T9X. Get them from your radio parts jobber. EVERY PR CRYSTAL IS UNCONDITIONALLY GUARANTEED.

PR CRYSTALS

AMATEUR TYPES

Fundamental, PR Type Z-2

Frequency Ranges in Kcs.: 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M).

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting; ± 500 cycles .....**$2.95** Net

(All Z-2 Crystals calibrated with a load of 32 mmfd.)

AMATEUR TYPES

Third Overtone, PR Type Z-9A

Hermetically sealed; calibrated 24,000 to 24,666 and 25,000 to 27,000 Kc., ± 3 Kc.; .050" pins. .**$3.95** Net

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ± 15 Kc.; .050" pins.

.....**$4.95** Net

CITIZENS BAND CLASS "D"

Type Z-9R, Transmitter

FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.255, calibrated to .005%. (Be sure to specify manufacturer and model number of equipment) .....**$2.95** Net

Type Z-9R, Receiver

Calibrated to .005%. (Be sure to specify manufacturer and model number of equipment .....**$2.95** Net

Type Z-9R, Radio Control

FCC assigned frequencies in megacycles: 26.995, 27.045, 27.095, 27.145, 27.195, 27.255; calibrated to .005% (Be sure to specify manufacturer and model number of equipment.)

.....**$2.95** Net

Type Z-1, MARS and CAP

Official assigned frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc. ..**$3.45** Net

Type 2XP

Suitable for converters, experimental etc. Same holder dimensions as Type Z-2. 1600 to 12000 Kc., (Fund.) ± 5 Kc. **$3.45** Net

12001 to 25000 Kc. (3rd Overtone) ± 10 Kc. .....**$4.45** Net

Type Z-6A, Frequency Standard

To determine band edge. To keep the VFO and receiver properly calibrated. .050" pins. 100 Kc. .....**$6.95** Net

PR Crystals

Since PR 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
COUNCIL BLUFFS, U.S.A.

COMMERCIAL CRYSTALS AVAILABLE FROM 100 KC. TO 70 MC. PRICES ON REQUEST.

For further information, check number 2, on page 110

one good thing leads to another...

A single word, rather than any single feature, accounts for the enthusiastic acceptance we've experienced with the SX-117. The word is *"Versatility."*

No other receiver in its class lets you work so much territory so well —wherever your present or future interests may lie.

For instance: You get all important coverage from 3.0 Mc. through 30 Mc. (five crystals provided) plus four positions from 85 kc.—3 Mc. for use with HA-10 low freq. tuner.

You get *three-step variable selectivity*, including a transmitter-type V.F.O. that can be *locked on frequency* . . . less than *1 μv* sensitivity . . . extreme electrical and mechanical *stability* . . . up to *50 db.* attenuation to unwanted heterodyne in the pass band.

Looking ahead, you'll find interesting the oscillator output jacks for transceive operation with Hallicrafters' HT-44 matching transmitter.

The SX-117 costs $379.95. The HA-10 adds just $24.95 (less low freq. crystals).

SX-117 **triple-conversion receiver by** ***hallicrafters***

5th & Kostner Aves., Chicago 24, Ill.

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

CQ

The Radio Amateur's Journal

Vol. 19, No. 8 August 1963

OFFICES
300 West 43rd Street
New York 36, N. Y.
Telephone, JUdson 2-4460

CQ—(Title registered U. S. Post Office) is published monthly by Cowan Publishing Corp. Second class postage paid at New York, N. Y. and at Garden City, New York. Subscription Rates: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year $5.00; two years $9.00; three years $13.00. Pan-American and foreign, one year $6.00; two years $11.00; three years $16.00. Printed in the U.S.A. Postmaster: send Form 3579 to *CQ* 300 W. 43rd St., N. Y. 36, N. Y.

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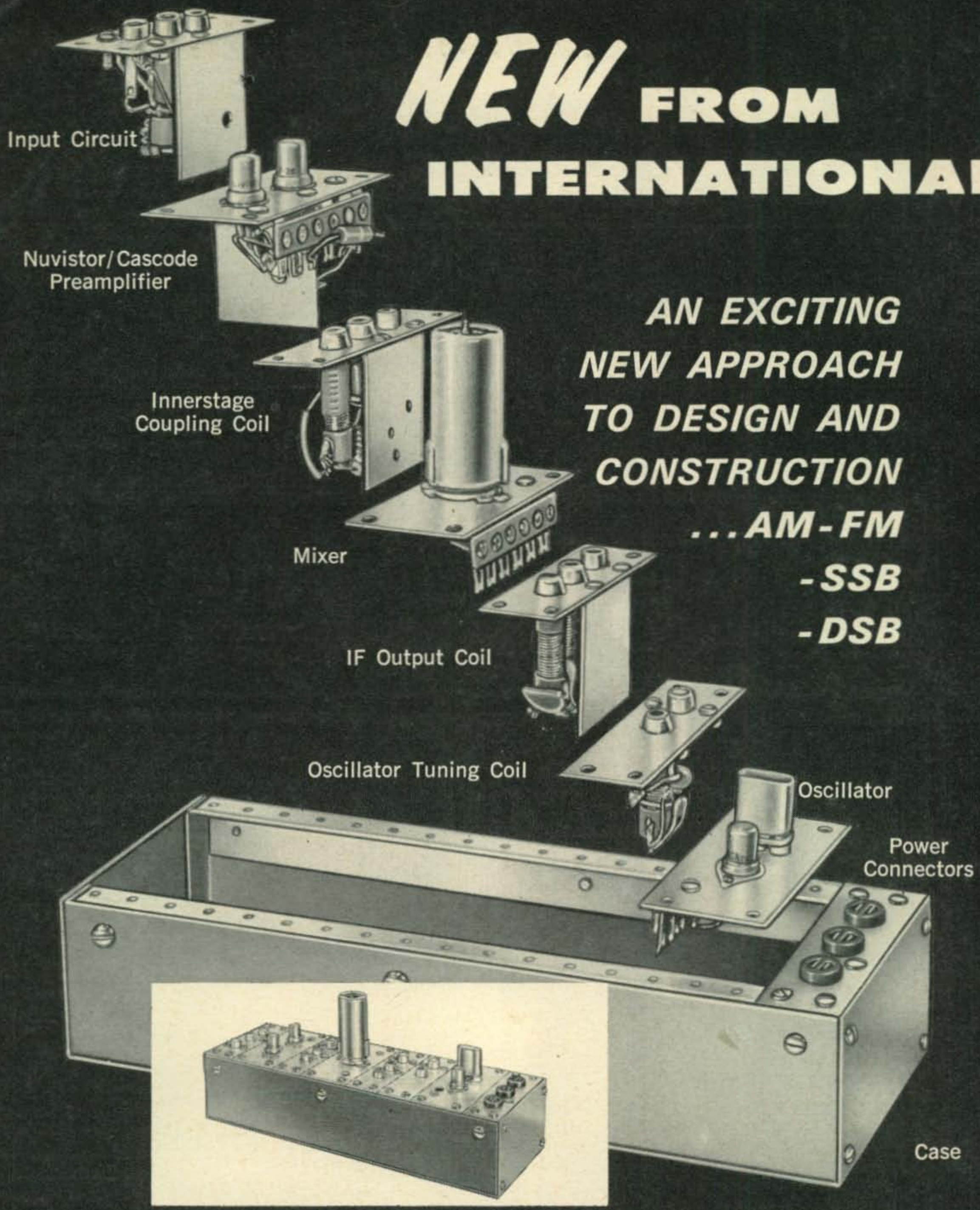
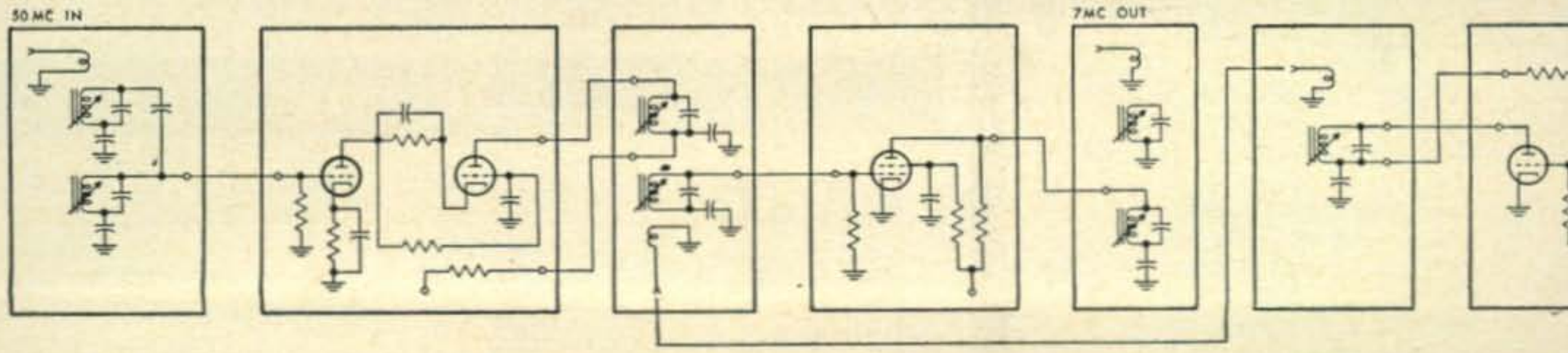
NEW FROM INTERNATIONAL

AN EXCITING NEW APPROACH TO DESIGN AND CONSTRUCTION ...AM-FM -SSB -DSB





AOC*

*Add - On - Circuits

Amateurs and experimenters will discover a new and easier way to build a wide variety of communication and electronic gear with International **AOC** units . . . individually wired oscillators, preamplifiers, detectors, etc., each tested and mounted on miniature metal chassis.

For example, the eight **AOC** units (illustrated) have been assembled to make a 6 meter converter. Each circuit may be removed to make modifications, or build other equipment. Simple to build, and so easy to change.

AOC units permit custom building for a wide range of frequencies, modes, and power. RF coils are available from 200 kc to 450 mc. IF transformers are available from 262 kc to 10.7 mc. Transmitter power to 100 watts. Matching cases, complete with hardware, available in a variety of lengths.

If you are planning to build a receiver, transmitter, converter, or other electronic equipment use International **AOC** units.

PREAMPLIFIERS • MIXERS • OSCILLATORS • INTERMEDIATE FREQUENCY AMPLIFIERS • DETECTORS • DISCRIMINATORS • BUFFERS • POWER AMPLIFIERS • MODULATORS • FREQUENCY MULTIPLIERS • SPEECH AMPLIFIERS • RECTIFIERS • FILTERS • REGULATORS • POWER TRANSFORMERS • OSCILLATOR BRIDGES •

AOC units are moderately priced from.....**$2.00** up.

INTERNATIONAL ANTENNAS FOR 6 METERS

BASE STATION VERTICAL

This antenna offers exceptional improvement of signal to noise ratio. Shunt fed, grounded radiator. Rigid aluminum and cadmium plated steel construction. Vertical length adjustable. Cat. No. 160-129 . . . . . **$27.95**

MOBILE

Base loaded whip antenna for installation on roof of auto. May be mounted on trunk lid or door facing with International blind mounting bracket (Cat. No. 160-126) Sealed loading coil-adjustable whip. Cat No. 160-130 **$19.95**

For complete details, mail coupon today.

INTERNATIONAL
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18 NORTH LEE • OKLAHOMA CITY, OKLAHOMA

International Crystal Mfg. Co., Inc.
18 North Lee
Oklahoma City, Oklahoma
Please rush details on AOC units.

Name_____

Address_____

City_____ Zone___ State_____

For further information, check number 4, on page 110

For further information, check number 5, on page 110

ZERO BIAS

GREEK mythology has it that Pandora, the first mortal woman, was given a mysterious box by the Greek God Zeus and, in her anxiety to see what it contained, opened it letting all human ills escape into the world, leaving only hope.

It appears to us that a great many amateurs are now "hoping" the recent incentive licensing proposal of the American Radio Relay League will return to Pandora's Box.

We cannot avoid mentioning that in our opinion the League announced their proposal with a great deal of impropriety. It is obvious, too, from the "clarification" editorials of March and July, that a tremendous number of amateurs misunderstood that which the League was attempting to convey.

It is also sad indeed, to note that the League waited fully ten months to quote from a speech made at the 1962 ARRL National Convention by an FCC official and which, by the way, appeared on this page in October, 1962. Did they perhaps think that his comments were too sensational for the amateur public?

SINCE it has been well over ten years since the demise of our Class A, B and C licenses, and since so many erroneous rumors have been spreading as to how the Leagues incentive plan will take shape, we feel a little reminiscing about our "old" system may be in order.

First, let us make it clear to some of the newcomers that in the past, absolutely no phone operation was permitted on 40 meters and at that time, no 15 meter band existed.

The Class B or C license, carrying identical examinations and operating privileges, was the beginners route for *all* entering the hobby. The difference between the two classes was merely the geographical location at which the test was administered. The Class C license was given by a qualified amateur and not at an official FCC office. It was primarily designed for the handicapped/shut-in or those who found it a hardship to travel a great distance to an official testing point.

The Class B and C examinations required of the applicant the sending and receiving of 13 w.p.m. c.w., in addition to a written examination on radio theory and amateur regulations.

The Class B and C licenses allowed all amateur privileges, except that phone operation was prohibited below eleven meters. (Since there was no 15 meter band, and no phone was permitted on 40, this meant the Class B and C licensees were denied use of phone on 75 and 20 meters only).

After a one year "apprenticeship" the B and C holders were offered the opportunity of taking the Class A examination. This test required *no extra c.w.* and since the Class A was primarily concerned with obtaining additional phone privileges (20 & 75) it only follows that the criteria for the examination should be additional radiotelephone principles. This, in fact, was the case. We emphasize, no additional c.w. was required.

With the change in licensing structure, the Class B became the General and the Class C Conditional. The Class A amateur became "Advanced," on paper only, since the examination was no longer administered. All amateurs had equal operating privileges with the exception, of course, of the newly created Technician and Novice.

Considering the scope of the 1951-52 changes it is not surprising that many present-day amateurs have misinterpreted the possible outcome of a return to the previous system.

WE have been literally beseiged with letters asking us to take a stand against a return to restricted voice segments. From a purely business standpoint, it would certainly be to our benefit to vilify the League, thus winning support and patronage for *CQ*. We feel the "me too" attitude of which we have recently been accused is in the best interest of the hobby and we condemn those who disagree, simply for the sake of disagreement.

It is obvious to us as it is to many amateurs that the League's incentive licensing proposal has been mistakenly, as well as deliberately, distorted. We therefore ask our readers to temper emotion with patience and wait for a possible clarification of just what is being proposed and just what its effect will be.

OUR COVER

Don't confuse this cover with our March issue! This one's a receiver and if you haven't already guessed it W6BLZ is the man behind the soldering iron. It's one of the many features you'll find in the September issue. Look for it!

Cleveland Convention Cancelled

Editor, *CQ:*

On May 27, 1963 the Board of Directors of the Cleveland Amateuradio Convention, Inc. voted to cancel the 13th ARRL National Convention which was scheduled to be held in Cleveland, October 4, 5, 6, 1963.

The Corporation regrets having to announce this decision but, as we were unable to formulate a program that met with the satisfaction of all scheduled participants, we had no other choice. We are an organization composed entirely of volunteer workers who hadn't the time, individually or collectively, to fathom and appease the desires of all concerned.

We wish to thank the individuals and manufacturers who expressed an active interest in the Convention. We are sorry if we have inconvenienced you in any way.

Board of Directors
Cleveland Amateuradio Conv., Inc.
P. O. Box 5167
Cleveland 1, Ohio

G. I. Patches

Editor, *CQ:*

I have read with a great deal of interest Letters (KL7 YK/KG6 and WAØDLG) in the March issue of *CQ* and cannot say that I agree with their views.

I, too, am in the Navy, stationed aboard a destroyer presently in the Middle East. It is my opinion that the contribution afforded by phone patches to the morale of thousands of military personnel around the world far out-weighs the aggravation caused by a few poor operators. My ship, for example, has been stateside for two of the six months and will be over here another four months before we get home again.

I run phone patches here about six hours a week when operations allow and it has been my experience that the men think very highly of their hometown ham and of the amateur fraternity as a whole. They really appreciate it. This ship for one, sends out a very elaborate certificate-size, photograph QSL card to stateside stations providing phone patch outlets.

Les Franklin, ET2, W1LDK
U.S.S. *Harlan R. Dickson* (DD-708)
FPO, New York, N. Y.

"Creeping Meatballism"

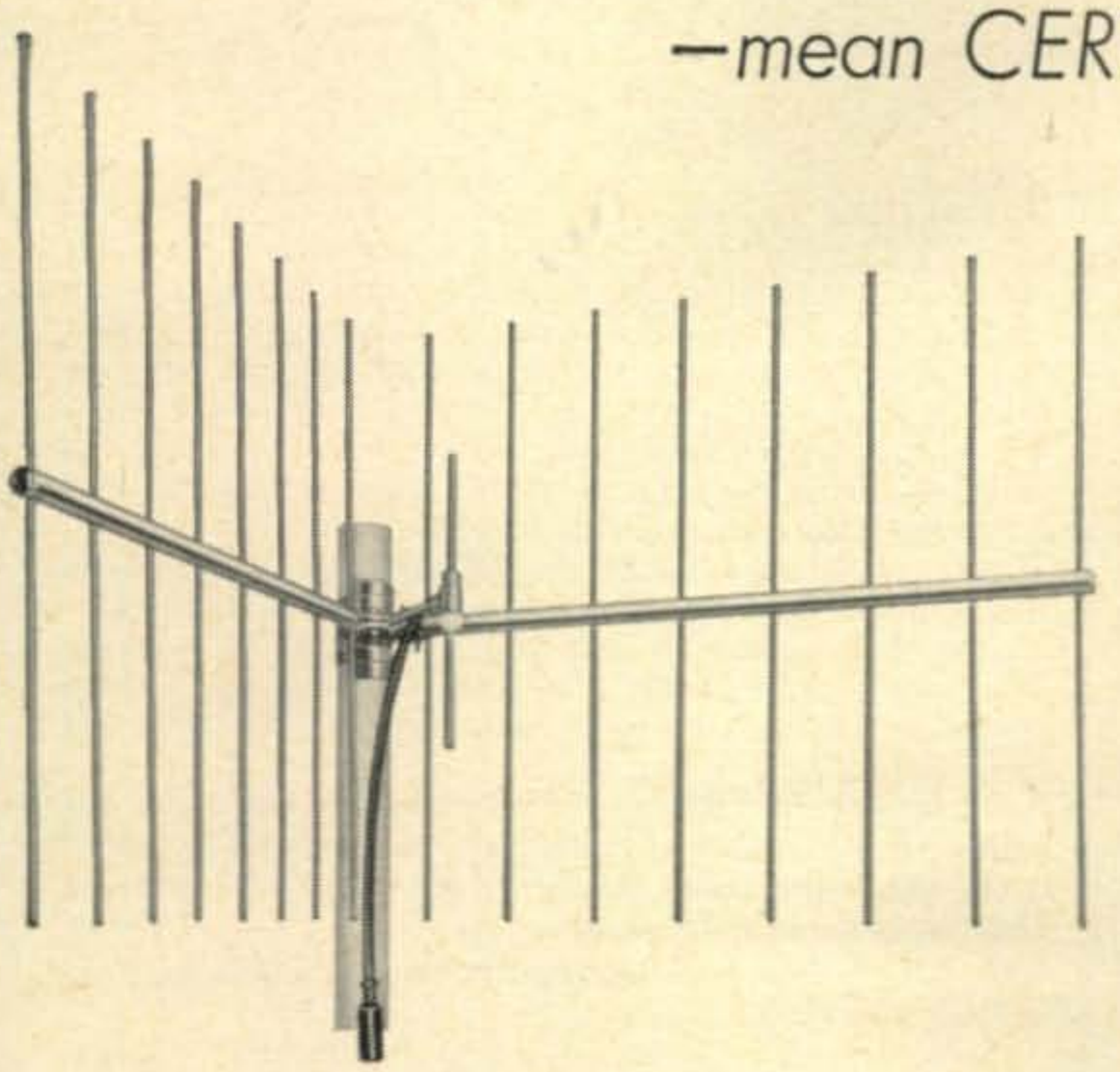
Editor, *CQ:*

To try to stem the tide of "Creeping Meatballism" across the entirety of the 2 meter band is a lost cause. Those who are opposed to the "progress" of the on rushing Technician horde, with their "new blood" (vampires all?), just haven't read the handwriting on the wall. It's only a matter of time (several decades more) before, by sheer strength of numbers alone, the Technicians will overrun the entire ham spectrum! Their ranks are en-

For further information, check number 6, on page 110

C-P COMMUNICATION ANTENNA SYSTEMS

—mean *CERTIFIED PERFORMANCE!*



Base Station Corner Reflector Advanced Design Antenna

(10X-Unidirectional Gain)

Cat. No. 161-509, Frequency Range 450-470 MC

Cat. No. 161-509 Corner Reflector Antenna is designed for use in the 450-470 Mc band. All reflector screen components are manufactured of high strength aluminum alloys, all mounting components are fabricated of hot-galvanized steel and all radiating components are fabricated of aluminum. The above combine maximum strength, optimum electrical performance and minimum weight for the first time in an antenna of this type.

This lightweight aluminum antenna is ideal for use in multiple corner arrays.

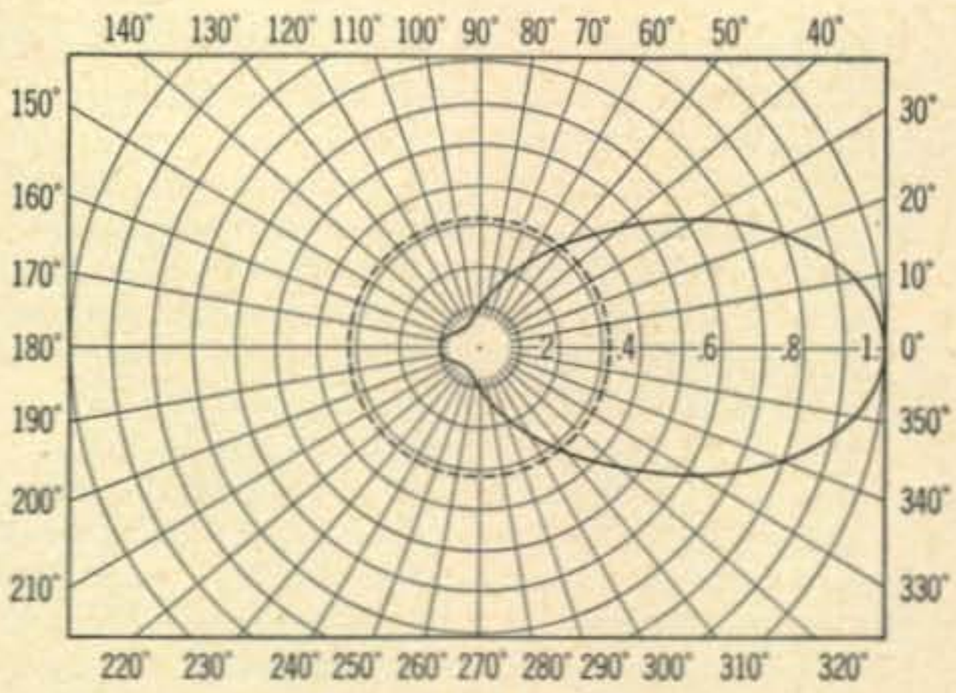
Electrical Specifications:

Nominal input impedance	50 ohms
Forward gain	10 db
Front-to-back ratio	20 db
Maximum power input	250 watts
Internal feedline	RG-8A/U
Flexible terminal extension	18" of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±3%
Lightning protection	Direct ground

Mechanical Specifications:

Reflector (size per side)	2' x 2'
Reflector material	High strength aluminum alloy
Radiating element material	High strength aluminum alloy
Radiating element diameter	⅜"
Rated wind velocity	100 MPH
Lateral thrust at rated wind	16 lbs.
Torsional moment on mounting pipe	16 ft. lbs.
Weight	8 lbs.

Stainless steel hardware supplied to mount antenna on 2" IPS pipe.



Horizontal field strength pattern of Corner Reflector 10X-Gain Antenna Cat. No. 161-509. A dipole pattern is shown for reference.

COMMUNICATION ANTENNA SYSTEMS FOR AMERICAN BUSINESS

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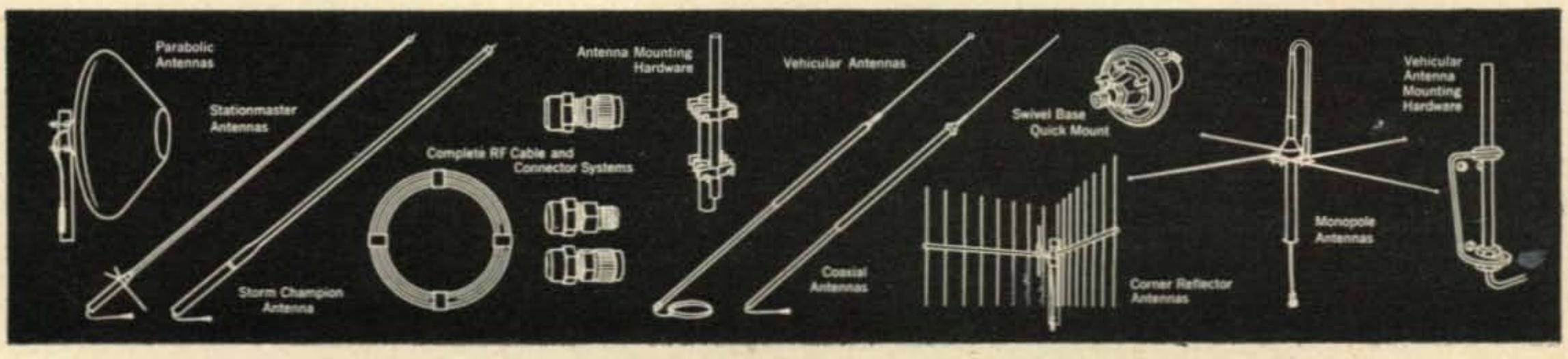


joying quite a population explosion. Before too long they will be able to lobby for just about anything they desire and exert enough pressure to get it! Do you really think that the League Directors are generous enough to give the Techs the rest of 2 meters of their own accord? Think of how generous they have been to the Amateur Extra Class (" a group too small to worth worrying about").

It may sound a little 1984ish, but the day may come when serious hamming will be carried on semi-clandestinely via the exchange by mail of recorded tapes!

Al P. LaPlaca, K2DDK
28 The Beach Way
Manhasset, N. Y.

Editor, *CQ:*

Re: your ZERO BIAS (July, p. 7), I feel that incentive licensing and use of v.h.f. band space can be handled in one big ball of wax by setting aside the top megacycles of each v.h.f. band as the private country of the Class A and Extra Class hams; the one stipulation would be that they would be limited to single sideband operation in these bands.

Let's see what this would do . . . It would place the most experienced operators in the most vulnerable TVI area; *i.e.* 53 to 54 mc. This would almost force an improvement in the state of the art both by hams and by teevee manufacturers. It would occupy other bands previously unoccupied in the v.h.f. spectrum by making it a "status symbol" for these elite hams and give them a private stomping ground, uncluttered by the "lids" of lower grade.

Other services could not criticize us for not using our bands to their fullest. V.h.f. single sideband research would be in the hands of the most experienced of hams and Extra Class hams would have exclusive recognition.

John P. Stowe, K1UZV
P.O. Box 31
Newtown, Conn.

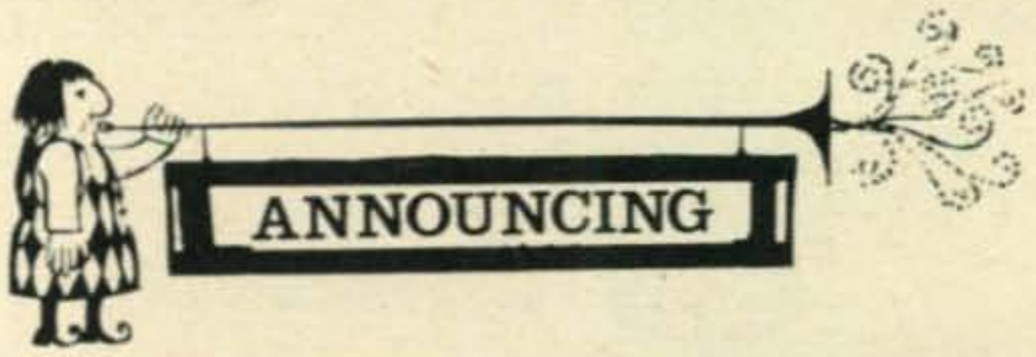
"Our Boy"

Editor, *CQ:*

This is just a rather brief note to let you know that I have appreciated *CQ* ever since I first ran into it a good many years back.

This letter is particularly a comment of appreciation for HAM CLINIC. I recently ran into an electronic problem which I had not seen discussed any place, and an airmail letter to Chuck in Switzerland was mailed here on the 4th of March, and an airmail reply was on my desk March 11th. I frankly do not think that anyone can complain either about the speed of service or the detailed reply which I received. I hope that he remains on your staff for a good many years, and HAM CLINIC continues to be a regular feature.

Ernest S. Pentland, M.D., VE3DWB
369 Queen Street E.
Sault St. Marie, Ontario



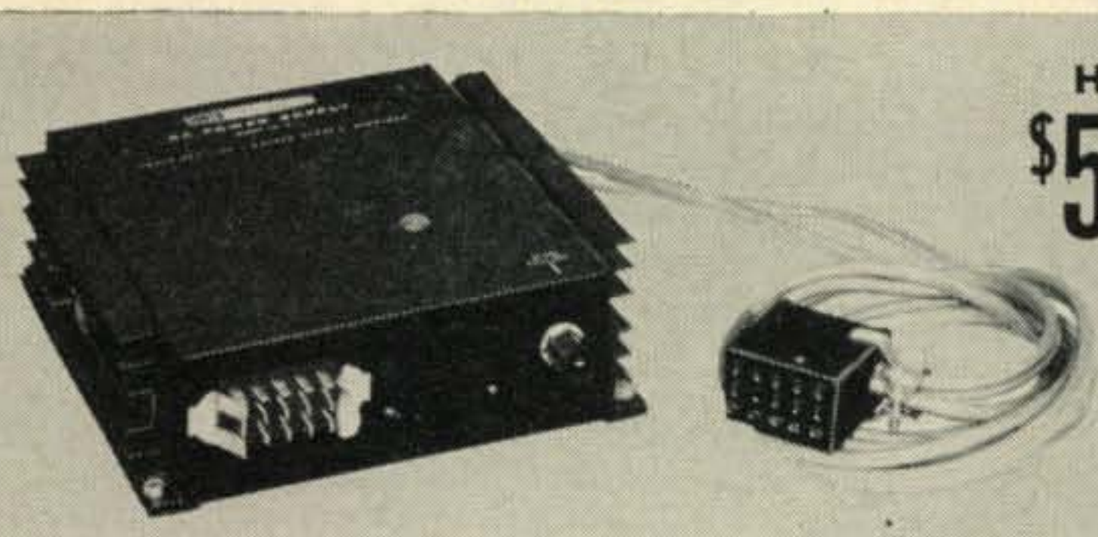
Illinois

The Egyptian Radio Club will hold its annual hamboree on Sunday, September 15 at its club house on the levee at the Chain-of-Rocks Canal near Granite City, Illinois. Games and contests for entire family. Ample space to park and swap. Club located 200 yards south of U.S. 66 and 40 By Pass, ¾ mile west of U.S. 67 Alternate, and 2 miles east of Mississippi River Bridge. Mobiles monitored on 29640, by club station W9AIU. For info contact Egyptian Radio Club, Inc., Box 1300, R. R. 1, Granite City, Ill.

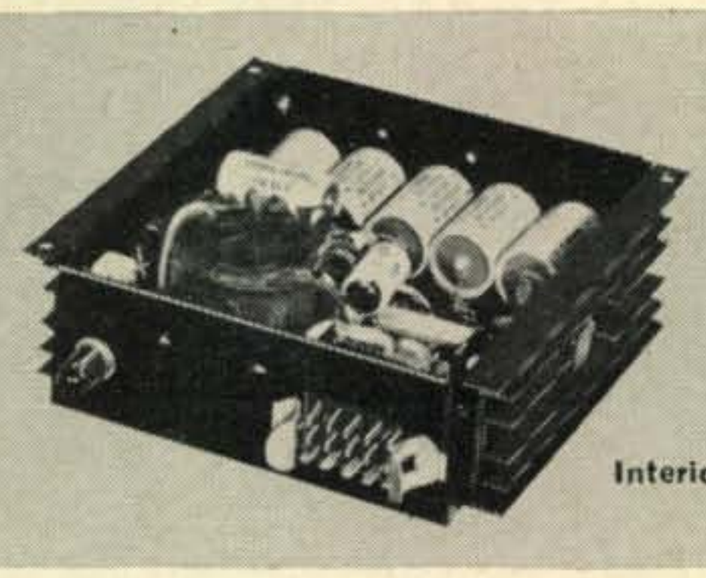
The Hamfesters Radio Club's 29th Hamfest will be held Sunday, Aug. 10, at Santa Fe Park, near Chicago. Tickets are $1.00 in advance and $1.55 at the gate. Contact Tom Campana K9DYW, 1209 W. 74th. Chicago 36, Ill. For further info Tom Campana K9DYW

NEW HEATHKIT® SOLID-STATE POWER SUPPLIES

FOR ALL HAM TRANSCEIVERS



HP-13
$59.95

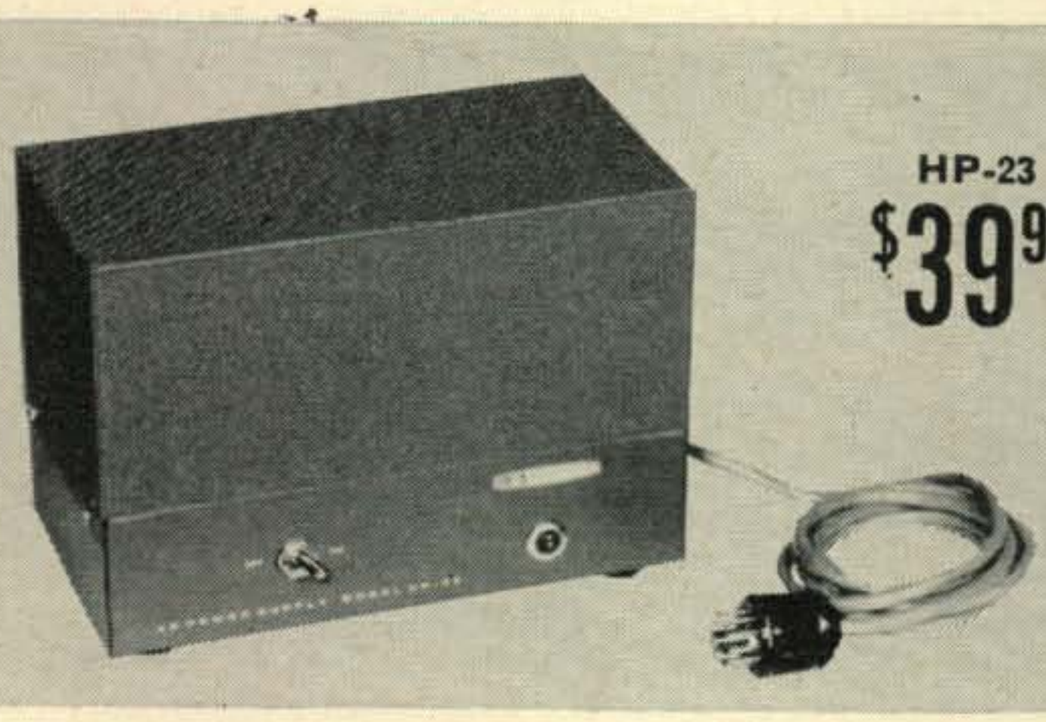


Interior

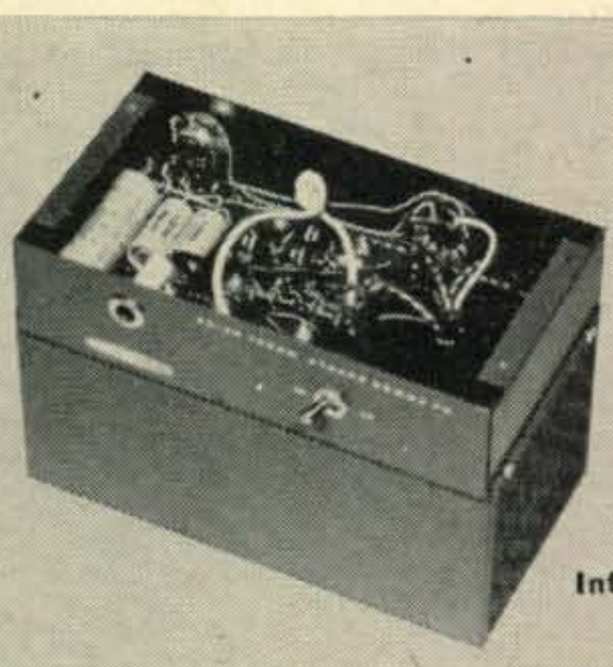
NEW DC "MOBILE" POWER SUPPLY: Furnishes all power required by Heathkit and other makes of SSB transceivers and mobile gear. Features encapsulated high-efficiency "Deltamax-core" toroidal transformer, power switching transistors, silicon rectifiers, circuit breaker protection, and relay control of primary power. 1500 cps switching frequency for low ripple output, excellent dynamic regulation.

Kit HP-13...7 lbs....no money down...$6 mo.....**$59.95**

SPECIFICATIONS—Input voltage: 12 to 14 volts DC. **Input current:** 25 amperes maximum with full load. **High voltage output:** 800 volts DC, no load; 750 volts DC @ 250 ma. AC ripple, less than 1% @ 250 ma; Duty Cycle, 150 ma continuous; 150 to 300 ma @ 50%. **Low voltage output:** (high tap) 310 volts DC, no load; 300 volts DC @ 150 ma. (low tap) 265 volts DC, no load; 250 volts DC @ 150 ma. AC ripple, less than .05% @ 150 ma. Continuous duty cycle, to 175 ma. **Adjustable bias voltage:** —40 to —130 volts DC @ 20 ma max. Duty cycle, continuous. **Dimensions:** 7⅜" W x 7½" L x 2⅜" D. All voltages referenced at 13 VDC input.



HP-23
$39.95



Interior

NEW AC POWER SUPPLY: Converts mobile gear to fixed-station operation in minutes. Furnishes HV, LV, bias, and filament power. Excellent dynamic regulation and extremely low AC ripple for optimum performance. Features long-life silicon rectifiers, provision for remote switching and fused line plug. Complete instructions for use with Heathkit and other SSB gear.

Kit HP-23...18 lbs....no money down, $5 mo.....**$39.95**

SPECIFICATIONS—Power requirements: 120 volts AC, 50-60 cycles, 350 watts maximum. **High voltage output:** 820 volts DC, no load; 700 volts DC @ 250 ma. **AC ripple:** Less than 1% @ 250 ma. **Duty cycle:** 150 ma continuous, 150 ma to 300 ma @ 50%. **Low voltage output:** (High Tap) 350 volts DC, no load; 300 volts DC @ 150 ma. (Low Tap) 275 volts DC, no load; 250 volts DC @ 100 ma. Less than .05% AC ripple @ 150 ma, continuous duty to 175 ma. **Fixed bias:** —130 volts DC, no load; —100 volts DC @ 30 ma. **Adjustable bias:** —40 to —80 volts DC @ 1 ma maximum. Less than .5% AC ripple. Continuous duty to 20 ma. **Filament voltage:** 6.3 V. AC @ 11 amps; 12.6 V. AC @ 5.5 amps. **Dimensions:** 9" L x 4¾" W x 8¾" H.

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- ☐ Enclosed is $39.95 plus postage; please send HP-23 AC Power Supply
- ☐ Enclosed is $59.95 plus postage; please send HP-13 DC Power Supply
- ☐ Please send me free Heathkit catalog.

NAME _____
(Please print)

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Prices & specifications subject to change without notice. Export prices slightly higher.

For further information, check number 8, on page 110

Aurora, Illinois

The Fox River Radio League, Inc. will hold its annual Swap and Shop picnic on September 22. The usual equipment display, raffle, swap tables, etc. will start at 10:00 A.M. Free coffee all day. The location is Phillips Park on the south side of Aurora, Illinois. There are plenty of eating places, a Zoo, and playground equipment for the kids. For more complete details, write the Fox River Radio League, Inc. P.O. Box 443 Aurora, Illinois.

Pittsburgh

The 26th annual Hamfest of the South Hills Brass Pounders & Modulators of Pittsburgh, Pennsylvania, will be held Sunday, August 11th, from noon till dusk at Totem Pole and Spreading Oaks Lodges, South Park, about eight miles south of Pittsburgh on Route 88. Plenty of picnic space for the family. Mobiles check in to club station W3P1Q on 10 and 6 meters. Registration for door prizes $2.00 at the door or $1.50 in advance. For further information or pre-registration write Dave Imhoff W3HND, 2283 Spokane Avenue, Pittsburgh 10, Pennsylvania.

Alabama

The North Alabama Hamfest will be held in Decatur, Alabama, on August 18 at the Decatur High School. The main prize will be a Drake TR-3 with a.c. power supply. The second prize will be a Drake 2B receiver with speaker. For further information, write to Paul Burks, K4UEC, Secretary, North Alabama Hamfest Association, P. O. Box 9, Decatur, Alabama.

Wyoming

The annual Wyoming Hamfest will be held Aug. 10-11 in Big Horn National Forest recreation area on U.S. 16, west of Buffalo, Wyoming. The annual banquet will be held on Saturday evening at the Pines. Talk-in frequency will be 3920 kc. For further information, advance registration, or help in cabin reservations, contact Wyoming Hamfest Chairman, Box 141, Sheridan, Wyoming.

Iowa

The Cedar Valley Amateur Radio Club of Cedar Rapids, Iowa will host an amateur radio convention on Aug. 31-Sept. 1 at the Town House Motel in Cedar Rapids. Two Collins 75S-3 communications receivers will be given away as main prizes. General Chairman for the event is Charles Carney, WØGDJ and the President is Bill Bradford, KØHDK. Amateurs should send their $2.00 registration fee to Box 1346, Cedar Rapids, Iowa.

Washington

The Walla Walla Valley Radio Amateur Club will hold its 17th annual picnic on Sunday, Sept. 15 at Wildwood park in Walla Walla. Registration 10:00 A.M. to 12 noon, no charge. N. W. Division Director, Rex Roberts, W7CPY and his SCMs will be on hand to answer questions. 29.6 and 3970 will be monitored to home you in. Listen for W7DP. Contact Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, Washington for further information.

New Jersey

The East Coast V.H.F. Society will hold its 5th annual outdoor picnic on Sunday, August 4th at Saddle Brook Park, Saddle Brook, N. J. starting at 10:00 A.M. Mobileers will be assisted on 2, 6 and 10 meters. Lots of entertainment expected.

Pennsylvania

The Mt. Airy V.H.F. Radio Club, Inc. ("The Pack Rats") will hold their 8th annual picnic on Sunday, Aug. 11 (rain date, Aug. 18) at Fort Washington State Park, Flourtown, Penna. A big turnout is expected and if your interest in the very high frequencies, this event is designed for you.

The Uniontown Amateur Radio Club, W3PIE will hold their 14th annual "Gabfest," Saturday afternoon

[*Continued on page 84*]

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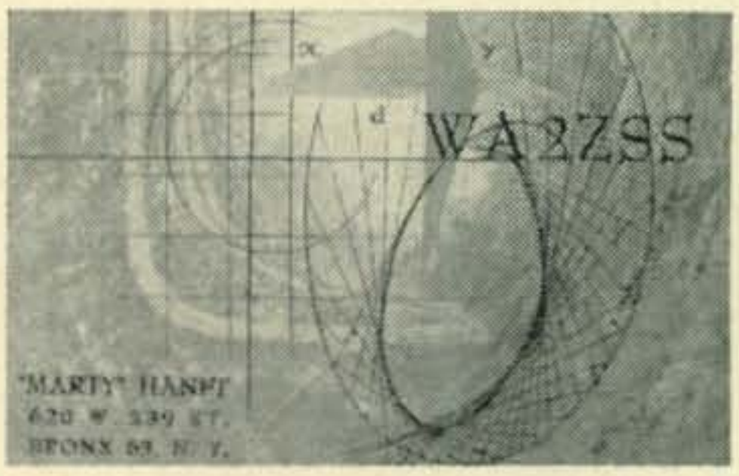
For further information, check number 10, on page 110

QSL contest

JOSE ALVAREZ, TG9MP is winner this month, using a two-tone blue card featuring Tecún Umán, national hero of Guatemala. Runners up include WA2ZSS, KG6R and TI2PI.

Honorable mention goes to: W1DBN, W1HIK, K6KVO, W7ABO, K7NCP, K7OYH, KL7ENV, HB9J and SVØWW.

We still continue to receive dozens of inelligible surprinted picture postcards as well as hand-made one-of-a-kind cards. They are very nice but can't compete with the regular printed versions.



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An Economical TVI Free 6 Meter Transmitter

BY WARREN RUDOLPH*, W4OHM

TVI, the bugaboo of 6 meters, has been effectively cleared from this economical 135 watt transmitter. The author also discusses sources of TVI other than the transmitter. For the sake of economy, directions are given as to how to use the power supply, metering circuits and modulators of the existing transmitter (without radical modifications) such as the Viking I, Viking II and the DX-100.

THE transmitter described herein was born as the result of a desire on the part of the author to help out a brother ham who was plagued with TVI. After assuring the 6 meter operator that TVI free operation on 6 meters was entirely possible, even in our fringe TV area, I set about designing the transmitter shown in fig. 1 and the accompanying photographs. It was initially decided that the transmitter must possess the following features:

1. First, and foremost, the transmitter must be completely free of TVI chargeable to the transmitter. (More about this later.)

2. All leads entering or leaving the r.f. unit must be double bypassed and filtered through r.f. chokes specifically chosen or designed for the particular job they were intended to do. In addition, all leads entering or leaving the r.f. unit must be run in thoroughly shielded and bonded braid.

3. It must utilize the existing modulator, power supply and metering circuits.

4. It must be compact and economical to construct.

5. It must be designed as a plug-in r.f. unit to enable quick connection to the existing power supply, modulator and metering unit so that, if at a later date, it was desired to cover other bands, then other r.f. units could be built up and plugged into the basis unit without difficulty.

6. The r.f. unit must be designed to operate on voltages commonly available from transmitters such as the Viking I, Viking II, DX-100 etc., and must be capable of using the modulator and metering circuits of the Viking or other transmitter with which it is used.

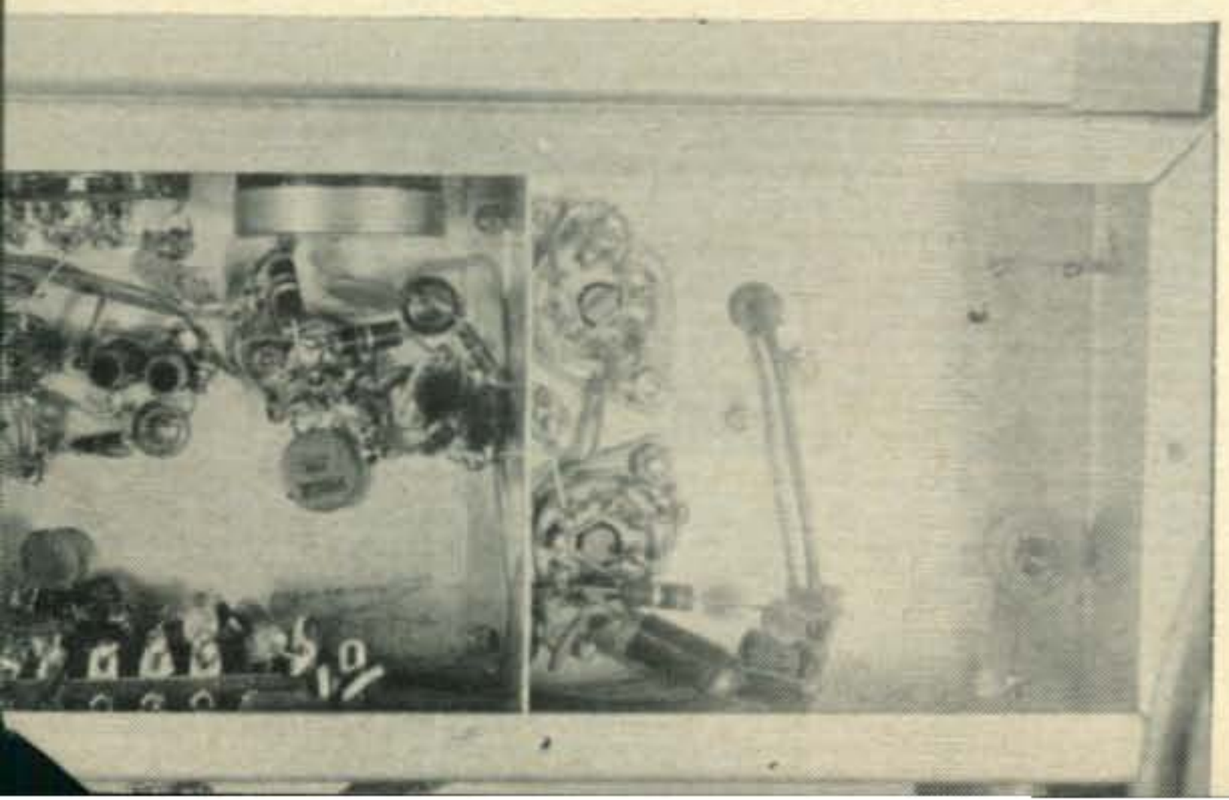
7. It must start with an oscillator frequency of at least 25 mc, with no sub-harmonics, and be capable of using either 8 or 25 mc crystals.

8. All stages must be double slug tuned, the final neutralized and a low pass filter must be included in the transmitter unit.

With these parameters in mind the design was worked out and the chassis dimensions and parts list given to the 6 meter man. In a few days he reappeared with a very excellent chassis and shield, formed and punched as I had directed and with the required parts.

In the next few days I constructed the transmitter and upon its completion, checked it out and operated it within 2 feet of TV receivers with no interference on any of the 4 channels commonly received here, and with only very mild overloading on channel 2. I might point out that the locally received channels are channel 3, 45 miles distant; channels 4, 5, 7, and 9 which are over a mountain and 72 miles distant; and channels 2, 11, and 13 which are received from Baltimore, Md., 96 miles away and which are very weak in this area.

*743 Berryville Avenue, Winchester, Virginia.



Bottom view of the transmitter shows the oscillator and driver multiplier in the left section shielded from the final section. The power feed filter network is located in the lower left of the chassis with the shield removed for the photo. In the final unit described in this article the neutralizing trimmer was mounted next to the partition between the two 6146 sockets. The low pass filter was removed for experimental purposes but is normally located in the far right of the r.f. amplifier compartment.

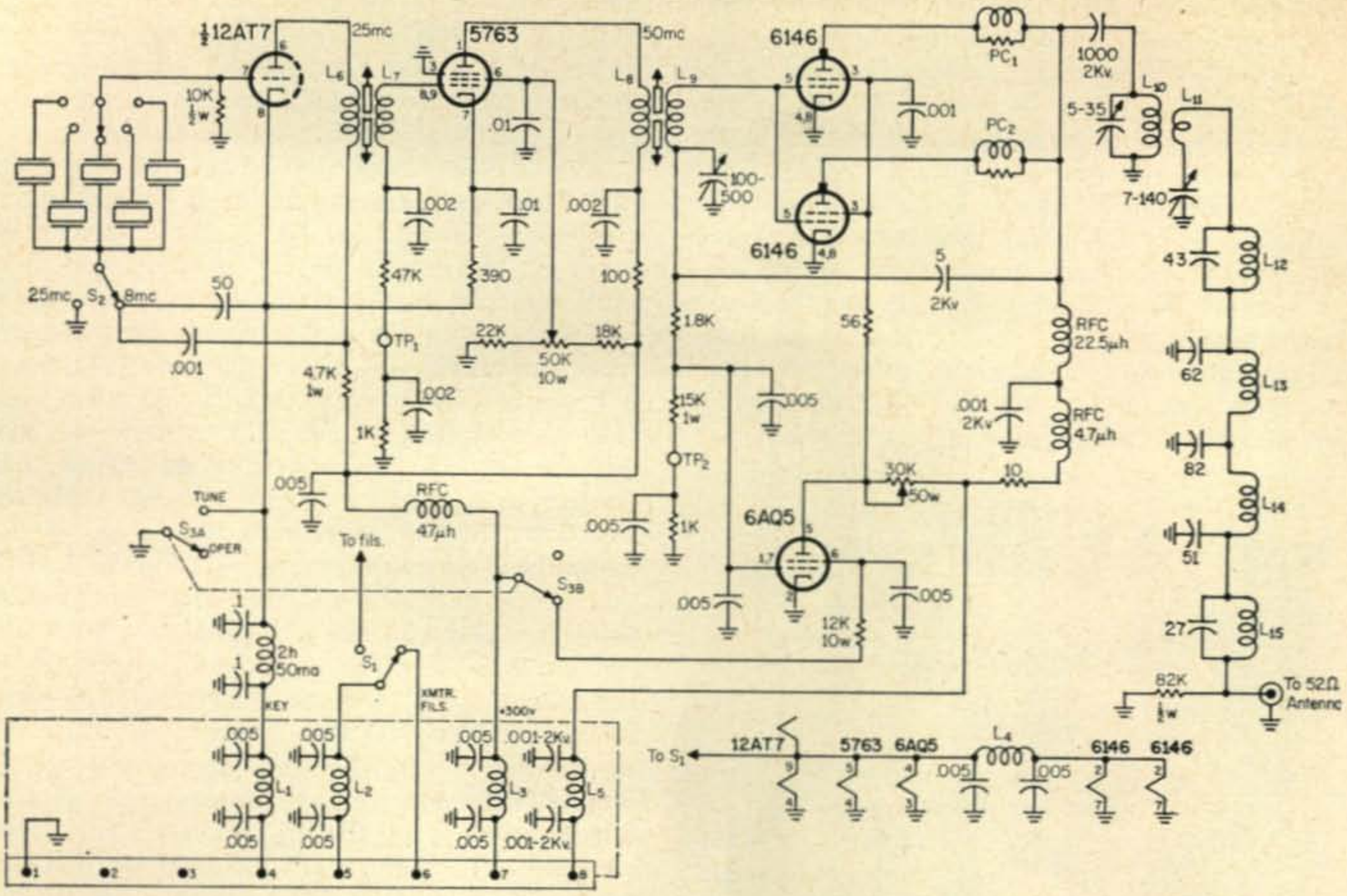


Fig. 1—Circuit of a six meter transmitter using two 6146s. A built-in low-pass filter and complete shielding make this a clean rig. Power is obtained from a commercially available exiter. The 6AQ5 clamp tube and its associated circuitry do not appear in the photographs but were added later.

L_1, L_2, L_3, L_4, L_5—29t #18E, ⅜" diam. closewound on a poly rod.

L_6, L_7—Merit TV-102 coils.

L_8—Merit TV-102 coil stripped and rewound with 6t #18E ⅜" long.

L_9—Merit TV-102 coil stripped and rewound with 8t #18E ⅜" long.

L_{10}—3t #10, 1" diam., close wound

L_{11}—3½t #10 ¾" diam., close wound.

L_{12}—3½t #18E ¼" diam., close wound.

L_{13}—10½t #18E ¼" diam., close wound.

L_{14}—10½t #18E ¼" diam., close wound.

L_{15}—3½t #18E ¼" diam., close wound.

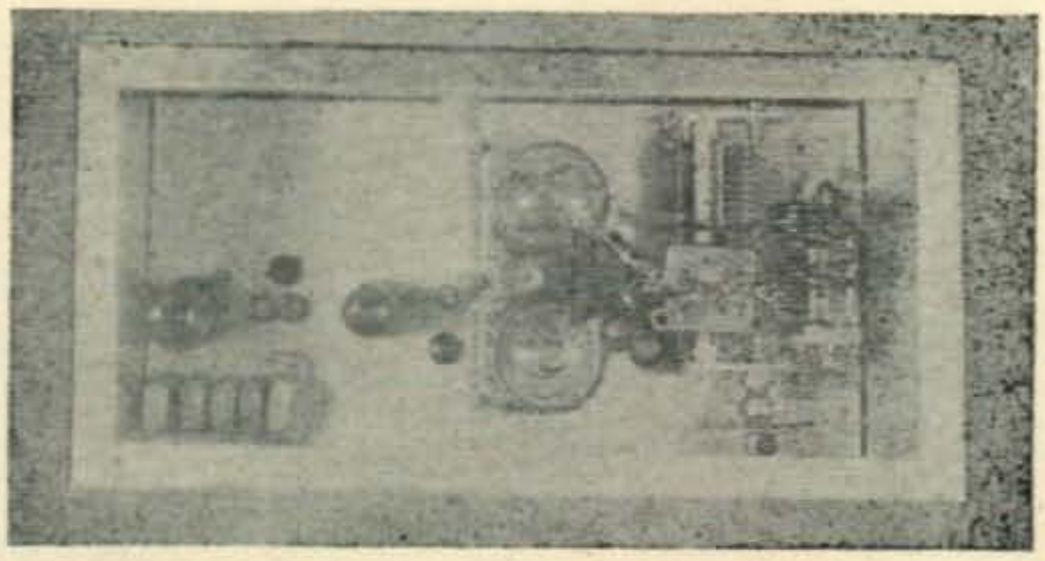
Pc_1, Pc_2—1t #18E on 100 ohm 1w carbon resistor.

The Circuit

The circuit begins with the familiar "Robert Dollar" oscillator for overtone use of 8 mc crystals. This oscillator is very reliable and has none of the trick circuits of many overtone oscillators. Also it puts out a signal only on the overtone frequency and nothing at the crystal freqency. This circuit will work with either 8 or 25 mc crystals without the switch shown in the crystal circuit. However, when using 25 mc crystals a very slight frequency drift of about 200 cycles will be noted when plate voltage is first applied. Grounding the bottom of the crystal circuit, when using 25 mc crystals, eliminates this effect. A switch is used, as shown in fig. 1, to bypass the feedback network for the 25 mc crystals or supply adequate feedback for the 8 mc crystals. If the slight frequency drift is not objectionable, then the switch may be eliminated and the bottom of the crystal sockets merely connected to the junction of the 50 mmf and .001 mmf capacitors.

The oscillator plate coil is tuned to 25 mc and is a Merit TV i.f. transformer with a single winding. Another Merit i.f. is also used in the doubler grid circuit.

The second stage uses a 5763 in a doubler circuit with variable screen voltage to control excitation to the final. The doubler plate and final grid coils are also wound on Merit TV forms. On these, however, the original windings have been removed and new coils, as

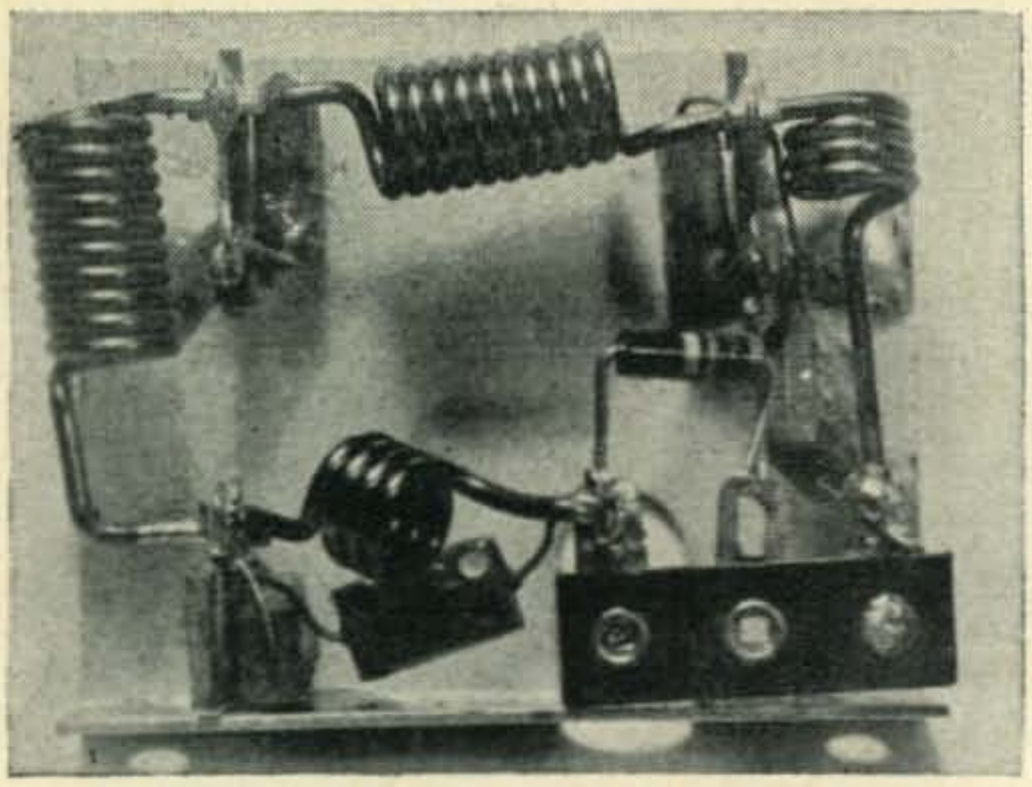


Top view of the rig showing shield placement and enclosure. The r.f. is pumped below the chassis to a low-pass filter. The antenna loading capacitor is screw-driver adjusted.

specified in the parts list, are wound on them so that they will tune to 50 mc.

Capacity bridge neutralization is used in the final, which employs a pair of 6146's in parallel. These tubes have parasitic chokes in the pleate leads and the plate circuit is high *C* and uses a tunable pickup link with variable coupling. A 6AQ5 clamp tube is used to protect the final if excitation should fail.

The low pass filter is a stock Bendix Radio item available from Bendix Radio of Baltimore, Md., for a nominal price. However, specifications and a detailed photograph are given and the filter can easily be duplicated.



View of the commercial Bendix low pass filter. The input is the right terminal of the 3 point strip and the output is the left terminal. In the home brew unit it would be desirable to provide greater isolation between the input and output terminals.

TVI

Construction details are clearly shown in the photographs and too much emphasis cannot be placed on the importance of using quality parts and the parts specified in the list. Don't substitute or use junk box parts or parts of questionable values. Also don't tamper with the parts layout. This transmitter is bug free and TVI free *if* it is built exactly according to specifications. When you start changing layout and parts values you change feedback conditions etc., and there is no telling what may happen. As shown here, the transmitter has been thoroughly checked out, and if built according to specifications and the layout given it will be free of any TVI chargeable to the transmitter.

This does not necessarily mean that you won't have any TVI when you go on the air, but it does mean that any TVI you do have will not be the fault of the transmitter. For example, upon putting this transmitter in operation at the 6 meter ham's home we had absolutely no TVI on any channel of TV sets operated in the same house and with one set even in the same room. One set had to be equipped with a high pass filter to eliminate the overload on channel 2 but the other sets operated entirely clean without the need for high pass filters. This "Hams Paradise" continued until the wind began to blow and then pandemonium broke loose on the TV sets. We had TVI galore. As soon as the wind died down the TVI also disappeared. This was eventually traced to a rusty antenna tower and erratic electrical contact in the tower.

Also it was found that several clothes lines in the back yard were radiating at their resonant frequency. Since the XYL didn't look with favor on the demise of her clothes lines, they were replaced with plastic clothes lines without the wire center core. Correction of these defects eliminated the last vestiges of TVI.

I would like to point out though, that even with a completely clean transmitter, you will occasionally get into a TV set which has started to go bad or which lacks sufficient selectivity in the front end. However, if the transmitter is built exactly as shown and if you check out your antenna and feed system properly, you can be sure that any TVI will not be your fault. I might add, that the six meter man who is using this transmitter now operates whenever he chooses and has his transmitter sitting on top of an old model Dumont TV receiver which he keeps running whenever he is on the air. He has no interference of any kind on any channel on the Dumont set or on the other family set in the living room of the house.

