

September 1963

50¢



UNIVERSITY OF ILLINOIS  
LIBRARY

SEP 27 1963

CHICAGO



4-62KX2318DCD 63  
UNIV OF ILL LIBRARY  
CHICAGO UNDERGRADUATE  
-DIV  
NAVY PIER  
CHICAGO 11 ILL

The Radio Amateur's Journal

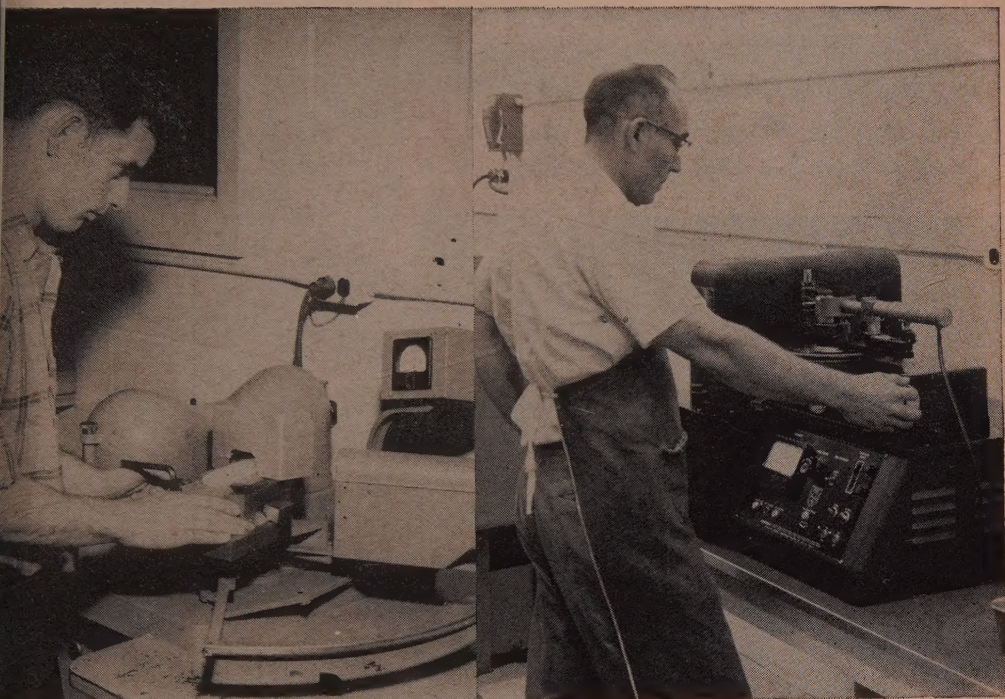
# SLOWPOKE!

The KWM-2 protects your investment with a depreciation so slow that if you had purchased KWM-2 when it was introduced four years ago, it would take you until about 1975 to fully depreciate it. Actually, it will never fully depreciate, but the present rate is about \$70 a year or less than \$1.50 a week. There are several reasons why the KWM-2 is so slow in depreciating. One is that in four years there have been no design changes, no spec changes, few component changes. Another is that when the KWM-2 was introduced, it included 19 "first-in-the-industry" exclusive features. Today that figure has been reduced because many of those "firsts" have been incorporated as standard in all amateur equipment. But Collins KWM-2 is still the only transceiver which includes all 19 features in one unit. ☐ See your Collins distributor and get full details on how little it really costs to own the finest...the Collins KWM-2. ☐



For further information, check number 50, on page 110

# rays Preorient Raw Quartz for Making CRYSTALS...Orientation Verified By raying Blanks Coming from Cutter



## AMATEUR TYPES



FUNDAMENTAL, PR  
TYPE Z-2—Frequency  
Ranges in Kcs.:  
3,500 to 4,000 (80-  
M); 7,000 to 7,425  
(40M); 8,000 to 8,-  
222 (2M); 8,334 to  
9,000 (6M)  $\pm$  500  
Cycles ...\$2.95 Net

Z-2 Crystals calibrated with a  
capacity of 32 mmfd.)



Third Overtone,  
PR Type Z-9A,  
24,000 to 24,666  
and 25,000 to  
27,000 Kc.,  $\pm$  3  
Kc. ...\$3.95 Net

eters, Fifth Overtone, PR Type  
A, 50 to 54 Mc.,  $\pm$  15 Kc.....  
5 Net

zens Band, PR Type Z-9R  
% .....\$2.95 Net

ORDER FROM YOUR JOBBER

Rigid inspections are the rule at every stage of  
production . . . to make PR Crystals the *finest*  
*that money can buy.*

Photograph at left shows raw crystal being pre-  
oriented. Each bar of crystal must be placed in  
exactly the right position, as shown by X-ray.  
The crystal is then locked in place, and the  
entire jig with crystal is transferred to an auto-  
matic cutting machine. Photograph at right  
shows cut crystals being rechecked by X-ray, to  
verify precision of orientation.

PR CRYSTALS have been the Standard of  
Quality since 1934. Get them from your jobber.

PR

Crystals



USE **PR** AND KNOW WHERE YOU ARE

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

For further information, check number 1, on page 110

# All this performance for only \$650<sup>00</sup>!

Full amateur band coverage, 80 through 10 meters • Hallicrafters exclusive new R.I.T. (Receiver Incremental Tuning) for  $\pm 2$  kc. adjustment of receiver frequency independent of transmitter, and AALC (Amplified Automatic Level Control) • Receiver AF gain and RF gain controls • SSB operation, VOX or PTT . . . CW operation, manual or break-in • 1650 kc. crystal filter . . .



## SPECIFICATIONS

**Frequency coverage:** Eight-band capability — full coverage provided for 80, 40, 20, 15 meters; 10M crystals furnished for operation on 28.5–29.0 Mc. Other crystals may be added for full 10 meter coverage without adjustment. Available for operation on specified non-amateur frequencies by special order.

**Front panel controls:** Tuning; Band Selector; Final Tuning; RF Level; Mic. Gain; Pre-Selector; R.I.T.; Rec. RF Gain; AF Gain; Operation (Off/Standby/MOX/VOX); Function (CW/USB/LSB); Cal.

**General:** Dial cal., 5 kc.; 100 kc. crystal cal.; VFO tunes 500 kc.; 18 tubes plus volt. reg., 10 diodes, one varicap. Rugged, lightweight aluminum construction (only 17½ lb.); size—6½" x 15" x 13".

**Transmitter Section:** (2) 12DQ6B output tubes. Fixed, 50-ohm Pi network. Power input—150W P.E.P. SSB; 125W CW. Carrier and unwanted side-band suppression 50 db.; distortion prod., 30 db. Audio: 400-2800 c.p.s. @ 3 db.

**Receiver Section:** Sensitivity less than 1  $\mu$ v for 20 db. signal-to-noise ratio. Audio output 2W; overall gain, 1  $\mu$ v for ½ W output. 6.0–6.5 1st I.F. (tunes with VFO). 1650 kc. 2nd I.F.

**Accessories:** P-150AC, AC power supply, \$99.50. P-150DC, DC power supply, \$109.50. MR-150 mounting rack, \$39.95.

*New*

# SR-150

Fixed/Mobile  
Transceiver

# hallicrafters

Overseas sales: Export Division, Hallicrafters • Canada: Gould Sales Co., Montreal, P.Q.

5th and Kostner Aves., Chicago



## The Radio Amateur's Journal

Vol. 19, No. 9

September 1963

### Editorial Staff

#### EDITOR

A. S. TROSSMAN, W2DTJ  
MANAGING EDITOR  
RICHARD A. ROSS, K2MGA  
TECHNICAL EDITOR  
IRVING TEPPER  
TECHNICAL DIRECTOR  
W. M. SCHERER, W2AEF

#### CONTRIBUTING EDITORS

CONTEST CALENDAR  
FRANK ANZALONE, W1WY  
USA-CA CUSTODIAN  
CLIF EVANS, K6BX

PROPAGATION  
SPACE COMMUNICATIONS  
GEORGE JACOBS, W3ASK

RTTY  
MYRON KRETZMAN, W2JTP  
DX

URB LE JEUNE, W2DEC  
YL

LOUISA B. SANDO, W5RZJ  
HAM CLINIC

J. SCHAUERS, W4VZO/HB9  
V.H.F.

DONALD L. STONER, W6TNS  
SIDE BAND  
DOT STRAUER, K2MGE  
IRVING STRAUER, K2HEA

#### BUSINESS STAFF

##### PUBLISHER

S. R. COWAN

ADVERTISING REPRESENTATIVES  
ACK SCHNEIDER, WA2FPE

DICK COWAN, WA2LRO  
CIRCULATION MANAGER

HAL WEISNER, WA2OBR

##### PRODUCTION MANAGER

CARY L. COWAN

##### ART DIRECTOR

MICHAEL A. DOMINGUEZ

#### OFFICES

300 West 43rd Street

New York 36, N. Y.

Telephone, 212 JUdson 2-4460

2—(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, Can-  
ada 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. Entire contents copyright  
© 1963 by Cowan Publishing Corp.  
CQ does not assume responsibility  
for unsolicited manuscripts. Post-  
master: send Form 3579 to CQ  
300 W. 43rd St., N.Y., N.Y., 10036.

### Table of Contents

|                                                                  |                                     |    |
|------------------------------------------------------------------|-------------------------------------|----|
| A Compact Receiver for the<br>C. W. Man.....                     | E. H. Marriner, W6BLZ               | 22 |
| A Stable Transistorized<br>V.F.O.....                            | Cmdr. Paul H. Lee, W3JHR            | 25 |
| 160 M. QRP for Medium<br>Power Rigs.....                         | Harold E. Davis, W8MTI              | 27 |
| A Surplus Vidicon<br>TV Camera.....                              | Martin L. Kaiser, W2VCG             | 28 |
| A D.C. Source From the<br>PE-73.....                             | Alan M. Hansel, KØIQF               | 31 |
| Results . . . 1963 Armed Forces Day Communication<br>Tests ..... |                                     | 33 |
| A V.F.O. Adaptor.....                                            | David T. Geiser, WA2ANU             | 34 |
| CQ Reviews: The Workman Model BX 125 Transverter                 |                                     | 35 |
| CQ Reviews: The Lil Lulu 6-Meter Transmitter.....                |                                     | 36 |
| CQ Reviews: The Knight-Kit Model LC-1 Code<br>Oscillator .....   |                                     | 38 |
| IQSY—The International Quiet<br>Sun Year.....                    | D. R. Hearsum, W8LUZ                | 39 |
| A Fully-Manual Time-Sequence<br>Key.....                         | David T. Geiser, WA2ANU             | 41 |
| Name That Thing.....                                             | Raymond De Vos, W2TAM               | 42 |
| Diode Power Supply<br>Calculations.....                          | E. H. Marriner, W6BLZ               | 44 |
| Rules: 1963 CQ World Wide DX Contest.....                        |                                     | 46 |
| The V.H.F. Amateur.....                                          |                                     | 71 |
| Two Meter<br>Kilowatt.....                                       | Bob Heil, K9EID & Gus Budina, K9EBA | 72 |
| The VHF Amateur Reviews:<br>The Clegg Thor 6 Transceiver.....    |                                     | 74 |

### Departments

|                        |     |                            |    |
|------------------------|-----|----------------------------|----|
| Announcements .....    | 12  | QSL Contest .....          | 16 |
| Contest Calendar ..... | 56  | RTTY .....                 | 68 |
| DX .....               | 48  | Sideband .....             | 54 |
| Ham Clinic .....       | 66  | Space Communications ..... | 51 |
| Ham Shop .....         | 106 | USA-CA .....               | 62 |
| Letters .....          | 8   | VHF .....                  | 60 |
| Novice .....           | 58  | YL .....                   | 65 |
| Propagation .....      | 52  | Zero Bias .....            | 7  |

# C·P COMMUNICATION ANTENNA SYSTEMS

— mean  
CERTIFIED PERFORMANCE!

BASE STATION COAXIAL ADVANCED DESIGN ANTENNA (2X-Omnidirectional Gain)

CAT. No. 79-509, FREQUENCY RANGE 108-174 MC\*

Cat. No. 79-509 2X-Gain Antenna combines the simplicity of a coaxial antenna with the gain of a more complex structure. Though external appearance is that of a standard coaxial antenna, the union of special element lengths and internal matching devices produces 3 db omnidirectional gain.

## SPECIFICATIONS

### Electrical:

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Nominal input impedance .....     | 50 ohms                           |
| Maximum power input .....         | 500 watts                         |
| Omnidirectional gain .....        | 3 db                              |
| 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 .....                   | ±1%                               |
| Lightning protection .....        | Star gap                          |

### Mechanical:

|                                     |                                                                                         |
|-------------------------------------|-----------------------------------------------------------------------------------------|
| Skirt .....                         | 2" dia. red brass                                                                       |
| Whip rod .....                      | 6061-T6 aluminum                                                                        |
| Support pipe .....                  | 1-5/16" dia. hot-galvanized steel, 24" minimum length<br>exposed available for mounting |
| Rated wind velocity .....           | 100 MPH at 150 Mc                                                                       |
| Lateral thrust at rated wind .....  | 19 lbs. at 150 Mc                                                                       |
| Bending moment 6" below skirt ..... | 55 lbs. at 150 Mc                                                                       |
| Weight .....                        | 30 lbs. at 150 Mc                                                                       |

\*Exact frequency must be specified

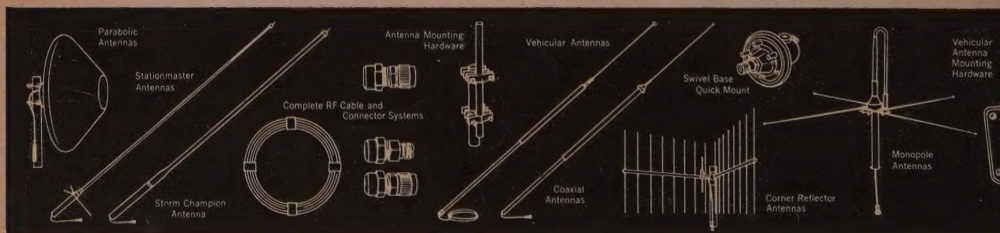


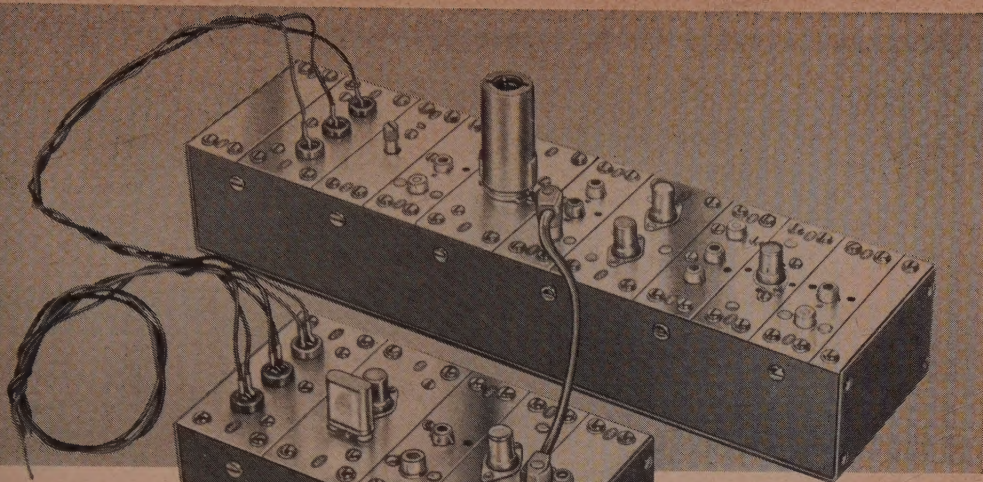
COMMUNICATION  
ANTENNA SYSTEMS  
FOR AMERICAN  
BUSINESS

*Communication Products Company*  
DIVISION OF

**PHELPS DODGE ELECTRONIC PRODUCTS  
CORPORATION**

MARLBORO, NEW JERSEY — Telephone HOpkins 2-1880 (Area Code 201)  
LOS ANGELES 65, CALIF. — Telephone CHapman 5-1143 (Area Code 213)





**Build  
This...**

# AOC 2-METER CONVERTER

COMPLETE KIT USING INTERNATIONAL PREWIRED AOC UNITS

- 2 RF STAGES
- 3 DB NOISE FIGURE

Everything that you need for building a 2-meter converter with International Add-On-Circuits. Multiple step-by-step instructions show you how to assemble the factory prewired units. Now . . . packaged in kit form for easy construction!

The converter kit includes input circuit, nuvistor grounded grid preamplifier, nuvistor/cascode preamplifier, innerstage coupling coil, mixer, IF output coil, oscillator tuning coil, oscillator, power connectors, hookup wire, special molded cables, hardware, and cases. **Specify IF desired when ordering.**

In addition . . . the AOC units in your converter are designed so that each circuit may be removed for modification or change. At a later date . . . the same circuits may be used to construct other electronic equipment. You never discard an Add-On-Circuit because of obsolescence.

**BUILD WITH INTERNATIONAL AOC AND YOUR EQUIPMENT WILL NEVER BE OBSOLETE**

**AOC  
DESIGN SHEET**

Customer Name \_\_\_\_\_ Date \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The following is our suggested AOC units for building:

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Cost \_\_\_\_\_ Price Required \_\_\_\_\_ Units \_\_\_\_\_ Cases \_\_\_\_\_

\_\_\_\_\_

| BILL OF MATERIALS |          |           |       | BILL OF MATERIALS |          |           |       | BILL OF MATERIALS |          |           |       |
|-------------------|----------|-----------|-------|-------------------|----------|-----------|-------|-------------------|----------|-----------|-------|
| Quantity          | Part No. | Part Name | Price | Quantity          | Part No. | Part Name | Price | Quantity          | Part No. | Part Name | Price |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |
|                   |          |           |       |                   |          |           |       |                   |          |           |       |

18 NORTH LEE STREET      INTERNATIONAL CRYSTAL MFG. CO., INC.      OKLAHOMA CITY, OKLAHOMA

AOC units may be used to build receivers, transmitters, or other gear. For complete details of available AOC units write International today!

**2-Meter Converter, Complete.....\$59.50**

**INTERNATIONAL  
CRYSTAL MFG. CO., INC.**

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 9, on page 110

# STILL LEADING THE FIELD...THE SWAN SW-240



**NOW ...**  
**WITH NEW STYLING**  
**AND EXTENDED**  
**CW COVERAGE**  
**14,000-14,350 KC**  
**7,000-7,300 KC**  
**3,650-4,000 KC\***

240 watts PEP input. High frequency crystal lattice filter. Precision tuning mechanism. Exceptional frequency stability. Receiver sensitivity better than one microvolt. Automatic gain control. — **\$320**  
 Break-in CW operation.

#### MOBILE MOUNTING KIT

Locking type, including speaker switch, with front-mounted mike jack ... **\$19.50**

#### SIDEBAND SELECTOR KIT

Provides both opposite sideband and AM receive position ... **\$18**

#### SWAN POWER SUPPLIES

SW-117AC (illustrated) for home station. With 5 x 7 speaker and phone jack ... **\$95**

SW-12DC for mobile operation. With pre-wired cables and installation hardware ... **\$115**

ASK THE HAM WHO OWNS ONE



**SWAN**  
 ELECTRONICS CORP.  
 Oceanside, California



# ZERO BIAS

**I**S AMATEUR radio still the hobby it used to be? Does it still rank with stamp collecting, photography, bird watching and model building? Is it still the fun party it was years ago?

We're sure all our readers will agree it used to be, but there's no denying—things have changed! Our precious frequency spectrum is no longer the exclusive domain of the large industrial nation. It can no longer be considered the possession of the highly-populated, wealthy countries. Today, every nation, on every continent seeks to expand its use of industrial, commercial, and propaganda broadcasting. Dozens of newly independent nations, as well as many older countries, eagerly await their chance to make use of frequencies, sadly lacking throughout the world.

No—amateur radio can no longer be considered a hobby. In bygone years when amateur radio bore no frequency occupancy problem, amateur radio was truly a hobby. Today, however, our favorite pastime treads boldly on the valuable tool of world-wide communications.

Consider for a moment what the American ham bands must sound like to a fellow in South America, Africa, or for that matter even as close a neighbor as Mexico. Consider the trivia, the rubbish, the "Ugly American" image we propagate throughout the world. It is this illusion, this caustic picture which casts serious doubts on the retention of our frequencies.

As the Administrative Radio Conference of the International Telecommunications Union convenes in Geneva (probably not before 1965) it is rather unlikely that the delegates from such countries as Ghana, Togo or Indonesia, to name a few, will indicate an enthusiastic desire to vote affirmatively on matters pertaining to amateur frequency allocations. During the next conference some one-hundred and twenty votes will decide the fate of many of our allocation problems. How many affirmative votes do you think will come from countries disinterested in amateur matters? Keep in mind that many of these countries have only one, two or at most a half-dozen hams, while some have no resident licensees at all. Should they vote to allocate three megacycles of valuable spectrum to be used as a toy? Should they support other petitions for the allocation of precious spectrum? Hardly!

Keep in mind that many commercial users of

radio pay enormously high fees to their governments for the privilege of placing a transmitter in operation. Many of these countries depend to a great extent on the income derived therefrom. Is it not conceivable, therefore, that these nations would prefer to institute commercial, rather than amateur services?

We in this country should be cognizant and indeed proud that a lobby group such as the ARRL, representing U.S. amateur radio, will do its part in convincing the United States' delegation as well as other delegates that amateur frequencies should be preserved.

To this end lies the basic motive for inauguration of the League's present incentive licensing proposal. It is the hobby aspect of amateur radio which we *must* dismiss, for if our frequencies are to survive (and we assume everyone puts the importance of our spectrum above all other considerations) a stronger reason than occupying our idle time is required.

With incentive licensing the League is now prepared to place amateur radio in a light which will clearly illustrate to all nations, that public interest and necessity far outweigh individual goals.

Incentive licensing is a long term project designed to place amateur radio on a plane far above its present status. We ask a question of those whose operations may be curtailed: Would you rather suffer the inconvenience of a few hours study and another FCC exam, or would you rather suffer the consequences of having no amateur radio at all?

## OUR COVER

WE'RE trying something a little different this month! We have the cartoonist's caption and we think it's pretty darn good; but we want to know if you have any ideas. If you think you have a good one send it to "Gags," c/o CQ. Deadline is October 10, 1963.

BEGINNING with the November issue, CQ will again be mailed to our subscribers with a protective outer wrapper.

Communications, mobile radio...

# A First Class FCC License

...or Your Money Back!



Your key to future success in electronics is a First-Class FCC License. It will permit you to operate and maintain transmitting equipment used in aviation, broadcasting, marine, microwave, mobile communications, or Citizens-Band. Cleveland Institute home study is the ideal way to get your FCC License. Here's why:

Our training programs will *quickly* prepare you for a First-Class Commercial Radio Telephone License with a Radar Endorsement. Should you fail to pass the FCC examination after completing your course, you will get a *full refund* of all tuition payments. You get an FCC License . . . or your money back!

You owe it to yourself, your family, your future to get the complete details on our "proven effective" Cleveland Institute home study. Just send the coupon below TODAY. There's no obligation.

## MAIL COUPON TODAY FOR FREE CATALOG

### Cleveland Institute of Electronics

1776 E. 17th St., Dept. CQ-5  
Cleveland 14, Ohio

Please send FREE Career Information prepared to help me get ahead in Electronics, without further obligation.

#### CHECK AREA OF MOST INTEREST -

- ☐ Electronics Technology  
☐ Industrial Electronics  
☐ Broadcast Engineering

- ☐ First-Class FCC License  
☐ Electronic Communications

other \_\_\_\_\_

Your present occupation \_\_\_\_\_

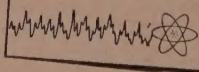
Name \_\_\_\_\_ (please print) Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Accredited Member National Home Study Council

### How to Succeed in Electronics



## LETTERS TO THE EDITOR



"The Swans of Abbotsbury"

Editor, CQ:

Congratulations on printing G3BID's candid and patently sincere article in August, 1963 CQ. This provocative article, as your staff so calmly put it, is more than just provocative. A stronger adjective is needed. The truth of Mr. Wagner's article is probably as shocking to some amateurs as was Darwin's Theory of Evolution to dogmatic objectors of the 1800s. I am curious to see how much opposition the article will receive.

The opposition will more than likely come from the mass-produced amateur who has been manufactured on the local radio club's assembly line. Then again, the opposition might stem from the ignorant amateur who cannot foresee the plight our one-time select hobby is destined to meet.

Mr. Wagner's analogy is by no means stretched or far fetched. It is an excellent one, and one which only an intelligent and concerned radio amateur could see. Those amateurs who agree should also agree to a system in which the number of amateur radio operators is kept at a minimum. One way of accomplishing this constant ham population is the institution of an incentive licensing system and amateur tests which are difficult, and in reality, unfair to the common ordinary person. They should be unfair to the ordinary person because amateur radio operators are not common ordinary people. Let's admit it, we think that we're pretty special, and we are! However, we will not be special if we let every Tom, Dick or Harry get a license. The quantity of amateur radio operators is no criteria for quality.

To the common, apathetic, and pseudo-ham, this select policy sounds snobbish. It may very well be snobbish but I consider it facing up to reality.

Mr. Wagner's article asked us a question: "What will it be boys, citizen band operators or intelligent elect radio amateurs?"

Chester Mroz, WA2LDC  
Eden, New York

[Editors Note: Not so surprising is the fact that from the many letters received on "The Swans of Abbotsbury" before copy deadline, so far, none have voiced opposition.]

## R.S.G.B.

Editor, CQ:

Thank you, on behalf of the eleven thousand-plus members, for the tasteful cover design of CQ for July conveying congratulations to our Radio Society of Great Britain on its 50 Year Anniversary!

That the R.S.G.B. is not as well-known abroad as it might be was forcibly brought home to me a few years back. A visiting WØ picking out the letters R-S-G-B

**FIRST  
and ONLY..**

**remotely tuned ROTATABLE DIPOLE!**

**DESIGNED SPECIALLY FOR  
40 AND 75 METERS IN  
LIMITED ANTENNA SPACE**

**NEW-TRONICS  
CLIFF-DWELLER<sup>TM</sup>**



FAT PEND.

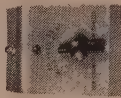
### ELECTRICAL FEATURES

- Antenna resonance finger tip controlled from transmitter location in shack.
- VSWR: 1.1 to 1 or less across entire band
- Feed-point variable to compensate for antenna environment
- No traps . . . no baluns . . . no matching devices of any kind
- Feed direct with any length 52 ohm cable
- Power handling capacity — maximum legal limit

The CLIFF-DWELLER is another New-Tronics first. Here's a tuneable dipole ideal for hams who live in apartments or in homes on small lots. The CLIFF DWELLER will give you unbelievable performance even in limited space.



**Housing for motors and gear  
trains with mounting yoke**



**Resonance and band  
switching control**

### MECHANICAL FEATURES

- Approx. lengths  
28'-6" — 26'  
30'-6" — 26'  
31'-4" — 26'  
Two-Bander
- Self supporting, accepts 1 1/4" threaded pipe for mounting in standard rotators
- Maximum turning radius approx. 15'-8"
- Sturdy aluminum die cast housing for motors and gear trains which drive end sections of dipole
- Heat treated aircraft type, 1 1/4" heavy wall aluminum tubing
- Completely waterproofed resonators and housings

| MODEL NO. | FREQ. MC   | WEIGHT        | NET PRICE |
|-----------|------------|---------------|-----------|
| CD 40     | 7.0-7.3    | Under 20 lbs. | \$ 92.50  |
| CD 75     | 3.5-4.0    | Under 20 lbs. | 99.50     |
| CD 40-75  | Two Bander | Under 20 lbs. | 129.50    |

See the CLIFF-DWELLER and other fine NEW-TRONICS products at your distributor or write us for descriptive literature.

**NEW-TRONICS CORPORATION**

3455 VEGA AVENUE • CLEVELAND 13, OHIO



**ONLY FRINGE YOU CAN'T PULL IN  
BETTER WITH ANTENNA SPECIALISTS'**  
**ASP-244 2 meter base antenna**

Omnidirectional • Vertically polarized coaxial  
• Field tunable • Stainless steel radiator • Heat  
treated aluminum skirt • Includes cable, connectors  
\$29.95 amateur net  
**the antenna  
specialists co.**

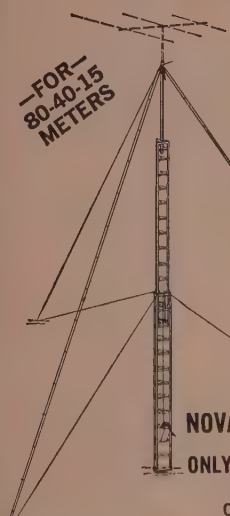


12435 Euclid Ave., Cleveland 6, Ohio

Manufacturers of Antenna Specialists brand base  
and mobile antennas for amateur, professional and  
CB. Custom design broadcast and professional in-  
stallations. "ZEUS" portable generators.

For further information, check number 31, on page 110

**NEW!! COMPLETE TRI-BAND  
NOVICE ANTENNA SYSTEM**



**—FOR—  
80-40-15  
METERS**

**FEATURES:**

- New Tri-ex trapless antenna
- Single feedline (coax)
- Overall height 46 ft.
- Tri-ex crankup tower included
- One man installation
- Performance proven
- Cement foundation not required
- Mount your 2 meter beam on top! (All band novice operation)
- Price complete delivered anywhere in U.S.A.

**NOVA 1  
ONLY \$97.50**

Order from your favorite radio store or direct with payment in full

**Write For Details**

**Tri-EX TOWER CORPORATION**  
127 East Inyo Street • TULARE, CALIFORNIA  
Telephone MURdock 6-3411

For further information, check number 24, on page 110

from my conversation enquired: "R-S-G-B. Is that sort of a Society, or somethin'?"

Readers particularly interested in talking to British amateurs might like to know that the R.S.G.B. publishes annually a *Call Book*, covering G, GC, GD, GI, GN, GW, as well as EI. This publication, running to 69 pages of calls in the 1963 edition, is complete at the time of publication and omits no calls. It can be obtained from the Society at 28 Little Russell Street, London, W.1 and is priced at 5 shillings [70¢], postage included.

Your quote concerning "Amateur Radio's first Golden Jubilee on page 7 of July's *CQ* is incorrect. The Wireless Institute of Australia, formed in March, 1910 celebrated their 50th Anniversary in 1960, thereby predating the R.S.G.B. by over three years! In their journal, *Amateur Radio*, dated July, 1935, the W.I.A. is quoted as being "... the world's oldest Amateur body ..."

F. Allan Herridge, G3D  
96, George Street,  
Basingstoke, Hampshire

Our apologies to the Wireless Institute of Australia for overlooking the first amateur Golden Jubilee. Since it is not likely that American amateurs are familiar with the W.I.A., we reproduce below their official insignia.



They also publish *Amateur Radio* monthly which may be obtained by subscription via P.O. Box 36, East Melbourne, C2, Victoria, Australia—Editor.

**For . . .**

Editor, *CQ*:

Congratulations on an excellent ZERO BIAS editorial in the August *CQ*! Qualified by fifteen years of hamming, I am convinced that *CQ* is interested in the long range betterment of amateur radio.

C. LaMar Ray, K1R  
13 Sherman Street  
Shelburne, New Hampshire

Editor, *CQ*:

Accept my congratulations on the sensible editorial in the August issue of *CQ*. I refer to your summary of the former licensing procedure and to the last two paragraphs of ZERO BIAS. I fear that an obstinate minority of hams have seized upon the ARRL incentive licensing and restricted phone band proposals as a means to express their imaginary grievances against the only group that can be credited with permitting us to enjoy the radio as we know it today.

Some letters from readers (July, *CQ*) indicate a mature analysis of the problem, if one exists. ARRL specifically requested that members should communicate to their Division Director on the incentive licensing proposal prior to the board meeting. Personally I am in favor of incentive licensing and restricted phone bands, and advised my Division Director. Many of my friends are likewise. Quite apparently the opposition were not so recently interested to take action to permit their views to be considered. Certain people are always ready to criticize action after it is taken, but will never raise a voice in protest or approbation at the proper time.

Again, I am glad to see the position *CQ* has taken and do not consider it a "me too" attitude. That is a phrase coined by the uninformed who have no logical complaint. . . .

Gilbert L. Countryman, W4  
75 East Bay Street  
Charleston, S.C.

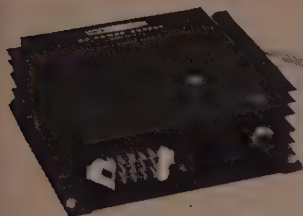
Editor, *CQ*:

After reading your August editorial, I could not resist writing immediately to thank you and congratulate you on the good sense and real regard for the future of the hobby, that it shows.

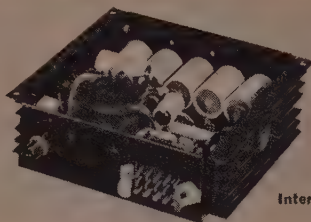
Other magazines, and even previous editors of *CQ*, have, I know, allowed themselves to be swayed by transient emotions puffed up by a minority of selfish ignorant hams. I am glad to see the cooperative understanding approach you have now taken!

# NEW HEATHKIT® SOLID-STATE POWER SUPPLIES

**FOR ALL HAM TRANSCEIVERS**



HP-13  
**\$59<sup>95</sup>**

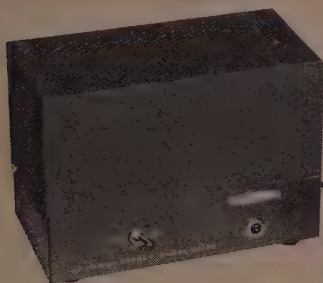


Interior

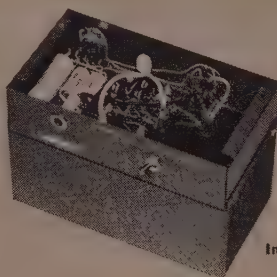
**NEW DC "MOBILE" POWER SUPPLY:** Furnishes all power required by Heathkit and other makes of SSB transceivers and mobile gear. Features encapsulated high-efficiency "Deltamax-core" toroidal transformer, power switching transistors, silicon rectifiers, circuit breaker protection, and relay control of 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:** 7 $\frac{3}{4}$ " W x 7 $\frac{1}{4}$ " L x 2 $\frac{3}{4}$ " D. All voltages referenced at 13 VDC input.



HP-23  
**\$39<sup>95</sup>**

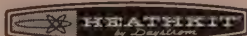


Interior

**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 4 $\frac{1}{4}$ " W x 8 $\frac{3}{4}$ " H.



## FREE CATALOG

*Send for your copy today! Fully illustrates over 250 different kits at savings of 50% or more! Choose from the world's biggest selection of quality ham gear... "Mobile"... "Fixed"... and Accessories!*



**HEATH COMPANY, BENTON HARBOR 12, MICHIGAN**

- ☐ 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 3, on page 110

Designed for



Application



### The No. 90651 GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.

**JAMES MILLEN  
MFG. CO., INC.**

MAIN OFFICE AND FACTORY  
**MALDEN  
MASSACHUSETTS**



My acquaintance with your publication and its predecessors: *Radio* and *Pacific Radio News* goes back to 1919. It has always been an independent, relaxed magazine and that is nice for a contrast.

Fred J. Elser, Col. USA-Ret., W6F  
1189 Tamarisk Road  
Palm Springs, California

#### .... and Against

Editor, *CQ*:

We feel very sad and angry after reading your ZEP BIAS in the August issue of *CQ*...

... Are you afraid of the alleged powers of ARRL? Is it because you may have too many of "Class-A's" on your staff? If this is true then "FI 13," gets this letter. We Generals and our Class-friends then know where we stand.

... Your quote: "The Class-A Amateur became 'advanced' on paper only, since the examination was no longer administered, should have said that the scope of the exam for the General licensee was upgraded with Class-A questions and has been upgraded every year since then, by the F.C.C."

... If you check the facts and you want to be honest and fair, you will have to admit that the General licensee received his upgrading and has earned the right to operate all bands with no exception.

If you have no ulterior motive, as you say, and you want to be fair to the majority of your readers (the General licensees) you should make amends for the lack of concept and for the omission of the upgrading of the general licensee by presenting the facts in the entirety. Please do not underestimate the wrath of the General licensee and many of their Class A relatives and friends, who are with them in the fight against this grab for the benefit of the Horse and Buggy operator of "Ye Olden Days."

Lou and Alice Brummel, K2BEJ/K2ET  
63 St. Johns Avenue  
Yonkers, N. Y.



**ANNOUNCING**

#### Pacific Voyage

You guys with your "all band" receivers may be able to do a great service for Bill Willis who left Peru on raft, July 4th for a month "sail" of the Humboldt current. Bill is 70 years old, alone, and is using a hand-powered transceiver. C.w. reports will be made 8364 kc, 2-3 hours after dark and 2 or 3 hours before sunrise. He's using the call *Salvita Three* and any information should be reported immediately to R. Griffiths, c/o Marconi Marine Division, 75 West Street New York 6, N.Y.

#### New Jersey

Bill A-647, recently introduced at the New Jersey General Assembly has a chance of obtaining call-let plates for hams of that State. All New Jersey amateurs are urged to write or phone their representative indicating their approval of the bill.

#### New Rochelle, N.Y.

The Communications Club of New Rochelle will begin its eighth year of classes leading to the Novice, Technician and General License. A code class will also be offered. Dates for registration are Sept. 12, 16 and 17, by mail or in person. Contact Charles Blake, Director, CCNR, P. O. Box 971, New Rochelle, N.Y. Phone—914 632-9000.

#### Syracuse

The Syracuse V.H.F. Roundup will be held on Oct. 12, at the 3 Rivers Inn, Rt. 57, ten miles north of Syracuse, N.Y. Registration starts at noon and tickets may be obtained from K2BYU, 405 Edgerton, Min.

# WHAT'S MISSING IN THIS PICTURE ?

Missing—the inevitable operating restrictions found in present-day “No-Knob” amateur equipment.

Hammarlund does not subscribe to the current theory that Amateur Radio Equipment must be “compact”—with minimum and over-simplified operating controls. Equipment of this type is self-limiting—and therefore imposes severe restrictions on the amateur who wants to be in control—and obtain the best possible performance under infinitely varied operating conditions. For example, the “pro” might reinsert the carrier off-center on SSB in order to dodge QRM. (Try to do this on a “no-knob” receiver).

Hammarlund communications receivers contain the control functions that can spell the difference between mediocre and excellent. These include: ■ Variable selectivity regardless of operating mode ■ Fast AVC attack—adjustable decay ■ Individually controlled noise limiter and (optional) IF noise silencer ■ Direct reading frequency calibration . . . just to name a few.

Compromises are missing with Hammarlund equipment. We design and manufacture amateur radio equipment that the novice can grow with—and the expert will enjoy.

Why buy built-in obsolescence?



Established 1910



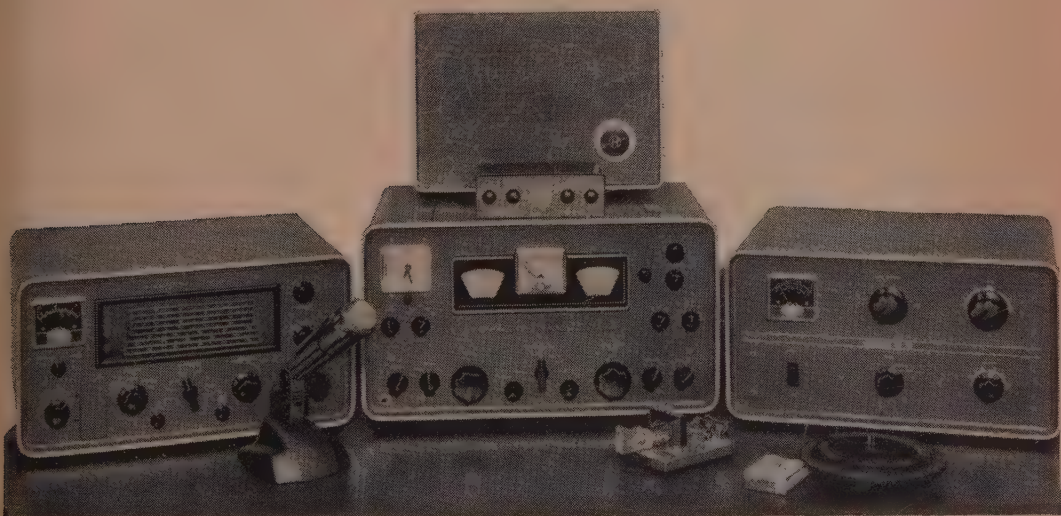
**HAMMARLUND**

**MANUFACTURING COMPANY**

A GIANNINI SCIENTIFIC COMPANY

53 West 23rd Street, New York 10, New York

All-Hammarlund station including the versatile HX-50 SSB exciter, the new HQ-170A receiver which has earned an envied and enviable reputation as the **Amateur Band Specialist**, and the “Instant-On” HXL-1 Linear Amplifier for booming 1500 watt P.E.P. performance.



For further information, check number 13, on page 110

TWO-WEEK TRIAL - \$ MONEY BACK GUARANTEE

**\$99<sup>95</sup> wired**

## WRL METEOR SB-175 TRANSMITTER

Another outstanding ham rig from W.R.L. Sold on a "Factory To You Basis" means another outstanding savings to you. The powerful Meteor SB-175 is factory wired - ready to operate for only \$99.95 (less power supply). Try it for 2 weeks, at our risk. Ideal for the Novice (75-watt setting) or Advanced Operators. Handsome and rugged. One knob band switching 80-10 meters. Fixed or Mobile. Provisions for crystal or VFO. Compact, 5" high x 11 1/8" wide x 8" deep, wt. 10 lbs. W.R.L. Power Supply - PSA 63 - \$24.95 Kit, \$39.95 Wired. Intra-connecting Cable \$1.75, P.L. 68 Mike Plug 99¢.



## WORLD RADIO LABORATORIES

3415 West Broadway, Council Bluffs, Iowa

You must be 100% satisfied or return postpaid for full refund.  
**WRL** - the home of the Famous Galaxy 300.

**SIDE BAND** 140 watts Double Side Band **AM** 100 watts **CW** 175 watts **CW**

N.Y. Price, \$6.00. W2RHQ, W2IYR and K2TXX will also pass along any info.

### Indiana

The Hoosier Hills Ham Club, Inc. with headquarters in Bedford, Indiana will sponsor their annual hamfest, to be held at Spring Mill State Park, Mitchell, Indiana. The date is October 13th, and plenty of activities will be on hand to keep the party going. Registration is 50¢ and it goes to Box 484, Bedford, Indiana.

### San Francisco

The Greater Bay Area Hamfest, sponsored by several leading clubs in the San Francisco area will be held at the Edgewater Inn, 77th Ave. and Nimitz Freeway, Oakland, California. The dates are Sept. 21 and 22 and registration is \$6.50 which includes Sunday banquet. For pre-registration and information write the Greater Bay Area Hamfest, Box 3791, Rincon Annex, San Francisco 19, California. Letters must be postmarked by midnight, Sept. 15 to be eligible for the pre-registration prize.

The North California Amateur Radio Teletype Society will have a fine demonstration of a projection printer and will be on hand to answer questions about RTTY.

### Cincinnati

The 26th Annual Stag Hamfest sponsored by The Greater Cincinnati Amateur Radio Association, Inc. will be held all day Sunday, Sept. 22 at Strickers Grove next to the Mt. Healthy Drive-In, Compton Rd., Mt. Healthy, Cincinnati, Ohio. For information contact W8ALW, 3965 Harmar Ct., Cincinnati.

### York County, Pa.

The 8th Annual York County Hamfest will be held Sunday, Sept. 1, rain or shine, at the Adams County Fair Grounds, Abbotstown, Pa. Registration is \$1.50. XYLS and jr. ops. free. Refreshments will be available and plenty of prizes will be given away. Dan Webster, K3BKH, 235 North 3rd St., Columbia, Pa. will send you more information.

### South Jersey

The South Jersey Radio Association will sponsor an annual gala hamfest September 8, 1963, at Molia Farm, Malaga, New Jersey. Rain data will be held on October 6th. Advance registration for non-club members is \$1.50. General admission at the gate, \$2.00. Day's activities will include 2 and 6 meter transmitter hunt, swap shop, OM, XYL and Harmonics door prizes. For Mobiles there will be talk in by K2AA on 2, 6 and 10 meters. All are invited to bring their lunch basket and swapping gear and enjoy a day of fun and excitement.

### Texas

The Houston-Harris County Hamfest is scheduled for October 19-20 at Sinclair Park, Houston. W5DP will "talk-in" stations on 3855 kc. W5ZPD will fill in directions, etc. QTH, 3518 Dalstrom, Houston, Texas.

### San Diego, California

The Southwestern Division ARRL convention will be held at the Conference Building in Balboa Park on October 11-13. The event is sponsored by the San Diego Council of amateur radio organizations. Their address is P.O. Box 6132, San Diego, California.

### Missouri

Members of the Zero-Beaters A.R.C. of Washington, Missouri will erect a Rhombic for experimental purposes on Sunday, Sept. 15th. WA0FYA/0 will be used on 15 and 20.

### Lend An Ear Day

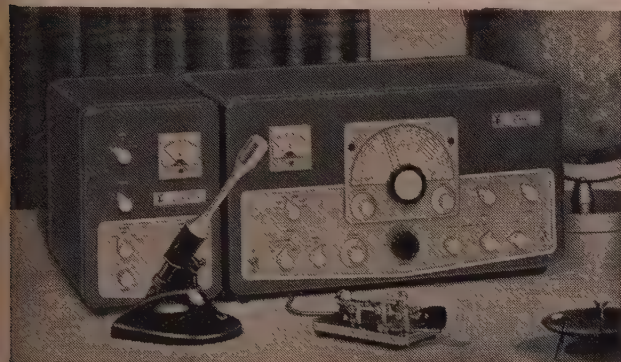
The Society of Radio Operators in Chicago will host an open house on Oct. 12, 1963 at the Edgebrook Field House, 6100 McClellan Ave., Chicago, Ill. The purpose of the day is to receive contributions to provide the hard-of-hearing with transistor radios and ear plugs. If you can't make it on Oct. 12, contributions may be addressed c/o A. W. Rutherford, 729 N. Delphia Ave., Park Ridge, Ill.

### World Scout Bureau

VE3WSB in Ottawa will be on the air Oct. 19 and 20 as part of the 6th International Scouting Jamboree.

[Continued on page 84]

# 1st Choice Among Nation's Amateurs!



## Matched Pair

Outstanding performance  
on SSB, AM and CW with  
absolutely no compromise  
on any mode!

**"SSB ADAPTER"**—The new filter-type SSB generator—with bandswitching 80 through 10 meters . . . more than 50 db sideband suppression . . . more than 45 db carrier suppression! When used with the Viking "Valiant" or "Valiant II" it places 275 watts P.E.P. at your command. Two compact units and interconnecting cables . . . RF unit is only 8" wide—may be placed on your operating desk. Power supply unit may be placed in any convenient location. Features built-in multiplier requiring VFO input only—band-pass interstage couplers require no tuning—design and front panel make operating practically fool-proof. Superb audio fidelity and balanced audio response; excellent sideband, spurious and carrier suppression. Other features: positive VOX and anti-trip circuits with built-in anti-trip matching transformer and adjustable VOX time delay. With remote power supply, tubes and crystal filter, less microphone.

Cat. No. 240-305-2—Wired, tested . . . . . Net \$369.50

**INVADER**—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 through 10 meters—no extra crystals to buy—no realigning necessary. Delivers a solid 200 watts CW input: 200 watts P.E.P. SSB input; 90 watts input on AM! (25-30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. With tubes and crystals.

Cat. No. 240-302-2 Wired, tested . . . . . Net \$619.50

**INVADER 2000**—Here are all of the fine features of the "Invader", plus the added power and flexibility of an Integral linear amplifier and remote controlled power supply. Rated at a solid 2000 watts P.E.P. SSB, 1000 watts CW, and 800 watts AM! (250 to 300 watts output—upper sideband and carrier.) Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. With power supply, tubes and crystals.

Cat. No. 240-304-2 Wired, tested . . . . . Net \$1229.00

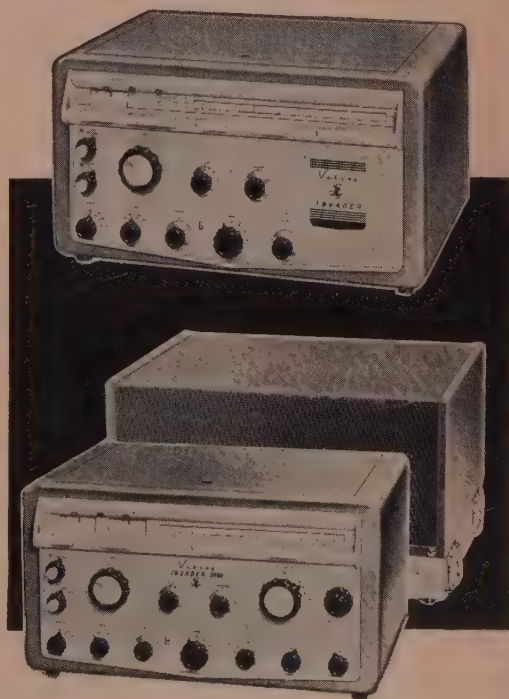
**HIGH POWER CONVERSION**—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader 2000". Wired, tested, includes everything you need—no soldering necessary—complete conversion in one evening.

Cat. No. 240-303-2 . . . . . Net \$619.50

**"VALIANT II"**—Outstanding flexibility and performance—bandswitching 160 through 10 meters—delivers 275 watts input CW or SSB (with auxiliary SSB exciter or Viking SSB adapter) and 200 watts AM! Low level audio clipping—differentially temperature compensated VFO provides stability necessary for SSB operation! High efficiency pi-network tank circuit—final tank coil silver-plated. Other features: TVI suppression; time sequence (grid block) keying; high gain push-to-talk audio built-in low pass audio filter; self-contained power supply; and single control mode switching. As an exciter drives any popular kilowatt level tubes and provides quality speech driver system for high power modulators. Provision for plug-in SSB operation with no internal modification. With tubes, less crystals.

Cat. No. 240-105-1—Kit . . . . . Net \$375.00

Cat. No. 240-105-2—Wired, tested . . . . . Net \$495.00



**E. F. JOHNSON COMPANY**  
WASECA, MINNESOTA, U.S.A.

For further information, check number 4, on page 110

# TURNER MICROPHONES... BEST FOR MOBILE AND BASE

## GOING...

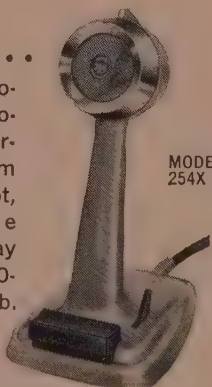
Convenient, top-performing, low-priced Model 350C from Turner. Rugged, dependable mobile mike... world's most popular. Why pay more... only \$16.80 list... buy the Turner 350C. Response: 80-7000 cps. Level: -54 db.



MODEL  
350C

## OR SITTING STILL...

A low-cost crystal microphone with on-off push-to-talk and lock switch. A perfect mike for the ham shack. Cable is 7 foot, three conductor (one shielded), wired for relay operation. Response: 80-7000 cps. Level: -48 db. List price \$23.50.



MODEL  
254X

SEE YOUR DEALER OR WRITE  
FOR COMPLETE SPECIFICATIONS



**MICROPHONE COMPANY**

925 17th Street N.E.,  
Cedar Rapids, Iowa

IN CANADA:  
Tri-Tel Associates, Ltd.,  
81 Sheppard Avenue West,  
Willowdale, Ontario

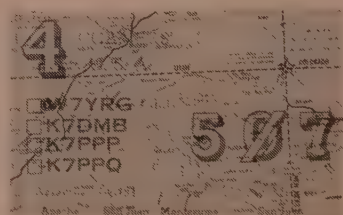
# QSL contes

**O**UR request for four-call cards brought in quite a few, some of which are pictured here. The winner is a quartet from down South-America way, consisting of three brothers, CX3AAV, YV5BIG, BNY, and the XYL of YV5BNY, YV5BNZ. The cards, all different colors, were designed by Raul, YV5BIG.

Doc, K7DMB, another "Four Corner" vacationer, makes the trip every year around July 4th. He wonders if anyone would be interested in planning for next year's trip. Write: Doc Altis, 5424 W. Gardenia, Glendale, Arizona.



## Runners Up



|                                                                                                     |                                |                                    |                                  |
|-----------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|----------------------------------|
| JANE<br><b>K6RLR</b><br>"HAM"                                                                       | FRANK<br><b>K6YBI</b><br>"HAM" | LARRY<br><b>K6YOE</b><br>NO. 1 SON | DOE<br><b>W6GER</b><br>NO. 2 SON |
| <p align="center"><b>THE WILLIS FAMILY</b><br/>RT. 1, BOX 524-J<br/>CHICO, CALIFORNIA, U. S. A.</p> |                                |                                    |                                  |
| To _____                                                                                            |                                | By _____                           |                                  |
| XMITR. _____                                                                                        |                                | RCV. _____                         |                                  |
| PSE                                                                                                 | QSL                            | THX                                | 73 88 23                         |

For further information, check number 34, on page 110

Introducing A NEW MEMBER of a World-Famous Family

**hy-gain's**

**MODEL 248BDT  
DOUBLET for  
20·40·80  
METERS**



**Takes up to 500 Watts AM; 1 KW P.E.P.**

**Slim Line Solid State Traps**

**Strong, Weatherproof Insulators**



Keeping pace with the popular new 3-band transceivers for 20, 40 and 80 meters is Hy-Gain's Model 248BDT Doublet antenna which was designed expressly to give you un-paralleled doublet performance on 20, 40 and 80 meters. You can install the 248BDT horizontally or as an inverted V and be assured it will deliver true half wave performance on every design frequency.

The 248BDT features a matched set of Hy-Gain's Slim Line Solid State traps that have earned user acclaim through daily use in tens of thousands of installations throughout the world. The 248BDT also features Hy-Gain's ruggedly constructed weatherproof center and end insulators which are molded from high impact cyclac plastic. The center insulator accepts either  $\frac{1}{4}$ " or  $\frac{3}{8}$ " coax cable. Hardware used in the center insulator is iridite treated to MIL specs. The 7" end insulators furnished with the 248BDT feature deeply carved serrations that increase the leakage path to approximately 12 inches.

Engineered to take up to 500 watts AM; 1 KW P.E.P., the 248BDT is fed with 52 ohm coax and can be adjusted for phone or CW. SWR less than 2:1 at resonance on all three bands. The 248BDT is an ideal antenna system for the popular new 3-band transceivers for 20, 40 and 80 meters. It's sensibly priced at ... **\$22.50** Ham Net.

## OTHER **hy-gain** MULTI-BAND DOUBLET

*... the doublets that are different !*

|                                                                   |                        |
|-------------------------------------------------------------------|------------------------|
| <b>Model 5BDT</b> —Trap Doublet for 10-15-20-40-80 meters .....   | <b>\$34.95</b> Ham Net |
| <b>Model 4BDT</b> —Trap Doublet for 10-15-20-40 meters .....      | <b>\$24.50</b> Ham Net |
| <b>Model 3BDT</b> —Trap Doublet for 10-15-20 meters .....         | <b>\$17.50</b> Ham Net |
| <b>Model 2BDT</b> —Trap Doublet for 40 and 80 meters .....        | <b>\$19.95</b> Ham Net |
| <b>Model 2TD</b> —Trap Kit for 40 and 80 meters .....             | <b>\$12.95</b> Ham Net |
| <b>Model 2BDP</b> —Trapless Fan Doublet for 15-40-80 meters ..... | <b>\$19.95</b> Ham Net |

See them today at your favorite Hy-Gain Distributors or  
write for the name of the Hy-Gain Distributor nearest you.

**Hy-Gain Antenna Products Corporation 8413 N.E. Highway 6, Lincoln, Nebr.**

# your choice of 2 GREAT **EICO**® TRANSMITTERS...

designed  
by Hams...  
for Hams...

to the highest  
Ham standards



**90-WATT  
CW TRANSMITTER\* #720**  
Kit \$89.95 Wired \$129.95  
\*U.S. Pat.  
"Top quality" — **ELECTRONIC  
KITS GUIDE**

Ideal for veteran or novice.  
"Clean" 90W CW, 65W AM-  
phone with EXT plate modulation.  
80 through 10 meters.

**60-WATT  
CW TRANSMITTER #723**  
Kit \$59.95 Wired \$89.95  
"Compact; well-planned layout.  
Clean-sounding, absolutely  
hum-free carrier; stable." — **ELECTRONICS  
WORLD**

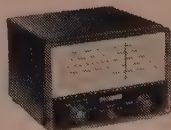
Perfect for novice or advanced  
ham needing low-power standby rig.  
"Clean" 60W CW, 50W AM-phone with  
EXT plate modulation. 80  
through 10 meters.



**TRANSISTOR CODE PRACTICE  
OSCILLATOR #706**

Complete with battery  
Select variable  
tone, flashing light,  
or both together.  
Phone jack for private  
use. Efficient speaker:  
clean loud signals.

Kit \$8.95 Wired \$12.95

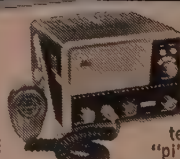


**New!**

**VARIABLE  
FREQUENCY  
OSCILLATOR  
(SELF-POWERED)  
#722**

Approaches  
crystal stability.  
80 through  
10 meters.

Kit \$44.95  
Wired \$59.95



**CITIZENS BAND  
TRANSCIVERS**

**770 Series**  
Superhet; pre-  
aligned xmitter;  
osc; match an-  
tennas by variable  
"pi" network. Single  
& multi-channel models

From Kit \$79.95 Wired \$109.95



**HIGH-LEVEL  
UNIVERSAL  
MODULATOR-  
DRIVER #730**

Delivers 50W undistorted audio for  
phone operation. Can plate-modulate  
transmitters having RF inputs  
up to 100W. Unique over-modulation  
indicator. Cover E-5 \$4.50.

Kit \$59.95 Wired \$89.95



**GRID  
DIP  
METER  
#710**

Kit \$29.95 Wired \$49.95  
Includes complete set of coils  
for full band coverage. Continuous  
coverage 400 kc to 250 mc.  
500 ua meter.



**PEAK-TO-PEAK  
VTVM #232  
& exclusive  
\*UNI-PROBE®**

Kit \$29.95  
Wired \$49.95  
**VACUUM TUBE VOLTMETER #221**  
Kit \$25.95 Wired \$39.95



**DC-5MC  
LAB & TV 5"  
OSCILLOSCOPE  
#460**

Kit \$89.95  
Wired \$129.95  
**5" GENERAL PURPOSE SCOPE #427**  
Kit \$69.95 Wired \$109.95



**DYNAMIC  
CONDUCTANCE  
TUBE  
& TRANSISTOR  
TESTER #666**

Kit \$69.95  
TUBE TESTER #625  
Kit \$34.95  
Wired \$49.95



**RF SIGNAL  
GENERATOR  
#324  
(150kc-435mc)**  
Kit \$28.95  
Wired \$39.95  
**TV-FM SWEEP GENERATOR  
& MARKER #368**  
Kit \$69.95 Wired \$119.95



**ELECTRONIC INSTRUMENT CO., INC.**  
3300 NO. BLVD., L.I.C. 1, N. Y.  
Export Dept., Roburn Agencies, Inc.  
431 Greenwich St., N. Y. 13, N. Y.

EICO, 3300 N. Blvd., L.I.C. 1, N. Y.

☐ Send free Catalog & name of  
neighborhood distributor.  
☐ Send free "Short Course for  
Novice License." ☐ Send  
36-page STEREO HI-FI GUIDE:  
25c enclosed for postage  
& handling.

Name.....

Address.....

City..... Zone..... State.....

Add 5% in the West.

**ENGINEERS:** Excellent career opportunities in creative electronics design. Write to the Chief Engineer.

For further information, check number 43, on page 110

# NEW

## Mosley

### EL

### TORO

## antennas



TW-3X  
\$19.95

TW-3X Jr.  
\$14.95  
NS-3

• **THREE MODELS** - Mosley El Toro antennas are available in three models, TW-3X - NS-3 and TW-3X Jr., designed to give outstanding performance. These versatile antennas were developed for the ham with a limited budget, limited space and the traveler working portable.

• **THREE BAND OPERATION** - Mosley TW-3X and TW-3X Jr. antennas operate on 20, 40 & 75/80 meters. Mosley NS-3 (Novice Special) operates on 15, 40 & 80 meters. All Mosley antennas feature pretuned, compact design & excellent broad band characteristics.

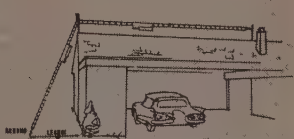
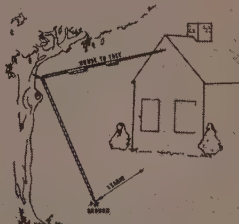
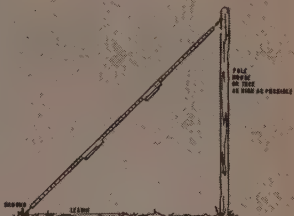
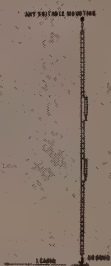
• **TWO POWER RATINGS** - Mosley TW-3X has an AM rating of 1000 watts input to the final amplifier and a CW/SSB rating of 2000 watts P.E.P. Mosley TW-3X Jr. and NS-3 (Novice Special) have ratings of 300 watts on AM & 1000 watts input to the final amplifier on CW and SSB.

Mosley El Toro antennas are trap type grounded quarter wave antennas using a unique method of tuning and a single 52 ohm coax line. Antenna is 58 ft. long and can be mounted to fit most any location. No radials are needed when mounted at ground level. Antennas come pretuned, in kit form and can be easily adjusted to resonate at any portion of the rated bands.

## Mosley Electronics, Inc.

4610 N. LINDBERGH BLVD., BRIDGETON, MISSOURI

63044



Since its introduction in 1956, the PL-172 beam pentode (now identified as the PL-8295/172) has become widely accepted by both amateurs and manufacturers of military and commercial communications equipment as the tube to use as a 1000 to 1500 watt-output linear amplifier of single-sideband signals. Now, in keeping with Penta Laboratories' policy of continuing product improvement, we announce the *ceramic* PL-8295A, which promises to become the new standard of excellence.

Like the PL-8295/172, with which it is directly interchangeable, the 1000-watt plate dissipation PL-8295A beam pentode uses the exclusive Penta vane-type suppressor grid, which provides high efficiency and output,

excellent linearity and low distortion. The new ceramic design adds to these features improved reliability, decreased cooling air requirements, and tolerance of high temperatures and severe shock and vibration.

Design your new linear amplifier around the Penta ceramic PL-8295A, or use it as a replacement for the PL-8295/172, and enjoy all the advantages of this rugged, high performance, low-distortion beam pentode. Write today for your free copy of the complete, factual PL-8295A data sheet.

### PENTA LABORATORIES, INC.

312 N. Nopal St., Santa Barbara, Calif.

Export Agents: Frazer & Hansen Ltd.  
San Francisco 11, California

Trade Mark Reg. U. S. Pat. Off.



# NEW CERAMIC PL-8295A



For further information, check number 14, on page 110

# YOU WILL AGREE — THEY MUST BE USING MASTER MOBILE



## DEPENDABLE

# POWER

## UNITS

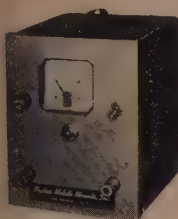
### AUTOMATIC TAPER CHARGER

**COMPACT.** 8" High x 6 1/4" Wide x 7" Deep.

**AUTOMATIC CHARGING** — the charging current is automatically reduced as the battery approaches full charge, and drops to a trickle charge when the battery reaches full charge. Overcharging is completely eliminated.

**HIGH CURRENT RATINGS.** Model TC-15 for 15 amps, Model TC-30 for 30 amps — both types designed for continuous-duty operation.

**IDEAL FOR** mobile radio systems, or on boats requiring a 12-V ignition source. Unit is not only an excellent heavy-duty charger, but may also be used as a bench supply for repair of car radios...for marine application, electroplating, powering model trains, and wherever else a high current, stable 12-volt source is needed.



MODEL TC-15 \$59.50

MODEL TC-30 \$79.50

Your 12-V battery fully charged every morning!

### K-73 "GO" POWER LINEAR AMPLIFIER

**SMALL:** 13 1/2" wide x 6 1/2" high and 12 1/2" deep

**COMPACT:** 15 1/2 pounds.

#### FEATURES:

2-811A zero bias triodes in grounded grid.

750 Watts PEP.

500 Watt self contained TRANSISTORIZED DC Power Supply employing a bridge of solid state rectifiers for excellent regulation. Panel meter measures plate current or RF output.

Ideal linear amplifier for any 50-100 Watt SSB exciter, such as KWM-2, SWAN, HALLICRAFTERS, SONAR, etc.

Covers 10, 15, 20, 40 or 80 meter operation with a heavy duty band switch.

Internal antenna relay allows barefoot operation when amplifier is not in use.

Wide range PI-NET output.

Does not require additional batteries in most automobiles.



MODEL K-73 \$289.50

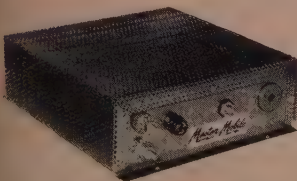
NET

MODEL RC-73 \$17.95



### REMOTE CONTROL: INCLUDES

Five wire remote control cable for On-Off switch, Pilot Light, Plate MA or RF Output Meter and Push-to-Talk Antenna Changeover Relay.



MODEL MPS-800 \$119.50

MODEL MPS-1250 \$139.50

### POWER SUPPLY

...dc-dc transistorized converter dependably powers transceivers in the 100-watt output class.

**SMALL SIZE.** 2 3/4" High x 8" Wide x 9" Deep...

**TWO OUTPUT MODELS.** Model MPS-800 100-watt SSB exciters: 800V @ 275 ma; 300V @ 150ma, and a zener diode regulated —90VDC bias supply.

Model MPS-1250, 1250VDC @ 400ma, 300VDC @ 150ma, and a zener diode regulated —90VDC bias supply.

# Master Mobile Mounts INC.

4125 W. JEFFERSON BLVD. • LOS ANGELES 16, CALIF.

AVAILABLE  
AT LEADING  
RADIO JOBBERS  
NOW.

For further information, check number 42, on page 110

# A Compact Receiver for the C.W. Man

BY E. H. MARRINER\*, W6BLZ

*Today's modern receivers, featuring all bands, all modes, all everything, often outdo themselves in weight, size and complexity. This receiver has been specifically designed for the c.w. man although with some changes it can easily be adapted for s.s.b. It covers 20 and 40 and is a compact unit with good calibration. The selectivity, and sensitivity are comparable to many commercial receivers.*

THE "C.W. Special" is an eleven tube receiver (including rectifier and voltage regulator) expressly designed for the c.w. operator. A 500 cycle Collins mechanical filter, permanently connected, takes care of the i.f. selectivity problem and all of the components, with the exception of an ARC-5 variable capacitor, can be obtained through the local parts distributor.