Construction

The r.f. unit is constructed on a 5" × 10" × 3" aluminum chassis. The top shielded enclosure is 6" high and is allowed to lap ½" over the chassis making it actually 5½" high above the chassis. Drill plenty of ventilating holes but keep their maximum size ⅛" or at the very most 3/16" to minimize r.f. leakage. Fasten the shield to the chassis with self tapping screws and shakeproof washers spaced not more than 1½" apart. Fasten the top and bottom plates in similar fashion and be sure and drill plenty of ventilating holes in them also.

Install rubber mounting feet on the bottom plate, being sure that the feet are at least ½" high to keep the unit sufficiently above the table to allow ample air circulation. The heat generated in the unit will make the vents act like a chimney and suck cool air in from the bottom and expel it at the top. Don't forget, you have a lot of r.f. power in a small package so give it plenty of ventilation.

All sockets and the terminal strips are securely mounted with shakeproof washers above the chassis and a double shakeproof washer and solder lug below the chassis.

TVI suppression also depends, to a large degree, upon r.f. isolation in the low voltage lines. It is most desirable to place all the filters at the power feed point as shown in the photographs. The chokes (L_1, L_2, L_3, L_5) and capacitors are mounted between a pair of terminal strips and enclosed by a shield. The addition of the chassis bottom plate provides a completely sealed container except for the four ¼" slots

for the leads. Even these, as well as one terminal strip, may be eliminated by the use of feed-through capacitors.

The shield was removed for the photograph but consists of an L shaped section of aluminum flanged on all edges so that it may be screwed to the chassis bottom and sides as well as the bottom plate. This effectively shields the chokes from direct radiation from any of the r.f. stages thus permitting a more thorough filtering job.

The final pickup link is made adjustable by elongating the screw holes in the "L" mounting bracket of the link tuning capacitor to allow about ½" adjustment as shown in fig. 2. The output link capacitor is adjusted with a screw driver through a hole provided in the shield. Since this capacitor will normally be adjusted only occasionally, it is not necessary to bring an insulated shaft out for that purpose. In the event you should want to provide a shaft and dial for adjustment, be sure to use a fiber or polystyrene rod for the extension shaft so that no metal passes through the shield enclosure. It doesn't take much to radiate interference and even the short length of metal shafting can, under proper conditions, cause some trouble.

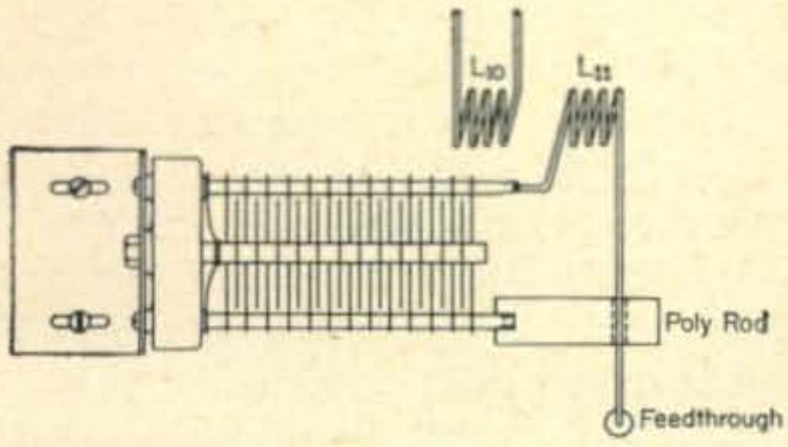


Fig. 2—Details of the variable coupling arrangement of the output. The coupling link is mounted on the capacitor by wedging a polystyrene rod on one of the stator studs. The rod then supports L_{11}. As the capacitor bracket is positioned in the slots, the coupling is varied.

The final capacitor shaft is extended through the shield as this must be adjusted to keep the final in resonance when moving over the band. However a flexible coupling is used inside the shield and the portion of shaft which extends through the shield must be made of bakelite, lucite or some other insulating material so as not to conduct harmonics out via the shaft.

I realize that using slug tuned coils and placing the crystals inside the case places a limitation on the ability to move about the band, but with the layout given the band-pass couplers formed by the double slug tuned coils provide about 400 kc of bandwidth without readjustment. In the setup designed, provision was made for 5 crystals but if desired a 10 position ceramic switch could be substituted and 10 crystals mounted inside the chassis, just so long as the leads are kept short. However, the crystals *must* be mounted inside the shield as a crystal holder can radiate a surprising amount of harmonic energy.

Dress all leads close to the chassis; make sure that all grounds are as short and direct as possible; place the low pass filter below deck and couple from the final pickup link to it through a feedthrough bushing as shown in the photographs.

As originally supplied from the manufacturer, the TV coils used for the i.f.s have the mounting spring at right angles to the coil terminals and this prevents mounting the coils sufficiently close for maximum pickup. Carefully pry the coil mounting spring loose and turn it ¼ turn so that the ears of the mounting spring project from the sides in the same direction as the coil terminals. When drilling the mounting holes for the coils, leave only about ⅛" of metal between the holes to assure very close mounting of coils. Also be sure to use the end of the coil next to the chassis for the cold end of the coil and connect the end away from the chassis to the grid or plate of the tube.

A small hole is drilled in the shield partition between the exciter and the final and the grid drive lead is passed through. A small ceramic or porcelain feed through insulator is passed through the chassis between the 6146 tubes and the neutralizing capacitor is mounted on this.

Power Supply

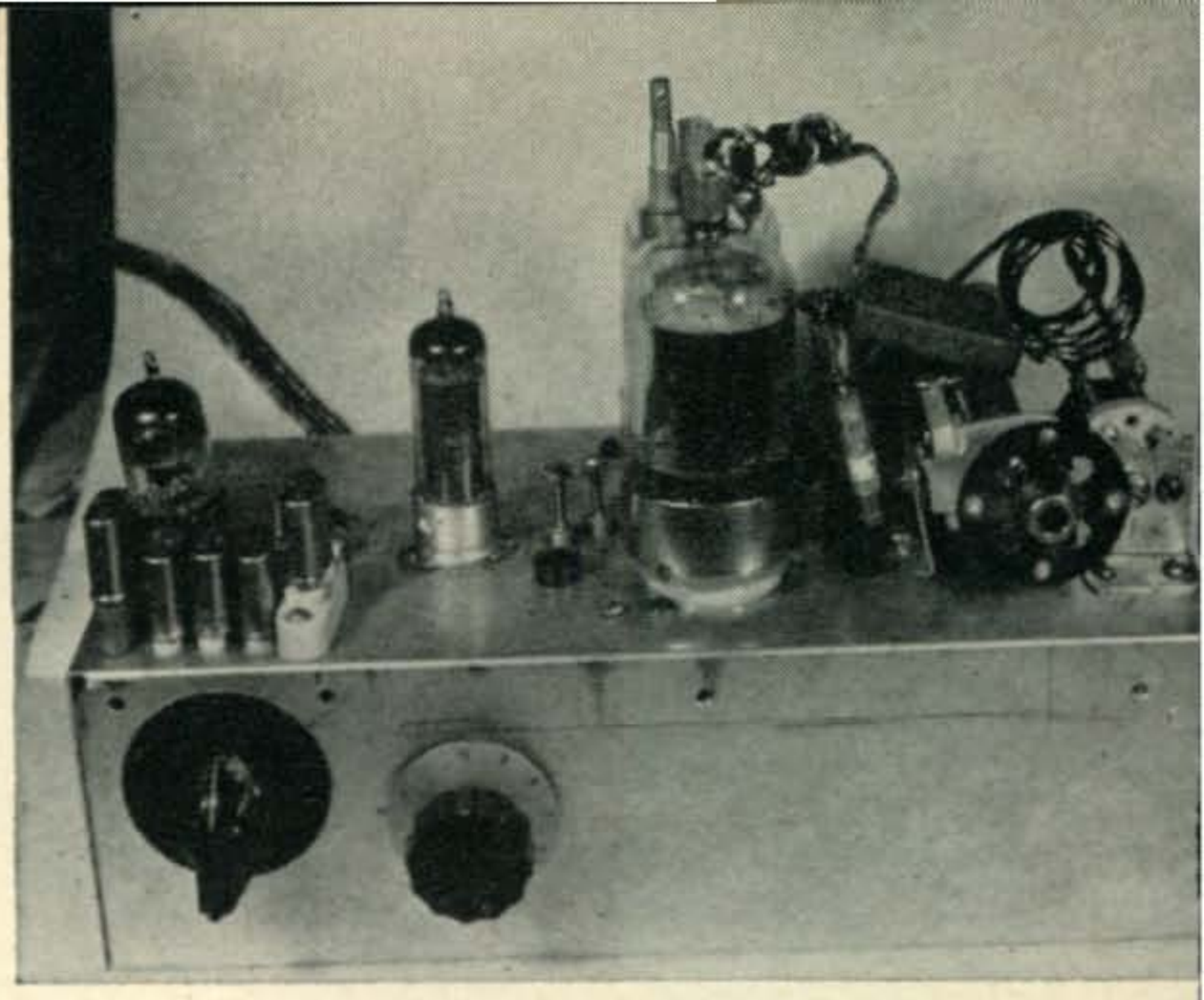
Since in this case it was desired to use the r.f. section with an existing power supply, modulator and metering setup, no power supply or other data of that type is supplied.

To connect this unit to an existing transmitter such as the Viking II, DX-100 or other similar transmitter, without in any way defacing or imparing the performance of the existing transmitter, proceed as follows:

1. If the rear apron of the existing transmitter does not already contain an accessory socket with sufficient pins, install an octal socket at a convenient point on the rear apron and wire it according to the following instructions and the diagram.

2. Break the line feeding 6 volts to the r.f. tube filaments and connect this wire to pin 5 of the octal socket. Connect another wire from pin 6 of the octal socket to the wire feeding the r.f. tube filaments. (A jumper placed between pins 5 and 6 of the octal socket will now return the existing transmitter to normal. Be sure to break the filament lead to the clamp tube of the existing transmitter.

3. Connect a wire from the high voltage line feeding the r.f. final in the existing transmitter to the #8 pin of the octal socket. Obtain this voltage from a point on the final side of the existing transmitter plate current meter or metering point so that final plate current for the 6 meter unit can be read on the existing transmitter plate meter. (For tuneup purposes, the 6 meter unit's final plate current can be read with a 20,000 ohms per volt meter connected across the 10 ohm resistor. Two volts



Front view of the 6 meter transmitter with the top shield removed. The oscillator is on the left with the crystals grouped in front. The oscillator plate and multiplier grid slugs are behind the right crystal. Next is the 5763 doubler-driver, followed by the doubler plate and final grid coil tuning slugs. The neutralizing capacitor may be seen standing vertically between the final tubes, as the alternate neutralizing method described in the text was used in this version (several have been built). The final plate tuning and coupling capacitors are on the right. The front panel controls are crystal selector and drive control.

will indicate 200 ma plate current, 3 volts 300 ma etc.)

4. Connect a wire from the low voltage B supply to pin 7 of the octal socket.

5. Connect a wire from the transmitter keying circuit to pin 4 of the octal socket. (This will enable the 6 meter unit to be keyed through the plug on the existing transmitter.)

The Viking II and some other transmitters already have keying controls, low voltage B plus, filament, etc. brought out to a plug on the rear apron. When adapting the unit to these transmitters the pin numbering arrangement can be juggled to permit using as many of the existing connections as possible.

Switch S_1 is mounted in the 6 meter adapter. Throwing it to the ON position for the 6 meter rig disconnects the r.f. tube filaments in the existing transmitter and applies 6 volt filament power to the 6 meter unit. Throwing the switch to the regular position connects filament voltage to the r.f. tubes in the existing transmitter. In this way actual filament current drawn from the existing transmitter power supply is virtually the same regardless of which unit is in operation and since only the r.f. tubes whose filaments are lit will draw plate power, the existing transmitter power supply will not be overloaded.

The above described method permits using the keying circuit, final plate current metering circuit, modulator, microphone and microphone input, TRANSMIT-RECEIVE switch and antenna relay voltage socket of the existing transmitter. Going from the existing 160 through 10 meter transmitter to the 6 meter unit then becomes a matter of throwing S_1 and waiting for the tube filaments to warm up. Since separate antennas will be used for the 6 meter unit and the regular transmitter, they can be left permanently connected.

If the existing transmitter does not have a keying jack, or if this unit is used with a separate power supply, a key may be connected from pin 4 of the octal power socket to chassis ground and the 6 meter unit keyed in that manner. In this case mount the key jack as close to the octal socket as possible and ground it securely to the chassis in order to take advantage of the harmonic suppression provided by L_1 and the associated capacitors.

Tuning Up

Plug a suitable crystal into a crystal socket and close S_3. Place S_2 in the appropriate position for 8 or 25 mc crystals. Tune the slug in L_6 for a rise in grid voltage as measured with a 20,000 ohms per volt meter at TP_1. Tune the slug L_7 for a further increase in reading at TP_1. Go back and forth over these two adjustments several times as there is some interaction.

Connect a 20,000 ohms per volt meter to TP_2 and tune L_8 and L_9 for maximum grid voltage to the 6146's. The 50,000 ohm drive control should be advanced to maximum at the beginning of this tuning operation. However, since 6146 tubes should not be driven to more than 4 ma per tube, do not let the meter reading exceed 8 volts. Keep reducing the setting of the drive control as the L_8 and L_9 adjustments are made, to hold the grid voltage below the 8 volt level.

With drive applied and running at the 8 volt level but with no plate or screen voltage on the final, slowly tune the final plate capacitor through resonance while watching for a flicker in final grid voltage reading. Carefully adjust the mica trimmer in the final grid circuit a small amount at a time and each time retune the final capacitor through its range until no flicker in grid current occurs at any setting of the final plate capacitor. When this condition has been achieved, the final is correctly neutralized.

The 1,000 ohm metering resistors at TP_1 and TP_2, have been selected so that when read with a 20,000 ohms per volt meter, 1 volt equals 1 ma of grid current. Likewise the 10 ohm resistor in the final was chosen so that 1 volt would equal 100 ma of plate current. Since any error in the values of the resistors will cause a proportionate error in the meter readings, it is suggested that several 1,000 ohm and 10 ohm resistors be checked on an accurate ohm meter and units chosen which are very close to the values specified.

To tune the final reduce the drive to zero, return S_3 to the operate position and apply plate and screen voltage to the final. Slowly advance the drive control until the final plate is drawing 100 ma. Slowly tune the final plate ca-

pacitor for a dip in plate current and then tune the antenna link capacitor for a maximum final plate current reading. If final plate current is being read across the shunt with an external meter, the reading will be the actual plate current input. However, if the final plate meter in the existing transmitter is being read, then approximately 24 ma must be subtracted from the reading obtained to obtain true plate input since the 6146 screens consume approximately 24 ma and this current is also flowing through the meter. If sufficient plate loading cannot be obtained by tuning the link capacitor for maximum, reposition the link closer to the cold end of the final tank and repeat the tuning procedure. Proper loading is 230 ma plate and screen current for phone. On c.w. this can be upped to 300 ma. Needless to say, a 52 ohm antenna should be connected when making all adjustments. In actual operation, use only sufficient drive on the 6146's to obtain full output without downward modulation. Excessive drive is one of the worst causes of TVI. Usual drive will run 5 to 6 ma for both tubes.

Low Pass Filter

The capacitors in the low pass filter are 500 volt units and must be within 2% of the values given. Under no circumstances should the unit be operated into an antenna giving more than a 1½ to 1 s.w.r. as excessive voltage will be developed across the capacitors with consequent filter damage. It is recommended that an s.w.r. bridge or forward and reflected power meter such as the Monimatch Mark II be used to determine s.w.r. at all times. A good match will pay dividends, not only with longer filter life, but also with increased power output.

Measurements taken here with a Bird Through-Line Watt Meter indicate an r.f. power output of 93.8 watts with 135 watts input, an efficiency of 69.5%. This compares with an efficiency of approximately 75% for the Viking II which has a top frequency of 10 meters.

It is suggested that initial tuneup be made using an external meter across the 10 ohm shunt. With the Viking II as the power source, plate voltage will be approximately 670 volts and a plate current reading of 200 ma will equal 134 watts input. Note this reading on the plate current meter of the existing transmitter. Due to screen current requirements also being read in this condition, the plate current reading will be between 224 and 230 ma. Use this as a reference for future tuning with the existing transmitter's plate meter. When excitation is removed, a meter connected across the shunt will show that the plate current has been reduced to a very low value. However, since the clamp tube will then be drawing plate current and since this tube gets its current through the existing transmitter plate current meter, the reading on the existing transmitter's meter will not fall nearly as low as the external meter. When drive is applied, the 6AQ5 is cut off and draws virtually no plate current.

A Few Final Comments

Should you desire to use a fixed capacitor below deck in the 6146 grid circuit and a variable neutralizing capacitor above deck, as shown in the photos, select a 470 mmf ceramic or mica for the grid circuit and a 1 to 10 mmf neutralizing capacitor (tubular preferred for space reasons) with at least a 1500 volt rating for the plate end of the neutralizing circuit.

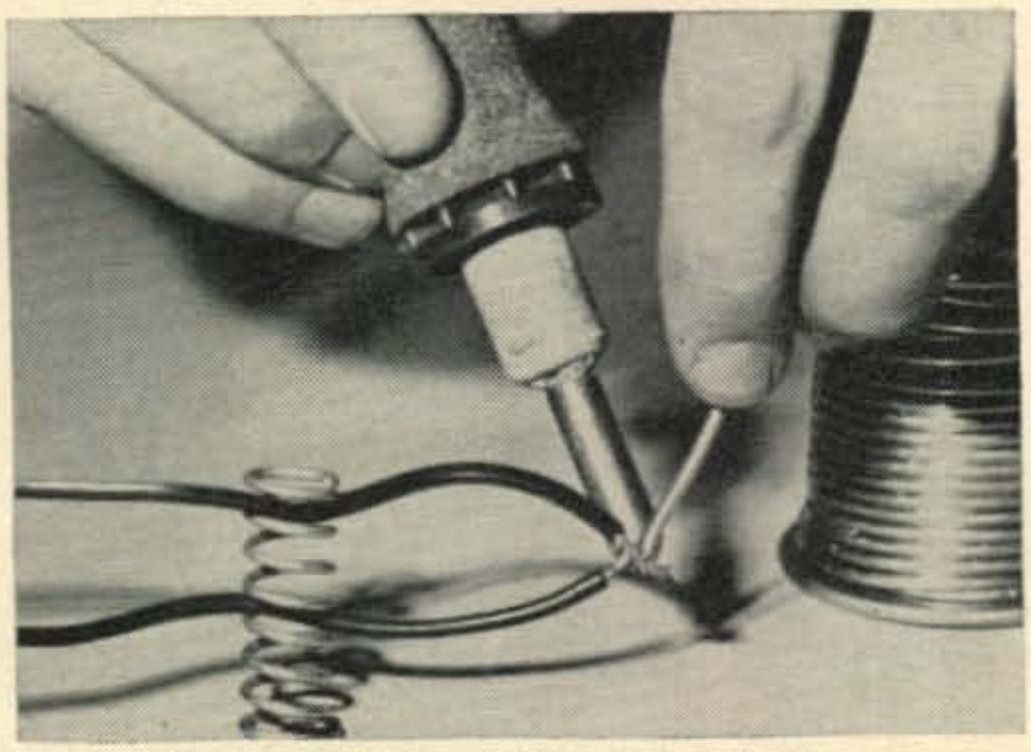
Choke L_4, the 6146 filament choke, is mounted right at the 6146 sockets and the .005 capacitors are grounded with as short leads as possible.

The ground for pin 7 of the 6146 sockets is run with #12 bus bar to the solder lugs under the socket mounting bolts. All other unused pins on the 6146 sockets are likewise grounded with #12 bus bar. (If you have trouble finding bus bar, ordinary #12 electric house wire makes an excellent substitute when the plastic insulation is removed.)

The exciter is capable of generating far more drive than necessary but since the stages fall off in efficiency rapidly on either side of the pass band the excessive drive permits compensation to maintain the required drive over about a 400 kc segment of the 6 meter band.

If you must move about the band and don't like the idea of the bottled up tuning arrangement then you may solder a nut onto the top of L_6, L_7 L_8 and L_9 tuning slugs and run bakelite or polystyrene shafting up through the shield top and place tuning knobs on the shaft ends. Under no conditions should you run metal shafting out through the shield. ■

Ham Hints



Spring Simplifies Soldering

Although ordinarily it is a tough job holding small parts or wires while they are soldered, a coil spring simplifies soldering considerably. Drill a small hole in the bench or a block of wood and insert a coil spring like the one shown. Wedge the work between the spring turns while soldering. Small resistors or capacitors can be held for testing this way, too.

THE SWANS OF ABBOTSBURY

A True Story With A Moral

BY E.M. WAGNER*, G3BID

After you've read this very provocative article we think you'll understand why some of our staff were reluctant to see it in print. It may not solve any problems but it certainly offers interesting debate material for the next club meeting.

DOWN in the West Country of England in one of the little known Counties called Dorset, lies the village of Abbotsbury.

Here, before the Norman Conquest in about the year 1050, during the Reign of Edward the Confessor, Orc, who had been the house-carle to King Canute founded a Monastery from which the village gets its name. Little of the Monastery now remains and today probably Abbotsbury's only claim to fame is the Swannery.

There is a lake about 6-miles long and between one-quarter and one-half mile wide which is fed with fresh water from streams which flow down from the hills. A certain amount of salt water also enters the lake because it is separated from the open sea only by a bank of stones or shingle, known as the "Chesil Bank" through which a certain amount of salt water percolates.

This mixture of slightly salt water is ideal for the growth of a certain weed or grass which is found on the bottom of this lake and which is the preferred food of swans. The swans with their long necks are able to pick this grass or weed from the bottom while cruising around the shallow lake. As a result, a large number of swans inhabit this lake.

We have records showing that this situation existed at least 550 years ago; this large Swannery is mentioned at the time of the dissolution of the Monastery under Henry VIII in 1535. We have every reason to believe that for over 1,000 years large numbers of swans inhabited this lake.

The habits of the swan are interesting. It is monogamous. When a pair has mated, they stay together for life and each year they return to exactly the same area to build their nest and jealously guard this patch against all comers.

But perhaps the most interesting thing about the swans is the way they have maintained their numbers within reasonable limits throughout the centuries. Under normal circumstances, they rarely fall below 600, and they rarely exceed 1,200 or 1,300. These numbers are not maintained within these limits by the depredations of their enemies or by the destruction of the swan by human beings. The swan here has few enemies and the human beings do not kill swans in any large quantities. It would have been reasonable to expect that their numbers would, therefore, have increased steadily but this has not been the case.

When the swans approach 1,000 or 1,200, their breeding habits gradually change, and they are more and more reluctant to breed. They seem to sense that if the numbers increase too far, the over-crowding may bring disease, the breeding of a weaker strain of swans, malnutrition due to inadequate food supplies, and possibly extinction altogether. Thus, whenever the number reaches around 1,000 or 1,200, fewer and fewer swans bother to build nests and breed, and only a small proportion of these bother to hatch out their eggs. When the numbers fall they become very interested in breeding, and take more trouble to hatch their eggs.

During the war owing to the noise and general disturbance due to bombing, etc., the numbers fell abnormally to around 300 but once peace again returned to the area they bred enthusiastically until their numbers again reached figures in the 800-900 neighborhood, when the intensive breeding gradually stopped and the figure again stabilized around one-thousand.

The Monastery, founded before the Norman Conquest, is no more. The Monasteries continued to increase in numbers, size, wealth and power throughout the Middle Ages until they attracted the jealousy of the Crown and Henry VIII dissolved them. Those few which survived suffered at the hands of Cromwell, and today there are few Monasteries in England.

* * * *

AFTER World War II the number of radio amateurs in the world dropped to low levels.

All radio-amateur activity had virtually been abolished during the war. After the war many countries were slow to grant licenses; some countries, for political reasons, were debarred from having amateurs at all. Thus, immediately after the war there were many countries in the world in which amateur radio activity was not yet permitted. Besides this, radio amateurs had died, and the total amateur population had fallen.

There then began an intensive period of breeding.

Clubs were formed, the national associations

[*Continued on page 102*]

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A 10 Meter Mobile Converter

BY J. R. HARRIS, W8HJN

This one tube converter requires only 12 volts for plate, screen and filament and, with a b.c. receiver, will cover 28.5 to 29.7 mc in two segments.

ARE you that type of ham, like me, whose finances and time are limited, but still have the desire to expand your hamming to mobile operation? If so, this converter may be for you. No high B plus voltages, variable tuning capacitor or crystals are required, but still a high level of stability and performance is obtained. Though this converter was specifically designed for 10 meters, the concepts used can be easily applied to any of the other h.f. bands by just changing the tuned circuits.

Circuit Operation

The circuit consists of a heavily coupled tuned antenna input circuit to the converter, with a fixed local oscillator frequency. The plate circuit is untuned allowing the use of the auto radio as a variable i.f. amplifier/receiver, and thus a means of tuning over the band. By using this form of conversion, the stability problem is kept simple (fixed local oscillator), construction effort down (no front panel dial to worry about), and costs are reduced (no variables or i.f. output transformer). Furthermore, the use of a 12AD6 twelve volt space charge tube eliminated the B plus supply without the necessity of resorting to transistors, with their higher costs and design problem difficulties.

Construction is simple and straightforward (see fig. 1). Use of fairly high *C* tuned circuits, sturdy coil construction and short leads augment stable operation. If possible, have the coils ventilated to prevent heat expansion. Isolate the input and output circuits to prevent undesirable direct coupling of broadcast stations. Coaxial cable inputs and outputs are mandatory from this standpoint. Since some auto radios use the input cable to tune the car radio antenna input circuit, it will sometimes be necesary to use a short low capacity output cable and the insertion of C_4 for adjustment of maximum signal strength during converter operation.

Alignment

Alignment of the converter is simple. With the converter off, readjust the auto radio input trimmer (if their is one) for maximum output, using any broadcast station on the high end as a signal. With the converter on and warmed up, adjust C_1 for resonance at 29 mc in the input circuit. With S_2 in the lower band position (A), adjust C_2 to resonate the local oscillator at 30.0 mc. Now with the auto radio tuning from 1500 kc to 1000 kc the band of 28.5—29.0 mc is covered. Now place S_2 in the upper position (B) and adjust C_3 for 30.5 mc. local oscillator operation. Tuning the car radio from 1500—800 kc will now give operation from 29.0—29.7 mc. The signal can be peaked up by adjusting C_4 (if used) for maximum signal strength. If the radio does not have an input trimmer, C_4 may not be necessary.

It might be wondered why a high side local oscillator frequency was chosen, causing "backward" tuning of the car radio. It was picked here to keep the image problem to a minimum. If a low side local oscillator frequency had been used, possible images from the Citizen Band would result. For converter operation on any other h.f. band, it is feasible to use low side local oscillator operation with the frequency chosen so that the car receiver reading is suggestive of the ham band frequencies. For example: to tune 75 meters, setting the oscillator on 3.0 mc will permit 800—1000 kc to correspond to tuning 3.8— 4.0 mc. Of course, there are other local oscillator and i.f. frequency choices that could be made. This could be done to use a portion of the broadcast band where no interfering broadcast signals are heard. ■

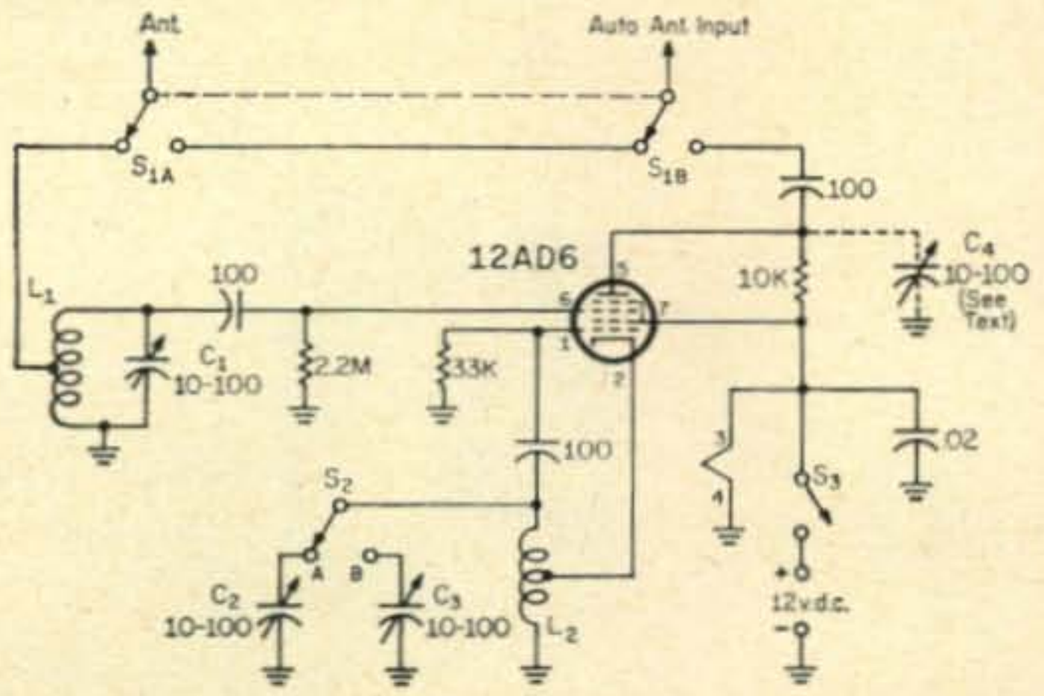

Fig. 1—Circuit of a converter for 12 volt operation that will permit a broadcast car radio to tune 10 meters in two segments, 28.5—29 and 29—29.7 mc. All capacitors are in mmf unless otherwise noted and all resistors are ½ watt. Inductors L_1 and L_2 are both 5 turns of #16 wire, ⅝" diameter, space wound ¾" long and tapped two turns up from ground.

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The Simplest and Cheapest Rig

BY DAVID T. GEISER*, WA2ANU

Here is a simple one tube c.w. rig that will operate with any pentode. It can put out from ¼ to 8 watts and is TVI free. While designed for 40 and 80 meter Novice operation, it offers a simple method of trying out 160 as well.

ANYONE who begins an article with a title like this had better be able to prove his point. I know that in my experience the title is true, and on top of everything else, it is the least critical and smoothest-operating rig I've ever used. The power output is modest, ranging from ¼ to 8 watts, but I have worked over 400 miles with that quarter of a watt. Here's how to make the rig:

The Circuit

The circuit (fig. 1) does look unusual—the best name I can figure out for it is the "Resistance-coupled Pierce" oscillator. Throw in the words "electron-coupled" also if you wish, for it is. The cathode, control grid, and screen grid make a crystal oscillator, and the electrons that slip by the screen hit the plate, amplifier style.

The extreme effort at cost reduction meant that the costly parts had to be removed—no fixed mica capacitors, no air variable capacitors, no r.f. chokes. Power and the transmitter tube had to be "stolen" from other equipment. Yet operation had to be fool-proof and TVI-free. All these objectives were met.

Oscillator feedback paths are made of composition resistors. The feedback and bypass capacitors are intended to look like short circuits on the operating frequency and, in combination with the resistors, discourage TVI harmonics. Link coupling is used—it's cheapest and feeds a low quarter-wave antenna pretty well, though an antenna tuner would help if a good 50 ohm or higher impedance antenna is used. A good

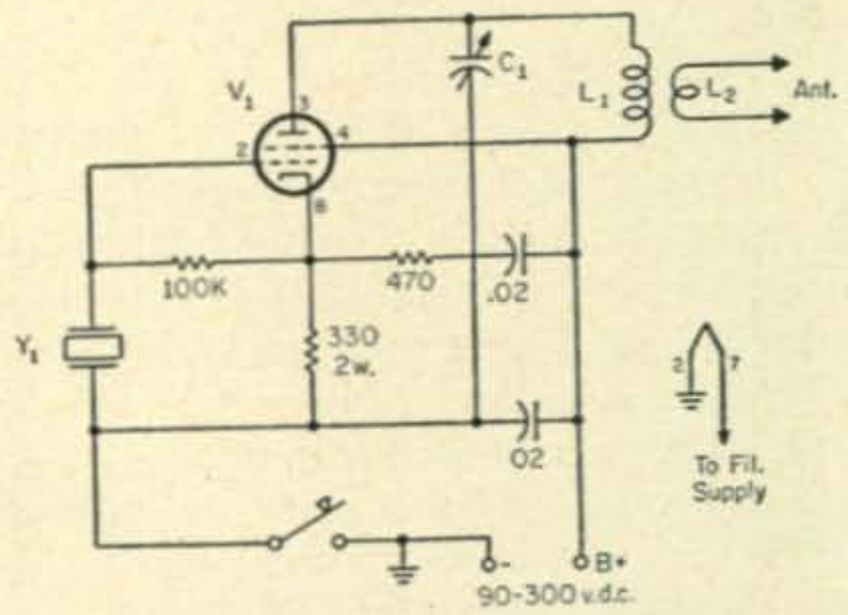


Fig. 1—Circuit of a simple one tube rig. The tube may be a 6F6, 6K6, 6V6 6Y6, 6L6, 25L6, 35L6, 50L6, 12A6, etc. The basing is the same for all these tubes but the filament voltage requirements may differ. All capacitors are in mf and all resistors are ½ watt unless otherwise noted.

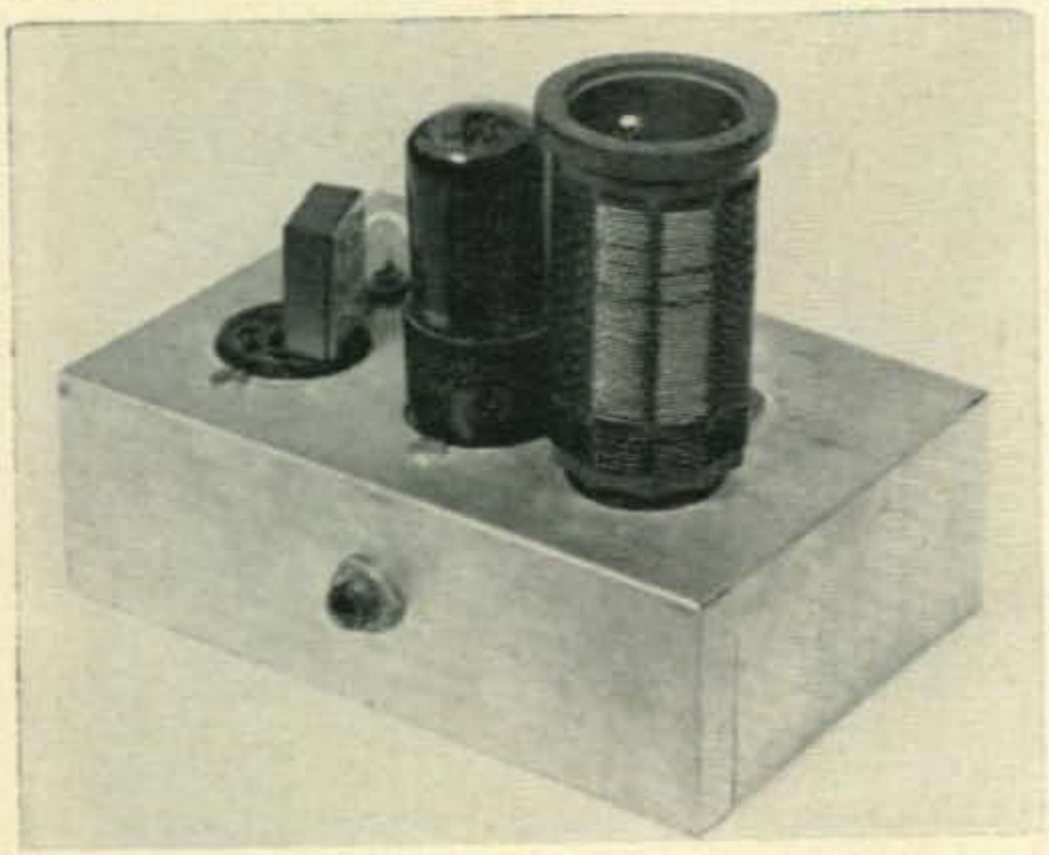
C_1— 60-300 mmf compression trimmer, El-Menco 303-M.
L_1— 40 M—11t # 18, 1¼"d., 1¼" long.
80 M—18t # 18, 1½"d., 1½" long.
160 M—33t # 24, 1½"d., 1½" long.
L_2— 40 M— 3t # 18, 1¼"d., closewound.
80 M— 4t # 18, 1½"d., closewound.
160 M— 8t # 18, 1½"d., closewound.
Y_1—See text.

mica padder capacitor is used for plate tuning, being a few cents less than a purchased broadcast tuning capacitor (which of course could be used.)

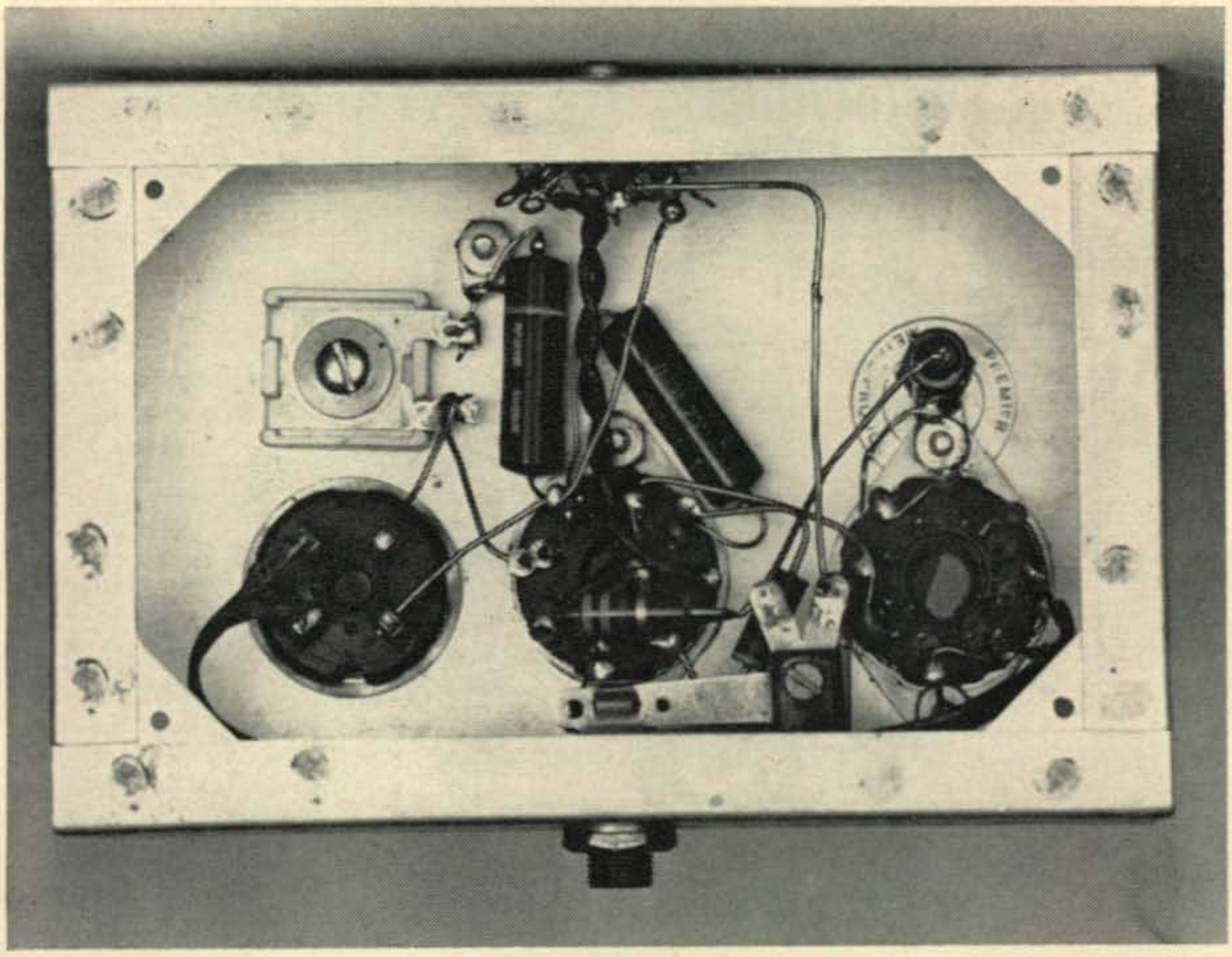
Stealing tubes is easy. Without *any* change in wiring, the 6F6, 6K6, 6V6, 6L6, 12A6, 12V6, 25L6, 35L6, and 50L6 work fine. With this variety of tubes to choose from, it should be easy to find an un-needed piece of equipment from which to borrow one. While you are at it, you had just as well take the equipment—after all, the socket from which you removed the tube did have the proper filament and B+ voltages available—take an old octal tube base and wire a power cord into the socket.This way, after you have removed the tube to plug into the transmitter, you can take the power from the robbed socket. (This trick is a shameless steal from *QST* and several editions of various ARRL books.) One hint: take the B+ from the screen supply as an inductive output transformer may mess up your keying. Also, the plate supply voltage may be too high for the transmitter screen.

One common question (there have been dozens of these transmitters built by beginners) is "What B+ voltage *do* you need?" Generally the range I recommend is 90 to 150 volts for the 25, 35, and 50 (filament) volt tubes, 90 to 250 volts for the others, with possibly a 300 volt maximum for the 6L6 (but that's pushing.) This brings up

*Light Military Electronics Dept., General Electric Co., Utica, N.Y.



Top view of the simple transmitter. The pilot light used for tuning may be seen just behind the crystal on the left.



Bottom view of the inexpensive transmitter showing the minimum number of parts used. The compression trimmer tunes the plate tank circuit. Although the model pictured above uses chassis grounds throughout, the floating ground shown in fig. 1 provides greater protection against shocks from the key.

the other question: "Can G, GT, GA, GB, or GC versions of these tubes be used?" I've tried them all, and they all work.

There is one danger in stealing the voltage from an a.c.-d.c. broadcast receiver or record player. Both sides of the key are hot. The elegant way to eliminate this danger is to connect the receiver to the line through a forty-watt isolation transformer. That costs money. I put the *whole* key inside of two plastic laundry bags, one over the other. Replace them at the least sign of wear, and inspect them often. Use a keying relay if you aren't a very careful person.

The layout is not critical. A chassis is not even necessary, though I like to mount the parts on a frame of some sort. I also like to use short leads, for this generally helps performance in any equipment and discourages TVI.

Special Tricks

Most hams know that the usual FT-243 crystal holder will fit in the ordinary octal socket; few realize that *two* of the crystal holders will fit in the same socket at the same time. Thus if you have a holder with a defective crystal, you can make from it a connector for your antenna and ground and use one half of an octal socket for the crystal, the other half for the antenna and ground connector. Should the ham not have an unused crystal holder, an old-fashioned Moseley TV lead-in connector (male) will do the job even better.

A major transmitter expense is in the current indicator used for transmitter tuning. A #49 pilot lamp lights to full brillance on 60 ma. If a little cylinder of black paper is slipped over the lamp (end open) a dull glow can still be seen at 20 ma. When tuning, resonance is indicated by lamp dimming. Loading is shown by increased brightness. The lamp is good for all tubes but the 6L6 and good there if a 33 ohm ½ watt resistor parallels it. If connections are soldered to the lamp base with stiff wire there is no need for a lamp socket.

Other Bands

While the transmitter was basically designed for 40 meters, it also works well with different coils on 160 and 80 meters. Keying and power output are just as good, though of course the distances of the average contact are less. The prime requirement for the coils for the other bands is that they have enough turns to be resonant with the tuning capacitor near maximum capacitance. The link should have ¼ to 1/3 as many turns as the plate coil, the actual number of turns and link position depending on what is necessary to load the users antenna.

For some reason the oscillator does a pretty good job tripling the crystal frequency. Thus, if the transmitter is made with plug-in coils, make sure the 40 meter coil is *not* plugged in when using an 80 meter crystal.

Acknowledgement

This circuit development was made while in the employ of Sprague Electric Company, North Adams, Mass. Their permission to publish is gratefully acknowledged. ■

CQ Reviews:

The Hallicrafters SR-150 Transceiver

ONE of the finest additions to the Hallicrafter's Line is the SR-150 Transceiver. This is an all-band affair, 80 through 10, designed for upper or lower s.s.b. or c.w. operation as a fixed station or a mobile unit.

It is a high quality piece of gear, embodying advanced design features which result in a high degree of performance and convenience. Construction is rugged and very attractive. It weighs only 17¾ pounds and is reasonably small in size —6½" × 15" × 13". The power supply speaker weighs 25 pounds.

A.C. operation is by means of the PS-150-120 power supply which includes a built-in speaker. A 12-volt supply, the PS-150-12, is available for mobile use together with a special mobile mounting rack, MR-150, which may be permanently mounted and folded out of the way when not in use. It allows rapid plug-in type transceiver installation.

Circuitry

The SR-150 utilizes 19 tubes with a dual conversion i.f. system, one of these being a tunable i.f. arrangement. Figure 1 is a block diagram showing the receiver and transmitter lineups separately in simplified form which can be followed without further explanation. Stages marked with an asterisk are common to both the receiver and transmitter.

Note that separate carrier oscillators, V_{10A} and V_{10B}, are used for each sideband instead of the usual system of switching crystals in one oscillator. This eliminates the need for running critical r.f. circuits to the sideband selector switch since the oscillators may be switched in their d.c. cathode circuits. The v.f.o. frequency also must be shifted for sideband selection. This is likewise done with a d.c. circuit which operates a diode switch controlling the insertion of the necessary frequency-shifting padder. This is described in fig. 2.

Regarding the transmitter section, the 12DQ6 B's are driven to a peak-power input of 150 watts. The output circuit consists of a pi-network fixed for an output impedance of 50 ohms.

Automatic Audio-Level Control (a.a.l.c.) is provided to prevent excessive flat topping of the output signals. This is accomplished as follows: An a.f. signal appears on the bias line of the final amplifier just as soon as overloading commences. This a.f. is amplified by a triode and rectified by a pair of diodes. The resulting d.c. potential is applied to the 6 mc i.f. and the first 1650 kc amplifier as a control bias to reduce the overall gain as needed for the minimization of flat topping.

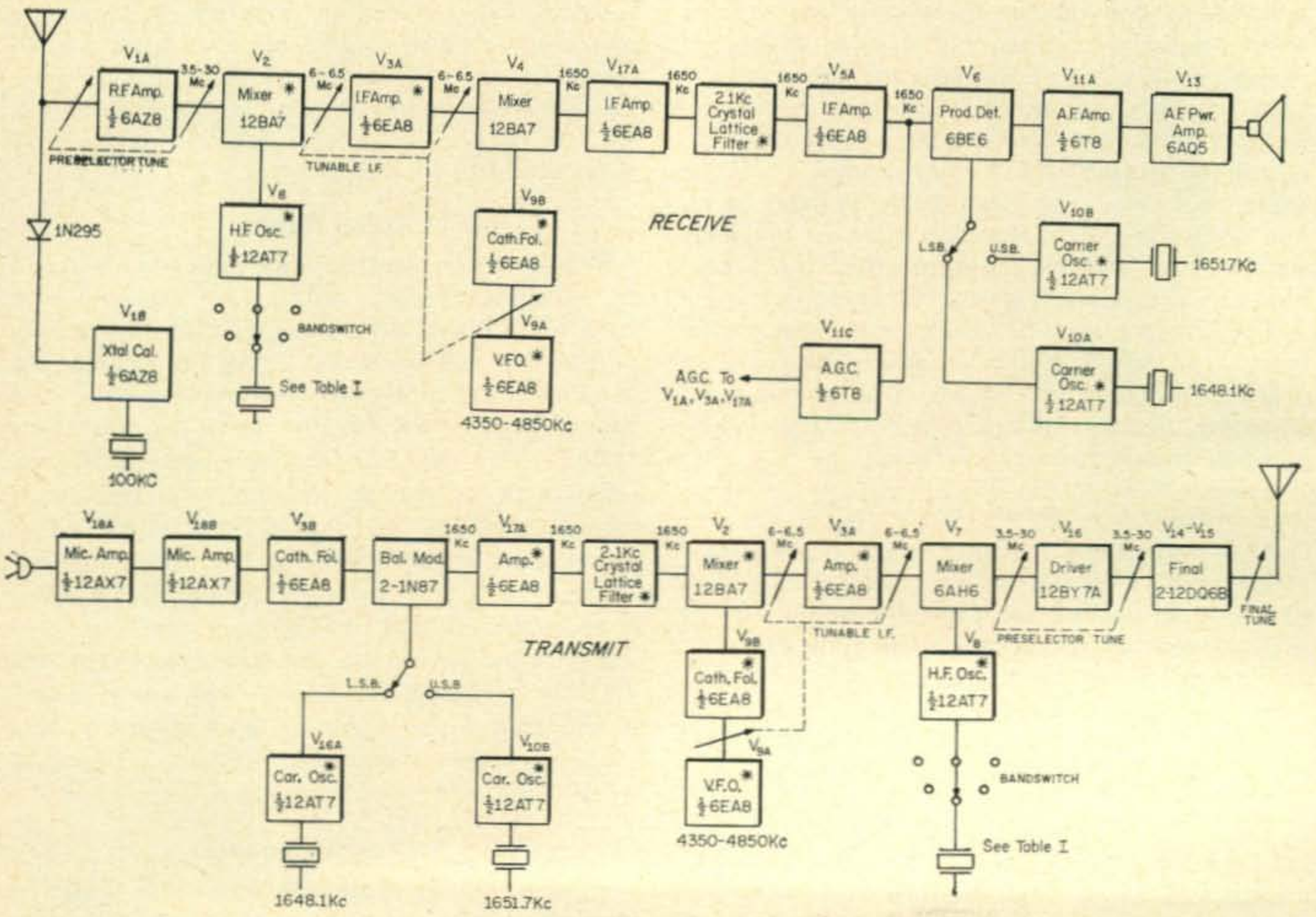
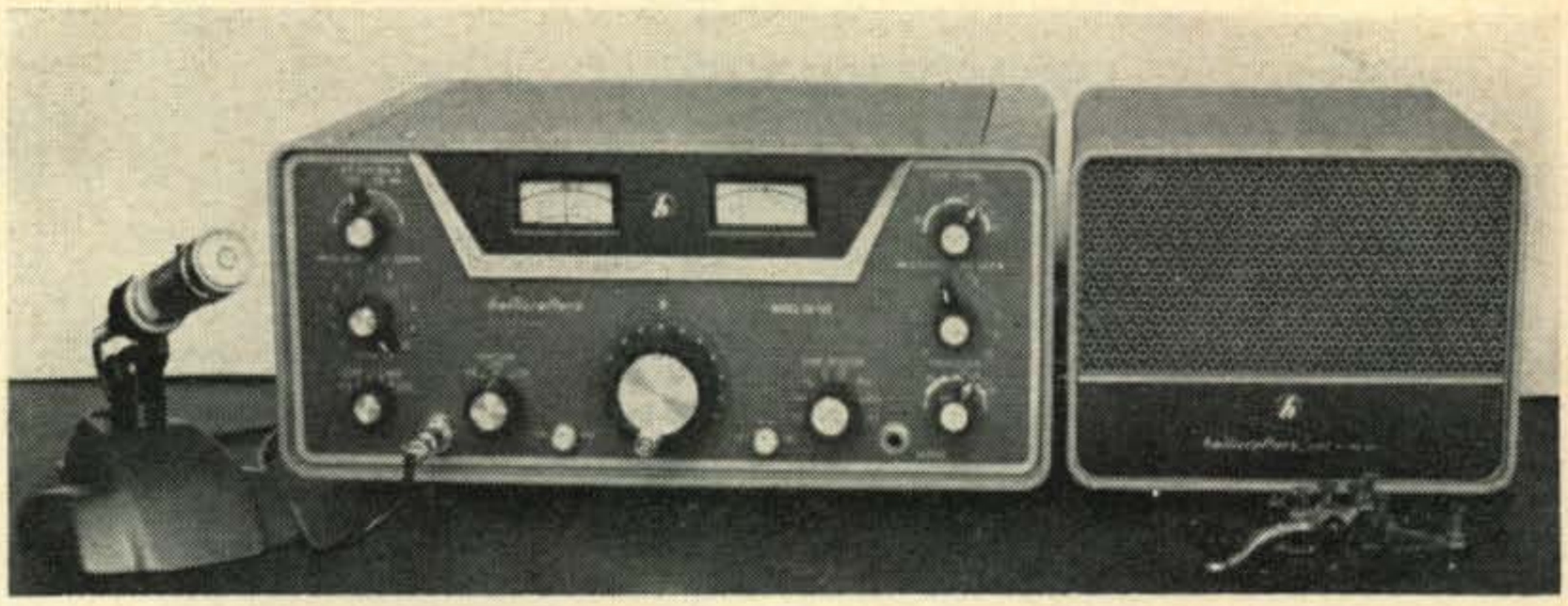


Fig. 1—Functional block diagrams of the SR-150 transceiver. Receiver and transmitter functions are shown separately. Circuit elements marked (*) are used on both transmit and receive. Vox and a.a.l.c. circuits are not shown.



The Hallicrafters Model SR-150 Transceiver and PS-150-120 matching a.c. power supply with built-in speaker. The addition of a mike, key and antenna provide a complete s.s.b. and c.w. station.

It will be of interest to note that diode switching also is employed for part of the changeover functions between receive and transmit. This is one of the few cases where such use of the diode switch has been found in amateur equipment. This is explained in fig. 3.

Metering

A triode is used in a v.t.v.m. circuit which reads the a.g.c. voltage during receive, for which the meter is calibrated in S-units. The setting of the r.f. gain control does not affect the meter zero and relative readings still may be had when the r.f. gain is lowered. During transmit, readings are obtained from a diode rectifier coupled to the output. The meter then gives relative output-power readings useful for tuning up and monitoring.

Crystal Calibrator

The output of the crystal calibrator is fed through a diode to provide strong harmonics up through 30 mc. Instead of mechanically aligning the dial scale with the hairline for calibration, a CALIBRATION ADJUST control is provided which varies the d.c. control bias on a Varicap diode padder to bring the v.f.o. frequency in line, as described in fig. 2. This allows the indicator to always be set at the center of the dial window.

Table I—H.F. Oscillator Crystal Frequencies

Band *(mc)*	**Crystal Frequency** *(mc)*
3.5 - 4.0	10.0
7.0 - 7.5	13.5
14.0 - 14.5	20.5
21.0 - 21.5	27.5
28.0 - 28.5	34.5
28.5 - 29.0	35.0
29.0 - 29.5	35.5
29.5 - 30.0	36.0

Receiver Incremental Tuning

One of the special features of the SR-150 is Receiver Incremental Tuning (RIT). This permits the receiver to be independently tuned over a range of ± 2 kc either side of the transmitter frequency without affecting the latter. Thus, if a QSO is being conducted on zero beat with another station, and if a second station breaks in slightly off frequency, the RIT may be switched on to tune in the latter without throwing the transmitter off the frequency of the first station. When the latter transmits, the only need is to throw off the RIT switch, and the receiver is again tuned to the first station. See fig. 2.

The RIT also is indispensable on c.w. as it allows the transmitter to be tuned and left at zero

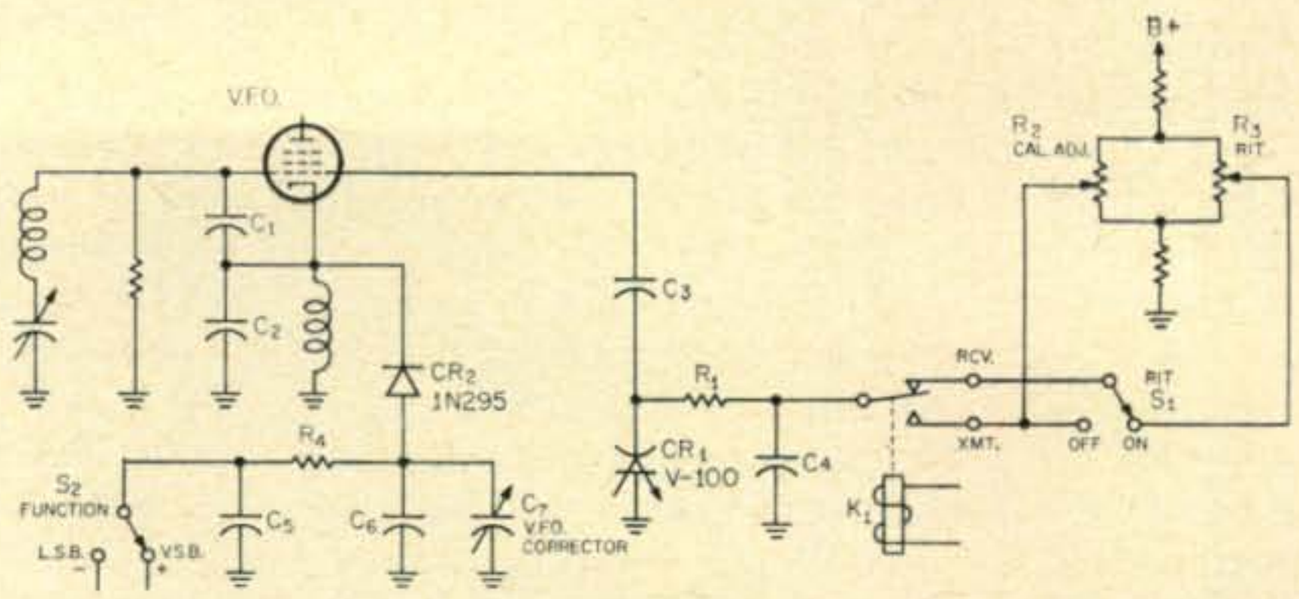


Fig. 2—Diode switching and varicap diode circuitry in connection with v.f.o. for sideband selection, calibration adjustment and RIT.

Diode CR_2 functions as a diode switch between the v.f.o. correctors, C_6 and C_7, and the high side of the v.f.o. capacitor C_2. When the function switch, S_2, is set for upper sideband, a positive potential is applied to the anode of CR_2 which then conducts and thereby places C_6 and C_7 across C_2, shifting the v.f.o. frequency as needed. When S_2 is set for lower sideband, a negative potential is applied as back bias to CR_2, making the latter non-conductive, thereby disconnecting C_6 and C_7 from C_2. This increases the frequency to its normal state as set up for l.s.b. use.

Diode CR_1 is a type V-100 Varicap which is connected in series with C_3 across the tuned circuit of the v.f.o. When RIT switch, S_1 is at the OFF position, a variable d.c. positive potential is applied to CR_1 from the CALIBRATION ADJUST control, R_2, through either the RECEIVE or TRANSMIT position of K_1. This potential determines the capacitance of CR_1 and thus the v.f.o. frequency for aligning the dial readings with the calibrator frequencies. R_1 and C_4 provide r.f. isolation of the control circuits.

When the RIT is engaged with S_1 at the ON position, the arm of R_2 is switched out and that of the RIT control, R_3, is connected instead to CR_1 through the receiver position only, of K_1. This provides a separate variable control potential for changing the capacitance of CR_1 and tuning the v.f.o. for reception.

When K_1 is in the transmit position, R_3 is disconnected and R_2 is back in service, restoring the transmitter frequency to its original state and thus making tuning of the receiver and transmitter independent of one another within the specified range.

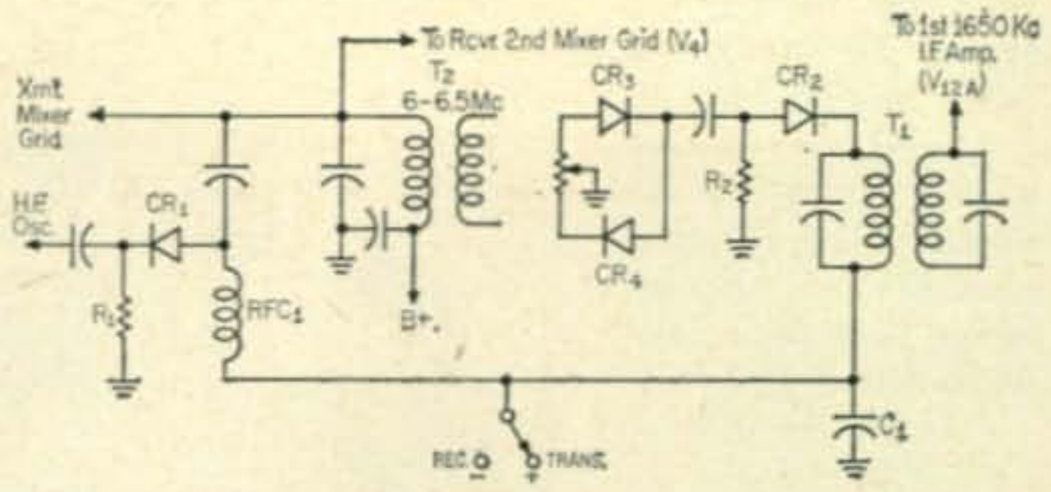


Fig. 3—Changeover diode switching circuits. The d.c. control circuitry is shown in simplified form for ease of explanation. CR_1 and CR_2 (1N295's) are the diode switches. When S_1 is in the *transmit* position, the anodes of the diodes are at a positive potential with respect to their cathodes and the diodes conduct. CR_1 then feeds r.f. from the crystal-controlled h.f. oscillator to the transmitter mixer grid, the tuned circuit of which is used for both receive and transmit. CR_2 feeds the r.f. from the balanced modulator, consisting of CR_3 and is also used bilaterally. CR_4, to T_1 and then to the first 1650 kc amplifier which

When S_1 is in the RECEIVE position, the anodes of the diodes are negative with respect to their cathodes and there is no conduction through the diodes. Thus the unwanted h.f. and 1650 kc oscillator signals cannot pass through the receiving channels, nor will they leak through the switching control circuits as might otherwise be experienced if a mechanical switch were used. In this connection, RFC_1 and C_1 prevent r.f. from appearing on the d.c. control circuits. R_1 and R_2 provide the necessary d.c. return path for the diodes.

beat with the received c.w. signal, while allowing the receiver to be tuned slightly off frequency to obtain an audible beat. In practice the RIT was found to be a most useful feature which actually is handier in use than appears on paper.

Panel Controls

The panel controls are conveniently arranged with the R.F. and A.F. GAIN combined on concentric shafts as are the R.F. LEVEL and MIC GAIN as well as the RIT and its ON-OFF switch, Other controls are: OPERATION (Off, Stdby., mox, vox), FUNCTION (c.w., u.s.b., l.s.b.), BAND SELECTOR, PRESELECTOR, FINAL TUNE, CALIBRATE ADJUST and CALIBRATOR ON-OFF. The front panel also includes a phone jack and a two-way screw-on type mike connector. A keying jack is located on the rear apron together with a 500-ohm output jack.

An additional feature is the inclusion of *two* antenna connectors, one of which is used for transceiver service with a common antenna. The other may be employed when separate receiving and transmitting antennas are used, or to avoid additional switches or relays when a linear amplifier is used.

Performance and Operation

Tuning the receiver is a simple procedure of selecting the desired band, the proper function, advancing the r.f. and a.f. controls and peaking up the r.f. circuits by means of the preselector control which is calibrated for each band.

The receiver sensitivity was found to be better than the manufacturer's specification of 1 μv for 20 db s./n. ratio. An input of 250 to 800 microvolts results in S-9 meter readings, depending on the band used. S-meter calibration was found to be extremely close to 6 db per S-unit up to 9, but above this point the calibrations equalled 5 db per step rather than the indicated 10 db. For example: a 10 db over S-9 signal reads 20 db over on the meter.

The main dial calibrations are in 5 kc increments on two 500 kc scales with each division on the vernier dial equal to approximately 1 kc. The latter varies somewhat over different sections of the range. Tuning is exceptionally smooth without backlash, making s.s.b. operation a pleasure. The 5 kc dial calibrations are quite near the top of the dial window, making observations a bit difficult unless one crouches down, so it may be desirable to tilt the unit slightly upward. This is of special concern with mobile installations.

Sideband suppression is better than experienced with most receivers and the overall a.f. quality is pleasant. The former was found to be —50 db at 500 c.p.s. A.v.c. action is smooth with little evidence of annoying pumping. A warm-up period of 15 to 30 minutes, depending on the prevailing ambient temperature, was required before frequency stability of 100 cycles or less was achieved. Mechanically the SR-150 is very rugged. Bouncing it up and down on the bench produced no deteriorating effects on the frequency nor were microphonics indicated.

No noise limiter is provided. This is a disappointing aspect where mobile operation is concerned, but it might be pointed out that the SR-150 is not alone in this respect. For some reason, manufacturers have skipped over this necessity in transceivers which are designed to include mobile service. It cannot be that a good noise limiter is not available. Take for example the IFNL[1], which we have used in a mobile installation for many years with exceptionally gratifying results.

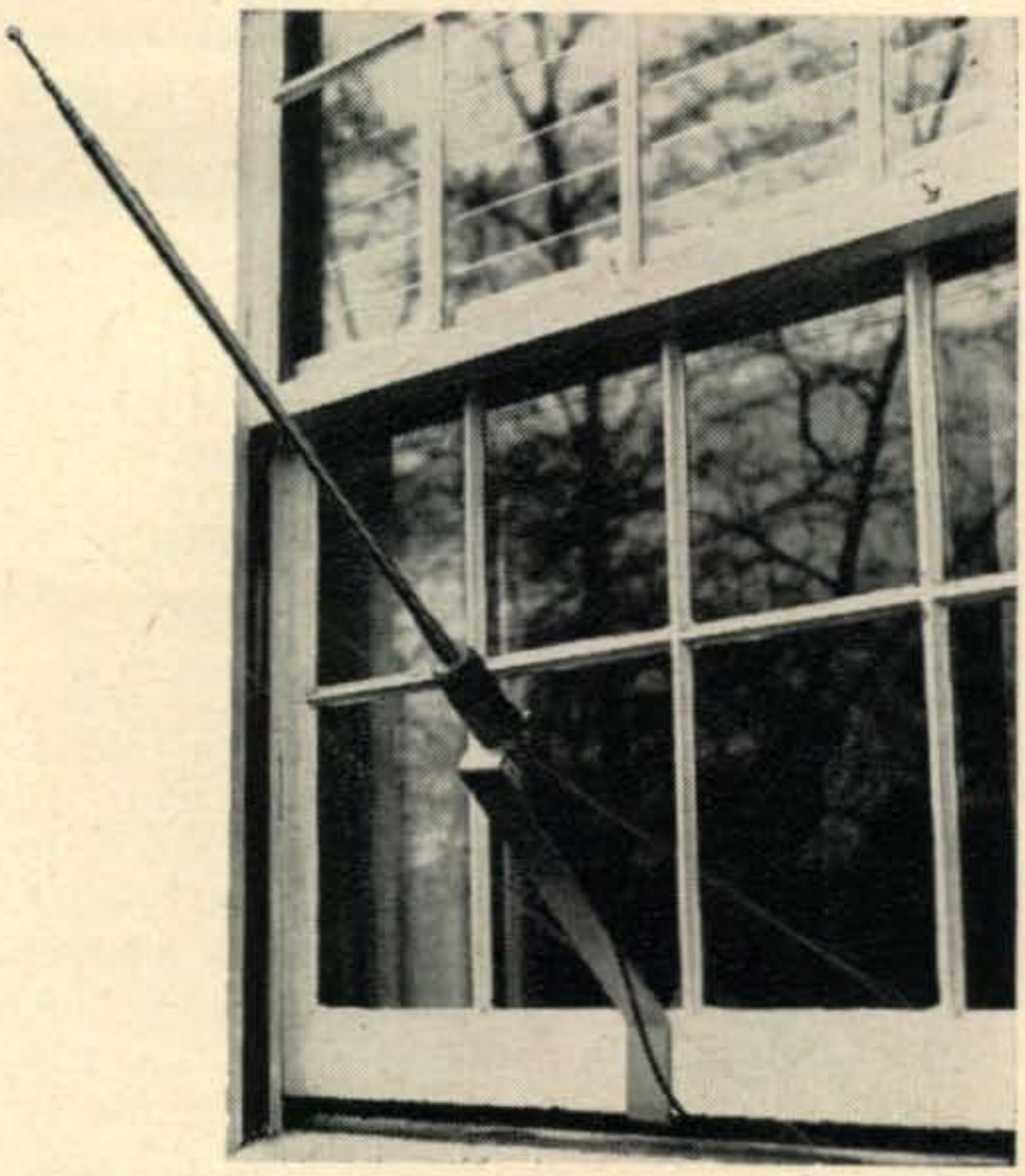
Transmitter Performance and Operation

Tuning the transmitter involves placing the FUNCTION switch on c.w., advancing the R.F. LEVEL control and adjusting the PRESELECTOR and FINAL TUNE while observing the output meter for proper peaking and maximum output. The FUNCTION switch then is set for the desired sideband (or c.w.), the OPERATION switch for either manual or v.o.x. and the MIC GAIN adjusted as needed. The latter is not critical since the a.a.l.c. will take care of excessive level. It was found that a slight degree of flat topping does occur just at the point at which the a.a.l.c. takes hold, but it is a relatively small amount.

The measured peak-output power was 95 watts on 80, 40 and 20, 80 w. on 15 and 70 w. on 10. Two-tone test patterns at these levels indicated excellent linearity. No signs of amplifier instability were experienced. The 12DQ6 final amplifier tubes are operated within safe ratings, so

[*Continued on page 108*]

[1]Scherer, W. M., "IFNL, An SSB IF Noise Limiter," *CQ*, Apr. '60, p. 42.



The DPZ Vacationer Antenna shown mounted on a window. It uses a retractable whip (shown fully collapsed) at the base of which is a loading coil slipped over an insulator connected to the top of a mounting bracket which is fastened to the window frame with a thumbscrew-type clamp. A short counterpoise (not shown) runs from the bracket along the floor indoors. The arrangement also may be used on a porch rail, boat, *etc.* It covers the 2- to 20-meter bands, and disassembled, fits into a brief case.

CQ Reviews:

The DPZ Vacationer Antenna System

THE DPZ Vacationer Antenna System is just the ticket for the ham who is vacationing or travelling and, at the same time, wishes to do some operating on any band from 2 through 20 meters. It was developed out of the need for a highly effective antenna which is truly portable, lightweight, simple and which requires a minimum of carrying space.

The arrangement consists of a 57-inch retractable whip which is screwed on to a special base insulator mounted on a substantial bracket made of anodized aluminum ¼" × 1½" × 12". The bottom end of the bracket is bent in the form of a U, and together with a thumbscrew-type fastener makes it possible to secure the antenna to the frame or sill of a window, or to the rail of a porch or fence. With this mounting the antenna is positioned at a 45° angle. It also may be mounted vertically, where circumstances so permit, by means of a separate bracket and C-clamp which are supplied at slight extra cost.

A counterpoise-type ground system is included and consists of 15 feet of insulated wire which is clipped on to the bracket. For 2 and 6 meters, a shortening bar is screwed on across the base insulator and connects the whip section directly to the inner conductor of 10 feet of 52-ohm coaxial line. The outer conductor is connected to the bracket.

For use on 10, 15 and 20 meters, one of three furnished loading coils is easily installed on the base insulator in place of the shorting bar.

Installation and Operation

Complete instructions are furnished for installation and adjustment. In this regard, after the correct loading coil, or the shorting bar, has been installed and with the whip adjusted to a specified length, the antenna should be clamped to the frame or sill of a window. One precaution, in this respect, is that mounting should not be made on a metal surface. If such a situation occurs, a piece of wood or masonite board should be used as an insulator. This may be clamped to the metal surface with a C-clamp, and the antenna then attached to the board.

The counterpoise is clipped to the base bracket and is laid on the floor or ground in a direction away from and in line with the antenna, while the coaxial line is run off at a right angle.

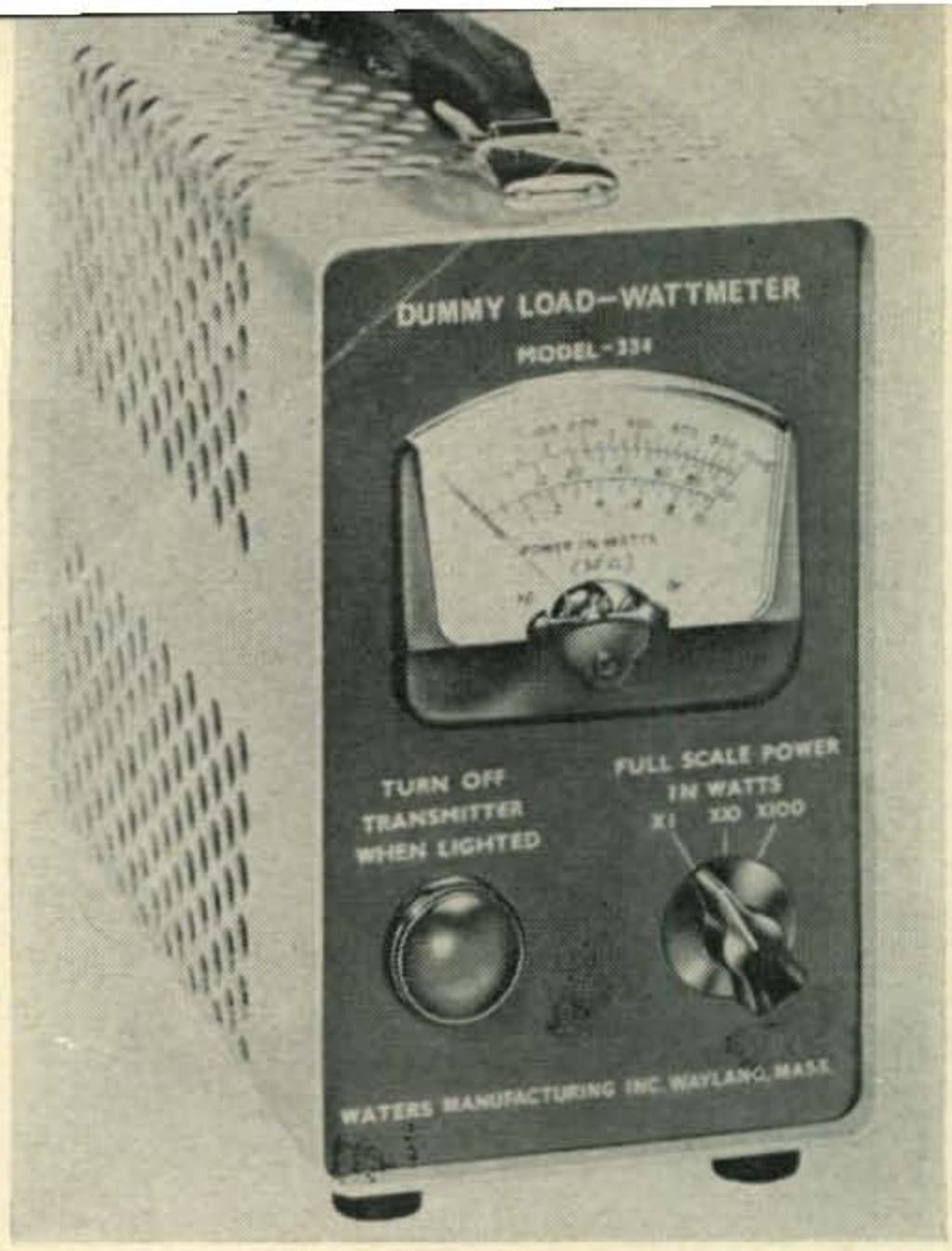
Specified lengths for the counterpoise are given for each band. These are approximate, since requirements can vary for various locations; however, they were found to be close enough to afford good operation in most cases. In the event one wishes to optimize the setup, a reflectometer-type s.w.r. meter inserted in the coaxial line, will be helpful toward adjusting the counterpoise for minimum s.w.r. which will turn out to be between 1 to 1 and 2 to 1.

The DPZ Vacationer Antenna System loads up very nicely and yields plenty of r.f. "soup," as may be evidenced by healthy r.f. sparks when the end of the counterpoise or whip is lightly touched with a lead pencil. Good contacts throughout the West and South have been made with it at a poor location in the heart of New York City. Others have reported excellent results, including DX contacts, from more favorable sites.

The weight of the DPZ Antenna is less than 4 lbs, yet it is rugged and when disassembled, it will fit in a brief case or KWM-2 portable case.

"Have antenna, will travel with transceiver," should be the trend afforded by the Vacationer Antenna System. It is priced at $22.50 and is marketed by the DPZ Corp., Inc., 30 Broad St., New York 4, N. Y.—*W2AEF*.

Waters Model 334 Dummy Load-Wattmeter. An attractive instrument which provides a non-reactive load and at the same time indicates r.f. power over a wide range of frequencies.



CQ Reviews:

The Waters Model 334 Dummy Load-Wattmeter

A NUMBER of low cost dummy loads are commercially available, but the Waters Model 334 Dummy Load-Wattmeter is one which also includes a built-in r.f. wattmeter to enable the user to directly read the actual power output of a transmitter (up to 1000 watts). Other arrangements used by the amateur are often inaccurate or necessitate hooking up several pieces of equipment whenever measurements are to be made. The Waters device does away with these difficulties.

The usefulness of a dummy load itself has been covered from time to time, but it might be well to mention that it provides an artificial load which may be used in place of an antenna when testing, tuning up or checking the loading characteristics of a transmitter, without actually putting a signal on the air (as required by Sec. 12.160) which might otherwise cause interference. Such devices as lamp bulbs often are used, but due to their inherently high reactance, little factual or accurate information can be gained from their use.

The Waters Model 334 provides a non-reactive shielded load of 52 ohms over a frequency range of 0 to 230 mc. It will handle up to 1000 watts for a time period depending on the power level. The load element is immersed in a controlled-dielectric cooling oil which is contained in an inner case with a special hermetically sealed SO-239 coaxial connector which mates with a PL-259. In the event the inner case temperature rises above 220° F, which will occur after 5 to 7 minutes of operation at 1000 watts, a thermal switch turns on a panel-mounted warning light which derives its power from the r.f. source (see fig. 1). An advantage of this arrangement, over that in other devices which simply provide a vent, is that there is no chance of oil seepage or spillage and it provides a warning of overheating the load element.

Power readings are indicated on a meter which has three separately calibrated scales for power ranges of 0-10, 0-100 and 0-1000 watts. These are selected by a switch. Circuitry for the wattmeter is shown at fig. 1.

On the rear of the instrument is an inspection stamp where a numeral is written followed by the letter "W". This is the reading in watts on the 100-watt scale which should be obtained when a 60-cycle a.c. potential of 120 volts r.m.s. is applied to the unit. This will enable the user to check the accuracy of the wattmeter in the event it is deemed necessary.

The entire Dummy Load-Wattmeter is one integral unit mounted in a perforated steel case equipped with a top-mounted carrying handle. It is attractively designed and finished in two shades of gray with black meter case and selector switch with white panel lettering. Its size is 4¾" w. × 9" h. × 10¼" d., requiring little space either in use or storage. Weight is 12 lbs.

Performance and Operation

Since the dummy-load impedance is 52 ohms, it should be connected to the transmitter with coaxial cable of the same value. As the instrument is a power absorbing device, it can become quite hot during operation, and some of the heat

[*Continued on page 109*]

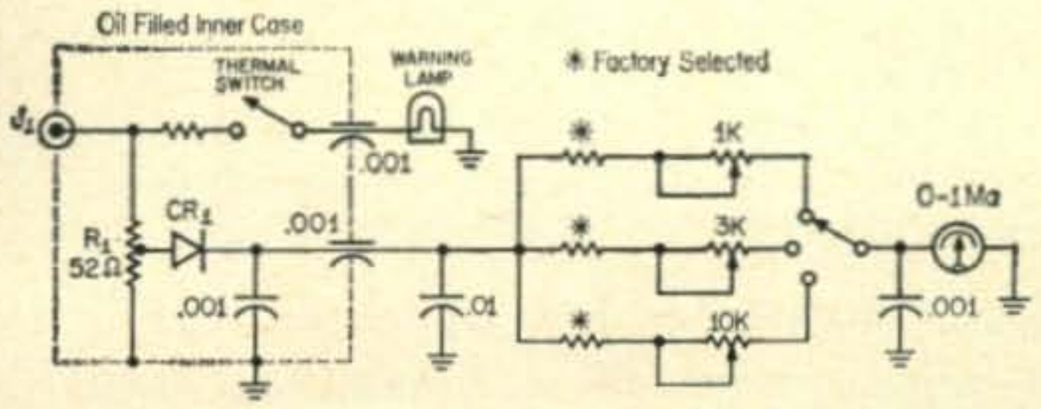


Fig. 1—Circuitry of the Waters Model 334. The r.f. rectifier diode CR_1 which supplies d.c. to operate the meter, is connected to a tap on the special load resistor, R_1, rather than at the top of it. This arrangement permits high-power levels to be read without damage to the diode. It also minimizes reactive effects across R_1 which otherwise could be experienced due to diode loading. Factory calibration is made against a known source of power while the meter resistors are adjusted as needed.

Note that the thermal switch is mounted inside the oil-filled case, so when the temperature rises to near maximum safe operating point, the switch will close and energize the warning light by means of the r.f. potential across the load.

Results of the

4th Annual *CQ* 160 Meter C. W. Contest

Best Conditions In Years Yield Record Turnout

BY CHARLES M. O'BRIEN*, W2EQS

Wow! What Conditions! And, what a fortunate suggestion it was that Frank, moderator of CONTEST CALENDAR, recommended that we run this affair during the last week-end in January. We had planned on making it a fixture for the last week-end of February but with the declining sunspots, a number of contests were moved up. This was the very finest week-end for Top Band DX since about 1954/1955. We also received requests from the boys over G-way to change it, since their RSGB Top Band Contest was running concurrently with ours, therefore causing a great deal of confusion over in those parts. Take a guess as to how many countries participated in this year's event. Don't cheat, now. Close your eyes. Okay, open 'em. Here's your answer . . . 28. More on that later.

It still defies a great deal of imagination as to how so many, many signals can crowd into two small 25 kc segments (that's all we had at contest time—the band was widened after). And never were there so many "new" calls on the band as during this past season. Many a night you'd hear remarks similar to, "This is the first time I've been on the band in 20 years." To a few it was 30 years.

How many stations participated in this year's event? A total of 1,167! It was mentioned earlier that there were 28 countries represented. How does this compare to last year? Well, there were 1,077 stations in 23 countries in 1962. Every single State that was allowed the use of 160 was represented. That meant 44 States (including KH6), 8 Canadian Provinces and DX? Here it is —and keep in mind that this is 160 . . . CT, DJ/DL, EI, G, GD, GI, GM, GW, HB, HC, HK, HR, KH, OH, OK, PA, VK, VP5, VP7, VP9, VR3, XE, YV, ZL, 5B4 and one other that must remain nameless. What's the breakdown of participating stations by country? This may be of interest to you: W/K, 731; G, 253; OK, 69; VE, 38; GM, 13; DL/DJ, 9; GI, 7; HB, 7; KH, 4; ZL, 4; PA, 3; EI, 2; GD, 2; and one each in all other countries as listed above.

In 1960, the first year of this contest, the greatest number of QSO from any one station was 116; the greatest multiplier, 31. In 1961 it was 233/44; in 1962 it was 243/48 and this year topped that with 274/53. It was W9EWC who had the 274 QSOs and W8HGW and W9EWC who had the 53 multiplier.

How many listened the week-end after the Contest? Gosh, were conditions ever poor. Even the ARRL DX contest over the week-end of February 23-24 couldn't begin to compare to our conditions and the continuance of their contest over the week-end of March 23-24 was a complete washout, as far as 160 was concerned.

Interesting comments ran such as this, "thought conditions best in years." Others said, "No—signals were weaker this year—only reason for thinking conditions were better was due to the tremendous increase in DX participation."

A total of 185 logs was received. This may not seem to be too many when you consider the total of 1,167 stations that were worked but the return, percentage-wise, comes to a healthy 15.8%. which is far better than many of the long established, well known contests draw.

For the sake of Awards, and in lieu of no QSL, *CQ* will honor all listings within the logs received as sufficient proof of contact for WAZ, WPX, etc.

A most attractive Certificate will be sent shortly to the highest scoring station in each State, Canadian province and foreign country.

Comments

Just about the most interesting part of any contest is noting the comments from the gang. They're as varied as can be and range from soup to nuts and A thru Z. So, on with the show. . . .

1st DISTRICT

W1TX: "A very good contest. Wish there had been more foreign activity." K1SDX: "Worked my first 160 meter DX but would liked to have seen more activity

W9PNE, active 160 meter participant for many years underestimated activity during the 4th Annual CQ 160 "Test." Brice took honors for Illinois.

*48 Prospect Avenue, Westwood, New Jersey

Here is K7MLO who threw the rig on the shelf together just for the contest. It worked well enough to garner Dan first place for Oregon.

from W7-land." K1BXI: "As far as I know I was the only Maine station in the contest. Maybe next year I can get some of the others on." K1DIR: "My first 160 Contest. Certainly a real good one. Was amazed to work 11 counties. Never thought so many signals could fit into just 25 kc." W1PH: "Congratulations for the most interesting contest on the air today. Could spend only a couple of hours in it which equalled more fun than all others combined. Low power sure gets out on 160." W1FZ: "Great Contest! You are to be commended for sponsoring this one." W1RWP: "Condx FB except locally. Lots of DX though, with strong signals and finally fulfilled long time ambition of 160 meter trans-Atlantic QSO."

2d DISTRICT

W2KHT: "Congrats on FB contest. One of the best; hate to think we must wait another year. Conditions were excellent (How did you plan it?)." W2HUG: "Very enjoyable Contest; DX condx were good; worked one new county (EI) and 3 new States." K2GNC: "Best Contest I've ever been in and only hope we can keep the same kind of fair play and good operating procedure as a feature of the Top Band. Thanks for organizing this fine party which promises to be better each coming year during this sunspot cycle." K8HBR/2: "Congrats on a very fine contest. I made more contacts than ever before but not as many states. Enjoyed every minute of it." W2QOS: "Condx were excellent and did you ever hear such daytime conditions with S9 signals from W9? Very unusual." WA2OJD: "A very minor amount of my operating time has been on 160 but I was quite pleasantly surprised at the interesting propagation characteristics displayed by this band during the contest and at this period of the sunspot cycle. Another undoubted pleasure was to encounter a darned good bunch of contest operators. It was an excellent show all the way." W2WZQ: "Amazing what can be done in the middle of daylight on 160!" WA2MUA: "I had more fun in this contest than in any other that I have ever been in and hope to participate regularly." W2IP: "Raised VE2UQ on the first call with 12 watts and this turned out to be my first 160 meter QSO in *40 years.*" W2EQS: "Was really gunning for W2FYT this year. Not only did he beat me out again but W2IU sneaked in ahead of me too."

3d DISTRICT

W3GQF: "I still say make it two week-ends to allow for lousy conditions and limit the number of hours to compensate if you like." W3RFA: "FB contest again this year. DX reports were like those I used to get on 20 meters 25 years ago as a boy op. Most depressing moment was a 559 report from DL1FF just after he gave 599 to W1BU." W3GJS: "Thanks again for another FB Contest. As in past years the band was heavily populated. Thought I had built the ultimate in a converter but when the stations are 5 to 10 deep what is one supposed to do?"

4th DISTRICT

WA4FJM: "Enjoyed the Contest. Am not much of a contest man except when the mood strikes. This was a good workout for the Top Band. It was a relaxing change to work a contest in which there was no time limit to work against . . . means a person can sit back and stretch without having to worry about his average. Where, oh where, was neighbor South Carolina?" W4OMW: "Working hours prevented me from getting in contest but couldn't refrain from losing a few hours sleep to get in and work a few. Received an s.w.l. card from England so maybe now I'll be able to work into Europe what with being near the east coast and having wonderful propagation condx from here in North Carolina." W4HYY: "Antenna troubles with all the ice. Anyhow, nice Contest." W4CHK: "Enjoyed the contest very much and worked my first European station on Top Band." W4IQU: "Wotta Contest! Finally made it across the Atlantic on 160. GI6TK gave me a thrill like that of my first QSO 27 years ago. This contest gets better every year." WØVEH/4: "It sure was a lot more fun operating from VP9-land as I did last year (and getting 10 points per contact). However, it is a mighty fine contest and I hope you keep it going each year. W4KFC: [Purposely I held Vic's comments till last. Is there any contest this fellow isn't actually in?] "Put in much more time than I intended; with activity and conditions so good it was a great temptation to keep on going! Certainly was a thrill to hear 160 meters producing S8 signals from WØ-land in broad daylight at both ends. What a surprise to hear the band alive with signals from all over the east in the middle of the afternoon and the W6/K6s coming through in early evening. Was chagrined to miss West Virginia which I can see on a clear day from the top of my tower." (There was only one station on from W. Va., Vic and he gave out exactly *one* QSO—*Ed.*)

5th DISTRICT

K5LIW/5: "This was my first time on 160 and what a contest it was! W5HAI, WN5CGU (my jr. op.) and I made a week-end out of it. We journeyed to Lake Texoma on the northern most border of Texas and set up K5LIW/5 in a lake cabin. One of those southern Oklahoma ice storms slipped across the border on Friday night and our ice-coated half wave wire drooped precariously low. On Saturday night the mercury dipped to 10 degrees and really chilled us to the bone. But, the antenna stayed up, the kerosene stove warmed us and we were able to enjoy very last minute of this fine contest . . . a mid-winter Field Day! Will be there again next year."

6th DISTRICT

WA6JPQ: "Real nice contest as usual. The big thrill was when some W3 told me that G5JU and G3s were calling me. Never heard them!" W6JTB: "This is quite a contest and all the operators here at the club really enjoyed it. (WA6s, ILG, IJH, GJW, K6PJY). See you again next year." W6GWQ: "Another fine contest even though the local noise level was quite high. Accessories included a TR switch with keying monitor, large coffee pot, large ash tray and an Understanding XYL!" W6OST: "A great contest; always good operators; score going up each year. East Coast came through great the first night. What happened to the DX boys who were lamenting that nobody looked for them; never heard a one or one being called." W6YC: "I didn't find conditions too good here. Regardless, though, I enjoyed taking part." K6EIV: "The old proverb stands true, 'If you can't hear 'em you can't work 'em.' What I needed was an antenna . . . maybe next year." K6TSQ: "Condx seemed poor this year; possibly due to my makeshift antenna system. Still just as much fun as ever, though, and I intend to participate again next year. How about some of the gang hanging around 160 between contests?" WB6AFI: "I never heard so much QRM on 160 as in this year's contest. Many stations in the 'East' segment were rolling in."

7th DISTRICT

K7CTI: "Friday night after the contest was one-hour old and unbeknown to me at the time, I decided to turn the one-eyed monster off and trot upstairs to take a check on the bands. I had read of the contest in *CQ* about 2 years ago but had absolutely no idea that this was to be the week-end! After discovering that 80 was loaded with QRM/N, I thought that 160 might have something better to offer—and boy did it ever! As soon as I realized that it was the contest I hurriedly turned on the rig and had every ambition of getting my feet wet. But, then I remembered that the rig had no 160-

Young K8TYS proves you don't have to be a pro to mingle with the 160 crowd. Doug walked off with the Michigan crown.

Back in February, during the contest, he was VP5XG and now he's 6YAXG, still in Jamaica. Pete, originally G3HVG, is ex-VS7XG, 4S7XG and VU2XG.

meter v.f.o. and I had traded off my only xtal. Suddenly, thoughts of a half junked ARC-5/T-18 somewhere in the attic came to mind. Well, after about 45 minutes I amazingly had it on the air. It was beginning to look as if I would get my feet wet after all. Then I realized I had no 160 meter antenna! I tried every conceivable method of getting one of my other antennas to load. Finally I found a half way efficient combination. By now I had used another 45 minutes and was just itchin' to start. Can you imagine me working in a contest with my operating desk covered with an upended ARC-5 and a maze of jumper wires. Was utterly amazed at my 50 watts getting through to the east coast. Condx were marvelous. This contest will be one of my major operating activities of the year in the future." K7ICW: from the fabulous city of Las Vegas advises that local conditions are horrible. "About one mile away is the greatest collection of neon signs in the world and some sure are good QRM generators. A power failure also occurred during the height of the contest causing my lights to blink and my heart to skip a few beats!" K7OEP: "The contest was great fun again this year. Glad to give many of the boys their first 160 Utah QSO. K7MLO: "Congrats on a FB contest. This was my first 160 meter Test but won't be my last. Had a whale of a good time and built this rig just to get on 160 for the affair." K7EKD: "Thank you for the very fine contest. Glad to be back after two years out. Can't wait till next year."

8th DISTRICT

K8TYS: "Enjoyed the contest very much. It was a blast. Never heard so much c.w. on the band. I didn't get too much sleep those two nights. Heard lots of DX. Am looking forward to next year's affair." W8FGX: "This Contest gets better every year. Was amazed at European sigs. Sounded like 80 meters. Sorry didn't have time to really compete but sure looking forward to next year." (What do you mean by that word "compete," Jake?—*Ed*). W8BAR: "We were surprised at the strength of the DX signals. And, being used to the rat race on 40 c.w. we were surprised at the courteous operators on 160." W8QWI: "Competition very, *very* keen!" W8CAG: "Enjoyed contest very much but have to study for semester exams too. Age 16." W8LOF: "Certainly enjoyed the contest this year and am looking forward to next year's. Worked 2 new countries in G and GI." K8IQQ: "Never entered a contest before." K8EKG: "Resolved—next year I will have up more wire in the yard even if I have to loop it around the house. It was fun even though I wasn't getting out."

9th DISTRICT

W9PNE: "This was a terrific contest. There must have been 250 W/VE contestants." (There were 769, Brice—*Ed.*). "They were stacked many layers deep during the late evening hours. Condx the best I've heard on 160 in years. Europeans so thick they QRMd each other." W9EWC: "Activity and band condx both amazing. Aside from excellent openings to Europe both nights, the east coast was readable all day long." W9YT: "I think we could have taken the State except for W9SZR at W9EWC. To make matters worse, he was a member of our Club for many years! (Badger Amateur Radio Society, University of Wisconsin)."

10th DISTRICT

WØDK/Ø: Boulder, Colorado, Amateur Radio Club. "This was the first time that most of our ops had worked 160 and was the first 160 contest for all of us. We used the 185 foot towers of a local broadcast station but seemed to be hurt to the west as the towers were right against the foothills of the Rockies. Didn't know what these antennas would do for us but within a week QSLs began arriving from Europe and South America. Because of the contest interest in 160 sure has grown in the Boulder area." WØVXO: "You couldn't have picked a better weekend for the contest. Condx were the best I have ever heard on 160. The contest was a real thriller and yielded me several new countries. WØAIH: "My WØAIH/VE3 operation showed that it is much, much easier to work Europe from the Toronto area than from Minnesota! I just barely hear Europe from northern Minnesota. 160 meter contests have a thrill all their own." WAØDJG: "This was the first time I ever participated in a contest of any sort and I must say that it sure was a lot of fun! Isn't it surprising what can be done with just 50 watts and a simple long wire"? WØOGC: "I worked part of one night last year so this was my first time to really enter the contest. It sure is a most enjoyable one and hope it goes on for a long time. My XYL just got her ticket (WAØFAJ) so will have some relief during the next affair." WØBBS: "Well, the 1963 160 meter contest is over and I once again had a fine time. In late afternoon and early evening a good number of 1800-1825 kc stations were coming in (Nebraska) but none of them would call CQ west or listen for us. We also need a larger 160 meter band as QRM was terrific." (We finally did get it, OM—*Ed*). WØFQB: First 160 meter contest worked since before WW II. Had a ball. Missed the power and break-in I used to have but look out for me next year! Thanks for plugging Top Band." WØSDN: "Condx much better this year. A fine contest and the most enjoyable one I've ever been in. I think the move from February to January a wise one. Shortly after "rat race" was over I received a number of heard cards from s.w.l.s in England."

CANADA

VO1DX: "Boy, I worked feverishly to get my 70-foot welded pipe pole up and we just made it in time. Friday afternoon we strung out the 550 feet of antenna and hoisted it in readiness. Didn't work too many but it was fun and I'll always enter this contest." VE2UQ: "Great contest. Planning 1964s already!" VE3QU: "For-

got about test till Saturday night. Hence, low score. But got 2 new provinces, 1 new state and 2 new countries. At last got across pond." VE3DU: "Another contest on 160 is now history. Boy, what QRM on Saturday night! Never heard so many European signals in one evening. Even in the afternoon W-signals were coming in from all directions." VE6IZ: "Although most of my reports were of fairly good strength, after the first dozen I really seemed to bog down and couldn't buy a QSO. Have a poor antenna. Am located on a 50 × 125 foot lot in town and not much one can do about that!" VE7EH: "How about a new *CQ* 80 Meter W. W. CW Contest next year with the same rules in addition to the 160?" (Any comments boys?—*Ed*).

DX DX DX DX DX

EI9J: "Was looking forward to the Test but when the time came I had something else to occupy my mind. We were in the longest freeze-up most folks can remember. Two days before the Test the water feed pipe into house froze. Left us with what was in the tank in the roof space. This lasted 'til the Saturday of the Test so was pre-occupied with what to do. Only for that am sure I would have put in more time and enjoyed it better." G3IGW: "Thanks for a fine contest in terrific condx. The 11 Ws and VEs worked are only a small fraction of those heard from coast to coast." G5JU: "Over this week-end I worked more W/VE stations than on any previous occasion. Logged WA6JPQ at RST339 on 1998 kc. Heard several other signals around this frequency too weak to copy." G3GRL: "Regret was only able to get on for part of the time. Condx were excellent and a number of your countrymen were putting terrific signals in here from 0100 to 0800Z." G3NHE: "Enjoyed my first attempt very much and look forward to next year's event. Condx seemed exceptional both days. Some 60 W/VE/VO stns were heard." G5ZT: "Was off air several hours due to electric mains supply having been cut off due to terrible weather. Just before contest my 144 mc beam, Mosley TA-33 Jr and 600-foot long-wire blew down in a blizzard but managed to get the 600 footer up again in time. Expect many British amateurs had similar experiences." G3RSR: "Dozens of Ws were heard at RST599." G8PG: "Boy, what a FB contest!" G3HZL: "My first entry in this contest and it was very much enjoyed. Plenty DX heard." G3PEO: "Mains voltage varied constantly. Watched TV picture size as indication of when to go back into Contest—hi!" G3MWZ: "My first attempt at your 160 event and very enjoyable. My score would have been better but no mains electricity available for a long period of time." GI6TK: "Heard W6KIP." [Many of you don't know it but GI6TK is a blind operator. Our very sincerest thanks to W. Dougan, BRS-22700, who prepared and submitted Frank's logs—*Ed*]. GM3PBA: "Many thanks good contest and don't change a thing next year. Heard all W-districts except W7.

CT1CO: In spite of very meagre results I enjoyed this contest very much and hope to be there next year." PAØLOU: "I could have cried when I heard DL1FF work all those nice DX stations. I heard everything but W5/6/7. Called Ws and VEs for hours but nil. The misery of a poor antenna!" HR3HH: "The Contest was quite a success as far as I was able to observe but East/West conditions weren't as good as last year. Heard only 2 Gs and HC. Couldn't get much response from the west coast even though I called 'CQ West' many times." DL1FF: "What QRM! But the worst part of it was EUs calling W/VE/VO on their own freq. Messed things up terribly. We can work between only 1825-1835 and 1985-1992 kc." (West Coast please note for possible future skeds—*Ed*). KH6EOF: "Think I did better last year but condx were better too. There were four KH6s on: BI, DVD, EWD and myself." KH6DVD: "Was home for just a short time, including the contest, between business trips in the western Pacific and (now) S.E. Asia. Regular antenna was down leaving only an impossible 50′ horizontal about 20′ high worked against ground. Did get on, though, and even worked a new country as one of my 3 contacts—VR3O." HC1DC: "Didn't hear as many west coast stations as last year. Lots of W/VEs didn't listen up to 1827 and missed me but in the U.S.-band I couldn't work much due to the terrific QRM."

PAØLOU, not unknown in DX circles tried his hand at 160 and came out on top for The Netherlands.

VP5XG: "What fun it was joining in the *CQ* Top Band Contest. Thanks a million for inviting me to the session and for letting me know about it." W4WQQ/VP9: "Thanks for a most enjoyable contest. Many things were learned especially how the OLD DX hounds work. Most of the contacts were with the old contest pro's whom we have worked before but too many others weren't interested in DX. Many passed up the weak W4 station not realizing it was /VP9. Heard over 200 stns." ZL3RB: "I'm pleased I was able to check in on the band both nights. Condx were much better the 1st night. Was disappointed that VR3O wasn't tuning 1875-1900 kc as I could have worked him FB." XE2OK: "I'm sorry about my poor log but really don't know what happened. Run 100 watts but the QRM from the many W-stations prevented me from doing any better. Anyway conditions were much improved over 1962 and next year will probably even be better than 1963." XE1OK: "Worked nothing in DX Test this year. Friday night heard lots of W/K/VE S8 to S9 but couldn't get them. Called dozens of stations Friday plus lots of CQ DX but not even *one* station heard me. Worst I have seen." And last but by no means least an extremely rare one no matter what band and I speak of none other than Martin, VR3O, Christmas Island. He managed only 4 QSOs but not too long ago I had the extreme pleasure of having had an eyeball QSO with him. He told me that the W/K boys were so thick out there in both segments of the band he, himself, didn't know what frequency to select for himself. What a shame for us to have missed such a rare one!

W5HAI and K5LIW/5, lone Texas entry. Any comments?

An 8" × 10" reprint of the new 160 meter operating regulations appearing in this month's ANNOUNCING section are now available free from *CQ*. Please enclose a self addressed stamped envelope.

The first column indicates the number of contacts, second is the multiplier, third is the number of different countries worked and the last column is the final score.

Connecticut

W1TX	162	46	11	20,424
W1WY	173	42	10	18,648
K1SDX	155	32	6	10,944
W1AW	18	13	2	468

Maine

K1BXI	64	25	3	3400

Massachusetts

K1DIR	169	43	12	20,382
W1ME	121	36	10	11,952
W1AQE	129	28	4	7672
W1BB	29	24	6	2352
W1PH	37	15	2	1110

New Hampshire

W1FZ	79	26	3	4316
W1CTW	28	15	2	870

Rhode Island

W1PPN	117	30	7	8940

Vermont

W1RWP	104	28	3	6048

New Jersey

W2FYT	226	47	10	25,380
W2IU	188	47	12	22,560
W2EQS	207	43	10	20,898
W2KHT	140	37	8	12,432
W2HUG	133	34	5	9860
W2CVW	63	18	2	2268
WA2QPX	1	1	1	2

New York

W2UWD	191	47	11	21,338
K2GNC	162	35	7	12,740
K8HBR/2	170	34	2	11,560
W2QOS	127	36	5	10,008
W2SSC	140	33	4	9768
WA2OJD	108	32	7	8192
W2PSQ	92	31	4	6200
W2WZQ	100	28	2	5600
WA2MUA	56	17	2	1904
W2RSV	18	10	1	360
W2IP	13	8	2	208
WA2JWN	2	2	1	8

Delaware

W3EJU	29	13	2	754

Maryland

W3GQF	227	50	11	30,300
W3RFA	100	39	10	10,608
W3BKE	96	27	2	4992
W3MSR	53	16	2	1696

Pennsylvania

W3GJS	108	27	2	5832
W3BUR	98	29	2	5684
W3AHX	100	23	2	4600
W3AJS	24	12	2	576
W3DHO	22	12	2	528
W3EHO	3	3	2	42

North Carolina

K4HJJ	76	31	5	5456
WA4FJM	74	23	2	3404
W4OMW	28	13	1	728

Tennessee

K4RIN	111	29	2	6438
W4HYY	50	21	2	2100
WA4FDR	46	21	2	1932
W4ZJY	22	15	2	660

Virginia

W4KFC	241	51	11	28,254
W4CHK	125	35	6	9870
W4IQU	94	28	6	6160
W4KXV	72	28	4	4480
WØVEH/4	77	23	3	3726

Arkansas

K5ALU	34	15	1	1020

New Mexico

W5SOT	53	24	3	2736

Oklahoma

W5IPT	64	20	2	2560

Texas

K5LIW/5	122	36	5	9648

California

W6KIP	139	40	8	13,680
WA6JPQ	112	33	5	8448
W6JTB	95	29	4	6206
W6GWQ	74	26	4	4544
W6OST	72	22	2	3168
WA6PMK	59	15	2	1770
W6YC	58	12	2	1740
K6EIV	55	11	2	1210
K6TSQ	41	12	2	984
WB6AFI	33	14	2	924
W6OJW	18	6	2	216

Arizona

K7ZZW	76	28	2	4256
W7ENA	45	16	2	1440

Montana

K7CTI	64	24	3	3264
W7EGN	29	18	3	1188

Nevada

K7ICW	74	24	3	3744

Oregon

K7MLO	53	18	3	2088
K7HDB	38	10	2	760
W7JRI	36	10	2	720

Utah

K7OEP	47	17	2	1598

Washington

K7EKD	91	27	3	5346
W7RGL	34	15	2	1020
W7ZVY/7	30	10	2	600

Michigan

K8TYS	80	26	3	4368
W8CXS	27	13	2	702
W8ROV	6	6	1	72

Ohio

W8HGW	225	53	12	29,680
W8FGX	202	49	12	24,500
W8BAR	168	36	7	13,248
W8QWI	161	37	4	12,506
W8CAG	114	32	2	7040
W8LOF	101	31	4	6758
K8IQQ	65	20	2	2600
W8AQ	24	11	3	616
K8EKG	24	11	1	528

West Virginia

W8VVE	1	1	1	2

Illinois

W9PNE	164	45	11	18,720
K9MBR	193	39	4	15,678
W9YYG	141	38	4	11,324
W9MAK	45	21	2	1890

Indiana

W9HLY	165	39	6	14,040
K9YWO	136	33	3	9240

Wisconsin

W9EWC	274	53	13	37,524
W9YT	180	42	5	16,128
W9BQM	31	18	2	1116

Colorado

WØDK/Ø	154	41	6	13,940

Iowa

WØHA	66	30	2	3960

Minnesota

WØVXO	220	46	10	24,288
WØAIH	215	42	6	19,404
KØPAU	107	33	2	7062
WØRHI	92	32	3	6144

Missouri

WAØDJG	108	30	3	6720
WØOGC	97	29	3	5800
WØUXQ	67	29	3	4176

Nebraska

WØBBS	83	36	2	5976
WØFQB	52	22	2	2288

North Dakota

WØSDN	140	42	5	12,768

Hawaii

KH6EOF	16	6	3	786
KH6DVD	3	2	2	18

Alberta

VE6IZ	15	8	2	240

British Columbia

VE7EH	85	26	5	5044
VE7AKI	82	28	4	5040
VE7AFB	43	14	2	1204

Newfoundland

VO1DX	26	15	4	1260

Nova Scotia

VE1EK	41	16	2	1312

Ontario

VE3BWY	148	34	4	10,608
VE3QU	58	29	4	3828
VE3DU	60	27	3	3456

Quebec

VE2UQ	179	38	8	16,644

Saskatchewan

VE5DT	10	7	2	140

Bahama Islands

VP7NY	15	10	2	1450

Bermuda

W4WQQ/VP9	46	17	2	7820

Colombia

HK7ZT	4	4	3	120

Christmas Island

VR3O	4	2	2	80

Czechoslovakia

OK1ZC	117	12	12	5820
OK1AAI	108	11	11	4851
OK2KGV	78	9	9	2673
OK1OO	73	9	9	2529
OK3CEA	71	9	9	2385
OK2KOI	58	8	8	1576
OK1AEZ	54	7	7	1386
OK1ZL	42	8	8	1176
OK1KNH	50	6	6	942
(OK 1-15284)				
OK2QX	49	6	6	876
OK2KGU	43	6	6	714
OK2KJU	35	6	6	654
OK1BM	30	7	7	651
OK2OP	33	5	5	450
OK1PG	24	6	6	396
OK1PH	23	4	4	220
OK1ZW	30	3	3	216
OK1KTI	19	3	3	132
OK1AHZ	19	2	2	82
OK1KNH	25	1	1	50
(OK 1-577)				
OK1AHN	14	1	1	28

Ecuador

HC1DC	59	25	6	14,250

Eire

E19J	66	21	8	10,395

England

G3IGW	165	20	16	13,685
G5JU	124	21	11	12,210
G3GRL	118	18	11	8334
G3NHE	114	12	12	4212
G3NIS	147	10	10	3940
G2DC	121	9	9	3150
G5ZT	71	11	10	2794
G3RSR	114	8	8	2432
G8PG	58	9	9	1476
G3HZL	73	7	7	1379
G3PEO	67	7	7	1316
G3JKY	50	8	8	1040
G3MWZ	34	7	7	749

Finland

OH3NY	10	4	4	200

Germany

DL1FF	154	24	12	20,880
DL1YA	14	3	3	201

Honduras

HR3HH	49	22	3	10,010

Jamaica

VP5XG	42	20	6	8000

Mexico

XE2OK	34	17	2	5780

Netherlands

PAØLOU	52	10	10	2241
PAØVB	30	8	8	1152

New Zealand

ZL3RB	4	2	2	32

North Ireland

GI6TK	117	24	12	17,232

Portugal

CT1CO	16	4	4	720

Scotland

GM3PBA	101	10	10	5040

Switzerland

HB1WJ	50	6	6	1464

Wales

GW3JI	135	22	15	16,104

Reviewing The Radio Classics

Single Layer Coils

BY DAVID T. GEISER*, WA2ANU

Number 8 of a Series

THE Bible for the radio amateur in the years 1918-1926 was not the ARRL *Handbook;* it had not yet been printed. A book that many would nominate for that period was *Radio Instruments and Measurements,* Circular C74 of the Department of Commerce.[1] One massive contribution of this book was its tables of coils and coil constants. These tables, with little change, appear in engineering handbooks today. The beginner and old-timer of that era, *and* this, can still make much use of the data.

The single-layer air-core coil was and is the backbone of coils in radio transmitter use. While other means of achieving a frequency-selecting effect have been discovered, the capacitor and coil can rarely be beaten for their combination of low cost and high versatility. There are two modes in which the combination operates: series and parallel. When losses, real or induced, in the coil and capacitor are small, the expressions for resonance are the same:

$$f = \frac{1}{2\pi\sqrt{LC}}$$

f = frequency in c.p.s.
L = inductance in henries.
C = capacitance in farads.

The quantities, henries and farads, point out a still-present difficulty, for high frequencies require coils measured in microhenries and capacitances of picofarads (micromicrofarads.) These decimals respectively are one-millionth and one-million-millionth of the basic quantity.

When the coil and capacitor are connected in series and a resonant frequency is examined, it is found that the impedance of the combination becomes purely resistive, seeming to have only the resistance of the coil and capacitor. Since capacitors typically have much less resistance than coils, it is legitimate to say that "only the resistance of the coil appears". As good coils can be made to have very low resistance, the combination at the resonant frequency can be made to appear like a short circuit. This is of great advantage in eliminating harmonics, for such a combination can short out the harmonic and have little effect on the desired signal.

To get greatest benefit from a coil, then, it is necessary to design it for lowest losses. If the coil is wound on a cylindrical form (solenoid), the best ratio of length to diameter is approximately 2½:1. Losses increase gradually as length is shortened—a 1:1 ratio is still pretty good. If the length of the coil is increased the probability of poor magnetic flux linkage will increase losses more than inductance, and a shorter rather than longer coil is often desirable.

The ideal coil and capacitor, connected in parallel, at the resonant frequency appear to be an infinite resistance (open circuit). If the coil has losses, the apparent resistance of the combination will decrease as the coil resistance increases. When the resistance of the coil becomes 1/10th or more of the coil reactance X_L, the formula for resonance no longer applies.

Reactance of a coil is:

$$X_L = 2\pi f L \text{ ohms.}$$

There are several reasons for losses in a coil. The first that comes to mind is "skin effect", the tendency for high frequency currents to crowd to the surface of a wire. This means that the core of a wire has little effect on its radio frequency resistance. A silver-plated wire would have the same good radio-frequency characteristics expected of a solid-silver wire.

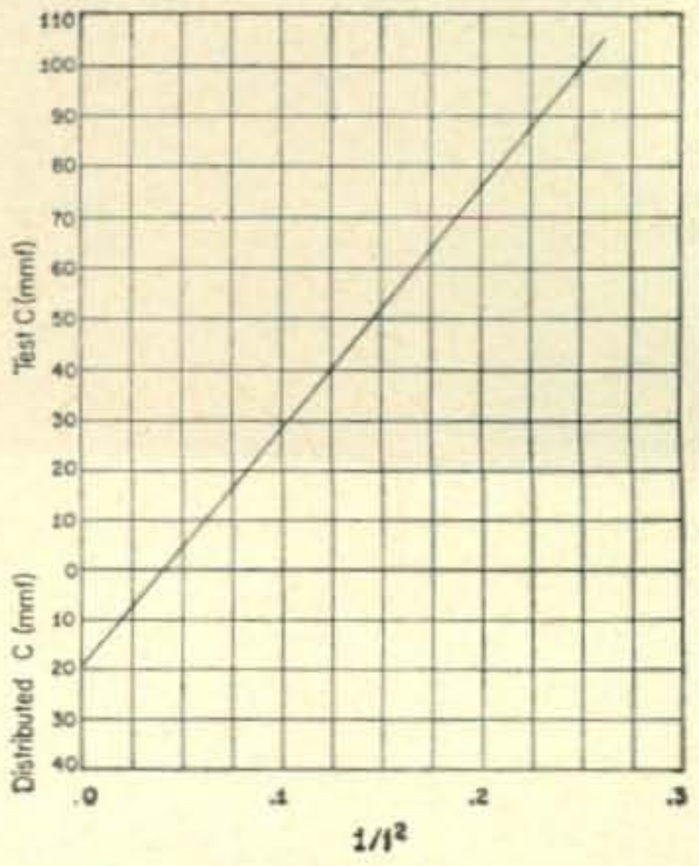


Fig. 1—Graphical solution of distributed capacitance. The coil in question resonates at 2 mc with 100 mmf and at 3.5 mc with 20 mmf. Plotting capacitance against $1/f^2$, a distributed capacitance of about 19 mmf is shown.

*Light Military Electronics Dept., General Electric Co., Utica, N.Y.

[1]This book is still available in the second (1924) edition from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. for $1.25. This is a reprint of the original edition and was issued for historical purposes. In spite of the occasional descriptions of spark and arc equipment, this reviewer believes it is worth every cent of its cost as a reference for unusual calculations.

Coils with radio currents flowing in them show voltages between individual turns and therefore these turns act as if they had tiny capacitors connected between them. Insulation that is air or mostly air (cotton or silk) reduces this effect just as plastic or enamel (with their higher effective dielectric constants) will increase it. The effect of this distributed capacitance is cumulative, and can be thought of as a single capacitor in parallel with the coil terminals. An easy way to calculate this distributed capacitance is shown in fig. 1. Measure the resonant frequency of the coil (by grid-dip or Q meter) with a large and a small capacitance. (I make one capacitor about 4 times the other, using small silver-mica types and short leads.) On graph paper plot the capacitance against $1/f^2$. The two points should have a straight line drawn through them. Where this line intersects the capacity line is the value of the distributed capacitance.[2]

As parallel resonance greatly increases currents circulating in both coil and capacitor, operation of a coil at its self-resonant frequency endangers it. A good rule of thumb seems to be to allow a turn-spacing of half-a-wire-diameter to a full-wire-diameter between adjacent turns if a good combination of low distributed capacitance and high Q is wanted.

Q, a later concept, is the ratio of reactance to resistance. It can be used either as criteria of a part or a circuit, for it is a ratio of energy stored to energy dissipated. In typical radio transmitters, the only place that energy should ideally be dissipated in the radio paths is by actual transmission from the antenna. Coils, however, will dissipate energy and will keep a tuning or matching network from being 100% efficient. Taking a simple tank circuit (coil, capacitor, and load resistance), the percentage of the power lost is $100 \times Q_{circuit}/Q_{coil}$ when the normally correct assumption is made that there are negligible losses in the capacitor. This means that if the circuit Q is 20 and the coil Q is 100, 20% of the tube output power is lost in the tank coil. This explains why good transmitter circuit design requires rather low circuit Q (10-15) and high coil Q (200 or so). If circuit Q gets too low, there is both loading and harmonic trouble.

Generally, as all dimensions of a coil are increased, Q increases in the coil for the desired inductance. For best Q, use the biggest wire diameter and maximum possible length and diameter of the coil.

There are practical limitations in the size of a coil—usually one wants to use it inside of a metal case or shield of some kind. A later development was shielding practice, though the effect of shielding is fully predictable from Maxwell's nineteenth century equations. Shields in the vicinty of a coil contribute stray capacitance, decrease coil inductance, and increase losses. All of these effects are generally undesirable. A good rule is to have no shield closer to the coil than a distance of one "coil-diameter." Thus a 1-inch diameter coil would be at least one inch from any shield. If a shield must be closer, have the shield near a part of the coil that has the smallest r.f. voltage present, to reduce capacity effect. Silver or copper plated shields reduce shield losses, but still decrease inductance.

The inductance of a coil is most commonly calculated with some variation of Nagaoka's formula's, a good one being

$$L_{microhenries} = \frac{a^2N^2}{9a + 10b}, \text{ where}$$

a = radius of the coil in inches.
b = length of the coil in inches.
N = number of coil turns.

The modern ham does not have to do this arithmetic for most common coils if he has an ARRL *Type A Lightning Calculator*. The answers on this aid are in "turns per inch", a handy form when making coils from manufactured coil stock. Such stock usually comes in increments like 4, 8, 12, 16, and 32 turns per inch.

Tapped and Variable Coils

Often a designer will want to use a tapped coil to cover more than one band, changing the inductance by selecting taps on the coil. There is a problem of what to do with the unused part of the coil. If the unused part is open-circuited, magnetic field from the part in use and the distributed capacity of the unused part may cause high current flow and reduce the efficiency of the used portion. If the unused part is short-circuited, high currents will flow and the inductance will decrease. All considered, a fair compromise seems to be to short out the unused part if it has many more turns than the desired part, and leave it open-circuited if it has many less. The middle region is pretty much of a toss-up. Some compromise may be made by having the different switched-in coil sections shielded, separated, or at right angles to each other so the inductive coupling will be least. On occasion, the high-frequency parts of the coil use wide-spaced turns, and low-frequency parts close-spaced. Remember to keep the unused parts of the coil at low r.f. voltage, to minimize stray capacitance.

[*Continued on page 94*]

[2]A more precise method of calculating the stray capacitance of an inductor is by use of the formula:

$$C_{Stray} = \frac{C_1 F_1^2 - C_2 F_2^2}{F_2^2 - F_1^2}$$

Where: C_1 = large test capacitor.
C_2 = small test capacitor.
F_1 = resonant frequency with C_1.
F_2 = resonant frequency with C_2.

For example, using the same values in fig. 1, $C_1 = 100$ mmf, $C_2 = 20$ mmf, $F_1 = 2$ mc, $F_2 = 3.5$ mc. Substituting in the equation.

$$C_{Stray} = \frac{(100)(2)^2 - (20)(3.5)^2}{(3.5^2 - (2)^2} = 18.8 \text{ mmf}$$

The accuracy of such calculations, of course, is dependent upon the accuracy of the capacitors and the frequency measuring equipment used.

Announcing...

The Summer, 1963 *CQ* V.H.F. Contest

AUGUST 24-25, 1963

MARK your calendars, stock up on pencils, and fire up that coffee pot, for the endurance test to end them all is scheduled for the fourth weekend in August: the all-new Summer *CQ* V.H.F. Contest. In this one, only *one* band may be used and only *one* operator will be permitted, so send the recruits home.

This is a single band, single operator affair, designed for the average v.h.f. man. You'll be competing only against other operators on your chosen band in your own state, and awards will be presented on that basis. If you've felt, perhaps, that you didn't stand much of a chance in other contests, rest assured that this one is aimed at you. In addition to our band categories, a 144 mc Novice division has been included to add to the fun.

Write today for your supply of official logs at the address shown in the rules below, including a large self-addressed stamped envelope. Other sheets may be used, of course, as long as you present the required information. The rules are simple and to the point. If you are collecting counties for the USA-CA or other awards, you won't want to miss the contest! Judging by past response in our contests in the single-band single-operator division, this Summer's competition promises to be one of the biggest ever.

All you have to do is fire up that rig on your favorite v.h.f. band, call "CQ Contest" and pray you hold out for the next twenty-four hours. See you August 24th!

RULES

CONTEST PERIOD: The duration of this contest is 24 hours, starting at 1 P.M. local time Saturday, August 24, 1963, and ending 1 P.M. local time, Sunday, August 25, 1963. Contacts between time zones will count only when both time zones are participating in the contest.

BANDS: Any single amateur band, 50 mc and up may be used.

COMPETITION: This is a single band, single operator contest *only!* Divisions are: 50 mc *only;* 144 mc *only;* 220 mc *only;* and 432 mc *only*. Novice entries will be scored individually from other 2-meter competition.

EXCHANGE: Exchanges on the air will consist of the following information: Signal Report, Serial Number, County and State. Serial number on each band shall consist of the signal report followed by a three digit number beginning 001. Failure to start with 001 will result in disqualification. Typical exchange for phone, "You are 58001 in Reno County Kansas Over" and for c.w., "589001 RENO KAS K"

CONTACT POINTS: Contacts between stations worked for the first time will count one (1) point. One-way contacts do not count. Mobile-in-motion contacts of any kind will count only for contact purposes and *not* for county multipliers.

MULTIPLIERS: COUNTY: A multiplier of (one) 1 will be allowed for each new county worked. All counties can be checked with the *CQ* USA-CA Record Book.

HOUR: A multiplier of (one) 1 will be allowed for each hour of station operation during the contest where at least *one* contact is logged.

POWER: A multiplier of 1.25 will be allowed for stations which at no time during the contest period run in excess of 50 watts input. Stations exceeding 50 watts input will use a power multiplier of one (1).

LOG INSTRUCTIONS: Logs are available from *CQ;* please enclose a large self-addressed stamped envelope and request number of logs (40 contacts per sheet). All times are to be kept in local time. Fill in the date (required only once), time, call, county and state, serial number sent and received; PRINT *or* TYPE.

All contestants are expected to compute their own

[*Continued on page 102*]

CQ V.H.F. CONTEST

Log For 50 Mc Band — Call K 2 S S Q

(Use separate log for each band.) Page 2 of 7 Pages

DATE / TIME	STATION	COUNTY & STATE	SERIAL NUMBER Sent	SERIAL NUMBER Received	County Mult.
8/24/63-1303	WA2TEN	Essex, New Jersey	59001	59008	1
1305	WA2TIC	Queens, New York	59002	59006	1
1308	WA2AXM	Passaic, New Jersey	59003	59005	1
1313	WA2JYO	Bergen, New Jersey	59004	59005	1
1315	K2MGA	Queens, New York	58005	59001	
1316	WA2NLJ	Queens, New York	58006	59004	
1319	K2MLB	Essex, New Jersey	59007	59011	
1323	K2UED	Bronx, New York	59008	58003	1
1330	K2GSP/2	Sussex, New Jersey	56009	57019	1
1333	WA2QIS	Queens, New York	59010	59007	
1337	WA2LAO	Nassau, New York	59011	59020	1
1339	WB2AAI/2	Cape May, New Jersey	55012	56017	1
1345	W2LOF	Morris, New Jersey	59013	59025	1
1347	[illegible]	Bergen, New Jersey	59014		

1432	WA2IML	Nassau, New York	59037	59001	
1433	WA2PBR	Union, New Jersey	59038	59031	
1436	K3ITW	Philadelphia, Penna.	57039	58043	1
1439	K3UKP	Bucks, Penna.	58040	57019	1
1441	K3LCM	Montgomery, Penna	59041	59046	1
1445	W2KVA	Westchester, New York	59042	59019	1
1448	K2RAN	Warren, New Jersey	57043	58036	1
1450	K1FLR	Fairfield, Connecticut	58044	58001	1
1452	K1BAK	Providence, Rhode Island	55045	53009	1

CQ Form 1052A eff. Feb. 1963 (other forms may be used)

Page 1 of 7 Pages

CQ SUMMER V.H.F. CONTEST

Check if power multiplier (1.25) used. Station Call K 2 S S Q

Band Operated 50 Mc State New Jersey

SCORING

Number of Contacts 236 × Number of Counties 41

× Number of Hours 7½ × Power Multiplier 1.25

TOTAL SCORE 287,360

Transmitter Description and Power Homebrew: 6BQ6-6BQ6, 25 watts input.

Receivers National 183 with mixister converter and preamplifier.

Antennas Eleven element Yagis, up 50 feet on cross-over tower.

Other operating aids VFO, checksheet, 24 hour clock, "No Dope."

Remarks (Suggestions, Criticisms, and Comments)

Sporadic-E opening from 0450 to 1248 Sunday, providing many new counties.

This is to certify that in this contest I have operated my transmitter within the limitations of my license and observed fully the rules and regulations of the contest.

Bob Brown
(Signature)

Name BOB BROWN (USE BLOCK LETTERS) Call K 2 S S Q

Street and Number 67 Russell Avenue

City Kalway County Union State New Jersey

Submit logs to: CQ, 300 West 43rd St., New York 36, N.Y. Att: VHF Contest Committee

CQ Form 1062 eff. July, 1963

Typical log and cover sheet for the Summer, 1963 CQ VHF Contest, August 24-25.

Results of the Spring, 1963 *CQ* V.H.F. Contest

COMPILED BY BOB BROWN*, K2ZSQ

Sunny Weather, Sporadic-*E* and Astronomic Scores!

HERE was a contest for everyone: single operators, multi-operators, club stations, mountaintoppers and even aero-mobiles! And to top it all off, most of the country had fine weather for the entire weekend, coupled with a solid Sporadic-*E* opening Sunday morning which sent scores rocketing. Even our staunch contesters in the rather sparsely populated western states were able to rack up an admirable total with the help of the ionosphere (thanks, George).

For the uninitiated, perhaps a quick summing up of the aims of this contest are in store. The contest, run on the weekend of May 4-5, 1963, was of twenty-four hour duration. Competition categories were vastly different from anything run by *CQ* in the past. Basically, we presented three divisions: General, All-Band Multi-Operator, and Club Aggregate. Novice scores are also presented here, although their inclusion was not mentioned in the announcement. Under the General division, which encompasses most of the contest activity, were included multi-operator stations using only one band, and all single operator stations, regardless of band or bands used. In this manner multi- and single-operator stations in a given state could compete with one another on a fairly equal basis; whereas in the past, the two were in completely different competitions. The All-Band Multi-Operator division placed, for example, an all-out club's mountaintopping efforts in competition with other groups operating both 6 and 2 meters, without effecting state totals for the single op's. For the first time in the history of *CQ*'s V.H.F. Contests, a Club Aggregate competition was offered, with top prize being an engraved trophy. And, as you can well see, quite a number of clubs took advantage of the offer. Rest assured that future Spring *CQ* V.H.F. Contests will feature club aggregate scores.

The scoring, too, is new to *CQ*. Rather than having multi-band stations combine totals for their final scores—contacts, counties, and hours were added *separately* for contact totals, county totals, etc., *then* multiplied out for grand totals. We're quite pleased that a good number of entrants took the time to comment favorably on this new system. Looks like this, too, is here to stay.

HIGH SCORES

Club	Peninsula A.R. Klub	
General	W8HBI/8	936,240
Novice	WN2CUD	38,903
A.B.M.O	WA2VLR	822,828

*Editor, *The VHF Amateur*.

Gary, K1YLU, at the mike of his two meter station on Mt. Wachusett, Massachusetts, during the contest.

All-Time Records Broken

This contest was important, also, in other respects. Two all-time high records were shattered. The Peninsula Amateur Radio Klub's (WA2VLR) staggering contact total of 408 and W8HBI/8's gathering of 332 rocketed unknowingly over the previous high of 313 accumulated by K2OIQ/2 in the August, 1961 affair. Congratulations to the "Aardvarks" at WA2VLR for setting the new *CQ* V.H.F. Contest record at 408. Okay, boys—How long will it stand?

Another shattered record was the all-time county count of 79, set by W3JMY/3 and K2OIQ/2 in the August, 1961 contest. Four stations topped it this year: WA2VLR with 84 counties; K3IPM with 90, and W8HBI/8 and VP7CX, both dragging in 94! This one is really going to be hard to beat! You wanted incentive, here it is.

Meanwhile, in New Jersey, quite a battle was raging between a couple of contest pros. Although in entirely separate categories, W2LST and WA2VLR were going at it hard and heavy on 50 mc, neck-in-neck at times. At the outcome, however, W2LST won out with 305 contacts to WA2VLR's 230. To offset this unspeakable de-

The gang at K6PXT/6, the V.H.F. Repeaters, Inc. Back row, K6ZOA, K6PXT, WA6GPB, W6YAM. Front row, WA6HSL, WB6CYO, K6DOQ, WA6BMT, WB6-BHC, WA6NCD, K6LWA.

mise, the P.A.R.K. managed to top the Zephyr V.H.F. Society's (W2LST) total by adding their two meter achievements and walking away with first place in the Club Aggregate division. Transmitters at WA2VLR? Two Clegg Zeuses...