The receiver, as presented here, tunes 7.0 to 7.2 mc and 14.0 to 14.2 mc but this can be changed by alteration of the oscillator frequency range. A great deal of design time was spent in achieving the configuration shown here and it is suggested that care should be taken before any changes are made.

## Circuit Operation

For 40 meter operation, signals feed link  $L_1$  and couple into  $L_2$  which is tuned by  $C_1$ . The signal is fed to the control grid of  $V_1$  the gain of which is controlled by the 5K pot in the cathode circuit. The output of the r.f. amplifier is tuned, from the front panel, by  $C_2$  and fed to  $V_2$ , the first mixer. Here it is mixed with the oscillator crystal frequency, for an output in the 4.4 to 4.6 mc range. Transformer  $T_1$ , a standard 4.5 mc TV sound i.f. transformer, is broad enough to accept this bandwidth.

The output of the first mixer feeds  $V_3$ , the second mixer. Here the signals mix with a tunable

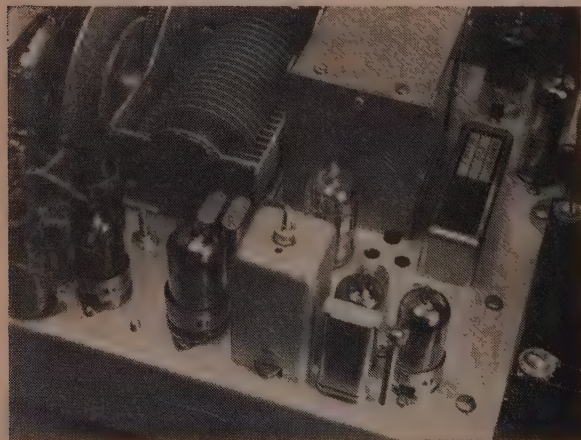


Front view of the 40-20 meter c.w. receiver. The control functions, counter-clockwise starting from the upper left corner, are: MAIN TUNING; B.F.O.; AUDIO GAIN; CALIBRATOR; VERNIER TUNING, MIXER BANDSWITCH; R.F. TRIMMER ( $C_2$ , R.F. GAIN (on-off), ANTENNA TRIMMER and R.F. BANDSWITCH. The antenna input connector is in the upper right corner.

oscillator of 4855 to 5055 kc. The output of  $V_3$  is 455 kc and is fed to the 500 cycle mechanical filter. The output of the 500 cycle filter is fed to a 6EW6,  $V_4$ , an i.f. amplifier and from there to  $V_5$ , the product detector. A plug-in type filter, F455E-05, may be used rather than the one listed in fig. 1 if various bandwidths are desired.

The audio output is fed to the triode section of the 6CX8,  $V_6$  and from there to the pentode section.

The crystal calibrator,  $V_{11}$  is routine and is controlled by a front panel switch. The output



Front end mounting details of the two band c.w. receiver. The antenna trimmer,  $C_1$ , is mounted between inductors  $L_2$  &  $L_4$  at the left. Tubes from left to right are:  $V_1$ , 6BZ6;  $V_2$  12AT7;  $V_{11}$ , 6BA6 (behind 100 kc calibrator crystal); and  $V_3$ , 6BE6. The 12AU7 tunable oscillator is mounted next to its shielded inductor. A 5Y3 (not shown in this photo) replaced the silicon rectifiers originally used. See text.

\*528 Colima Street, La Jolla, California.

is coupled into the antenna by several turns of wire, as shown in fig. 1. The 3-30 mmf capacitor is used to zero the oscillator with WWV.

The b.f.o. is an Armstrong rather than the usual Hartley circuit. In the Hartley oscillator, as originally tried, the cathode, being above ground by the amount of the tap on the oscillator coil, picked up an a.c. hum. This hum modulated the signal and was apparent as the b.f.o. was tuned near zero beat. In the Armstrong circuit the cathode is directly grounded and the hum disappears.

The a.v.c. voltage is obtained by rectifying the audio signal using a diode with a high back resistance. The 1N538 has a back resistance of 10 megohms and a forward resistance of about 600 ohms. However, any other diode with a high back resistance will do nicely.

If the receiver is to be used for sideband, change  $C_9$  to a high-quality 0.05 mf capacitor (metallic type) and remove the 3.3 megohm resistor in parallel with it. The 0.05 mf capacitor will charge rapidly and hold in for a long enough time to give smooth s.s.b. reception.

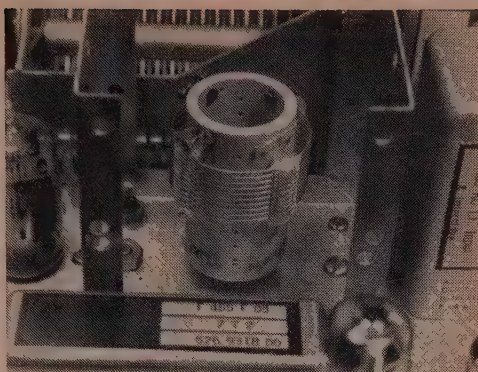
Although the power supply is straightforward the reason for not using silicon rectifiers should be mentioned. It was found, in an earlier model, that the high gain exhibited by the audio system actually picked up the switching transients of the diodes. R.f. chokes placed in the power leads did not completely eliminate the interference so a conventional 5Y3 was used in preference to a complete shielding operation.

### Construction

The receiver is built in a California Chassis cabinet, number 469. The size is  $5\frac{3}{4}$ " high,  $8\frac{11}{16}$ " wide and  $11\frac{1}{4}$ " deep. The chassis comes with the cabinet and is  $8\frac{7}{16}$ "  $\times$   $10\frac{15}{16}$ " and 2" deep.

Construction can be started by mounting the power supply and audio stage components. The tuning capacitor and panel can also be assembled after drilling the necessary holes.

My method of construction was stage by stage. First I got the audio stage going, along with the



Interior view of the shield box containing  $L_7$  in the tunable oscillator circuit. The coil stock is mounted on a National XR-62 form.

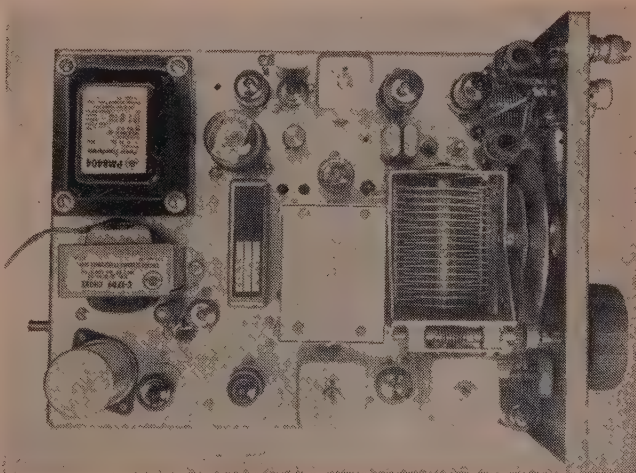
b.f.o. and product detector. By feeding in a 455 kc signal from a generator, I was able to check the stage performance and then go on with the project. No signal will be heard if the b.f.o. is not at 455 kc.

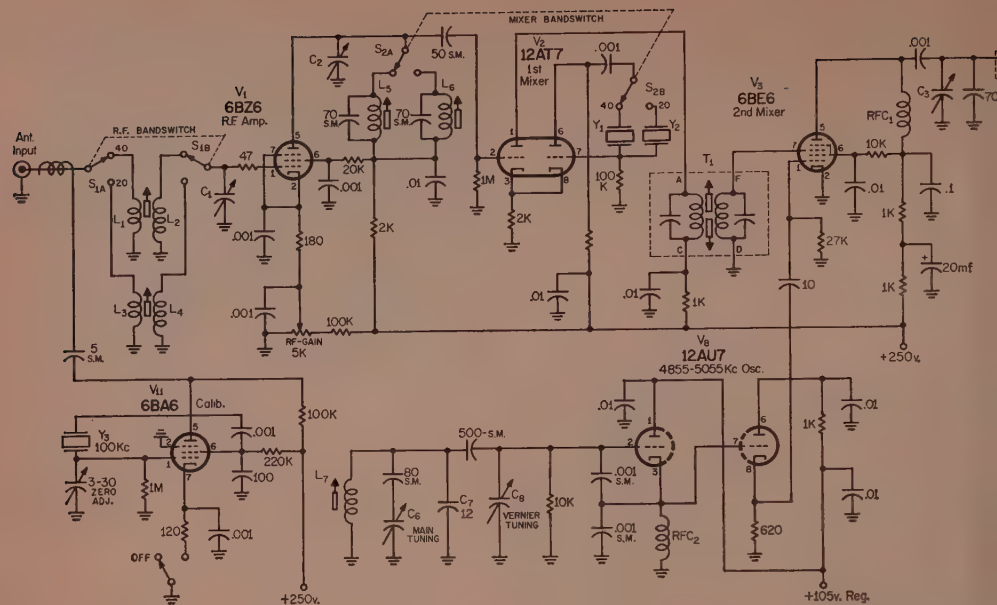
Next, the 6EW6 i.f. stage was wired in along with the 6BE6 second mixer. I could now feed the 455 kc signal into the control grid of the 6BE6 by coupling in through a small capacitor. Swinging the signal generator back and forth will indicate the selectivity of the filter. After this, I wired in the r.f. stage and first mixer.

One thing further remained and that was to track the tuning oscillator. It had to tune the range 4855-5055 kc, with an output of about 3 volts, to mix with the 6BE6 mixer. After experimenting with open bulk coil mounted on insulators, I decided better stability could be obtained by putting the coil in a "beefed up" box. This also reduced some of the radiated signal. As it turned out an LMB number 871 "Jiffy Box,"  $2\frac{3}{4}$ " l.  $\times$   $2\frac{1}{8}$ " w.  $\times$   $2\frac{3}{4}$ " deep, fit very nicely behind the tuning capacitor.

The oscillator tuning range is adjusted by changing the value of the silver mica capacitor in series with  $C_6$ . As this silver mica is reduced in value the frequency coverage is reduced; how-

Top view of the c.w. Special receiver for 40 & 20 meters using a surplus ARC-5 tuning capacitor. The  $2\frac{3}{4}$ "  $\times$   $2\frac{1}{8}$ "  $\times$   $2\frac{3}{4}$ " box houses the tunable oscillator inductor  $L_7$ . Tubes at the bottom from left to right are:  $V_6$ , 6CX8;  $V_4$ , 6EW6;  $V_5$ , 12AT7; and  $V_7$ , 6C4. The 5Y3 and 0B2 are mounted above and below the Collins mechanical filter.





ever, the actual tuning frequency becomes higher. To bring the frequency back down to where it should be, the slug in  $L_7$  may be adjusted. Variable capacitor  $C_8$  is added in order to compensate for any small differences in crystal frequency when switching bands, insuring accurate dial calibration.

When the variable oscillator was finished and fed into the mixer, all slug tuned coils and i.f. transformers were adjusted with the dial set at 7100 kc.

If you are wondering about the dial port, it is an old dial-light jewel of the 115 volt type (1" diam.). I knocked the glass out, and forced

The  $8\frac{7}{16}'' \times 10\frac{1}{16}'' \times 2''$  chassis is wired in stages. The 100 kc crystal calibrate zero-adjust capacitor is mounted to the right of the 5Y3 rectifier socket and inductors  $L_5$  and  $L_6$  are mounted below the mixer bandswitch. The 8K, 10 watt variable resistor in the power supply is mounted behind the audio transformer  $T_3$ , at the upper left.

in a piece of clear lucite. This was polished and a hair line scribed on the surface.

I might mention, if you drill holes and build as you go, use a hand drill or remove the mechanical filter as it can be damaged by abuse.

### Spurious Signals

The level of spurious signals will depend upon how well you filter the leads to all stages. This will keep unwanted signals from chasing around the chassis wiring and getting into the wrong places. A further help is to bypass all oscillator filaments right at the tube socket pin with a 0.01 mf disc ceramic capacitor. This is especially true for the b.f.o., since it will prevent harmonics from flowing back down the filament leads.

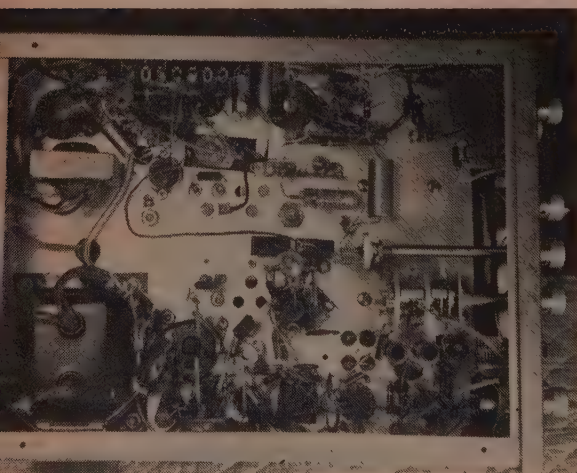
No special shield was found necessary in the receiver except for the can on  $L_7$  to reduce radiation from the coil. Use shielded wire on all of the audio gain control circuits going to the panel.

### Alignment

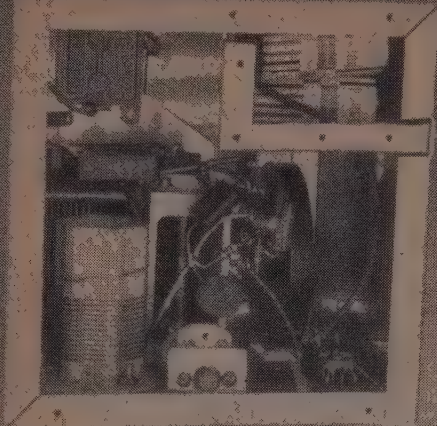
To peak the circuit, feed a signal from a stable source into the input at 7100 kc. Advance the R.F. GAIN control fully and tune  $C_1$ . If it doesn't resonate at mid position, set it at the mid position and adjust  $L_2$  for maximum signal. Do the same thing with  $L_5$  and  $C_2$ .

Next peak  $T_1$  and then  $C_3$  and  $C_4$  for maximum output. Follow right along and peak  $T_2$ . If the receiver has no output, one good reason may be that the slug of  $T_4$  has not been adjusted. There will be no output from the product detector unless the b.f.o. is within range to produce a beat. Set  $C_5$  at mid-scale and adjust the slug until a beat note is heard.

I think you will get a lot of pleasure bringing the receiver to life! You are sure to learn a lot just by tinkering with it.







Bottom view of the transistorized v.f.o. built around an LM tuning capacitor and housed in a 6" x 6" x 6" cabinet. The battery compartment at the rear holds eight #1 flashlight cells. An ARC-5 coil form is used for  $L_1$  for improved stability.

on Navy MARS and Naval Reserve frequencies outside the amateur bands with adequate stability (0.003% tolerance), which previous vacuum tube v.f.o.'s did not do.

### Construction

This transistorized v.f.o. is extremely simple to build, and is quite inexpensive. In a previous issue of *CQ*<sup>1</sup>, I described a v.f.o. built from a cut-down ARC-5 command set. For those who do not have the back issue, the ARC-5 chassis was cut just ahead of the oscillator section, the front panel was moved back, the amplifier tuning capacitor, with its dial, replaced the oscillator capacitor, and the ARC-5 oscillator components were used in a vacuum tube circuit. The same mechanical concept is used in the transistorized

<sup>1</sup>Lee, Paul, "Low Cost VFO," *CQ*, July 1955, page 33.

Bottom view of the transistorized v.f.o. built on a cut down ARC-5 chassis. A false front panel is used to cover the extra holes. The r.f. output jack can be seen in the rear left corner.

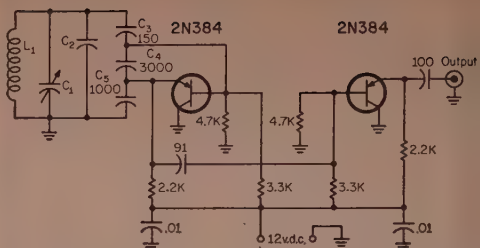
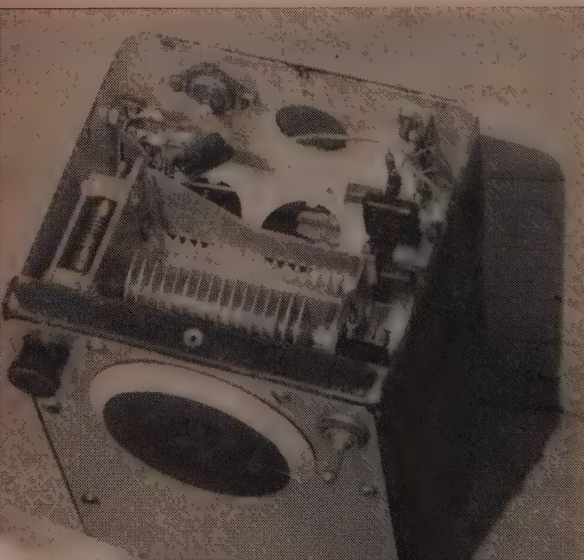


Fig. 1—Circuit of the "Synthetic Rock" v.f.o. The tank circuit components,  $L_1$ ,  $C_1$ ,  $C_2$ , are ARC-5 oscillator components, the values of which are dependent upon the ARC-5 chosen and the frequency desired. All resistors are  $\frac{1}{2}$  watt; all capacitors greater than one in value are in mmf and less than one in value are in mf.

v.f.o. described here, but the process of "cutting down" is carried to the extreme by stripping out all the wiring and components except the oscillator tuning capacitor below the chassis, and the coil and padding capacitor above the chassis.

Two 2N384's are mounted on terminal strips beneath the chassis, and with the addition of a few capacitors and  $\frac{1}{2}$  watt resistors, plus a coaxial connector and two batteries, the unit is wired up as shown in fig. 1. The two Z4 6 volt batteries in series provide the 12 volts power for the unit. Eight #1 flashlight cells can also be used in series, and will fit in the space at the rear of the chassis.

### Stability

One of the secrets of the excellent frequency stability of this unit is the fact that the oscillator transistor is connected across a relatively low impedance ( $C_4$  and  $C_5$ ), and is quite loosely coupled to the tuned circuit through the voltage divider action of  $C_3$ ,  $C_4$ , and  $C_5$ . This effectively removes the transistor from the frequency determining tank circuit itself. In fact,  $C_3$  could be made even smaller if desired. Its lower limit would be that capacity which still permits the circuit to maintain oscillation.

This circuit is the result of much trial and error. Many published circuits involve connection of the transistor across high tank circuit impedances resulting in a peculiar instability which manifests itself as a low frequency rumble or burble on the signal. It was actually an irregular frequency shift of only a few cycles (perhaps less than five cycles) about a very stable mean frequency, but the frequency could be seen as a fluctuation of the receiver S-meter. The long-term frequency stability was excellent but the burble was there due to making the transistor look into too high a tank circuit impedance.

The 2N384's work very well in the circuit shown here. The emitter-follower buffer provides excellent isolation from anything that follows that stage. The v.f.o. can of course be designed to work on any frequency you wish. In my case I use it on 4.9-6.1 mc, to provide the injection frequency for the s.s.b. exciter.<sup>2</sup>

[Continued on page 90]

<sup>2</sup>Lee, Paul, "Crystal Filter Type S.S.B. Exciter," *CQ*, November 1961, page 32.

# 160M. QRP for Medium Power Rigs

BY HAROLD E. DAVIS\*, W8MTI/A8QZT

Now that the 160 meter band is open for operation in all states, a lot of amateurs are trying to operate their DX-100's and Viking transmitters at reduced input.

In many states the maximum power limit is 25 watts input. Operation of the DX-100 and Viking at this low input can lead to other problems such as arc-over and severe distortion due to the extreme change in plate impedance as presented to the secondary of the modulation transformer.

Some of the methods tried to reduce the input of either of these transmitters to the 25 watt level include using a lightbulb or resistor in the primary of the plate transformer. This results in quite poor regulation which leads to other problems which will not be discussed here.

It occurred to the author that another method, less expensive than purchasing a variac type transformer, was capable of giving the desired results with only slight modification of the original transmitter. This modification should not reduce the resalability of the transmitter.

In a few words, this system entails using a TV type power transformer which may easily be salvaged from an old chassis. The two primary

and the three secondary leads of the plate transformer in the transmitter are disconnected inside the transmitter and reconnected to the five-pin Amphenol MIP male chassis plug mounted on the rear of the chassis. A five pin female MIP plug is mounted near the male plug and then wired to the appropriate points in the transmitter from which the plate transformer leads were disconnected. A jumper cable is then made using five lengths of high-voltage plastic insulated wire, ending in a male plug at one end and a female at the other. Another five pin male plug is then used to connect to the primary and high-voltage leads of the TV power transformer. All these connections are shown in fig. 1.

For normal operation the jumper cable is used between the two chassis plugs thereby connecting the regular plate transformer into the circuit in the normal manner. For QRP operation the jumper cable is removed and the TV transformer plugged into the female plug.

Caution: make sure the insulation used for the jumper cable wiring is enough to handle the high voltage.

Incidentally, QRP operation is a good idea on other bands when the full power of the transmitter is not needed. ■

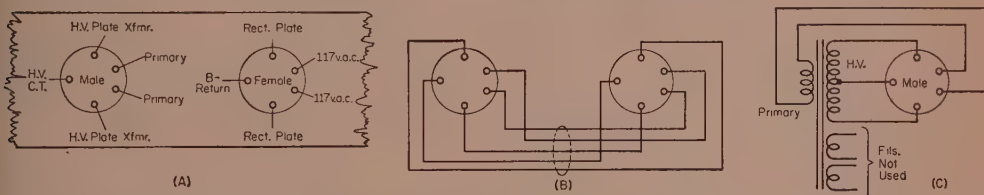


Fig. 1—The modification shown above permits operation of the DX-100 or Viking transmitters at 25 watts on 160 meters. The male and female plug arrangement is shown in (A) while (B) shows the simple jumper plug used for normal operation. A TV type power transformer shown in (C) is used for reduced power.

## ALL NEW... COMPLETELY DIFFERENT... NEVER BEFORE DONE!

A complete issue of CQ devoted to tools and workshop practices for the amateur. An absolute must for the home-brewer, the kit builder, and the ham who repairs and modifies his own station.

This issue will feature articles on chassis-punching and layout, wiring, soldering techniques, tool selection, workshop planning, etc.

All this, and much more will be presented in the Special November CQ Annual. This issue will be a permanent reference guide in your shack. Don't miss it. November CQ. A real beauty!

# A Surplus Vidicon TV Camera

BY MARTIN L. KAISER\*, W2VCG

*For the amateur who would like to get started in TV without investing a great deal of money, this article describes, in detail, the conversion of a surplus ATK-ARK iconoscope system into a highly sensitive one-inch vidicon system.*

ONCE again there seems to be an upsurge of interest in amateur television. A surplus ATK-ARK iconoscope system conversion is described in this article. The total cost of this unit, after conversion, is around \$100; the initial investment is somewhat higher, but sale of the unused iconoscope and lens helps to defray the original cost.

The conversion is accomplished in three general steps. First, the chassis is stripped of all components that will not be used (some of these components can be resold); second, the sweep frequencies are changed to those standard for TV; and, finally, a 7038 or the 7735A vidicon is installed. A 6198 will do too.

## Component Removal

In the first step, the following components are removed: the lens shutter, shutter relay, lens, lens heater, iconoscope, iconoscope mounting brackets, bias light, iconoscope-compartment shield and yoke support bracket.

Lift the yoke through the large opening in the chassis so that it is on the upper side of the unit. Cut a small notch towards the front of this opening to allow freedom of movement for the yoke wires when the yoke is in position inside the focus coil.

## Focus Coil

A focus coil for the vidicon must be constructed as shown in fig. 1. After the form is glued together, 3,500 turns of #30 enameled wire is scrambled wound to a uniform depth across the entire length.

\*418 Hale St., Pennington, N. J.

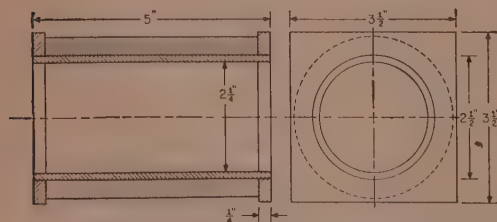
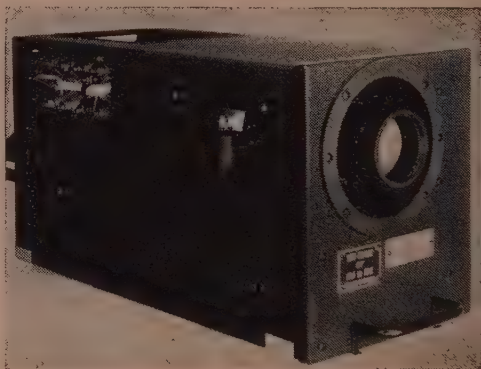


Fig. 1—Construction data for the focus coil to be used with the vidicon in the modification of the ATK-ATR TV camera. The end blocks are  $\frac{1}{4}$ " bakelite and the center tube is of  $2\frac{1}{2}$ " o.d.,  $\frac{1}{8}$ " wall bakelite.



Side view of the unmodified ATK TV camera.

After winding the focus coil, fasten it, together with the magnetic focusing potentiometer, to the case inside the large compartment vacated by the iconoscope. Slide the yoke into the focus coil opening so that the leads enter from the front. The focus coil circuit is shown in fig. 4.

## Circuit Modifications

For proper heater voltage on  $V_{107}$  and  $V_{103}$ , shunt  $R_{198}$  and  $R_{199}$ , individually, with two 36 ohm 1 watt resistors as shown in fig. 2.

Change  $C_{132}$  to a 120 mmf NP0 ceramic capacitor so that the horizontal oscillator runs

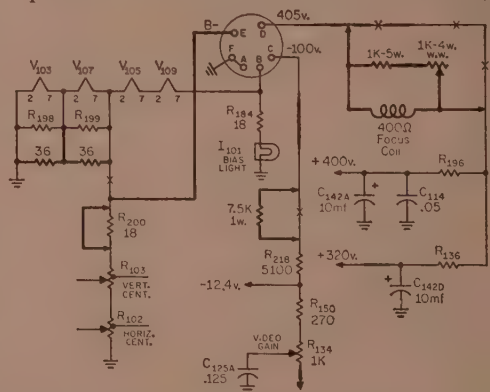


Fig. 2—Several of the modifications to enable operation of the ATK-ATR TV camera are shown above. These are the filament circuit, centering circuit, focus coil, minus 100 volt input and the bias light to be removed as noted in the text.

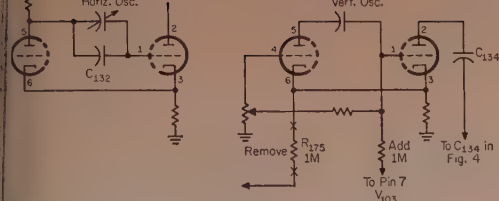


Fig. 3—Circuit areas of the changes required in the horizontal and vertical oscillator circuits to permit operation on the standard TV sweep frequencies, 60 and 15,750 cycles. Also shown is the removal of  $R_{175}$  in the keystoneing circuit and the vertical blanking line to be wired to the vidicon circuit.

at 15,750 cycles per second. This is shown in fig. 3. Inductance  $L_{115}$ , the master-oscillator coil, shown in fig. 4, is adjusted later to this same frequency by means of the monitor TV set. Bring the range of the vertical oscillator to 60 c.p.s. by wiring a 1 megohm  $\frac{1}{2}$  watt resistor from pin 1 of  $V_{111}$  to pin 7 of  $V_{103}$  as shown in fig. 3.

Short  $R_{200}$  and remove the wire leading from this resistor to the junction of pin 7- $V_{107}$  and pin 2- $V_{105}$ , at the tube end, and extended to pin E of the power socket as shown in fig. 2. Insert a 7500 ohm 1 watt resistor in the lead from pin C at the power socket to  $R_{218}$  also shown in fig. 2.

Fasten a 1 megohm variable resistor to the shutter relay bracket for vidicon bias. Ground one end of this variable resistor and wire the other end lug to pin C of the power socket as shown in fig. 4.

and blocking resistors by removing  $R_{101}$  (270K),  $R_{125}$  (330K), and  $R_{107}$  (470K) also shown in fig. 4.

The network which provides the focus and target voltage potentials for the vidicon is converted from the original bias-focus divider for the iconoscope. Remove the wire on pin 5 of the iconoscope from the lug (originally connected to  $R_{107}$ ), and fasten it to the top of  $R_{108}$ . From  $C_{109}$  to pin 4 of  $V_{105}$ , run a lead to supply the +318 volts required for the divider network. The resulting circuit is shown in fig. 4.

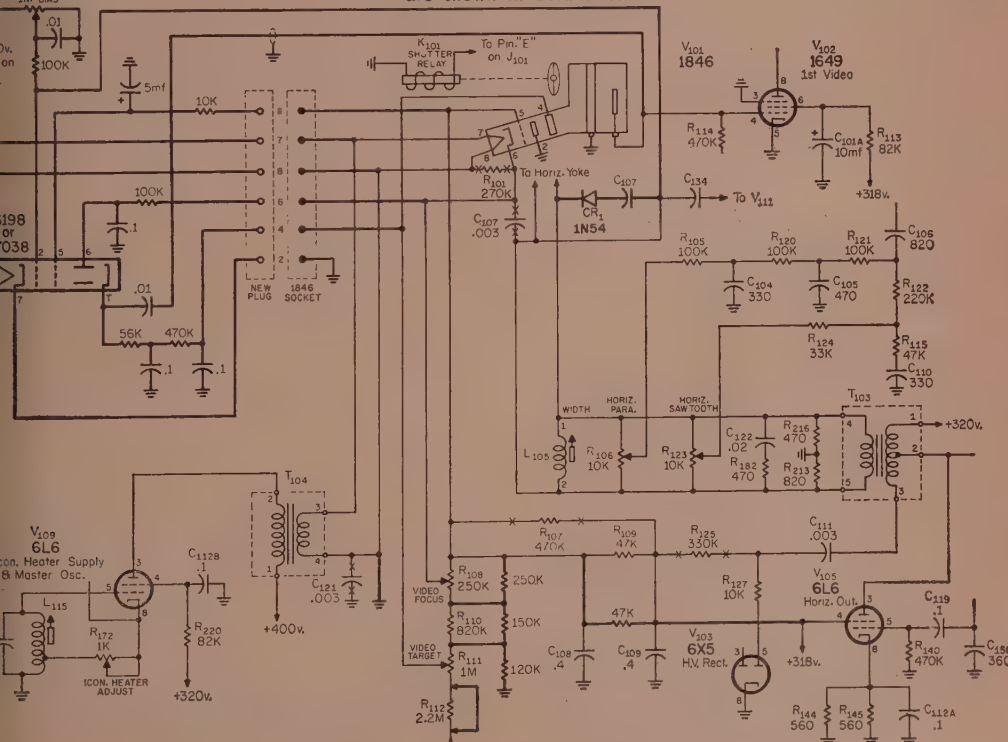
Shunt  $R_{109}$  with a 470K  $\frac{1}{2}$  watt resistor,  $R_{108}$  with a 250K  $\frac{1}{2}$  watt resistor,  $R_{110}$  with a 15K  $\frac{1}{2}$  watt resistor,  $R_{111}$  with a 12K resistor, and short  $R_{112}$ ; this arrangement provides the proper potentials for the vidicon.

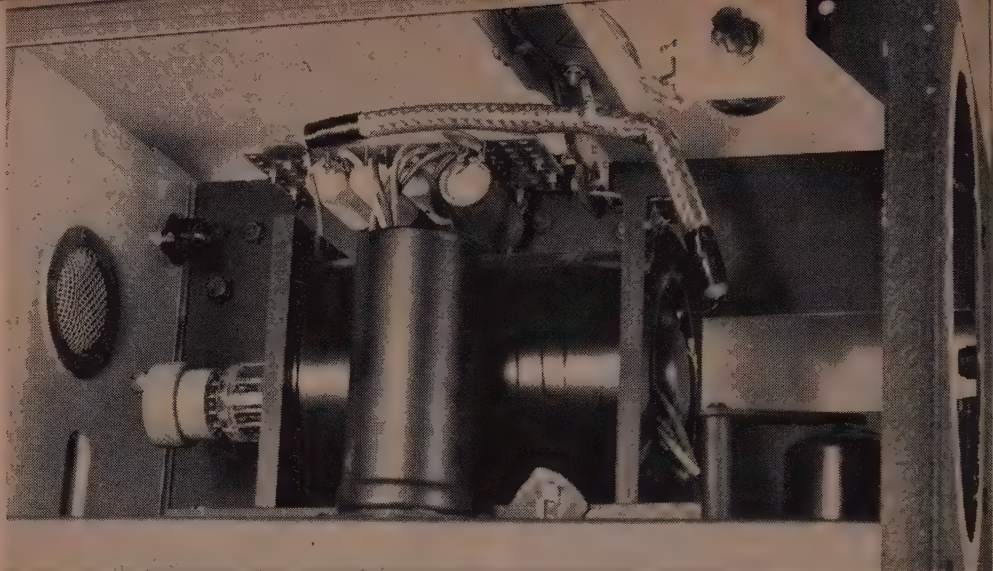
## Keystoneing and Blanking

The beam-landing characteristic of the offset gun in the 1846 iconoscope required a "keystone" circuit in the original unit which is not necessary for operation of the vidicon. This circuit is eliminated by removing  $R_{175}$  shown in fig. 3 and moving  $R_{137}$  (the 820K resistor in the horizontal discharge-tube plate) from terminal #2 to terminal #1 of the vertical output transformer,  $T_{102}$ .