This year was the first time that we've used a Novice competition in a contest, first in *The VHF Amateur* Twelve Hour Contest in March, and again in the Spring *CQ* affair. In both cases, WN2CUD took top honors, and deservedly so. And his status of third high in New Jersey was also no easy chore. But all good things must come to an end; next year will bring W*B*2CUD, eh?

We could go on and on pointing out jobs well done throughout the contest, but the truth of the matter is that exceptional work was done by so many, we'd run out of space! In any case our hat's off to all who participated.

Notes & Comments

WA2VLR—A fifteen minute delay at the start due to a blown fuse really started us off with a bang. Had to go out and *buy* them! Next year, we'll have a supply on hand before the contest . . . *WA2WNO*—Operating aids? V.f.o. which didn't work and 40′ of pipe (antenna masting) which crashed to the ground . . . *WA2YDN*—Why don't you try to hold a contest when the skip isn't coming in; they were messing up my contacts . . . *WA4JNL*—Most enjoyable for all of us! . . . *WA9ASZ*—My first contest. It sure was fun hearing Colorado, Florida, Connecticut, etc., all calling 'CQ Contest' . . . *KØGIC*—Worked four VE4s within the contest period but couldn't get a QSO number from them . . . *WØTRD*—Very fine contest . . . *W8KNC/7*—Enjoyed contest. Was disappointed to get so many 001 contacts, though . . . *WA4EEZ*—This was my first contest and I did my best, but didn't make too many contacts at first. But then the band opened! . . . *VP7CX*—Will have to get more logsheets next time—had to stop at 200. QRM was very heavy down this way . . . *K9DWR*—Give YL, XYL, Novice, and Technician awards to stimulate more activity on the part of the glory seekers (like me) . . . *WA9AVI*—There should be more contests like this one . . . *WA9GLU*—Went QRT at 0400 because of S9 noise level. It didn't stop all day . . . *KØYJG*—Congratulations on picking the day of the contest to coincide with a band opening . . . *WA6ZLV*—Great contest! Let's have another soon! . . . *WA6PKO*—My first contest—can scarcely wait till the next . . . *WA4GJU*—This club, with membership of 22, had a total of 16 members present during the contest at our portable location . . . *WA4FLU*—Wonderful contest. Would like to have had it last until about 10 P.M. Sunday night with a 6 or 8 hour "recess" (getting old) . . . *K3KEL/3*—Forgot about contest until it was almost half over. Is there an award for the lowest scoring station? . . . *W3JMP/3*—F.b. contest. Just wish I had more time to operate than I did . . . *K3UCA*—VP7CX was worked off the back of the beam, but even "head on" I couldn't snag WA2VLR . . . *K7RIE*—One hour before the contest started the skip was coming in and three hours after it was over the skip came back in. *Nuts!* The contest was a lot of fun, though, and I had a chance to work

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Club Scores

Call letters following each club listing designate the highest scoring club member or station. Totals are computed by adding all individual member totals, which are also entered separately in the other categories.

Peninsula A.R. Klub (N.J.) WA2VLR	822,828
Zephyr VHF Society, Inc. (N.J.) W2LST	704,550
Mt. Airy VHF R.C., Inc. (Pa.) K3IPM	644,820
Tri-State College A.R.C. (Ind.) W9BF	229,470
Montachusett A.R.C. (Mass.) K1YLU/1	219,024
VHF Repeaters, Inc. (Calif.) K6PXT/6	167,796
Merrimac Valley A.R.C. (Mass.) W1EUJ/2	149,760
6 Meter Club of Dallas W5EFH	135,880
6 & 2 Ham Club, Inc. (Ill.) K9DWR	135,788
Manchester Memorial H.S.R.C. (N.H.) K1UGZ/1	104,473
Six Meter Club of Chicago, K9ZWV	97,140
Cleveland A.R.C. (Tenn.) WA4GJU	77,985
De Paul H.S.A.R.C. (N.J.) WA2WNO	73,800
Marion VHF Hi-Banders, Inc. (O.) K8ZES	71,337
Five Towns R.C. (N.Y.) WA2JUG	66,906
Continental VHF DX Assoc. K2ZSQ/8	64,950
Central Ohio VHF Society, K8JZW/8	64,380
Triangle R.C. (N.C.) W4FDO/4	63,648
Oxford Furnace VHF C. (Va.) WA4JNL	31,973
Union County A.R.A. (N.J.) W2TND	27,540
Greensboro R.C. (N.C.) W4BUZ	26,507
Lake Washington A.R.C., Inc. (Wash.) K7RIE	17,375
Elmira A.R.A. (N.Y.) W2ZJ	11,232
West Allis R.A.C. (Wisc.) W9FLP	2550
South County A.R.S., Inc. (Calif.) WA6ZLV	1389
West Creek A.R.C. (N.Y.) K2CVD	660
Connecticut Mobileers, K1CRQ/8	322
Dayton A.R.A. (O.) WA8DSN	1

new stations . . . *WA6LYF*—Awards should be offered to the counties and not each individual state because competition with Southern California is quite difficult, if not impossible . . . *WA6QQI/6*—County idea appears to be the equalizer between the East and West coasts, as this political unit is rather uniform in extent . . . *WB6CKT*—My most enviable ability to stay awake comes from preparing for finals . . . *K7OCG*—There just isn't any interest here in Arizona in a contest. They're all waiting for XD . . . *WA2OOL*—Very enjoyable contest. Am looking forward to next year's . . . *WB2CWG*—Conditions were poor in the contest, but had a lot of fun . . . *K7IFE*—Not too much activity. Channel 2 has too many bluffed in this area! ■

General Competition

This group includes multi-operator stations using only one band and all single operator stations regardless of band or bands used. Number groups after call letters denote the following: number of contacts; number of counties; hour multiplier; band(s) operated and final score. Note: Since many contestants took advantage of the 1.25 power multiplier, simple multiplication of the number groups shown will not always result in final score presented here.

Alabama

K4BEI/4	77	33	17	6	44,197

Alaska

KL7EMG	5	1	4	2	25

Arizona

K7OCG	25	1	8	6	200

California

W6YX	94	26	24	6,2	58,656
W6BB	98	9	23	2	25,346
WA6QQI/6	93	21	8	2	19,527
K6SDZ/6	65	14	18	2	16,380
W6SAW	76	10	11	2	12,125
WA6LYF	62	7	17	2	9223
K6DPQ	39	9	16	6	7020
WA6PKO	35	8	13	6	4550
W6YKS	31	6	12	6	2665
WA6UAM	25	4	16	2	2000
WN6DAQ	17	6	12	2	1530
WA6ZLV	19	4	8	2	759
WB6BIG	16	4	7	2	630

Colorado

WØHMT/Ø	71	30	19	6	50,588
KØYJG	70	36	16	6	50,400

Connecticut

K1TLA	53	19	19	6,2	22,658
K1YEI	32	9	11	2	3960
K1RTS	9	18	8	2	1296
KN1ZLC	20	3	9	2	540

Florida

WA4EEZ	64	19	18	6	27,360

Georgia

K4YZE	12	3	14	2	630

Idaho

K7UGD	14	8	6	6,2	840

Illinois

K9DWR	93	26	24	6,2,1¼	72,540
K9ZWV	82	19	24	6,2,1¼	46,740
K9ZWU	64	18	20	6,2,1¼	28,800
WA9AVI	84	20	17	6,2	28,560
K9LAL/9	77	13	21	6	26,226
WA9FGW/9	74	11	24	2	24,420
K9CNN	60	18	20	6	21,600
K9AJY	60	12	18	6,2	12,960
W9CEK	62	10	16	6,2	12,400
WA9EJD	52	11	13	6	7436
WA9FIH	57	5	16	6	5700
K9ZPY	36	11	14	6	5544
WA9GLU	35	10	11	6	4183
K9RQU	51	8	9	6	4590
WA9FXX	46	9	8	6	4140
WA9CVX	38	7	13	6	3458
W9CMD	31	4	11	6	1705
K9VSW	27	8	4	6	1080
K9ABH	21	6	6	6	945
K9IOG	18	7	4	6	630
K9DTB	17	4	7	6	476
K9BBN	17	3	9	2	449
WA9AEN	9	5	6	6,2	338
K9KAE	14	2	6	6	238
K9SZT	13	5	2	6,2	163
K9ZNE	12	2	5	6	150
K9ZNF	13	2	5	6	130
W9JNQ/9	11	2	4	6	88
K9YHH	9	3	3	6	81
W9RHZ	10	3	2	6	75

Indiana

K9OYD/9	95	24	24	6,2	68,400
WA9ASZ	67	14	16	6	18,760

Kentucky

WA4CQG	50	14	22	6	15,400

Kansas

KØGIC	26	20	33	6	1560

Michigan

WA8DOR	91	12	21	6	23,142
W8VRH	61	19	18	2	20,862
K8NGR	42	10	16	2	8400
W8ZGW	26	11	16	2	4576

Minnesota

WØTRD	98	38	24	6	89,376

Montana

W8KNC/7	38	33	8	6	12,540

Nebraska

WØYOY/Ø	25	7	14	6,2	2450
WAØDJK	20	4	10	6	1000

New Hampshire

K1UGZ/1	131	29	22	6	104,473

New Jersey

W2LST	305	77	24	6	704,550
W1EUJ/2	160	39	24	6,2	149,760
WN2CUD	91	18	19	2	38,903
W2TND	72	17	18	2	27,540
WB2CWG	66	14	15	2	17,325
K2ZSP	40	18	8	6	7200
WB2BUR	20	6	9	2	1350
WA2ZOW	21	6	8	2	1260
WA2CMG	18	13	4	2	1170

New York

K2CBA	158	64	24	6,2	242,688
WA2FXV/2	141	68	24	6	230,112
WB2DFI	133	46	24	6,2	183,540
WA2IMG/2	142	40	24	6	170,400
WA2SPL	141	45	24	6	151,320
WA2HFL	94	34	24	6	76,704
WA2PVG	162	27	13	2	71,078
WA2JUG	35	12	5	2	26,650
WA2YDN	80	19	20	6	38,000
WB2FCU	60	18	19	2	26,650
WA2TGC	38	29	16	6	22,040
WB2DUW/2	41	14	20	2	14,350
WB2BHS	48	17	15	2	12,240
W2RPZ	43	14	16	2	12,040
WA2SUG	49	15	16	6	11,760
W2ZJ	52	18	12	6	11,232
WA2NZA/2	41	12	13	6	6396
WA2OOL	32	14	10	2	5350
K2CVD	11	8	6	6	660

North Carolina

K4QIF	58	19	24	6,2	33,060
K4MHS	59	15	23	2	25,444
WA4FLU	49	14	20	6,2	17,150
K4YYJ	48	13	13	2	8112
W4BUZ	46	9	13	2	6728
K4GPL	49	9	15	2	6615
WN4MFG	44	6	18	2	5940
WA4AJI	35	10	12	6,2	5250
WN4MST	35	7	15	2	4594
W4ACY	34	8	10	2	3400
WA4CCK	29	7	8	2	1624
WA4CUD	32	4	10	2	1600

Ohio

W8HBI/8	332	94	24	6	936,240
WA8AHU	128	32	19	6	77,824
K8ZES	79	43	21	6,2	71,337
K8JZW/8	74	29	24	6	64,380
W8KKF	73	22	24	6,2	38,544
K8PXX	38	14	14	6	9310
WA8EWT	51	12	7	6	5355
K8RXD	11	7	5	2	481
K1CRQ/8	23	14	10	2	322
WA8DSN	1	1	1	6	1

Oregon

K7IFE	19	8	13	6	2470

Pennsylvania

K3IPM	244	90	24	6,2	527,040
K3LOM	151	39	20	6	117,780
W3ETB	90	46	18	6,2	93,130
K3UCA	85	13	19	6	26,234
W3JMP/3	69	21	10	6	18,113
KN3WQC	49	12	16	2	11,760
K3RVS	27	9	15	2	4556
K3KEL	4	3	3	6	45

South Dakota

KØLER	12	7	6	6	630

Tennessee

WA4GJU	97	35	23	6	77,985
W4IMX	85	29	16	6	39,440
WA4FOE	69	27	20	6	37,260

Texas

W5EFH	115	21	24	6	57,960
K5CMC	92	28	20	6	51,520
K5IVB	66	16	20	6	26,400

Virginia

WA4JNL	49	29	18	6	31,973
WA4JMO	13	8	8	6	1040

West Virginia

K2ZSQ/8[1]	55	42	20	6	57,750
K8OHD	42	24	22	6	27,270

Washington

K7OQP/7	75	16	17	6	25,500
K7RIE	65	7	20	6	11,375
W7ANI	50	6	16	6	6000
K7JZP	20	7	12	6,2	2100

Wisconsin

W9FLP	34	5	12	6	2550

England

G2DHV/P	54	14	8	2	7560

French West Indies

VP7CX	197	94	13	6	240,734

Novice Results

WN2CUD	91	12	19	38,903
KN3WQC	49	12	16	11,760
WN4MFG	44	6	18	5940
WN4MST	35	7	15	4594
WN6DAQ	17	6	12	1530
KN1ZLC	20	3	9	675

All Band, Multi-Operator

(All Six & Two Meters)

WA2VLR	408	84	24	822,828
W9BF	136	59	24	229,470
K1YLU	169	54	24	219,024
K6PXT/6	231	29	24	160,776
W6NLO/6	256	15	24	115,200
K1PLR	131	29	24	91,176
WA2WNO/2	82	30	24	73,800
W4FDO/4	78	34	24	63,648
W1ALE	70	23	17	34,212
WA4CLF/8	52	16	24	24,960

[1]Staff, ineligible for award.

The Tattooed Ranger

BY DAVID C. YEOMAN*, WØQWY

The Viking Ranger is modified here for use with the Tattoo II. It permits the Tattoo to control the transmitter and receiver functions on c.w. and allows p.t.t., vox on phone, keyboard control on RTTY or a remote switch on any mode plus provisions for normal front panel operation. Those who already have p.t.t. simply adapt their unit.

PRESENTED here is a method of adapting the popular Viking Ranger transmitter for use with the "Tattoo II", which was featured in a previous issue of *CQ*[1].

The installation is a modification of the standard Push-to-Talk circuit for the Ranger, which, if already installed, requires only the addition of a d.p.d.t. switch and a few additional wires. When completed, it not only allows the Tattoo to control the transmitter and receiver on c.w., but also allows p.t.t. or vox on phone, keyboard control on RTTY, or a remote switch on any mode. An additional feature is that the rig may be returned to normal control from the front panel. This isn't provided in the factory circuit. By using this circuit, only one control wire need be brought out of the transmitter.

The modification was born when I changed over from make and break, to narrow frequency shift keying for identification on RTTY. After a few trys at turning two switches to get on the air, and usually forgetting one, I decided something must be done. Single switch operation from the remote RTTY table was desired. A little time with the Ranger instruction book soon revealed a modification of the Push-to-Talk circuit that would do the job.

The modification gave me remote control of the change-over along with keying the carrier in the c.w. mode. By changing a d.p.d.t. switch to a d.p.d.t. with a center "off" position, my original modification is just the ticket for adding the Tattoo. So if you're interested, follow me.

P.T.T.

If p.t.t. is not, as yet, incorporated, it will be necessary to obtain the components designated in the Ranger instruction book, plus a d.p.d.t. switch with a center OFF position.

Referring to the instruction book, in the section entitled, "Push to Talk Addition", complete steps *a* through *e*, skip *f*, and *g*, then complete *h*, and *i*.

Modification

Now we are all even and can proceed together. In order not to mar the panel and still provide front panel control, the FUNCTION SWITCH, S_1, is mounted on a bracket behind the dummy knob covering the crystal socket. The bracket, pictured in fig. 1, is made of .040 aluminum scrap.

If two crystals are to be used, a slide switch can replace the bat handle unit I used. This will provide the necessary clearance, but will be more difficult to operate. Center off slide switches seem to be difficult to come by, but if no RTTY operation is contemplated, leaving off the lead to clip 11 will allow a regular d.p.d.t. switch to be used.

After mounting the switch on the bracket, remove the two 6-32 screws which secure the crystal socket to the standoffs. Slip the bracket behind the socket so the switch is on the side next to the VFO-SPOT switch. Replace the screws.

After locating SW_{4A}, the Ranger OPERATE switch, and the appropriate clips[2], check if there is a jumper between 11 and 12. As supplied, the jumper is not included in the Ranger. However, it may have been added to increase spotting injection. If the provision for RTTY is to be included, this jumper *must* be removed.

[2]The nomenclature used here will be the same as that used in the instruction book.

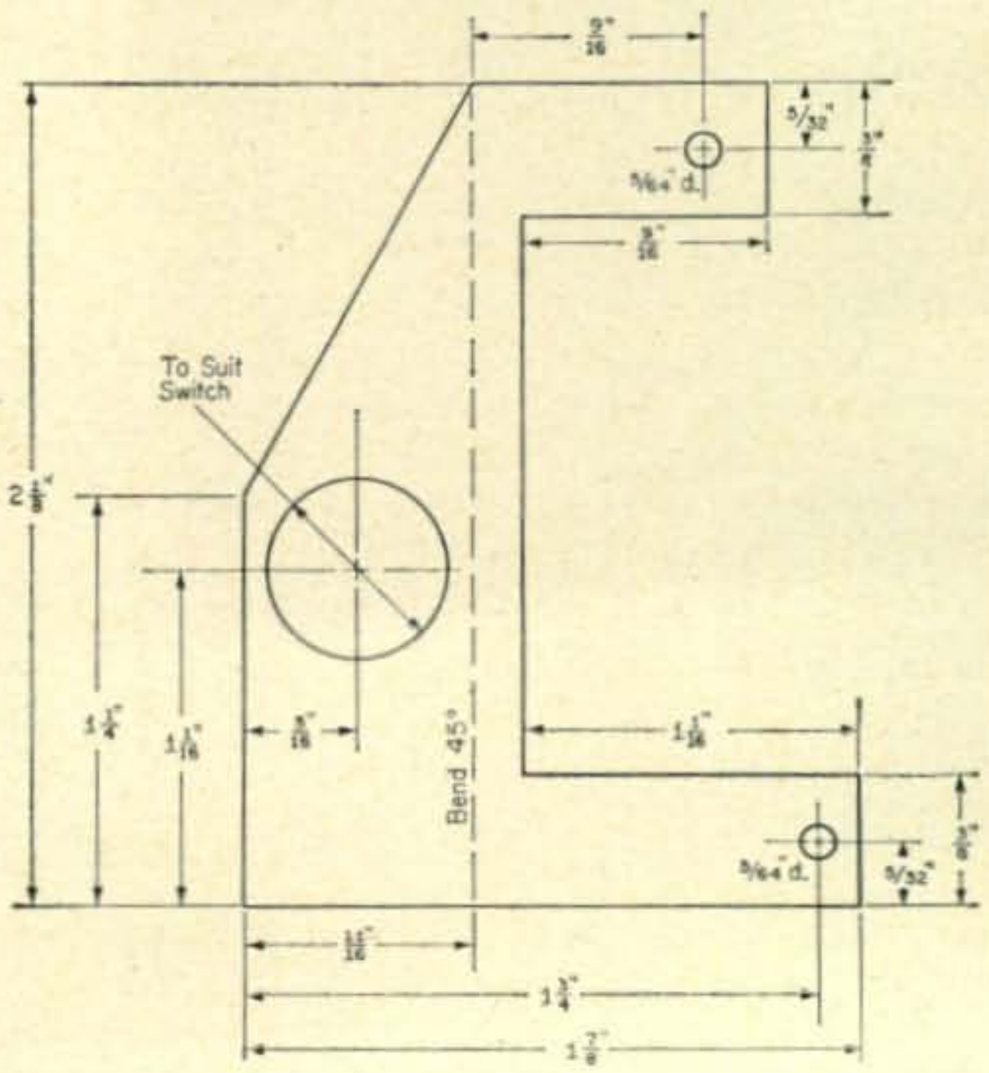


Fig. 1—Mounting bracket for the three position toggle switch to be mounted on the crystal socket of the Ranger. The left-hand section should be bent up.

*R.R.1, Toddville, Iowa

[1]Gunn, R.C. "Tattoo II, Automatic Station Control", *CQ*, September 1961, p. 50.

Now we dig in. Locate clip 5 on SW_{4A}; remove the blue and orange lead. In its place, connect two pieces of wire about 5 inches long. Connect one of these to the lower end of S_{1A}, the d.p.d.t. switch. Redress the blue and orange wire so that it may be connected, along with a 7 inch wire, to the common terminal of S_{1A}. Route the 7 inch wire through the hole by SW_{4A}, and solder the free end of it, and the free end of the 5 inch wire to one set of normally open contacts of the relay.

If p.t.t. has been installed previously, the jumper between clips 3 and 5 must now be replaced and the instructions in the next two paragraphs need not be followed.

The final leg follows. Remove the two black leads from clip 8 of SW_{4A}. Solder them to a 1½ inch length of wire and slip spaghetti over the joint. Now connect the other end of the 1½ inch wire to the bottom end of S_{1B}, the d.p.d.t. switch, along with an 8 inch wire.

Connect two wires to terminal 8, SW_{4A}. One about 2½ inches long, and the other about 4 inches. Drop the shorter wire below the chassis and connect to the common terminal of S_{1B}. The 4 inch wire and the loose 8 inch wire are now connected across the other set of normally open relay contacts.

If p.t.t. is already in place, the previous step has already been done, only in a different manner. All that is necessary is to run a pair of wires from the relay to the d.p.d.t. switch, being careful that the lead from the common terminal of S_{1B} goes to the same terminal as the black pair taken from clip 8.

For you c.w. fellows, this completes the job.

If an unmodulated, unkeyed carrier is desired, as in the case of RTTY, a lead from the top of S_{1B} to clip 11, SW_{4A}, will give it to you. The revised schematic is shown in fig. 2.

Operation

As for operation, if all is well, the following conditions should exist. With the switch toggle up, normal operation from the panel OPERATE switch should be obtained with no remote switching in either phone or c.w. With the switch in the middle "off" position, remote switching will operate in both phone and c.w. positions of the panel OPERATE switch. Flip the toggle down, and in the c.w. position of the OPERATE switch, an unmodulated carrier will be produced when the remote switching lead is grounded. Phone p.t.t. is still operative in this position.

Check that the antenna relay operates whenever the remote switching is activated.

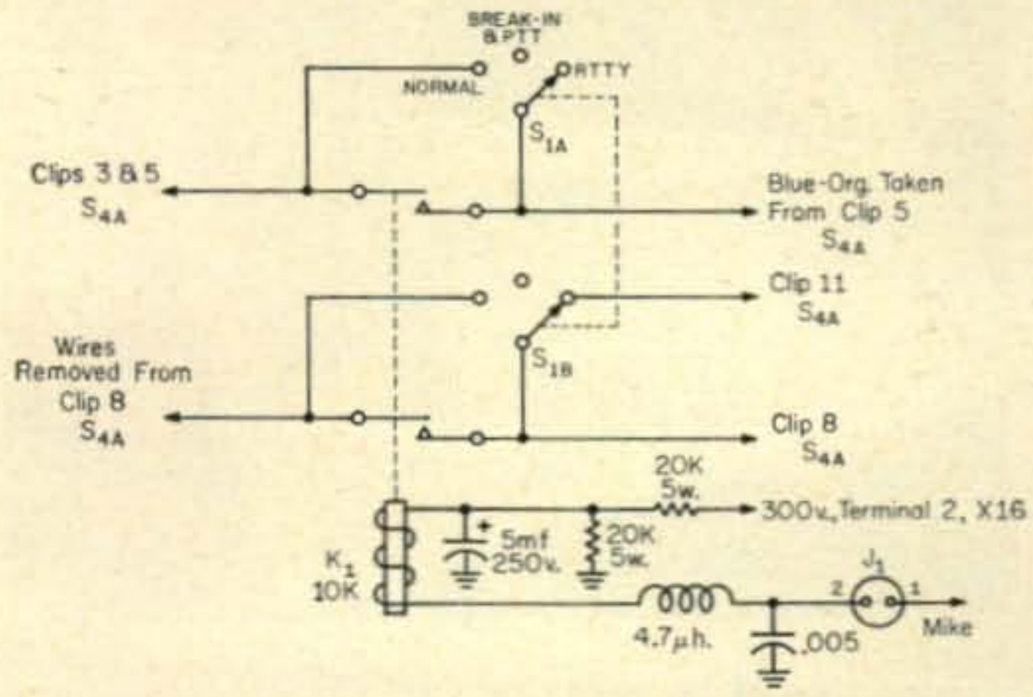


Fig. 2—Revised circuit showing the p.t.t. modification and the added three position toggle switch for the Ranger.

Connecting Tattoo II

To connect the Tattoo II, all that is necessary is to connect a phone plug on a pair of leads connected to J_2 of the Tattoo, and plug it into the Ranger key jack. Now connect a lead to the Tattoo relay, K_2, terminal, the other side of which is grounded. The other end should go to pin 2 of the Ranger mike plug, either through a plug such as on the mike cord, or an adaptor which will allow the mike to remain plugged in. The adaptor is shown in fig. 3.

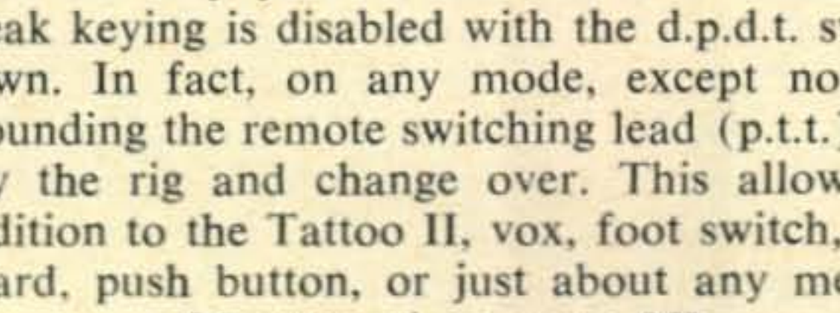
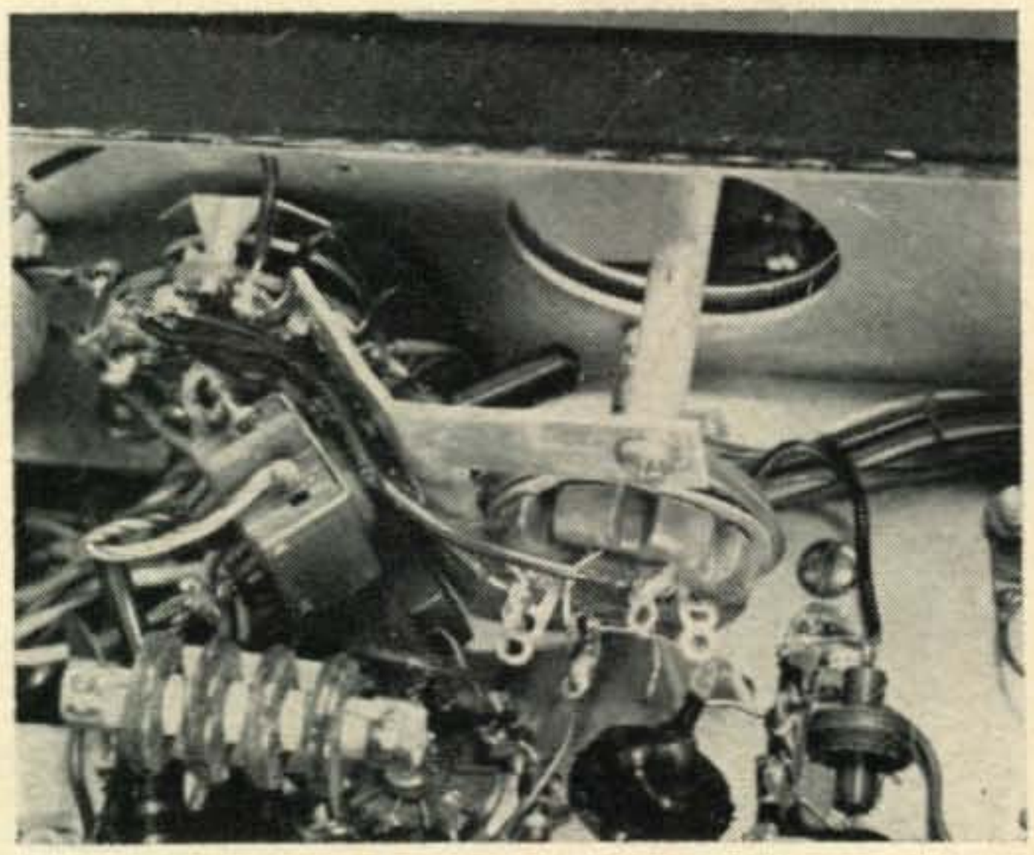


Fig. 3—Simple adaptor for connecting the Tattoo II to the Ranger through the mike connector.

To operate break-in keying, plug the key into the Tattoo, push the d.p.d.t. switch to the center "off" position, move the panel operate switch to cw position, hit the key and away you go. To receive, just stop sending.

For RTTY, using f.s.k. for identification, turn the d.p.d.t. switch down. Any method of grounding the p.t.t. lead will key the rig and change over from receive to transmit. It should be pointed out that f.s.k. identification must be used since the key jack is shorted, and make and break keying is disabled with the d.p.d.t. switch down. In fact, on any mode, except normal, grounding the remote switching lead (p.t.t.) will key the rig and change over. This allows, in addition to the Tattoo II, vox, foot switch, keyboard, push button, or just about any method

[*Continued on page 88*]



The three position toggle switch is mounted on the crystal socket of the Ranger with the special bracket. The dimensions for which are shown in fig. 1. Photo by KØOYI

A Quarter Wave 80 Meter Marconi

BY E. H. MARRINER*, W6BLZ

Here is another application of the old quarter wave Marconi antenna which has been neglected for many years. This article shows how to erect a short 80 meter antenna in the backyard.

ANOTHER new antenna? No, just another application of the old quarter wave Marconi antenna which has been much neglected for many years. This article will show how to erect a short 80 meter antenna in your back yard.

My 80 meter dipole type antenna was suspended between two 25 foot four by fours. The antenna was 125 feet long and weighted down in the center by the coax feeder. When the wind was blowing the continual scratching of the drooping wire hitting the roof of the house kept me awake all night! The dipole antenna also paralleled the telephone line coming into the house and coupled my s.s.b. signals into the telephone conversation. Another bad feature was that it disrupted my neighbors f.m. reception. The solution was obvious; move the antenna to the front yard away from surrounding objects and houses.

A vertical antenna was tried for awhile, but living near the sea-coast, the corrosion soon toppled the aluminum irrigation tubing used for the antenna. Looking around for a better solution and a maintenance free antenna of short length, a quarter wave Marconi seemed like the best solution. Radiation into the shack could be minimized by removing the end to the front yard and feeding it via coax and a tuner box mounted at the base of the 4" × 4" mast.

*528 Colima Street, La Jolla, California

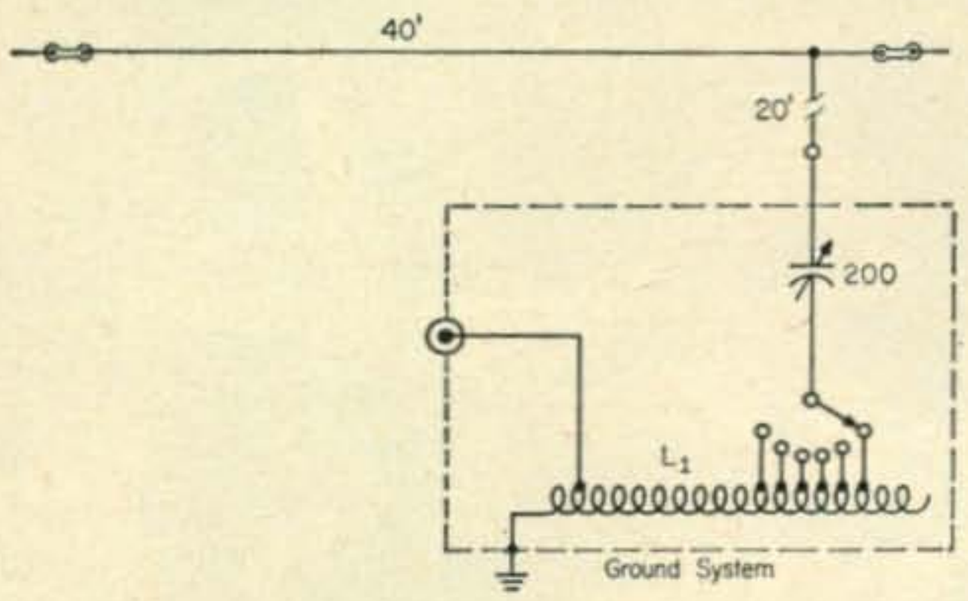


Fig. 1—Dimensions for the 80 meter quarter wave Marconi and the details for the tuning unit. The ground system is discussed in the text. The coil is 24 turns of Air Dux #2408 and the capacitor is a 200 mmf unit salvaged from a BC-375E tuning unit.

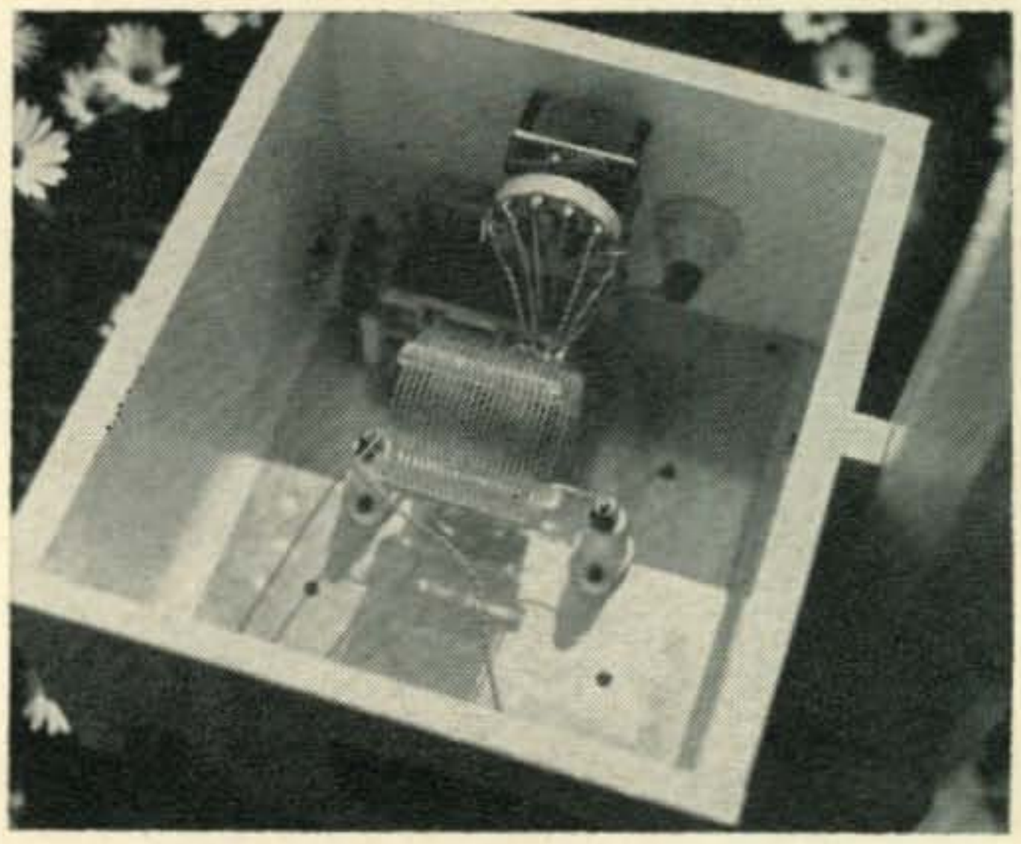
Reviewing the literature I found many construction hints on making a half wave antenna but none showing the quarter wave type. We decided to give it a try anyway and proceeded to hook 40 feet of wire from my chimney over to the mast and drop it down 20 feet to a tuner box. The tuner box had a 200 mmf variable capacitor in series with this wire and a tapped coil. A 150 feet of length of RG-8/U coax feed was buried in the ground at a depth of three inches running from the shack out of the mast. For a match to the antenna, the coax was tapped up from the ground end of the coil to the proper impedance point.

As it turned out I set the tap at 3850 kc and could easily cover the whole eighty meter band by tapping the coil length to gain antenna resonance without bothering this matching tap. You may find it a bit awkward to run out on the wet grass in your bare feet during the middle of the night. If you have tender feet a fixed coil could be used and the capacitor tuned to resonance by using a reversing d.c. hobby type motor to remote control the operation.

Tuner Construction

A plywood box 12 × 12 × 10 inches high is mounted at the base of the mast and painted

[*Continued on page 88*]



Interior view of the tuner housing. The aluminum plate on the bottom may be seen but the right plate is not visible. The clips for tapping the coil are type WC-1 made by E. F. Johnson Co.

Professor Samuel Finley Breese Morse

An Appreciation *

BY DAN McCOY†, W8DG

TODAY—April 27th marks the 172nd anniversary of the birth of Professor Samuel Finley Breese Morse. Among the several hundred of you gathered here tonight, there are probably many who have never heard of him and a few who have heard of him only in a vague sort of way. Few radio amateurs and those engaged in commercial radio realize the debt that we owe to this man. He was the inventor of the telegraph. Morse provided one of the basic foundations upon which our beloved hobby is built.

Morse was born at Charlestown, Massachusetts, in 1791. He came from good solid American stock. His father was a militant orthodox clergyman, an early patriot and a friend of George Washington and Daniel Webster. He was also a recognized authority on geography and has been referred to as the father of American geography. His mother was the granddaughter of Dr. Finley, one of the founders of Princeton University.

Early in his life, Morse showed considerable talent for drawing and painting. At the age of four, he was punished by his teacher for scratching an excellent likeness of her on a chest of drawers. At fourteen he was quite an accomplished artist when he entered Yale University, his father's Alma Mater. There he helped support himself by painting portraits on ivory of members of the faculty and of students for five dollars each.

Morse first became acquainted with electricity at Yale where he dabbled around with some minor experiments. Upon graduation in 1810, he forgot about electricity and elected to pursue art as his life's work. He went to London for further study, did well in his art work, and gained fame in 1813 when he won the Gold Medal at the Society of Arts.

Financial reverses forced Morse to return home in 1816. He tried to support himself traveling through New England painting portraits but found little patronage. Financial reverses plagued him for the next 30 years.

Through his father's help, he went to Charleston, South Carolina, a budding social and cultural center, and was introduced into the right circles. He rapidly gained fame there as a portrait painter and received commissions from most of the leading families. One of his portraits, a picture of James Monroe, then President of the United States, hangs today in the Charleston City Hall.

In 1819 he returned to New England and married Miss Lucretia P. Walker of Concord, New Hampshire. He took his bride to Charleston and they remained there for three years. Financial reverses again caught up with him and he returned north to New York City where he managed to earn enough money to open a studio.

His big break in art came when the City of New York commisioned him to do a full length painting of General Lafayette. The General sat for Morse in the White House at Washington. This portrait now hangs in the City Hall at New York. Morse now was one of the first ranking American painters.

While Morse was in Washington at work on this picture his wife died in New Haven, Connecticut. The slowness of communication of the times was then brought forcefully to his attention. Seven days after his wife's funeral he received word of her death. This slowness of communication prompted Morse to return to his old hobby of electricity. In 1829 he took a deep interest in a series of lectures on this subject at Columbia College. That fall he returned to Europe to continue his studies of art and devoted three years to painting in the famous galleries there.

While there he found time to study the system of semaphore signals which lined some of the highways leading from Paris. This was a visual system in which semaphore arms were set at various positions to denote words. On clear days messages were relayed from one tower to another. Morse considered this a step in the right direction but far from being an answer to speedy communications. He developed a numerical system of dots and dashes choosing a lexicon of basic words and giving each word a number. From this beginning the American Morse Code grew.

About 1831 financial worries again overtook Morse and forced him to return to New York. He is quoted as saying "My shoes are out at the soles and I must return to painting for my living." However, his interest in communications again revived and during the winter of 1835-1836 he built his first crude telegraph instruments and carried on further experiments. Morse was not a good mechanic, but by September, 1837 he had perfected his instruments sufficiently so that he could demonstrate them to his friends.

*Address to the 1963 Dayton Hamvention Saturday, April 27, 1963.

†7546 Normandy Lane, Dayton 59, Ohio.

He had stretched 1,700 feet of wire around his room at New York University, placed his sending instrument at one end and his receiving mechanism at the other. Alfred Vail, a friend who years later became President of the Western Union Telegraph Company, was so impressed that he set about finding a financial sponsor. Vail was an excellent amateur mechanic and possessed an energetic spirit. He finally convinced his father, Judge Stephen Vail, owner of the Speedwell Iron Works, Morristown, N. J., of the value of Morse's idea. Vail's father advanced $2,000, which was a large sum of money at that time. He also granted the use of his machine shop. Morse and Vail retired to the Speedwell Works at Morristown to continue their experiments.

By January 6, 1838, a greatly improved set of instruments of sound design and workmanship had been built. Three miles of wire was stretched around the Morristown factory to prove to Judge Vail that he had not wasted his money. The Judge was skeptical when he arrived for the test on that eventful day. His business and social friends had been laughing at him for supporting this fantastic idea of a "wild-eyed" dreamer. Bankers told the Judge that he had wasted his money.

Judge Vail wrote out this message "a patient waiter is no loser." He entered the factory, gave the message to Morse to send to Vail at the other end of the wire. He told his son; "If you receive that message in this room, it being some distance from the sending instrument, I will believe that this idea of Morse's is a sound one." The message came through of course, exactly as written.

Judge Vail then encouraged the two to demonstrate the idea to the public immediately. Morse and Vail returned to New York University to prepare for a public test to be held on January 24, 1838. In the presence of a group of leading New Yorkers a humorous message was successfully sent and received. Shortly after, Morse and Vail demonstrated their telegraph before the Science and Arts Committee of the Franklin Institute at Philadelphia and received its endorsement.

After heartbreaking effort, Morse finally persuaded Congress to assist him. Thirty-thousand dollars was appropriated for a practical demonstration between Washington and Baltimore. The Honorable Francis O. J. Smith, Editor of an agricultural paper *The Maine Farmer*, a member of Congress and a man of much influence, obtained the contract to lay the pipe in the ground which was to contain the wires between Washington and Baltimore. Smith asked Ezra Cornell, one of the founders of Cornell University, to invent a machine for digging the ditch that would leave the dirt deposited on one side and another machine to fill in the trench. Cornell was successful in this and Morse inspected the machines in August, 1843. While Cornell's machines were successful, the wires and pipes which they had laid were not, due to lack of proper insulation.

Morse then decided to string the wires on poles. Cornell invented an insulator for the wires which was adopted. Morse obtained permission from the Baltimore and Ohio Railroad to erect his poles and string his wires along their right of way from Washington to Baltimore. The line was completed in May, 1844 with the Washington end in the Capitol Building and the Baltimore end in the Pratt Street station of the Railroad. Morse remained in Washington and Vail went to Baltimore.

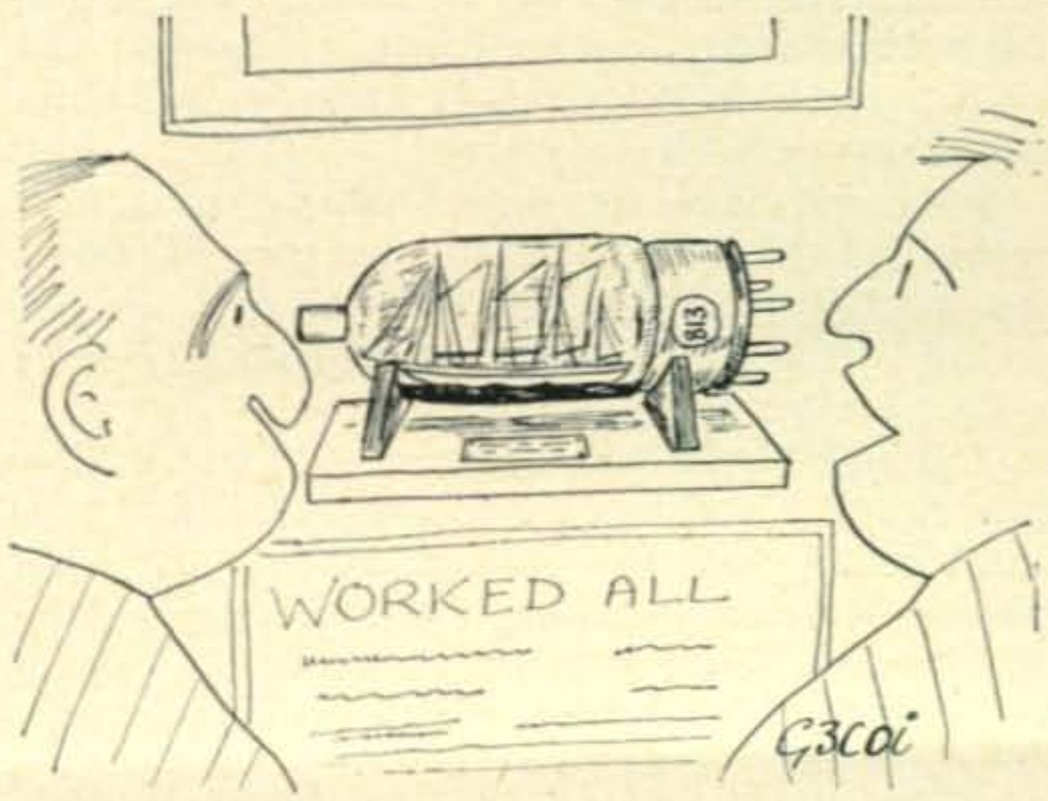
On May 24, 1844, by 8 A.M., an important crowd had assembled in the small Supreme Court chamber of the Capitol. A few minutes later, Miss Annie G. Ellsworth, daughter of the Commissioner of Patents and a friend of Morse arrived. She and her mother had been designated to select an appropriate text from the Bible for the first message.

At 8:45 A.M. Morse began slowly tapping out the now famous message "What Hath God Wrought?" (Numbers 23:23). Vail received it at Baltimore and repeated it back to Morse, in Washington, where it was received with cheers. However, there were still skeptics in the crowd. Therefore Morse and Vail carried on an extended conversation. They exchanged the time, news of the two cities and commented on the weather. The wife of James Monroe, former President of the United States, sent a message of greeting to her friend Mrs. John Wethered in Baltimore.

Three days later news from the Democratic Convention, then in session in Baltimore, was received by telegraph in Washington causing great excitement. Martin Van Buren seemed the likely winner of the Presidential nomination, but James Polk won. Hours after the news had been received by telegraph, it was confirmed by people arriving in Washington by train from Baltimore. From then on, as we say in slang today, Morse "had it made."

Many honors came to Samuel Morse. A bronze monument to his memory now stands in Central Park, New York City. It was erected by subscriptions from the Nation's telegraph operators. Morse's memory was a love passed on to these men that succeeded him. His telegraph key

[*Continued on page 88*]



". . . I won it in a maritime mobile contest."

DX DX DX DX DX

URBAN LE JEUNE, JR.*, W2DEC

The following certificates were issued between the period from May 6th, 1963 to and including June 5th, 1963:

CW WAZ

1803	HA5KBP	Central Radioklub of Budapest
1804	OH2BZ	Markku Aalto
1805	OK1FV	Vomocil Vaclav
1806	VK3AHQ	Henry Denver
1807	DJ2HI	Jo Thiele
1808	DL3ZI	Manfred Staar
1809	UA3FT	Ivan Kazansky
1810	OH2A	Suomen Radioamatoorilitto RY
1811	DL1XS	Ludwig Luther
1812	K8PUU	Paul R. Nelson
1813	K6TQR	W. J. Thompson
1814	SVØWZ	Sergeant R. Horn

ALL-PHONE WAZ

199	HK3LX	Edmundo Quinones P.

TWO-WAY SSB WAZ

168	K8NZD	H. C. Anderson

CW WPX

442	UA9DT	Vadim V. Kozlov
443	HA5BI	Istvan Biro
444	W7DIS	Allen N. Davis
445	DJ2SR	Ernst A. W. Munter
446	PY4AP	Hipacid Gomes Marra
447	OH9PF	Teuvo Hulkko
448	UA4PA	Oleg A. Safiullin
449	KØIKL	Mrs. Joyce L. Polley
450	GI3JEX	David Butler
451	WA2KSD	Brian Alsop

PHONE WPX

92	F8HA	Jacques de Maussion
93	ZE2JE	Dudley N. Kaye-Eddie

SSB WPX

135	W8JXY	Chester W. Bolg
136	ZE1JE	Molly E. Henderson
137	W5DNL	Mel Malkove
138	VE3PV	Peter Victor Travis
139	K2POA	Arthur B. Johnson

WPX ENDORSEMENTS

	Mdoe	*Continent*	*Band*
K1KPS	CW	E	
W7ABO	CW		20
W9GFF	CW	F	
DJ5VQ	CW	E	
	Mixed	E	
DL9OH	Phone	F	
F8HA	Phone		20
KP4AOO	Mixed		20
OK3EA	CW		80
UA3FT	CW	E	

A-Asia; *E*-Europe; *F*-Africa; *N*-North America; *O*-Oceania; *S*-South America.

Here and There

EAØ Spanish Guinea: EAØAB seems to be quite active on 14032 kc c.w., 2000 GMT preferred. (*Tnx VERON*)

FR7/G/T/E Glorieuses-Tromelin-Europa: From our friend, Chas., F9RS, comes word that all three of these rare spots recently put on the DX Map by Gus will now be permanently activated by resident amateurs some time this year.

GC Alderney: G2HFD will be on from Alderney between August 11 and 30, mainly on 14 mc, but also on 1.8 and 3.5 mc, all s.s.b. QSLs go to 20 Lock Chase, Blackheath, London, S.E. 3. (*Tnx G2BVN*)

HL Korea: Frank, HL5X, has been signing 6N5X lately. I don't quite understand why as the other Korean stations are still using HL or HM. (*Tnx KL7FAR*)

JT1 Mongolia: Vlad, UA3CA, has now arrived in Mongolia and is very active signing JT1CA around 14110 kc, s.s.b. Vlad will stay there for a very long time, probably a year. He will very shortly be joined by another Vlad, UC2AR.

*Box 35, Hazlet, New Jersey.

WAZ and WPX

THE WAZ and WPX certificates are awarded by the *CQ* DX department. WAZ is issued for proof of contact with the 40 Zones of the world as shown on the official WAZ Zone Map. WAZ is issued in three classes, *i.e.* Any mode, all phone and all s.s.b. For complete rules, see the January, 1962 *CQ*, page 50.

WPX is issued in four classes, *i.e.*, all c.w., all phone, all s.s.b. and Mixed. The number of prefixes required are: C.w.-300; Phone-300; s.s.b.-200; Mixed-400. For complete rules, see January, 1962 *CQ*, page 52. WAZ applications, Zone Maps and WPX applications may be obtained from the DX Editor at the address shown at the head of this column. Please send a self-addressed, stamped envelope or a self-addressed envelope and an IRC. All applications should be sent directly to the DX Editor.

WPX HONOR ROLL

C.W. WPX

W2HMJ	685	YU1AG	503	DL9KP	450	W4DKP	410	CT1PK	600	W5ERY	358	K4PUS	305	W8JIN	605
W8KPL	632	W5LGG	502	W8JIN	449	W1CKU	408	W8WT	576	W8JIN	356	DJ3CP	304	W3OCU	588
W5KC	629	W6YY	502	W9UZS	447	K4IEX	408	G3DO	576	PY2CK	354	K1IXG	303	K9EAB	578
W2AIW	617	DL7CS	502	W8RQ	445	K4JVE	407	W9YSQ	471	5A5TO	353	WA2SFP	300	W6YY	570
W2EQS	605	K2CPR	501	W3AYD	443	W5AFX	407	CT1HF	466	W1ORV	351	K2TDI	300	W4BYU	557
W6KG	574	W9SFR	501	OE1FF	442	W7HDL	405	W9UZC	462	LA5HE	351	W3VSU	300	W3AYD	552
W4OPM	571	W2EMW	500	W3BQA	437	W4YWX	404	MP4BBW	454	W6USG	350	W4NJF	300	YU1AG	552
W9UXO	566	W2FXA	500	LA5HE	437	GI3OQR	404	PAØHBO	453	ZS6IW	350	W4RLS	300	HB9EU	551
K6CQM	565	K2ZKU	500	ON4FU	433	KP4AOO	404	W6YY	448			KØRDP	300	W2GT	528
W5OLG	564	K9EAB	497	VE3ES	433	ZS4MG	404	G8KS	430			WØCVU	291	G8KS	520
DL1QT	552	W2MUM	495	W8UMR	429	K2ZRO	403	VK6RU	421	**S.S.B. WPX**		GI6TK	278	K9AGB	510
W2NUT	550	W1WLW	494	WØAUB	429	W9DYG	403	W3AYD	420			WA2EOQ	275	W5LGG	509
W1IJB	546	OK3DG	488	W2RA	428	W9IHN	403	F8PI	418	MP4BBW	462	VE3ES	274	K2ZKU	508
K2UKQ	546	SM5CCE	488	K5LIA	428	VE6VK	403	PZ1AX	413	W4OPM	451	K2JFV	266	W9DWQ	508
W9YSX	544	W4BYU	487	OK1MB	428	K4TEA	402	K9EAB	412	G3AWZ	428	K2MGE	263	W4BQY	505
W9GFF	538	W8PQQ	481	W3CGS	426	G8PL	402	K2CJN	409	HB9TL	423	W3AYD	262	W3KDP	501
SM7MS	534	W4HYW	478	W1EIO	425	WA2CBB	401	DL3TJ	404	W3NKM	402	W4EEU	262	W8UMR	500
ON4QX	533	W3OCU	466	KL7MF	424	K9BVR	401	W1UOP	402	G3DO	402	VE3BKL	259	LA5HE	500
W1EQ	528	K6SXA	464	SM5WI	424	WØVBQ	401	G3NUG	400	K9EAB	401	XE1CV	256	DL3RK	493
W2HO	526	W2KIR	463	WØPGI	420	IT1TAI	401	VE3BQP	386	G8KS	400	G3FKM	255	JA2JW	480
K9AGB	515	DJ2KS	462	HB9TT	419	VE3JZ	401	OE1FF	382	W3MAC	381	UR2AR	255	WØMCX	476
KP4CC	515	PY4OD	462	G3HIW	418	OE3WB	400	SP7HX	381	G3NUG	356	K5OGP	254	W3CGS	475
IT1AGA	515	JA2JW	461	W8IBX	416	SP4JF	400	TG9AD	381	TI2HP	356	W6USG	252	W9FVU	474
G2GM	513	W9WCE	458	WØMCX	416	SP6FZ	400	DL6VM	376	PZ1AX	345	TG9AD	252	G3FKM	463
W6WO	511	W3BCY	457	K2PFC	415	VE1AE	400	DJ3CP	375	VE3BQP	334			DL1YA	456
W2GT	510	OK3EA	456	VK3XB	415	VE4OX	400	PAØSNG	369	W2HXG	324	**Mixed WPX**		WØVBQ	452
W8LY	506	UC2AR	456	W5AWT	412	VK3KB	400	G3FKM	366	W2VCZ	320			PAØLOU	452
W9DWQ	506	DL3RK	454	W5DA	412			W8UMR	363	W6YMV	320	W4OPM	629	GI6TK	450
G3EYN	503	PAØLOU	451	K5LZO	411	**Phone WPX**		SM3AZI	362	W1UOP	318	W9YSX	622	HK3LX	450
		W3PGB	450	WA2DIG	411			SM3EP	361	W2YBO	318	G3DO	617		
		DL1YA	450	W2PTD	411	W9WHM	600	W1DGJ	358	W8PQQ	315	W8WT	607		
										W1ORV	307				

UC2AR will operate c.w. and s.s.b. (*Tnx VERON*)

KG6 Guam & Mariana Islands: Although the following letter from WG6ALS is quite long, it is repeated in its entirety in the hope of clearing the situation.

"Sorry to hear that people back in the States are confused about happenings out here in the Mariana Islands as implied in a letter in your May DX column. I am afraid that the letter, as published, will only add to the confusion so would like to put forth a few more facts and either straighten things out once and for all or confuse them even more.

"At approximately the same time that Guam became a separate country for DXCC the Trust Territories for the Pacific Islands was in the midst of moving nearly all their Government Offices from Guam to Saipan. Is it any wonder that requests for amateur licenses was given a back seat? Can you imagine how much confusion there was trying to see that records, office equipment, families of employees and countless other things were shipped to Saipan, plus trying to run as efficiently as possible? I am sure this individual was not being given the usual run around nor was anyone trying to pass the buck. They were trying to look after the welfare of the thousands of people who would be affected by this move. To me, this is much more important than a DXpedition.

"Phil, K7GCD, applied for a license after the move was completed and was treated most cordially. The call KG6SZ has been set aside for DXpedition purposes to Saipan. Phil, Bob (KG6ALD). Fred (K9IOZ/KG6), and myself made the pilgrimage to Saipan on 22 March 63 returning to Guam 25 March 63. While there we used this call. Saipan is the most logical place for a DXpedition in this area due to availability of housing, transportation to the Island, eating establishments and other every-day necessities. This is not meant to belittle the other islands as they are just as attractive and the people are just as friendly as they are on Saipan. On Saipan you can work and live without being a burden on the local populace.

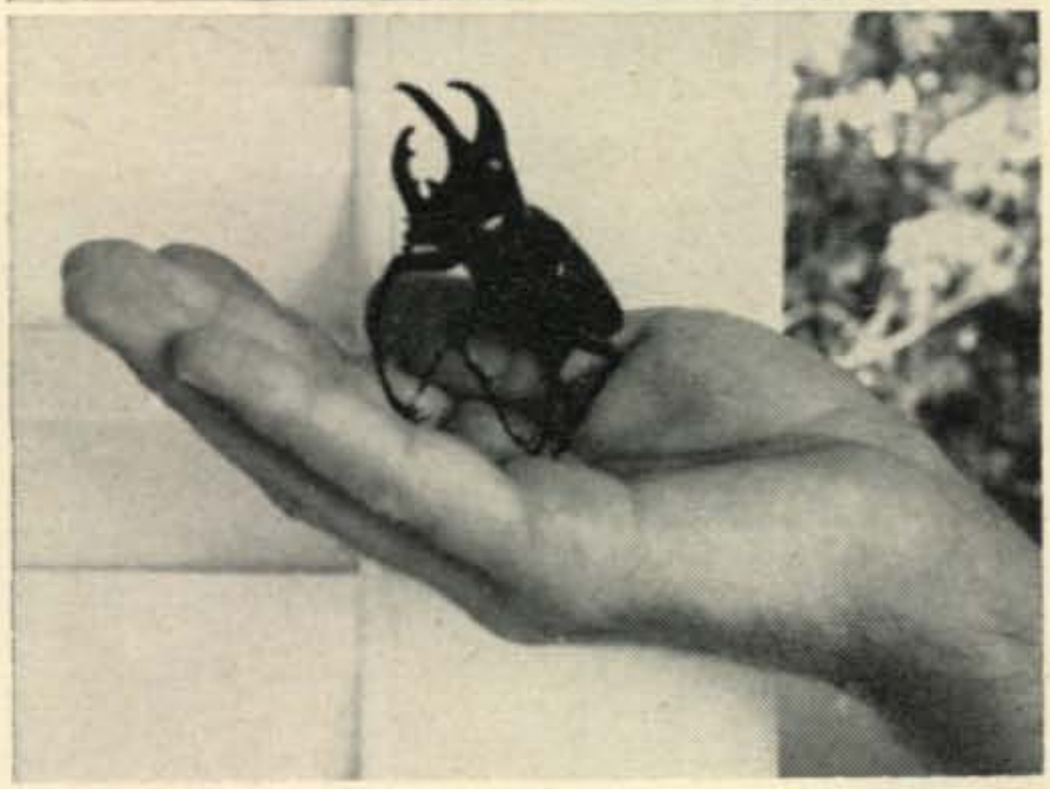
"The four of us met Mr. M. W. Goding, the High Commissioner of TT and also Mr. José Benitez, the Deputy High Commissioner. They most certainly do not impress me as being "Buckpassers." We received every consideration and courtesy they could bestow upon us. Mr. Benitez even payed us a visit during our operations and it wouldn't surprise me if someday you work a KG6S? station and the ops. handle will be "José." Mr. John Welch handles licensing for TT. We had problems arise which were cordially and swiftly resolved usually in our favor. Never once did anyone get unpleasant with us.

"On the 23 of March a Seaman from the Coast Guard Station took his Exam and got on the air as KG6SA. The club station rig is a bit sick but should be in good shape by now. Father Sylvan, KG6SE, is also active. At the time he was using a Globe 65A transmitter. He now has a DX-100 and SB-10 adapter. Since the typhoon, power has been a problem for Sylvan but in short order he will be banging into the States. Steve, KG6AED is on Saipan, now working on getting power back on for the island and he is using the KG6SZ call. Also, KG6RD, is active from Rota. DXpeditions to this area should be minimized for the present with this bunch on.

"The island, three miles off the southern tip of Guam happens to be Cocos Island. It is nothing but a wide spot in the reef that attaches to Guam itself. The U.S. Coast Guard, and not the Navy, maintains a Loran station there. They take up about one-fourth of the entire island. The balance of the island is privately owned. Only power available is at the Coast Guard station.

"Legally this island is under the jurisdiction of Guam. One individual tried to set up a gambling casino out there but immediately gave the idea up when the Guam law-enforcement agencies pointed out that the island belonged to Guam itself. The Navy does not rule the island. Please do not try to point out this Navy rule to a Coast Guardsman.

The four smiling gentlemen are in the usual order Dale, W2ZX; Paul, K2DCA; Pete, K2OEA, and Bob, W2FXN, and as the banner exclaims, they comprise the Mark IV DX Ass'n.



Ron Skelton, VS4RS, was not only bitten by the DX bug, but caught the critter in the act. Since being bitten by the bug, Ron is active daily on 20 meter c.w. between 1300 and 1500 GMT. Now, we need a picture of a "DX Hog" to complete the menagerie.

"Just received information today that the Coast Guard Station on Ulithi Atoll (KC6) will have a station operational very soon.

"I strongly advise that anyone having queries regarding the Mariana Islands write directly to the Mariana Amateur Radio Club, Box 445, Agana, Guam. They, if no one else, will have complete and up-to-date information.

"If you plan to visit Saipan, wait! At least until the typhoon damage is cleared up. Let's not burden these people with DXpeditions when they have far more important tasks ahead of them. I will guarantee that if you approach Mr. Welch in the right way and at the right time your DXpedition will be a happy and long-remembered affair."

Thanks a million for throwing some light on the matter, Mel.

KG6 Marcus: KH6PD/KG6 and JA1EEB/KG6 are being helped by a new arrival K1NPN/KG6. (*Tnx NCDXC*)

KP6 Palmyra: W6FAY/KP6 will be active until the end of September. Jay will make a special effort on 160 and 80 for the low frequency boys. QSL to his home QTH. (*Tnx W6FAY*)

PK Indonesia: W9AAC/PK1 is authorized to operate on 14349 on *Lower* sideband only. No one has reportedly worked him locally. Flip the switch to l.s.b. and keep an eye out for him. (*Tnx WWDXA*)

PX Andorra: From August 31st to September 7th, F2MO and F2QX will be signing PX1MO and PX1QX. All bands 10 thru 80 meters will be used. QSL via their home QTH.

VK4 Willis Island: Beginning June 13th, 1963 a change of personnel takes place on Willis Island. The new operator will have the call VK4JQ. He is John Copley ex-G3DYD/VR3N/JZØPC/VK2AVU. He has Swan transceiver 14 mc only. For c.w. he has the following crystals 3506, 3410, 3520, 7025, and 7050. For s.s.b. the following crystals 7055, 7060, 7065. He hopes to be as active as conditions permit but will be limited by fuel, commercial skeds, weather and radiosonde work. Willis has one ship per year and is a completely isolated cyclone warning station 300 yards long and 100 yards wide. He will be there for one year. (*Tnx VK2AGH*)

VK9 Christmas Island: ". . . big things take time to get moving, and we think it's a big thing that the Christmas Island A.R.C. has now been formed and officers elected.

"We have approximately 40 enthusiastic members of all races; Indian, Chinese, Malay and European, and the spirit of Amateur Radio prevails.

"Our Club transmitter, under the call VK9DR for the present will be installed shortly. Shortage of gear has been the problem. Aerials are up, and lead-ins waiting forlornly.

"Ahrone bin Arripin, our Club librarian, has built a t.r.f. receiver/phase-shift oscillator combination for club use, and we will be monitoring the 20 and 40 meter bands, prior to installation of transmitter.

"When we get going we will be looking for DX on Saturdays, on 20 and 40 meters between the hours of 0400 GMT and 0700 GMT, under the call VK9DR.

"Our Club will have the loan of Hammarlund transmitter and receiver for two months, commencing in August. Get the boys ready for DX contacts.

Through the courtesy of the British Phosphate Commissioners, we have the use of a very fine radio shack, complete with lecture room, operating room and workshop. We have all instructional facilities including a recorder.

Our lads are very keen and we trust that the Club's efforts will be the means of guiding many an Asian lad into a useful electronic occupation apart from his interest in ham radio.

QSL officer Ron Ashley will see that QSL is 100% thru the Bureaus. Although VK9DR is the only licensed Amateur on our roll at present, it is probable that we will have more active hams in the near future."

The above letter, which was relayed by VK4SS, is from Don Reed, VK9DR.

VK9 Cocos Keeling: VK6RU skeds VK9LA Sundays on 14100 at 2300 GMT. (*Tnx NCDXC*)

VS4 Sarawak: VS4RS usually found on c.w. has recently been active on a.m., 14245 kc working s.s.b. stations. (*Tnx WGDXC*)

VU2 India: VU2AJ, Dutt, is very anxious to complete 10,000 contacts with W/K stations and even hopes eventually to have 10,000 different ones. He presently has over 3,000 different ones and is nearing the 10,000 mark on totals. W5NA offered to put up a suitable award

for him when he reaches his 10,000th contract.

He can usually be found from 0200 to 0300 GMT short path, and continues a little later if conditions are good. His frequency is around 14040, c.w. only, and varies a few kc up or down to get away from interference. (*Tnx W5VA*)

ZS2MI Marion Island: ZS2MI is now QRV with c.w. on Saturdays and Sundays around 1200 GMT on 14060 kc. (*Tnx VERON*)

4X4 Israel: 4X4LC has resumed operation after about a year off the air. He can usually be heard every weekend on 14105 kc s.s.b. at 1700 to 1800 GMT. All QSLs can be sent via K2ORY. (*Tnx K2ORY*)

Norwegian Prefixes

The following is a breakdown on the Norwegian prefixes in addition to the usual "LA":

LB, Jan Mayen, Svalbard, Bouvet and Queen Maud Land; **LC,** Military stations; **LD,** Portable "LC"; **LE/LF,** Industrial; **LG,** Special; **LF,** Experimental; **LH,** University Stations; **LI,** Schools & Universities; **LJ,** Naval Stations; **LA/G,** Antarctica; **LA/M,** Portables; **LA/P,** Arctic. (*Tnx WWDXA*)

W2CTN

I'm sorry to hear that Jack, W2CTN, has been feeling under the weather. I'm sure Jack would appreciate receiving a card *other than* a QSL card from the gang.

LI DXA

I'd like to wish the new officers of the Long Island DX Association the best of luck. This fine group of DXers have chosen the following:

Pres: W2FGD; V. Pres; W2EXH; Sec/Treas: W2LJF. The Editor of the Club bulletin will remain W2MES.

Islas De Misteriosa

FDXC gang may hit this very rare DXCC country this summer depending on outcome of St. Felix trip. This spot is so rare no one has ever heard of it!

AWARDS

The WAGC Award

Requirements are nine contacts with GC on two of the four Channel Islands. The same call can be worked on different bands and count as different contacts. QSLs must be sent to claim the award, together with fee of 7/6d (about $1.00). Award manager is Mrs. Jill Banks, XYL of GC2CNC. (*Tnx Fla. DX Report*)

The 8 × 8 × 8 Award

This award is now issued by the DXCPR for confirmed contacts with eight stations in KP4, plus eight other countries located in Zone 8, for a total of 16 contacts. No date limitations. ARRL Country List and *CQ* Zone Boundary apply. Endorsed for mode of operation and band. Certified list signed by two amateurs must be sent (no QSLs) and $1.00 or 10 IRC to KP4RK, Box 10525, Caparra Heights, P. R.

This pretty YL or I should say XYL is JA1CLM/3. Her OM is JA1CLN and they share this rig in Takarazuka City. *(Tnx JA2JW)*

Two of the most popular hams in Japan are JA2EM and JA2JW shown here in front of the JA2JW shack. *(Tnx JA2JW)*

The Malayan Amateur Radio Transmitters Society DX Award

The Malayan Amateur Radio Transmitters Society has recently been receiving applications for a MARTS DX certificate.

As no such certificate exists, the Society wishes it to be known that it awards only one certificate—The Worked All Malayan Area Certificate, the rules for which are reproduced below.

The Council of the MARTS have decided to award the Worked All Malayan Area Certificate upon evidence of contacts with the undermentioned call prefixes in the Malayan Area:

Ten in VS1; Ten in VS2/9M2; Two in VS4/VS5 (One Area); One in ZC5.

The Malayan Amateur Radio Transmitters Society require the observation of the following rules when making an application for the award:

1. A signed statement to the effect that the applicant observed the rules of his/her license when making the contacts.

2. All 23 cards to be forwarded with the application.

[*Continued on page 91*]

CONTEST CALENDAR

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

FRANK ANZALONE*, W1WY

CALENDAR OF EVENTS

August	3-4	Illinois Party.
August	4-10	Chattanooga Party.
August	10-11	WAEDC C.W.
August	17-18	WAEDC Phone.
August	17-18	QRP QSO Party.
August	24-25	Summer, *CQ* V.H.F.
August	24-25	JARL DX C.W.
August	24-26	New Jersey Party.
*Aug. 31/Sept. 1		LABRE C.W.
*September	7-8	LABRE Phone.
*September	7-8	Peruano C.W.
*September	14-15	Peruano Phone.
September	14-15	S A C C.W.
September	21-22	S A C Phone
September	28-29	MARC VE/W.
*October	5-6	Oceania Phone.
*October	12-13	Oceania C.W.
October	12-14	ARRL CD C.W.
October	19-20	ARRL CD Phone.
October	23-24	YL/AP C.W.
October	19-21	RSGB 7 mc Phone.
October	26-27	*CQ* WW DX Phone.
November	2-3	RSGB 7 mc C.W.
November	6-7	YL/AP Phone.
November	9-11	ARRL SS.
November	16-18	ARRL SS.
November	16-17	RSGB 21/28 mc Phone.
November	23-24	*CQ* WW DX C.W.
*December	7-8	OK DX C.W.

*Not yet officially announced.

Illinois Party

Starts: 1600 GMT Saturday, August 3.
Ends: 2200 GMT Sunday, August 4.

Fully covered in last month's CALENDAR. Logs go to: Cliff Corne, K9EAB, 711 West McClure Ave., Peoria, Ill.

Chattanooga Party

Starts: 0001 GMT Sunday, August 4.
Ends: 2359 GMT Saturday, August 10.

Also covered in last month's CALENDAR. Logs go to: Frye Amateur Radio Club, P.O. Box 13, Chattanooga, Tenn.

QRP QSO Party

Starts: 1800 GMT Saturday, August 17.
Ends: 2400 GMT Sunday, August 18.

This is the first annual QRP QSO party sponsored by the QRP Amateur Radio Club. Details were rather skimpy but the object of the party seems to be for members to contact as many members and non-members as possible during the contest period. A station can be worked once on each band and mode, each contact counting one point.

Suggested frequencies are: c.w.-3540, 7040, 14,065 and 21,040; a.m.-3855, 7260, 14,260, 21,300 and 50,350.

Logs should contain: Call of station worked, band and mode, RS/RST exchange, QSO Nr., state or county, QRP Club Nr. (if any) and score claimed.

Logs go to: Bill Gilliland, K5FNV, Rte. #1, Brooksville, Miss. The deadline is August 31st.

New Jersey Party

Starts: 2300 GMT Saturday, August 24.
Ends: 0400 GMT Monday, August 26.

Details in last month's CALENDAR. Logs go to: GSARA, Red Cross Bldg., Broad Street, Shrewsbury, N. J.

DARC WAE

C. W.

Starts: 0000 GMT Saturday, August 10.
Ends: 2400 GMT Sunday, August 11.

Phone

Starts: 0000 GMT Saturday, August 17.
Ends: 2400 GMT Sunday, August 18.

This is the 9th annual WAE contest being held by the DARC.

Rules are the same as in previous years, with one new addition, a power classification. Class A up to 50 watts input, Class B up to 150 watts and Class C over 150 watts.

With the QTC feature in the c.w. portion of the contest, log keeping is quite detailed and it is strongly recommended that you use the official DARC log form.

Full details in last month's CALENDAR. Your logs go to: Dr. H. G. Todt, DL7EN, Chlodwigstr. 5, 1 Berlin 42, Germany.

Summer CQ V.H.F. Contest

Starts: 1 P.M. Local Time Sat., August 24.
Ends: 1 P.M. Local Time Sun., August 25.

This is a brand new contest for you v.h.f. men and should stir things up quite a bit on the v.h.f.s. The complete rules can be found on page

*14 Sherwood Road, Stamford, Conn.

38 in this issue.

JARL DX

Starts: 1000 GMT Saturday, August 24.
Ends: 1600 GMT Sunday, August 25.

This is the 4th annual All Asia DX Contest held by the JARL. It's the Asians working the non-Asians on c.w. only in this one. All bands, 3.5 thru 28 mc.

Classification:

1. Single band. Single operator.
2. Multi-band. Single operator (No multi-operator category).

Serial Numbers:

1. For OM stations. Five figures, RST report plus two figures denoting your age.
2. For YL stations. Five figures, RST report plus 00, (Zero, Zero).

Points and Multiplier:

1. For non-Asian stations. One point per contact and a multiplier of one for each Asian country worked on each band.
2. For Asian stations. One point per contact and a multiplier of one for each non-Asian country worked on each band. The DXCC and WAE country lists will be used.

Scoring:

1. Score for each single band is the total contact points on that band multiplied by the total number of countries worked.
2. The multi-band score is the total contact points from all bands multiplied by the sum total of the countries worked on all bands.

Awards:

1. Certificates will be awarded to the highest scorer on each single band in each country.
2. And to the three highest scoring stations on all bands in each country. (Once again we refer you to the results of last year's contest opposite). It's almost impossible for an East Coast station to win. Awards for Canada and the USA should be made on the basis of call districts.)
3. In addition the highest scoring multi-band station in each continent will receive a souvenir.

Mailing deadline for your logs is September 30th and they go to; The JARL Att: Contest Committee, P.O. Box 377, Tokyo Central, Japan.

S A C

C. W.

Starts: 1500 GMT Saturday, September 14
Ends: 1800 GMT Sunday, September 15.

Phone

Starts: 1500 GMT Saturday, September 21.
Ends: 1800 GMT Sunday, September 22.

This is the fifth Scandinavian Activity Contest and this year is being sponsored by the SRAL (Finland) the original starter of this contest.

It's the world working the Scandinavians in this one. For contest purposes the following prefixes will be considered as a country multiplier: LA, LA/p, OH, OHØ, OX, OY, OZ and SM/SL. A total of 8 on each band.

[*Continued on page 90*]

1962 JARL CONTEST RESULTS

North America

Alaska

KL7DND	M	372
KL7DUZ	7	11

Canada

VE6TP	14	748
VE2NV	7	72
VE2AFC	21	9

United States

WA6IVM	M	1242
K6IEC	"	1017
K6SDR	"	798
W6WAW	"	45
K5UYF	"	40
W6ETR	"	18
W7IEU	"	16
W7ZVY	3.5	4
WA6SLU	7	38
W8JIN	"	26
W7POU	"	24
W7DJU	"	16
W6AFI	14	1482
WØLIL	"	396
WA6AYU	"	366
W2WZ	"	252
K1RTB	"	110
W1GYE	"	100
WA6QAU	"	75
K7JCA	"	39

Mexico

XE1PJ	14	4

South America

Argentina

LU8FBH	14	42

Brazil

PY4ABH	M	28
PY5OF	7	19
PY5FO	14	12

RESULTS WAE 1962 CONTEST

C.W. RESULTS

Continental Winners

UA9DN	101,700
DJ3KR	80,520
WA2WBH	55,388

North America

United States

K1MEM	1691
W1RWU	234
K1QFC	20,046
WA2WBH	55,388
W2WZ	24,440
W2KVL	2916
W2QDY	867
W2EMW	840
W2FXA	450
WA2WSB	189
WA2VBW	4
W3AFM	11,968
W3WJD	9471
W3BYX	6550
K3JJG	5518
W3KTW	4163
W3OCU	3801
W3QLW	1752
W3RNY	1710
K3MNT/3	102
W3FSP	91
K4BAI	11,235
K4LDR	1744
W4KFC	1264
W4KXV	765
W5WZQ	3968
W5KC	896
W5LGG	800
WA6SBO	1782
WA6QUA	230
W7PQE	1003
W9KXK	2662
HC1DC	21,114
ZS6IW	16,720
KH6DVG	102
W9WCE	1650
W9WIO	60
W9GMS	1
KØBPO	3784

Panama

HP1AC	72

Bermuda

W5JDX/VP9	2376

Canada

VE1ZZ	4788
VE1AE	3060
VE1EK	1792
VE4ZX	40
VE7BFJ	4

South America

Bolivia

CP5EZ	2440

Ecuador

HC1DC	21,114

Columbia

HK3TH	280
HK7ZT	70
HK7YC	40

Brazil

PY1ADA	896
PY2BNX	494
PY5OF	330
PY7MP	1206

PHONE RESULTS

Continental Winners

DJ3KR	22,860
9G1YL	12,446
EP3RO	5,379
OX3AI	2,730
PY7MP	1,647

North America

United States

K1OSY	1275
W2WZ	1470
W2QKJ	363
W2KVL	24
W3OCU	742
K4LDR	162
K5MDX	728
W5KC	91
K8CFU	300
W8JXY	171

Puerto Rico

KP4AVQ	16

Greenland

OX3AI	2730

Canada

VE8BC	520

Bermuda

W5JDX/VP9	1098

South America

Brazil

PY2CDS	319
PY7MP	1647

PROPAGATION

GEORGE JACOBS*, W3ASK

LAST MINUTE FORECAST

The following is a forecast of day-to-day propagation conditions expected during Aug., 1963. This forecast attempts to predict *specific* days upon which openings shown in the Propagation Charts in this column are most likely to occur, and the expected quality of the openings. For example, the following forecast shows that circuits rated (2) in the Propagation Charts are most likely to open with "good-to-fair" quality (B-C) when conditions are above normal (Aug. 8, 11, 14, 31), and with "fair-to-poor" quality (C-D) when conditions are expected to be normal. Circuits rated (2) are not expected to open on those days forecast to be disturbed, etc.

PREDICTED PROPAGATION CONDITIONS AND CIRCUIT QUALITY

Prop. Chart Forecast Rating	*Above Normal Days (WWV rating higher than 6)* Aug. 8, 11, 14, 31	*Normal Days (WWV rating 5-6)* Aug. 3-7, 9-10, 12-13, 15-18, 21-22, 24-26, 29-30	*Below Normal Days (WWV rating 4)* Aug. 2, 19, 23, 27	*Disturbed Days (WWV rating less than 4)* Aug. 1, 20, 28
(1)	C	D-E	E	E
(2)	B-C	C-D	D	E
(3)	A-B	B-C	C-D	D-E
(4)	A	A-B	C	D

Where:

A—is an excellent opening with strong steady signals.
B—is a good opening, moderately strong signals, with little fading and noise.
C—is a fair opening, signals fluctuating between moderately strong and weak, with moderate fading and noise.
D—is a poor opening, signals generally weak, with considerable fading and high noise level.
E—is a very poor opening, or none at all.

VERY few 10-meter DX openings are forecast for August, although excellent short-skip conditions are expected between distances of approximately 750- and 1,400-miles. Some fairly good DX openings are forecast for 15 meters during the daylight and early evening hours, with excellent short-skip conditions also forecast for distances between approximately 600- and 1,400-miles. Twenty meters is expected to be the best band for DX propagation from sunrise until several hours after sunset, with good openings forecast to almost every area of the world. Excellent 20 meter short-skip openings are forecast for distances ranging between approximately 400- and 1,400- miles.

Despite higher seasonal static levels 40 meters is forecast to open to many areas of the world from shortly before sunset, and should remain open through the hours of darkness and the sunrise period. To most areas of the world, 40 meters is expected to be the best band for DX propagation during the hours of darkness. Some 80 meter DX openings are forecast for August, during the hours of darkness and the sunrise period. Openings, however, may be noticeably weak and noisy. Few 160 meter DX openings are predicted for August, but some may occur during the hours of darkness and at sunrise.

This month's column contains a detailed propagation forecast to DX areas of the world for use during August and September, 1963. For a more detailed forecast of short-skip conditions expected during August, over distance ranging between approximately 50 and 2400 miles, see the *CQ* Short-Skip Propagation Charts appearing in last month's column.

VHF Ionospheric Openings

Sporadic-*E* ionization is expected to occur fairly frequently during August, and is expected to result in a number of short-skip openings on 6 meters between distances of approximately 750- and 1,300-miles. Some openings may also be possible on 2 meters, at distances ranging between approximately 1,100- and 1,400-miles, which is the maximum range for one-hop sporadic-*E* propagation.

The *Perseids*, a month-long meteor shower which began late in July, is expected to reach maximum intensity during mid-August. The ionization produced by this meteor shower may result in meteor-scatter type openings on both 6 and 2 meters, especially during the middle of the month.

Six and 2 meter ionospheric openings may also occur as a result of auroral-scatter, and such openings usually take place during ionospheric disturbances. Check the "Last Minute Forecast" appearing at the beginning of this column for periods that are expected to be disturbed during August.

Sunspot Cycle

The sunspot cycle continues to decline slowly, but steadily towards a minimum. The Swiss

*11307 Clara St., Silver Spring, Md.

Federal Solar Observatory reports a monthly mean sunspot number of 44 for May, 1963. This results in a 12-month running smoothed sunspot number of 30 centered on November, 1962. A smoothed sunspot number of 21 is forecast for August, 1963. 73, George, W3ASK

AUGUST & SEPTEMBER, 1963

Time Zone: EST (24-Hour Time)

EASTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	07-11 (1) 11-14 (2) 14-16 (1)	05-08 (2) 08-11 (1) 11-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-20 (1)	18-19 (1) 19-20 (2) 20-23 (3) 23-01 (2) 01-05 (1)	19-21 (1) 21-00 (2) 00-01 (1) 21-00 (1)†
Eastern Europe & European USSR	09-14 (1)	06-11 (1) 11-16 (2) 16-19 (1)	20-02 (1)	21-00 (1)
Southern Europe & North Africa	07-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	05-07 (2) 07-12 (1) 12-14 (2) 14-17 (4) 17-19 (2) 19-22 (1)	18-19 (1) 19-20 (2) 20-00 (3) 00-02 (2) 02-03 (1)	19-20 (1) 20-21 (2) 21-23 (3) 23-00 (2) 00-01 (1) 20-00 (1)†
South Africa	11-14 (1)* 06-10 (1) 10-12 (2) 12-14 (3) 14-16 (2) 16-18 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-22 (1) 05-07 (1)	18-19 (1) 19-21 (2) 21-23 (1)	19-21 (1)
Eastern Mediterranean	09-12 (1) 12-14 (2) 14-16 (1)	05-07 (1) 11-14 (1) 14-16 (2) 16-20 (1)	19-23 (1)	*NIL*
Central Asia	19-21 (1)	06-09 (1) 18-22 (1)	18-21 (1)	*NIL*
Southeast Asia	17-19 (1)	07-10 (1) 16-20 (1)	*NIL*	*NIL*
Far East	16-19 (1)	05-07 (1) 07-09 (2) 09-10 (1) 15-17 (1) 17-19 (2) 19-22 (1)	05-08 (1)	*NIL*
Samoa, Pacific Area & New Zealand	14-19 (1)* 08-10 (1) 13-17 (1) 17-19 (2) 19-21 (1)	18-20 (1) 20-23 (2) 23-07 (1) 07-09 (2) 09-12 (1)	23-02 (1) 02-05 (3) 05-07 (2) 07-08 (1)	03-07 (1) 04-06 (1)†
Australia	17-19 (1)* 08-10 (1) 15-17 (1) 17-19 (2) 19-22 (1)	06-07 (1) 07-09 (2) 09-12 (1) 17-21 (1) 21-23 (2) 23-01 (1)	02-04 (1) 04-06 (2) 06-08 (1)	04-06 (1) 04-06 (1)†
South America	09-13 (1)* 13-16 (2)* 16-18 (1)* 05-07 (1) 07-10 (2) 10-13 (1) 13-15 (2) 15-18 (4) 18-20 (2) 20-21 (1)	05-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-17 (3) 17-21 (4) 21-23 (3) 23-01 (2) 01-05 (1)	18-20 (1) 20-22 (2) 22-03 (3) 03-05 (2) 05-07 (1)	20-22 (1) 22-03 (2) 03-06 (1) 01-04 (1)†
McMurdo Sound, Antarctica	15-17 (1)* 13-16 (1) 16-18 (3) 18-19 (2) 19-21 (1)	14-16 (1) 16-19 (2) 19-21 (3) 21-22 (2) 22-00 (1) 07-09 (1)	00-05 (1)	*NIL*

TIME ZONES: CST & MST (24-Hour Time)

CENTRAL USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	08-12 (1) 12-14 (2) 14-16 (1)	05-06 (1) 06-07 (2) 07-14 (1) 14-16 (2) 16-19 (1)	20-22 (1) 22-00 (2) 00-02 (1)	21-00 (1) 21-23 (1)†
Eastern Europe & European USSR	08-13 (1)	05-06 (1) 06-08 (2) 08-10 (1) 10-12 (2) 12-18 (1)	20-01 (1)	21-00 (1)
Southern Europe & North Africa	06-10 (1) 10-13 (2) 13-15 (1)	05-07 (2) 07-12 (1) 12-13 (2) 13-15 (3)	18-20 (1) 20-23 (3) 23-01 (1)	19-20 (1) 20-22 (2) 22-00 (1) 20-23 (1)†
Central Africa	07-10 (1) 10-13 (2) 13-15 (3) 15-17 (2) 17-19 (1)	05-07 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-22 (1)	18-20 (1) 20-21 (2) 21-22 (1)	20-22 (1)
Eastern Mediterranean	07-13 (1)	06-11 (1) 11-12 (2) 12-17 (1)	19-22 (1)	20-22 (1)
Central Asia	07-12 (1) 18-21 (1)	06-07 (1) 07-09 (2) 09-10 (1) 18-21 (1)	19-21 (1) 05-07 (1)	*NIL*
Southeast Asia	10-13 (1) 18-21 (1)	07-09 (2) 09-12 (1) 20-00 (1)	05-07 (1)	*NIL*
Far East	07-10 (1) 14-16 (1) 16-18 (2) 18-20 (1)	05-06 (1) 06-08 (2) 08-13 (1) 20-22 (1)	05-08 (1)	*NIL*
Samoa, Pacific Area & New Zealand	13-20 (1)* 11-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	17-19 (1) 19-21 (2) 21-00 (3) 00-04 (2) 04-07 (1) 07-09 (3) 09-11 (2) 11-13 (1)	23-01 (1) 01-06 (3) 06-07 (2) 07-08 (1)	01-03 (1) 03-06 (2) 06-07 (1) 03-07 (1)†
Australia	15-19 (1)* 08-10 (1) 13-16 (1) 16-20 (2) 20-21 (1)	20-22 (1) 22-00 (2) 00-07 (1) 07-09 (3) 09-10 (2) 10-11 (1)	03-04 (1) 04-06 (2) 06-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-07 (1)†
Northern & Central South America	08-16 (1)* 06-08 (1) 08-12 (2) 12-15 (3) 15-17 (4) 17-19 (2) 19-21 (1)	02-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-19 (4) 19-23 (3) 23-02 (2)	19-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-06 (1)	21-23 (1) 23-02 (2) 02-05 (1) 23-05 (1)†
Argentina, Chile & Uruguay	09-13 (1)* 13-16 (2)* 16-18 (1)* 06-08 (1) 08-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	14-16 (1) 16-18 (2) 18-20 (4) 20-01 (3) 01-03 (2) 03-05 (1) 05-07 (2) 07-09 (1)	20-22 (1) 22-02 (2) 02-04 (1)	23-03 (1) 23-03 (1)†
McMurdo Sound, Antarctica	14-18 (1)* 11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	16-18 (1) 18-20 (2) 20-21 (3) 21-23 (2) 23-00 (1) 08-11 (1)	23-06 (1)	*NIL*

TIME ZONE: PST (24-Hour Time)

WESTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	06-08 (1) 10-13 (1)	05-11 (1) 11-14 (2) 14-17 (1) 20-22 (1)	19-01 (1)	21-00 (1)
Eastern Europe & European USSR	09-12 (1)	06-16 (1) 19-21 (1)	19-00 (1)	*NIL*
Southern Europe & North Africa	06-10 (1) 10-12 (2) 12-13 (1)	05-08 (1) 08-11 (2) 11-13 (1) 13-15 (2) 15-18 (1) 20-22 (1)	18-19 (1) 19-21 (2) 21-22 (1)	19-22 (1)

*Predicted 10 meter openings.
†Predicted 160 meter openings.

[*Continued on page 104*]

SPACE COMMUNICATIONS

GEORGE JACOBS*, W3ASK

THE following table contains a listing of frequencies on which space orbiting satellites could be heard as of July 1, 1963. Many of the satellites shown on the list are expected to continue to be heard during August and the remainder of 1963.

The satellites which can be heard with the least amount of difficulty are those which transmit continuous beacon signals (c.w. beacons). These signals can be identified by their steady tone (or by a series of dashes in the case of Russian satellites), when the receiver's b.f.o. is in the ON position. Telemetry signals are considerably more difficult to receive since telemetry data, in most cases, is transmitted only upon command from the ground. Telemetry signals usually consist of two or more musical notes being transmitted at the same time. Each satellite's inclination and period are shown in the table as a further aid in identifying satellites from which signals can be received. The "inclination" is the angle that the satellite's orbit makes with the equator, and it tells from which direction the satellite will arrive. If a directional antenna is being used to receive satellite signals, it should be aligned at the same angle to the equator as the satellite's inclination. The satellite's "period" is the time (in minutes) that it takes for the satellite to complete an orbit. By timing strongest reception on successive orbits, it is often possible to identify a satellite by its period.

The table contains no data for Russian satellites. At the time the table was compiled, the USSR had completed a series of COSMOS (14, 15 and 16) and VOSTOK (5 and 6) launchings, including the male-female launch of Col. Bykovsky and Lt. Terechkova. It was not expected, however, that these satellites would still be transmitting signals by August. Almost all of the satellites recently launched by the Soviet Union have used frequencies in the 19,900-20,010 kc band, and between approximately 143.5-143.7 mc. If additional Russian satellites have been launched between the time this table was compiled and printed, check the above mentioned bands for signal reception.

73, George, W3ASK

*11307 Clara St., Silver Spring, Md.

Transmitting Satellites (By Frequency)
(As of July 1, 1963)

Frequency (Mc)	*Name*	*Power (Watts)*	*Date Launched*	*Inclination (Degrees)*	*Period (Minutes)*	*Remarks*
54.000	ANNA 1-B	0.10	31 Oct 1962	50	108	C.w. tone modulated.
108.023	VANGUARD 1	0.03	17 Mar 1958	34	134	C.w. beacon when in sunlight.
136.050	TELSTAR 2	0.25	7 May 1963	44	225	C.w. beacon & Command telemetry.
136.080	ALOUETTE	0.20	29 Sep 1962	80	106	Command telemetry.
136.140	RELAY 1	0.25	13 Dec 1962	48	185	C.w. beacon & Command telemetry.
136.200	EXPLORER 16	0.10	16 Dec 1962	52	104	Command telemetry.
136.233	TIROS 6	0.05	18 Sep 1962	58	99	C.w. beacon & Command telemetry.
136.316	EXPLORER 17	0.50	3 Apr 1963	58	96	Command telemetry.
136.406	ARIEL	0.25	26 Apr 1962	54	101	C.w. beacon & Command telemetry.
136.440	EXPLORER 14	2.00	2 Oct 1962	37	2185	C.w. telemetry.
136.559	EXPLORER 17	0.03	3 Apr 1963	58	96	C.w. beacon.
136.590	ALOUETTE	0.2	29 Sep 1962	80	106	Command telemetry.
136.620	RELAY 1	0.25	13 Dec 1962	48	185	Command telemetry.
136.744	OSO-1	0.2-1.0	7 Mar 1962	33	96	C.w. beacon & Command telemetry.
136.860	EXPLORER 16	0.05-0.1	16 Dec 1962	52	104	Command telemetry.
136.868	INJUN 3	2.0-0.2	13 Dec 1962	70	115	Command telemetry.
136.921	TIROS 6	0.05	18 Sep 1962	58	99	C.w. beacon & Command telemetry.
136.978	ALOUETTE	0.05	29 Sep 1962	80	106	Continuous cw, on-off control.
162.000	ANNA 1B					
216.000	ANNA 1B	0.1	31 Oct 1962	50	108	C.w. tone modulated.
324.000	ANNA 1B					
			FUTURE LAUNCHES			
136.02	ECHO 2	0.02	Late Fall, 1963	.....	.....	C.w. beacon & Command telemetry.
136.17	ECHO 2					
136.47	SYNCOM 2	2.0	Summer, 1963	.....	.....	C.w. beacon & Command telemetry.
136.77	SYNCOM 2	0.5	Summer, 1963	.....	.....	C.w. beacon for first 7 days only.
136.98	SYNCOM 2	2.0	Summer, 1963	.....	.....	C.w. beacon & Command telemetry.

sideband sideband sideband

SIDEBAND

IRV & DOROTHY STRAUBER*, K2HEA/K2MGE

SSB DX HONOR ROLL

TI2HP	279	MP4BBW	256	WA2IZS	235
W8EAP	278	W1LLF	254	PJ2AA	232
PY4TK	278	W5IYU	254	W1ORV	230
W2ZX	275	K2MGE	252	WØCVU	229
VQ4ERR	273	PZ1AX	251	W2VZV	227
K8RTW	271	W6RKP	249	K4PUS	226
W8PQQ	269	G8KS	248	K4AJ	226
W2FXN	269	G3NUG	248	VE3BWY	221
W6UOU	265	W3KT	248	WØPGI	221
K9EAB	263	W2TP	248	WA6HOH	219
HB9TL	262	W8YBZ	246	G2PL	217
K4TJL	262	G3FKM	245	VE3BQP	206
W2VCZ	262	G2BVN	242	W7DLR	206
WØQVZ	260	W6BAF	242	OH2NB	204
DL1IN	258	W6PXH	242	W9SFR	203
W3LMA	257	W6WNE	239	K4JEY	202
W4OPM	257	W1AOL	238		

SSB DX ENDORSEMENTS

W2TP	250	G3PEU	100	W5KHP	50
K4AJ	225	UA9DT	100	K7RJK	50
OH2NB	200	WA2WDV	75	K4UTE	50
K6VVA	175	ST2AR	75	G3NFV	50
K5OGP	150	UA3XZ	75	W2ODA	50
W2HQL	150	K8GOP	50	K4RHL	50
DL3RK	125	SM5CUP	50	W6WKJ	50
K2KGS	125	K8KOM	50	W7UVR	50

OF LATE, there have been numerous inquiries about the old "gentlemen's agreements" between sidebanders and a.m.ers, each group to steer clear of the other's portions of the bands. "Just what are the sideband portions of the bands?", we have been asked. With the picture changing so rapidly, it is a difficult question to answer.

It is certainly apparent to everyone on phone, regardless of the mode used, that the changeover to sideband is going ahead full steam! (Witness a phenomenal a.m.er, ZL2BE, and a famous c.w. man, W4BZ, going sideband! It is equally apparent that the former "boundary lines," particularly on 75 and 20 meters, can no longer be observed in the best interests of amateur radio. For the benefit of the newcomer who may run afoul of some of the more rabid a.m.ers, it is true that the boundary on 20 meters was *formerly* set at 14.270 but this was years ago when sideband operation was much less widespread than it is today. It is illogical to stick to this *outmoded agreement* in the face of the super-abundance of sideband activity. As long ago as a year, we suggested that sidebanders should, with good reason, operate between 14.250 and 14.350, based on the ARRL poll which indicated that two-thirds of phone operation on 20 was by sidebanders. We have even more reason today to advocate this expanded use of the band.

Similarly, 75 meter sideband operation has increased to the point where the band is jammed with sideband and it is impossible to contain this tremendous influx within certain specified boundaries. As we have pointed out in the past, most newcomers to ham radio and an uncommonly large number of former a.m. and c.w. operators have turned to sideband for phone operation. The percentage of additional a.m. operation is so slight as to be non-existent (witness the lack of new manufactured a.m. equipment!)

Although we have never advocated and do not favor interference between operators of the two incompatible modes, nevertheless we strongly believe that our fellow sidebanders should not permit themselves to be intimidated by the more raucous element among the a.m. group whose only delight these days seems to be not how to make the best use of the frequencies available but rather how to make themselves obnoxious and spoil the operating enjoyment of as many others as possible.

Bob Stankus, W2VCZ, has had some great experiences chasing and working DX but probably nothing compared with the thrill of seeing the *Faith 7* (with which he is shown above) parachute down some 3 miles from the U.S.S. *Kearsage*, aboard which Bob was assigned with his television crew.

*12 Elm St., Lynbrook, New York.

In plain language, sidebanders, stick to your guns! There are no longer any sideband "portions"—but be kind and courteous and leave a little space for those fellows who are still making up their minds to come on sideband—they'll *all* be sidebanders one of these days!

Sideband Around The World

Reminiscing about the early days of sideband when often you'd have to wait for hours before another sidebander would come on the band, we listen with amazement to the current swell of sideband activity among old and new hams alike. Thinking back, questions arise as to what has happened to Sam, OHØNC; Mirko, YU1AD; Jim, VS4JT; Stan, ZC4DA; Cyril, VK3AEE; Jimmy, CX5AF; Jiri, OK7HZ; Paul, VQ4EO; and many more, all of whom were daily contacts some years ago. While it's wonderful to continue the old friendships, it's good to make new ones and we're bursting with news about the activities of some of today's active sidebanders.

Barry, K2IEG, and Doris, WA2HTI, became the parents of a baby girl, Denise; while Libby, KØMAS, welcomed her second grandchild. . . . Marc, W2GYQ, rapidly and successfully recovered from his operation and is again active on 20 meters with his group "The Zigga Zagga Hoi Hoi Hoi" boys . . . Albania may be, by now, represented on sideband through the generosity of SM5BLA who was planning to furnish a rig to YO3GK for a DXpedition to ZA-land. . . . It was a great delight to meet Carol, DL4LA, on the air from Frankfort, Germany, particularly since we've had many contacts with her charming folks, Flo and Boris, K8JTB, of Detroit, Mich. . . .

Among recent visitors to our shack were Kurt, DL1CR, here to study American manufacturing methods; John, G3MSS, Vice-President of Collins Radio, Ltd. in London; and Phil, ZS1TP, and Anita, ZS1TZ, who visited many ham friends from California to New York. This delightful Capetown couple charmed all whom they met and we hope they enjoyed their visit as much as we enjoyed having them. . . . Still awaited are visits from Les, GI3CDF, and Dave, G3HS. . . . Lou, ZS6IR, and his lovely wife, Jackie, were among other visitors to the states but, unfortunately, we did not meet them. . . . Marty, ex-DL4FC is now W5HNC/5, while Gene, ex-DL4FX, is using the call K8RJP/5. . . . George, W4UWC, is QSL manager for Bill, 7X2VX, who doesn't seem to have much time for hamming due to his more important duties as U.S. Ambassador to Algeria. . . . Ted, K4WUS, is an ophthalmologist and hopes to contribute to the establishment of an eye bank in the East similar to the one so successfully set up in the Midwest. . . . Gunther, OE6LQ, is a student at the Technical University in Graz, Austria, with still another two or three years ahead in which to finish his technical engineering studies.

Sophie, W6SH, and Ralph, W6RH, kept us spellbound for almost an hour on 20 meters with their picturesque description of their recent trip to the orient and news of many of our mutual

The only sideband operator in Niger is Jacques Leroux, 5U7AH, (above) pictured with his 8½-year-old daughter, Patricia, (who is a stamp collector). Jacques, a native of France, is with the Posts and Telecommunications at Niamey and is technical assistant to the new government of Niger. His plans are to leave Niger within a year so be sure to look for him on the band and say "hello." *(Photo courtesy of K9EAB.)*

friends. In tribute to Sophie's expert handling of traffic, she and Ralph got the red carpet treatment on Okinawa as well as a special citation for Sophie. In Hong Kong, Luk, VS6AZ, and his Cleveland-born wife, Lillian, entertained the Heintzes. Tokyo delighted them with a fantastic display of cherry blossoms as well as a meeting with Harry, JA1ANG, and Yoshiko, JA1CLJ. (If Harry can only find the time to fix up his station as he's been planning to do, Yoshiko should soon be the first JA-YL on sideband!) This interesting travelogue was followed by a description of Ralph and Sophie's lovely home which abounds with feathered pets of many varieties. These two are truly a treat to talk to.

Congratulations to the Greater Michigan

[*Continued on page 96*]

A new, and very nice, couple on sideband are Pete, WA6MWG, and Jessie, WA6OET, of Palos Verdes Estates. Pete is an United Air Lines pilot on the Hawaii run, and Jessie supplements her hamming with Parent Education classes and Girl Scouting among other activities. Although they have been sideband enthusiasts only since last December, the Billons are quickly becoming among the most active sideband couples on the air.

HAM CLINIC

CHARLES J. SCHAUERS*, W4VZO

GROUNDED grid (g.g.) amplifiers have been covered in the literature from nearly every angle, but yet we continue to receive questions on them in nearly every mail.

Some of the questions received are not so simple and require a little head scratching and a lot of file research. But be this as it may, the g.g. amplifier—if properly constructed—is not the technical mystery some think it to be.

Essentially, the g.g. amplifier is always a linear amplifier (for ham use anyway) and its control grid is grounded. R.f. drive is fed to it in the cathode or filament circuit. It may or may not be operated in a zero-basis circuit configuration and neutralization is not required—at least at the high frequencies. When operated at u.h.f. or v.h.f., a small amount of neutralization may be required, depending on the tube used.

A good many hams feed their g.g. linears with direct coupling, *e.g.*, capacitance coupling, but this leads to less power output and greater intermodulation distortion. Feeding the cathode (or filament) with an untuned circuit is not a good practice because there is less suppression of the 3rd and 5th order i.m. products, than when a tuned circuit is used.

The average ham g.g. amplifier, for the allowable maximum power input, can be driven by exciters having between 50 and 150 watts output. Again it must be remembered that the driving power is not lost for most (but not all) of it appears in the output along with the r.f. from the final stage.

"Brute force drive" (as I call *untuned* g.g. input) can lead to very serious cases of TVI due to an undesirable loading effect created during half cycle wave excursions. Even with good exciter regulation this effect can occur in a single tube class B r.f. output stage. Swamping the input in the case of the g.g. amplifier to maintain good loading and regulation is foolish and is a waste of power. In low-level driver stages of the transmitter however, this may be necessary.

When zero-bias tubes are used it is possible to approach an operating efficiency of 70%; but do not get the idea that even though it is possible to obtain higher output power than the d.c. input to the plate circuit of a g.g. stage, that your efficiency is 100% or over! Close calculation will dispell this notion in a hurry when circuit losses are considered, and the overall driving power figured in.

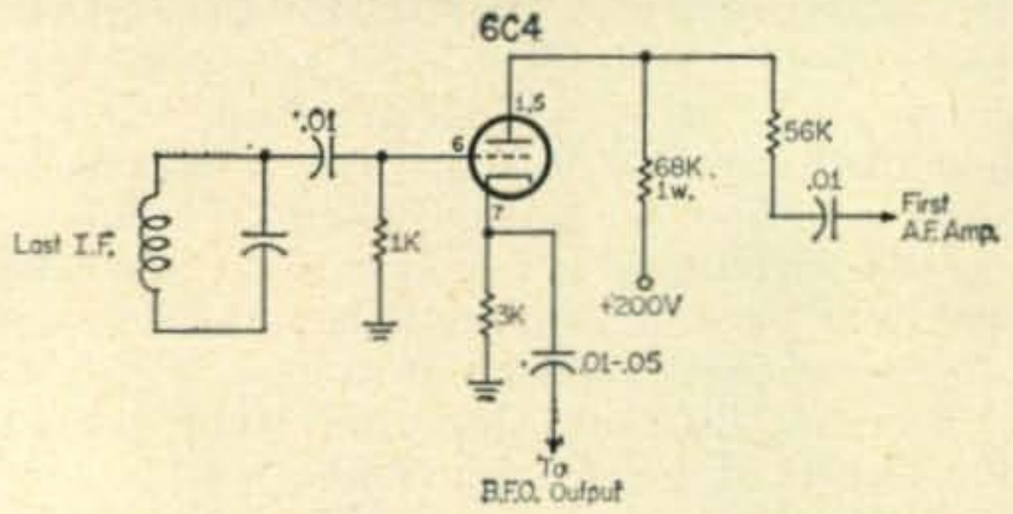


Fig. 1—A practical s.s.b. detector for nearly any receiver.

The g.g. stages do not like changing loads, or to be more clear, changing impedances—for this reason, be careful how and where the g.g. amplifier is used. For example, do not use it in an intermediate stage where the stage following reflects a changing load for the result can only be more distortion.

Input and output circuit Q are important in the design of g.g. amplifiers, the practical limits being between 10 and 17.

Yes, the g.g. amplifier can be used with tetrodes, but I recommend the zero-bias triodes.

For some real worthwhile information on tubes for s.s.b. use, write Amperex Electronic Corporation, Tube Division, Dept. CQ, Hicksville, L.I., N.Y. and ask for their technical data sheets on their 6155, 6079, 7527, 8179 and 6156.

Questions

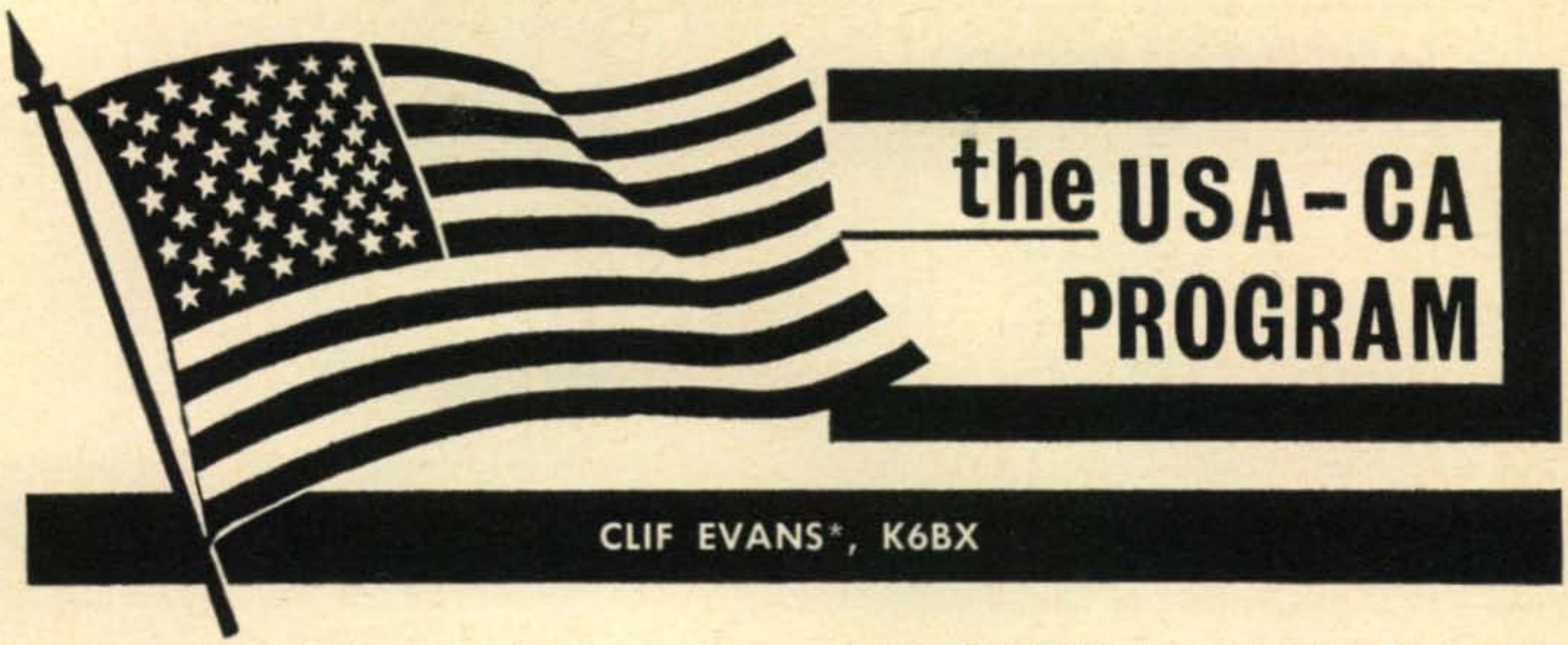
Simple S.S.B. Detector—"How about publishing a simple s.s.b. detector-circuit to work with any receiver having a stable b.f.o?"

See fig. 1. This can be a simple outboard device which does not disturb the set. Your regular detector can be switched in or out and the simple detector used, or not. A stable b.f.o. signal is required. This circuit will work with the following old receivers when the voltage to the b.f.o. tube is stabilized: SX-28, NC-183, SX-42, HQ-129, HRO-50, AR-88 and many others.

Knight P-2 S.W.R./Power Meter—"I see many s.w.r. meters advertised now and was wondering what you think 'the bargain of the moment' is? I would like a meter that enables me to tell when my transmitter is operating properly and putting out maximum power. Cost is important for I am a young Novice, and the set must have

[*Continued on page 98*]

*c/o *CQ*, 300 W. 43 St., New York 36, N. Y.



CLIF EVANS*, K6BX

CLIFF Corne, K9EAB, is first in world to bag USA-CA-1500! Operating completely from an iron lung, Cliff systematically knocked off his 1500 different U.S. counties while maintaining a healthy lead on all runners up. For background story on this world known top achievement amateur picturing him in his iron lung, see November, 1962 issue of *CQ*.

F. Norman Davis, W1GKJ, added the USA-CA-1000 gold seal of achievement to his USA-CA award, and became No. 10 at this county level.

Sixteen other lucky county hunters bagged USA-CA-500 during the month of May and brought holders of this level award up to 238. Here are the latest winners:

USA-CA HONOR ROLL

1500		1000	
K9EAB	1	W1GKJ	10

500					
W1UOT	223	W3EFY	228	W9GML	233
K2ETC	224	W1DMD	229	W1SXX	234
WØCUC	225	W9JQE/M	230	KØQJG	235
W4BWR	226	HK1QQ	231	W7GBL	236
KH6BLX	227	W8CSK	232	WA9AJF	237
				WØEXD/5	238

All were for mixed endorsement except K2ETC who received all A3. Two, K2ETC and W4BWR, are YLs. Of special note was application of Ralph Alley, W9JQE/M; he achieved USA-CA-500 using *only* mobile operation.

We Get Letters and Questions

Don, VP7NS, "congratulations on the magnificent USA-CA Program which has injected much new interest and enjoyment in the hobby. Until advent of USA-CA, my prime interest was DXing. However, my new interest in working U.S. stations has vastly increased, thanks to the USA-CA. Clif, many QSLs we receive still fail to name counties. Am ordering a P.O.D. #26 to help rectify this problem, but keep pounding away at U.S. hams that they are underselling their U.S. when they fail to name their counties in support of the one awards program that is meaningful in U.S. public relations."

*United States of America Counties Award Custodian, Box 385, Bonita, California.

Leslie, WA4EEZ, ". . . the USA-CA is a tremendous challenge to me as I am working for it on 6-and-2 meters. Now find many v.h.f.ers throughout the 50 U.S. states actively seeking USA-CA contacts and it has vastly broadened the v.h.f. operational backyard."

Dr. J. R. Erskine, "The USA-CA is creating real incentive to both contribution and hobby enjoyment. It is with pride we of the Kentucky Colonel Amateur Radio Club offer our awards contribution within the endeavors of the USA-CA Program."

Chuck, WA6AJF, "Know your readers are interested in QSL returns. Here's my tabulation for QSL return during 1962 which hit 62%. DX return was 72%; CHC return was 99.6%; QCWA return was 97%; HTH return was 93%; FHC return was 100%; lowest return by states were S.C., 60%; Texas was 72% and Nevada and Oregon were 67%.

U.S. Navy Supports Amateur Radio

From the very beginning, one of amateur radio's staunchest supporters has been the U.S. Navy. One has but to read any Armed Forces' Day message to be aware of the extent all our military forces support amateur radio affairs.

It is common knowledge that our Defense

Boy, this is a beauty! Worked All Korea award by the Korea DXers Society, KDXS, for working one HM and one HL9 station after September 1, 1960. Endorsements for all one band or mode or mixed. Send certified list showing full log data and 10 IRC to Byong-joo Cho, HM1AP, c/o KARL, Central Box 162, Seoul, South Korea.


United States Naval Communications

To all members of the Amateur Radio Fraternity: Greetings.
By this CERTIFICATE of RECOGNITION be it known that

has demonstrated exemplary interest and diligence in the field of Amateur Radio by establishing contact with at least 5 United States Ships operating Amateur Radio upon the High Seas as Maritime Mobile stations, by special authority granted by the Chief of Naval Operations.

Signed the 28th day of Oct. 1962, at Washington, D. C.

Director, Naval Communications
United States Navy

Here is U.S. Navy "Certificate of Recognition" for contacting stations on board five or more U.S. Navy ships. The list of ships contacted is compared with a master list and if the ships were, in fact, authorized during the period applicant states he worked specific ships and the call signs are as recorded, then the certificate is awarded. Applications, QSLs or log extract go to Chief of Naval Operations, OP-954N, The Pentagon, Washington 25, D.C.

Here is new Worked Florida Counties Award sponsored by the Amateur Radio Club of Florida. Awards Custodian is W4NOK. See text for story on this and two other Florida awards.

Department permits amateur radio stations to operate from military bases both continental and throughout the world. However, it may come as a surprise to you to learn there are over 230 U.S. Navy ships which have one or more amateur radio stations operating on board.

Another little publicized fact is that under a multitude of conditions our Defense Department permits crew members who are also licensed amateurs to engage in amateur radio operations from military, Coast Guard, and other government aircraft.

Naturally these amateurs are not permitted to operate under conditions where military or national security is involved; however, the nature of their activity is little different than if though operating from home QTHs. Such amateur radio privileges to members of our armed forces gives concrete evidence how free peoples in a free society and their government leaders think and act.

While the U.S. Navy issues several awards for special achievements, or special events, we are aware of only two operating awards generally available to all hamdon on a continuous basis. These are the U.S. Navy "Certificates of Recognition" for working five U.S. Navy ships, and one for working submarines of Submarine Squadron Twelve. See pictures and captions for rules of both these awards.

Massachusetts County Award Gets New Sponsor

The Worked All Massachusetts Counties Award originally sponsored by the Merrimack Valley Amateur Radio Club, now is sponsored by The Northeastern University Radio Club, W1KBN. The rules, as follows, remain the same: Contact each of Massachusetts 14 counties after January 1, 1955. Endorsements for all one band or mode or mixed. Send QSLs with return postage plus 50¢ to Northeastern University Radio Club, W1KBN, 360 Huntington Ave., Boston, Mass. A letter from Robert Knowles, K1DIR, states the new sponsor will hold a Massachusetts QSO Party in September at which time W1MX of MIT plans to operate from very rare Dukes County. Watch for date.

New Florida Awards Support USA-CA

The Amateur Radio Club of Florida came up with three new awards to help bring the state, its counties and cities better publicity and public relations. The series include the "Worked Florida Counties," the "Florida Cities Award" and "Sun City Award."

WORKED FLORIDA COUNTIES: (Second figure applies to DX stations including KH & KL) Work Florida counties as follows: Class D, 30/20; Class C, 45/35; Class B, 55/45; and Class A, 67/55. A new certificate is issued after the first one; fee for first certificate is $1 or 10 IRCs and subsequent new certificates cost 10¢ or 1 IRC. USA-CA county rules apply. Send certified list (GCR) to club: Box 7326 Euclid Station, St. Petersburg 34, Florida. (Old Man's note: This club is in process of preparing a publication listing all hams in the state. The PR realism of the award is attested by fact that many Florida Counties have no hams at all and some few even have *no* permanent residents.) See picture of award which shows map naming all counties.

FLORIDA CITIES AWARD: For working 10 of Florida's 20 largest cities as named: Miami, Miami Beach, Jacksonville, St. Petersburg, Orlando, Ft. Lauderdale, Hialeah, Pensacola, West Palm Beach, Tallahassee, Lakeland, Hollywood, Tampa, Coral Gables, Clearwater, Sarasota, Daytona Beach, Key West, Panama City and Gainesville. Make application as stated above.

SUN CITY AWARD: Work 10 stations in "The Sun City," St. Petersburg, Florida, which includes Pinellas Park, Bay Pines, Indian Rocks, Largo, Treasure Island, Redington Beach, St. Petersburg Beach and the Greater St. Petersburg Area. Make application as stated above.

"Symbols of Freedom" Parade

"Symbols of Freedom" is the theme of the upcoming January 1, 1964, Tournament of Roses Parade, to be held in Pasadena, California. The 'granddaddy of all parades' will appropriately feature an amateur radio float to publicize the highly important role the amateur plays *in the* United States 'People-To-People' Program.

The amateur radio float will carry a huge globe of the world as hams see it, cleverly outlined by

Pictured here is the "Radioman Submariner" sponsored by Squadron Twelve, Key West Florida. The certificate pictures the insignia of all units of the squadron. To get the award one must work two stations on board submarines of Submarine Squadron Twelve plus the club station, W4YVS or any amateur on the submarine tender (U.S.S. *Bushnell* (AS-15). Contacts must be after Jan. 1, 1962 for the submarines and after Jan. 1, 1963 for the club station or U.S.S. *Bushnell*. Submit either QSLs or notarized copy of log entries to: W4YVS, Submarine Squadron Twelve, U.S. Naval Station, Key West, Florida.

This is the new Kentucky Colonel award for working members of the Kentucky Colonel ARC. Stations within a radius of 100 miles of Bowling Green, Kentucky work 8 club members; others at greater distance work only 5. No charge. Send full log data to club: P.O. Box 401, Bowling Green, Ky.

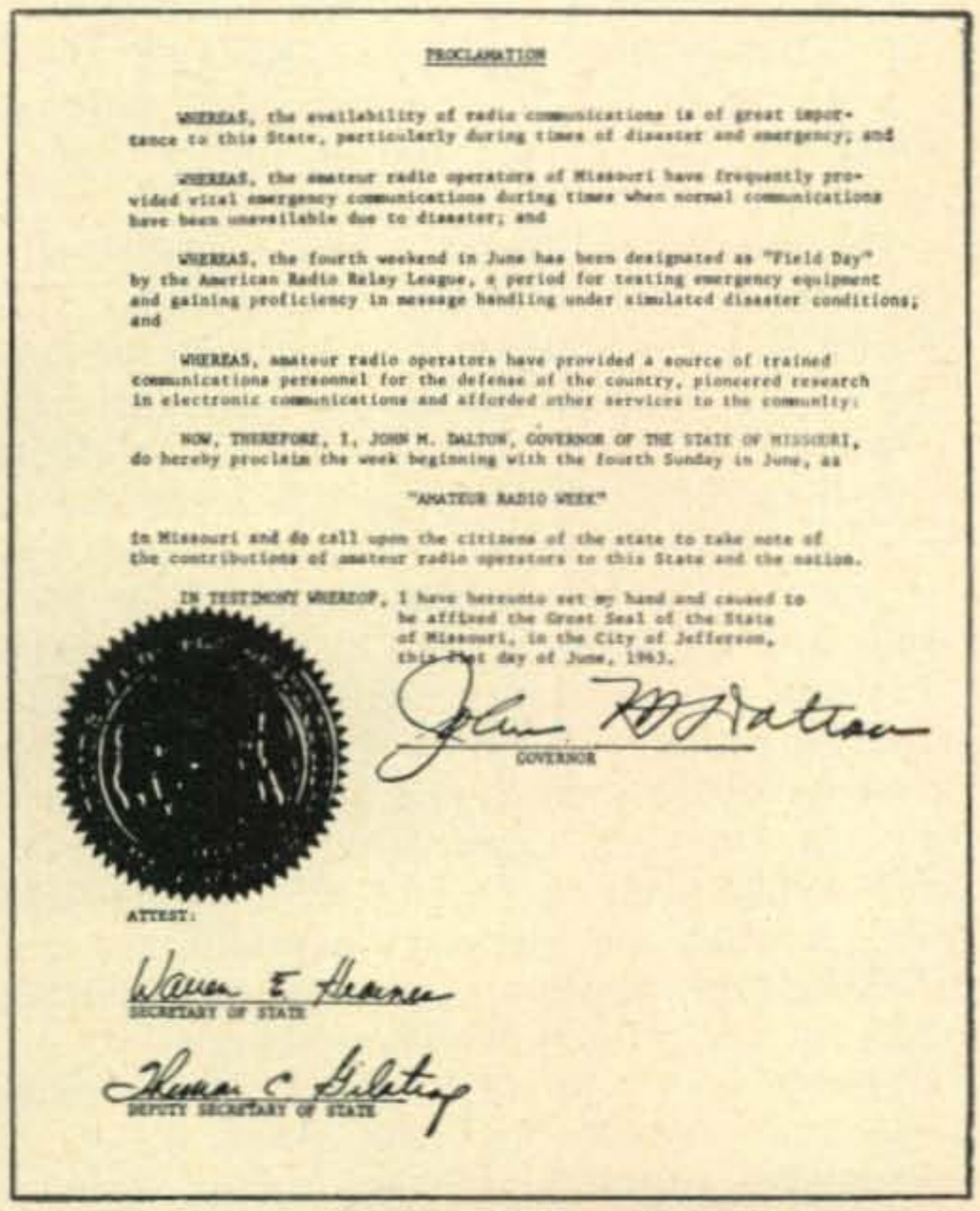
colorful flowers, and manned by several costumed folks depicting hams of several countries to exemplify hamdom's neutral fellowships.

In addition, operators will be working from the float site for 72 hours, and beautiful certificates will be awarded all those working this station; call sign to be announced later.

The Rose Committee has announced that this parade will be telecast in color via Tel-Star to Europe. Newspaper and TV publicity will be world wide.

Here is opportunity for all amateurs, individually and through clubs, to support an outstanding 'People-To-People' friendship program. It will cost $5000 to insure the amateur radio float is a winner. Contributions will be required to make it a high success. This amateur radio float project has been endorsed by the Los Angeles Council of Radio Clubs. Let's support this opportunity to exemplify amateur radio to the world. Send whatever contributions to Kay Koch, K6HIT, Chairman, 17204 Eastwood Ave., Torrance, California.

Old Man, K6BX


PROCLAMATION

WHEREAS, the availability of radio communications is of great importance to this State, particularly during times of disaster and emergency; and

WHEREAS, the amateur radio operators of Missouri have frequently provided vital emergency communications during times when normal communications have been unavailable due to disaster; and

WHEREAS, the fourth weekend in June has been designated as "Field Day" by the American Radio Relay League, a period for testing emergency equipment and gaining proficiency in message handling under simulated disaster conditions; and

WHEREAS, amateur radio operators have provided a source of trained communications personnel for the defense of the country, pioneered research in electronic communications and afforded other services to the community;

NOW, THEREFORE, I, JOHN M. DALTON, GOVERNOR OF THE STATE OF MISSOURI, do hereby proclaim the week beginning with the fourth Sunday in June, as

"AMATEUR RADIO WEEK"

in Missouri and do call upon the citizens of the state to take note of the contributions of amateur radio operators to this State and the nation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, this 31st day of June, 1963.

John M. Dalton
GOVERNOR

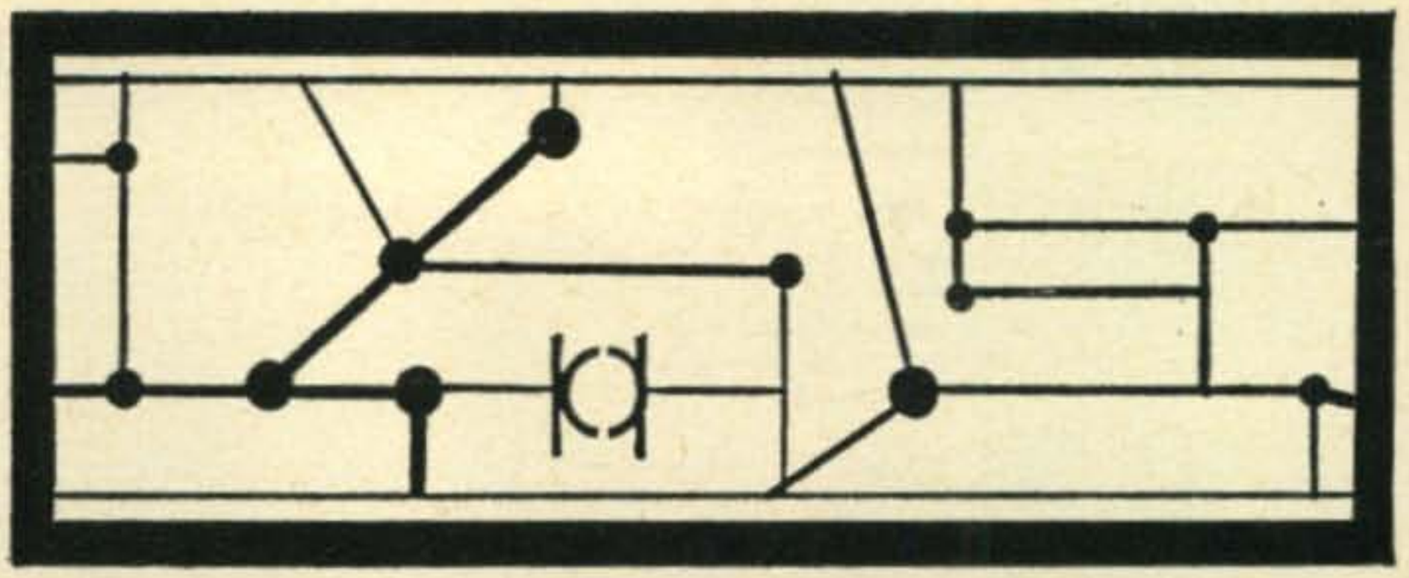
ATTEST:

Warren E. Hearnes
SECRETARY OF STATE

Thomas C. Gilstrap
DEPUTY SECRETARY OF STATE

Missouri joined the ranks of those states recognizing amateur radio when Governor John M. Dalton proclaimed the week commencing with the fourth Sunday in June as "Amateur Radio Week" in Missouri. Al Speer, WØBOA, himself a Missouri Congressman, looks on as the Governor signs the proclamation.

NOVICE



WALTER G. BURDINE*, W8ZCV

THE possession of an FCC amateur license does not in itself make you a ham, it takes lots of study, experimenting, operating and building of equipment to round out your amateur radio experience. Keeping abreast of your hobby will take lots of study, time and effort. Do you want to be a ham or just an operator?

The other day I heard a new operator tell a new Novice that he had just received his Tech license and would never have to study the code and theory again as his license was renewable. I wonder! Could he tune up his rig, could he actually solder a wire or figure out why the rig wouldn't load up to his all-band antenna? I'll bet he can't keep on hamming without some study and self improvement in the art of radio.

One of my greatest thrills is to build a better piece of equipment and have someone say that it works better than a well known commercial set. The knowledge gained by constructing my own equipment or rebuilding a commercial product gives me pleasure. Actually, the cost of home-brewing your own set is just about the same as buying commercial equipment. This is the reason we try to put something in the magazines every month that will strike the fancy of someone so that he will try to improve upon it and tell someone else how to do it.