Because the wire to pin 5 of the iconoscope also carries blanking, it is best to cut the wire at the output of  $C_{134}$  (in the plate lead of  $V_{111}$ ) and feed vertical blanking to the vidicon housing through a low-capacitance cable. This cable

Fig. 4—Partial circuit of the ATK-ATR camera showing the areas of modification discussed in the text. The changes are shown in bold lines.





Interior view of the vidicon compartment after modification. Mounted atop the rear wall is the terminal board described in fig. 5. The low-C cable may be seen connected from this board to the vidicon target. The bias potentiometer is in the upper right of the frame. The leads from the deflection yoke can be seen coming out of the front of the focus coil just below the vidicon camera tube.

can be made by pulling out the center conductor of a piece of RG-8 U cable and pushing a length of #30 wire through the plastic insulation.

Remove  $C_{107}$  (the 0.003-mf horizontal capacitor) from its original location (pin 6 of the iconoscope) and solder it between diode  $CR_1$  (at terminal #1 of the width coil) and the output terminal of  $C_{134}$ . Both horizontal and vertical blanking are fed to the vidicon by capacitive mixing.

Remove the lead at terminal  $D$  of the power socket and splice it to a high-voltage lead which is run through the chassis up to the focus coil. Feed another lead from the other side of the coil back to terminal  $D$ . The  $B+$  line current passes through the focus coil to provide the necessary focus field for the vidicon. Short  $C_{121}$  (the 0.003-mf capacitor at the output of the 6L6 master oscillator and heater supply). All changes in the chassis itself have now been completed.

### Vidicon Wiring

The focus coil and yoke are already in position; after installation of the bias pot has been

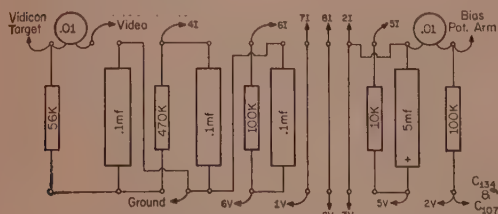


Fig. 5—Layout of the terminal board used to interconnect the iconoscope and vidicon wiring. All numbers followed by the letter  $I$  connect to the iconoscope socket wiring and all letters followed by the letter  $V$  connect to the vidicon socket. All resistors are  $\frac{1}{2}$  watt and all capacitors are in mf, 450 volts or better.

completed, make a small terminal-board layout of the filter resistors and capacitors for the vidicon as shown in fig. 5. Install this board near the vidicon. Make an adapter cable from six wires soldered to an 8 prong plug that has a base which matches the old iconoscope socket pins and solder this cable to the proper points on the terminal board. After connecting the vidicon socket to the same terminal board with a short cable, make a contact ring from shim stock for the vidicon target connector. Solder a wire from the target ring to the input of the first video amplifier shown in fig. 4. The iconoscope target clamp which is already in the vidicon compartment is a convenient terminal point for this connection.

The lens for this unit may be either a 35- or 16-millimeter simple camera unit having a suitable mounting bracket.

### Operation

The unit is prepared for operation by inserting the vidicon and turning the bias potentiometer to  $-100$  volts, the target voltage to zero, ( $R_{111}$ )

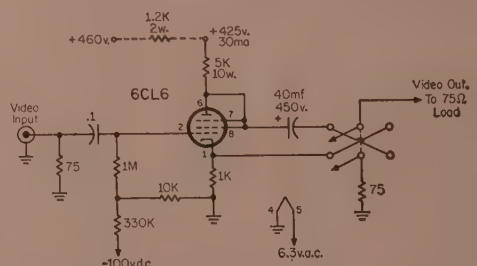


Fig. 6—Circuit of a simple amplifier stage that will permit phase inversion when necessary. All resistors are  $\frac{1}{2}$  watt unless otherwise noted.

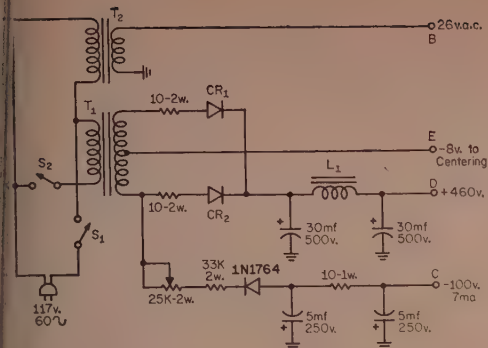


Fig. 7—The power supply circuit above provides all the necessary voltages for the ATK-ATR camera. The outputs are connected to the labeled pins of  $J_{101}$ , the power input plug.

CR<sub>1</sub>, CR<sub>2</sub>—Sarkes Tarzian 120-SM or equiv.

L<sub>1</sub>—4 h at 250 ma, filter choke. Stancor C-1412 or equiv.

T<sub>1</sub>—800 v. c.t. at 200 ma, power transformer. Triad  
R-21A.

T<sub>2</sub>—117 v. a.c. to 26 v.a.c. Stancor RT-201.

resistance, and the vidicon-heater resistor  $R_{172}$  to maximum resistance. Feed the video output through RG-59 U cable to a 75-ohm resistor in the monitor.

If a standard TV set is used for a monitor, it is not necessary to add synchronization, but if the signal is to be transmitted, synchronization can be added by placing an 80 mmf variable ceramic capacitor from the synchronization output to the video output jacks. Video polarity at the output can be reversed, if necessary, by using the simple phase inverter shown in fig. 6.

## Power Supply

Connect the power supply as shown in fig. 7, turn the heater supply on and allow sufficient time for warmup. Turn on the plate supply and check the high voltage at the camera end of the focus coil; voltage should be  $405 \text{ volts} \pm 2$ .

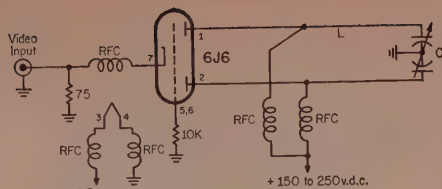


Fig. 8—This simple transmitter will radiate several hundred feet without an antenna. The B plus feed is to the center of L which is of #12 wire, 4 3/4" long, spaced 1/2". Capacitor C is a Johnson 5MB11. The r.f. chokes are 12t of #18 on a 1/4" form or Ohmite Z-436 chokes.

per cent. Adjust  $L_{115}$ , then adjust  $R_{171}$  until the picture locks horizontally. Turn up the video-gain potentiometer until definite signs of overdrive (tearing) appear on the monitor screen. Back the gain off  $\frac{1}{2}$  of a turn from this point. Turn down the bias until an image of the target area appears on the screen and adjust the electrical and magnetic focus for optimum results. Point the camera at a subject and turn up the target potentiometer until the image appears. Once again adjust the bias, mechanical, electrical, and magnetic focus and target until a good picture is received. Adjustment of the shading potentiometers will add a final touch.

During these adjustments, the heater of the vidicon is at a low potential; if best results are to be expected from this tube, the heater voltage must be set to 6 volts by connecting a vacuum tube voltmeter across the vidicon and turning  $R_{172}$  until the proper meter reading is obtained.

For "on the air" checks, a small TV transmitter such as the 6J6 oscillator shown in fig. 8 provides a radius of transmission of several hundred feet when used without an antenna.

When you have completed this conversion, you will find that your understanding of TV systems has been significantly increased. Also, you can enjoy the pleasures of seeing your self, your family, and your friends on TV. ■

# A D.C. Source From the PE-73

BY ALAN M. HANSEL\*, KØIQF

*This conversion of the PE-73 Dynamotor provides zero to 28 volts d.c. output when driven by a 1/2 to one horsepower gasoline engine or electric motor. It may also be used as a low voltage d.c. motor.*

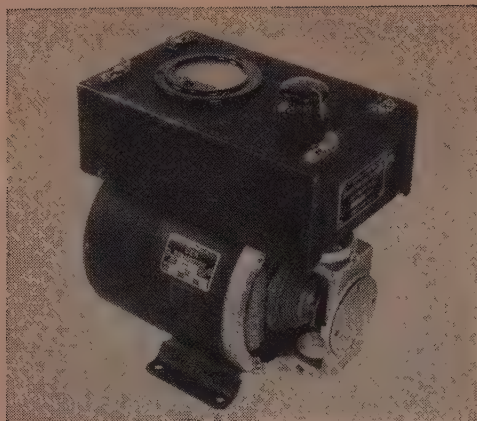
**H**AVE you been looking for an application for those useless 28 volt dynamotors? Can you use a low voltage power supply for field day, a battery eliminator for servicing mobile gear, or a battery charger? Then here is an easy and inexpensive way to fill your needs.

The conversion process consists of eliminating the high voltage function of the dynamotor, driving the converted unit with some sort of motor, and extracting the low voltage from the dynamotor

input. The conversion was done on several 28 volt PE-73s, but there is no reason why any dynamotor with suitable mechanical construction cannot be converted similarly.

The converted unit may be run with a 1/2 to 1 hp gas engine or electric motor, and easily turns out 28 volts at 20 amps, or 6 volts at 50 amps. The output voltage is continuously variable from 0-28 volts by the pot in the field circuit. Alternately, if you have lots of 28 volt d.c. around, the converted unit may be used as an electric motor, delivering about 1/2 hp at 5000 r.p.m.

\*1308 SE 7 Street, Minneapolis 14, Minn.



The original dynamotor consists essentially of a compound wound d.c. motor driving a d.c. generator. A common armature and field windings are utilized to conserve space. Since a d.c. machine may be used either as a motor or a generator, we will use the motor (low voltage) portion of the dynamotor as a generator in the converted unit.

Our aim in this conversion is to attach a V-belt pulley to the dynamotor so it can be turned with a motor. We also wish to provide a means of varying the generator output voltage. These objectives are easily accomplished and the conversion can readily be done in an evening.

### Pre-Testing

The dynamotor to be converted should be tested on 28 volts d.c. before beginning the conversion to make sure it runs. High voltage output isn't necessary since we won't use that anyway. Sad experience showed that a few minutes at this point would have saved considerable frustration when one of the converted units didn't work. If you don't have 28 volts available, use 12 volts since most of these 28 volt dynamotors will run, at least slowly, on 12 volts. Also when testing the unit, note the direction of rotation of the armature and mark it on the frame.

### Conversion

Remove all of the wiring from the junction box on top of the dynamotor. Take off both end covers and remove the four brushes. Remove the high voltage end framework which supports



View of the finished armature with the V-belt pulley and bearings mounted.

View of the converted PE-73 dynamotor. Note that the end support has been shifted 90° to clear a horizontal drive belt. The field rheostat in the junction box permits voltage output control from 0-28 volts.

the armature bearings, and take the armature out of the dynamotor. Remove the brush holders from the high voltage end. This completes the disassembly and brings us up to the mechanical conversion.

The armature revision requires the use of a metal turning lathe. However, it is not a job requiring precision machine work, and may be completed in about an hour. To protect the bearings, remove them from the armature shaft with a press or a bearing puller. Mount the armature in the lathe and cut away the entire high voltage commutator, down to the 3/4" steel shaft that passes through the entire armature, as shown in fig. 1.

After the entire commutator has been turned down, apply some varnish or shellac to the exposed insulation on the end of the armature to seal it against moisture penetration. Install a 1 1/2" diameter V-belt pulley in the space formerly occupied by the high voltage commutator. Press the bearings back on the armature shaft carefully. Install the armature into the dynamotor frame with the pulley at the high voltage end. Install a suitable V-belt on the pulley and put the high voltage end framework back onto the unit, but rotated 90° from its original position (heavy rib vertical). This permits the V-belt to be brought out to the side of the unit without interference from the bearing support.

### Wiring

Now look at the wires connected to the low voltage brushes. There is a heavy wire on each one, which is the generator output. Also there is a smaller wire attached to each of the brushes, at least to one of them, depending on the unit you are working with. These are the shunt field wires, and one of them should be removed. Splice a 12" piece of wire onto the shunt field wire that was just removed, and attach another 12" piece of wire to the brush holder that the shunt field wire was removed from. Pass the

[Continued on page 90]

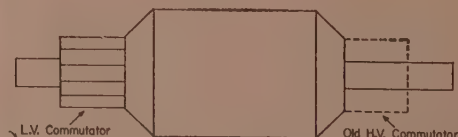


Fig. 1—Drawing of the armature showing the removal of the high voltage commutator which is cut away on a lathe.

# 1963 Armed Forces Day Communication Tests

ONCE each year the F.C.C. permits cross-band operations between selected U.S. military communication stations and the amateur radio fraternity. This event, by tradition, has been conducted on Armed Forces Day. On 18 May 1963 six military stations in the U.S. were selected for these tests. Each of the three sponsoring services, the Army, Navy and Air Force provided one station on the east coast and one station on the west coast. The east coast stations were WAR, NSS and AIR. The west coast stations were A6USA, NPG, and AG6AA. These stations operated on fixed frequencies outside the amateur bands and conducted the cross-band contacts with amateurs in the appropriate amateur bands from 181500 GMT to 190500 GMT with a break of one hour and fifteen minutes at 190245 GMT. The break was to permit special c.w. and RTTY broadcasts of messages from the Secretary of Defense.

During the twelve hours and forty-five minutes devoted to establishing contacts the six stations made 7,366 individual contacts. This far exceeded the performance of any previous year, and the amateur radio fraternity is to be congratulated for an outstanding demonstration of the military communications potential inherent in their chosen hobby.

Appropriate one-time commemorative QSL cards have been forwarded to each contact that could be identified in the Summer, 1963 edition of the *Callbook*. If you have not received your card for a firm two way contact you should contact the Armed Forces Day Contest, Room 5B960, the Pentagon, Washington D.C. for a clarification. Submit your call, station worked, time and frequency of the transmitting military station.

The messages from the Secretary of Defense were transmitted for competitive purposes. A Certificate of Merit has been issued to everyone who submitted a perfect copy of either or both of the messages. There were 654 perfect entries for the 25 w.p.m. c.w. message, and 583 perfect copies of the 60 w.p.m. RTTY message. Grading is completed and entries not considered perfect have been returned to the sender with an appropriate letter and explanation of the errors.

As always, some perfect entries were submitted without name, address or call. If you submitted an entry and have not received your certificate your entry may be one of those unidentified.

The following is the complete text of the c.w. message followed immediately by station or name of the award winners.

"Throughout this unsettled world today, thinking people are deeply and conscientiously concerned with ways and means of promoting unity and lasting peace between all nations. People who value a peaceful existence for themselves, their descendants and their fellow men cannot help but be concerned. The depth and gravity of their concern is reflected in the effort which they devote to promoting world peace and discovering expedient methods to that end. In your avocation of amateur radio each of you has a unique capability for promoting international goodwill. It is a capability which is informal and personalized in comparison with the sophisticated, formalized methods used in the higher levels of international diplomacy. Nevertheless, it is an important asset in the area of international relations which each of you should, in behalf of us all, use wisely and cherish highly. The ability to communicate spontaneously with fellow amateurs in foreign

countries makes you a spokesman, a representative of the United States, an ambassador *Pro Tem*. The mutual friendships and goodwill which you can collectively stimulate, promote and increase may well tip the balance permanently to the side of mutual understanding and lasting harmony between all peoples of the world. ROBERT S. McNAMARA, *Secretary of Defense*."

## C.W. Certificate Winners

**W1BDI**, BGW, BMW, CBT, CMI/MM, CMW, ECH, ELL, IIB, IUY, JNA, JOW, JPD, KMH, KQK, KQY, KYT, LZL, MC, MD, MEG, MIP, OPZ, QVK, SAD, SGU, SWX/1; WPR, ZAD, ZYO/6, K1AAA, GRS, NOW, QDN, RPZ, RYP, SDX, TEF, USN, YQZ; **W1HJP**; **KN1YRP**.

**W2BVE**, BXW, CLQ, CLX, GKZ, QGN, HQL, HX, JCA, JZG, LRW, IYH, MFB, MPM, MZB, MZV, PKY, RJ, RUK, RUZ, SKX, SWK, TAP, TUK, YJS, YQK, ZDD, ZMK, ZUX; **K2CJP**, DDE, EEA, EQP, JMI, JWD, LBB, MTD, QDG, SAV, UGZ, UTU; **WA2CKL**, DEX, EXP, FQW, IKT, KFT, KHV, KIP, MYS, NMK, OWQ, PFZ, SRR, TAF, TEA, TJA, TKL, TNT, VSQ, WJX, WKK, ZGP, ZPR; **WB2AAY**, AVK, CDB, DLW.

**W3ADE**, AX, BFF, BHK, BKE, BUR, CA, DZL, ECP, ELI, EOY, IRS, IVC, JHR, KGB, LCB, LIV, MCG, MGU, MNE, MWV, PIT, RKF, SCH, SXL, UQX, UYN, WZC; **K3CFR**, EZJ, GSH, HTZ, ILC, JSK, JSL, LYW, MCK, MNT, MTT, ODA, OTQ, OHR, OKJ, QXS, TLX, UPR, USH, VV/1; **AG3BA**.

**W4ABY**, ADY, AGV, AIY, ARH/6, CCC, CXV, EFV, FAS, FRO, GM, GNU, GPH, HOS, HWX, JJT, JJU, JLA, JRA, JYR, KPC, KH, KR, KLT, KYO, LYW, MHW, MKU, NPG, OBA, PCN, PQL, PUI, PVW, RRC, SLJ, SZZ, UUI, USA, VAH, VHX, WHK, WQO, YE, YPG, ZJO; **K4AO**, BAI, BP, BVD, DAH, FJH, GFL, HOE, JKK, KHT, LWL, NHR, SCT, WH, YRJ, ZSX; **WA4AGT**, CAW, CTZ, EMY, FRW, IJH, ISM, JVV, KPP, LUD, NDM.

**W5AFK**, AHC, ARI, AJG, BW, CCK, CCK, CEZ, CVF, DWB, DXX, FIV, HNF, MFX, MSX, NOP, QOX, QVZ, SQB, SYX, TZR, UPM, UY, ZU; **K5CAT**, GCK, JGZ, VQV, RRZ, SBT, SGX; **W5ACTW**; **A5ARK**, RCE; **A5BMI**; **WN5ERR**.

**W6AAQ**, ASH, AXV, BHG, CBX, CG, CGJ, CHL, CKU, CLB, CLY, CWF, DHX, ELT, FHI, FLW, FNG, FYW, FZC, GUO, GYH, HPE, IQ, KJI, KBT, KIT, MFH, MMG, MNN/4, MXO, NAZ, OFK, OJW, OWP, QIL, QQ, RDF, RGO, RXT, SAW, TDC, VHN, WPK, WNZ, WX, WXZ, YJU, ZF, ZLF, ZPX; **K6BPI**, DCF, DV, DYX, EA, EEZ, GK, GTP, GZ, HDI, IMJ, KUO, LKD, MTX, OGE, SWL, SXK/4, TTH, TWE, VCT, YJ; **WA6CFT**, CMK, DFW, DZM, ERU, FKN, HNZ, JSA, RGD, VGE, WMD, ZNY; **WB6BIG**, EUJ; **AA6CB**; **AF6B**.

**W7ADT**, ADY, BJY, DAN, DIS, DLR, EYF, FBP, FIX, FKK, FOS, FPP, HRM, JMH, JPN, JU, KG, LNG, LPM, MCU, NGV, NWK, PGY, REZ, RGD, SFF, SMR, SU, ZT; **K7BVZ**, EWZ, EXT, KJH, KYG, MTZ, NHG, NHV, OGU; **AA7NWA**.

**W8AHO**, APZ, BTW, CJN, CLX, CYN, DAE, DJD, DUW, FLA, FVP, GMX, FFK, FSR, HOW, HZA, IRN, JUE, KYV, LEX, MHP, MTI, NEM, NOH, OMY, OOK, ORP, PHM, QWE, QLI, RLR, SOU, TZO, YMP, YPC, YCP, ZEP; **K8AIR**, DDC, DIU, EEB, EQN, ERZ, HKU, ITH, JIC, KIR, LXI, QCU, RYU, VWM, WBC; **WA8BAQ/4**, DSB, ENO, EZW.

**W9APT**, ARM, BMJ, BRY, CHD, EGR, ELM/4, GSJ, FTO, HUZ, IDO, IFS, IMN, ITY/9, IXA, JAM, JOT, JYO, KCR, LRV, MIU, MWQ, NPG, ONI, QGQ, PNE, RGU, SZR, TGB, TI, VHD, VNN, WBE, ZEN; **K9ARW**, DHN, DHR, DOL, FOQ, ODF, GSK, IZD, KCO, NBH, QOV, UTQ, UUT, VPL/6, YMU; **WA9DHI**; **WN9GQC**.

**W0AH**, BES, BHA, FDJ, IJW, JHY, KIS, LJO, OKH, RGS, WWI, ZWK/6; **K0CST**, IHD, JPJ, JRU, KPU, RAL; **WA0DJG**; **A0CEC**.

**KH6AO**, BGW, BLT, BZF, DVD, DUV, EGF, ELW, EVU, FX, UK; **DL7JY**, 1IG0, VE2HY, 3BAQ, 5VV, 7JM.

R. S. Alcorn, S. Anderson, G. W. Arvidson, R. L. Aylsworth, G. G. Bachman, T. H. Badger, D. E. Baker, J. E. Ballard, G. J. Berger, T. L. Bever, F. C. Beyer, F. J. Billmaier, R. H. Blessing, O. C. Bonin, K. Brown, R. G. Brown, L. J. Bradshaw, R. M. Byrd, J. Cardoza, F. Carlson, H. R. Carlson, H. A. G. Castillo, G. R. Cason, E. A. Coleman, D. L. Daniel, G. Deebel, R. E. Davis, S. A. De Velvis, A. Dolack, Jr., G. O. Dunkle, A. L. Edmondson, F. R. Elliott, J. R. Engelhardt, D. L. Eskildsen, E. F. Fahey, Jr., D. P. Ferguson, R. L. Fish, J. L. Fissel, S. L. Fletcher, A. Fontillas, P. H. Furlough, J. K. Gaff, E. D. Garand, J. E. Garza, M. R. Haack, L. D. Hagan, J. W. Havery, H. G. Hayes, R. Herron, J. T. E. Hinkel, A. J. Holtzman, R. A. Hickman, G. O. Holum, J. A. Howell, R. A. James,

B. W. Johnson, J. E. Kelley, T. H. Kesinger, C. E. Key, J. C. Kilgore, W. A. King, J. L. Knight, P. D. Kroll, D. Kushman, L. Kwant, J. J. Lapham, Jr., K. B. Lawton, J. D. Laycock, C. R. Lewis, H. A. Long, Jr., M. D. Lyons, J. W. Massey, H. M. Matthews, Jr., F. E. Maughan, R. N. McCormick, C. W. Meeks, F. D. Miculka, J. F. Mikkelsen, D. W. Miller, L. Mohler, J. C. Moore, C. L. Myers, D. T. Nelson, J. L. Norman, R. G. Nunneley, R. Olivares, E. L. Parker, C. W. Parish, D. R. Peterson, A. D. Pinney, Jr., J. J. Rainey, H. J. Rausch, W. A. Rigling, Jr., W. H. Rigney, Jr., F. D. Robinson, R. M. Robinson, J. D. Rouse, K. Schroder, E. R. Seidler, G. A. Shaffer, M. Solomon, C. D. Spier, C. M. Stanley, C. W. Stout, W. S. Sullivan, D. M. Tripp, S. M. Udell, J. A. Ungari, J. Wegmans, L. W. Wheeler, L. R. Winchell, R. W. Woodard, J. L. Zimmerman.

The complete text of the 60 w.p.m. RTTY message is as follows:

"On this 14th anniversary of Armed Forces Day the Military Communications Services of the Department of Defense extend greetings to all amateur radioteletypewriter enthusiasts. Those of you who have built, assembled and are operating the equipment necessary to communicate by radioteletype possess a high degree of technical ability which is self evident. It is a technical ability which is born of the true pioneering spirit, an adventuresome spirit which is generated by an inherent individual desire to explore new horizons. In exploring, developing and adapting radioteletype communications for amateur use you have improved and increased your technical ability. In assisting other amateurs in this endeavor you have contributed to the technical advancement of amateur radio as a whole. depends largely upon the technical efforts of such people as you. It is you who will be the most versatile, who will contribute the most in communications emergencies. It is you technically proficient explorers who, by deed and accomplishment, will brighten the historical pages of amateur radio communications progress. ROBERT S. McNAMARA, Secretary of Defense."

#### RTTY Certificate Winners

W1BGW, FGL, GWW, JRV, KAY, KQY, LVWV, MCG, MEG, MFI, MX, OMN, OUG, SGU, TLZ, UHE; K1AAA, BIM, DVI, NAN, NNC, OCS, RPZ, USN, YZG; W1HJPF.

W2ABV, BVE, BWN, BXW, BZA, DLT, EW, EXB, FAN, GQN, IGX, ISK, JAV, LBO, LBX, LVW, MFB, MZB, NRO, OKO, ORX, ORY, PEE, TAM, SUC, SUH, UUI, VNW, ZMK; K2AJG, AMI, AXM, CUI, DDE, EQP, GYX, HAC, TJU, MAT, MTW, OWC, OWD, OYW, RJF, SDR, SQL, YQZ; W2ACKL, ELE, GSV, HOH, IKL, KFT, LKF, PFN, WWF; W2BDT, CVN; AA2HOS.

W3BBV, CA, CRO, DJZ, DTH, GUS, HIX, IDO, IZT, JNE, JRV, KMH, KQE, MHD, MWV, NNV, NSI, TDU, UCV, UDG, VVP, VYV, YC, YRB; K3ADS, BEG, BHK, CES, CKB, DDW, ECF, GGO, HGM, IDO, IQQ, JSK, KVS, LLI, MYW, QBA, UPR, ZVJ; A3Eov, SKL; AA3HJL; AF3KNH.

W4AIS, AIY, AVY, BOC, CAL, DDQ, DYE, EBH, FJ, GJY, HAG, HHH, IAA, IET, IPL, ISM, KH, KLT, KR, KZF, MDS,

NTK, NZY, OSC, RDE, RHZ, RWM, TQD, UFQ, ULM, UNA, USA, VEY, VHX, VUE, WQQ, YPG, ZZV; K4DIO, EID, HAO, HNT, IKK, JJK, JXG, MKO, MKQ, PAN, LQH, TGZ, TKU, UMK, VYX, YTB, ZSX, ZVQ; WA4AOM, BDB; A4BCO; AA4CEK; OHL; AD4DQD.

W5AJG, ANH, BHO, DKK, DMM, EDZ, EUT, FCP, FHW, HCS, LDJ, LKH, QJD, SQB, TBV, WUU; K5BQA, BTZ, CIL, DNH, JIC, LEF, LFS, MBB, OMQ, RAV, RDP, SGX, UY, VHM, YWX, ZNG; AF5HKW; KN5UWE.

W6ACN, AXV, BEG, BHZ, BIK, BNO, CAL, CBX, CEM, CG, CUV, DHX, DNJ, DOU, ECP, EFM, EGZ, FLW, FYZ, FZC, GEB, GGC, GYH, HKB, HTS, HXQ, JOZ, KNI, LDG, LFF, LKU, LX, MAP, MTJ, MZO, NSS, OWP, PRY, PSW, QID, QKN, RGG, RMM, SCQ, SYI, TDC, TPH, UGA, VVE, WLI, WPF, ZVV; K6ARR, BPI, CCJ, CUO, DX, DYX, EER, EPT, ESZ, FDD, GXT, GZ, HWL, IBE, ITY, JDN, JWS, KFF, LK, MDD, MYH, OEH, OWQ, QKY, QMJ, QVY, RBB, SBL, SEA, SZ, TEN, UCT, WBC, ZVC; W6AGMP, AVJ, CDV, DZM, FKN, GHK, JSA, JXW, LZB, MQL, MRK, NDZ, OKR, PDQ, PLV, SWA, VGE, VYR, YOI, YZO, ZCA; W6BAGO, CTR; W6AGM; A6AEE, ASH, CGG, NQH, PDD, USA; A6AET, SHZ; AB6USA; AD6DFT; AFA6ZYU; AFB6FIX, LUM.

W7AUK, BEG, CTK, EQU, ESN, FEN, FKK, FPH, FQW, GHS, GPT, JMH, JNS, LI, LNG, LPM, MCU, MEV, OHI, PGY, PHG, PRG, RGD, SMR, SCT, TYR, VPH, VZX, ZT; K7DPO, IAP, LRK, LRX, NKH; A7MUS, PBV; AB7WAF; AF7CGA, EXF, JWF.

W8AIC, AYY, CLX, CMH, CRY, DIE, DPW, EMO, FEU, FEY, GMX, HPR, IMK, IND/2, KJK, KXD, LBI, LEX, LGL, MGG, MTI, NIY, OMY, PHD, QCU, QWE, SWC, TY, VMP, YFX, ZCK, ZEP, ZYW; K8AIR, AIZ, CHL, CLX, CTI, DXB, EJI, ENX, FCI, FVP, HTS, IPM, INR, JHA, JIC, JON, LGL, LXJ, RJL, SOE, SXE, WNE, YCQ, YEK, YFV, YIF, YJQ; WA8GWC, TZO; A8GKN.

W9BMJ, CUW, DGV, EPT, FAA, GDW, GSJ, HRH, ITY, LNH, ONI, PFK, PUU, RCU, TVN, UMG, WBE, WKM, WMR, ZGC; K9BRL, CCX, CMX, DOL, EHP, EYY, MVJ, OJQ, PRD, QYY, RHD, SQV, UHR; AA9FPZ.

W0AJL, AUS, BBA, BDZ, BHA, CHV, DEL, EKJ, FAH, HAH, HVA, HYY, JHY, JQK, KIS, LEH, LOV, OKH, RWG, RWH, SYN, TUB, UMG, WVN, YTO, ZFN; K0CGP, CZO, FLK, GXL, HZO, IEB, IQR, MAL, OXK, OYI, PHD, YWT, ZQD; AFA0HLC; N8AQJ, ATZ, RQR.

J. H. Barnes, O. C. Bonin, U.S.S. Boston, D. R. Cason, COMCRUDESLOT 3, C. F. Cook, Base Comm., 29 Palms, Calif., A. Dolack, Jr., W. H. Elkerton, E. F. Fahey, Jr., W. A. Farnsworth, A. J. Fulkerson, D. J. Goodman, M. R. Haack, H. Hammer, G. R. Hermansen, J. E. Hicks, III, H. L. Holton, D. Hoyt, J. J. Humphrey, Jr., J. P. Humphreys, III, J. D. Laycock, P. T. Menadier, D. Mendoza, N. G. Newnham, NAS, San Diego, Calif, NRSQ 4-6 USNRTC, R. Olivares, T. M. Pfeiffer, H. Phillips, III, M. W. Reisen, C. E. Roberts, Jr., J. D. Rouse, E. R. Seidler, M. H. Smith, R. B. Smith, M. Solomon, J. E. Stewart, S. M. Udell, L. R. Winchell, Jr., H. W. Zuelke.

If you did not receive the one time QSL card or missed one of the certificates, plan now to participate in Armed Forces Day next year. Plans are already underway for 1964 and it is hoped that the amateurs will once again demonstrate to the world that they can provide the necessary backup for our nation's communication needs if and when their services become necessary.

## A V.F.O. Adaptor

THE less-expensive kit transmitters commonly use an octal tube socket for crystal and v.f.o. input. Ordinary FT-243 crystals easily fit the socket, their pins having a spacing equal to "every-other" octal pin. The v.f.o. output, usually being coaxial, poses a problem.

The amateur can wire coaxial cable into an octal plug, but then it becomes difficult to use the v.f.o. with different model transmitters.

Few amateurs know that the spacing from the center pin of the SO-239 (Amphenol 83-1R) coax receptacle to any of its four mounting holes is very near the 0.485 inch spacing of crystal pins. Thus, two stiff pieces of bus wire can be soldered directly from the center and one mounting hole of the coax receptacle directly into an octal plug such as the Amphenol 86-CP8.



Soldering to the pins of the octal plug will require much heat or will require internal pre-tinning. A solder pot made of an inch-long piece of 1/4 inch copper tubing (pinched closed at the bottom) makes the job easier. Either gas flame or a heavy soldering iron (100 watts or more) will heat the "solder pot" nicely.—WA2ANU

The Workman Model BX125 Transverter. It supplies 125 watts of 117 volt 60 cycle a.c. from a 12-volt d.c. source. The power line cord is equipped with a cigar-lighter type plug for convenient installation directly into the lighter receptacle of a vehicle.



## CQ Reviews:

# The Workman Model BX125 Transverter

ONE of the most useful devices is one which may be plugged into the battery system of an auto, boat or other vehicle to supply power for a.c. operated equipment such as amateur, Citizen Band and Civil Defense gear, grid dippers or other test equipment, portable a.c.-d.c. radios and TV sets, record players, tape recorders, p.a. systems, electric shavers, soldering irons, trouble lights, *etc.*

One such device is the Workman Model BX125 Transverter, a transistorized d.c. to a.c. converter which supplies up to 125 watts of 60-cycle 117-volt a.c. power from a 12-volt d.c. source. It is a completely assembled and wired unit, ready to go simply by plugging it into the lighter receptacle of a vehicle.