One item in my shack that brings that thrill and pride of accomplishment is my BIG power supply. I had read about transformers and silicon type rectifiers from about every magazine that is published and then sent to some of our better advertised manufacturers for more information. GE *Ham Tips* had a series connected power supply that caught my eye, so I figured out a neat little trick for supplying power to almost any rig that I might decide to build. It is able to supply almost any voltage from 30 to 2000 volts and still run cool. Now, I usually run low power, but with this supply I can still run low power and be able to get more "oomph" if necessary. My biggest problem was the transformer necessary to supply the power. You see, I had made up my mind to use a double voltage quadrupler with two transformers and silicon rectifiers, hooking the voltage quadrupler sections in series, to increase the voltage capabilities of the supply. Lady luck was with me at

*R.F.D. 3, Waynesville, Ohio.

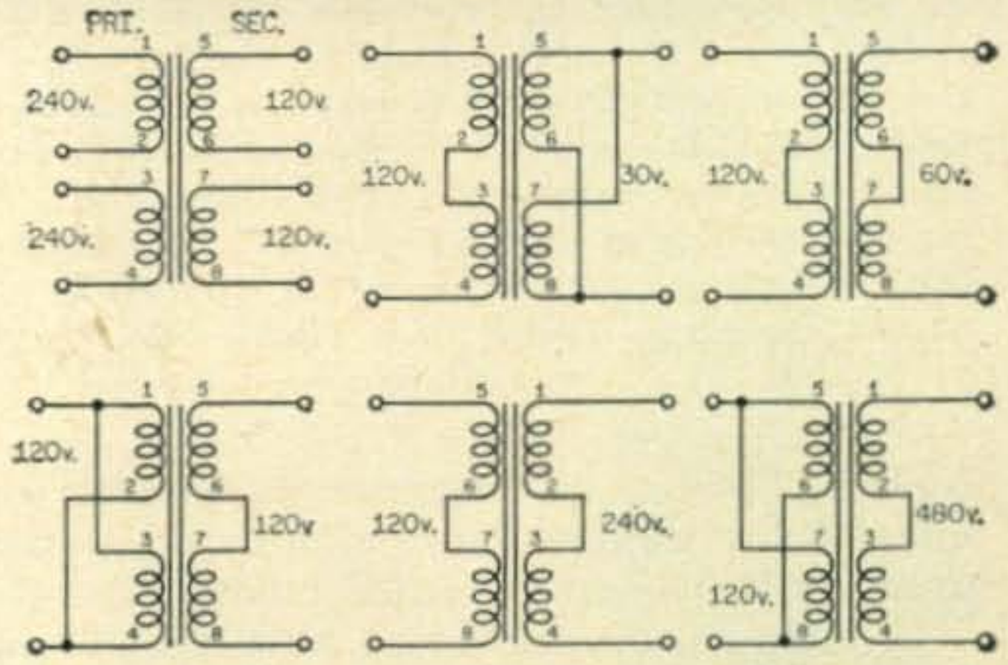


Fig. 1—Circuits using the transformer described in the text to obtain voltages from 30 to 480 volts. Other hookups are possible but will result in duplication of voltage outputs.

the Stagfest in Cincinnati and I ran into a fellow that was selling a screwy looking transformer that just filled the bill. The funniest thing was that he thought that I was buying something that wouldn't fill my requirements and made me promise that I wouldn't try to get my money back at the next year's hamfest. I didn't! The transformer was rated at 0.75 kva. It had two 120 volt secondaries and two 240 volt primaries with no connection between any of the windings. I used the transformer in reverse; this is permissible *if* the ratings of any winding is not exceeded. You cannot take more power from a winding than the rated transformer output, in this case 0.75 kva. The transformer hookups are shown in fig. 1.

Rectifier circuits used with these transformer hookups will be shown next month.

Complete Homebrew Station

From the letters and comments heard at the hamfests and on the air comments, I have decided to show you some of the various ways to build a complete transmitter and all of the accessories that go together to make a complete station.

The station should be built so that you can sample c.w., a.m. and s.s.b. operation. I will have it in operation and available for demonstration if you want to see it operate. It really isn't too much trouble to get a station going if you will do a little studying and a lot of work. You can have something to be proud of and

you will be able to service the unit after construction. Understanding the construction and operation of your station will make you a better operator.

I believe that a good ham should be able to use all modes of operation and operate several bands to derive the most satisfaction from his operator's license. I don't like to hear a ham say that c.w. is the only way to communicate or that everyone that doesn't operate s.s.b. should send his license back. The phone-c.w. and l.f.-v.h.f. squabbles don't help our standing with the public's opinion.

I will try to use some of the components that are readily available and then use some of the more sophisticated components for the fellow that wants them. I have reasons for both of these ideas. Many of our younger hams do not have the money to buy *new* parts for a rig, but have parts that are either available surplus or from the junk box. If you have ideas please send them along and I will try to use them as I build the units. I will have photos and schematics of the final units in the column. What say gang?

Re Six Meter Converter

I have been asked about how to make the plate connection to the nuvistor tetrode and the answer is so simple: just use the grid cap connector for an old-fashioned octal tube; they fit perfectly. I use the type that was a double spiral spring with the wire soldered to one of the two wire ends. They are available for about 15 cents per dozen. The copper-clad laminate can be obtained from both Allied Radio and Lafayette at about $1.50 for a 9×12 inch sheet. It can be cut with a hack-saw and the edges can be smoothed on a small grinder, you can also take out any small sawing mistakes the same way. Oh, yes I have a wonderful small power-supply for it, too.

Letters

G. L. Wolford, 318 S. Adams St., New Carlisle, Ohio, says: "Dear Walt, I am planning to get my license this summer, but you said keep the cards and letters coming.

"I read your NOVICE Column every chance I get and I really enjoy the letters and pictures you get from people who are doing so well with the low-powered rigs, like the one in Texas using the AT-1 and Don Lindsey, WØEVZ with only 6 watts.

"Would it be worth while for you to put in your column how to build some low powered rigs, say like 10, 15 or 20 watts and maybe a regenerative set. Good luck in your column and your own v.h.f. project and I'll let you know when I get on the air. 73, Gordon."

Thanks Gordon, I finished 3000 days on the v.h.f. bands and I'm starting on the next thousand. I will try to give you the necessary low-powered rigs soon. I'm sure you and many others will enjoy them as much as I do.

Edward L. Tobias, WA2VKK, 280 First Avenue, New York 9, N.Y. writes: "Dear Walt, I never got down to writing you as a Novice, but thought I would as a Technician.

"I'll start off with some details. I am 14 years old, and received my Novice ticket in Sept. 1961. Because of antenna limitations I went on two meters, I ran on Gonset III with a dipole out my window and got out quite well. As a Novice I earned: Worked All Manhattan, VHF Century Club Certificate, Section Net Certificate, became an OES and, of course, made RCC. I am also a member of the QRP Club. I worked 6 states and received 140 QSLs on two meters.

"As a Technician, I am on the v.h.f. net and have just made BPL. I now hold v.h.f. PAM and OBS appointments. I use m.c.w. on two meters. My code speed is about 20 w.p.m. and soon hope to get the General.

"I will help anyone interested but am sorry to say that theory is not one of my best points, but will try. Once you pass it you will think it was a snap but it takes work. It's worth it for sure.

"73 es keep up the good work, Ed."

Help Wanted

The following aspirants need help this month:

John D. Martin, Wyaconda, Mo., and 1416 S. Davis, Kirksville, Mo. needs help with code.

Paul L. Wilkins, 33 Woodbury Forest Drive, Hampton, Virginia, Tel. 826-4087 needs help to get a Novice license.

James G. Plimpton, Box 68, Colman, South Dakota, needs help with code and theory.

Larry Johnson, 3115 Hazel Street, Erie, Pa., needs help for his Novice.

Joseph M. Cassano, 515 Brighton Street, Bethlehem, Pa., could use help with code and theory.

A Marine Radio Operator, James E. Bedwell, Box 2188 Gieger Trailer Park, Jacksonville, North Carolina, needs help with the theory.

That's about all for this month. Can you help by writing a few letters and sending some pictures. Remember this column is yours, it's for both the Novice and the Technician license.

73, Walt

Robert Lucas, WAØDXZ, 26 Glendale Court, Iowa City, Iowa has worked 41 states with a T-60 and an SX-140. He says ham radio is the *best*.

VHF

DONALD L. STONER*, W6TNS

DESPITE numerous visits to my analyst, two vacations in Central America and a growing family which sucks up money like a Hoover vacuum—the fact remains clear and unassailable—I am still a "surplus hound." Every so often, I revert to nature and attack a piece of Uncle Sam's finest with hammer and tong ably assisted by a mechanical beaver and continuity tester for solving that age old question—"Where does that wire come out of the harness?"

During one recent foray into the world of bristol knob screws, glyptoled hardware and microminiature schematics, I came up with a project which will interest most v.h.f.'ers. The attack was perpetrated on a Navy RAX-1 receiver.

When the dust settled, the hole punches were cleared out and the floor swept clean of drill shavings, I had a superb receiver capable of tuning 7-27 mc, just right as a tunable i.f. for v.h.f. converters up to 1296 mc. Although the i.f. is about as broad as a Communicator III, it can be made razor sharp with a third conversion stage. Because of the complexity of the RAX-1 schematic, it is not reproduced here. If you cannot promote a copy of the schematic unit, it can be found in the *Surplus Schematics Handbook* (*CQ* Technical Series) by Ken Grayson, W2HDM. Note that this circuit is for unit 1 and the 7-27 mc version is called unit 3. Unit 3 has one extra r.f. and i.f. stage but the unit 1 schematic will give most of the answers.

The modification involves cleaning out the rear apron below the dynamotor mounting area, much the same as for an ARC-5 receiver. Trace out the wires leading to the power plug and label them B+, filament, audio output and so on. B+ does not come out the rear on some units. Note that the filament circuit consists of two 12 volt strings which are connected in series at the power plug. The two lines should be connected in parallel, of course, for 12 volt operation.

Several power supplies have been constructed for converting the RAX-1 to 117 volt a.c. operation. In all cases the power transformer and B+ choke are mounted on the rear apron. In one version, a 6X4 rectifier was mounted in the old power plug socket, while another used two series connected 400 p.i.v., 500 ma silicon rectifiers in place of each diode section in the 6X4. Virtually any power transformer which will deliver 150-170 v.d.c. after the filter choke, and which has 5 and 6 volt, 2 amp. filament winding can be used. One conversion, which employed a Stancor PC-8404, required about 700 ohms in series with the high voltage secondary centertap lead to bring the B+ down to 160 volts. This is wasteful of transformer capability but does have the advantage of providing a source of negative 60 volts for biasing off converter r.f. amplifiers, *etc.* A suitable circuit is shown in fig. 1, along with the proper connections for substituting silicon diodes for the 6X4. Note that the two filament windings must be correctly phased to provide 11.3 volts a.c. This is sufficient for the tube heaters. The choke may be any value rated at 60 ma or more.

The front panel was modified by removing the rack mounting alignment pins and filling the holes with toggle switches for on-off and noise limiter. The porcelain antenna post was removed and replaced with a 12 volt pilot lamp.

A small Japanese S-meter (Lafayette) was installed in upper right corner of the panel. This is a tight squeak, so lay the holes out carefully.

The importance of a good noise limiter in v.h.f. receivers cannot be overemphasized. The limiter used in the RAX-1 conversion is extremely effective, particularly considering its simplicity, and is shown in fig. 2. The diode can be any good quality germanium device with a high back resistance. It is necessary to insert this limiter in series with the top end of the volume control. The volume control is the rear

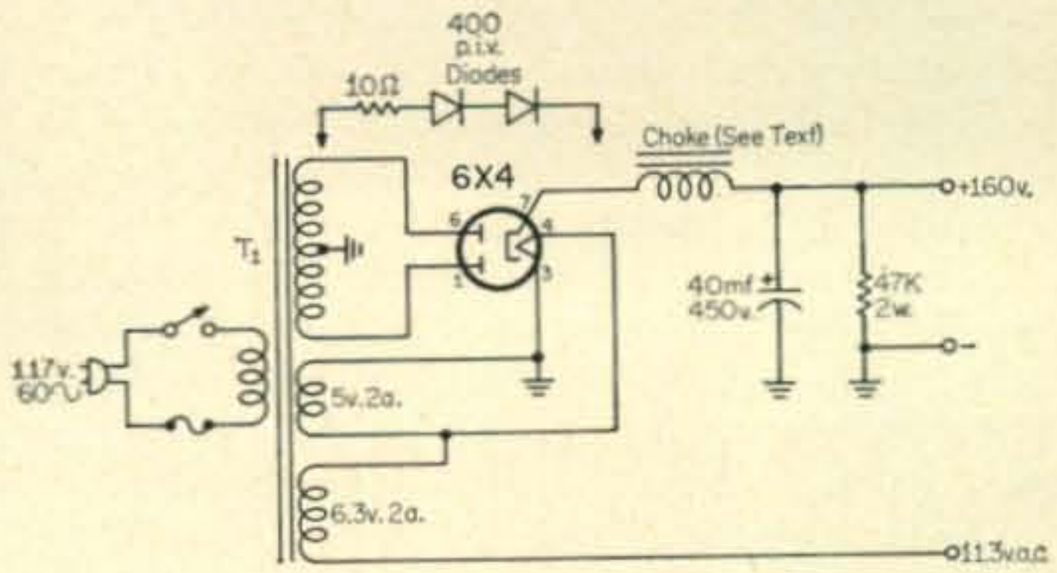


Fig. 1—Power supply suitable for the RAX-1 (unit 3). Transformer T_1 may be any type supplying 440 volts at 60 ma or more and having both 5 and 6.3 volt windings. The resistor/silicon diode circuit shown may be substituted for each session of the 6X4 if desired.

*Alta Loma, California.

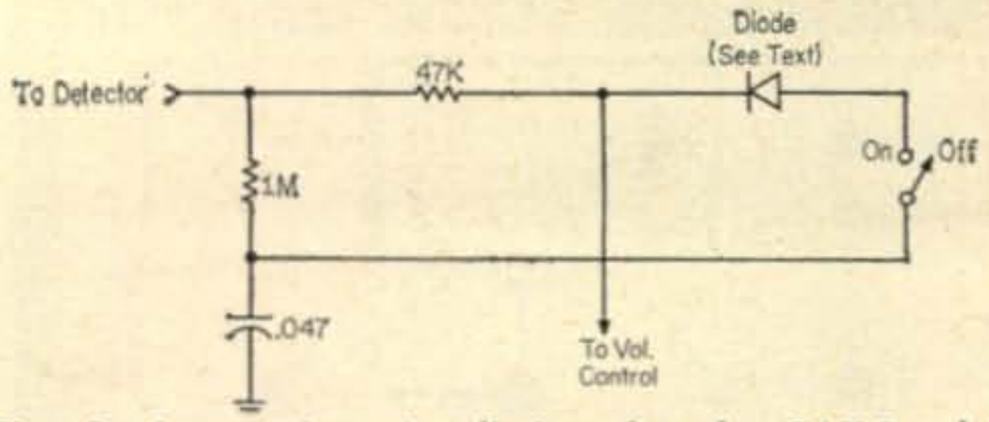


Fig. 2—Automatic noise limiter for the RAX-1 v.h.f. conversion.

section of the twin AB pots. The "hot" terminal is the easiest one to reach and the two wires on it can be easily disconnected.

The S-meter circuit (fig. 3) was unashamedly stolen from the *Radio Handbook* (Editors and Engineers). It worked first time without any cut or try. It consists of a simple vacuum tube voltmeter with the 6AB4 tube forming one leg of a bridge circuit. The meter is connected between the two arms of the bridge and a 10K potentiometer is used to bring the circuit into balance. A 2K potentiometer in the tube cathode controls the full scale sensitivity.

Finally a Stancor A-8101 500 ohm line to 3.2 ohm transformer was added to match the receiver output to a speaker. This transformer was mounted above the choke on the rear of the cabinet.

Possibly a preferable method would be to replace the output transformer (T_{117} in the RAX schematic) with a 5,000-ohm-to-speaker transformer.

Tunable I.F. For "Ham Band Only" Receiver

One of the most interesting aspects of the reworked RAX-1 is the added third conversion stage. The RAX-1 (unit 3) has a 2275 kc i.f. which is pretty wide for serious v.h.f. work. However, by adding the stage shown in fig. 4, the i.f. can be heterodyned to 3.5 mc on a "ham band only" receiver such as the S-Line, SX-111, SX-117 and so forth. By replacing the output coil with a "loopstick" and 50 mmf capacitor the difference frequency (1050 kc) can

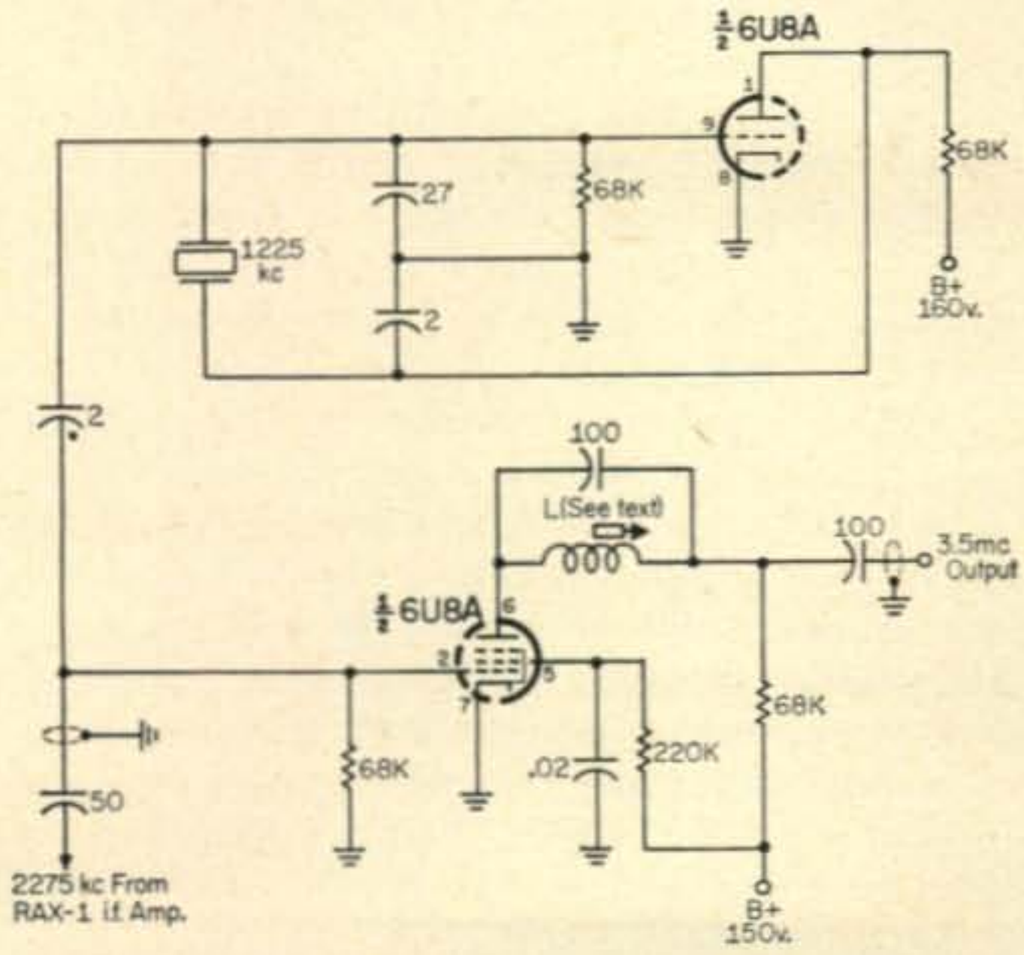


Fig. 4—Converter for adapting the 2275 kc RAX-1 i.f. to 3.5 mc for use with a ham-band-only receiver as a Q-fiver.

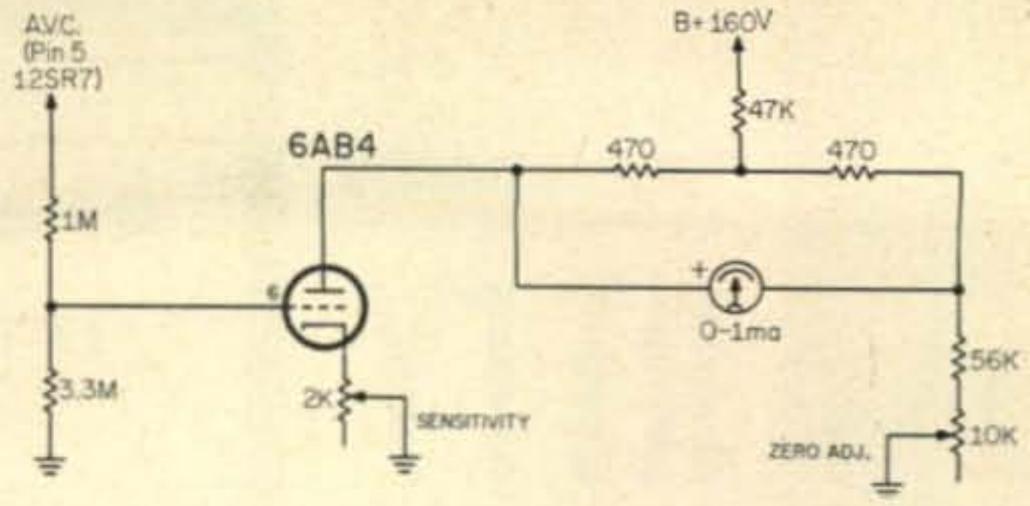


Fig. 3—S-meter used in the RAX-1 and suitable for use in any receiver having a.v.c.

be received on a broadcast band receiver and can even be fed into the super selective RAX-1 (unit 1).

A 6U8 is used as a mixer and 1225 kc oscillator. The sum frequency (2275 + 1225 kc) of 3.5 mc is fed to the receiver. The i.f. signal is coupled from the plate (pin 8) of the 1st i.f. stage in the RAX. The 50 mmf capacitor is used to adjust the output level of this third conversion stage. Keep the output of the converter low or the receiver may not be able to handle the high signal level, even with the r.f. gain control reduced. The output coil for 3.5 mc consists of 75 turns of #28 scramble wound on a ⅜" slug tuned form. Peak this coil for maximum signal at 3.5 mc. The crystal was purchased at U.S. Crystals and cost about $2.50 plus tax and postage.

The tube and circuit was mounted on the rear apron along with a phono-type output jack. Connect the 50 mmf capacitor (which couples signal to the converter) right at the 12SK7 and connect it to the 6U8 grid (pin 2) through coax cable.

Many thanks to my father K6BLC who prepared the conversions and supplied the information for the new circuitry.

Who's News

Congratulations to Karl Fischer, DM2ADJ, of the German Democratic Republic, who qualified for VHF-CC on 144 mc.

Dennis Ernst, Route 1, Jasper, Indiana, reports hearing six meter stations WA5CWB, VVE, EWJ, and AAG, K4WLI and others between S3 and S5 on June 1. He inhales with a 6AK5-6J6 converter into an NC-188, exhaler is a T-60 into a dipole about 40 feet up. Not bad. The lack of v.f.o. prevented Dennis from snagging any of the choice stuff.

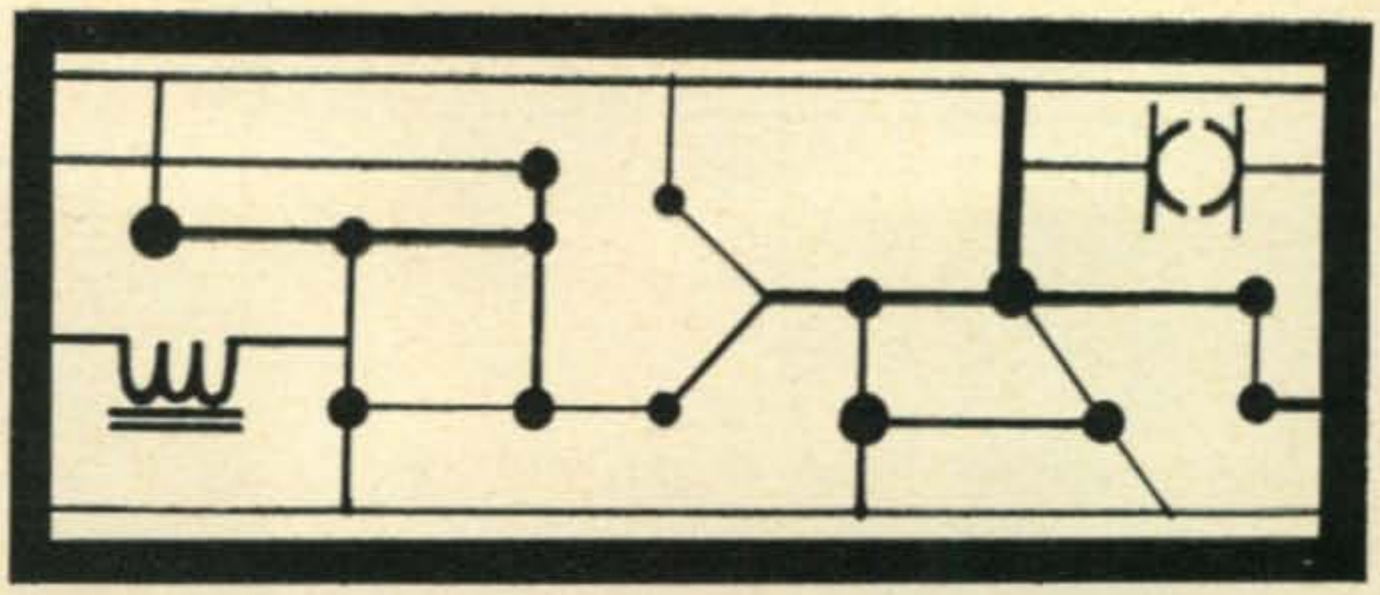
Walt, K1RTS, is currently mobiling with an ARC-4 and expects to finish his new 13 element beam shortly.

Tom McKee, K4ZAO, advises us: "Data is being collected for the fifth issue of *FM NETS*, a directory which attempts to list all counties with wide band f.m. nets operating on either 6 or 2 meter.

"Information desired is as follows: frequency of net, location of net (please list the largest city with activity within a given county), Number of calls on the frequency in the county, and a liaison station for the county (probably the

[*Continued on page 91*]

RTTY



BYRON H. KRETZMAN*, W2JTP

THE radio amateur interested in radioteletype has had to work under many handicaps ever since RTTY emission became authorized. Originally we were confined largely to v.h.f. because only the impractical make-and-break keying was permitted on our h.f. bands. History was made on December 29,1952 when the FCC amended part 12 to allow F-1 (frequency-shift-keying) to be used in the "non-voice" parts of the h.f. bands. This amendment spelled out the stringent standards which we were to follow; the code to be used, the speed, and the shift: 850 cycles plus or minus 50 cycles. On audio (a.f.s.k.) the upper limit of 3000 cycles was placed. In addition the dual identification rule was imposed, requiring that we identify ourselves with International Morse Code (or phone on v.h.f.) as well as on the printer keyboard.

Eventually the FCC was petitioned to allow us to use narrow shift. On March 16, 1956 the FCC amended its Rules to allow us to use any shift under 900 cycles. Here was *positive* progress! The FCC was again petitioned in 1961 to eliminate the handicap of dual identification. On February 26th 1962 the FCC released a detailed memorandum opinion and order which denied this petition. Here was *negative* progress.

*431 Woodbury Road, Huntington, N. Y.

RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc on h.f.

80 meters	3620 kc
40 meters	7040 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.60 mc
2 meters	146.70 mc

Dual Identification Petition

On April 10, 1963 Ed Bruening W8DTY submitted a petition to amend the identification rules as follows:

SECTION 12.82 (*a*)(2):

"The required identification shall be transmitted on the frequency or frequencies being employed at the time and with the type of emission authorized and being employed thereon. In addition to the foregoing, when a method of communication other than telephony or telegraphy using the International Morse Code will be used at any amateur station, the station operator will submit a prior written notice to Federal Communications Commission district office having jurisdiction in the area where such operation is contemplated.

"Except for the first such notice of intent which must be submitted thirty days in advance of such operation, an additional notice will be resubmitted each December for the following year in which such operation is contemplated.

"The notice must contain the station call sign, station location, and the amateur bands which will be used for transmissions other than by telephony or telegraphy using the International Morse Code. At such time as the station changes facilities, adds bands of operation, or discontinues such transmissions, a change to the original notice must be submitted to the FCC district Engineer-in-Charge."

Our own comment is that this petition merits the support of all RTTYers. It would not place any administrative burden upon the district of-

RTTY The Hard Way...No. 22

"I just prepared a 'form letter tape' and feed it into the printer . . . really catching up on my correspondence . . !"

W3MHD Pittsburgh, Pa., RTTY Station of Frank C. Gibson. Exciter: HA-5 modified for f.s.k.; Final Amplifier: 250-TH at 700 watts; Receiver: Drake 2-B; Terminal Unit: W6OWP; Antennas: TH-4, Half wave dipoles on 40 and 80; Teletype: Model 26 Page Printer; Model 14 Typing Reperforator; Model 14 Transmitter-Distributor.

fices of the FCC and would help their monitoring efforts. It also imposes no hardship on the RTTYer as it is similar to the notification requirement with regard to portable operation. Keep your eye open for a request by the FCC for comments, then hit 'em with those 14 copies.

On the Bauds

W1VSA is on 80 from Charlotte, Vermont, with a 4-1000A final. W1TLZ of Norwalk, Conn., is on 144.80 mc a.f.s.k., a.m., horizontal, and has worked little besides W2UYX and W2EW. *(Try 146.70 f.m., and 146.94 for phone liason, Norm; polarization is vertical in this area, by the way.)* W2HWH, traffic man of Maplewood, N. J., made it on 80. K2SDR is also on 80 from Plattsburgh, N. Y. W2GQN of Elmont, L. I., is on 20. WA2YSH of Wyoming, N. Y., is looking for a Model 12. (!) W2EHW of Rye, N. Y., has a Model 15 and is building W2JAV transistor units.

Last October K4KXQ and K4GRY made the first a.f.s.k. QSO on 52.60 f.m. in the Richmond, Va. area. Other stations now active are WA4EQG and W4PZY. Autostart is in use and a repeater is planned. K4YYO of Charleston Heights, N. C., has a Model 15 and wants to know how to f.s.k. his HT-32. *(Watch for an article by WØAJL, OM!)* WA4FIJ of Panama City, Florida, is on 80 and 40 with a Model 19 and W2JAV TU.

W5AJG, old timer v.h.f. man of Dallas, Texas, reports that the surplus TH-5/TG, a narrow-shift audio TU, is hitting the junk markets in the Dallas area. *(Watch for a conversion article by Leroy May.)* W5EUT of Houston, Texas, is on all h.f. bands with his Model 19, HT-37/GSB-201 and 2-B. K5IFH of Pasadena, Texas, has a Model 19 for 6 and 2. WA6AVJ of Arlington, Calif., has built the W2JAV transistor units, and has his eye on the new Delco 350-volt transistors for a keyer. W6WRX of Redondo Beach, Calif., offers to help anyone identify any non-amateur RTTY stations. W7GOV of Enohomish, Wash., just acquired a Model 15 and some tape gear. W7UAV of Baker, Oregon, is looking for a receiver.

W8WYL reports that 150 attended the RTTY Forum at the Dayton Hamvention. W8SLS won the Model 15 donated by W9KRW; and, K8ZRZ and K8BAX won copies of the *New RTTY Handbook* donated by *CQ*. W8OMY of Columbus, Ohio, now has a Model 19 and reports increased activity in his area: W8ABO, K8RJI, W8ARP, W8BTW, W8TSE, W8UHZ, and W8ORL. K9IXS, the Radio Club of the Elkhart (Indiana) High School is on 80 with Models 15 and 26, and W2JAV and Twin City TU's. A kw amplifier is available.

KØJRG of Lincoln, Neb., has a CV-57 TU (455 kc i.f.) and an HQ-170 (60 kc i.f.) receiver, and wants to know what to do. *(Sell or trade the CV-57, then build an audio TU, Stan!)* WØZOQ of Shawnee Mission, Kansas, worked K3ADS on 51.40 mc May 5th. WØVAA of Wisner, Neb., is building the W2JTP Tuning Fork Standard.

W1MQT/VO1 is on 80 and 40 from Newfoundland after 2000 GMT weekdays and any time weekends. Jerry has 14 and 15 gear, a CV-89 TU, O-39C exciter, a pair of 4-400's, and a dipole 85 feet up. Receivers are SP-600 and R-388. Skeds are desired. KH6DVF is looking for dope to f.s.k. his 32S-3. *(Write Collins, Jim.)* K4AGE is looking for a machine in Morocco. KA8AB in Japan expects to be on soon. DL9EX has trouble frequency shifting his 32S-1. *(Write Collins, Fritz.)*

Comments

We just had the usual long and interesting letter from Irv Hoff K8DKC, active experimenter and author of articles in *RTTY*. Irv tells me about the remote control system in operation between W8SDZ in Toledo, Ohio, and his station in Ann Arbor, Michigan. Both stations have 100 watt f.m. 6 meter sets and beams. In conjunction with carrier operated relays and an Electrocom FSC-250-ASR terminal unit, Keith in Toledo can operate Irv's h.f. transmitter. He has the option of copying either from his 75A-4 or from Irv's SX-115, once set up; providing the received station doesn't drift. *(What, no a.f.c.?)* All of which points up some of the fascinating control arangements made possible by the combination of commercial surplus f.m. "two-way radio" equipment and RTTY gear. By the way, W2JTP has been set up for remote control and retransmit, either phone or RTTY, for several years now.

73, Byron, W2JTP

YL

LOUISA B. SANDO*, W5RZJ

TIME for the YLRL 25th Anniversary convention, June 19-21, 1964, is slowly drawing around. The Buckeye Belles, hostess club for the event, have already put a full year of planning into the convention. K8ITF, Marge, chairman of decorations and favors, is working on a bedspread that is to be the main YL prize. Each of the YL clubs has been requested to embroider material with that club's emblem, using YLRL blue as the main color. Other prizes, for OM or YL, will be: Drake TR-3 all-band transceiver, Clegg Thor 6, P&H Linear, T.O. keyer, Waters Hybrid coupler. Tickets for these will be in books of 6 for $5, or singly at $1.

K8MZT, Shirley, chairman, has announced a new location for the convention: the Nationwide Inn, 4101 W. Broad in Columbus—this to provide more space since so much interest is being expressed in the convention.

Shirley also announces the committee has held the line price-wise with complete convention ticket set at $10 (registration $2.50, Saturday luncheon $2.50, banquet $5). Congratulations to the committee. This is the same price as each of the earlier YLRL conventions, including the first one in 1955, and you know what's happened to prices since then! Tickets are now available from K8UKM, Elizabeth Isham, 474 Darbyhurst Rd., Columbus 4, Ohio. So order yours soon and give the convention committee a boost—financially and morale wise.

*4417 Eleventh St., N.W., Albuquerque, New Mexico.

YLs attending the 16th Annual Amateur Radio State Convention at Grand Rapids, Michigan in April. L. to r., front row: K8TYK, K8KCD, W8KLZ. Second row K8IAI, K8HLC, K8TIV, W8REI, W8ONI, KHOMH, WN8GNS, K8RTG. Back row: K8YGO, K8YEX, W8AXZ.

YL in Peace Corps

First YL we've learned of to enter the Peace Corps is Marolyn Gwinn, W8WUB. Marolyn is in training at the Univ. of New Mexico here in Albuquerque and we had the pleasure of a chat with her recently.

W8WUB was featured in this column in May '59, as a most attractive 15-year old high school sophomore at Huntington, W. Va. More recently her QTH has been Grand Rapids, Mich. Her mother Ethel is W8WUE, her dad is W8PFL, her twin sister Carolyn is ex-KN8CHX, and there are several other hams in the family. Marolyn began as a Novice in '55 at age 11. She has been very active and holds many certificates.

The Peace Corps training is rugged and Marolyn finds almost every moment occupied

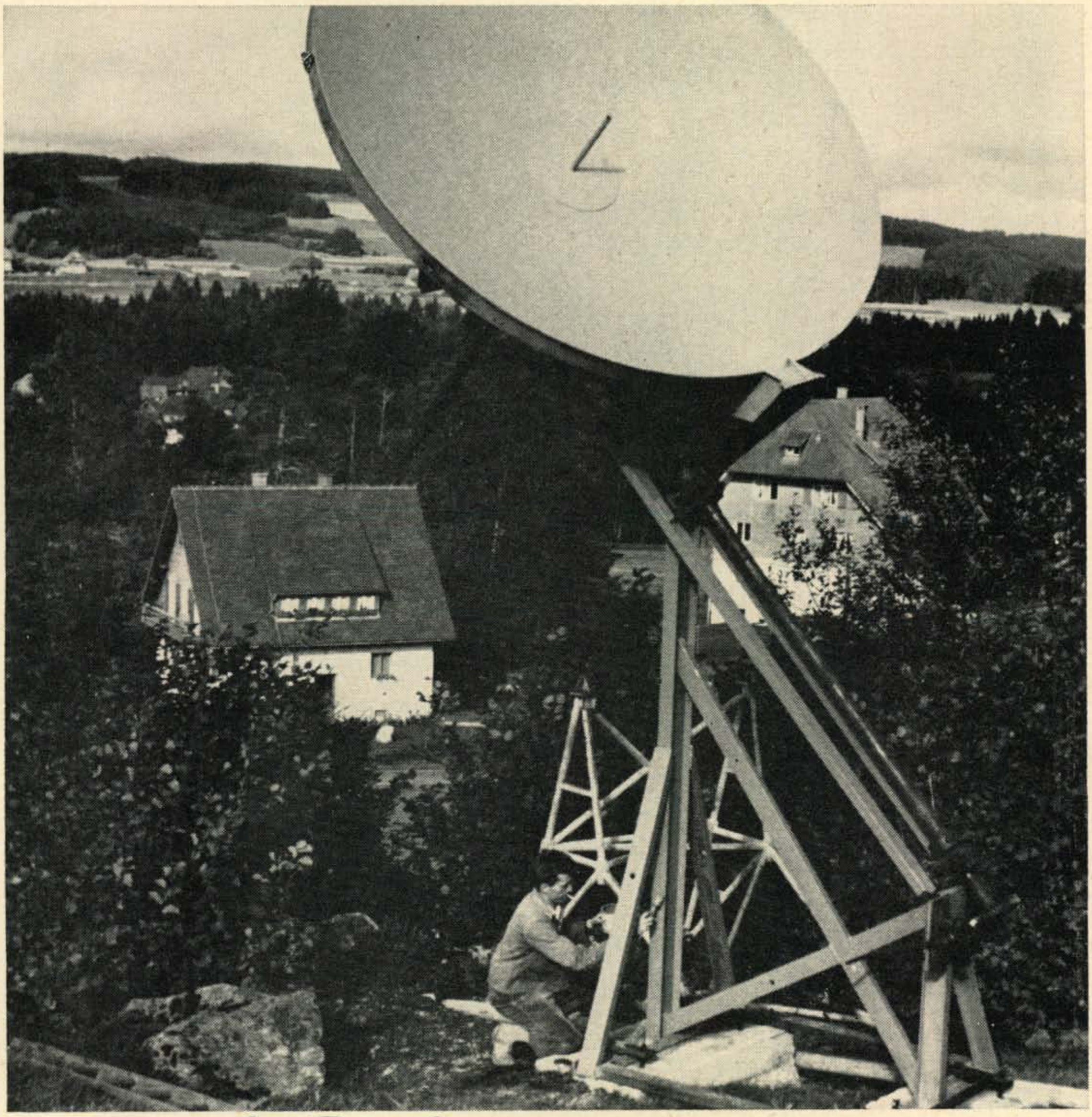
[*Continued on page 92*]

Some of the members of the Buckeye Belles, hostess club for the 4th International YLRL Convention to be held at Columbus, Ohio, June 19-21, 1964. L. to r., K8GWF,W8LGY, W9YWH, K8ITF, K8DHF, K8HGD, next unidentified, K8MZT, K8TFL, WA8AHU, W8VWL, WN8ADS, W8VWL's jr. YL, K8VWW, K8TKS, K8URM. Buckeye Belles membership has grown to 200—enough for a convention right there!

VHF AMATEUR

Vol. 5, No. 8—August, 1963

BOB BROWN, K2ZSQ, Editor



In This Issue

Departments

Cover Photo: Ten foot dish used by DJ3EN in the Black Forest, Germany. See page 71.

Features

Address all correspondence to: Bob Brown, K2ZSQ, Editor, *The VHF Amateur*, 300 W. 43rd St., New York 36, N. Y.

New from Gonset

A HIGH QUALITY TRANSISTORIZED SSB TRANSCEIVER

that is ULTRA-COMPACT • LIGHT WEIGHT • low in cost

Gonset has scored a breakthrough with the new "Sidewinder"—a 2 meter SSB, AM and CW transceiver that combines technical excellence with contemporary design and compact, sturdy construction.

The Gonset "Sidewinder" provides coverage of the entire 2 meter band in four segments 1 Mc wide. It has built-in VFO and the receiver is *completely* transistorized. There are a total of 21 transistors, 6 diodes and three tubes in the "Sidewinder," which operates on either SSB, AM or CW.

The power supply is designed for snap-on back or remote installation and is available either as a kit or a wired and tested unit.

CHECK THESE DELUXE FEATURES AT YOUR LOCAL DISTRIBUTOR!

• Receiver and transmitter utilize dual conversion. • Designed for mobile and fixed station operation. • Illuminated dial and "S" meter. • High voltage power supply is used only in transmit mode. • Highly Stabilized VFO. • Crystal lattice filter for both receiver and transmitter. • 20 watts PEP input SSB, 6 watts input AM, 20 watts input CW.

Transceiver: 8¾" wide, 4¾" high, 7" deep. Weight: 7 lbs.-10 oz. Amateur net price **$349.95**

Power supply: 8¾" wide, 4¾" high, 5½" deep. Weight: 11 lbs.-2 oz. Amateur net price—kit **$39.95** Wired and tested unit **$49.95**

The new Gonset "Sidewinder" SSB Transceiver will be on display at your local distributor's in August.

GONSET®
DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIFORNIA

For further information, check number 1, on page 110

Cover Story:

VHF In Germany!

DR. KARL GERHARD LICKFELD, DL3FM*
Klingenburgstrasse 30
Mulheim (Ruhr) — Ickten, Germany

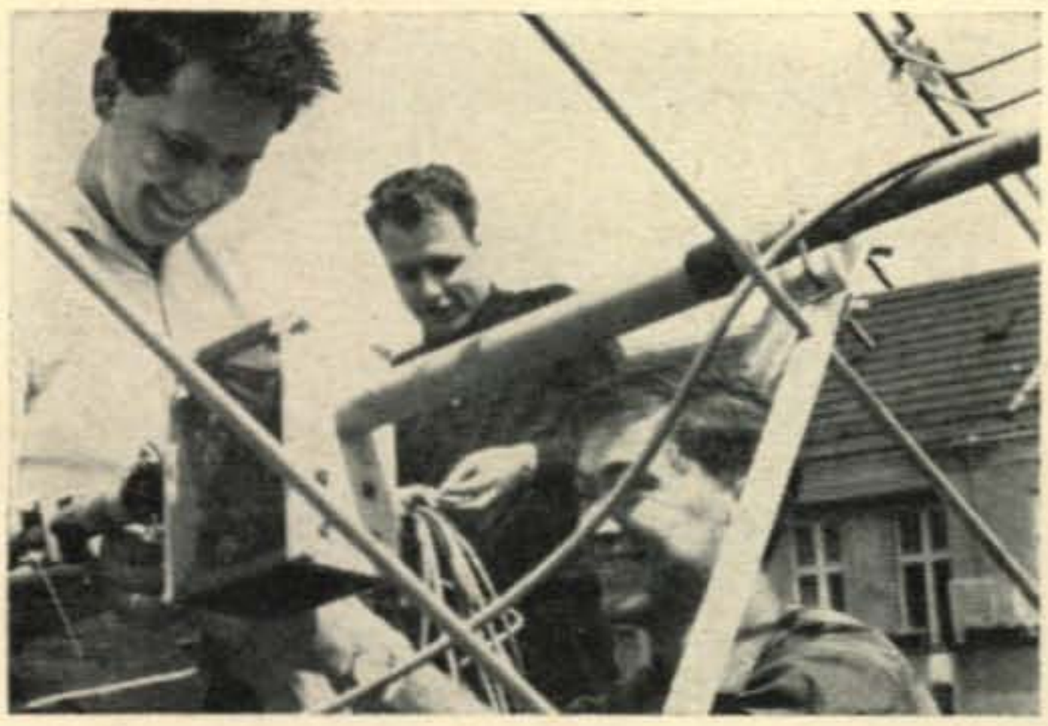
VHF IS QUITE THE THING HERE IN GERMANY. We've had activity on these bands since 1949, but up until 1960 VHF was synonymous with 144 mc (we have no 6 meter band). In recent years, however, we've been pushing efforts for the 432 mc band while activity is running up a steep rim. My own spare time is very, very short, being absent from home 12 to 13 hours every day. I had planned to be ready on 1296 mc in the Summer of 1962, but things have since been postponed. The Swiss-German group around HB9RG has had the luck to make a "first" when they received their own echoes. There are other more or less semi-hidden groups of German amateurs who are on the way to a moon bounce program. What we all need, though, is more close cooperation with American amateurs who are the pacemakers. I think one must not look on just the tops of the present VHF art only, so we'll turn down again to the flat areas of normal VHF hamming.

On 144 mc (144-146 here) s.s.b. is becoming more and more popular. In most cases commercially made 14 mc boosters are used to get up to 144 mc, using homebrew mixing equipment. Filter-type exciters are the cry of the day, but it should not be forgotten that once a German amateur *did* run a phasing-type s.s.b. transmitter on 144 mc. He was DL3NQ. He left Germany a couple of years ago. There's a big trend for phone-only on 2 meters, but the real old men among us are keeping an eye on c.w. phenomenas all the time. Meteor scatter contacts have taken place between Germany and UR and OH land, to name only two real DX countries. The American boys should remember that our climate here does not catalyze superrefraction as much as it does the climate of North America, especially along the coasts. Distances ranging around 1200 km (745.20 miles) can only be covered with the greatest difficulty here on 144 mc. Up to 20 different countries (*not counties!*) have been worked by German amateurs via aurora on 2 meters. At the beginning of December, 1962, a big opening occurred and contacts between England, Norway, Sweden, Denmark and Germany were commonplace on 432 mc. Crystal-controlled converters and transmitters are used here exclusively. And semi-conductors are being used more and more for 144 and 432 mc converters. Noise figures of 4 to 6 db have been obtained through their use on 432. Most power amplifiers in the medium power class for 2 meters are equipped with the QQE 03/12, an equivalent of the 6360. Higher power exhalers are proud of their QQE 06/40's or even their 4X150A's.

We are not allowed to run a full gallon here. The upper power limit is 250 watts, but most hams don't exceed the 120 watt level. For a fairly long time we have had a system of spot frequencies on 2 meters. This means that even very weak signals can easily be identified, since every German VHF man use but one crystal in his transmitter. Power levels of 100 watts can often be found on 432 mc, using the QQE 06/40. 1296 mc transmitters are built around 2C39A's; converters for this band are using diode mixers. Long Yagis have been and still are the most accepted, but we don't forget the advantages of full wave dipole arrays. Summing up, it could be said that we are observing a steadily increasing population on our amateur VHF bands, certainly no detriment to the hobby! ■

*VHF Editor, *das DL-QTC*.

Ice-covered 432 mc antenna on top of Germany's highest mountain, Zugspitze. DL9JU controls antenna temperature . . . The Zugspitze is chosen as a contest location very often since it opens the VHF doors to the southeastern parts of Europe.



Erecting a new "5 over 5" are Berlin amateurs DL7HR, foreground right, and DL7HM, background, while an SWL keeps smiling. Berlin can be contacted on 144 mc from West Germany and is a link between it and the East.

Power Supplies for VHF Equipment

ROBERT D. FRANTZ, W3AVU
32 West Gaul Street
Wernersville, Pennsylvania

MOST AMATEURS WHO PURSUE the art of VHF communication tend to neglect the technology of d.c. power supplies. While it is true that the greatest fascination of VHF lies in the r.f. circuitry, any successful station will contain numerous sources of d.c. Many circuits that are used in commercial power supplies are relatively unknown to the amateur, yet they are very useful in communications equipment. The following paragraphs will briefly review some of the d.c. sources that are of interest.

Using Silicon Rectifiers

The appearance of low cost silicon rectifiers has opened many circuit possibilities that would be very clumsy or impossible with vacuum rectifiers. Although solid state rectifiers have many advantages over the vacuum type, a few precautions must be observed in their application. A sure way to ruin a silicon rectifier is to exceed its peak inverse or breakdown voltage rating. It is important that anyone wishing to use silicon rectifiers in a power supply be capable of determining the peak inverse voltage that appears on the diodes. Fig. 1 shows three typical power supplies that could be built from a single transformer. The transformer voltage rating is given in r.m.s. volts. Note that the filter with no load will charge to the peak voltage output, or approximately 1.4 times the voltage rating of the transformer. Since the transformer winding connected to any string of diodes will also swing negative, the diode strings must be rated at more than twice the output voltage.

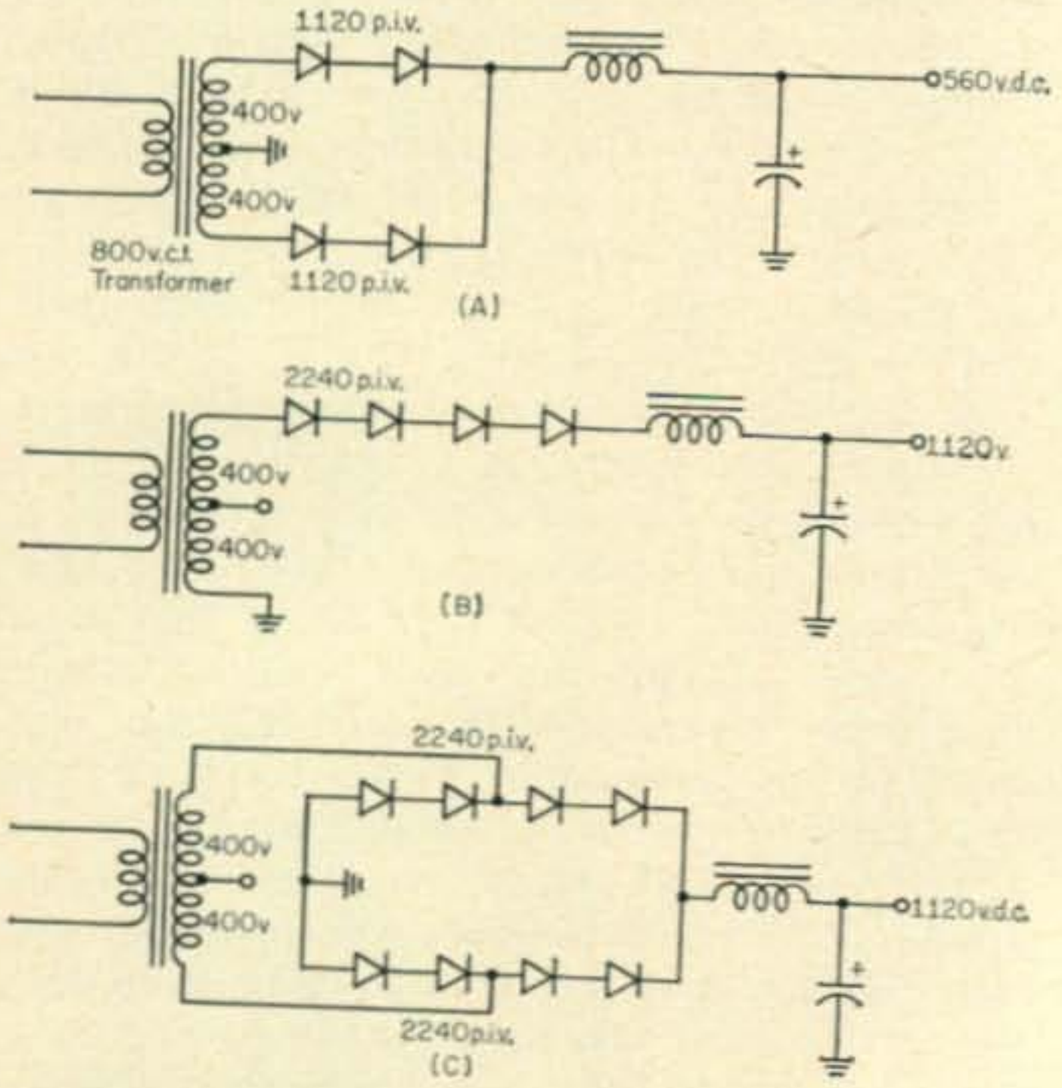


Fig. 1—Power supplies that can be built from a single transformer.

Remember that in Fig. 1 the diode inverse voltages shown are actual voltages that appear across the diodes. For reliability, each diode string should be rated at about three times the no-load output of the supply. It has been the author's experience that any number of diodes can be connected in series to give a p.i.v. rating equal to the sum of the individual ratings. The voltage across the individual diodes will be self-adjusting and no equalizing resistors or capacitors are needed.

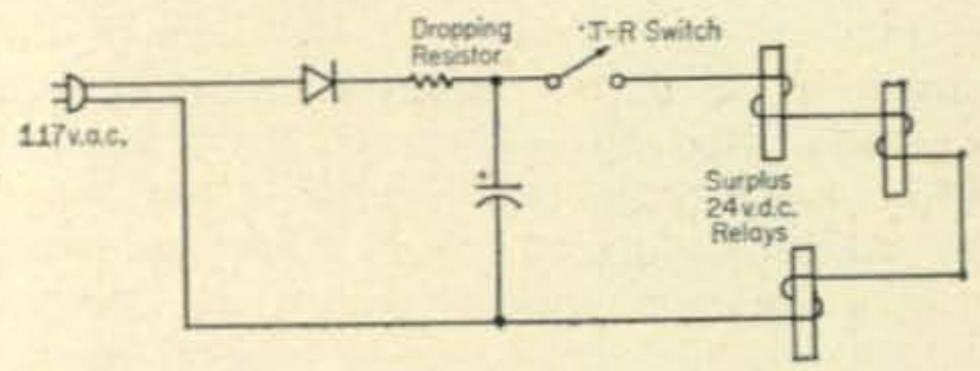


Fig. 2—Control circuit using silicon diode.

Fig. 2 shows a circuit where a silicon diode is very convenient. When the TRANSMIT-RECEIVE switch is open, the filter capacitor charges to about 150 v. This action provides a high current to close the relays, but allows the circuit to hold the relays closed with lower current. No part of this control circuit should be connected to the chassis, due to the lack of an isolation transformer.

A listen to the beat notes of most v.f.o.'s on the VHF bands will tell you that 60 c.p.s. f.m. is a problem. The f.m. is caused by a.c. on the v.f.o. tube heater. One way to eliminate the problem is to supply d.c. to the tube heater. A direct approach is shown in Fig. 3A. A disadvantage of the circuit is that several thousand microfarads are required in the filter, and even then the percentage of ripple will be fairly high. A better circuit is shown in Fig. 3B. This circuit takes advantage of the fact that the current output of a transistor is determined by the base current, and is relatively insensitive to supply ripple. The base current is easily filtered because it is very low, being the heater current divided by the current gain of the transistor.

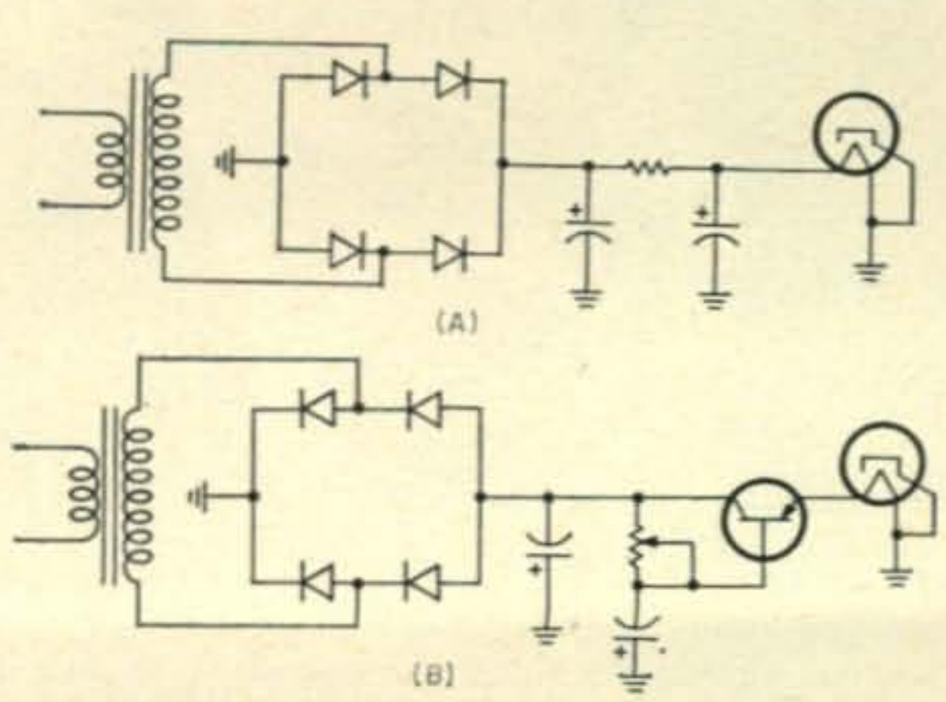


Fig. 3—Two methods of supply filaments with d.c.

Adjustable Power Supplies

It seems that most amateurs are unfamiliar with adjustable, regulated power supplies, yet these supplies are invaluable for trying new circuits, or supplying the screens of large transmitting tubes. Even the simplest of electronic regulators will give more than adequate regulation for most amateur applications, and a couple of low cost surplus tubes will supply many watts of regulated power.

Two basic types of voltage regulators are shown in Fig. 4. The circuit of Fig. 4A is a series regulator. Operation of the circuit is best explained by means of an example set of conditions. Suppose that the desired output is 150 v. across a 5000 ohm load (30 ma). Also assume that the particular tube in the regulator will conduct 30 ma. when it has 300 v. plate to cathode, and —10 volts grid to cathode. Note that in the circuit of Fig. 4A, these conditions are met. Also note that the VR tubes have established a reference voltage that will not change with variations of the unregulated supply. If the voltage from the unregulated supply decreases, or the load resistance goes down (more load current), the voltage across the load will tend to decrease. Any decrease in load voltage decreases the regulator cathode voltage, making the grid voltage more positive with respect to the cathode, thus decreasing the drop across the tube. Any tendency for the load voltage to increase will cause an opposite reaction, and the drop across the tube will increase. It is obvious that the regulation is never perfect, since a small change in load voltage is required to operate the regulator tube. The output voltage is adjusted by moving the voltage tap on the potentiometer. In this circuit the regulator tube acts as variable resistor in series with the load, and dissipates maximum power when supplying high current at low voltage output. In most cases, the regulator tube heater must be supplied from a separate filament transformer, or the allowable heater cathode rating may be exceeded. Several tubes may be connected in parallel for increased current output.

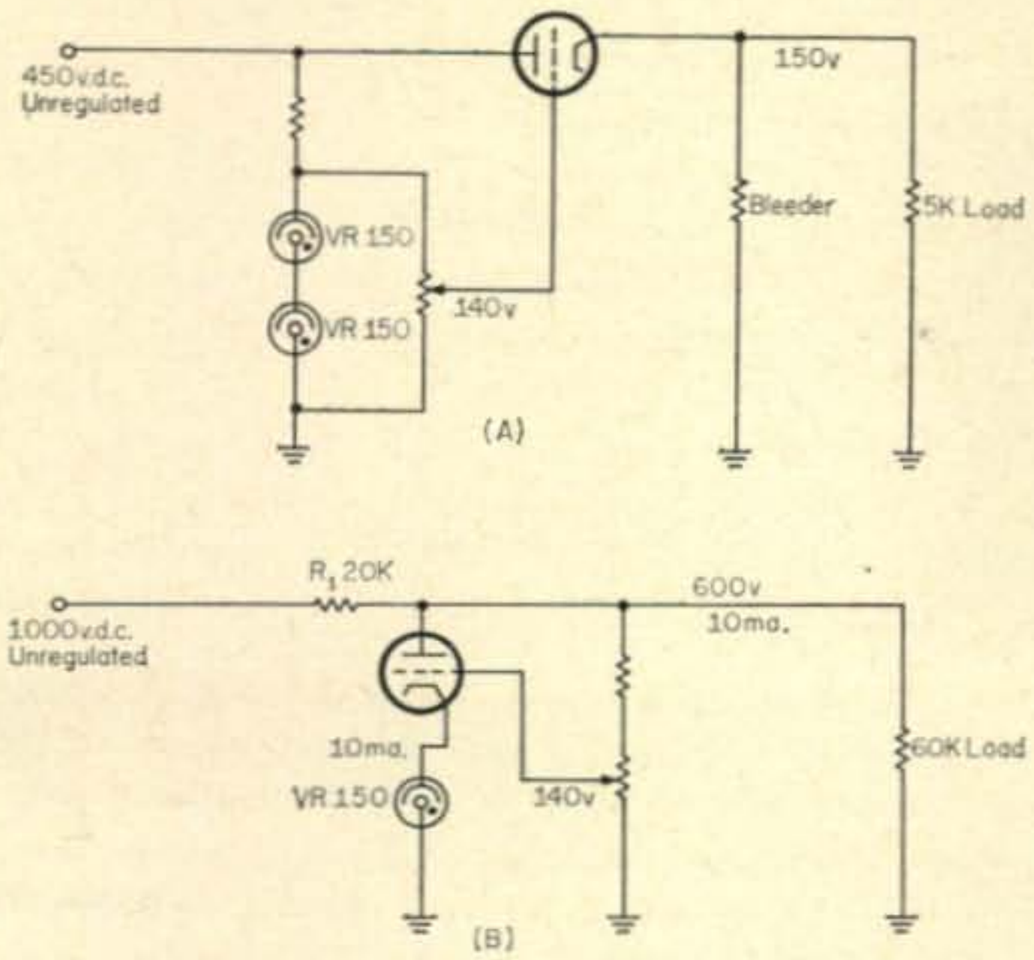


Fig. 4—Two types of voltage regulators.

Shunt Regulator

The circuit of Fig. 4B shows a typical shunt regulator which is most useful as a source of regulated power for high voltage-low current devices, such as klystrons. In this circuit the unregulated d.c. source supplies current to the load and to the regulator tube. The cathode voltage of the regulator tube is fixed by the VR tube. If the load voltage tends to decrease, the voltage on the grid of regulator tube will decrease, making it more negative with respect to the cathode. The voltage change at the regulator grid will cause it to draw less current, and reduce the voltage drop across R_1. This type of regulator dissipates maximum power when operating with no load.

Many types of voltage regulators are possible, and a search through industrial engineering textbooks will reveal many circuit configurations. One thing to keep in mind is that any regulator (including the clamp tube) can produce parasitic oscillations, and could be a very elusive source of TVI! ■

New Supreme 6 Meter KW Amplifier

New Supreme Model SB6-LA

THE UNIT PICTURED AT THE LEFT is the new Supreme SB6-LA, a six meter linear amplifier using an Eimac 3-400Z in grounded grid operation. The rating for s.s.b. with a driving power of 32 watts p.e.p. is a full kilowatt, while a.m. operators will have 600 watts input. C.w. power is also a k.w. In spite of these power levels, the unit is but 6½ × 15 × 9½" and weighing only 15 lbs. A quiet-operating 58 c.f.m. blower keeps the 3-400Z's cool. Plate voltage supply requirements are between 2500-3000 volts at 300 ma. Price, $229.50.

The Supreme Model SSB-6B is another item of interest to VHF men (not pictured here). This item is a six meter s.s.b. transmitter with 75 watts p.e.p. input, 6146 final. It is capable of u.s.b. or l.s.b. at the flick of a front panel switch, c.w. or a.m., with carrier injection. A 7360 serves as balanced modulator. One major feature is its v.f.o. control, tuneable from the front panel as part of this fine package. The SSB-6B uses the McCoy 32B1 Silver Sentinel crystal filter. Carrier suppression better than 50 db, unwanted sideband suppression better than 40 db. This transmitter comes complete, wired and tested, for $279.50. ■

Another VHF Amateur Exclusive:

A New VHF Operation: F.M.

BYRON H. KRETZMAN,* W2JTP
431 Woodbury Road
Huntington, New York

PERHAPS WE SHOULD HAVE USED the word *different* rather than *new* in the title of this article, since f.m. is really not new to amateur radio. Have you tuned the high ends of the 6 and 2 meter bands lately? We have in mind the f.m. signals that can be found, for example, on 52.525 or 146.94 mc. You can copy these signals on a standard communications receiver equipped with a converter by the slope-detection method.

When you hear these f.m. stations, you will probably notice that operation is very brisk, to say the least. Break-in is rapid. No one fools around with repetitious calling. This is because everyone transmitting is on the same frequency and receivers are crystal controlled with a squelch circuit that quiets the speaker in the absence of signals. You may hear only a few of the stations working each other, but those obviously are having no difficulty. This might be partly because you are most likely using a horizontally polarized antenna while vertical polarization is used on VHF f.m. Another reason is that these stations are using very hot receivers, especially designed for f.m. reception. Characteristic of this mode, mobile stations are doing S9 work with stations quite distant, compared to their a.m. counterparts.

In certain areas you might even hear duplex operation. Shades of 5 meters! This is where the casual listener will have to do a bit of figuring to determine just what the heck is going on. Chances are that you're hearing a cross-band duplex operation, possibly between 6 and 2 meters. (This can be very confusing to the uninitiated!) Repeating that is the re-transmitting of signals automatically, is fairly common. Short beeps of different audio frequencies may also be heard. Read on! This VHF f.m. operation gets more fascinating by the minute.

Equipment Being Used

Here is the straight dope: These VHF f.m. nets are making use of commercial surplus two-way radio equipment, formerly used in taxi cabs, police cars and the like. These commercial f.m. sets are available with ranges of 30-40 mc, 40-50 mc, and 150-170 mc. The low-band units require just the removal of padding capacitance and/or taking off turns on some coils. The high-band sets require just the addition of capacity across the tuned circuits to get to the 2 meter amateur band.

Naturally, most of the equipment available is of the mobile variety with vibrator power supplies for the receivers and dynamoters for the transmitters. Power supplies for a.c. input have to be built in order to use these units at the home station.

Believe it or not, there are even some rugged individualists who like to build their own VHF f.m. transmitters and receivers. (Frequency modulating a v.f.o. is a lead pipe cinch; the receiver is a *bit* more complicated.) Other interesting technical aspects of this VHF f.m. operation consist of remote control, repeater control by tone bursts, the cross-band duplex mentioned earlier, and in-band duplex.

Operation

It should be pointed out that this VHF f.m. is vastly different from the usual a.m. operation on 6 or 2 meters. There is no "DX chasing," almost no CQ'ing, and no one talks long enough for the 10 minute identification rule to apply. Fundamentally, an f.m. channel is a vast intercom network where there is real communication between hams.

The individuals you meet on these frequencies might well be called a new breed of hams, much different from the type found on 20 and 75 fone. This VHF f.m. gear cannot be bought over the counter. You have to look for it and really dig into it to make it work. No worries about ruining resale value! As a result, this kind of hamming, like RTTY, is developing a more technically competent breed of hams.

Information on VHF F.M.

We couldn't possibly cover this entire subject here, except in a most general way. As mentioned previously, VHF f.m. is really not new. The ARRL had quite a promotion going in *QST* back in 1940. Almost nothing has appeared anywhere in over 20 years, except for one extremely good description of 2 meter VHF f.m. operation by Jim Aagaard, K9OJY, in *QST*.[1]

*RTTY Editor, *CQ*.

[1]Aagaard, James S., "Two Meter F.M. for Noise Free Local Communication," *QST*, July 1960. Operation of f.m. nets in the Midwest.

With deep regret we record the recent passing of two well-known VHF men, Benjamin A. Narod, K2KDJ, and Karl G. Vincent, W3ASD.

UHF ROUNDUP

an exclusive feature of The VHF Amateur

ALLEN KATZ, K2UYH*

I GUESS EVERYONE RUNS INTO the problem of balancing the budget at one time or another during the year. Bookkeeping can become an extremely intriguing subject, especially when the presence of a new 75A4 or a couple 8072's depend on how well you can juggle the figures.

But tell me, when was the last time you balanced the books on your u.h.f. communications potential? The results of this type of bookkeeping can be just as beneficial. On the credit side of the ledger you have such items as transmitter power, antenna gain, and perfect receiver power. On the debit side you have path loss, receiver noise, and transmission line loss. The balance tells you whether a contact is possible between two given points.

To make a balance sheet for your own set up, you can start on the credit side. First determine your transmitter power output. Usually you are doing quite well if you can achieve 50% efficiency on the u.h.f. frequencies, although some of the newer tubes claim better values. Convert your power output to a db gain (relative to one watt) by using the standard equation, Gain = 10 log $P2/P1$. If you had a 1 kilowatt transmitter with 50% efficiency, your power output would be 500 watts, and your gain would be 10 log 500 or 27 db. This value would be your first entry on the sheet.

The next important credit entry is antenna gain. Most fellows have some notion of their antenna's gain. Unfortunately all too often this notion is in error. This poor situation exists because figures for commercially available antenna are in many instances misleading, and antennas constructed from magazine articles are produced inaccurately or just given the wrong gain rating to start with. In the case of this balance sheet, the antenna gain used should be the value in db relative to a half wave dipole. The only way to truly know this value is measure it properly yourself. Here the article "How to Measure Antenna Gain" in November 1962 *CQ* is an excellent starting point. However, if you are too lazy to determine your antenna's gain and satisfied with just guess work, you can try and match your antenna with one in the *VHF Handbook* or use one of the many cookbook gain formulas around. Don't forget to add in the gain of the receiving antenna. This is a balance sheet for the total communications system.

The final entry on the credit side is perfect receiver power. It is the gain the receiver could generate, when no noise is added by the receiver. This gain is limited by two factors: the amount of noise present on the frequency of the receiver (measured as a temperature in degrees Kelvin), and the bandwidth of the receiver. The equation for the gain is 10 log $Kt \triangle f$ where K is Bolzmann's constant, -1.37×10^{-23}. The only problem that you might encounter in calculating this gain is that of determining the noise temperature. Noise temperature decreases with frequency, however its value can vary all over the place depending on the level of man made noise and the sky conditions. Average values are: 1500°K for 2 meters, 550°K for 220 mc, 150°K for 432 mc, and 80°K for 1296 mc. Note these are average values; even on 2 meters the noise level can drop down to 250°K under ideal conditions.

Sample Balance Sheet (432 mc)

Antenna Gain:		
Transmitter (64 element beam)	+ 20 db	
Receiver (64 element beam)	+ 20 db	
Transmission Line Loss:		
Transmitter (100′ RG8U)		— 5.8 db
Receiver (100′ RG8U)		— 5.8 db
Perfect Receiver Power (100 c.p.s.)	+ 188 db	
Receiver Noise Figure		— 6 db
Path Loss (via the moon)		— 250 db
Transmitter Power (500 watts output)	+ 27 db	
Total	+ 265 db	— 261.6 db
Balance	**+ 3.4 db**	

On the debit side you can start your entries with the transmission line losses, the item accounting for the energy lost in the transmission line at both ends of the path. RG-8U has 3 db loss per 100 feet on 200 mc. Therefore if you were using 50′ of RG-8U on 220 mc, the transmission line loss for your end of the path would be approximately 1.5 db (provided you have a 1:1 s.w.r.). To obtain the total transmission line loss, you would have to add the loss due to the feedline at the other end of the path.

The next item is receiver noise. This term is due to the noise your converter adds to the noise already coming in from the antenna. Receiver noise is almost completely equal to the noise figure in db of the first r.f. amplifier. On 220 a good nuvistor front end will buy you below 5 db in added noise. On 432 the level is a db or so higher.

The final item in our balance sheet is the path loss. Although its definition is not complicated —the amount of positive gain needed to communicate over a given distance with a 1 to 1 signal to noise ratio—it is probably the hardest term to determine accurately. For instance say you wished to communicate over a 500 mile path on 432 mc. Under normal conditions your lowest path loss would be via reflection from the moon (about —250 db). But add just a little tropospheric bending and your straight path loss could be well below 250 db. Sufficient data exists in radio engineering handbooks for the path losses over short distances. However, over the greater distances in which most amateurs are

*48 Cumberland Avenue, Verona, New Jersey.

interested information becomes scarce. In most instances for distances over 500 miles, the moon bounce path can be considered the minimum one.

We have devoted a large portion of this column to comparing a communication system to a budget. In planning a budget you would not add green stamps and dollars, but it is just this type of mistake many amateurs are making in planning their u.h.f. stations. The importance of a clear understanding of the above system can not be over exaggerated. With it you will be able to see the weak points of equipment and what improvements will bring the greatest benefit.

Reports

Ernie, W3UJG, Rockville, Maryland:

Ernie, who is active on 220 mc and 432 mc comes through with a report to show that the u.h.f. bands are really active down his way. On 220 he runs a pair of 4X150's at 500 watts on c.w., 350 watts on s.s.b. and 200 watts on phone into an eleven element yagi 40' up. On this band he holds skeds on s.s.b. every night with K2DZM in Rahway, N.J. The frequency used is 220.1 mc and the time is 2200 hours EDST. On Monday, Wednesday and Friday nights skeds are held with W4LTC at 2300 hours. And on Sunday morning W3ARW is QSOed at 1030. Ernie also mentioned to be on the lookout for a group of locals at 1100 hours on Sundays. Stations in the group include W4's UBY and VCG and W3LCC. Among W3UJG's further contacts for the months of April and May are W2SEU in Long Island, N.Y., and W1GB/1 in Conn.

On 432 mc Ernie runs a single 4X150 final at 120 watts to a 13 element yagi 45' up. His receiver consists of a 6CW4 to 1N21 mixer which converts down to 50 mc and then into a Drake 2A. On ¾ meters Ernie holds no fixed skeds, but reports plenty of local activity. W3's RE, AHQ, AIR, LCC and W4UBY are some of the stations most often contacted by W3UJG. Ernie makes one other comment, that he plans to be on 432 mc s.s.b. soon and mentions that K2DZM and W3HFY are already on with s.s.b.

Ben, W9OVL, Hammond, Indiana:

Ben, our Chicago area reporter, sends in a list of over 25 220 mc stations active in his area. On the top of his list are K9's DNG, WSZ and WA9FLV. Ben also sent along another example of the importance of low loss sockets on 220 mc. "We have run across many 220 rigs practically complete, but not on the air. K9JIJ has two Tecraft transmitters on 220 mc. One does a very fine job as Rudy has low loss feedline and his antenna is high up." *Ben is another member of the fraternity who believes in low loss open wire line with no baluns.* "The other one (identical to the first) will not work although everything checks through OK. The transmitter was brought back to life by replacing the last two 6360 sockets with ceramic (porcelain) ones."

73, Allen, K2UYH

Ignition Noise vs. Frequency

IRWIN MATH, WA2NDM
126B Taylor Avenue
East Brunswick, New Jersey

DUE to the increasing interest in mobile communications by amateurs, it was felt that an investigation of the frequency distribution of the r.f. energy radiated from the ignition system of automobiles would prove useful both to the amateur contemplating mobile operation and the amateur already engaged in this phase of the hobby.

Tests were conducted between the frequencies of 2-150 mc thus encompassing the 80 through 2 meter bands. For those frequencies between 2 and 30 mc, a Hallicrafters SX-100 was used and for frequencies above, a Civil Patrol 30-50 mc receiver; a 6 meter converter; and a 100-156 mc converter all using the SX-100 as a tunable i.f. In order to have some sort of reference, a Measurements Corporation #80 signal generator was used and all noise measured with respect to a 10 m.v. signal at the respective frequency. All readings were taken by a peak voltmeter placed across the receivers voice coil leads, and were converted to db of noise readings vs. frequencies. Antennas used were ¼ wave whips above 30 mc and a 12 foot length of copper rod through a variable impedance matching device below 30 mc. All antennas were placed where the whip antenna would normally be and vertically polarized. With horizontal polarization of the pickup antenna, results followed very closely but with somewhat lower noise amplitude. The auto used was not equipped with ignition suppression devices. Unfortunately one that was so equipped was not available and thus could not be tested.

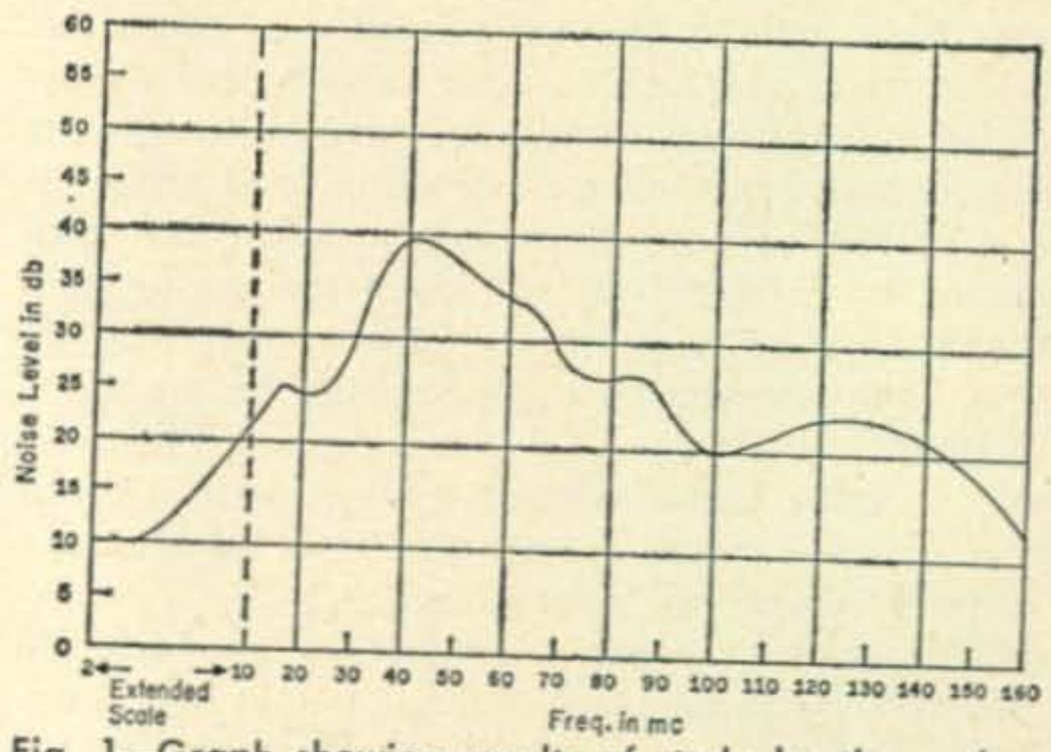


Fig. 1—Graph showing results of study by the author of automobile ignition noise. Note peak between 30-45 mc.

The maximum value of ignition interference seemed to center around 30-45 mc. In fact at about 40 mc, noise was about 30-40 db above any other frequency examined. This would indicate why equipment such as six meter transceivers are so plagued with ignition interference. ■

DX REPORT

an exclusive feature of The VHF Amateur

BOB BROWN, K2ZSQ*, Editor

THOSE OF US WHO OBSERVE SIX METERS from the East Coast have been fortunate enough this year to experience first hand one of the oldest and most accepted characteristics of ionospheric propagation, whether it arrives in the form of *F*2, TE, or Sporadic-*E*. As past studies have found (brought out most extensively during the IGY) skip signals above 50 mc riding any of the above mentioned forms of propagation will occur most frequently over a North-South path. During our last sunspot cycle when stations from Maine to Florida were working into South America with good regularity, this "North-South phenomena" was brought to light not just as a theory, but as a known fact. Although variations have occurred, even now in 1963 we are seeing every day further evidence of its existence. Judging from the number of 6 meter operators enjoying Sporadic-*E* skip this season along with the numbers of "DX'ers," it would be fair to say that the interest aroused in propagation at the VHF's is more intense today than ever before. And for good reason: there is DX to be worked.

With few exceptions Sporadic-*E* skip of the most common single-hop variety observed at K2ZSQ has developed over an almost predictable path on 50 mc. At the very start of the opening, the state of Florida would be heard breaking through. Later, if movement was to occur at all, we'd not only be working the W4's in Florida, but also into Alabama, Georgia and Tennessee. Then we'd snag a few W5's and WØ's before it moved to the Midwest, the W8's and W9's. Usually at this point our DX would either die out or return to Florida for another cycle. But always our DX started with the W4's. This pattern hasn't changed much in all the years we've been on 50 mc. At times our skip wouldn't be much more than Florida, for the "cloud would lift" before any movement had a chance to develop. But the W4's were always first. In more recent years, however, we observed another interesting occurrence: we were hearing KP4's first. Now that six meter activity in Puerto Rico has reached to a substantial intensity and there always seems to be someone on, we'd hear our Spanish speaking neighbors right in there with the W4's, or more often than not, first.

The reason is quite simple. As in past years during the peak of the sunspot cycle, the first skip signals heard and worked were always the ones South of us, over the proverbial North-South path. Since Florida and Puerto Rico are almost directly south of W2-land, we'd work them first. Okay; this brings us up to 1963.

But with this season something happened to further alter this set of circumstances. Harold Lund, VP7CX, of San Salvador, Bahamas, ventured his foot inside the 6 meter door. As we all know, now Harold is probably the most sought after DX figure of the year. And he's *always* in there. VP7CX breaks through when we hear nothing else from that direction. VP7CX breaks through when we're working the KP4's, and the W4's. VP7CX breaks through while we're working the WØ's. VP7CX breaks through when we're working the locals!

Believe it or not, this is K9HOW's QSL card! Aside from producing nice photographic cards, however, Paul manages to keep the VHF bands quite busy from his Chicago, Illinois, QTH.

A quick glance at a map tells the story. While Puerto Rico and Florida are both more or less s.s.w. of us, San Salvador is almost directly South. Since VP7CX fits into the North-South path factor perfectly, it explains his many "visits." When FG7XT started making appearances on 6 meters, he, too, fell into Harold's striking force area. We feel that the actual location of these stations is more a determining element than anything else. Regardless of the propagational causes, however, I think we'll all concede that the end result has been a most pleasant one for DX'ers!

News from the Mailbag

Misawa Air Base, Japan: Art Roberts (KØZQR), now KA8AR, writes with his lunchbox news from this exotic country.

"Bob, first off I want you to know I enjoy *The VHF Amateur* very much." *Good start, eh?* —ED. "I am writing to let you know abou some of the 6 meter activity here in Japan. When I came here I knew there was activity on 6, but I figured it would all be in the Tokyo area. I was wrong! Misawa A.B. is about 400 miles North of Tokyo, but there is real activity! I am using a Heathkit Sixer with a 55" piece of wire up the wall on the second floor of the barracks. Well, I get 'S9 plus' reports from hams on the Southern part of Japan. Best so far is Hiroshima, about 800 miles. Planning to get a beam up and am

**The VHF Amateur,* 300 West 43rd Street, New York 36, New York.

Step right up and meet George Chong, W6BUR, VHF enthusiast extraordinair, holding a homebrew 50 mc low level sideband mixer. Photo courtesy of Cal Cape.

working on a badly needed converter. I hear that the JA boys work VK's and ZL's every once in a while. I am listening! We are restricted to 50 watts on 6. I hope to get a transmitter of about that power built soon.

"When I get a beam up I'll be listening for any possible openings to KH6, KL7 and the States. My frequencies are 50.250 and 50.533 mc. Also have rigs for the d.c. bands, mainly 20 meters (30 watter) and a BC-779." *For shame!*—ED. "Have an SCR-522 for 2 meters, no QSO's though. Also have an APX-6 that works, if you like to listen to TACAN and radar—hi! Well, enough for now. I'll keep you filled in on the KA8 situation." *You do that, Art, and don't forget photo's!*—ED.

San Salvador, Bahamas: Harold Lund, VP7CX, sends in another newsy letter regarding skip and his planned trip. Space doesn't permit our including all of VP7CX's notes and letters, although they have been appearing on a regular basis in the *VHF News Bulletin* each week. We highly urge you to send in your self-addressed stamped envelopes, by the way, for your weekly issues so you won't miss out on the latest DX scoop from VP7CX and others.

"Not too much to report this week. Did pick up California on c.w. Have worked all continental U.S. call areas now. Had good openings into Arizona, Michigan, and Oklahoma.

"Trip to HI8 land seems pretty well set. Leaving here June 21st and will return the 4th of July. Am taking along a Clegg Thor VI and a portable 3 element beam. Will probably use the call HI8XHL . . . I received some new QSL's this week and will start to get them out between band openings. I expect it will take some time though. Might take a month or two to get caught up. If the band stays in this shape, though, I might *never* get caught up—hi! VP7CT caused a little excitement on the band. He ended up with a total of only about 25 contacts as he was only on two days before going to the States on Vacation. The transmitter sent down by Ed Lipps, W3BWU, seems to be working okay; however, the converter does not work. Evidently the crystal was damaged in the mail. The transmitter has already been shipped to VP2SY. Crystal frequencies are 50.060 and 50.063. I will send down a 3 element beam and my Johnson 6N2 converter to him this week. (This will mean I'll be off two meters until I get it back.)

"I heard a W6 working a VP4 on six c.w., so there must be some activity down that way. Didn't catch the call . . . Would appreciate it if the fellows sending QSL's would mark their county and any club affiliation on it. When the bands go dead, I'll go through the cards and see if I can get some wallpaper. By the way, I would appreciate it very much if the fellows would use GMT on QSL's. Would make it much easier checking back against the log! That's about it for now. Will drop you a line when I collect some more news. I worked a few more Kentucky stations this week." *Good for you, Harold! I think you're doing better with Kentucky this year than we are. Let us know how your trip worked out.*—ED.

Saddle Brook, New Jersey: James F. O'Connor, Jr., WB2DQS, tells us what he's been doing on two meters.

"I have really enjoyed the *VHF News Bulletin* every week. They are very informative and quite interesting. Enclosed is my second batch of envelopes, more to follow. I haven't too much to report; the station is not completely set. Now running 100 watts to a CushCraft "Big Wheel" on 2 meters. Recently worked a little under 200 miles for a new and fifth state on 2." *What was it?*—ED. "Soon will be running 100 watts to 6 elements on 50 mc at 55' and 6 elements up 65' for 2. Right now looking for skeds anywhere, but especially to Rhode Island and Delaware on 2. School is almost out now, so any time of day will do; my frequency is 145.008 mc." *Okay, boys, you have the scoop. Write Jim at 74 South Broadway.*—ED.

Louisville, Kentucky: Dale Peterson, WA4CQG, faithful reporter from the land of blue grass proposes a new contest. See how you feel about his ideas.

"Bob, I was very much interested in your April EDITORIAL. I try to participate in as many VHF contests as I can. As you, I believe that contests play an important role in the testing of equipment and the operating ability of the operator . . . However I find fault with all these affairs in that there is very little c.w. operation. I would be very happy to see a c.w. VHF contest. There are many operators around this general area (200 miles) whose operation is 90% c.w. Maybe this will, or maybe this won't be, a big hit. But I wish you would try it, at least one time. I think you will be surprised with the response. While I am writing I might as well mention that *CQ* took a giant step further when they started publishing *The VHF Amateur*. Please inform me whether you will or will not consider a c.w. VHF contest. I think you're making a big mistake if you don't." *Okay, fellows, we'll leave it up to you. If you think Dale has the right idea, don't keep it to yourself! Drop a card with your ideas to: C.W. Contest,*

c/o The VHF Amateur, *300 West 43rd Street, New York 36, New York. We'll let you know what happens.*—ED.

Argentia, Newfoundland: Bill Graham, WA4-DKS, writes on what he hears from the North country.

"This evening myself (WA4DKS) and my friend Sam Leach (K3KLC/VO1) were scanning the bands with an NC-270 and 100 ft. long wire antenna and were happy to note a band opening on 6 meters. We logged the following calls at approximately 2135 GMT, May 27: K1IXS, K1FIL, K1RPW and K1RXS. K1FIL and K1RPW were 59 plus here. Many other signals were heard, most of them readable." *Thanks, Bill, for your enlightening note. Next thing in store for you is a 6 meter rig, and antenna!*—ED.

Ozone, Tennessee: Reliable Joe, WA4EPY, sends us notes on his observations during May.

"This was one of the most remarkable periods of skip openings in recent years. This station noted and/or worked skip all but three or four days during the entire month.

"Many of the openings were brief and sporadic, sometimes lasting only four or five minutes. Several days the openings moved in a clockwise direction from New England to Bermuda, Bahamas, Cuba, W5 and up to WØ within a period of two or three hours. At least twice the openings reversed 180°. On May 5, for example, after working several WØ's between 10:20 and 10:55 EST, we heard and worked VP5BB on Grand Turks at 10:55 and then several New York and Massachusetts stations. The same day at 1750 we worked WA8DDB in Michigan and at 1810 K4PGL/VP9 in Bermuda. We noted on one or two occasions some short skip—the coast of North Carolina and Virginia to East Tennessee. Every call area in the U.S. was worked; also every call area in Canada except VE5. Seven countries were worked: Canada, Bermuda, Bahamas, Turks & Caicos, Guadalupe, Cuba and Mexico. Several times again we noted what seems to be a high altitude duct between this station and VP7CX. Harold was heard or worked at this QTH (1700' above sea level) from 15 to 30 minutes before he was heard at lower altitudes. And it was noted that he was audible here from 15 to 30 minutes longer than at lower altitudes several times.

"Many of the openings were daytime and not too many extended into the evening hours, though on the 1, 2, 5, 6, 15, 16, 18, 23, 24 and 28th there were openings of longer or shorter duration after 1700 EST. Unlike last year, when so many openings fell on week-ends, this year very few did. All in all this was one of the most exciting periods of skip propagation we can recall."

Plainfield, New Jersey: Ted Schapack, WB2CIY, writes about his Summer activities.

"I will be portable-one this Summer for about 65 days in Ferrisburg, Vermont, just South of

Burlington. The sked times will probably be between 0000 and 0400 GMT. Please have the boys write for skeds at WB2CIY/2, c/o Hawkins, Ferrisburg, Vermont.

"Bob, maybe we'll work each other, although I don't think you'll need Vermont, and I certainly don't need New Jersey!" *We'll give it a try just the same, Ted. Ought to be fun!*—ED.

R.R.F. Notes

Before we start sorting through this month's Sporadic-*E* bonanza, a reminder is due re our program. We have official *R*eader *R*eporting *F*orms available in any reasonable quantity to those of you who would like to become contributing reporters. Just drop a line to me at the address shown requesting your supply. We always need more reporters who can take the time to let us know what they've been working and hearing. Okay, now into the stack!

KØFPC in Harrisonville, Missouri, snagged W4USZ and K8ULT for his first Georgia and Michigan, respectively. Bob sez, "WAØBPC in Butler works Omaha (200 miles) groundwave with a Clegg 99'er—WOW! My best groundwave with Sixer and dipole is 70 miles so far" . . . WA5EOG in Arkansas is getting more than his share of DX these days . . . WB2AAI also reports having a ball with Sporadic-*E* . . . K4PZT, Knoxville, Tennessee, recently added CO5CN, VE1IB, VE4MA, WAØBMB (S.D.), and VP7CX to his growing list of DX . . . WAØDJK in Omaha snagged K5ILD in Dallas for a 680 miler . . . K9CIF has all the luck: K7EMO, W7BKI (Wyoming), W1JCV (Maine), W4KYN (S.C.), all worked, while he heard FG7XT, KP4AST, KP4EVR, KP4BZR, KP4AAN, KP4BIU and WA6PVE . . . WAØDZH worked on 2 meters W8KAY on recent aurora, and heard W8IFX and W4HJQ. "WØGXB is on 144.060 mc and looking for contacts anywhere. WØDLB is active in the Cedar Rapids area. Not much DX to report, but will keep listening!" . . . WA4ITK of Miami sez he'll soon be operating, or rather "hilltopping," from Smoky Mountain National Park, near Gatlinburg, and along Blue Ridge Parkway near Blowing Rock, N.C. Intends to camp out and power Communicator III and 3 el. beam with Volkwagen *Say hello to "Brownie" for me, Verne.*—ED. . . . W8CUP, K4JPD and K4UVD worked in one day by K7OCG, Phoenix . . . K1RTS (2 meters, Conn.) got K1YLU, K1JSG and K1RGO/1 during the Spring *CQ* VHF Contest.

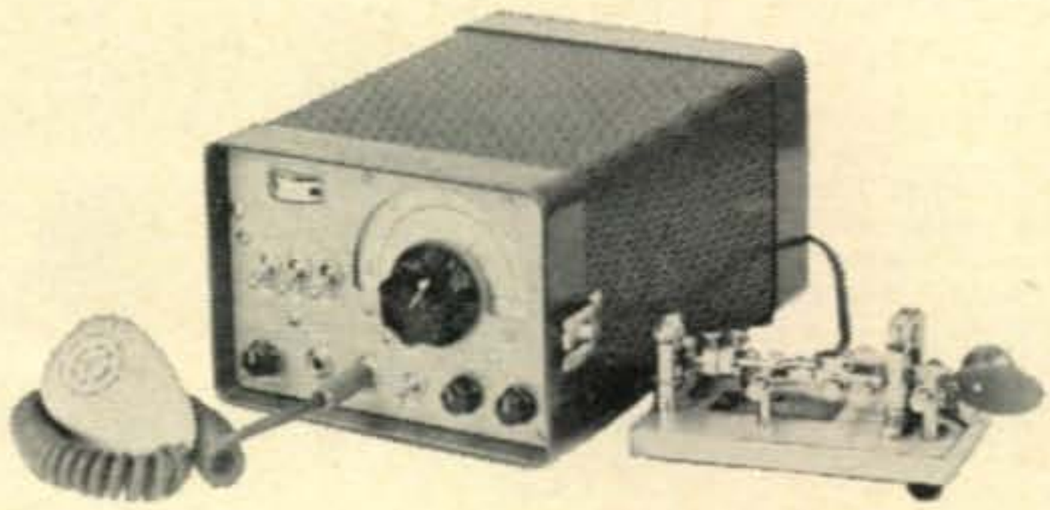
Tommy Roe, WB2DQO, of Yorktown Heights, New York, reports a staggering list of DX and sez that the K4HIL QSL card is one to behold and rejoice. Also sez that TVI man K3HNP neglected sending him a QSL! Tommy's moving to Virginia soon . . . K7OCG worked VE6OH, VE6CC, VE6AJX, and VE6CG on May 9 . . . John (K7OCG) says, "Thanks a lot, Bob, for all the glory you gave me in the June issue of *The VHF Amateur. Now I won't be* able to make a local contact—hi!" . . . W4UAR's been working well into the northeast on skip . . .

W5KMQ in New Mexico was caught by W6IEY for a nice 800 miler . . . WA4FJF of Panama City, Florida, succeeded in racking up Arkansas, West Virginia, Kansas, Colorado, California, Washington, Montana, and New Mexico during May. *Congratulations, Ellen!* . . . K5RCG/Ø in Nebraska sent in his staggering list of 6 meter skippers, too long to print here . . . K1PLR up in Stamford, Connecticut, recently snagged W1BU and W3BDK on 2 . . . K9TFJ's spouting with s.s.b. from Greenwood, Indiana. Caught K4YSN on d.s.b. . . . WB6BZX busy fishing out K7SMP, K7PAG, KØZKD, K7GWE, VE6OH, W5FRK, K7CML, K7ALE, K7EMO, K7LME, etc. These represent some choice areas like S.D., Mont., N.C., Idaho, Ariz., Wyo., & Utah! . . . K7NJS of Phoenix sez, "John, K7OCG, asked me to write to let you know there are other stations in Phoenix interested in your column." Jay's caught W8BBD, K8BKB, K5UMK, WØHPK, WA6YAN, K3NNZ . . . K4IXC, Melbourne, Florida, heard on two meters W9UNN/Ø in Wichita, Kansas on 144.091 mc on 6/2/63. He peaked 10 db over S9. *Es*? . . . VE3CVX worked K8WIQ, W8QLU, W8YIO, K8PBA, W8AOE, and K8ORA on June 2 . . . WAØDZH in Marion, Iowa, worked WØAWK, WØRSP, and K9GAQ,

WA6LRF's on 6 and busy working K7VMT, K1JDH/7, K7PLO, W5DNA, WA4BMC, VE7-ALP, VE6MO, K7NJJ and VE6UV . . .

[*Continued on page 83*]

New Six Meter Transmitter



OF SPECIAL INTEREST TO 6 meter enthusiasts is the new Whippany Laboratories Li'l Lulu 50 mc transmitter, designed with the mobile ham in mind. This transmitter has been popular for years as a construction item for club projects, etc., originally designed by Ed Ladd, W2IDZ. Now available with many added features, the Li'l Lulu comes as a complete package with v.f.o. control, gang-turned to amplifier stages, a 12 v.d.c. and 110 v.a.c. power supply, effective low pass filter, etc. The v.f.o. tunes 50 to 54 mc for full band coverage.

This transmitter offers in addition shaped keying for clean c.w., v.f.o. heater and plate voltages well regulated. Detail manual is supplied with each unit. Price, wired and tested, $225.00 through your dealer. ■

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Exactly matching the famous Zeus Transmitter, the Interceptor offers reception with virtually no cross modulation. Nuvistor RF stages provide an extremely low noise figure with high sensitivity. Stability is ideal for the exacting requirements of SSB and CW.

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CLEGG'S THOR 6

6 Meter Transceiver

The Thor 6 is of two unit construction . . . The Receiver—RF unit for convenient desk top operation and the modulator/pwr. sup. unit may be located remotely by a 10' interconnecting cable (provided).

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HAM NET $349.00

WE GIVE

For further information, check number 16, on page 110

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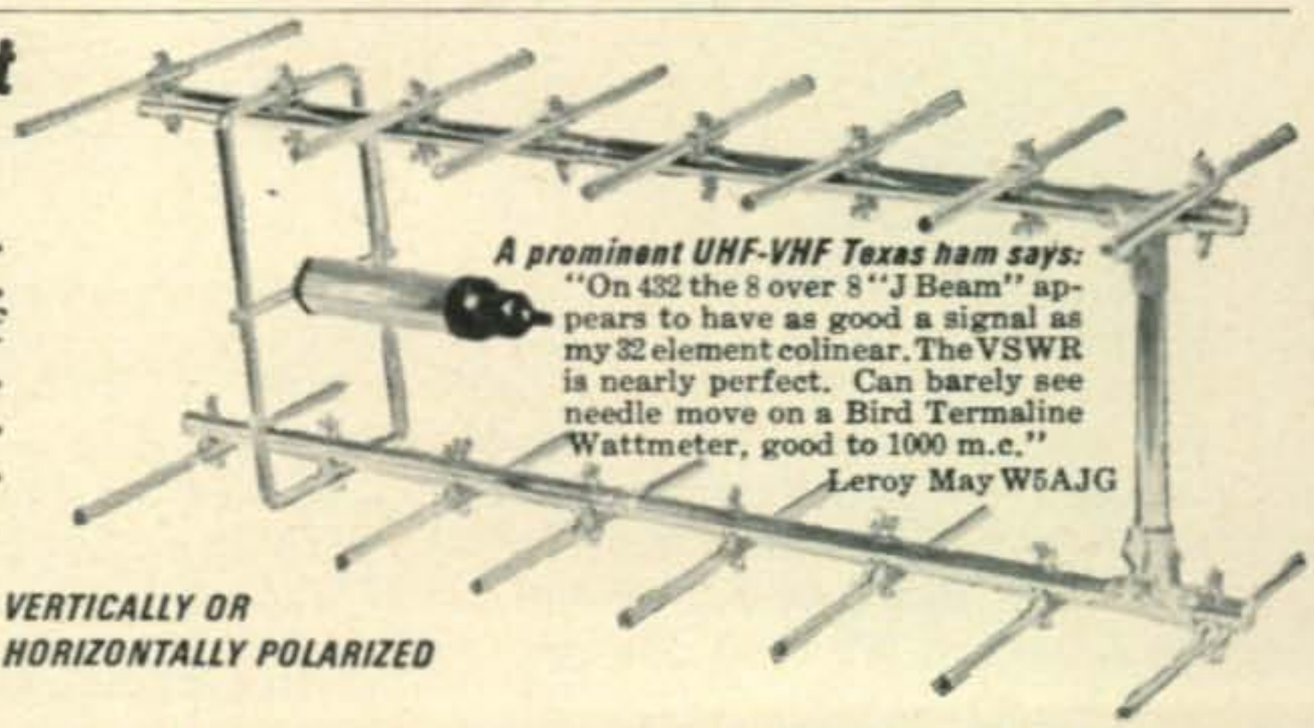

A prominent UHF-VHF Texas ham says: "On 432 the 8 over 8 "J Beam" appears to have as good a signal as my 32 element colinear. The VSWR is nearly perfect. Can barely see needle move on a Bird Termaline Wattmeter, good to 1000 m.c."

Leroy May W5AJG

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For further information, check number 17, on page 110

DX Report [*from page 81*]

on June 2 on two meters . . . "Heard Bill, W4YXT, and Doc, WA4ELH, (both Kentucky) working K9LTC, K9HDE, K9EVA about 50.21 mc between 1 AM and 2 AM."—Joan, K9YEN . . . K9DNW/7, Pinedale, Wyoming, worked K7KSZ and K7EEK, both in Washington. Jim uses a Sixer and dipole . . . K4YHG, Tampa, Florida, accumulated a huge list of DX recently including KP4AAN and VP5CW . . . K8REG, Dayton, Ohio, snagged K7MAC (Utah), W8-NAF/7 (Ariz.), and VE7ASM (Abbotsford, B.C.) in late May and early June . . . W2TND, Elizabeth, New Jersey, works 2 meters and snagged K4EUS, W1BU, K3OEK, W3IBH, K1RJH, W3ADK (using a 150′ dish), W2LWI and W1RJA during late May . . .

Worcester County, Maryland, is now available on 6 through K3NXH/3 in Ocean City. Charlie's already worked W4MMP (N.C.), K4TKP (Norfolk), K3LOM (Pa.), and many New Jersey stations. "I am trying to put Worcester County on the USA-CA map!" . . . K4EBT/W4RLX worked 247 stations in 63 counties with 16½ watts input during the March contest, altho he didn't submit a log. Milt sez he's worked 1106 DX stations on 6 meters in 42 states during the first six months of 1963

WA2DRK of Long Beach, New York, sent us a huge list of 2 meter DX heard but, unfortunately, not worked. "I don't think they tune to 145.00 mc," comments Harry. Some of these include: W1ALE, W1SCC, VE1QY, W1COP, K1NBF, K1VXL, K1BZA, W8KAY . . . KØDQG (Boone, Iowa) floods us with another skip list. Richard's really been going to town! . . . KØECG, St. Louis, snagged KØYCX, WØZMT, KØHIO, KØSLO and KØCCK on June 10-11 . . . WA9-CVD in Richmond, Indiana, (*our old stompin' grounds!*—ED.) reports some nice 2 meter groundwave in early June to K9VTT/9, K9VUX, K9RVG, K9PFI, and K8OEN/8

Flowers

Thanks to the fine cooperation between VHF DX men and *The VHF Amateur* (through our *R*eader *R*eporting *F*orms and the free *VHF News Bulletin*) we are proud to report 217 separate contributions to this column this month. 87% of these arrived on our official *RRF's,* the rest cards and letters. Although creating a job like Ye Editor's never dreamt of in his most horrible nightmares, it is gratifying to see the enthusiasm among the VHF fraternity toward our publication and efforts. Our heartfelt thanks for a job well done.

73, BOB, K2ZSQ

VHF•• BCNU NEXT MONTH

Announcing [*from page 12*]

and evening September 7, 1963. It will be held on the club grounds on the Old Pittsburgh Road, just 2 miles north of Uniontown, Pa. Refreshments will be available. Registration is $2.00.

California

Anyone wanting to join a hip Southern California net write to: Les Cammer, K6VWK, Navy 830, Box 18, c/o FPO, San Francisco, Calif.

Kansas-Nebraska

The annual Kansas-Nebraska Radio Club will hold their hamfest on Sunday, Aug. 11 at the Concordia, Kansas, National Guard Armory. This event will honor the memory of Ray "Bake" Baker, WØFNS. A complete program is planned. The club's address is P.O. Box 157, Concordia, Kansas.

Florida

The Daytona Beach A.R.A. will hold its hamfest on the Labor Day Weekend at the "Sun Rise" and "Blue Bird" Motels four miles north of Ormond Beach, Florida on Highway A1A. The club QTH is P.O. Box 88, Daytona Beach, Fla.

Delaware

The second annual Delaware hamfest will take place at the Dover Air Force Base picnic grounds on August 18 (rain date, Aug. 25). Registration $1.00 in advance, $1.50 at the gate. For more information and tickets contact W3LQE, 17 N. Avon Drive, Wilmington 3, Del.

Ohio

The Newton Falls Community Center, Newton Falls, Ohio will house the 6th Annual hamfest sponsored by the Warren Amateur Radio Ass'n. The date is Sunday, Aug. 25 and time is 12 noon to 5 P.M. Tickets and registration at $1.50 may be obtained from Imogene Kalman, 112 Shirley Lane N.W., Warren, Ohio.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D.C.

In the Matter of

Amendment of Parts 2 and 12 of the Commission's Rules to modify the availability of frequencies in the band 1800-2000 kc for use by the Amateur Service on a shared basis with Loran stations. } RM-298

REPORT AND ORDER

By the Commission:

1. The Commission's Order of February 13, 1963, in the above-captioned matter (FCC 63-137) was published in the Federal Register on February 22, 1963 (28 F.R. 1734). Among other things, that Order relieved certain restrictions on amateur operation in the band 1800-2000 kc.

2. The Commission's Report and Order adopted on April 10, 1963, in the same matter (FCC 63-318) was published in the Federal Register on April 16, 1963 (28 F.R. 3696). This Report and Order further relieved restrictions on amateur operation in the 1800-2000 kc band but advised the public that it would become necessary to extend the Loran-A system of radionavigation operations on 1900 kc to the area of the Gulf of Mexico beginning June 1, 1963. The Report and Order stated further that the Commission would amend its Rules to restrict amateur operation in other respects in the bands 1875-1900 and 1900-1925 kc as a consequence of the extended Loran-A operation.

3. The Commission has now been advised that Loran-A operations on 1900 kc will not commence until July 1, 1963. The revised sharing conditions reflect some relaxation of the sharing criteria with the radio-navigation system as a result of higher powered Loran transmitters and the use of improved receivers, and are made with a precautionary note that prompt and appropriate adjustment of the amateur radio service restrictions will be necessary if interference should be caused to the Loran-A service.

4. Because of the nature of Government requirements and the national defense considerations involved herein, the Commission finds that it is impracticable, unnecessary and contrary to the public interest to comply with the public notice and effective date requirements of Section 4 of the Administrative Procedure Act.

5. In view of the foregoing, IT IS ORDERED, That, pursuant to the authority contained in Section 4(*i*), (*j*) and 303(*c*),(*f*) and (*r*) of the Communications Act of 1934, as amended, Parts 2 and 12 of the Commission's Rules are amended as set forth in the Appendix hereto, effective June 30, 1963.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Acting Secretary

§2.106 [Amendment]

2. Section 12.111 (b) (3) is amended to read as follows:

§12.111 Frequencies and types of emissions for use of amateur stations.

(*a*) * * *

(*b*) * * *

(3) Amateur operation shall be limited to:

	Maximum D. C. Plate Input Power in Watts							
	1800 to 1825 Kc		1875 to 1900 Kc		1900 to 1925 Kc		1975 to 2000 Kc	
	Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*
Alabama	200	50	No oper.		No oper.		100	25
Alaska	200	50	200	50	No operation			
Arizona	100	25	100	25	100	25	500	100
Arkansas	200	50	No oper.		No oper.		200	50
California	No operation				200	50	500	200
Colorado	200	50	100	25	100	25	500	100
Connecticut	200	50	100	25	No operation			
Delaware	200	50	100	25	No operation			
Dist. of Col.	200	50	100	25	No operation			
Florida	100	25	No oper.		No operation			
Georgia	100	25	No oper.		No operation			
Hawaii	No operation				100	25	100	25
Idaho	100	25	200	50	200	50	500	100
Illinois	200	50	100	25	100	25	200	50
Indiana	200	50	100	25	100	25	100	25
Iowa	500	100	100	25	100	25	200	50
Kansas	500	100	100	25	100	25	200	50
Kentucky	200	50	100	25	100	25	100	25
Louisiana	200	50	No oper.		No oper.		100	25
Maine	500	100	100	25	No operation			
Maryland	200	50	100	25	No operation			
Mass.	500	100	100	25	No operation			
Michigan Up. Pen.	500	100	100	25	100	25	200	50
Michigan Lo. Pen.	500	100	100	25	100	25	100	25
Minnesota	500	100	100	25	100	25	200	50
Mississippi	200	50	No oper.		No oper.		100	25
Missouri	200	50	100	25	100	25	200	50
Montana W. of 111°W	100	25	200	50	200	50	500	100
Montana E. of 111°W	200	50	200	50	200	50	500	100
Nebraska	500	100	100	25	100	25	500	100
Nevada	100	25	200	50	200	50	500	200
New Hamp.	500	100	100	25	No operation			
New Jersey	200	50	100	25	No operation			
New Mexico	200	50	100	25	100	25	500	100
New York N. of 42°N	500	100	100	25	No operation			
New York S. of 42° N	200	50	100	25	No operation			
North Carolina	200	50	No oper.		No operation			
North Dakota	500	100	200	50	200	50	500	100
Ohio	200	50	100	25	100	25	100	25
Oklahoma	500	100	No oper.		No oper.		200	50
Oregon	No operation				200	50	500	100
Pennsylvania	200	50	100	25	No operation			
Rhode Island	200	50	100	25	No operation			
South Carolina	100	25	No oper.		No operation			
South Dakota	500	100	100	25	100	25	500	100
Tennessee	200	50	No oper.		No oper.		100	25
Texas E. of 103° W	500	100	No oper.		No oper.		200	50
Texas W. of 103° W	200	50	100	25	100	25	500	100
Utah	100	25	100	25	100	25	500	100
Vermont	500	100	100	25	No operation			
Virginia	200	50	100	25	No operation			
Washington	No operation				200	50	500	100
West Virginia	200	50	100	25	No operation			
Wisconsin	500	100	100	25	100	25	200	50
Wyoming	200	50	100	25	100	25	500	100
Puerto Rico	No operation				100	25	100	25
Virgin Islands	No operation				100	25	100	25
Swan Island	500	100	No oper.		No oper.		100	25
Serrana Bank	500	100	No oper.		No oper.		100	25
Roncador Key	500	100	No oper.		No oper.		100	25
Navassa Island	No operation				No oper.		100	25
Baker, Canton, Enderbury, Guam, Howland, Jarvis, Johnston, Midway & Palmyra Islands	No operation				500	100	500	100
American Samoa	500	200	500	200	500	200	500	200
Wake Island	500	100	500	100	No operation			

Correction

"A Solid State Fixed-Tuned Receiver" in the July issue has a resistor mislabeled. The *vertical* resistor from the —12 volt line, to the center tap of the driver transformer which is labeled 47 ohms should be 4.7K. Sorry.

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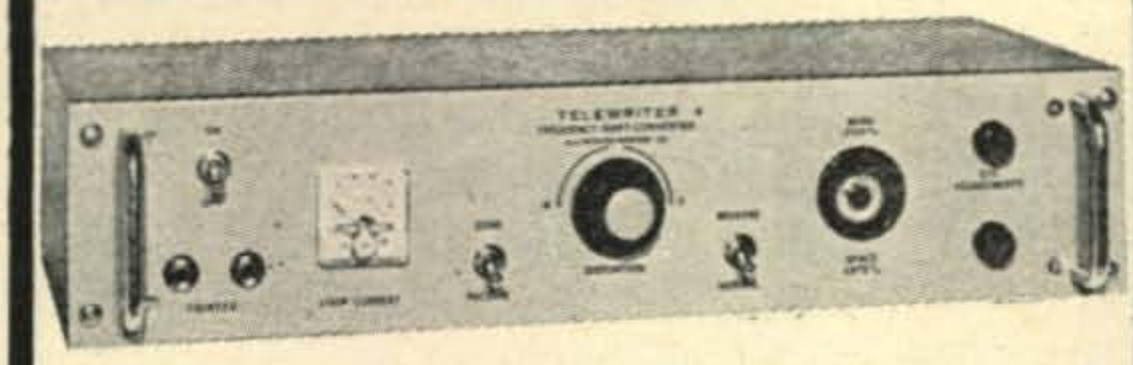
Harvey
VALUES OF THE MONTH



MODEL K CONVERTER BY ALLTRONICS-HOWARD —

Audio input. Output jacks on front for Magnet and Keyboard. Keyer Tube keys magnet directly (no relay). Loop and bias supplies built-in. Wired sockets provided in converter for polar relay for keying transmitter, or external relay may be used. Distortion control on panel. Automatic Mark hold in absence of signal. Copies any shift 100 to 1,000 cycles.

Model K for Rack Mounting **$189.00**
Cabinet ..... **$ 14.50**

MONARCH MODEL MT-220 VOLT OHM METER —

Ranges — DC Voltages: 0-2.5 - 10 - 50 - 250 - 500 - 5,000 Volts (20,000 ohms per volt) . . . AC Voltages: 0 - 10 - 50 - 250 - 500 - 1,000 Volts (10,000 ohms per volt) . . . DC Current: 0-0.05 - 5 - 50 - 500 ma . . . Resistance: 0 - 12K - 120K - 1.2M - 12M ohms (60 - 600 - 6K - 60K midscale) . . . Decibels: –20 to +62 db.
Amateur Net **$14.95**

ROTRON WHISPER FAN

The fan that moves 60 cu. ft. of air per minute . . . while running so silently you have to look to see if it's running! Removes heat to save your rig, yet uses only 7 watts. Measures 4½" square by 1½" deep. Has run for years in computers and other commercial equipment without attention — lifetime lubricated.
Operates on 110-120V. A.C.
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EXTRA-SENSITIVE HEAD PHONES BY SUPEREX

600 ohm impedance; extra-high sensitivity for weak signals and hard-to-read stations . . . reproduction is crisp, free of distortion . . . unequalled wearing comfort over long use.
Amateur Headphone Model AP-S.
Amateur Net **$24.95**

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most popular teletype machine among amateurs. Equipped with synch. motor for 110-120 VAC 60 cycles. Cover refinished . . . all units thoroughly tested mechanically and electrically.

Model 15 with holding magnet, keyboard **$250**
Model 15 with holding magnet, keyboard, automatic carriage return-line feed **$370**
Model 28 specially equipped Teleprinter **$750**

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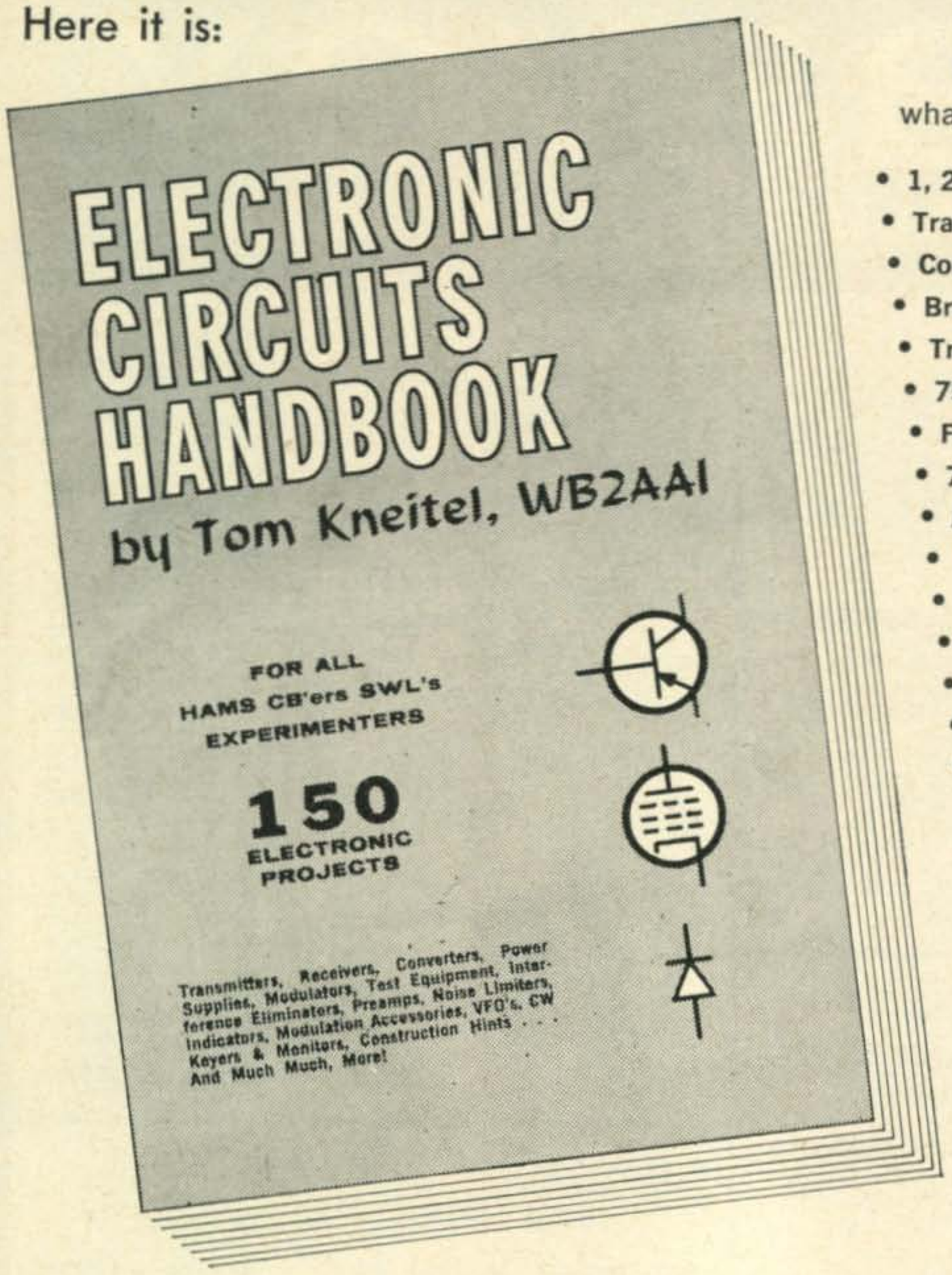
For further information, check number 19, on page 110

YOU ASKED FOR IT!

Here it is:



Here's just a sample of what you'll find in its chapters:

- 1, 2 and 3 tube transmitters
- Transmitting tube rejuvenator
- Comprehensive coil winding data
- Brute force power line filters
- Transistorized CW monitor
- 750 watt linear amplifier circuit
- Four good VFO circuits
- 75 Watt Novice "gallon" circuit
- All band preselector circuit
- All-nuvistor preamplifier
- TVI filters of all types
- Transistorized modulator circuits
- Mobile burglar alarm circuit
- Complete sub-miniature ham rig
- Building a free experimentors library
- A kilowatt final amplifier circuit
- Building walkie-talkie projects
- CPO to CW monitor conversion circuits
- Band-pass selectivity filter circuit
- Noise limiter and squelch circuits
- A VFO frequency checker circuit
- Electronic keyer circuit
- Zener diode generator circuit
- One tube receiver circuit

Here is the book we've all been waiting for! Tom Kneitel, WB2AAI, has compiled a book which presents and discusses in detail 150 of the most often needed circuits around the shack. Novices and old-timers alike will find many valuable circuits here ideal for construction projects. Its eleven chapters cover: construction, modulation circuits, transmitters, power supplies, frequency control, CW, receivers/converters, receiver accessories, test gear and indicators, interference eliminators, and experimental circuits.

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• Tunes 550 KCS to 30 MCS in Four Bands • Built-In Q-Multiplier for Crowded Phone Operation • Calibrated Electrical Bandspread on Amateur Bands 80 Thru 10 Meters • Stable Oscillator and BFO for Clear CW and SSB Reception • Built-In Edgewise S-Meter

Sensitivity is 1.0 microvolt for 10 db. Signal to Noise ratio. Selectivity is ± 0.8 KCS at —65db with Q-MULTIPLIER.

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MADE IN U.S.A.

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• 90 Watts Phone or CW on 80 Thru 10 Meters • Built-in 3-Section Low-Pass Filter • Clear, Chirpless, Grid Block Keying

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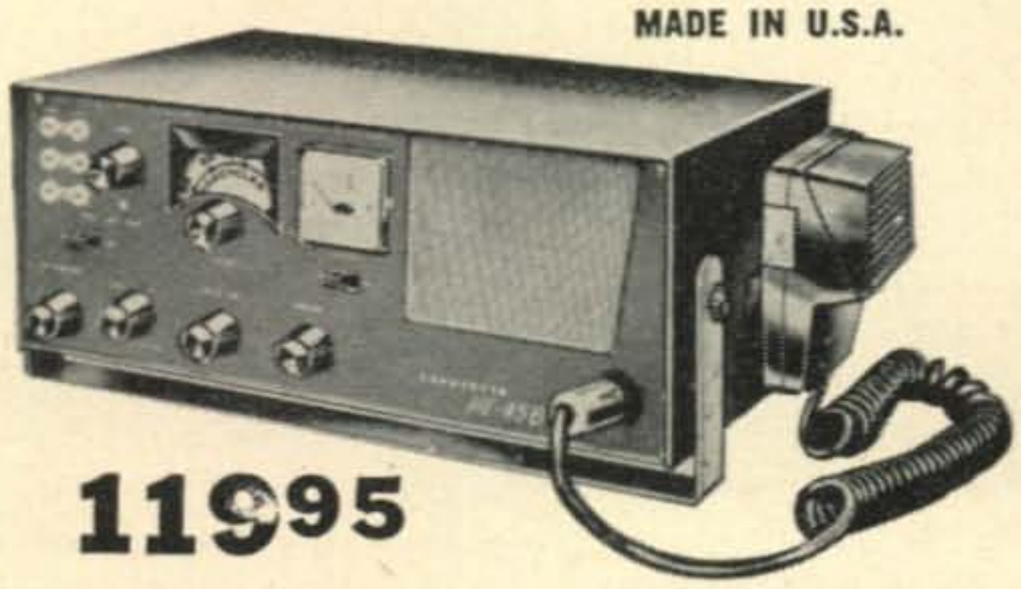

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• High Efficiency—Up To 100% Modulation • New Modulation and Power Transformers plus 7868 Power Pentode • New Heavy-Duty Communications Vibrator • Front Panel Antenna Loading Controls • New Standby Switch; VFO Power Jack • Sensitive Superheterodyne Receiver • Built-in 117 VAC and 12 VDC Power Supplies • Rugged Push-to-Talk Ceramic Microphone

LAFAYETTE HE-50A 10-METER TRANSCEIVER
Similar to above except for 10-meter operation **89.95**

LAFAYETTE 6 AND 2 METER CONVERTERS

- Self-Powered
- 7-11 MC Output
- Sensitivity better than 1 μv for 10 db S/N ratio
- Image Rejection: in excess of 40 db
- Antenna Input Impedance 52 ohms
- For 117V 50/60 cycles AC

2995 HE-56 6-METER

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Deluxe ruggedly built converters designed to respond to the weakest signals. Crystal Frequency, HE-56: 43MC; HE-71: 45.66 MC. Shpg. wt., 6 lbs.

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For further information, check number 9, on page 110

Morse [*from page 46*]

was their life and living. In their day the men of the clicking relays and sounders were the true nerve centers of the nation—yes of the world. No news, no secret was hidden from them.

The outgrowth of Morse's discovery, that electricity could be made to carry intelligence instantly over many miles of wire, played a dramatic part in National and World developments since. Here in the U.S. the Pony Express was replaced by the swifter wires. Our railroads for many years depended upon the telegraph for their proper and safe operation. Transcontinental telegraph service and transatlantic cables were also an outcome of Morse's invention.

Morse at one time commented, "if the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted instantaneously by electricity." In that prophesy we have today's television.

Truly, we radio Amateurs owe a massive debt of gratitude to this great scientific pioneer. It is indeed fitting and proper that we honor his birthday tonight. ■

SOURCES

1. Private correspondence Lew Tucker, Sec'y-Treasurer, Toledo Chapter, Morse Telegraph Club, Inc. and D. C. McCoy.
2. *Ezra Cornell—A Commemoration,* Cornell University, May, 1957.
3. *The Life of Samuel Finley Breese Morse—Inventor of the Telegraph,* American Heritage, April, 1961.
4. *A Pictorial History of Radio,* Irving Settel, The Citadel Press, New York City, 1960.

Ranger [*from page 43*]

you can dream up to get it grounded, to be used.

A thought worth mentioning is that the d.p.d.t. switch positions may be reversed due to the internal connections of the particular switch being used. Try this before giving up on the whole thing. Another word of caution; whenever the rig is operated with the remote switching, care must be taken when using the spotting switch. The operate switch must be returned to the standby position before spotting. Otherwise the rig will be keyed with no load. Don't blame me for that one, that's the way it works with the factory designed p.t.t. on phone. ■

Marconi [*from page 44*]

with Z-Spar boat paint. An aluminum plate of 16 gauge sheet is placed at the bottom of the box and on one side. Then a 24 turn length of Air-Dux #2408 is mounted on a couple of insulators. One end of the coil goes out through a bolt fastened to the aluminum plate for a ground connection. A 5 foot rod driven into the ground, and a few odd pieces of #12 wire buried a few inches in the lawn constitute the ground system. The other end of the coil goes to a variable 200 mmf capacitor taken from a defunct BC-375E surplus tuner unit. This capacitor is mounted on insulators and an insulated shaft runs out to a tuning knob. The five position switch in the BC-375E tuner serves as a switch to tap turns on my coil for the various parts of the band. The circuit is shown in fig. 1.

Tuning Adjustments

There are various ways to tune this type of antenna, but here is how I tuned mine. I unscrewed the coax from the tuner box and clipped a lead from the aluminum to the center conductor on the coax fitting. Setting the series capacitor at just about full mesh, I took the grid-dripper and tried to find out where the antenna resonated with the 24 turn coil. I found that by tapping down until I had 19 active turns my system would resonate at 3.5 mc. The following chart indicates the active turns per frequency:

3.5 mc	19	active turns.
3.6 mc	18	" "
3.7 mc	17	" "
3.8 mc	16	" "
3.9 mc	15	" "
4.0 mc	14	" "

Note that it required tapping one turn per 100 kc. As my most frequent operating position was at 3850 kc I grid-dipped my antenna system on the 3.8 mc tap and varied the capacitor just slightly for a nice deep null position. I was now ready to apply power and so connected on the coax feeder and placed the lead from the fitting on to the coil one and a quarter turns up from the ground end. This later proved to be the right spot. A rough field check can be made by applying a little power from the transmitter at 3850 kc and while watching the field strength meter, move the tap back and forth a half turn at a time. It will be possible to observe variation in output going away from this tap. Fasten it down at the point where you get the most radiation.

For a more precise adjustment of the tap you will have to use an s.w.r. indicator in the shack. First tune the transmitter up to a 50 ohm non-inductive resistor and then switch it to the antenna and measure the s.w.r. at 3850 kc. If it is not 1:1 and you want it the best, you can run back out to the tap and move it one way or the other slightly until the best or lowest s.w.r. is obtained. If you move the tap too far up the coil, the transmitter will not load into it. I found the vicinity of one turn about right. With the s.w.r. of 1:1 on 3850 kc I found I could move 50 kc either side with a maximum s.w.r. of 1.2:1 without going out to the tuner. In fact I tune most of the phone band without changing the tap. I could go down into the c.f. band to 3.6 mc with only 1.5:1 s.w.r. which isn't too bad. A purist could have a double pole switch and change both taps moving around the band but it has not been necessary here. This indicates that the coax matching tap can be left at one turn up from the bottom of the coil and the tuning capacitor rotated with a motor if the operator would like to keep the antenna at complete resonance at all times.

NEW NATIONAL NCX-3 TRI-BAND TRANSCEIVER AT LEW BONN COMPANY

The newest and hottest sideband rig on the market – a complete SSB/AM/CW station with a conservative 200 watts of SSB punch at a price less than competitive transmitters or receivers only! Complete coverage of the 80, 40 and 20 meter phone and CW bands with no extra crystals to buy. VOX or push-to-talk operation, SSB/CW fast attack, slow decay AGC, grid-block break-in CW keying with adjustable pi-network output. The aluminum front panel is anodized, not painted, for maximum protection, with solid brushed aluminum dial.