The Workman Transverter uses a d.c. switching system employing four power transistors (2 each in parallel) in a common-collector circuit. The transistors are mounted on the sides of the sturdy case which provides a heat sink for them and positions them to take advantage of some degree of air cooling. Two controls are provided. One is an ON-OFF switch, the other is a load adjuster, use for which will be shown later. The d.c. line power cord is equipped with a cigar-lighter type plug and a standard type a.c. outlet is mounted on the case.

### Installation and Operation

The input-power plug for the unit is wired for a negative-grounded 12-volt battery system, but if the positive side of the battery is grounded instead, the plug connections may easily be changed accordingly, by simply reversing the removable leads from the plug. Both the plug and power leads are marked for polarity, so no mixup as to their identity should occur.

When a device of this sort is plugged into a lighter receptacle, a good electrical connection should be assured by making certain that both the receptacle and the plug contacts are clean and fit tightly together. Failure to do this may result in burned contacts, resulting in poor efficiency especially if the equipment is used con-

tinuously over long periods of time.

After the a.c. equipment is plugged into the Transverter's a.c. outlet, the load control is set to position 3, the lighter plug on the d.c. power cord is inserted into the lighter receptacle and the power switch is turned on. If the a.c. equipment does not function properly, as could be experienced with recorders and record players running at the incorrect speed, the load control must be adjusted for best performance. When light bulbs are used, it is adjusted for their maximum brilliance. This control varies the a.c. frequency and the output potential slightly.

### Performance

One of these units was operated for an hour using a maximum continuous-rated load of 125 watts. No excessive heating of the transistors was experienced. With this load an input of 13 volts d.c. was needed to produce 115 volts of a.c. output, while 12 volts input resulted in 105 volts output. Smaller loads will produce a higher output for a given input. In this connection, it might be well to point out that to avoid running down the battery with heavy loads, the motor should be turned on, where possible, to keep recharging the battery, during which time the potential will be 13 or more volts. The no-charge amount, of course, will drop down to near 12 volts.

Operation was found satisfactory with reactive as well as resistive loads. Efficiency averaged near 80%, depending on the magnitude of the load. Intermittent use with a 150-watt soldering gun produced no deleterious effects. Reception with a communications receiver was found to be quiet and free from power-supply interference as otherwise experienced with some systems.

The size of the Model BX125 Transverter is  $5\frac{1}{4}'' \times 5'' \times 3\frac{1}{4}''$  and it weighs just slightly over four pounds. It is moderately priced at \$29.95 and is manufactured by Workman Electronics Products, Inc., P.O. Box 5397, Sarasota, Florida.—W2AEF



Lil Lulu is a small and neat a.m.-c.w. 6-meter transmitter with a v.f.o. A built-in power supply operates either from 117 volts a.c. or 12 volts d.c.

## CQ Reviews:

# The Lil Lulu 6-Meter Transmitter

**A** FEW years ago Ed Ladd, W2IDZ, designed and built a compact low-powered a.m./c.w. 6-meter transmitter which had a number of nice features for varied applications. It was not long before other 6-meter enthusiasts, seeing the results obtained with W2IDZ's unit, built duplicate rigs and, in a number of cases, their construction became club projects. Ed had no special name for identifying the transmitter; however, it was soon known as Lil Lulu, since those who used the device so often remarked, "She's a lulu!"

The success and popularity of Lil Lulu prompted the Whippany Laboratories, Inc. to manufacture similar units. In addition, the manufacturer decided to produce them as high-quality pieces of gear.

Lil Lulu features the following: v.f.o. covering the entire 6-meter band; regulated plate and heater potentials for v.f.o.; driver and final

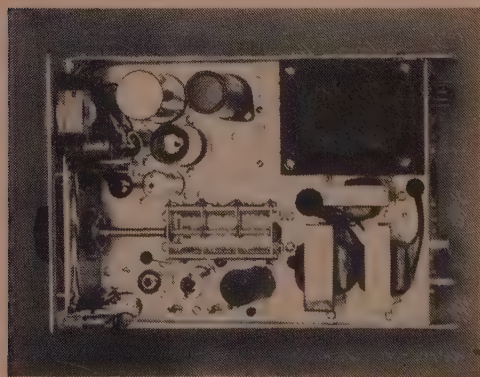
gang-tuned with v.f.o.; 5 watts carrier output on a.m. (20 watts p.e.p.) with 6 watts on c.w.; low-pass output filter; plate modulation; c.w. keying with wave shaping; self-contained power supply for either 117 v.a.c. or 12 v.d.c. operation; two-stage mic amplifier with either carbon or crystal mic input with push-to-talk provision; antenna changeover relay; output meter; power outlet with muting circuit for separate receiver; small size—ideal for fixed or mobile station use and is ruggedly built with the highest quality components obtainable.

A block diagram is shown in fig. 1. The v.f.o. uses a 6BH6 pentode electron-coupled oscillator, the plate section of which doubles into the 50 mc band using a broadly tuned circuit. This is followed with another 6BH6, an amplifier/buffer, which drives the final to an output of approximately 5 watts. An unusual feature is that the v.f.o., the buffer and the final are gang-tuned together, thus eliminating the need for retuning as the frequency is varied. Regulated B plus and heater potentials are used for the v.f.o.

The final amplifier is link coupled to the antenna circuit through a series-tuning capacitor which serves as a loading control. Another feature is the inclusion of an excellent low-pass output filter to minimize the possibility of TVI.

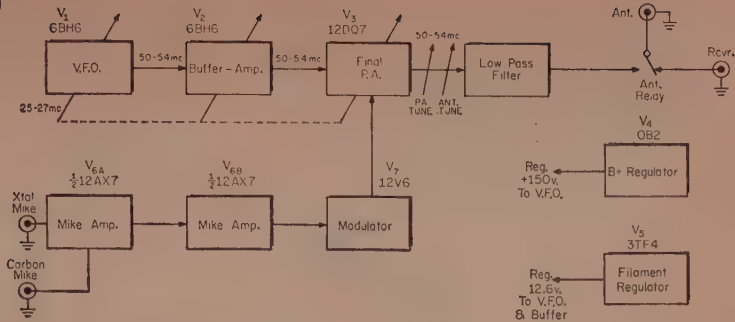
A changeover relay switches the antenna to the transmitter or to a coax receptacle on the rear apron for receiver use. A standard type PL-259 connector is used for the antenna and a type BNC is used for the receiver connection. The two different type connectors make it easier to identify the desired one, especially with mobile installations where it often is necessary to feel around in the dark for the right terminal.

For a.m. the final is plate modulated by a single 12V6 which is preceded with a two-stage speech amplifier consisting of both sections of a 12AX7 dual-triode. Two mic jacks are provided. One feeds directly to the grid of the 1st



Top view of Lil Lulu. Note the neat layout. The three-section variable capacitor tunes all stages together with the v.f.o., eliminating the need for retuning with frequency changes. The power transistors, for 12-volt d.c. operation, are in front of the power transformer.

Fig. 1—Block diagram of Lil Lulu.



a.f. amplifier for use with a crystal or high-impedance dynamic mic. The other jack is for use with a carbon mic and is connected in the cathode circuit of the 1st stage from which current also is obtained for the carbon unit. Both jacks are the three-way type and provide push-to-talk operation with the mic button.

The cathode of the final is keyed for c.w. A wave-shaping circuit is used which improves the keying characteristics and eliminates key clicks which might otherwise cause TVI on adjacent channels. The key jack is located on the rear apron.

A frequency-spotting switch enables the operator to "zero-in" on frequency without swishing a signal over the band on the air. A panel meter indicates the transmitter output and so is used during tuneup.

The built-in power supply operates from either 117 volts 60 cycle a.c. or 12 volts d.c. When a.c. is used, the line power is fed directly to primary No. 1 on the power transformer. For 12-volt operation the d.c. is converted to a.c. by means of a transistorized switching circuit and is fed to primary No. 2 on the transformer. Two separate power cables are supplied, one for 117 v.a.c., the other for 12 v.d.c. With the latter, either a positive or negative grounded system may be used, for which the interconnections on the cable plug must accordingly be made. Power for a separate receiver also is available from a rear apron receptacle and is transferred between receiver and transmitter through auxiliary contacts on the antenna relay.

### Operation and Performance

Lil Lulu is easy to tune up. This is done for a maximum output reading on the meter, after which the transmitter is ready to go on any frequency to which the v.f.o. is set. Tracking of the ganged circuits is remarkably close, with constant output maintained as the v.f.o. is tuned across the band.

With a.m., the setting of the panel gain control determines the percentage of modulation. There is no sure method for checking the degree of modulation, although the instructions specify the mic level to be raised to the point where the output meter starts to flicker. It was found that considerable over-modulation was required before the meter responded noticeably. With a crystal mic the gain setting will be around 9

o'clock. In any event, it is best to check the modulation level with an oscilloscope.

Such visual observations indicated that the modulated r.f. envelope tended to square off above 90 per-cent modulation; however, splatter was not noticeable at the 100 per-cent level where the a.f. quality sounds clean, is pleasant and carries a good punch. The carrier output was measured about 15% lower than the manufacturer's rating.

C.w. keying produces no sign of key clicks, but some keying chirp was evident.

As far as drift is concerned, the frequency stability was found to be 3 to 5 kc (depending on the starting ambient temperature) for the first 15 minutes of operation and approximately 1 kc per hour thereafter, this being close to the manufacturer's specification. Subjecting Lil Lulu to vibration indicated frequency flutter which would not be of serious concern with a.m., but might be objectionable with c.w. during mobile operation.

When 12-volt primary power was used, it was found that performance did not equal that ob-

[Continued on page 95]



Bottom view of Lil Lulu. High-quality components are used throughout in an easy-to-reach arrangement. The r.f. stages are shielded from one another. The v.f.o. section, which has its bottom cover removed, is at the upper right. The low-pass output filter is in the lower right section.



The Knight-Kit LC-1 code oscillator and transmitting key which is supplied with it. A three-position switch provides selection of loud speaker (at the left), blinker light (at left above switch) or jack for headphones (at right above switch). A label with the code characters is pasted on the side of the case (foreground).

## CQ Reviews:

# The Knight-Kit Model LC-1 Code Oscillator

**K**NIGHT-KIT® has come up with a real nifty little code-practice oscillator in kit form, their Model LC-1. It is especially designed to aid aspiring amateurs, scouts, students, hobbyists and short-wave listeners in learning the International Morse Code.

Its advanced design features a two-transistor circuit with economical operation using a single "C" size flashlight battery, a tone control, a built-in loud speaker which provides sufficient volume for group practice, a phone jack for use with any high-impedance headphones and a code-flasher light. Selection of speaker, phones or light is made by a three-position switch on the panel. In addition to this, a professional type adjustable key is included.

Assembly of the kit requires from two to three hours and may easily be accomplished by even the neophyte when the easy-to-follow instructions, as set forth in the assembly manual, are used together with Knight-Kit's usual means for readily identifying components.

After the unit has been wired and the work carefully checked over, no difficulty should be encountered in getting it to work. The only adjustment required is that of a variable internal tone control which is set for the best stability at the most desired tone. A moderate range of

tone selection may be obtained with adequate stability.

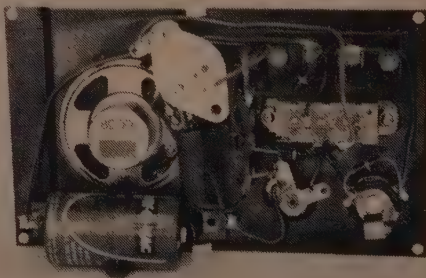
## Performance

In operation the LC-1 functions nicely with clean keying characteristics, pleasant tonal quality and excellent volume resulting from the use of a power-type output transistor. The key is adjustable to fit the operator's touch. In this respect however, it was found that the minimum spring tension was too great for the light-fingered user. This was corrected by removing the spring and compressing it all the way before re-installing it. Better latitude of adjustment was then obtainable. It will also be well to screw the key to a base of larger area to stabilize its position during use.

The use is attractively styled with a two-tone panel of charcoal and light gray which is mounted on a black plastic case on one side of which is pasted a label with the Morse Code characters for ready reference. The size is  $6\frac{1}{4} \times 3\frac{3}{4} \times 2$ " making it possible to carry the unit in a coat pocket. Weight is only 1 lb.

The Knight-Kit Model LC-1 Code Oscillator sells for \$7.95 including battery, lamp and key. It is available from Allied Radio, 100 N. Western Ave., Chicago 80, Ill.—W2AEF

Interior view of the Knight-Kit LC-1 code oscillator. The power transistor is to the right above the speaker. To the right of the battery are the lamp socket and the phone jack.



# IQSY—The International Quiet Sun Year

BY D. R. HEARSUM\*, W8LUZ ex G2HLP

*Scientists and the amateur fraternity plan to make the most of the period of minimum solar activity—the sun spot doldrums.*

THOSE of you who followed or were active in the scientific work carried out during the IGY—International Geophysical Year—will be interested to learn that we are about to witness another “International Scientific Spectacular.” Scientists of some 36 nations will take part in geophysical research during 1964-65, the “International Year of the Quiet Sun” or IQSY.

Our hobby, high frequency communication, has a spicy element of chance which is forced upon us by solar flares and the resulting sun spots. As you know, these solar activities occur in dual 11 year cycles, each originating in a different hemisphere of the sun. In 1964-65 it is predicted that we shall be experiencing a minimum of solar activity as shown in fig. 1. These

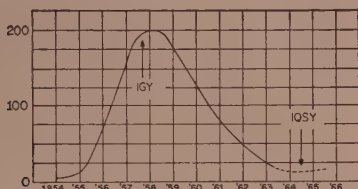


Fig. 1—A plot of Sunspot Cycle 19 based upon smoothed sunspot numbers from the Zurich Observatory.

predictions led the Geophysical Committee of the International Council of Scientific Unions to propose a program at its 1961 meeting in London, England. The proposal has resulted in the IQSY. In a letter to Dr. Alen T. Waterman, Director of the National Science Foundation, President Kennedy authorized United States participation in the IQSY. The National Academy of Science—National Research Council is developing the United States plans for the IQSY in cooperation with the National Science Foundation.<sup>1</sup>

Amateur radio has contributed handsomely to our ability to communicate internationally. We hams strive to understand and use some of the atmospheric conditions which permit us to communicate reliably, or fold up our tents and

quietly steal away. Until recently, and certainly without our experimental efforts, it would have been practically impossible for man to consider undertaking such vast international scientific programs as the IGY and now the IQSY. Indeed, our own United States programs of upper atmosphere research, charting the oceans, or even studying the wild life in the Polar regions are only achieved safely and with the aid of fast, reliable communication. Let us have a look then, at some of the things which will take place during the year of the quiet sun. We will also try to see where amateur radio might again participate, if only to permit those far from home to talk to their friends and relatives stateside.

Quoting Dr. Waterman: “The program calls for observations in the disciplines of solar activity, geomagnetism, aurora and airglow, ionospheric physics, cosmic rays, space research, meteorology and aeronomy.” Right away we can guess that there are areas where the ham may be “on call” for some of these phenomena. The v.h.f. gang, for example, may even have an Oscar in orbit just when and where needed during a sprightly session of air glow and aurora!

## Plasma

Another specific study is—determining the state of the interplanetary medium during solar minimum—any volunteers to take a low powered rig on a space probe? Scientists refer to the interplanetary medium between the earth and the sun as plasma. Plasma exists in all regions where the gaseous or corpuscular matter is in an ionized state that is, there are free electrons in the medium. This is a condition which can be produced in the laboratory in a neon tube, for example. Plasmas in the solar system can be relatively static or can consist of matter that is rapidly changing its shape or drifting in a known direction. The “solar wind” is a case of drifting particles, drifting at great speeds. The Mariner space probe sensed a solar wind drifting at some 250 miles per second.

If we should take an imaginary voyage from the surface of the earth to the sun, we would find that the interplanetary plasma undergoes rapid changes near the surface of the earth and again as we approach the sun. These changes of temperature, ionization (electron density) etc., are shown in fig. 2. A great deal more is known

\*8981 Cloy Road, Dayton 59, Ohio

<sup>1</sup>Each participating country in the IQSY has its own coordinating body. Reports and requests for additional information should go to: IQSY, National Academy of Sciences, 2101 Constitution Avenue N.W., Washington 25, D.C.

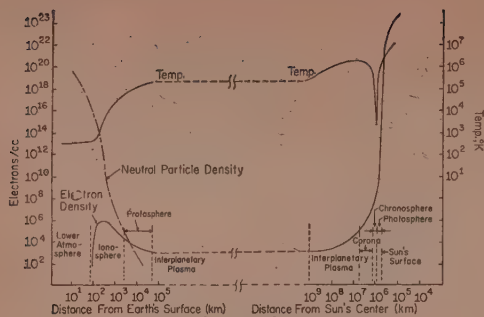


Fig. 2—Charts indicating the characteristics of the plasma between earth and sun. After Bochynski, IRE Proceedings, December 1961.

about the state of the region close to home, namely the lower and upper atmosphere, the ionosphere and the more remote protosphere, than the rest of space. At the other end of our imaginary trip, as the sun is approached, we reach the sun's corona, the chromosphere, the photosphere and finally the fiery surface. Actually, it is the activity here, in this remote area, which causes many of the effects observed in the plasma close to the earth. During the IQSY, records will be made of the spectrum of radio bursts from the sun and will be used to study the density of electrons in the sun's corona. Every effort will be made to determine the energy level of solar ionizing radiations that influence the content and consistency of the middle atmosphere and in turn our radio propagation conditions. In other words the interaction between electromagnetic waves and the plasma close to the earth drastically influences our communication circuits.

### Radiation Belts

As you know, the Van Allen and other radiation belts have been discovered more recently. The Van Allen belts are particularly interesting because they consist of radiation from the sun which has become trapped due to the deflecting forces of the earth's magnetic field. They give rise to huge circulating currents in the upper atmosphere. These currents, in turn, could influence the earth's magnetic field. Very little is known about the interrelationship of these more recent discoveries and their influence on radio propagation.

And so you see such IQSY work as "mapping the earth's radiation zones for shape and density" may give some real clues to the conditions that either frustrate or please us when trying to raise that choice DX. Here, perhaps, we can only observe results, but who knows what propagation effects may coincide with the facts which the experts turn up. These experiments should spur us into better use of our log books—after all, we do a pretty poor job of recording the "conditions" which we observe and talk about so eloquently during our operating hours. Some logs could be very revealing, I'm sure, and could include notes about aurora, solar noise, or even

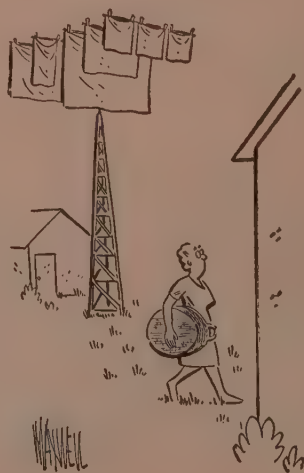
a successful v.h.f. scatter QSO. So let's jot down those unusual conditions as we observe them and then we can compare notes with the expected results as they are published.

### Observation Facilities

In most cases the United States IQSY program will use the data received from existing facilities and geophysical networks used since IQSY. These will be supplemented by the universities and other private institutions where the observations need to be stepped up. A small number of additional observation centers may also be set up for IQSY and we may well keep a sharp lookout for them on the air and perhaps offer amateur relay aid to these temporary outposts. In order to monitor the earth's radiation zones and their effects, observations will be made at magnetically conjugate points on the earth. For example, at posts near the poles, Alaska, Canada and the northern United States and corresponding locations in Australia, New Zealand and the Antarctic. At these and other observation posts workers will study whistlers at low and very low frequencies, and will provide an extensive radio noise network. Radio and radar will be used to measure temperatures throughout the radio spectrum.

Special research during the solar minimum will include observation of the sun from the ground, probably some balloon-borne solar telescopes, and, of course, rocket soundings. Spaced receiving antennas on the ground will attempt to detect solar flares not seen by optical means.

You must realize that these experiments are being carried out for the very first time in history when solar activities are truly becalmed in the doldrums. Let's not react with a literal interpretation of "IQSY" and all swarm into the lower frequency bands—let's stay put sometime and see what Ole Sol can do during his quietest years! A lot of learned people are about to help us find out!



# A Fully-Manual Time-Sequence Key

BY DAVID T. GEISER\*, WA2ANU

*This simple modification of a hand key permits independent keying of the oscillator and amplifier stages. It also provides a simple method for keying the oscillator only thus providing a means for zeroing.*

THE C.W. practice of letting the oscillator of a transmitter run continuously while keying the amplifier gives a good radiated signal, but makes receiving on the same frequency difficult. Keying both the oscillator and the amplifier at the same time may cause oscillator instability with clicks, chirps, and thumps. Time sequence keying turns on the oscillator first; after time has passed for oscillator short-term stabilization, the amplifier is turned on. When the key is lifted, the amplifier turns off first, followed by oscillator turn-off. Oscillator frequency instability just isn't transmitted.

The owner of a J-38 (or other) hand key can have the advantages of time-sequence keying at a net cost of less than a dollar.

The one requirement of time-sequence keying is that the oscillator reach stable frequency quickly. Almost all kit and commercial v.f.o.'s will do this. There should be no lag filter in the oscillator keying lead, though an r.f. choke and 0.001 mfd TVI filter is permissible. This lets oscillator frequency transients end quickly. Click filters, if needed, should be placed in the amplifier keying lead.

The simplest way to perform sequenced keying is to fit an ordinary key with an extra set of contacts (see photo) adjusted to "make" before the original contacts touch each other; the new contacts also "break" after the original contacts open at the end of a dot or dash. Use the new contacts to key the oscillator and the original contacts to key the amplifier, and you have a time-sequence key.

## Contact Source

The extra contacts may be made from old relay arms, though the contacts shown in the photograph were new and selected from the Guardian 200 kit of contact arms. One kit contains enough parts for at least two more keys (and possible four, using other mounting methods).

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

The accessory hardware on the J-48 key provides a convenient mounting for the extra contact arm. Note the solder at the crossbar of the arm to insure good connection for the movable contact.

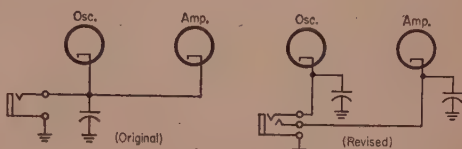


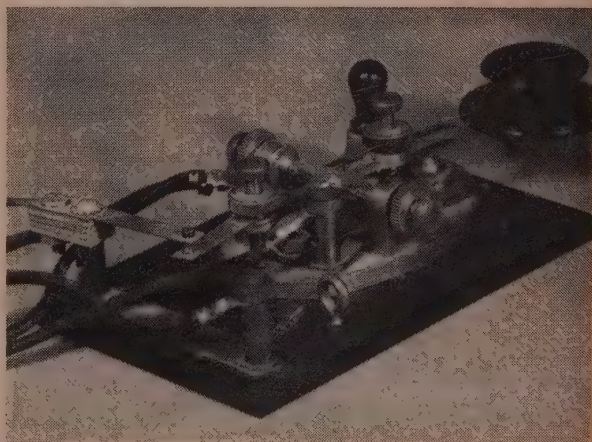
Fig. 1—The simple method of splitting the oscillator and amplifier keying circuits is shown above.

Only one precaution is necessary: Make sure parts are securely mounted to prevent mechanical shifting. The contact arm attached to the key lever is not only held in place by the "spacing adjustment" knurled bolt, but also is soldered to the key arm. The stationary contact arm is secured with bolts and lockwashers.

## Zeroing Provisions

Transmitters having oscillator and amplifier cathodes keyed with a single key may be "split" (fig. 1) by replacement of the single-circuit keying jack with a two-circuit jack. If this is done, it is suggested that the oscillator circuit be the first one reached by an inserted plug, so that partial insertion will permit keying the oscillator alone without also keying the amplifier; for zeroing-in and other use.

It should be noted that time-sequence keying will not eliminate chirp resulting from crystal heating in an improperly adjusted crystal oscillator. Such slow chirps is a sign of crystal overload, and the crystal is in danger. When in doubt, query the equipment designer for a recommended make and type of crystal. ■



# NAME THAT THING!

BY RAYMOND DE VOS\*, W2TAM

## SHADES OF WALTER MITTY

**A**FTER a good supper, as was my custom, I went into the living room to watch a few of the early evening TV programs. Comfortably settled in an easy chair, I could digest my food in peace to the accompaniment of the shrill voices coming from the TV and the rattling of the dishes in the kitchen. Normally, I would only stay for about one half hour, but somehow, on this particular evening I felt fuller than usual and the chair seemed cozier so I decided to extend my viewing period a bit . . .

And now, Ladies and Gentlemen, we present to you "NAME THAT THING," the show you have been waiting for. A program designed to keep you on the edge of your seat, test your ingenuity, your skill, your knowledge and your perceptiveness. Prizes? Yes indeed! Prizes such as you and I dream about. Now, in order to make it even more interesting, we are not going to announce the prizes until a contestant has won. And now a word about how this program functions. This week we have chosen from among a multitude of applicants three distinguished connoisseurs whom we consider the best informed in the field as our contestants.



" . . . Three distinguished connoisseurs . . . "

These gentlemen will be confronted with a piece of surplus equipment to be identified as fully as possible. If any contestant fails to recognize the equipment he will be eliminated, the successful contestants will go on to the next higher level, which means a better prize, but also a more difficult identification. In as much as we do not wish any unlucky contestant to leave empty handed we have consolation gifts. This is not a prize but a gift, which consists of a shopping bag containing fifty pounds

of self tapping steel screws with octagonal heads, as salvaged from the World War German aircraft industry. A mighty fine prize and one I'm sure all recipients will treasure and which will come in handy around the shack for various construction purposes. So on with the program!!!!

The contestants are seated at small tables each with his own microphone and a pad and pencil. A large polished table placed center stage serves as display counter for the equipment to be identified. Numerous spotlights are located strategically to give the best possible lighting. A hush descends upon the audience as a page boy in full dress uniform brings out the first piece of equipment and sets it carefully on the mahogany surface. He centers it carefully, removing in the process a normal amount of varnish, and his look of anguish is replaced by one of joy as he marches off stage. The announcer looks appreciatively at the equipment, black crackle finish with nice shiny screw heads, smiles at the audience and then turns to the contestants. "You will write your answer on the pad provided. When you have signaled that you are finished the page boy will bring the pad to me and I will read your answer aloud and then give the correct answer. If you fail to give the correct answer you may leave the stage and collect your consolation gift of the wings. Kindly identify the piece of equipment now on the display table and good luck. A few moments of intensive scribbling follow and finally the pads are in the hands of the announcer. He reads very solemnly, "Contestant number one, APR-1, hi frequency receiver. Contestant number two, APR-1 receiver. Contestant number three, ARC-27 transmitter." Ladies and gentlemen, the correct answer is AN/APR-1. Loud applause. Contestant number three gets up from the table very dejectedly and goes off stage to collect his gift. The announcer again says, "The prizes you have won are, first a bag of 1000 unmarked resistors; 100 two-inch drill bits used and may need sharpening and 100 lo washers." Everyone settles down after the first round of excitement and the next piece of equipment is brought in. Same routine is followed. "Contestant number one, MAR receiver Navy type, high frequency with power supply. Contestant number two, RDZ receiver portable only, no power supply except dynamotor, 20 to 390 mc, crystal controlled, can be used with MAR but is not an integral part of the inst

\*140 Summit Ave., W. Trenton, N. J.

tion. The correct answer is as stated by contestant number two, 100% correct." The announcer beams, the audience applauds wildly. It seems that the prize is a whole carton of 17½ volt dated surplus batteries, and something else. "Now, sir," turning to me, "you have won the following additional prizes a gift certificate for \$100 to be used at the Croyden ship breakers yard as part payment on some electronic gear the full price of which will be set by Croyden. Note carefully that any



"... the full price of which will be set by Croyden ..."

tendency to haggling may render this certificate null and void. Since you are the only remaining contestant you will give your identification directly into the microphone." Same routine as before only now I'm alone and I see the page boy arriving with something that looks like an AN/APA-6. He is wasting his time, baby stuff!! "And now ladies and gentlemen," I hear the announcer saying, "we come to the last and final award. Sir, if you win this time you will be without a doubt known as the most knowledgeable, best informed surplus hound in the United States. I might as well tell you that the prize will be a guided tour through every surplus store and yard in the fifty states and ten tons of electronic equipment and parts of your own choosing, freight prepaid. So now sir if you are ready we will begin with part one of this three part question." The page boy put a small olive drab rectangular box on the table. It had rubber feet, but when set on the rubber feet the handle was on the side instead of on top. Where had I seen this before? Let me think. . . . I took a stab. "This is a TS 47/APR, signal generator, 40 to 500 mc." I hear the announcer shouting the word, "Correct," and then I keep my fingers crossed for the next part. You know, it is getting tougher all the time. I look toward the table and see that the thing to be identified is not a complete unit, but a part of a unit. Well, let us see, it looks like something out of the ART-13, either the crystal calibrator or the speech amplifier. This is not too difficult, but I must not make a snap decision. Another look, oh yes, no crystal, well, here I go. "This is the speech amplifier from the ART-13 transmitter with driver transformer,

a plug-in unit with Dynamic or Crystal input." The M.C. corroborated this statement and loud applause and some cheers rang through the studio. "And now, sir," the announcer purred in his most unctious manner, comes part three. If you answer this one correctly the grand prize is yours. Good luck, and we are all with you in this final moment of supreme effort." You could feel the tenseness in the atmosphere; all was still as the page boy deposited the final "test" on the table. I looked and then my stomach hit bottom. What is it? A little black crackle container, round with three connectors, Amphenol size 18, I recognized, and two ears for clamping at the other end. It looks like something clamped onto something else with two large hand-tightened, probably knurled, nuts and three cables connecting to the other end. In my head the wheels were spinning furiously. I concentrated with all my powers and beads of perspiration came to my forehead. What is it? Faintly in the background I could hear the announcer urging me to say something since time was running out. All of a sudden, recalling some experience out of the past, it came to me. Of course, now I know, I almost shouted it, "This is a goniometer from the model DAQ direction finder made for the Navy. It attaches to the bottom of the scope indicator." The announcer could hardly contain himself. "Correct," he yelled, "absolutely cor-



"The announcer could hardly contain himself."

rect." Pandemonium broke loose, the audience went wild and the applause defied the sound-proofing in the studio. People rushed on stage to grab my hand, pat me on the back, or shake my shoulder. I was being congratulated, jostled, lionized, all at the same time; somewhere a bell rang. . . . . "Wake up, wake up." My wife had me by the shoulder and was shaking me vigorously. "Wake up, turn down that darn TV and answer the phone. Some guy wants to talk to you about radio. My heavens, with that TV so darn loud and the phone ringing, how can you possibly sleep with all that racket? You might also wipe that silly grin off your face. What's so funny anyhow? You might think you just won a prize or something!

# Diode Power Supply Calculations

BY E. H. MARRINER\*, W6BLZ

*This article explains how to determine the number of diodes needed for full wave and bridge circuit power supplies and discusses the selection of power transformers for use in bridge circuits.*

**M**ANY hams have damaged silicon diode rectifiers because they have exceeded their peak-inverse-voltage ratings. When replacing the rectifier tubes in a full-wave transformer type power supply with one diode in each side of the secondary, the p.i.v. rating *must* be taken into consideration to prevent damage. This article is designed to give a clearer understanding of how to arrive at the number of diodes necessary when building or modernizing an a.c. power supply.

Most of our discussion will be confined to 400 p.i.v. type diodes. Because of their price and availability, 400 p.i.v. diodes are most commonly used by amateurs. Let's see what can be done with these diodes in a full-wave type power supply.

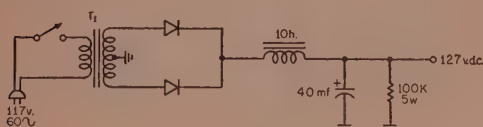


Fig. 1—The use of diodes in a full-wave configuration is shown above. With 400 p.i.v. diodes units the d.c. output is limited to 127 volts as explained in the text.

The use of one diode in each side of a transformer is very discouraging. The circuit of fig. 1, a simple full-wave rectifier, presents a peak inverse voltage to the diodes equal to the peak voltage of the full secondary. A little calculation will show that, with 400 p.i.v. diodes, the maximum allowed voltage across the full secondary is 280 volts r.m.s. This will provide a d.c. output of 124 volts, if you could find a power transformer with this low rating.

It is possible to increase the p.i.v. rating by connecting diodes in series. Thus the use of two in each leg would raise the total p.i.v. rating to 800 volts. However, these same four diodes can be used more efficiently in a bridge circuit. The transformer size will be smaller since the full secondary voltage needed is only half the voltage required for full-wave operation.

## Bridge Rectifier Circuit

Figure 2 is a typical bridge circuit that provides an output of 560 and 240 volts. A positive

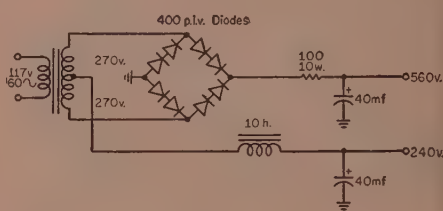


Fig. 2—A practical bridge circuit using 400 p.i.v. diodes. With a 100 ohm filter in the high voltage output, the peak voltage is approached rather than 482 v.d.c. that would be obtained with choke input.

output of almost one half the full output, 240 volts, is taken from the center tap of the power transformer secondary and used as a screen voltage supply. The eight diodes used each have a 400 p.i.v. rating. The current ratings of the diodes usually exceed that of the power transformer so the transformer current rating is the limiting factor. Actually the diodes can stand short circuit current up to 5 amperes for a brief period of time but they cannot stand an excessive peak inverse voltage at all.