TECHNICAL DATA

Electrical performance exceeds the most critical requirement — SSB generation with National 5.2 MC. high frequency 2.5 KC. crystal lattice filter, together with RCA 7360 sheet beam balanced modulator provide 40 DB suppression of unwanted sidehand and 50 db minimum suppression of carrier.

1 microvolt for 10 db S/N minimum receiver sensitivity. Receiver uses transmitting filter for superb skirt selectivity and adjacent channel rejection. Parallel 6GJ5 pentodes in final amplifier assure conservative operation, even under extended key-down conditions.

May be used on RTTY with AFSK audio injection, and a high power final may be easily added as a result of incorporation of external control relay terminals. Matching NCXA AC supply/speaker console and NCXD transistorized D.C. supply system-engineered for use with NCX-3.

Before you buy your next sideband rig, compare the NCX-3 with all others available — dollar for dollar, feature for feature, watt for watt and band for band — it can't be beat.

10% DOWN

$36.90 ($369.00)

110 volt power supply $110.00
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For further information, check number 21, on page 110

Performance

On c.w. there has been no difficulty working the east coast and on day-time s.s.b. anything works on 80 meters anyway. I think you will find this antenna works real fine; if you don't think so, give it a try as it isn't much work to haywire one together. ■

Calendar [*from page 52*]

1. Two classifications, single and multi-operator. Club stations will be considered as multi-operator even though only operated by one man.

2. Use all bands 3.5 thru 28 mc.

3. The usual five and six digit serial number, signal report plus a three figure progressive contact number starting with 001.

4. Each contact is worth one point.

5. A multiplier of one for each country prefix worked on each band, a maximum of eight per band. (LA/p will count as only one country even though there are three countries under that prefix.)

6. The final score will be the total QSO points multiplied by the sum of the multiplier from all bands. (There is no single band classification.)

7. Certificates will be awarded to the two highest scoring stations in both classes, c.w. and phone, in each country and each W/K call area. The committee may issue additional awards, depending on the returns.

Logs should show in this order—Date/Time in GMT, station worked, numbers sent and received, band used and note each new multiplier worked. A separate sheet for each band is not necessary, however a summary sheet showing the score for each band is requested.

The summary sheet should also include other essential information regarding equipment and other comments. Don't forget the usual signed declaration that all rules have been observed. And most important, your name and full address in BLOCK LETTERS.

Mailing deadline is October 15th. This year your logs go to the SRAL Contest Committee, P.O. Box 306, Helsinki, Finland.

Ed. Note

As usual no word from down South America way so I have nothing to report on the two tentative listed activities. It is assumed that the dates will hold as in previous years and that there are no rule changes, if you are interested.

Rules for our World Wide DX contest next month. No rule changes anticipated. Most of the letters received favored continuing the changes made last year for at least another year. The only one that stirred up any criticism was the 2 points for contacts between North American stations. Most of the favorable comments came from phone stations. However if this change is continued for another year it will have to be for both sections of the contest. We shall see.

73 for now, Frank, W1WY

DX [*from page 50*]

3. A list of contacts with date, time, frequency, and mode of operation.

4. Overseas applicants send 10 IRC or $1 (US). Local applicants free.

5. That reports are not less than Readability 3 and Tone 8.

Applications are to be made to the Awards Manager, MARTS, P. O. Box 777, Kuala Lumpur, Malaya.

QTHs & QSL Managers

KM6BI has cards on file for the following ex-KM6s: FAA, AM, BA, BF, BK, BO, BQ, BT, BU, BW, BZ, CB, CC, CG, and CJ. The above-mentioned stations will receive their QSLs if they send their present QTH to James Wichman, KM6CX, Navy 3080, AEWBARRONPAC, Midget c/o FPO, San Francisco, Calif.

DU1JC–via W6ZJY.
FL5A–via W4ECI.
FM7WN–F. Sifflet, Distillerie Rosiere, St. Joseph, Martinique.
FP8CB–via WA2WBH.
FU8AG–via K7GGN.
HI8AJ–Dr. Abraham Jaar, POB 1213, Santo Domingo, Dominican Republic.
HI8AKU–Johnny Jaar, POB 1213 Santo Domingo.
HI8JSM–J. S. de Madrena, Box 521, Santo Domingo.
HI8XAA–via W8NWO.
HS1P–via W4CKB.
JT1AD–Box 639, Ulan Bator, Mongolia.
K3KLC/VO1–Sam Leach, VW-11 Radio, Navy 103, FPO, N. Y., N. Y.
KG6ID–via W9VZP.
TF2WHB–via K4MQD.
ex-VK4HG–(Willis Is.) 545 Crown St., Surrey Hills, N. S. W. Australia.
VK4JQ–(Willis Is.) via W6HYG.
ex-VK4WV–(Willis Is.) 8 Dedrick St., Braybrook, Vic., Australia.
VP5LG–via VP7LG.
VQ4ERR–via KØLFY.
VQ8BFA–via G8KS.
VR1N–c/o Hammarlund, General POB 7388, New York 1, N. Y.
VR3O–now WA6MFY.
VS9ASS–via W4ECI.
VS9KDV–via W4ECI.
W6FAY/KP6–Box 11173, San Diego 11, Calif.
XW8AL–via K4KTR.
ZB1CH–Clive R. Burchell, Officers Mess, RAF, Luqa, Malta.
ZD7BW–via G3PEU.
5N2JKO–via W4MCM.
5U7AH–via K9EAB.
6N5X–via W6ZY.
9U5BH–Box 81, Butare, Rwanda.
9U5JH–Box 76, Kitega, Burundi.

VHF [*from page 65*]

station sending in the report). So that old listings may be corrected also, please list any frequencies which have been used for f.m. operation, but which are no longer used for this purpose. One person may report for more than one county if desired, but please list a separate liaison for each county. Send all information to: Thomas A. McKee, K4ZAD, 1306 Grove Road, Lynchburg, Va. Information is needed by September 1. All those sending in information will receive a copy of the complete directory."

From George Haylock, G2DHV/m: "Have been operating as ON5ZQ and PA9DHB/M mobile on 144 mc on the European continent. I agree with your May, 1963 article on reciprocal

permits, and such calls as G2DHV/W1 would also solve the QSL identity problem. Previous calls were ON4IE/2, DJØAA, and 3A2CK. Two other stations operating were PA9NMR/M and PA9FPK.

At the recent Fresno hamfest, I ran across Loren Parks, K7AAD, who manufactures just about the finest 2 and 6 meter converter and preamplifiers you have ever seen. One 2 meter converter was connected to W6NGN's famous "weak signal source". Ed says the converter is pretty good which, for him, means it's superb. Drop a line to Loren at Route 2, P.O. Box 35, Beaverton, Oregon.

Amperex has a new transistor, their 2N2786, which is rated at 400 mw output at 180 mc with a 10 db power gain. Two meters here we come!

For now, 73, de Don, W6TNS

YL [*Continued from page 53*]

with classes running from 6:45 A.M. to 8:30 P.M., with 5 or 6 hours of Spanish instruction per day. She says *if* she passes the course (we're sure you will, Marolyn!), she hopes to be sent to Colombia, S.A. Asked if she'd be able to take her rig along, she replied the Colombian government had turned down her request, but that Peace Corps officials are trying to work out some arrangement.

Here and There

Floridora officers elected at the club's annual birthday party: President, K4RDX; Vice President, K4PPX; Secretary, WA4FJF; Treasurer, K4HSC; Publicity Chairman, K4RHL; Certificate Custodian, K4RNS. The Floridora s.s.b. net frequency has been changed to 3933 kc. The Floridoras now offer stickers to be added to their certificate for each additional ten members worked.

Los Angeles YLRC officers installed at the club's June meeting held at QTH of W6NZP include: President, W6VDP; V.P., W6QYL; recording secty., WA6BJB; corres. secty., WA6PQI; treasurer, K6ELO.

New officers for the San Diego (Missions to Missiles) Club: President, W6WDL, Vice President, K6YGJ, Corresponding Secretary, WA6-EAI; Treasurer, WA6CQS; Publicity Chairman, K6UTO; Certificate Custodian, W6GGX.

Congrats to YLRL editor, K1EKO, Edie, and her OM on the arrival of Janet Lee on April 15. She kindly arrived between issues of *YL Harmonics.*

Silent Key

We regret to record the passing of June B. Hengels, W9RBP, on May 19. June got her ham ticket in 1934 while studying at RCA for a commercial operator ticket. She became the YF of Henry, W9RTY, two years later. They had 3 daughters and a son and several grandchildren. Prewar, June was very active on 160 phone and more recently on 10, 20 and 40 phone.

33, W5RZJ

TERRY
W9DIA

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Radio Classics [*from page 37*]

There are continuously variable coils, such as the common inductors found in Command sets in surplus. These inductors may have some difficulty with dead-end effects, but not usually on the band of the transmitter. More modern roller inductors will have spaced turns whose spacing varies with inductance to minimize dead-end effects. Roller inductors should not be varied with full transmitter power applied or the wire surface will be damaged from sparking. Collins, however, has used an interesting variation with *two* drums, one metal and the other ceramic. A tape of metal is wrapped around the ceramic drum as a coil, one end attached to the metal drum. The metal and ceramic drums are held apart by springs and both drums are rotated the same direction at the same time. This rolls the tape from the ceramic to the metal drum, completely avoiding friction contacts and unused parts of a coil. (The tape on the metal drum just looks electrically like a part of that drum.)[3]

If part of a coil is wound in a direction opposing the majority of turns it will cut down the effective value of the inductance. Occasionally the last half turn will be wound "on air" so it can be twisted to aid or slightly oppose the majority inductance, permitting fine adjustment of the actual inductance.

Much the same inductance-reducing effect may be obtained by moving a conductive slug (usually silver or copper plated) into the vicinity of the coil. The inductance is decreased, as is also the Q.

Slug-Tuned Coils

More recently there has been an emphasis of permeable slugs to increase the coil inductance. Polydorf in the 1930's and 40's worked with various configurations and applications of the permeable slug. Considerable inductance increases may be obtained, but the usual cost is at some expense of Q. The advantages of small size and easy adjustment usually outweigh any disadvantages. There are permeable slugs for all purposes—permalloy dust (in a plastic binder) is common for low frequencies, but ferrites are used for the higher frequencies. Ferrite cores, sintered mixtures of iron oxide and other "secret ingredients", can be tailored for almost any part of the radio spectrum. Such cores, however, should be used only in the frequency range recommended and are not "general purpose." There are few cores suitable for power stages of transmitters, and types usable at the kilowatt level are strictly special.

Radio Instruments and Measurements gives excellent discussions of practically every coil configuration that the ham can imagine. The endurance of the work in present electronic handbooks attests to its initial quality. ■

[3]I believe this is essentially the same form as a variable resistor attributed to Wheatstone in the 1886 Edition of Kempe's *Electrical Handbook*.

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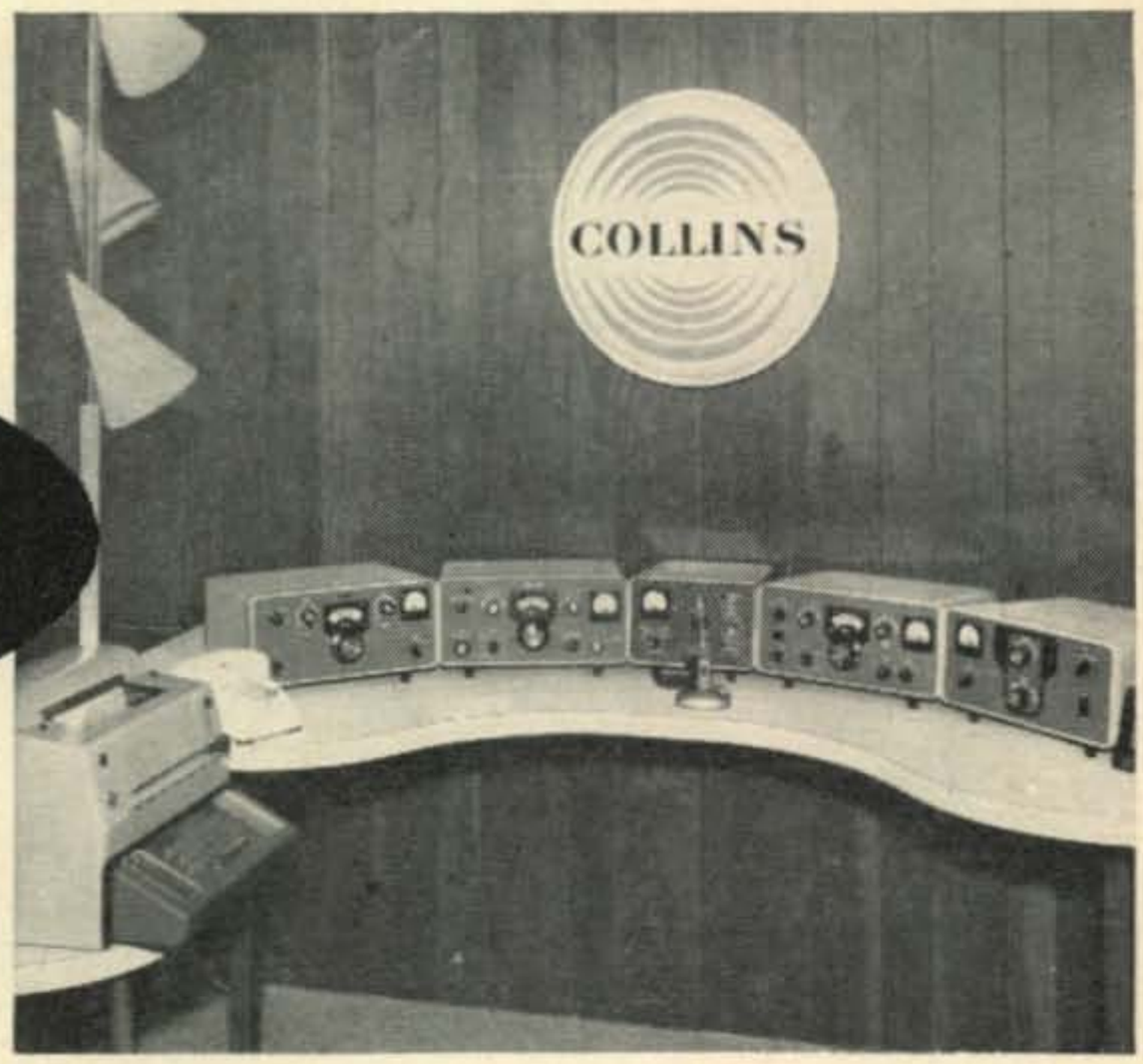
DOC, W 9 H J S, manager of our Chicago store and STEVE, W 9 E A N, manager of our Milwaukee store hold daily 6 and 2 meter SSB Q S O's 90 miles apart using Collins 62S-1 SSB converters.

Working Collins displays in all our three stores. Shown here is the complete Collins station at our Chicago store.



Pictured here in our Chicago display, left to right: 62S-1 VHF SSB Converter, $895.00 ($20.01 per month); 75S-3 Receiver, $680.00 ($15.20 per month); 312B-4 Console $195.00 ($2.57 per month); 32S-3 Transmitter, $750.00 ($15.81 per month); 30L-1 Linear Amplifier, $520.00 ($11.62 per month).

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☐ C.O.D. ☐ 1 Year ☐ 2 Years ☐ 3 Years (10% deposit)

If ordering on terms, please list following information on separate sheet and enclose with this order: Name, address, age, married? children? Employed by? Salary? How long? Own or Rent Home? To whom renting? or buying from? Wife employed? Own car?—who buying from? Three to five credit references. The more information you give, the faster we can approve your credit.

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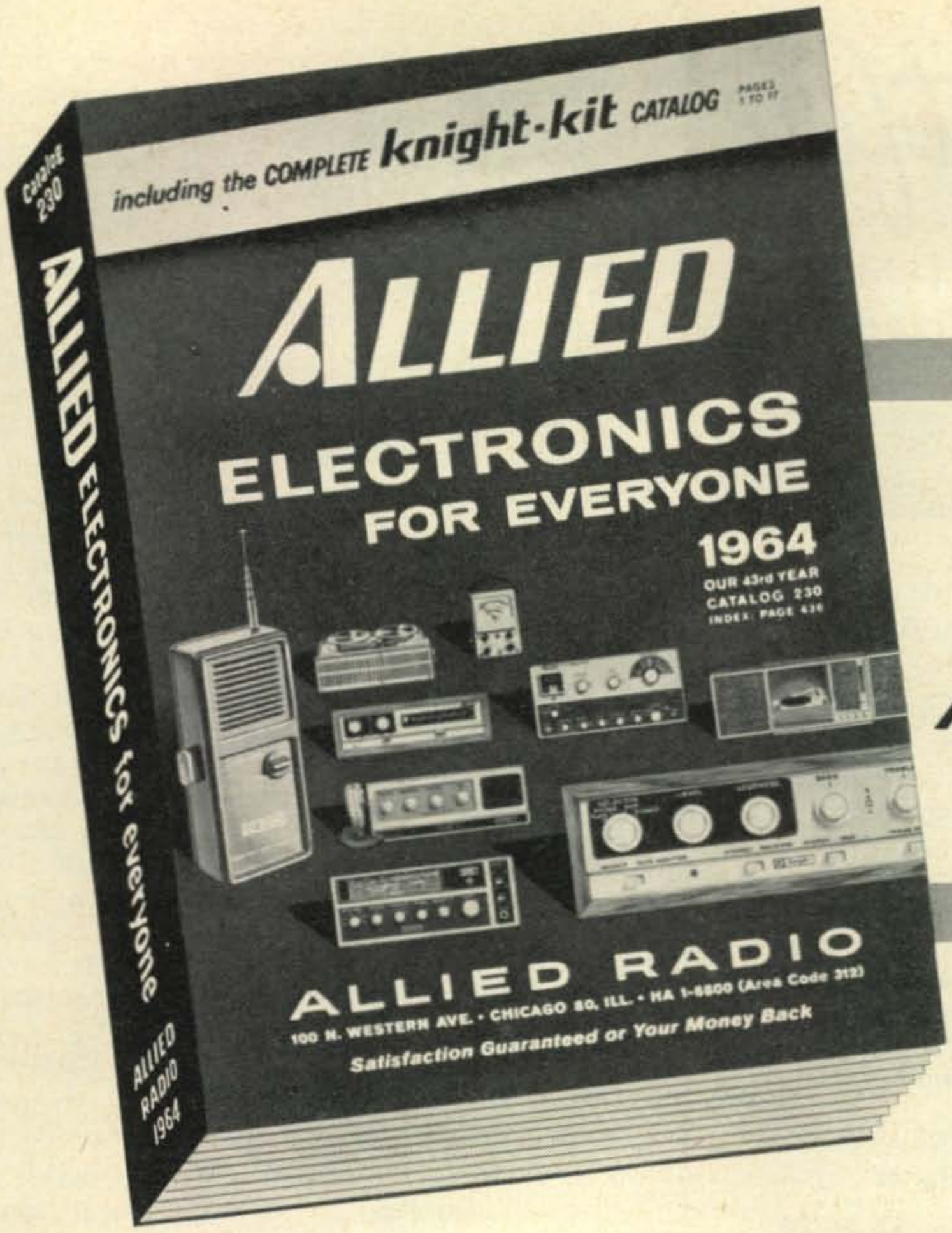
Sideband [*from page 57*]

Foundation which had such enthusiastic boosters for "Michigan Week." Talk about good public relations—everyone's attention was focused on Michigan during the third week in May when its hams went to town, enticing contacts for special certificates to be awarded for working five Michigan hams . . . Speaking of certificates, our hearty congratulations to members of the Certificate Hunters Club and its organizer, Clif Evans, K6BX, for the sane and sensible way in which their early June Contest was conducted. The contestants stuck to the top end of the band, caused little or no interference to other operators, and seemed to be having a great time. . . . Hansheinrich, DL1IN, better known as "Father Neptune," is now acting as the DARC DX bulletin station, dispensing the latest in DX news, in English and German, every Friday on 80 meters for the European amateurs. Hans writes that it is often difficult to find something new and interesting to talk about but this was before the current wealth of DX activity that is now with us. . . . Talk about rare DX— what could be more rare than JT1CA on sideband from Mongolia. Operated by Vlad, UA3CA, the station is active on about 14.108 kc.

Jim, WA6HOH, has finally tracked down Marge Dennis, the only 9N1 YL operator ever, and is pleased to report that Marge and Ralph are finally going ot settle down in a home of their own. . . . Bill, WØEEE, is now QSL manager for Robby, VQ4ERR, from his home station, KØLFY to which requests should be sent (in GMT only) with s.a.s.e. . . . From August 1st to August 11th, look for OK5SSB, the special call of a camping-out of Czechoslovak s.s.b. amateurs in South Bohemia. They will operate all bands, sideband only. This will be the first OK5 call on the air—WPX hunters, please take notice!

That boy, Cliff, K9EAB, never ceases to amaze us . . . 300 for DXCC; 276 on s.s.b.; 412 total awards to date, and probably the first to work 1500 Counties! He's even gotten his Dad into the act. Cliff, Sr., WA9CDQ, traveled 2200 miles in 70 hours in a marathon county expedition, operating in exactly 100 counties in Illinois, Indiana, and Kentucky! . . . David, G2MA, one of the first active sidebanders in the U.K., had to forego the London Sideband Dinner because of the celebration of his son, Doug's 21st birthday, but hopes to meet the sideband group next year. . . . Les, G8KS, and his charming wife, Peggy, celebrated another important occasion—the engagement of their daughter, Judy. . . . Robby, LX1RK, 9Q5RK, is now enjoying a well-earned holiday with his family back in Luxembourg. . . . Glen, ex-9N1GW, (remember the pile-ups he caused as the first 9N1 on sideband?) has again changed QTHs and is operating as K4KMX in Warner Robins, Georgia. . . . You fellows who would like to get your wives interested in ham radio had better check the hows and wherefores with Ip, OZ5KQ. Latest word has it that his XYL, Lillian, recently earned her



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license, OZ5QM! Lillian must first fulfill the necessary requirements before coming on 20 meter sideband and we are eagerly awaiting her appearance.

One of the more fascinating sidebanders we've run across is Bill, W4PR, with whom the well of conversation never runs dry. Latest from Bill's bailiwick in Birmingham, Alabama, is that his eldest daughter, who is interested in cinema direction and production has achieved a scholarship to a very famous European school of cinema. . . . Harold, KL7DQB/K4HBZ, has had quite an international existence: originally hailing from New South Wales, Australia, he became a "male war bride" by marrying a gal from Georgia in Tokyo, returned with her to Orlando, Florida, and is now operating in the Aleutians! Have you noticed how many of our southern boys who are in the military wind up in some of the coldest outposts we have?

A lot of sidebanders are spending their vacations on camping trips this summer; listening to Dale, KØHMP, it's not hard to see why the enjoyment! In fact, if the band hadn't changed, Dale might have finally sold *us* on the idea of tenting out, so contagious was his enthusiasm . . . Whether you are camping, boating, swimming, golfing, or just relaxing in the garden under a shady tree, we hope that you are having a wonderful summer and enjoying your sideband activities.

73, Irv and Dorothy

Ham Clinic [*from page 58*]

both a 52 or 72 ohm capability and usable on all bands, for I go up for my General license soon. Help me?"

Sure. My recommendation which will cost you the small sum of $14.95 is Allied Radio's Model P-2 SWR/Power Meter Kit. It was reviewed in the March 1963 issue of *CQ*. The reasons I like it: it can be left in the line at all times; can be used with 52 or 72 ohm antennas; measures forward and reflected power; will handle a kilowatt; covers a fantastic range—1.8 to 432 mc; is easy to assemble and not complicated to calibrate; requires no a.c. power or batteries; has coax connectors; is much better than 10% accurate; uses a 100 microamp meter; reads s.w.r. from 1:1 to 20:1; has a sensitivity adjustment and the instruction manual gives you additional information on its use—for example, determining the resonance of an antenna. It is a fine bargain.

Transistor V.F.O.—"Tell me, how is it that we do not see more transistorized v.f.o.s? It seems to me that there should be more."

The big deterrent is heat, but voltage regulation also plays a major role in the stability of a transistorized v.f.o.

Tube Equivalents—"Seeing that you are in Europe, perhaps you can give me the American equivalent tube types for the following European tubes: B329, EC84, ECC81, EK90, EL84, X32, L63, U78, EF94 and BPM04.

In order: 12AU7, 6AJ4, 12AT7, 6BE6, 6BQ5, 5V4, 6J5, 6X4, 6AU6 and 6AQ5.

Transceiver Recommendation—"I have heard on the air that you will not recommend equipment unless it is good. They say that I can depend on your recommendation with fullest confidence. If so, tell me, what transceiver should I buy in the $400 to $600 price class?"

I'm glad that the word has finally gotten around. When I recommend something OM, I'm willing to stake my professional reputation on it. With due respect to advertisers and anyone else, until I have actually checked out all the transceivers now available I shall reserve my personal recommendations. After checking out equipment on a purely technical and impersonal basis, I then look for what pleases me. I shall be able to help you with the first but not the second, for every ham has their own personal likes and dislikes. In the meantime, I suggest that you read the reviews in *CQ* and other magazines and compare. If possible, operate the different sets at your distributors—if he does not have an operating room he should have.

S.S.B. Channel Separation—"How many db down must a signal be on the receiver filter characteristic for sufficient channel separation?"

When allowance is made for the frequency instability of the emitted s.s.b. signal, the separation (between channels close to each other) need only be great enough to insure that the nearest frequency of the interfering signal is 40 db down on the receiver filter characteristic. See: *Reference Data for Radio Engineers,* 4th Edition.

Inducto-Tuner V.H.F. Converter—The last article which appeared on using a Mallory Inducto-Tuner for making a converter usable in and out of the ham-bands was in the November 1949 *CQ*. Evidently, these tuners are available somewhere in quantity—but where? We have been receiving letters requesting info on using the tuner.

Reference Manual of Transistor Circuits—"Would you please refer me to a good book on transistor circuits that does not cost a fortune? Not an engineer's manual, please!"

One of the best manuals I have seen (title above) is published in England for about $2.25 postpaid and obtainable from Mullard Ltd., Mullard House, Torrington Place, London W.C.1, England. This is a book of 307 pages and contains 28 chapters. The most important information is presented to the largest number of users in such a way that it can be absorbed as readily as possible. If you do not know how to use transistors for your ham experiments after reading this book then you'll never learn. I recommend it wholeheartedly.

SX-101 Mark III—"I have been experiencing erratic S-meter action in my SX-101 Mark III receiver. What checks do you suggest?"

First check the 6BA6 S-meter tube (V_{15}), then check each of the resistors in its circuits, especially R_{88} and R_{86} (pots). If R_{88} and R_{86} are dirty there can be erratic action. Check S_4 (AVC SWITCH) for proper contact too.

HQ-105TR—"I purchased a Hammerlund HQ-105TR transceiver which can be operated either

THE CQ HAM MART

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SIDEBAND HANDBOOK

Written by *Don Stoner, W6TNS,* was almost one full year in the preparation of this terrific volume. This is not a technical book. It explains sideband showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only *$3.00.*

CQ ANTHOLOGY

Most amateurs do not have a good file of back issues of *CQ*. So we've looked back through the years *1945-52* and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out. The price is a mere *$2.00.*

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on 10 meters or on CB frequencies. I intend to use it for both. My question: if the transmitter goes out while operating on 10 meters can I fix it without a radiotelephone operator's license (second class)?"

The answer is yes, *if* you then stick to the hambands. But if you want to operate on the CB and have touched the alignment and/or frequency adjustments, then the set must be checked by someone holding a radiotelephone second class license.

Thirty

We appreciate the many letters of encouragement from our readers. We want you to know that we get great satisfaction from using most of our available sparetime to help hams the world-over with their technical problems.

73 and 75. Chuck. W4VZO/HB9.

VHF Contest [*from page 40*]

scores. Log should be checked for duplication and proper point and multiplier credit before submission. All logs become the property of *CQ* and cannot be returned. Be sure to retain your own station log copy for FCC purposes.

Include a signed pledge stating that all rules have been obeyed and that all logged data is accurate. This pledge is included on standard summary forms also available free from *CQ*.

SCORING: Scores will be computed by multiplying contact points × county multiplier, × hour multiplier, × power multiplier.

EXAMPLE:	100	Contacts
	×10	Counties
	1,000	
	×10	Hours
	10,000	
	×1.25	Power Multiplier (If Used)
	12,125	*Final Score*

AWARDS: Certificates will be awarded to the highest scoring station in each state on each band. Additional awards will be made in this category at the discretion of the Contest Committee. In addition, certificates will be issued highest scoring Novice stations in each state. An engraved trophy will be presented to the highest scoring station in the Novice competition *(Donated by K2ZSQ)*.

DISQUALIFICATION: Violation of the amateur rules, the rules of this contest, unsportsmanlike conduct, or insufficient log data will be deemed adequate cause for disqualification. Amateurs entering this contest agree to abide by the decision of the Contest Committee.

DEADLINE: All logs must be postmarked NO LATER than September 15, 1963. Logs received after this date will be used for checking purposes only. Results of this contest will be published in *CQ* for November Send logs directly to:

CQ V.H.F. CONTEST COMMITTEE
300 West 43rd Street
New York 36, New York

Swans [*from page 22*]

of the different countries encouraged the local clubs to run courses to teach short wave listeners to get their licenses; publicity was initiated, contests were organized and almost every means known to modern high-powered salesmanship

were used to improve the "image" of the radio amateur and encourage recruitment into this hobby.

Today there are over 300,000 radio amateurs in the world and according to many of the articles published in the amateur-radio press the growth is becoming alarming.

Are we to prove that the species radio amateur is less intelligent than the swan? The task of keeping our numbers in bounds is surely much easier. There is no biological urge to become a radio amateur. Surely all we need to do is to stop encouraging people to become radio amateurs. We should not, of course, prevent one single person who genuinely wishes to become a radio amateur, from doing so; but need we devote so much effort, energy and high powered salesmanship to persuade people to become radio amateurs, to organizing contests, etc.? It is one of the oddest phenomena of this age that the very magazines, clubs and associations which publish articles lamenting the QRM, and bemoan the increased growth of the amateur-radio population, also regret a decline in traffic handling on certain traffic nets, express disappointment if a contest attracts fewer entries than the previous year, and congratulate themselves if a contest has broken all previous records for activity.

It is surely a completely inconsistent policy to bemoan the QRM and over-crowding on the one hand and to congratulate oneself on the creation of this QRM by bigger and more QRM creating contests.

There have even been articles suggesting the rationing of time on the air. Yet in the very same journals one finds encouragement to clubs to increase their recruiting drive for more radio amateurs.

There is no need for any legislative action; there is no need for rationing; there is even no need for voluntary restriction. All we need is a relaxation of the insensate urge to encourage more and more people to join, becoming more and more active in a hobby which so many people already regard as overcrowded. It is not a conflict between those who think it is overcrowded and those who think it is not. The curious phenomenon is that it is the same people, the same journals, the same organizations which bemoan the over-crowding which go out of their way to create it.

Let us show that we are not less intelligent than the swans; that by the exercise of a little restraint, without actively *dis*couraging people from becoming amateurs, we devote no more effort to *en*courage them to do so.

It is appreciated that there are commercial interests who, for purely business reasons wish to increase the number of radio amateurs. What is not understandable is why the non-profit making organizations, and non-profit amateur associations continue to devote so much effort to recruiting new members and more activity, to what they themselves regard as an already overcrowded hobby. ■

Prop. [*from page 54*]

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
South Africa	06-10 (1) 10-13 (2) 13-15 (1)	05-13 (1) 13-16 (2) 16-18 (1) 21-23 (1)	18-19 (1) 19-20 (2) 20-21 (1)	19-21 (1)
Eastern Mediterranean	08-11 (1)	06-12 (1) 19-21 (1)	*NIL*	*NIL*
Central Asia	16-19 (1)	06-07 (1) 07-09 (2) 09-16 (1) 16-18 (2) 18-21 (1)	05-07 (1)	*NIL*
South-east Asia	09-15 (1) 15-18 (2) 18-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 19-00 (1)	03-07 (1)	03-06 (1)
Far East	12-14 (1) 14-18 (2) 18-20 (1)	06-07 (1) 07-10 (2) 10-19 (1) 19-21 (2) 21-23 (1)	00-02 (1) 02-06 (2) 06-08 (1)	03-07 (1) 04-06 (1)†
Samoa & Pacific Islands	16-19 (1)* 09-11 (1) 11-18 (2) 18-20 (1)	07-08 (1) 08-11 (2) 11-18 (1) 18-20 (2) 20-23 (4) 23-01 (2) 01-03 (1)	21-22 (1) 22-05 (3) 05-07 (2) 07-08 (1)	22-01 (1) 01-04 (2) 04-06 (1) 02-06 (1)†
New Zealand	12-18 (1)* 09-10 (1) 10-12 (2) 12-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	17-19 (1) 19-21 (2) 21-23 (4) 23-01 (3) 01-03 (2) 03-07 (1) 07-09 (2) 09-11 (1)	22-23 (1) 23-01 (2) 01-05 (3) 05-07 (2) 07-08 (1)	00-02 (1) 02-05 (2) 05-07 (1) 02-06 (1)†
Australia	14-18 (1)* 12-16 (1) 16-20 (2) 20-22 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-07 (1) 07-09 (2) 09-13 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-07 (2) 07-08 (1)	02-03 (1) 03-05 (2) 05-06-(1) 03-05 (1)†
South America	08-12 (1)* 12-15 (2)* 15-17 (1)* 05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2) 13-15 (3) 15-17 (4) 17-19 (2) 19-21 (1)	14-16 (2) 16-18 (3) 18-20 (4) 20-00 (3) 00-02 (2) 02-06 (1) 06-08 (2) 08-14 (1)	19-21 (1) 21-00 (3) 00-02 (2) 02-05 (1)	21-23 (1) 23-01 (2) 01-03 (1) 23-01 (1)†
McMurdo Sound, Antarctica	12-17 (1)* 11-16 (1) 16-18 (2) 18-21 (1)	07-09 (1) 16-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	00-07 (1)	*NIL*

Explanation of Forecast Ratings

The numerical ratings appearing in parenthesis following each predicted time of band opening indicates the *total* number of days during each month of the forecast period that the opening is expected to occur, as follows:

(1) Less than 7 days.
(2) Between 8 and 13 days.
(3) Between 14 and 22 days.
(4) More than 22 days.

For the *specific* days of each month on which a particular band opening is most likely to occur, as well as a day-to-day forecast of reception conditions (expected signal quality, noise and fading levels), see the "Last Minute Forecast" which appears at the beginning of this column.

The *CQ* DX Propagation Charts are based upon a double-sideband a.m. effective radiated power of 600 watts, a single-sideband e.r.p. of 300 watts, and a c.w. e.r.p. of 150 watts, at antenna radiation angles less than thirty degrees. The Eastern USA Chart can be used in the 1, 2, 3, 4 and 8 amateur call areas; the Central USA Chart in the 5, 9 and Ø areas, and the Western Chart in the 6 and 7 areas. The Charts are valid through September 30, 1963. Propagation information contained in these Charts is derived from basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado. ■

Ham Shop

Rates for the Ham Shop of 5¢ per word for advertising which in our opinion, is non-commercial in nature. A charge of 25¢ per word is made to all commercial advertisers or organizations. Since we do not bill for Ham Shop advertising, full remittance **must** accompany all orders.

Closing date is the 15th of the 2nd month preceding date of publication. Your copy should be typewritten, double spaced on one side of the page only.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchandise listed therein. We reserve the right to reject advertising which we feel is not of an amateur radio nature.

QSLs?? CB's?? WPE's?? Largest variety samples 25¢ (refunded). Sackers, W8DED, Holland, Michigan.

QUESTION Want to design a QSL card? Sampler Instruction Kit 25¢. Wow! what cards you can create. $1.50 and up 100. Samco, Box 203, Wynantskill, N. Y.

QSL's . . . Samples 10¢ . . . Filmcrafters, Martins Ferry, Ohio.

QSLs Large selection styles including photos. Fast service. Samples, dime. Ray, K7HLR, Route 3, Twin Falls, Idaho.

QSLs free samples. Fast service. Bolles, 7701 Tisdale, Austin, Texas.

QSL's 3-color glossy. 100 $4.50. Rutgers Vari-typing Service. Free Samples, Thomas Street, Riegel Ridge, Milford, N. J.

QSLs Samples 25¢ Rubber stamps; name, call, address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLs—$2.00 per 100 postpaid U.S. only. Glossy, red and green. Free sample. Hobby Print Shop, Umatilla, Fla.

QSLs SWLs that are different, colored, embossed card stock and "Kromekote." Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

QSL Kromekote 3-color . . . order 200 get 25 each of 8 different styles . . . many styles. Samples 10¢. Progress Printing. Box 1154, Biloxi, Miss.

QSLs four colors glossy stock, forty designs—send $5 for 200 and get surprise of your life. 48 hour service. Satisfaction guaranteed. Constantine Press, Blandensburg, Md.

QSLs—SWLs samples 10¢. Malgo Press. Box 375 M.O., Toledo 1, Ohio.

QSL Cards in 3 colors $2.50 per 100. Free samples and catalogue. Garth Printing, Box 51Q, Jutland, New Jersey.

QSL cards: 2 color, glossy; 100 for $2.50. Samples, Dime, Ramsbottom Printing, Box 237F, Kirksville, Missouri.

RUSPRINT QSLs—SWLs 100 2-color glossy $3 postpaid. QSO file cards $1 per 100. Rusprint Box 7507 Kansas City 16, Mo.

QSLs SWLs XYL-OMs (Sample assortment approximately 9¾¢) covering designing, planning, printing, arranging, mailing, eye-catching comic, sedate, fantabulous. DX-attracting. Protopay, snazzy, unparagoned cards. (Wow!) Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSL's—100—$2.50. Samples. Dime. AMEE's Printery—W9FXQ—Box 138, Oak Lawn Illinois.

QSL Cards Brownie, W3CJI—3110 Lehigh, Allentown, Pa., Catalog with samples 25¢.

QSL Large Selection Styles including Photos. Fast service. Samples dime. Ray, K7HLR, Route 3, Twin Falls, Idaho.

QSL Samples, dime. Print Shop, Corwith, Iowa.

HAM name pins. Get your first name and call letters permanently engraved on plastic. Special price to ham operators, 55¢. Send name and money or write for sample. PINCO, P.O. Box 11077, St. Petersburg, Florida.

WØGFQ, Leo, has big discounts on overstock of used equipment, due to so many trades on the fabulous new Galaxy SSB Transceiver. Now's the time to save on reconditioned equipment. Write for our latest list—over 1,000 items. World Radio Laboratories, Box 919, Council Bluffs, Iowa.

TRANS-NITION Electronic ignition eliminates point arcing interference in mobile rigs. Coil, Manual Special $8.50. Complete kit $20.00 Negative ground, $25.00 Positive ground. Manual $2.00. Anderson Engineering, Wrentham, Massachusetts.

MOBILE station, Like new Gonset G-77 xmtr, Super-Six and Superceiver combination, all bands, 6 or 12 volts, independent of b.c. rcver, all cables, manuals; Master-Mobile all band antenna; all perfect. Best offer takes all. Smith, W1YBT, 3 Woodlawn Drive, Williamstown, Mass.

FOR SALE complete GE 2-way radio system on business frequency 35.94mc. Base station $200. Antenna & line $50. Mobile unit, 12v, 60w, $175. 6v, 50w, $50. Philip Petersen, 3001 St. Charles Road, Bellwood, Illinois.

TRADE-ins accepted on purchases of demos and brand new Ham, CB, Marine and Hi-Fi equipment. We are one of the largest retailers in the country and carry complete lines of new equipment of almost all manufacturers in stock. Time payments —up to 24 months—arranged. We will also buy your used equipment for high cash prices. Many specials available. Call Bob at Crown Electronics, 64 Cortland Street, N. Y. 7, N. Y. Worth 4-0790 for real money saving deals, whether you have something to trade-in or not.

COMMUNICATOR III, 6m, $160, Super 12 converter $35, Gonset Commander mobile xmtr (needs a few plug-in coils) $30 or best offer. Cleaning shack. f.o.b. Bill Thiele, K9RCV, 22 Vernon Lane, Lafayette, Ind.

WANT 220 432 gear. W9DJ.

NEED MONEY? Get that new rig now—no need to do without! Borrow money to buy it quickly, confidentially, as thousands are doing, from National Loans by mail. Easily arranged, repay in small monthly amounts. Borrow $100 to $600 without co-signers or collateral. For our quick 73, write, tell us how much you need. National Loans, Dept. Q, 101 S. Tejon, Colorado Springs, Colo.

SELL SX 101A $250; HC-10 s.s.b. converter $75; Transtenna T-R switch Model 102, outboard $50; all like new and F.O.B. . . . Lamb, 1219 Yardley Rd., Morrisville, Penna.

HRO-60 one owner guaranteed perfect, recently aligned, coils for 500 kc thru 30 mc $349. Don Parrott, Box 277, Idaho Springs, Colorado.

WANTED old radios manufactured before 1925, especially Grebe, Murad, Paragon and Zenith. J. Worcester, R.D. 1, Frankfort, N.Y.

FOR SALE Eico 720 transmitter excellent condition $65, antenna relay excellent $7. Clark Cramer, 817 Macon Place, Raleigh, No. Carolina.

CHICAGO area, for sale NC-300 serial 481-0038 and matching speaker; Gonset monitor; Stancor 202A cw xmtr 100W; DeLuxe Vibroplex; vertical antenna 10-15-20 and miscellaneous $275 or offer. W9RFO, 163 Maple Ave., Elmhurst, Ill.

ANNUAL Wyoming Hamfest August 10-11. Ham vacation in the beautiful Big Horn mountains. For information write Box 141, Sheridan, Wyoming.

LIGHTWEIGHT but sturdy "Space Guns" added to your present tri-band or 20 meter beam's driven element, provided it is fed directly with co-ax and does not employ any type of match such as the Gamma, etc., gives you a rotateable dipole on 40 meters with a figure 8 pattern. Four band operation on one feed line. Simple tuning and installation instructions included. Immediate delivery. Net $39.95 per pair, f.o.b. Nettles Manufacturing Co., P.O., Box 614, Denver, Colorado, USA.

HIGHLY-EFFECTIVE home study review for FCC Commercial Phone Exams. Free literature! Wallace Cook, Box 10634, Jackson 9, Mississippi.

FOR SALE Reconditioned, excellent teletype 60 wpm sunc. M15 w/keyboard $90. W/auto-carriage-return-line-feed $150; M19 w/table & TD $240; M19 keyboard $55; M14 typing reperforators w/keyboard $125; w/o keyboard high or low base $75; with line count switch and/or distributor (requires external tape head) $15 each, extra. FPR5H $45; 9 channel TD $150; tri-channel TD $90; (AN/TG C cover CQ January 63) ANTGC set (tri channel TD + 2 typing-reperf.) $175; Automatic Electric auto-tape relay equip. AN/GGC-2 75 wpm available, 60 wpm. Excellent cond. Dual channel $325. Single channel with tape in storage $245. Repairs and reconditioning. M14, M15, M19. Frank Holloway, Jr. 513 N. Pinehurst Ave., Salisbury, Md.

HAMS Convert any television to sensitive, big-screen oscilloscope. Simple changes. No electronics experience necessary. Illustrated plans, $2.00. Relcoa, Box 10563, Houston 18, Texas.

RTTY WE255A relays $3.50. Sockets for same $1.00 postpaid. Jerry Copeland K8OQI, 8423 Newells Lane, Kalamazoo, Mich.

TWO METER package, Heath Twoer transceiver with field strength meter and one Novice band crystal, $45. 8 el. 2 meter beam, $10. Both for $50. Bob Brown, K2ZSQ, Box 528, Rahway, New Jersey.

SELL Filter King 2 meter converter, 28-30 mc i.f., 2 switched crystals, ideal for 75A-4, etc., $30. UTC CVM-3 125 watt mod. trans., used, $12. S-22 250 watt mod. trans., used, $16. Drake TV-1000-LP filter, $6. Matched pair Gold Lion KT-88's, GZ-34, two B-759's, brand new, all for $10. K2EEK, 75-15 177 St., Flushing 66, N. Y., JA 3-5420.

SELL SP-400X with power supply and speaker $125. Bargains on tubes and parts; write for list. W3CNS.

NCX-3 with power supply; brand new never opened. First $425. Hallicrafter HT-18 Good condition $45. K5GNU, Bill Zapotozcny, Midkiff, Texas.

FOR SALE Knight T-60 and mike—$45 or offer. Going sideband. K7SSG, RTE 1, Box 505, Snohomish, Wash.

FOR SALE near new Heath MR-1; HP-20 power supply; Dow-Key 12 vac relay; Mosley 3 band dipole; 100 ft. each of 52 and 72 ohm coax, and two 30 ft. masts. Cost $275. Sell for $160 or by piece. Dick Farrell, 9950 Broadway, Temple City, Cal.

FOR SALE Apache and SB10 Adapter; Heathkit Scope; HQ-110C; 3 El. Hornet Tri-Band Beam; 16 El. Cush Craft 2 meter Collinear antenna; VM Tape Recorder; 4-400; 4-125; 813 final with modulator; exciter power supply; final power supply in 6 ft. rack. Sell or swap to best bidder. Richard Greene K5IUN, 2105 No. 17th Street, McAllen, Texas.

FOR SALE HQ-140X; 10B; vfo; model B slicer; $300 or best offer. W7ZOS, Box 278, Saratoga, Wyoming.

KWM-2 with PM-2 and CC1; 10D mike and stand; Waters rejection tuning 900. 30L1 new $450 or both $1300. Ham-M new sealed carton $90. W5UV.

WANTED Coil Sets E, F, G, H, J, AA, AB, AC and associated dial scales; NFM 83-50 adapter; Select-O-Ject data sheet, all for HRO-50-T-1. Also 200-V transmitter. All must be in good working order. For Sale or Trade: Gonset G-76 Transceiver, best offer over $285. K1RFX/7, Dave Flinn, 8076 Maple, Fairchild AFB, Washington.

WANT low freq (15 kc) receiver, surplus or used OK. Prefer superhet but will consider regen. Must have 110 vac supply. State lowest price first letter. Box S9, CQ.

SELL Gonset Super Six Converter $25.00 or swap for Heath HP-20AC power supply. Ronald Kaullen, 6326 Blue Flag Ave. Harrisburg, Penna.

VIBRO-KEYER $12. Neidich, 921 Walt Whitman Rd., Huntington Station, N.Y.

TRANSFORMERS How to design them $1.50. Ralph Devins, WA2UYW 48 Woodruff Ave., Brooklyn, N.Y.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or Budget. Graham Radio, Dept. B., Reading Massachusetts, Tel: 944-4000.

WYOMING hamfest Aug 10-11. Ham Program, banquet. Tourist mobiles invited. See "Hamfest" section this issue, or contact any Wyoming ham.

SELL HQ-170, $250; C.E. Model 10-B Exciter $87.50; Heathkit Seneca $140; Johnson 1002 mmfd. 3500v $7.50; Johnson Dual 216 mmfd. 4500v variable $10; PE103 Dynamoter $10; Modulation transformer for pair 805 $15; Sola Autotransformer 80-130v $15; Sola constant voltage transformer 500 kva $15. All excellent FOB W5APM, Box 3209, San Marcos, Texas.

WANTED Commercial, Military, All types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URR, URM, TS, 618S, 17L, 51R, Others. : . . Ritco, P.O. Box 156, Annandale, Va.

POWER Supply 680 or 1360 vdc, 500 ma. Best offer. Neidich, K2ENN, 931 Walt Whitman Rd., Huntington Station, N.Y.

CRYSTAL Lattice filters Hycon 2215KA(3 kc); 2215KB (.5 kc); 10MF (3 kc at 10.7 mc); SX-42 and speaker, re-aligned, excint, $85; SX-28 and speaker, re-aligned, vy good, $65; Johnson TR switch, like new, $15; Bruning 2699PC drafting machine like new, trade or offer, WØLWZ, 1030 So. Dudley, Denwer 26, Colorado.

WANTED Teletype printers, perforators, reperforators, transmitter-distributors test equipment; Model 14, 15, 19, 26, 28, etc. All types Collins receivers, 51J, R-388, R-390, 75A, etc. Cash or trade for new amateur equipment. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Richmond 2-0048.

FREE Interesting sample "Equipment Exchange Bulletin." Bargains! Swaps wanted! Write: Brand, publisher, Sycamore, Ill.

COLLINS 75S-2; $395 Optional filter and xtal; $50. K2BUS, 238-73 116 Rd. Elmont L.I., CU 5-8589.

SR-150 [*from page 28*]

quick tuneup time is *not* needed to prevent damage to the tubes.

The selection of mox (push-to-talk) or vox operation is included in the SR-150. For c.w., either manual or break-in operation is possible. The vox works very smoothly. Controls for vox level, anti-trip, vox delay and meter zero are accessible for screw-driver adjustment on the left side of the cabinet. Reference must be made to the instruction manual for the identity of these controls and, although adjustment is not fre-

quently needed, it will be found helpful to mark these with homemade labels secured to the case with Scotch tape.

Since the output circuit is fixed to match only a 50-ohm load, use with other impedance antenna systems, such as may be encountered at temporary or portable locations particularly with the lower-frequency bands, will require a separate antenna matching or coupling system.

The Hallicrafters Model SR-150 is priced at $650, which is about what one might expect to pay for a high quality and versatile unit of this type. The Model PS-150-120 a.c. power supply is $99.50, the Model PS-150-12 12-volt supply is $109.50 and the Model MR-150 mobile mount is $39.95—W2AEF.

Waters Dummy Load [*from page 30*]
will be transferred to the connecting cable. This may require a high temperature cable (RG-87 A/U) if operation at maximum power is conducted for extended periods of time.

After the transmitter has been tuned up for the desired input, the output power may be read directly on the meter. The manufacturer's specifications of power accuracy are as follows: 2-30 mc, 5% full scale; 30-150 mc, 7.5% full scale; 150-230 mc, 10% full scale. The v.s.w.r. is given as less than 1.3 to 1 up to 230 mc. Our tests indicated the performance of the Model 334 to be well within the specified tolerances.

The wattmeter diode will be destroyed if *peak*-power levels of 1000 watts are exceeded. This means that if a linear amplifier, capable of a p.e.p. output of more than this amount is involved, the input power during measurement or tuneup will have to be reduced accordingly. When this is required, the power at maximum capabilities (in excess of 1000 watts) can be estimated from the efficiency realized at the lower level.

Note that the power limitation is for *peak* values. This also means, that in the above case, full modulation should not be applied. The wattmeter is highly damped, so modulated-power readings will not be indicative of true values anyway. This precaution also applies to a.m. transmitters having more than 250 watts of output carrier power.

In cases where the dummy load generally is used for tune-up purposes, the employment of a coaxial switch (such as Waters Model 335 or 341) will make it convenient to rapidly change from dummy load to an antenna.

The Model 334 provides a simple means for the measurement of r.f. loss in coaxial cable. It also is an excellent termination for checking the accuracy and balance of a s.w.r. meter or r.f. bridge.

Since this device is a completely self-contained laboratory-type instrument of high accuracy over a wide frequency range and power range, it should prove to be a very popular item. The Waters Model 334 Dummy Load-Wattmeter is priced at $79.75. It is produced by Waters Manufacturing, Inc., Wayland, Mass.—*W2AEF*

READER SERVICE

CQ Magazine, Dept. RS

300 WEST 43rd STREET
New York 36, N. Y.

Void after
Aug. 28, 1963

Please send me more information on your ads in the Aug., 1963 *CQ* keyed as follows:

1	2	3	4	5	6	7	8	9	10	A
11	12	13	14	15	16	17	18	19	20	B
21	22	23	24	25	26	27	28	29	30	C
31	32	33	34	35	36	37	38	39	40	D
41	42	43	44	45	46	47	48	49	50	E
51	52	53	54	55	56	57	58	59	60	

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NAME_____
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Type of work (specify)_____

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CITY_____

ZONE_____ STATE_____

advertisers index

For further information, check number 46, on page 110

NOBODY BUT TERRY OFFERS SUCH LIBERAL POLICIES

THE REASONS WHY YOU SHOULD BUY YOUR RECONDITIONED EQUIPMENT FROM US . . .

- ✓ Full Credit Within 12 Months Towards Purchase of Higher Priced NEW Equipment
- ✓ Full Credit Within 90 Days Towards Purchase of Higher Priced Reconditioned Gear
- ✓ Free Two Week Trial
- ✓ 30 Day Guarantee
- ✓ 10% Down—36 Months to Pay

RECONDITIONED GEAR

Limited Quantities Subject to Prior Sale

Summer Clearance Sale—Act Now! and Save

The New Display items listed here carry *FULL NEW* Manufacturer's Guarantee, etc.—Most of the New Display items have *not* been taken out of their protective plastic display bags.

B & K	
1050 Dyna-Scan	$ 69
B & W	
LPA-1 Line (no cab)	$149
51SB adaptor	119
51SB-B adaptor	109
651 matchmaster	19
L-1000A Linear	199
5100 Xmtr	179
5100S Xmtr	189
5100B Xmtr	199
CENTRAL ELECTRONICS	
Mod A slicer	$ 19
Mod B slicer	29
GC-1 gated comp	29
MM-1 analyzer	49
10B SSB exciter	89
20A SSB exciter	129
100V Xmtr	475
200V Xmtr	595
458 VFO (C.E.)	19
458 VFO/10m.	39
MM-2 analyzer	69
MM-2 kit NEW	59
CLEGG	
99'er Xcvr	$ 99
Zeus Xmtr	495
NEW DISPLAY Zeus Xmtr	599
NEW DISPLAY Interceptor Rec	399
NEW DISPLAY Thor IV Xcvr	299
NEW DISPLAY 99'er Xcvr	139
COLLINS	
KWM-1 Xcvr	$399
KWM-1 console	69
KWM-1 Mount	29
KWS-1 Xmtr (ser. 0-500)	695
KWS-1 Xmtr (ser. 500-1000)	795
MP-1 DC Sup	139
KWM-2 Xcvr	849
PM-2 AC Sup	109
30L-1 linear	390
30S-1 linear	895
32S-1 Xmtr	469
32V-1 Xmtr	119
32V-2 Xmtr	169
75A-1 Rec	199
75S-1 Rec	349
75S-1/blanker	389
75S-1/500 cycle	399
51J-4 (rack) LATE	995
75A-2 Rec	229
75S-2/blanker	479
75A-3 Rec	329
75A-4 Rec (ser. 0-1000)	399
75A-4 Rec (ser. 1000-2000)	425
75A-4 Rec. (ser. 2000-3000)	449
75A-4 Rec (ser. 3000-4000)	475
310B-3 exciter	99
516F-1 AC Sup	79
516E-1 DC Sup	129
516F-2 AC Sup	79
NEW KWM-1 mount	50
NEW KWM-1 DX adaptor	35
NEW 75S-1 Rec	395
NEW DISPLAY KWM-2 #10549	925
NEW DISPLAY 75S-3 #12552	544
DRAKE	
1A Rec	$149
2A Rec	189
2B Rec	209
2BQ combo	29
NEW DISPLAY 2B Rec	245
NEW DISPLAY 2BQ combo	35
EICO	
720 Xmtr	$ 49
730 Xmtr	39
ELDICO	
SSB-1000 linear	$175
SSB-1000F linear	275
ELMAC	
PSR-612 DC Sup	$ 19
PMR-7 Receiver	79
PMR-8 Receiver	109
A-54 Xmtr	34
A-54H Xmtr	39
AF-67 Xmtr	69
AF-68 Xmtr	119
PSA-500 AC Sup	19
M-1070 DC/AC	39
GLOBE	
UM-1 modulator	$ 29
65B Scout	44
SD-75 Scout	79
VHF-62 Hi-bander	99
90 Chief Xmtr	29
90A Chief Xmtr	34
DSB-100 Xmtr	59
300 Xmtr	149
300A Xmtr	169
350 Xmtr	219
500 King Xmtr	269
500A King Xmtr	289
680 Scout Xmtr	39
680A Scout Xmtr	44
GONSET	
Comm II 6m.	$129
Comm III 6m.	149
Comm III 2m.	179
Comm IV 220mc.	199
Comm IV 2m.	269
3156B aircraft	59
G-28 10m Xcvr	119
G-43 Receiver	79
G-63 Receiver	129
G-66 Receiver	79
G-66B Receiver	89
3-way Rec Sup	24
Thin Pak	19
G-76 Xcvr	239
G-76 AC Suppy	69
G-76 DC Supply	69
G-77 Xmtr	119
G-77A Xmtr	139
GSB-100 Xmtr	249
GSB-101 linear	199
GC-105 2m Xmtr	179
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Tri-band Conv (Cash As-is)	10
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G-76 AC Sup	115
G-76 DC Sup	115
3311 88-108 mc FM Conv 12v B+	35
GR-111 Receiver	59
3357 6, 2, & 1¼ VFO	59
3275 6m Conv	29
3261 Super 12 Conv	59
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HT-32 Xmtr	$369
HT-32A Xmtr	419
HT-32B Xmtr	495
HT-33 linear	249
HT-33B linear	599
HT-37 Xmtr	349
HT-41 linear	295
HT-40 Xmtr	59
S-40A Receiver	49
S-40B Receiver	59
SX-42 Receiver	129
SX-43 Receiver	89
SP-44 panadaptor	49
S-53 Receiver	44
SX-71 Receiver	109
SX-73 Rk-Mt	495
S-85 Receiver	69
SX-62 Receiver	179
SX-88 Receiver	295
SX-96 Receiver	129
SX-99 Receiver	89
SX-100 Receiver	189
HALLICRAFTERS—Cont.	
SX-101 Receiver	$199
SX-101 Mk III Rec	219
SX-101A Receiver	249
SX-110 Receiver	109
SX-111 Receiver	179
SX-115 Receiver	349
SX-117 Receiver	279
SX-140 Receiver	69
SR-34 (AC) XCVR	249
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HA-6 Transvertor	249
P-26 AC Supply	69
SX-100 Receiver	249
SX-111 Receiver	199
FPM-200 Xcvr	1495
HAMMARLUND	
HC-10 slicer	$ 79
HX-50 Xmtr	319
HQ-100 Receiver	109
HQ-100C Rec	114
HQ-110 Rec	149
HQ-110C Rec	154
HQ-120 Rec	69
HQ-129X Rec	109
HQ-140X Rec	139
HQ-145 Rec	169
HQ-145C Rec	174
HQ-145X Rec	189
HQ-150 Rec	159
HQ-170 Rec	219
HQ-170C Rec	225
HQ-180C Rec	309
NEW HQ-145C Rec	225
HARVEY WELLS	
TBS-50 Xmtr	$ 29
TBS-50C Xmtr	34
TBS-50D Xmtr	39
APS-50 AC Sup	19
T-90 Xmtr	59
R-9A Rec	49
HEATH	
MR-1 Receiver	$ 59
MT-1 Xmtr	59
RX-1 Receiver	189
TX-1 Apache	179
VF-1 VFO	17
VHF-1 Seneca	159
HA-10 linear	219
HG-10 VFO	29
HP-10 DC Supply	29
HX-10 Marauder	279
SB-10 SSB adaptor	59
HX-11 Xmtr	29
DX-20 Xmtr	24
HP-20 Supply	29
HR-20 Receiver	129
HX-20 Xmtr	179
DX-35 Xmtr	34
DX-40 Xmtr	39
DX-60 Xmtr	59
DX-100 Xmtr	119
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Pacemaker	219
Ranger I	139
Ranger II	239
6N2 Thunderbolt	339
Thunderbolt	339
Valient I	239
Viking I	79
Viking II	109
"500" Xmtr	445
122 VFO	25
Mobile VFO	19
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Valient I kit	250
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T-60 Xmtr	39
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T-150 Xmtr	89
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Phasemaster IIB	179
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Mk III linear/Sup	$299
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NEW CCTV-2 Camera	$350
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MB-6 Receiver	$ 59
MB-560 Xmtr	59
MB-565 Receiver	49
RVP-260B DC Sup	19
TRS-600S AC Sup	29
MORROW—Cont.	
RTV-630 Supply	$ 29
3-band Conv (Cash As-Is)	10
5-band Conv (Cash As-Is)	20
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HFS Receiver	$ 89
HRO-50 Receiver	149
SW-54 Receiver	29
NC-57 Receiver	49
HRO-60 Receiver	279
NC-88 Receiver	69
NC-98 Receiver	89
NC-125 Receiver	84
NC-155 Receiver	149
NC-173 Receiver	89
NC-183 Receiver	119
NC-183D Receiver	189
NC-190 Receiver	159
NC-240 Receiver	69
NC-270 Receiver	169
NC-300 Receiver	179
NCX-3 Xcvr	289
NCXA AC Supply	79
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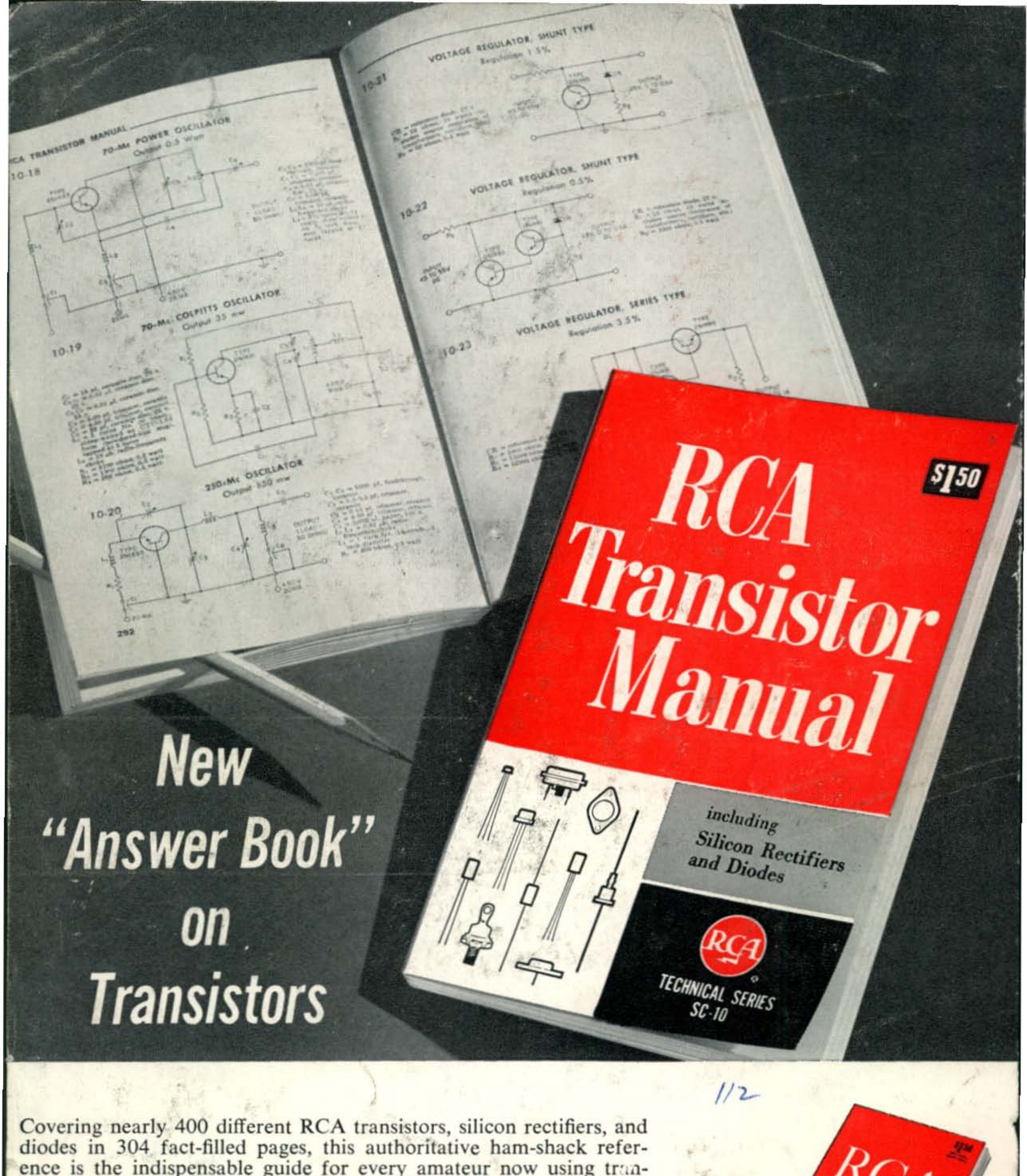

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