## Power Transformer

When we use a power transformer designed for full-wave operation in a bridge rectifier circuit, theoretically, the available current is reduced to about one half that of the full-wave rectifier. This is because any increased power drain in the secondary circuit is reflected back to the primary where there will be a corresponding increase in current. This may overheat or burn out the primary winding. To illustrate this more fully, consider a transformer with a high voltage winding of 600 volts r.m.s. center tapped at a 100 ma rating. In a full-wave circuit this transformer will produce a d.c. output of 270 volts. If the full 100 ma is drawn we dissipate 27 watts. ( $W = E \times I = 270 \times 0.1 = 27$  watts). Place the same transformer in a bridge circuit and we will get an output of 540 volts. If we still draw 100 ma, the power dissipated will be  $540 \times 0.1 = 54$  watts. This will double the primary current.

For practical applications the bridge rectifier will operate at almost the full transformer current rating for several reasons. First, replacement transformers are designed for continuous operation. C.w. or s.s.b. operation provides

\*528 Colima Street, La Jolla, California

shorter duty cycle thus reducing the average power. Also, by using a choke input filter, the output voltage will be reduced, thus increasing the amount of available current. Since the 5 volt filament winding is not used, this power saving is also transferred to the high voltage winding.

Generally speaking, as long as the transformer doesn't heat up enough to destroy the insulation there is no reason not to use it. If the load is not held constant for periods of more than a few minutes at a time, the heat losses will be negligible. For s.s.b. and c.w. these requirements are fulfilled and thus a 1300 volt r.m.s. center tapped transformer at 250 ma, in a bridge circuit, will supply us 1200 volts at 250 ma. It isn't hard to see that a bridge rectifier, using diodes, will save weight, space and money.

### How Many Diodes?

At this point we will explain how to determine the number of series diodes needed in each leg to accommodate a higher p.i.v. Let's assume a required d.c. output of 600 volts. To determine the required peak a.c. to be delivered by the transformer we multiply  $E_{a.c.}$  by 1.57;  $1.57 \times 600 = 942$  volts. The p.i.v. of each leg then must be able to withstand about 950 volts. Three 400 p.i.v. units may be placed in series or two 600 p.i.v. units to provide 1200 volts for a good safety factor. If the r.m.s. voltage of the transformer is known, the chart of fig. 3 may be used.

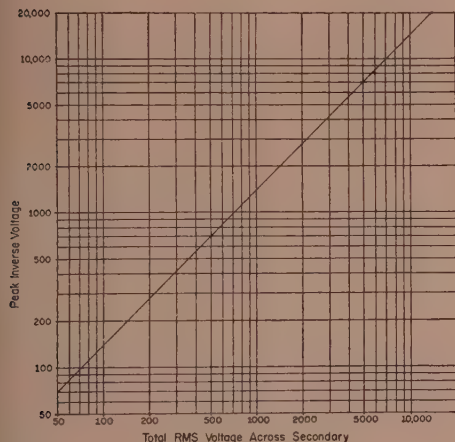


Fig. 3—A handy chart to convert r.m.s. to peak or vice versa.

### Transformer Rating

In order to acquire a power transformer we must know the r.m.s. rating of the high voltage secondary. This may be found in one of two ways. First we may multiply the required peak voltage by 0.707. This is;  $942 \times 0.707 = 666$  volts. Thus a power transformer that provides about 650 or 660 volts r.m.s. is necessary.

This figure can also be determined by multiplying  $E_{a.c.}$  by 1.11. This is  $600 \times 1.11 = 666$  volts. Either approach is valid.

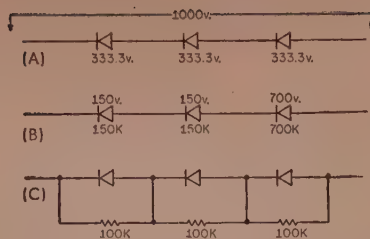


Fig. 4—When diodes are placed in series the voltage drops that appear across them when they are non-conducting may be equal as in (A) but may not be equal as in (B) due to different back resistances. In such a case the drops may be equalized by resistors as in (C).

### Series Diodes

When diodes are placed in series for rectifier operation a precaution must be observed. When similar type diodes are in the non-conducting state there is no assurance that their back resistances are identical. Consider the three diodes shown in fig. 4. Here we have three 400 p.i.v. rated units across 1000 volts. If the back resistances are all equal the drops are as shown in (A), 333.3 volts each, well in the safety zone. However, this is rarely the case as the back resistances may vary widely. Figure 4 (B) shows a more likely situation. Here, the back resistances are varied and thus the voltage drops across each diode vary as shown. Note carefully that one diode has a voltage drop across it in excess of its 400 p.i.v. rating and will quickly break down. This will place an increased load on the remaining two diodes and they will soon follow the first.

The solution is the use of equalizing resistors as shown in fig. 4 (C). This assures an equal distribution of voltage across the diodes despite differences in back resistance.

Why not try to build a diode power supply? Check the surplus ads for some inexpensive 400 volt diodes and give the bridge circuit a try; I am sure you'll be happy with the results. ■



"QRX, fellas—QRX!"

# Rules: 1963 CQ World Wide DX Contest

Oct. 26-27, Nov. 23-24, 1963

## I. CONTEST PERIOD

PHONE SECTION: 0000 GMT, Saturday, October 26th to 2400 GMT, Sunday, October 27, 1963.

C. W. SECTION: 0000 GMT, Saturday, November 23rd to 2400 GMT, Sunday, November 24, 1963.

## II. BANDS

Contest activity will be in the 1.8, 3.5, 7.0, 14.0, 21.0, and 28.0 mc amateur bands.

## III. TYPE of COMPETITION

### 1. PHONE SECTION:

- (a) Single Operator.
- (b) Multi-Operator, single transmitter.
- (c) Multi-Operator, multi-transmitter.

### 2. C.W. SECTION:

- (a) Single Operator.
- (b) Multi-Operator, single transmitter.
- (c) Multi-Operator, multi-transmitter.

### 3. INTER-CLUB DX Clubs affiliated to a National body.

## IV. EQUIPMENT

There is no limit to the number of transmitters and receivers allowed, and competitors may use the maximum power permitted under the terms of their license.

## V. SERIAL NUMBERS

1. Phone stations will exchange serial numbers consisting of 4 numerals, the first two being the RS report and the last two their own Zone number.

2. C.w. stations will exchange serial numbers consisting of 5 numerals, the first three being the RST report and the last two their own Zone number.

3. Stations in Zones 1 through 9 will prefix their Zone number with Zero. (01, etc.)

## VI. POINTS

1. Contacts between stations on *different* continents will count three (3) points.

2. Contacts between stations on the *same* continent but *not* in the same country, will count one (1) point.

3. *Exception:* Contacts between stations in the North American continent will count two (2) points.

4. Contacts between stations in the *same* country will be permitted for the purpose of obtaining a Zone and/or Country multiplier but *no* QSO points will be credited.

5. Only one contact per band with the same station, will be permitted.

## VII. MULTIPLIER

Two types of multipliers will be used.

1. Multiplier of one (1) for each Zone contacted on each band.

2. Multiplier of one (1) for each Country worked on each band.

## VIII. SCORING

1. The score of *each* single band will be the *sum* of the Zone and Country multiplier for that band, *multiplied* by the total contact points on that band.

2. The total all band score will be the *sum* of Zone and Country multipliers of all bands, *multiplied* by the sum of the contact points on all bands.

3. Those sending in logs for a single band will be eligible for a single band award only. If a log is sent in for more than one band, indicate which band is to be judged, *otherwise it will be judged as an all band entry.*

4. A station will not be eligible for more than one award.

5. Single operator contestants must show a *minimum* of 12 hours of operating time to be eligible for an award. If a contestant operates on more than one band and wishes to be judged for a specific single band, he must show a *minimum* of 12 hours on that band.

6. *Exception:* Contestants using the 21 or 28 mc bands will be required to show a *minimum* of only 8 hours.

7. Multi-operator stations must show a *minimum* of 24 hours of operating time to be eligible for an award.

8. Multi-operator stations will *only* be judged on the basis of an all band score.

## IX. ZONES and COUNTRIES

The CQ Zone map and the ARRL and WAE country lists will be used as standards. The continental boundaries used for WAC will also be recognized. Should any question arise as to the positive location of a station the official definition will be final.

## X. AWARDS

Certificates will be awarded for each section of the Contest as follows:

1. To the highest scoring single operator station on each single band in the following areas:

(a) Each call area of the United States, Canada and Australia.

(b) All other countries.

2. To the station having the highest all band score (more than one band) in the following areas:

(a) Each call area of the United States; Canada and Australia.

(b) All other countries.

3. Awards to multi-operator stations will only be made as in §2 above.

| CQ WORLD-WIDE DX CONTEST             |      |                                          |                    |                                |      |                                             |                    |        |      | Page <u>    </u> of <u>    </u> Pages |                    |
|--------------------------------------|------|------------------------------------------|--------------------|--------------------------------|------|---------------------------------------------|--------------------|--------|------|---------------------------------------|--------------------|
|                                      |      | Call <u>                    </u>         |                    |                                |      |                                             |                    |        |      |                                       |                    |
| Single Band <input type="checkbox"/> |      | Single Operator <input type="checkbox"/> |                    | Phone <input type="checkbox"/> |      | Single Transmitter <input type="checkbox"/> |                    |        |      |                                       |                    |
| All Band <input type="checkbox"/>    |      | Multi-Operator <input type="checkbox"/>  |                    | CW <input type="checkbox"/>    |      | Multi-Transmitter <input type="checkbox"/>  |                    |        |      |                                       |                    |
| Band                                 | QSOs | Zone Multiplier                          | Country Multiplier | Band                           | QSOs | Zone Multiplier                             | Country Multiplier | Band   | QSOs | Zone Multiplier                       | Country Multiplier |
| 1.8 Mc                               |      | +                                        | X                  | 1.8 Mc                         |      | +                                           | X                  | 1.8 Mc |      | +                                     | X                  |
| 3.5 Mc                               |      | +                                        | X                  | 3.5 Mc                         |      | +                                           | X                  | 3.5 Mc |      | +                                     | X                  |
| 7 Mc                                 |      | +                                        | X                  | 7 Mc                           |      | +                                           | X                  | 7 Mc   |      | +                                     | X                  |
| 14 Mc                                |      | +                                        | X                  | 14 Mc                          |      | +                                           | X                  | 14 Mc  |      | +                                     | X                  |
| 21 Mc                                |      | +                                        | X                  | 21 Mc                          |      | +                                           | X                  | 21 Mc  |      | +                                     | X                  |
| 28 Mc                                |      | +                                        | X                  | 28 Mc                          |      | +                                           | X                  | 28 Mc  |      | +                                     | X                  |
| TOTAL                                |      | +                                        | X                  | TOTAL                          |      | +                                           | X                  | TOTAL  |      | +                                     | X                  |

INSTRUCTIONS: To determine All Band score, total each column with double line. Single band stations are permitted to operate on more than one band. However, indicate and total ONLY the band you wish judged.

Name                      Call                      (Signature)                       
(USE BLOCK LETTERS)  
Street and Number                       
City                      Country                       
Logs must be postmarked not later than December 1, for Radiotelephone section and January 15, for Radiotelegraph section.  
Submit logs to: CQ Contest Committee, 300 West 43rd St., New York 36, N. Y.  
CQ Form 1037 ed. May, 1962.

The Summary Sheet shown here, as well as regular log sheets, may be obtained free of charge upon receipt of an s.a.s.e., or in the case of a DX station, 1 IRC.



CALL **W1STE** Log For **14** Mc Band **U S A**  
(Use separate log for each band.) PHONE ☐ CW ☒

| DATE<br>Time<br>GMT | STATION | SERIAL NUMBER |          | Fill in only when QSO is mult. |             | Points |
|---------------------|---------|---------------|----------|--------------------------------|-------------|--------|
|                     |         | Sent          | Received | Zone No                        | COUNTRY     |        |
| Nov. 25, 1963       |         |               |          |                                |             |        |
| 0003                | CL2CD   | 59905         | 59913    | 13                             | Uruguay     | 3      |
| 07                  | CL2RT   | 59905         | 59913    |                                |             |        |
| 13                  | LUSAQ   | 59905         | 59913    |                                | Argentina   | 3      |
| 19                  | HK1LQ   | 59905         | 59909    | 9                              | Colombia    | 3      |
| 21                  | IV5AGD  | 56905         | 57909    |                                | Venezuela   | 3      |
| 25                  | KT4CC   | 56905         | 56908    | 8                              | Puerto Rico | 3      |
| 29                  | IFNCS   | 56905         | 56908    |                                |             |        |
| 31                  | VP7WT   | 55905         | 56008    |                                | Bahamas     | 2      |
| 35                  | W6RW    | 55905         | 55903    | 3                              | U S A       | 0      |
| 35                  | W3JIN   | 55905         | 55904    | 4                              |             | 0      |
| 1320                | TP3AB   | 56905         | 56960    | 40                             | Iceland     | 3      |
| 25                  | Q13KC   | 55905         | 56940    |                                | Greenland   | 2      |
| 20                  | VO2NA   | 56905         | 57902    | 2                              | Canada      | 2      |
| 40                  | VE2HY   | 55905         | 55905    | 5                              |             | 2      |
| Nov. 26             |         |               |          |                                |             |        |
| 1200                | JALVZ   | 57905         | 57925    | 25                             | Japan       | 3      |
|                     | HJ2PE   | 58905         | 57295    |                                | Korea       | 3      |
| 15                  | KL7JDO  | 56905         | 56901    | 1                              | Alaska      | 2      |
| 28                  | KH6LJ   | 56905         | 57931    | 31                             | Hawaii      | 3      |
| 35                  | YK2GW   | 55905         | 56930    | 30                             | Australia   | 3      |
| 45                  | YK6RU   | 55905         | 55929    | 29                             |             | 3      |

TOTAL ZONES, COUNTRIES, POINTS THIS SHEET 13 15 47

CQ Form 1056 eff. May, 1962.



CALL **OH5SM** Log For **14** Mc Band **FINLAND**  
(Use separate log for each band.) PHONE ☒ CW ☐

| DATE<br>Time<br>GMT | STATION | SERIAL NUMBER |          | Fill in only when QSO is mult. |             | Points |
|---------------------|---------|---------------|----------|--------------------------------|-------------|--------|
|                     |         | Sent          | Received | Zone No                        | COUNTRY     |        |
| Oct. 26, 1963       |         |               |          |                                |             |        |
| 0445                | SD4WS   | 5915          | 5920     | 20                             | Cyprus      | 3      |
| 47                  | OU6SR   | 5915          | 5721     | 21                             | Azerbaijan  | 3      |
| 51                  | VO6KAA  | 5715          | 5621     |                                | Armenia     | 3      |
| 55                  | W6PBB   | 5615          | 5521     |                                | Georgia     | 3      |
| 0500                | M4BBW   | 5915          | 5921     |                                | Bahrain     | 3      |
| 05                  | OH2TJ   | 5915          | 5915     | 15                             | Finland     | 0      |
| 07                  | TI4MU   | 5915          | 5915     |                                | Italy       | 1      |
| 09                  | D11BE   | 5915          | 5914     | 14                             | Germany     | 1      |
| 11                  | GR2RM   | 5915          | 5914     |                                | England     | 1      |
| 1700                | VE3PV   | 5615          | 5504     | 4                              | Canada      | 3      |
| 15                  | W8NGO   | 5515          | 5504     |                                | U S A       | 3      |
| 15                  | VO2NA   | 5615          | 5502     | 2                              |             | 3      |
| 15                  | VR2GDO  | 5515          | 5503     | 5                              |             | 3      |
| Oct. 27             |         |               |          |                                |             |        |
| 0805                | KAZJL   | 5615          | 5525     | 25                             | Japan       | 3      |
| 15                  | K01BO   | 5515          | 5540     | 40                             | Greenland   | 3      |
| 25                  | TP2WOU  | 5615          | 5640     |                                | Iceland     | 1      |
| 30                  | CT2AAE  | 5615          | 5518     |                                | Acrotia     | 1      |
| 35                  | CT3AV   | 5615          | 5653     | 33                             | Madeira Is. | 3      |

TOTAL ZONES, COUNTRIES, POINTS THIS SHEET 10 16 41

CQ Form 1056 eff. May, 1962.

Here is a sample of a U. S. c.w. log (left) and a DX phone log (right). Zone and country multipliers are indicated to clarify trouble spots found in past contests. Note that point credit is not given for working your own country.

## XI. SPECIAL AWARDS

In addition, the following special awards will be made:

1. A cup will be awarded to the highest scoring single operator on a single band, phone station in the world. (Donated by K2IEG)
2. A cup will be awarded to the highest scoring single operator on a single band, c.w. station in the world.
3. A cup will be awarded to the highest scoring single operator, all band, phone station in the world. (Donated by W2SKE)
4. A cup will be awarded to the highest scoring single operator, all band, c.w. station in the world. (Donated by W9IOP)
5. A cup will be awarded to the highest scoring multi-operator, single transmitter phone station in the world. (Donated by W6YY)
6. A cup will be awarded to the highest scoring multi-operator, single transmitter, c.w. station in the world. (Donated by W3AOH)
7. A cup will be awarded to the highest scoring multi-operator, multi-transmitter, phone station in the world. (Donated by W6AM)
8. A cup will be awarded to the highest scoring multi-operator, multi-transmitter, phone station in the world. (Donated by K2GL)
9. A plaque will be awarded to the affiliated DX Club (not a national body) submitting the highest aggregate score of the scores submitted by its members. (Donated by CQ)

(a) For a club to enter, an officer of the club must submit a list of its participating members and their scores.

(b) This list may include scores of single operator and multi-operator stations; both phone and c.w.

(c) Stations that are members of a competing club therefore must indicate this fact on their report forms.

10. At the request of the donors, previous winners of a Trophy will again be eligible after a three year period. There are no restrictions to the winning of the CQ Plaque.

11. In countries or sections where the returns justify, second and third place certificates will be awarded. Also, such special and/or additional awards will be made as the Contest Committee shall choose.

## XII. DISQUALIFICATION

Violation of the rules and regulations pertaining

(Please circulate this information to your DX friends and radio club.)

to amateur radio in the country of the contestant, or the rules of this contest, or unsportsmanship conduct, will be deemed sufficient cause for disqualification.

## XIII. LOG INSTRUCTIONS

1. In keeping a log, fill in Zone number and Country, only the **FIRST TIME** it is contacted.
2. Use a separate sheet for each band and a tally sheet or report form.
3. Keep all times in GMT.
4. All contestants are expected to compute their scores. Logs should be checked for contact duplications and proper point credit before they are submitted.
5. Make sure name and address is clearly noted on each log. PRINT or TYPE.
6. Each contestant must sign a pledge that all rules and regulations have been observed and that the report is a true one. Note sample Contest report form.
7. If official forms are not available, use a duplicate form as indicated. The size is 8½" × 11" with 40 contacts to the page.
8. Copies of the Zone map, log sheets and report forms are available from CQ, address listed below. Send a self-addressed envelope large size; include sufficient postage. In the case of overseas stations, IRC coupons are acceptable. Indicate quantity of sheets required.

Send logs directly to:

CQ  
300 West 43rd St.,  
New York 36, N.Y.  
Att: Contest Committee  
(Indicate Phone or C.W. Section)

## XIV. DEADLINE

All logs must be postmarked NO LATER than December 1, 1963 for the phone section and January 15, 1964 for the c.w. section. In rare isolated places the deadline will be made more flexible. Send logs directly to:



# DX DX DX DX DX

URBAN LE JEUNE, JR., W2DEC

The following certificates were issued between the period from June 6th, 1963 to and including July 9, 1963:

## CW-PHONE WAZ

|      |       |                         |
|------|-------|-------------------------|
| 1815 | VK5BS | Kenneth Douglas Halsall |
| 1816 | OH3PF | Seppo Syvanemi          |
| 1817 | K9ALP | Louis G. Arnold         |
| 1818 | DL1SF | Arthur Lottermoser      |
| 1819 | W8QQH | Kenneth J. Patterson    |
| 1820 | W3DXN | Leonard G. Glass        |
| 1821 | W7DIS | Allen N. Davis          |
| 1822 | KØKKU | Edward L. Wood          |
| 1823 | DL9OH | Karl Müller             |

## TWO-WAY SSB WAZ

|     |       |            |
|-----|-------|------------|
| 168 | W6ZJY | Larry Ewig |
|-----|-------|------------|

## CW WPX

|     |       |                    |
|-----|-------|--------------------|
| 452 | K4TKM | Brook Byers        |
| 453 | W3GOQ | Robert W. McMurray |
| 454 | W3AHX | John R. McMurray   |
| 455 | W5EJV | L. F. Wanja        |
| 456 | W4BZ  | B. W. Benning      |

## PHONE WPX

|    |       |                 |
|----|-------|-----------------|
| 94 | DL2UZ | Emmanuel Tassin |
|----|-------|-----------------|

## MIXED WPX

|    |       |                     |
|----|-------|---------------------|
| 70 | W4BHG | James H. Millard    |
| 71 | VE3PV | Peter Victor Travis |

**BV1 Formosa:** The following letter is from Don, K8TZU, ex-BV1USF. "This is to let you, as well as your readers know that BV1USF went QRT on 8 June 1963 for lack of an operator. I had to close down the station in preparing to leave for the U. S. on 26 July 1963.

"BV1USF first went on the air on 22 Dec. 61. During this period, I have had 1,439 contacts on a.m., c.w. and s.s.b. All operation has been on 20 and 15, but predominantly 20 because of band conditions and frequency restrictions.

"I'm way behind on QSL cards (roughly 1,000) just got a thousand cards from the printers and am endeavoring to get them out of the way, so patience all. Pileups were terrific stateside the last three months of operation.

I will be operating K8TZU/9 Madison, Wisconsin probably in September or October 1963. New address for queries into BV1USF contacts will be: SMSG Donald K. Walker, Hq 30th Air Division (ADC), Truax Field, Wisconsin."

\*Box 35, Hazlet, New Jersey.



Gopal, VU2GO (Sgt. N. Raja-Gopal) '63 Activities Manager of the Bangalore Club. Active mostly on c.w. with his B2. (Tnx VU2GV)

**DUØ Philippine Islands:** The following letter from Scotty, W3EFZ, explains the recent operations of DUØDM. The last paragraph should be especially interesting.

"On the weekend of 16 February, DU1's GF, RS, NL, OR and CE along with Ws 3EFZ, 4YKO, 5PCL, 6JVG, K4HHW and ex-KA1GZ journeyed to the famous island fortress of Corregidor and set up two ham stations, one in the lighthouse behind General MacArthur's old headquarters and the second in the guest house near Malinta Tunnel. The first expedition commemorated the initial landing of U. S. Forces on 16 Feb 1945 in the recapture of the stronghold from the Japanese.

"The special call sign DUØDM was issued by the Philippine Government for use on Corregidor on a joint Phil-U. S. operator basis. The suffix "DM" represented President Diosdado Macapagal and Douglas MacArthur.

"Although conditions in February were not at their best, we did QSO some 250 stations on all continents.

## 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 | YU1AG | 503    | DL9KP | 450    | W4DKP | 410       | CT1PK  | 600    | W5ERY | 358        | K4PUS | 305       | W8JIN | 605    |     |
| W2HMJ    | 685   | W5LGG  | 502   | W8JIN  | 449   | W1CKU     | 408    | W8WT   | 576   | W8JIN      | 356   | DJ3CP     | 304   | W3OCU  | 588 |
| W8KPL    | 632   | DL7CS  | 502   | W9U2S  | 447   | K4IEU     | 408    | G3DD   | 576   | PY2CK      | 354   | K1IXG     | 303   | K9EAB  | 578 |
| W5KC     | 629   | D2CPR  | 501   | W3AYD  | 445   | K4JVE     | 407    | W9YSQ  | 471   | SA5TO      | 353   | WA2SFP    | 300   | W6YV   | 570 |
| W2AIW    | 617   | W9SFR  | 501   | OE1FF  | 442   | W7HDL     | 405    | W9U2C  | 462   | LA5HE      | 351   | W3VSU     | 300   | W3AYD  | 552 |
| W2EQS    | 605   | W2MWM  | 500   | W3BQA  | 437   | W4YWX     | 404    | MP4BBW | 454   | W6USG      | 350   | W4NJF     | 300   | YU1AG  | 552 |
| W6KG     | 574   | W2FXA  | 500   | LA5HE  | 437   | G13OQR    | 404    | PA0HBO | 453   | ZS6IW      | 350   | W4RLS     | 300   | HB9EU  | 551 |
| W4OPM    | 571   | K2ZKU  | 500   | ON4FU  | 433   | KP4A00    | 404    | W6YV   | 448   | K0RDP      | 300   | W2GT      | 528   |        |     |
| W9UXO    | 566   | K9EAB  | 497   | VE3ES  | 433   | ZS4MG     | 404    | G8KS   | 430   | S.S.B. WPX | W0CVU | 291       | G8KS  | 520    |     |
| K6QCM    | 565   | W2MUU  | 495   | W8UMR  | 429   | K2ZRO     | 403    | VK6RU  | 421   | G16TK      | 278   | K9AGB     | 510   |        |     |
| W5LQG    | 564   | W1WLW  | 494   | W0AUB  | 429   | W9DYG     | 403    | W3AYD  | 420   | MP4BBW     | 462   | WA2EOQ    | 275   | W5LGG  | 509 |
| DL1QT    | 552   | OK3DG  | 488   | W2RA   | 428   | W9JHN     | 403    | F8PI   | 418   | W4OPM      | 451   | VE3ES     | 274   | K2ZKU  | 508 |
| W2NUT    | 550   | SM5CCE | 488   | K5LIA  | 428   | VE6VK     | 403    | P21AX  | 413   | G3AWZ      | 428   | K2JFV     | 266   | W9DWQ  | 508 |
| W1JIB    | 546   | W4BYU  | 487   | OK1MB  | 428   | K4TEA     | 402    | K9EAB  | 412   | HB9TL      | 423   | K2MGE     | 263   | W4BQY  | 505 |
| K2UKQ    | 546   | W8PQQ  | 481   | W3CPS  | 426   | G8PL      | 402    | K2CJN  | 409   | W3NKM      | 402   | W3AYD     | 262   | W3KDP  | 501 |
| W9YSX    | 544   | W4HYW  | 478   | W1EIO  | 425   | WA2CBB    | 401    | DL3TJ  | 404   | G3DD       | 402   | W4EEU     | 262   | W3KDP  | 501 |
| W9GFF    | 538   | W3OCU  | 466   | KL7MF  | 424   | K9BVR     | 401    | W1UOP  | 402   | K9EAB      | 401   | VE3BKL    | 259   | W8UMR  | 500 |
| SM7MS    | 534   | K6SXA  | 464   | SM5WI  | 424   | W0YBV     | 401    | G3NUG  | 400   | G8KS       | 400   | XE1CV     | 256   | LA5HE  | 500 |
| ON4QX    | 533   | W2KIR  | 463   | W0PGT  | 420   | IT1TAI    | 401    | VE3BQP | 386   | W3MAC      | 381   | G3FKM     | 255   | DL3RK  | 493 |
| W1EQ     | 528   | DJ2KS  | 462   | HB9TT  | 419   | VE3JZ     | 401    | OE1FF  | 382   | G3NUG      | 356   | UR2AR     | 255   | JA2JW  | 480 |
| W2HO     | 526   | PY4OD  | 462   | G3HIW  | 418   | OE3BW     | 400    | SP7HX  | 381   | T1ZHP      | 356   | K5OGP     | 254   | W0MCX  | 476 |
| K9AGB    | 515   | JA2JW  | 461   | W8IBX  | 416   | SP4JF     | 400    | TG9AD  | 381   | P21AX      | 345   | W6USG     | 252   | W3CGS  | 475 |
| KP4CC    | 515   | W9WCE  | 458   | W0MCX  | 416   | SP6ZF     | 400    | DL6VM  | 376   | VE3BQP     | 334   | TG9AD     | 252   | W9FVU  | 474 |
| IT1AGA   | 515   | W3BCY  | 457   | K2PFC  | 415   | VE1AE     | 400    | DJ3CP  | 375   | W2HXG      | 324   |           |       | G3FKM  | 463 |
| G2GM     | 513   | OC3EA  | 456   | VK3XB  | 415   | VE4OX     | 400    | PA0SNG | 369   | W2VCZ      | 320   | Mixed WPX | DL1YA | 456    |     |
| W6WO     | 511   | UC2AR  | 456   | W5AWT  | 412   | VK3KB     | 400    | G3FKM  | 366   | W6YMV      | 320   |           |       | W4OPM  | 629 |
| W2GT     | 510   | DL3RK  | 454   | W5DA   | 412   |           |        | W8UMR  | 363   | W1UOP      | 318   |           |       | W9YSX  | 622 |
| W8LY     | 506   | PA8LOU | 451   | K5LZO  | 411   | Phone WPX | SM3AZI | 362    | W2YBO | 318        |       |           |       | PA8LOU | 452 |
| W9DWQ    | 506   | W3PGB  | 450   | WA2DIG | 411   |           | SM3EP  | 361    | W8PQQ | 315        | G3DD  | 617       |       | G16TK  | 450 |
| G3EYN    | 503   | DL1YA  | 450   | W2PTD  | 411   |           | W1DGJ  | 358    | W1ORV | 307        | W8WT  | 607       |       | HK3LX  | 450 |

## Phone WPX

W9WHM .600

"A repeat expedition to Corregidor occurred on the weekend of 18 May (Armed Forces Day in the Philippines as well as in the U. S.). On this occasion we operated three stations, a KWM-2 in the lighthouse on sideband and another KWM-2 on s.s.b. at Kindley Field plus a c.w. station in the guest house. In addition to the operators who participated in the first field day, we had DU1VQ, DU1IK, K1UDF, W5DAF, WA6RDH and KH6AED with us in May.

"True to the spirit of the historic joint stand by the WWII Phil-American defenders of Corregidor, we journeyed out to the island by Philippine Navy transportation and returned thanks to the U. S. Navy at Sangley Point. Past and present members of all three services, Army, Navy and Air Force were represented in the group—both Philippine and American.

"In May, propagation to the States was much better than in February and we QSOd some 300 Ws on s.s.b. and c.w.

"A letter has been sent to General MacArthur describing PARA's Corregidor ham activity and we suspect he will appreciate the call, DUØDM.

"You may be interested in knowing that additional 'expeditions' are planned. We plan to journey to Leyte (DU5) in October to commemorate the initial MacArthur landings there in 1944. The PARA is also entertaining the notion of operating a station on one of the remote islands (which may qualify as a new ham country) of this 7,000-island Republic; the Turtle Islands off Borneo are one possibility and the Spratlys another. 73, Scotty"

**EAØ Spanish Guinea: EAØAB** has been active recently around 14100 kc around 2100 GMT with his well-known T6 note. (Tnx LIDXC)

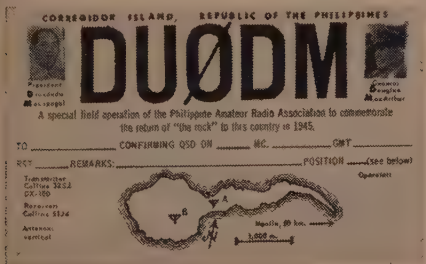
**HS Siam:** Many people have asked, "whatever

happened to HS2M." Mike is now living at 2806 Blaine Drive, Chevy Chase 15, Md. and the following letter from him should be of great interest.

"I'm writing to you to let the rest of the amateur group know what has happened to HS2M. I'm now here in Maryland starting college at the University of Maryland. I have been back in the U. S. almost 8 months and I am just getting out all the QSLs I owe to everyone. I shall fill you in on my activities as HS2M.

"I began operating in February, 1961 as HS2MP. Soon after that I changed to HS2M. I found that the extra letter took up valuable time. I QRTed in April of 1962. In this time I worked about 18,000 QSOs and 181 countries. The rig was an Eico 720K and the modulator a pair of 807s and, I might add, that I was modulating 300%! Most of the QSOs were solid and many of them gave me fine reports. Some of them did say that I was the best signal that was ever heard by that station. The antennas were two half-wave dipoles out of phase and a homebrew G4ZU four element beam up forty feet on a mast. (no Rotor) The receiver was an RAL-8, a superregenerative job. It was about 20 years old at the time. I can't work what I can't hear. Hi! I was on about four hours a day average. That is why so many QSOs were logged.

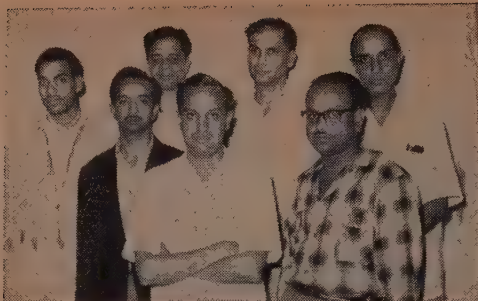
"I have made many friends and a few enemies, I'm sure. But all in all, it was a very enjoyable time. Tried to work all the stations that were new to me, which explains why I delayed in answering stations who I had worked before. I wanted to give all those not worked a chance. If anyone would like their due QSL, please send yours to the above address. I have just mailed about 12,000 QSLs from this address, so if you don't get one within the next two months, try again. I probably missed some stations.



QSL used for the DUØDM operation. See text for story. (Tnx W3FFZ)



L to r: Kneeling (holding banner) W3EFZ, W5PCL, standing DU1GF, DU1RS, DU1NL, WAYKO, W6JVG, DU1OR, DU1CE, K4HHW. See text. (Tnx W3EFZ).



Group of Bangalore hams, l to r: Ghose, VU2SO; s.w.l. Prakash; Sampath, VU2KEZ; Mani, VU2SE; Gopi, VU2BG; Sulu, VU2GV and Sham, VU2BZ. (Tnx VU2GV).

"I have sold almost all of my gear as I am in need of tuition money for college and I don't think I shall have too much time to operate anymore for the next few years. That is how it stands here at the moment. I hope to hear from some of you soon."

**JT1 Mongolia:** JT1CA continues active 14105-10 kc 1100-1300 GMT s.s.b. and is to be there on an assignment lasting one year. Vlad reports he is receiving the different continents at best as follows (GMT): Africa 1400-1600; N. Am. 1100-1500; S. Am. 2000-2300; Oceania 0100-0300 and 0800-1100; Europe 1430-1630 and 0400-0800, though the first Europe times are the best. (Tnx VERON)

**KJ6 Johnson Island:** KJ6BZ seems to be most popular judging from pileups 14010-25 kc daily 1000-1200 GMT. (Tnx WGDXC)

**KG6S Saipan:** KG6SA has been somewhat active around 0700 GMT. Frequency preferred seems to be 14035.

**KP6 Palmyra Island:** W6FAY/KP6 will be on June 22 until mid-September, after which he will QSY to Jarvis Island and thinks it will count as a new one under the new ruling. (Tnx WGDXC)

**OA Peru:** OA4NKY, John (Juan) is on 40 s.s.b. 7200 to 7235 or so each nite-0230 to 0630 GMT looking for QSO & QSLs from W1, etc. Has plenty W6s but would like to make "WAS." Can work only 40. Has Mosley 40 beam, 100 w.d.c. input. QSLs air mail. (Tnx W5DAU)

**TA Turkey:** TA2NK (DJ7BO) According to reports, the Turkish problem is solved, in that, Wolfgang will be there for two years and is now active on 14040-60 kc daily 2100-2200 GMT. All QSLs should be sent via DJ2NY. (Tnx WGDXC)

**VS9O Masirah:** Jeff Rackstraw writes that club station VS9OC is on 15 and 20 regularly at 1500-1800 GMT, a.m. and c.w. Any of the gang requiring QSLs prior to 1963 should send full log info to the address shown in the QTH section.

**ZL1 Kermadec Island:** ZL1ABZ continues active weekends s.s.b. 14115-20 kc 0300-0400 GMT. (Tnx ZL2GX)

#### Gus

Gus Browning, W4BPD is in Calcutta as this is being written presumably with Cal, W4ANE. He might operate a bit from there, however, about July 20 Gus will be in Phouchling, Bhutan,

about 18 miles from the Indian border. He will operate 5 to 7 days before going by pack-train to the Capitol City (140 miles distant passing corner of AC4-land) where he will install a 2-element beam and SR-150 for AC5PN and the King, to be left there permanently. This pack-train trip will take about 21 days and might have some interesting developments enroute, so watch 14034 kc. Gus has a 2 element beam for his own use and also a 30L-1 final, and a.c. power is available at AC5SQ and AC5PN's QTH so good signals may be expected if conditions permit. (Tnx WGDXC)

#### DXpeditions

South Sandwich-South Georgia & Falkland Islands — LU2XL, LU4BAD, LU4XG (LU8DBA) and The Radio Club of Argentina are in the preliminary stages of plans for a DXpedition to these places, licenses have been applied for and private air-transportation is available to Carl, LU2XL, who is a Texan, currently engaged in some phase of oil activities in Argentina and will keep all informed of developments. (Tnx WGDXC)

EA2CA, EA4CR and EA4GF are getting the equipment ready to go to Ifni, Rio de Oro, Annabon, Fernando Po and Spanish Guinea. The starting date of this DXpedition is not known at this time. (Tnx VERON)

#### New England DXCC Meeting

The 13th Annual New England DXCC meeting will be held Saturday, September 21 in the Grand Ballroom of Motel 128, located at the junction of Routes 128 and 1, Dedham, Mass. "Bull Session" commencing at 5:00 P.M. with dinner at 7:30 P.M. Cost, \$5.50 per person. Deadline for reservations is Sept. 16th. All DXCC members are invited. Make reservations and payable to Howard H. Ferris, W1HZ, 18 Whittemore St., Concord, Mass.

#### W9-DXCC Banquet

The annual meeting and banquet of W9-DXCC will be held at the Sheraton Hotel, Chicago. (Continued on page 90)



Releasing of first issue of SIRAN, Bangalore Club publication at the annual dinner by Chaki, VU2B (Brig. B.M. Chakravarti). L to r: Chaki, VU2BU; Chakex-VU2EV; Joe, VU2JA and Sham VU2BZ reading the address of welcome. (Tnx VU2GV)



## SPACE COMMUNICATIONS

GEORGE JACOBS\*, W3ASK

THE following are recent additions to the list of satellite frequencies which appeared in last month's column.

| Frequency (MC) | Name     | Power (Watts) | Date Launched | Inclination (Degrees) | Period (Minutes) |
|----------------|----------|---------------|---------------|-----------------------|------------------|
| 136.235        | TIROS-7  | 0.05          | 19 June 1963  | 58.5                  | 97               |
| 136.380        | LOFTI-2A | 0.05†         | 15 June 1963  | 70                    | 94               |
| 136.890        | SR-4     | 0.05†         | 15 June 1963  | 70                    | 94               |
| 136.922        | TIROS-7  | 0.05          | 19 June 1963  | 58.5                  | 97               |

†Estimated power, may actually differ slightly from this value

LOFTI-2A, launched by the USA on June 15, is conducting experiments in space of importance to radio communications. The 20-inch diameter spherical satellite, designed by the U.S. Naval Research Laboratory, contains a 40-foot antenna which was extended when the satellite entered its orbit. Also aboard the LOFTI-2A satellite is a 14-inch loop antenna and special low frequency (long wave) receiving equipment. The satellite is measuring trans-ionospheric low frequency reception on both the extended antenna and the loop antenna. It is hoped that these measurements will shed new light on low frequency propagation, and the ionosphere in general.

Launched on the same booster rocket with LOFTI-2A was the SOLAR RADIATION-4

satellite. This satellite, also designed by the Naval Research Laboratory, is intended to measure solar X-rays, and to study the effects of solar radiation and solar storms on the ionosphere.

On June 19, the USA successfully launched the seventh satellite in the TIROS weather satellite series. Like its predecessors, TIROS-7 carries two 2-watt TV cameras on board which scan the earth's atmosphere over millions of square miles, sending back to earth comprehensive pictures of cloud formations, weather fronts and other meteorological data. Both cameras operate on command on 235 mc.

TIROS-7, LOFTI-2A and SR-4 each contain c.w. beacon and command telemetry transmitters operating in the 136 mc band. The frequencies are shown in the above table, and widespread reception of these transmitters has been reported.

### Project OSCAR News

Project OSCAR has moved from garages and home workshops to its new home at Foothill Junior College, located in the peninsular town of Los Altos, approximately twenty miles south of San Francisco, California. The College has made available to the Project a two-story building on the edge of the campus, provided with utilities (gas, electricity), including the necessary land to erect antennas. The building will house Project OSCAR headquarters as well as the Project's communication control center and main tracking station. Mail address for the Project will continue to be Box 183, Sunnyvale, California, U.S.A. The building has been made available by Foothill College as part of the College's plan to establish a Space Science Center which will also consist of a 16-inch optical telescope, a 28-foot radio telescope, and a planetarium (the latter is already in operation).

Work continues on the OSCAR repeater satellite. A land-based "bread-board" version of the repeater has been functioning for some time and various vexing problems are now being encountered as space hardware is being built for pre-flight tests and environmental studies. The primary power drain of the package has been reduced from 5 watts to approximately 2.5 watts at a slight sacrifice in translator output. Study of the linear amplifier stages of the package is

[Continued on page 95]

\*11307 Clara St., Silver Spring, Md.



Telemaco Antonio Pissarro, CR6CW, shown at his satellite listening post in Cela, Angola, Portuguese West Africa. Tel uses a conventional home-built 6AM6-6J6-6AK5 converter into an old S40-A receiver, and a two-element beam cut for 136-137 mc. With this set-up, Tel has logged eight American satellites during the past year.



# PROPAGATION

GEORGE JACOBS\*, W3ASK

## LAST MINUTE FORECAST

The following is a forecast of day-to-day propagation conditions expected during September, 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 (September 5, 11, 22 and 30), 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.<br>Chart<br>Forecast<br>Rating | Above<br>Normal<br>Days<br>(WWV<br>rating<br>higher<br>than 6) | Normal<br>Days<br>(WWV<br>rating<br>5-6)                  | Below<br>Normal<br>Days<br>(WWV<br>rating<br>4) | Disturbed<br>Days<br>(WWV<br>rating<br>less<br>than 4) |
|--------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------|
|                                      | Sept. 5,<br>11, 22, 30                                         | Sept. 1-4, 6,<br>8-10, 12, 16,<br>18-19, 21, 23,<br>26-29 | Sept. 7,<br>13, 15, 17,<br>20, 25               | Sept.<br>14, 24                                        |
| (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.

**S**EPTEMBER is a month of changing short-wave radio propagation conditions. During the early part of the month conditions tend to remain the same as during the summer months, but towards the end of the month typical winter propagation conditions begin to be noted. Winter propagation conditions are characterized by higher usable frequencies during the daylight hours, lower usable frequencies during the hours of darkness, lower static levels, and generally stronger signal levels. During September, therefore, improved propagation conditions are expected on 15 and 20 meters during the daylight hours, and on 40, 80 and 160 meters during the hours of darkness.

\*11307 Clara St., Silver Spring, Md.

On September 23rd the autumn equinox occurs. This is the day when the sun crosses the equator on its apparent travel towards southern skies. On this date, day and night throughout the world are of equal length. On long radio paths extending from the northern to the southern hemisphere (for example from the United States to Australasia) there is a propagation balancing effect during the equinoctial period, which exists for about a month on each side of the day on which the equinox occurs. On such circuits, overall ionospheric absorption is usually at lowest levels, static levels are low and signal levels high during this period.

## VHF Ionospheric Openings

Meteor activity is at a low level during September, and sporadic-E propagation decreases considerably during the month. Some v.h.f. ionospheric openings may be possible, however, as a result of a seasonal increase in auroral activity, which usually takes place during September and the early fall. Check the "Last Minute Forecast" appearing at the beginning of this column for periods that are most likely to be below normal or disturbed during September.

## Sunspot Cycle Progress

The sunspot cycle continues its slow decline towards a minimum level. Table 1 lists the smoothed sunspot numbers observed during the present cycle, which began in April, 1954. Table 1 also shows the smoothed sunspot numbers predicted by CQ for the remainder of the present cycle. According to latest estimates, a minimum value is expected sometime between November, 1964 and April, 1965. A smoothed sunspot number of 19 is predicted for September, 1963.

For a more detailed account of sunspots, what they are and how they influence high frequency radio propagation, see "The Sunspot Story, Cycle 19; The Declining Years" by George Jacobs and Stanley Leinwoll, which appeared in the April, May and June, 1961 issues of CQ. Reprint copies of this three-part article, in booklet form, are available for \$1.00 a copy direct from CQ.

## CQ DX Contest Special

According to W1WY, CQ's CONTEST CALENDAR Editor, the following dates have been selected for the 1963 CQ DX Contest:

Next month's column will contain special Propagation Charts for the DX Contest.

This month's column contains Short-Skip Propagation Charts for September and October, 1963, as well as special propagation charts centered on Alaska and Hawaii, DX Charts for Sept. appeared last month.

73, George, W3ASK

## CQ SHORT-SKIP PROPAGATION CHART

### September-October, 1963

Band Openings Given in Local Standard Time

| Band<br>(Meters) | 50-250<br>Miles                                                                  | 250-750<br>Miles                                                                                                                     | 750-1300<br>Miles                                                                                                                    | 1300-2300<br>Miles                                                                                         |
|------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 10               | Nil                                                                              | 09-13(0-1)                                                                                                                           | 07-09(1)<br>09-13(1-2)<br>13-21(0-1)                                                                                                 | 07-09(1-0)<br>09-11(2-0)<br>11-13(2-1)<br>13-17(1)<br>17-21(1-0)                                           |
| 15               | Nil                                                                              | 07-09(0-1)<br>09-13(0-2)<br>13-21(0-1)                                                                                               | 07-09(1)<br>09-13(2)<br>13-17(1-2)<br>17-21(1)<br>21-07(0-1)                                                                         | 07-09(1)<br>09-15(2)<br>15-17(2-1)<br>17-19(1)<br>19-07(1-0)                                               |
| 20               | Nil                                                                              | 07-09(0-1)<br>09-12(0-2)<br>12-14(0-4)<br>14-16(0-3)<br>16-18(0-2)<br>18-07(0-1)                                                     | 07-09(1-2)<br>09-12(2-4)<br>12-14(4)<br>14-16(3-4)<br>16-18(2-4)<br>18-20(1-3)<br>20-22(1-2)<br>22-07(1)                             | 07-09(2)<br>09-12(4-2)<br>12-15(4-3)<br>15-18(4)<br>18-20(3-2)<br>20-22(2)<br>22-00(1)<br>00-07(1-0)       |
| 40               | 07-09(0-2)<br>09-11(1-3)<br>11-15(2-4)<br>15-17(2-3)<br>17-19(1-2)<br>19-21(0-1) | 07-09(2-3)<br>09-11(3)<br>11-15(4-2)<br>15-17(3)<br>17-19(2-4)<br>19-21(1-4)<br>21-23(0-3)<br>23-02(0-2)<br>02-05(0-1)<br>05-07(0-2) | 07-09(3-2)<br>09-11(3-1)<br>11-15(2-1)<br>15-17(3-2)<br>17-19(4-3)<br>19-21(4)<br>21-23(3-4)<br>23-02(2)<br>02-05(1-2)<br>05-07(2-3) | 07-09(2-1)<br>09-15(1-0)<br>15-17(2-1)<br>17-19(3-2)<br>19-23(4)<br>23-02(2-4)<br>02-05(2-3)<br>05-07(3-2) |
| 80               | 06-08(3-4)<br>08-21(4)<br>21-03(3-4)<br>03-06(2-3)                               | 06-08(4-2)<br>08-16(4-1)<br>16-18(4-2)<br>18-21(4-3)<br>21-03(4)<br>03-05(3-4)<br>05-06(3)                                           | 06-08(2-1)<br>08-16(1-0)<br>16-18(2-1)<br>18-21(3-2)<br>21-03(4)<br>03-05(4-2)<br>05-06(3-2)                                         | 06-08(1)<br>08-16(0)<br>16-18(1)<br>18-21(2)<br>21-03(4-3)<br>03-06(2)                                     |
| 160              | 16-18(1-0)<br>18-20(2-1)<br>20-05(4)<br>05-07(3-2)<br>07-09(2-1)<br>09-11(0-1)   | 17-19(1-0)<br>19-20(1)<br>20-02(4-3)<br>02-05(3-2)<br>05-07(2-1)<br>07-09(1-0)                                                       | 19-20(1-0)<br>20-22(3-1)<br>22-02(3)<br>02-05(2-1)<br>05-07(1)                                                                       | 20-22(1-0)<br>22-02(3-2)<br>02-05(1)<br>05-07(1-0)                                                         |

## HAWAII TO:

Openings Given in Hawaiian Standard Time\*

|                | 10/15<br>(Meters)                                         | 20<br>(Meters)                                                                   | 40<br>(Meters)                                           | 80/160<br>(Meters)                            |
|----------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------|
| Eastern<br>USA | 09-12(1)†<br>07-12(1)<br>12-13(2)<br>13-15(3)<br>15-16(1) | 03-05(1)<br>05-07(2)<br>07-12(1)<br>12-14(2)<br>14-16(3)<br>17-19(1)<br>16-17(2) | 17-19(1)<br>19-21(2)<br>21-00(3)<br>00-02(2)<br>02-04(1) | 18-20(1)<br>20-23(2)<br>23-02(1)<br>21-01(1)‡ |

\*Hawaiian Standard Time is 5 hours behind EST; 4 hours behind CST; 3 hours behind MST; 2 hours behind PST and 10 hours behind GMT.

†Indicates possible 10 meter openings.

‡Indicates possible 160 meter openings.

TABLE 1

Values of smoothed sunspot numbers observed during Cycle 19 and predicted for the remainder of the decline. Italic figures indicate future estimated sunspot numbers.

| Year<br>Month | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 |
|---------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan           | ..   | 14   | 89   | 170  | 199  | 179  | 129  | 80   | 45   | 28   | 14   | 5    |
| Feb           | ..   | 16   | 98   | 172  | 201  | 177  | 125  | 75   | 42   | 27   | 13   | 5    |
| Mar           | ..   | 19   | 109  | 174  | 201  | 174  | 122  | 69   | 40   | 26   | 12   | 5    |
| Apr           | 3    | 23   | 119  | 181  | 197  | 169  | 120  | 64   | 39   | 26   | 11   | 5    |
| May           | 4    | 29   | 127  | 186  | 191  | 165  | 117  | 60   | 39   | 25   | 9    | ..   |
| Jun           | 4    | 35   | 137  | 188  | 187  | 161  | 114  | 56   | 38   | 24   | 8    | ..   |
| Jul           | 5    | 40   | 146  | 191  | 185  | 156  | 109  | 53   | 37   | 22   | 7    | ..   |
| Aug           | 7    | 46   | 150  | 194  | 185  | 151  | 102  | 53   | 35   | 21   | 7    | ..   |
| Sep           | 8    | 55   | 151  | 197  | 184  | 146  | 98   | 52   | 33   | 19   | 6    | ..   |
| Oct           | 8    | 64   | 156  | 200  | 182  | 141  | 93   | 51   | 31   | 18   | 6    | ..   |
| Nov           | 9    | 73   | 160  | 201  | 181  | 137  | 88   | 51   | 30   | 17   | 5    | ..   |
| Dec           | 12   | 81   | 164  | 200  | 180  | 132  | 84   | 49   | 29   | 16   | 5    | ..   |

|                |                                                                       |                                                                                              |                                                                      |                                                                                                 |
|----------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Central<br>USA | 09-13(1)†<br>07-12(2)<br>12-14(3)<br>14-15(2)<br>15-17(1)             | 05-06(1)<br>06-08(3)<br>08-10(2)<br>10-13(1)<br>13-15(2)<br>15-17(4)<br>17-18(2)<br>18-19(1) | 17-19(1)<br>19-21(2)<br>21-02(3)<br>02-04(2)<br>04-05(1)             | 18-20(1)<br>20-01(2)<br>01-03(1)<br>21-02(1)‡                                                   |
| Western<br>USA | 09-13(1)†<br>06-07(1)<br>07-09(2)<br>09-12(3)<br>12-14(2)<br>14-17(1) | 06-07(1)<br>07-10(3)<br>10-14(2)<br>14-16(4)<br>16-18(2)<br>18-20(1)                         | 17-18(1)<br>18-19(2)<br>19-00(4)<br>00-03(3)<br>03-06(2)<br>06-08(1) | 18-20(1)<br>20-22(2)<br>22-03(3)<br>03-04(2)<br>04-06(1)<br>20-23(1)‡<br>23-02(2)‡<br>02-04(1)‡ |

## ALASKA TO:

Openings Given in Alaskan Standard Time§

|                | 15<br>(Meters) | 20<br>(Meters)                                           | 40<br>(Meters)                   | 80/160<br>(Meters) |
|----------------|----------------|----------------------------------------------------------|----------------------------------|--------------------|
| Eastern<br>USA | 12-14(1)       | 09-13(1)<br>13-15(2)<br>15-17(1)                         | 23-03(1)                         | Nil                |
| Central<br>USA | 12-16(1)       | 09-14(1)<br>14-16(2)<br>16-18(1)                         | 23-04(1)                         | Nil                |
| Western<br>USA | 12-17(1)       | 09-11(1)<br>11-14(2)<br>14-16(3)<br>16-17(2)<br>17-19(1) | 23-02(1)<br>02-05(2)<br>05-07(1) | 02-05(1)           |

## Forecast Ratings

The numerical ratings appearing in parenthesis following each predicted time of opening indicate the *total* number of days during each month of the forecast period 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.

On the Short-Skip Propagation Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the longer distance.

For the *specific* days of each month on which a particular opening is most likely to occur, as well as a day-to-day forecast of reception conditions (signal quality, noise and fading levels), see the "Last Minute Forecast," which appears at the beginning of this column.

All times are shown in Local Standard Time, using the 24-hour system. In this system midnight is shown as 00, while 01 is 1 A.M., 02 is 2 A.M., etc. Noontime is shown as 12, while 13 is 1 P.M., 14 is 2 P.M., etc.

The CQ Short-Skip Propagation Charts are based upon a c.w. effective radiated power of 75 watts from a half-wave dipole antenna, a half-wave or higher above ground. The Charts are valid through October 31, 1963. These forecasts are based upon basic propagation data published monthly by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

§Alaskan Standard Time (from Skagway to 141 degrees west longitude), is 4 hours behind EST; 3 hours behind CST; 2 hours behind MST; 1 hour behind PST and 9 hours behind GMT.

# SIDE BAND

IRV & DOROTHY STRAUBER\*, K2HEA/K2MGE

## SSB DX HONOR ROLL

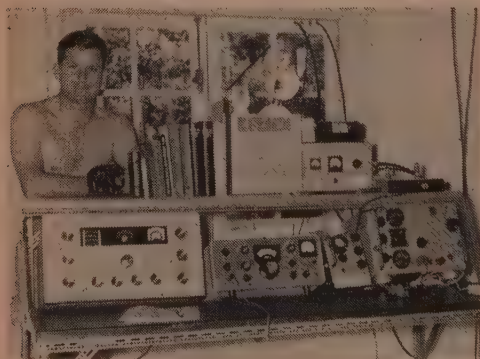
|              |     |              |     |              |     |
|--------------|-----|--------------|-----|--------------|-----|
| T12HP .....  | 282 | G8KS .....   | 261 | W6WNE .....  | 241 |
| PY4TK .....  | 278 | DL1IN .....  | 258 | W1AOL .....  | 238 |
| W8EAP .....  | 279 | W51YU .....  | 257 | WA21ZS ..... | 235 |
| W2ZX .....   | 275 | K2MGE .....  | 257 | PJ2AA .....  | 232 |
| VQ4ERR ..... | 273 | MP4BBW ..... | 256 | W2VZV .....  | 227 |
| W2FXN .....  | 272 | W1LLF .....  | 254 | K4AJ .....   | 226 |
| K8RTW .....  | 271 | G3NUG .....  | 253 | G2PL .....   | 225 |
| W8PQQ .....  | 269 | W6BAF .....  | 252 | K6LGF .....  | 224 |
| W6UOU .....  | 266 | G3FKM .....  | 252 | WA6EYP ..... | 222 |
| K4TJL .....  | 266 | W6RKP .....  | 251 | W0PGI .....  | 221 |
| W0QVZ .....  | 266 | W0UUV .....  | 251 | WA6HOH ..... | 219 |
| W40PM .....  | 265 | K1IXG .....  | 250 | W3VSU .....  | 217 |
| K9EAB .....  | 263 | G2BMV .....  | 249 | W7DLR .....  | 208 |
| HB9TL .....  | 262 | W3KT .....   | 248 | VE3BQP ..... | 206 |
| W2VCZ .....  | 262 | W2TP .....   | 248 | OH2NB .....  | 204 |
| W3LMA .....  | 261 | W8YBZ .....  | 246 | W9SFR .....  | 203 |
| PZ1AX .....  | 261 | W6PXH .....  | 246 |              |     |

## SSB DX ENDORSEMENTS AND CERTIFICATES

|             |     |             |     |              |    |
|-------------|-----|-------------|-----|--------------|----|
| W6RKP ..... | 250 | W6NWZ ..... | 150 | W2PDB .....  | 75 |
| W8UUV ..... | 250 | K1GHT ..... | 125 | ZS6YQ .....  | 75 |
| W6BAF ..... | 250 | W2MM .....  | 100 | W8OQV .....  | 75 |
| K1IXG ..... | 250 | K6RFU ..... | 100 | WA2JBV ..... | 75 |
| G2PL .....  | 225 | W1DGJ ..... | 100 | KP4AOO ..... | 50 |
| W4ZRZ ..... | 200 | W9OKM ..... | 100 | K5QVH .....  | 50 |
| W4NJF ..... | 200 | K3BNS ..... | 100 | K4RZK .....  | 50 |
| K5YYI ..... | 150 | W2FXA ..... | 75  | TG9SC .....  | 50 |
| K0MAS ..... | 150 | W8WUO ..... | 75  | W0EEE .....  | 50 |

**W**E are certain that you have read carefully Part 12 of the FCC regulations, perhaps some sections more carefully

\*12 Elm St., Lynbrook, New York.



As fine a station as one is likely to find in any part of the world belongs to Ian Wollen, 4S71W, the only sideband station in Ceylon. (Photo courtesy of WA6ZIQ)

than others. One section in particular, 12.0, could do with a bit of re-reading at this time in light of the proposals recently outlined by the ARRL.

Sec. 12.0 Basis and purpose. The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians and electronic experts.

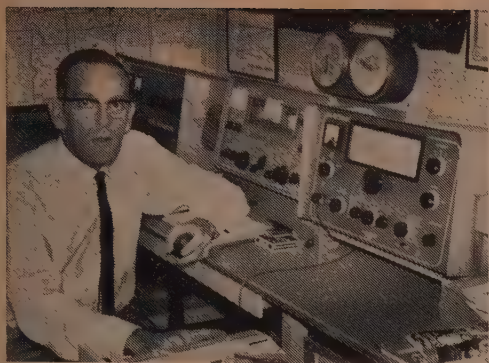
(e) Continuation and extension of the amateur's unique ability to enhance international good will.

The fundamental purpose and the principles outlined provide the basis for amateur radio. They are the reasons for the existence of amateur radio, the only hobby which is regulated by laws carefully spelled out and the only one that requires a government license.

Could it be that we have lost sight of these principles? Can it be that the time has come for



An indomitable experimenter with antennas is Fred Dodson, G3NVA, whose use of variations of the quad has brought him world fame. Fred's is often the lone signal coming through from the U.K. after every other G-station has faded out (Photo courtesy of WA2WPP)



Les Lyske, G13CDF, is shown at his fine station in Portadown. Holder of 120 awards, including the first CQ SSB "Worked 75" certificate for 80 meters, Les' set-up includes the following: KW Viceroy Mark III, KW 500 linear, and the HQ-170 as well as an inverted V, a vertical, and a full-wave center fed antenna, all on 80 meters, and a 3 element beam for 20.



Roy Hearsum, W8LUZ, and his delightful XYL, Mickey, were responsible for much of the success of the Ex-G Club get-together at the Dayton Hamfest. (Photo courtesy of W3HQO)

a re-appraisal and that the proposals put forth by the ARRL are worthy of calm, thoughtful and sincere examination?

### Fair is Fair

Within recent memory of us all, a bulletin was issued by the ARRL, denying credit for phone operation which took place within the c.w. portion of 20 meters (14.0 to 14.1). The furor aroused by this edict eventually simmered down and it is not our purpose to re-open old wounds. But it is our purpose to balance the scale and therefore we call attention to the dismaying trend on the part of American c.w. stations to operate above 14.1 in the DX s.s.b. portion of 20. Of late, we have heard a whole slew of W/Ks calling CQ incessantly, usually right on top of established sideband QSOs in this lower limit of the phone band or holding what seem to be local c.w. ragchews of interminable length in the area from 14.1 to 14.14. To zero beat their frequency on c.w. and ask them to please move only adds to the confusion and avails one nothing. How about it? If there is to be no phone operation interfering with c.w., then there should be no c.w. operation interfering with phone!

### Cross Modulation and SSB

For best sensitivity a receiver should have as much gain as possible ahead of the mixers insuring that weak signals will override the internal noise generated in the mixing stages. Conversely, we would like to see little amplification at this point when receiving strong signals to prevent overloading of the front end of the receiver. Obviously we cannot have both without some compromise.

When a receiver is tuned to a weak signal and a strong signal is present close by and outside the passband of the i.f., a type of interference known as cross modulation exists. Since the selectivity of the r.f. section is less than the i.f., it will accept these strong signals. The i.f. section

will not pass these strong signals and no a.v.c. action will be produced to reduce their amplitude. This will affect the operation of the r.f. amplifier and mixer stages and if they are strong enough will cause non-linear operation modulating the weak signal.

To minimize the generation of cross-modulation type of interference it is necessary to carefully select the tubes in the r.f. section, usually making it inadvisable to make changes in the r.f. tube of your receiver. The manufacturer has designed the circuit for the parameters of the tube he selected and any change might seemingly make your receiver perform better but might also create stronger cross modulation effects. Another help is the application of a.g.c. or a.v.c. to the first r.f. tube, since as the level of the weak signal is increased, the r.f. amplifier gain can be reduced, decreasing the amplitude of the interfering signal.

Cross modulation effects are not as troublesome in s.s.b. as they would be on a.m. since there is no carrier present to be modulated by the undesirable signals and the modulation is applied to each of the sideband signal components. As each s.s.b. signal consists of a number of relatively weak components, this undesired modulation is spread and when the s.s.b. signal is demodulated, the interfering signal is recovered as noise and is not as troublesome.

### Teaching Old Dogs New Tricks?

After reading the editorial by Reg Cherrill, W3HQO, in the June, 1963 *Bulletin* of the Ex-G Radio Club, we paused in our summertime activities to give some thought to his suggestion that a "heavy program of education on operating procedures both here and abroad would do much to alleviate the conditions on the amateur frequencies these days." There is no question but that many operators offend with some of their techniques but how many, upon reading a series

[Continued on page 92]



# 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

|           |       |                     |
|-----------|-------|---------------------|
| September | 7-8   | Peruano Phone       |
| September | 14-15 | W.A.K.I. DX         |
| 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   | 19-21 | ARRL CD Phone       |
| October   | 19-20 | RSGB 7 Mc Phone     |
| October   | 23-24 | YL/AP C.W.          |
| 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 S.S.           |
| November  | 16-18 | ARRL S.S.           |
| November  | 16-17 | RSGB 21/28 Mc Phone |
| November  | 23-24 | CQ WW DX C.W.       |
| December  | 7-8   | OK DX C.W.          |

### Peruano

Starts: 0001 EST Saturday, September 7  
 Ends: 2359 EST Sunday, September 8

This year's contest is limited to phone *only*! It's still a Pan American contest and operation therefore is confined to stations in the two American continents. The rules have been drastically changed and simplified.

1. You can use all bands but cross-band contacts are *not* permitted.

2. Serial numbers are of the usual five figure type, RS report plus a three figure progressive contact number starting with 001.

3. Each contact counts one point. (No mention of a multiplier was made).

4. Your log should show date and time; call of station worked; number sent and received; band used, and if a.m. or s.s.b. was used.

5. Awards evidently are on an over-all basis. 1st place gold medal and diploma, 2nd place silver medal and diploma, 3rd place bronze medal and diploma, 4th and 5th place diplomas. Diplomas will also be awarded to the three highest scoring YLs.

\*14 Sherwood Road, Stamford, Conn.

Include a summary sheet with your log with your call, name and address and other pertinent information.

Mailing deadline is October 15th and they go to: Radio Club Peruano, Att: G. Chirinos, OA4PX, P.O. Box 538, Lima, Peru.

### 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 sponsor of this activity. Each Scandinavian country takes turns running the contest.

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 eight for each band.

Complete details were given in last month's CALENDAR.

Mailing deadline is October 15th. This year your logs go to: SRAL Contest Committee, P.O. Box 306, Helsinki, Finland.

### W.A.K.I. DX

Starts: 0600 GMT Saturday, September 14  
 Ends: 0600 GMT Sunday, September 15

This is the first contest ever held in the Marshall Islands and is organized by the Kwajalein Atoll Amateur Radio Club.

1. Use all bands, 3.5 through 28 mc. On 40 meters the KX6s are confined to 7.0 to 7.15 mc. (Phone 7.1 to 7.15 mc).

2. Both c.w. and phone can be used but keep a separate log, as awards will be made for each mode.

3. Serial numbers for non-KX6s will be the RS/RST report plus QTH; (State, Province or Country). The KX6s will send the RS/RST plus a two letter abbreviation indicating their island QTH. (ET, EY, KJ, MO, PY, RN and possibly an uninhabited island, EB or GU).

4. For stations outside the Marshalls each contact counts ten (10) points. The same station can be worked only once on each band.

5. The multiplier for non-KX6s will be the number of different islands worked on each band, each worth five (5) points. Non-KX6s will indicate their state, province or country for multiplier purposes.

6. The final score therefore will be the total QSO points multiplied by the total multiplier points on each band.

7. Awards will be made for both c.w. and phone to the highest scoring station in each country, U.S. call area and Canadian province. In addition, the Worked All Kwajalein Island (W.A.K.I.) certificate can be gained by any station if his log shows QSOs with five (5) different Kwajalein (KJ) stations. (Include 4 IRCs with your log for this award).

8. Your log should show data in this order: Date & time in GMT; station worked; serial number sent and received; handle; band used, and QSO points. Logs go to The Contest Committee, Box 444, c/o Navy 824, FPO, San Francisco, Calif.

### MARC VE/W

Starts: 1800 EST Saturday, September 28

Ends: 2400 EST Sunday, September 29

The Montreal Amateur Radio Club is once again sponsoring this popular Canadian/U.S. party.

Although the contest period extends over 30 hours, you're only limited to 20 hours of operation. Therefore, it is essential that *on* and *off* times are clearly indicated on your log.

It's the VE/VOs working the W/Ks (and North American possessions) and visa versa.

1. Each completed contact counts two (2) points. The same station can be worked twice on each band, once on c.w. and once on phone.

2. The multiplier for W/K stations is rather complicated and unless you have a computer you had better read the following closely. There are four separate stages. (a) Number of VE sections worked, a maximum of ten, VE1-VE8, VE0 & VO. (b) 6.60, the ratio of U.S. to Canadian sections. (c) 2.5 provisional multiplier, based on the ratio of U.S. to Canadian logs received in previous contests. (d) Power multiplier, 2 if input is less than 30 watts; 1.5 if less than 100; and 1 for power inputs over 100 watts.

EXAMPLE for W/K stations: Contact points  $\times$  VE sections worked  $\times$  6.60  $\times$  2.5  $\times$  appropriate power multiplier for final score.

3. Only single operator operation is permitted.

4. Your log should show in this order: On the "receive" side, date/time, contact number, station worked, RS/RST, and ARRL section. On the "send" side, your message number and RS/RST sent. Columns showing type of emission, band used, sections worked and QSO points would also be helpful. And don't forget to indicate *on* and *off* times.

5. Certificates go to the highest scoring station in each ARRL section, and a trophy to the over-all winner.

You are expected to score your own log and check for duplicate contacts. Include a summary sheet giving all the essential information. Call, ARRL section, name and address, number of operating hours, power used and equipment description.

Also include and sign the following declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations and I agree to abide by the decision of the Contest Committee."

This year your logs go to: Gordon H. Webster, VE2BB, 1550 Erin Place, Dorval, Quebec, Canada.

W9NLJ expects to be active from Prince Edward Island during the contest. Although this only counts as VE1 for the contest, it does make P.E.I. available for the WAVE award. So look for W9NLJ/VE1 beginning September 24th and during the contest week-end.

### Results Pakistan 1963 DX Contest

Our friend Mohd, AP5CP considered the con-

test a great success, in spite of the fact that it was on the same week-end as the ARRL DX fracas and that this was the first time it was held.

Handsome certificates are being mailed to the following USA stations: K2LWR, K2ZZH/MM, W3CRA, W3MSK, W4BOM, W4KFC, W4LDL, W4LVV, K5CDA/MM, K6EVR, W8MPW, W8PQQ, W8VSK, W9ADN, W9EWC, W9HT, K0YND, W0DU and W0PNQ.

### Ed. Note

Trying to keep an informative and accurate "Calendar of Events" gets to be quite a frustrating job.

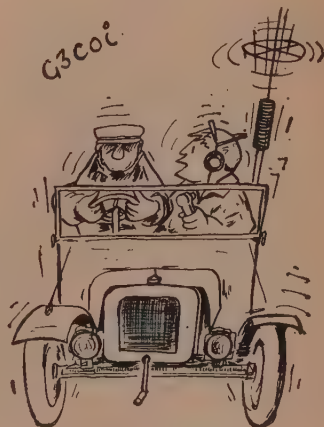
Last minute announcements, (some received after deadline) means rushing the copy to the printer. In one case, conflicting information made it necessary to scrap the original copy and rush the new material in order to make the deadline. The announcement of a new activity for September never did make the deadline and therefore remains unpublished.

What more can I say to impress all concerned: We must meet a deadline at the printers!

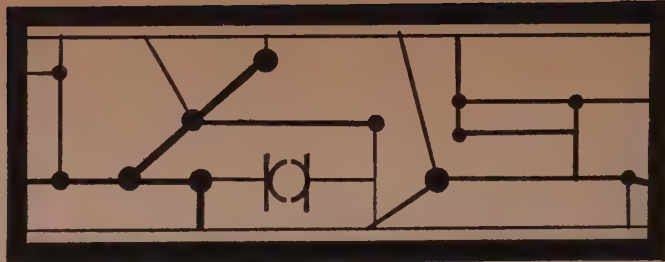
To make the September 14/15 week-end more confusing, the Western Pennsylvania DX Society wants us to announce a DX QSO Party for that date. Club members will be on to afford overseas amateurs an opportunity to complete their "Suits" for the "Hearts & Diamonds" club awards. Write to W3GJY, P.O. Box 206, Conway, Penna. for more information.

It's time you start planning for the real BIG one, our own World-Wide DX Contest. No changes in the rules. We are going to give the 2-point North American contact and the 0000 GMT starting time another whirl. OK Roger, down boy.

See page 46 for the official announcement. 73 for now, Frank, W1WY



..... chap here says we have  
f.m. ....



WALTER G. BURDINE\*, WBZCV

I HAVE just returned from the West Virginia State ARRL Convention held at Jackson's Mill, West Virginia. Cliff Apple, K8BUG, Sylvester Glancy, K8ACD/K3WOP and myself flew a Cessna 170-B over on Saturday morning and flew back Sunday afternoon, there is an emergency landing field adjoining the 4-H State park where the meeting is held and this is maintained by the State. The landing field is in excellent condition and we had 6 or 7 aircraft landing there this time. Jackson's Mill is about 25 miles south of Clarksville. We met some of the most wonderful people there and at night we had the most beautiful full moon that I can ever remember seeing.

Sam Harris, v.h.f. editor of *QST* was there and led an excellent session. It was generally conceded that more articles for the beginning and the serious v.h.f. operator should be written and published by our better operators. All agreed that the ham who builds his equipment is likely to be a better operator and have more pride in his equipment and operating ability.

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



Members of the Metropolitan Ragchewers Club help a Wheelbender get his transmitter in operating condition. See Story in text.

The last week-end in June was Field Day weekend and I participated with the v.h.f. group of the Defense Electronics Supply Center, as captain of the two-meter team, and can say we did well. We did have our share of trouble, which indicated that equipment must always be kept in good condition to survive the rigors of a 24-hour stint. That kind of test sure brings out the bugs in our equipment. My equipment continued to make *daily* contacts for 3,002 days and kept right on going. It sure was a sorry lot that went home Sunday afternoon; unshaven, unbathed and near exhaustion, but happy with a job well done.

We left all the operating to our new members when contacts became scarce but they got the idea that this was serious business and put in lots of hard work. All who were present decided we would be better prepared next year and better equipped.

### Some Random Ideas

The line of Heathkit v.h.f. transmitters known as the "Tener," "Sixer" and "Twoer" have the best little transmitters I have ever heard. Coupled to a good beam they do remarkably well and the quality of the signal is good. The superregenerative type receiver, while being very sensitive has its drawback in having poor selectivity. This doesn't bother the ham who has no nearby neighbors, but it does cause plenty of trouble to the city ham. I wonder about the idea of using one of W6TNS's small transistorized converters and changing the present Sixer or Twoer coils to tune about 20 to 24 mc for an i.f. strip. The power for the converter could come from the cathode of the modulator tube but would require more filtering, or it could be furnished by batteries.

Another idea for the same set is to use the r.f. amplifier and detector as a converter by adding a transistor oscillator and feeding it into the grid of the detector, thus making a regular crystal controlled converter. I have tried this on the Lafayette HE-35 using a Nuvistor oscillator and it works very well. The result is that you have a self contained crystal controlled converter and transmitter in one small case and there are no switching complications. You can use your regular low-frequency receiver to tune

the band chosen. I guess I'll have to get a Sixer or Twoer to try this one.

### Silicon Rectifier Circuits

Last month we discussed how to use a single surplus transformer to obtain a wide variety of output voltages. This month let's look at rectifier circuits that will enable us to use those a.c. voltages to our advantage.

Most surplus gear taken from aircraft requires a filament supply of 28 volts d.c. In fact, with some units containing dynamotors, a single 28 volt d.c. supply will put the entire rig in operation, high voltage included. Fig. 1 shows a low voltage, high current supply delivering about 28 volts at 5 amps, well enough filtered for most surplus work. The 30 volt transformer hookup shown last month is used.

Figure 2 shows a simple voltage doubler that will take the 120 volt a.c. hookup shown last month and deliver around 250 v.d.c. at over 500 ma. Not too much filtering is shown so if it is to be used with receivers or audio amplifiers, additional filtering should be added. Figures 3A and 3B show other voltage doublers also working from 120 v.a.c., but delivering both positive and negative outputs (relative to ground). These should prove handy for supplying small transmitters requiring bias supplies also. Again, little filtering is shown and more will be needed.

### Letters

Nevada has written! Not many letters from Nevada because there just aren't many hams in there. "Dear Walt: KN7TRG, Tony Morgan and I, KN7WLK Norm Thompson just took our Conditional exams together and both passed. We know a lot of hams need Nevada for WAS or USA-CA and we would be glad to schedule anyone. Tony is 13 and I am 15. Tony's equipment consists of a Challenger, Mosely CM-1 receiver, Hy-Gain 14AVS vertical and a Heathkit HG-10 v.f.o. I will use a Knight T-60, SX-101, and a Knight v.f.o. when our tickets come through. We are both members of the Las Vegas Radio Amateur Club and have our complete Collins S-Line in room 202 at the Thunderbird Hotel. We also have a TH-4 beam and a 72-foot tower. 73, Norm and Tony, 6228 Dayton Avenue, Las Vegas, Nevada."

On this next letter, I'm afraid that I won't be able to express myself well enough without using too many superlatives. Bob Hitchcock, WA8-GJM of Detroit wrote me about the Metropolitan Ragchewers Club and their activities. I think they have hit upon one of the best ways to tell the world that the ham is not a selfish egomaniac that enjoys ruining the local television shows and show that they have the good of all people at heart; they are the kind of people that will help one less fortunate than themselves.

The motto of the MRC is, "Dedicated To The Handicapped—So That They May Live Again Through Amateur Radio." That, gentlemen is a sermon unto itself and one that many of us might do well to heed. Apparently their actions

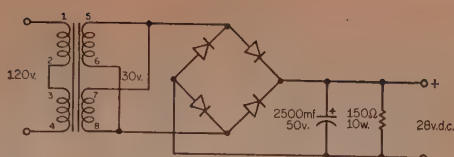


Fig. 1—Power supply suitable for operating the filaments of much surplus gear requiring 28 volts d.c. The silicon diodes may be 1N1341's (50 p.i.v., 6 a.).

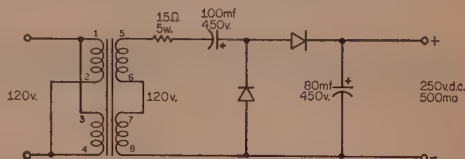


Fig. 2—A 250 v. 500 ma voltage doubler type supply. Diodes may be 1N553's or other 400 p.i.v. 500 ma types.

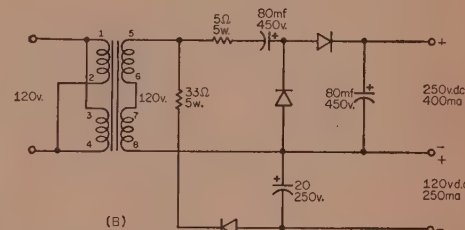
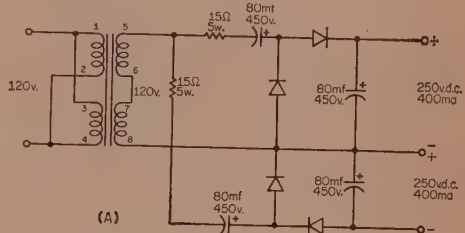
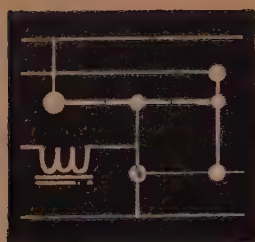


Fig. 3—Two examples of plate and bias supplies from a single transformer. Diodes are 1N533's (400 p.i.v. 500 ma).

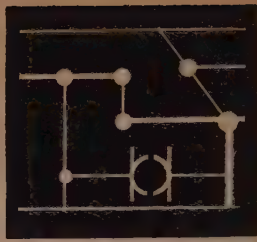
speak louder than words from the newspaper clippings sent with the letter. The club has about 150 members and of these about 20 are handicapped. Dues are \$3.00 for a Regular and \$2.00 for Associate membership. They use the money to buy and build equipment which they lend to a new licensee until he can obtain his own equipment. When permitted, they will install equipment in the hospital rooms of hams so that they may keep in contact with the outside world via ham radio. Their headquarters is located in Lakewood House on the Detroit River at the foot of Lakewood. Space has been made available by the Detroit Department of Parks and Recreation and is supervised by Recreation Director, Earl Rissman.

The club is especially interested in signing up handicapped men and women to teach them a valuable way to spend their idle time. The first chapter of this club is known as the R. H. Peter-

[Continued on page 100]



# VHF



DONALD L. STONER\*, W6TNS

**S**TARTING this month, the VHF column embarks on a slightly different format. In reviewing the current information available to active v.h.f.ers, it becomes obvious that little, if any, of the material is of interest to those on the West Coast. In particular, the *QST* column has been swamped with "Ruttydendrums" and many v.h.f. accomplishments have gone unnoticed or at best inaccurately and incompletely reported upon.

Virtually, all of the v.h.f. accomplishments of any importance have originated on the West Coast in spite of the worst obstacles to be found anywhere in the States. It is hoped that this column will become a meeting ground for those wishing to add to these accomplishments.

**Fresno**—During the recent Fresno convention, I had the pleasure of attending an informal meeting of the most prominent and active v.h.f. operators on the coast. It was also a rather historic occasion in that the various groups and individual operators reached complete agreement on polarization, frequencies, and so forth. The group was unanimous in making this a yearly get-together in conjunction with the popular Fresno hamfest.

Alan Margot, W6FZA, kept the lively discussion from going off on tangents. The following important points were agreed upon at Fresno:

1. 144.05 is to be kept clear for beacon stations transmitting from outside California. Anyone trying to lob a signal into W6—land should

\*Alta Loma, California.

use 144.05 and listen for replies on the same frequency.

2. The local calling frequency for 220 is to be 221.5 mc. DX work will be conducted on 222.000 mc.

3. Antenna polarization on 432 is standardized on vertical. Polarization on 1296 is also vertical as empirical evidence indicates this results in reduced radar interference.

Bill Pandratz, W6TJZ, showed his beautifully constructed 50 mc s.s.b. generator which extracted techniques employed in the 144 mc rig recently featured in *GE Ham News*. Bill used coax phasing lines to replace many of the tuned circuits and performance was reported to be excellent.

**Long Beach**—The first annual V.H.F. Jamboree presented by the Long Beach Microwave Society is now history and quite a jumping affair it was. One of the highlights was the 3300 mc "Rockloc" system demonstrated by the San Bernardino Microwave Society, Inc. Rockloc, developed by SBMSI, and demonstrated by Ed, W6OYJ, is an ingenious method of permitting crystal stability and duplex operation on the microwave frequencies. The basic idea is shown in the block diagram, fig. 1. The heart of the system is a Klystron used for local oscillator and transmitter. 3300 mc signals are heterodyned down to a 30 mc f.m. i.f. strip (BC-604 tank receiver) for amplification. With the a.f.c. switch in the RELATIVE position, the incoming signal is locked in by a.f.c.'ing the Klystron repeller with the discriminator voltage. Duplex operation is possible simply by modulating the repeller and using the SBMSI developed polaplexer for isolation. Thus, the transmitted and received signals are always 30 mc apart. So

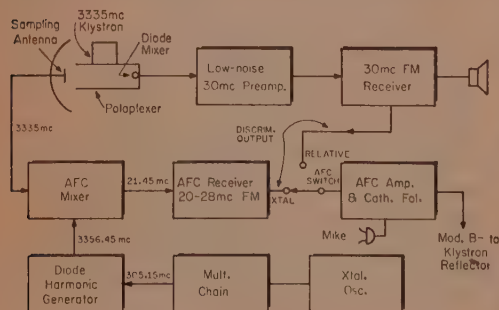


Fig. 1—3300 mc "Rockloc" station as used by members of the San Bernardino Microwave Society. The transmitted signal is at 3335.0 mc while the received signal is at 3365.00 mc, the difference of 30 mc being received by conventional means.



The antenna system at OH1ML's QTH.



VHFers get-together at Fresno. You can always tell the executives by the fact that they wear ties. Front row, l. to r. W6's CDT, GDO, FZA, ZUP, NGN, K6YIL, W7ZQX. Rear, l. to r. W6TNS, K6UQH, WA6FJX, WA6MGZ, K6SDZ, W6???, W6GGV, K6QXY, W6DNG, K6KFF, W6IZU, K6???, K7AAD, K6GVB, K7UZK, W6CBR, K6GOX, K6RNQ.

far, the system is conventional. However, for serious DX work, better frequency control and accuracy are required. The Rockloc system is so successful in this regard that a Drake 2B is coupled into the 30 mc i.f. strip to obtain super selectivity. Rockloc works in this manner: A crystal oscillator and diode harmonic generator are used to create a signal at 3356.45 mc. This is mixed with a sample of the transmitted signal on 3335 which is picked up by a sampling antenna located near the throat of the polaplexer. The resultant signal on 21.45 mc is amplified by an a.f.c. receiver (another BC-603 tank receiver).

By changing the a.f.c. Switch to the XTAL position the repeller is a.f.c.'ed by the discriminator output of this receiver. Any transmitter drift from the 3356.45 reference is thereby corrected thus providing the equivalent of crystal control.

Attesting to the performance of this system is the fact that this group has been able to "knife edge" signals from the Pomona Valley into the Victor Valley over a 10,000 foot range of mountains! This is a good trick on 144 mc and a superb accomplishment on 3300 mc. They demonstrated a rock solid signal between Pomona and the Hotel Lafayette in Long Beach. Even without the smog, and other man-made obstacles, this was an impressive feat.

**Personality**—All v.h.f.'ers are well aware of the historic accomplishments of John Chambers, W6NLZ, in contacting KH6UK direct, on two meters. Those skeptics who thought Indians were still scalping settlers in California surely must have conceded we were civilized when the EIMAC gang succeeded in bouncing a signal into the swamps of Massachusetts via the moon.

However, because of disbelief on the part of the ARRL and the extreme modesty of W6DNG, few people have ever heard of Bill Conkel. Long before these historic v.h.f. landmarks occurred, Bill was experimenting with moon bounce and obtaining excellent echos. This was done without any partner or encouragement until Bill met up with Ned Conklin, K1HMU.

Ned shared Bill's interest and although handi-

capped by college studies and limited operating time, K1HMU and W6DNG had many two meter contacts and exchange of reports via the moon. Bill has recorded many reels of tape of K1HMU signals and they have exchanged tapes. They made fascinating listening and produced far away expressions in the eyes of avid v.h.f. addicts.

Through Ned and subsequent correspondence, Bill met Lenna Suomenen, OH1NL, of Nikkila, Finland. Len also shared Bill's interest in moonbounce and the two amateurs agreed to conduct moonbounce experiments between Finland and California. The first signals were received during the winter of 1961 and two-way contact was established for certain in March of 1962. Again tapes were made to document the occasion and they are superb. I first heard them at Fresno. Even I could copy the calls and signal reports and I am not particularly known for my c.w. prowess. On one signal burst the receiver is obviously mistuned (the ringing and c.w. pitch don't match) and yet the signal is Q5 copy.

If it were anyone other than Bill Conkel, one might turn a skeptical eye toward the spinning reels on the recorder. However, anyone who has the good fortune to know W6DNG will vouch for the fact that anything he does is "the real McCoy."

Unfortunately, virtually nothing on Bill's record shattering two meter contacts with Finland have appeared in *QST*.

In case you are forming mental pictures of an exotic set-up at Bill's QTH, refocus, friend. Bill lives smack dab in the middle of a congested residential district. The power line noise level is unbelievably high. His transmitter is a straight-forward kilowatt and is located in his shack, about 100 feet from his antenna system. The receiving system consists of a 416 preamp, converter and a modified 75A-4. Bill has worked up a system for regenerating the signal which appears to produce a good 10 db increase in the signal to noise ratio and also a.f.c.'s the receiver

[Continued on page 94]



# the USA-CA PROGRAM

CLIF EVANS\*, K6BX

**J**OHN Thomas Laney III, K4BAI, came in for USA-CA-1500 number two; following K9EAB who grabbed off number one as reported last month. Runners up for the month ending 30 June, winners of USA-CA-1000, were W0MCX, Art Jablonsky, and VE3BKL, Homer T. Houser, for numbers 11 and 12 respectively. Indicative of vacation months, only three winners of USA-CA-500 came in as shown below:

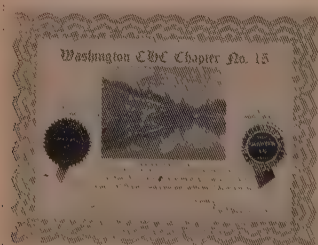
| USA-CA HONOR ROLL |     |        |    |       |   |
|-------------------|-----|--------|----|-------|---|
| 500               |     | 1000   |    | 1500  |   |
| K8ZNI             | 239 | W0MCX  | 11 | K4BAI | 2 |
| W4HOS             | 240 | VE3BKL | 12 |       |   |
| W8NXN             | 241 |        |    |       |   |

Of interest on the above, W4HOS was for all c.w. and K8ZNI was for all Novice c.w. operations; others were for mixed operations.

## Nuclear Power Award

Word from Tom, W4TDT, says 112 applications to date from those who have contacted the three military nuclear powered amateur radio stations while they are actually operating on nuclear power. See story in July, 1962 issue

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



Here is the beautiful Washington CHC Chapter 15 Award picturing the 14,410 foot ice crowned volcanic cone that dominates the skyline of Mt. Rainier National Park. To get this beauty one must work members of Chapter 15 as follows; W/VE work 8; DX work 5, DX no charge; W/VE send 50¢. Seal for 12/8 members with s.a.s.e. Send GCR list to Custodian, W7NNF, 18150 N.E. 60th Place, Seattle 55, Washington. Members: K6BX; W7CNL, CSW, DZB, NNF, NRB, OEB, UVR, YFO, COG, JWE; K7NHG, BJE, UXN, BVZ, RAM, KSF, OFW, OFX, QOM, JRE, PVF, PVG.

of CQ page 55.

Latest information on these three stations is: KC4USV now being heard on 7205 kc from 0600 to 1200Z. KG1CC now on 14335 kc from 1200 to 2000Z. KL7WAI operates around 14320 at various times and has been heard around 2100Z. The Nuclear Power Plant at Camp Century, KG1CC, is scheduled to be removed after March 31, 1964, so anyone still needing that contact should search with beams in that direction.

Tom reports many errors in mailing to Custodian. Correct QTH is Fort Belvoir Amateur Radio Club, P.O. Box 146, Fort Belvoir, Va.

## Tip to Mobilers to Rare Counties

Many mobilers headed for rare county expeditions have asked what frequencies the hunters hang out on. Our best answer would be for them to use CHC hangout frequencies (plus or minus 5 kc) and call "CQ RARE CTY." AM: 3810, 7235, 14250, 21,330 kc. SSB: 3990, 7205, 14340, 21440, 28690 kc.

## 20-K Award Changes Sponsorship

The 20-K Award for working 20 different U.S. Areas and Possessions with K Prefix, previously sponsored by W1AGS, is now sponsored by *The Directory of Certificates and Awards*. This writer is Custodian. Rules remain unchanged. For information send s.a.s.e.

## White Stick Award (Blind Hams)

It is with pleasure we announce the White Stick Award sponsored by the White Stick Amateur Radio Club for working at least 50 blind amateurs with no more than 10 in own country and with contacts after January 1, 1963. QSLs must show that operator is registered as being totally blind. Send GCR (certified) list and fee of \$1 or 10 IRC to Custodian, GI6TK, Frank A. Robb, 125 Downshire Road, Hollywood 14, Co. Down, Northern Ireland.

There is a story behind this one. Sparkplugging the WSA is the Custodian, GI6TK, Frank, who, as a blind ham, has excelled in many fields and wished the world to meet other blind hams who also are contributing to society in notable manner regardless of what some folks consider a handicap.

Every blind ham in the world is automatically a member of the White Stick Amateur Radio



Pictured here is Andy Rugg presenting number one C-150-C award to Fred Woodley at the May 11-12, 1963, Canadian DX Club Convention in Kingston, Ontario. Standing left to right are Andy, Fred, Garry Hammond, and Bob Viau; kneeling is Rodger McNicoll. See picture caption story about the C-150-C award.

Club . . . all that is necessary is that calls be registered with GI6TK, so folks, send along the calls of all known blind hams to him. Let's help Frank eventually list every blind licensed ham in the world, and we hope later to publish the list.

Why are we so enthused . . . we were once considered hopelessly blind . . . by a miracle of surgery, we regained partial vision in one eye . . . we operated blind for over a year and we learned the 'sight' and 'vision' ham radio gives to the blind. We know also that the blind ham does not consider himself handicapped simply because he has will to excel the average by his very perceptiveness in human relations.

Let's take GI6TK as example . . . blind, yet he has flown as Navigator and Radio Officer on the Test Flying team of a well known aircraft firm in Belfast, N. Ireland since 1937. He has actually been directly associated in the test-flying of scores of aircraft including *Mayo/Mercury*, *Bombay*, *Hereford*, *Stirling* Mk I, II, & III, *C-Class Flying Boat*, *Sunderland* Mk I, II & III, *Solent* Mk III & IV, *Britannia* Mk I & II, *Sandringham*, *Shetland*, *Plymouth*, *Sealand*, *Camberra* and others.

Who among you with 20-20 vision can match Frank's sightless contributions to the art and science of communications and amateur radio? Who else is better qualified to sparkplug the White Stick Amateur Radio Club which has purpose of giving publicity to the many contributions blind hams make to amateur radio and how they can and do help provide many hamdom services. Let's all get behind Frank in making the WSARC a monumental and living instrument of man's accomplishments under difficult circumstances . . . let's help Frank, a ham since 1928 (age 9) show the way along a brilliantly lighted path. Yes, Frank's XYL also is blind. See picture of Frank at his rig. P.S. A letter from Frank today, he is having difficulty getting award certificates printed up in Northern Ireland . . . who is willing to help Frank over this hurdle?



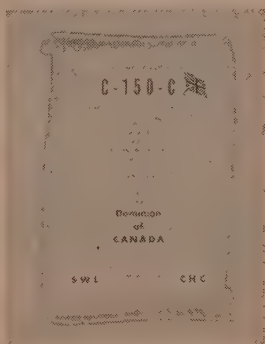
S.w.l.er 11-10280, Leonardo Papis of Varese, Italy wrote expressing his thanks to George, W3DPM who recently sent him a gift of an expired *Call Book*. We have hundreds of DX s.w.l.ers working for the USA-CA award who have requested a gift of an expired *Call Book*, so, if you have one, not over two-years old, send s.a.s.e. to K6BX for a name.

### YL International SSB'sers Awards Program

The SSB'sers, with membership nearing 1500 in over 200 countries have launched a major awards program for working members with emphasis on working DX. All contacts after February 9, 1963, the date the SSB'sers were founded. There are no band/mode endorsements. For all awards, send fees as specified. Complete member list will be kept updated in the *Directory of Certificates and Awards*. Awards are as follows: (Note: No charges to DX stations as a good will action)

KING NEPTUNE AWARD (KNA)

U.S. stations work 10 DX members plus 5 in the U.S.; DX stations work 10 members in U.S. plus 5 DX; total 15. Up to 15 seal endorsements to basic award for working additional



Here is the C-150-C Award sponsored by the Canadian SWL-CHC Chapter 1 for working cities of Canada. North Americans work 50 for basic award and with seals for each additional 25; other work 30, with seals for each additional 30 thereafter. Each a separate award. No Province restrictions for basic award but all 10 must be included for each seal after the first one. Available to s.w.l.s. Send GCR list and \$1 or 10 IRC to Custodian, Andy Rugg, 16 Lakebreese, Pointe Claire, Quebec, Canada. Endorsement seals for all one band/mode or mixed for one IRC or 10¢. (U.S. s.a.s.e. are not good in Canada). Send one IRC or 10¢ for awards rules and application blank which lists all Canadian cities.





# YL

LOUISA B. SANDO\*, W5RZJ

**C**ONGRATULATIONS to Anny Jenk, HB9YL, first licensed YL in Switzerland, who recently received CHC award No. 888 in a surprise presentation by Mayor Ramu of Frutigen. Anny's OM Fred, HB9TT, secretly compiled the list of her awards and applied to K6BX for CHC. She knew she had a lot, but was always too QRL to follow up with them, or QSLs, so HB9TT is award manager for both.

Fred, who works for PTT Telefonservices, went on the air in '55. QSLs and letters got Anny interested and in '57 Fred applied for her s.w.l. license. In the spring of '58 she passed the code exam and that fall the technical one. Since then they have enjoyed numerous QSOs together. Their QTH, in a valley of the Berner Oberland Mtns., is not too good for hamming and the Americas represent rare DX for them! Most W-K QSOs have occurred while they camped out on holidays using a 7-watt rig and dipole, or during national field day with their club (at Thun) as HB1TT-HB1YL. The Jenks run 50 watts and for the past year have been using a cubical quad. Anny has worked 160 countries, 150 confirmed; HB9TT has 208/200.

Anny and Fred have two jr. YLs, Elizabeth 14 and Margrith 12. Anny's second hobby is gymnastics and she is 2nd leader of a women's gymnastic club, the leader of which is YF of the mayor. (Quite a conspiracy there between Fred, Cliff and the Ramus!)

Fred adds there are currently two other YL stations in Switzerland: HB9YY, Anneli, YF of HB9YR, and HB9ACO, YF of HB9QV.

## IHHC

In the April column we had a pix of W7QYA and SM4KM, taken while Flo was on a world trip with another teacher from Lewiston, Mont. Since then Flo has returned home, and along

[Continued on page 102]

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

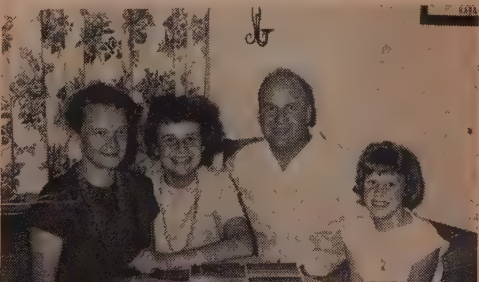
Anny Jenk, HB9YL, receives CHC certificate No. 888 from Mayor Charles Ramu at Frutigen, Switzerland. In the right photo, Anny and her family, Elizabeth, OM Fred, HB9YT, and Margrith.



Flo Majerus, W7QYA, enjoyed many ham contacts through IHHC during her world trip. Flo was first licensed in 1950 when working for CAA in Alaska. She works 20, 40, 80 mostly c.w., though can work s.s.b. and a.m., and especially enjoys DX. She uses a Thunderbolt kw to 3-element beam on 20, dipoles on 40 & 80. Her OM is W7VMB, Mel.



On her world trip Flo, W7QYA, visited the ZL YLs in Auckland and forwarded this photo of some of them taken during the New Zealand Field Day, which takes place in February. L. to r., ZL1AMK, Eleanor Jensen; ZL1LD, Pat Joseph; YF of ZL1AFQ, Enid Rosan, and ZL1ANA, Janette Barker.





# HAM CLINIC

CHARLES J. SCHAUERS\*, W4VZO

**W**HEN the klystron tube was invented, it opened up a large area for practical communications in the microwave spectrum. However, because of its high price, few amateurs used the tube in their u.h.f. work. Although it is still expensive, the price is within reach of most hams who are seriously interested in using the u.h.f. spectrum allocated for amateur radio operation.

As we know, the speed of the electrons emitted by a cathode in a vacuum tube is very high. However, at microwave frequencies, the time it takes an electron to travel between the cathode and plate of a vacuum tube may be quite long when compared to the frequency of a signal. Long before an electron can make its way to the plate, the field between the cathode and plate (at microwave frequencies) may reverse itself. The result is a phase reversal between plate voltage and current, increased plate dissipation, lower output power and frequency limitations.

In the klystron however, the drawbacks found in using vacuum tubes at microwave frequencies are obviated. In fact, the transit time is an important function in the klystron and is used to generate and/or amplify radio frequencies in the microwave region.

## How It Works

An electron stream always flows toward a positive point. A negative field will repel an electron while a positive electric field will attract it. However, as the electron moves away from a positive force, it will be slowed down. On the other hand, when it flows away from a negative field it is accelerated.

An increase of electron velocity increases the Kinetic (caused by motion) energy of the electron, and a decrease of velocity decreases its Kinetic energy.

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

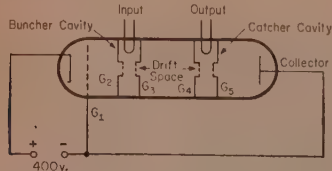


Fig. 1—Simplified Klystron amplifier. Focusing electrodes are not shown for simplicity.

When energy is added to a flowing electron or taken away from it, the energy must come from somewhere or be dissipated. This addition or subtraction of energy is due the action of the electric field.

To understand how the klystron operates, refer to fig. 1. Here you see at opposite ends of the tube a cathode (left) and an anode or collector (right). Next to the cathode is the positive accelerator grid ( $G_1$ ) which pulls the emitted electrons from the cathode and directs them in a very high-velocity stream toward the two grids in a cavity resonator. These grids ( $G_2$  &  $G_3$ ), called buncher grids, have an electric field between them which is due to the signal voltage fed into the cavity by a probe, coupling loop, or a waveguide. The cavity has both inductance and capacitance so acts like a tuned  $L-C$  circuit.

On positive half cycles, the field between the buncher grids speeds up the electrons. As the signal wave approaches its zero position, the electric field has less and less effect on the electrons, until zero is reached and there is no effect at all. On negative half cycles, the field slows the electron stream.

The electron stream then leaving the buncher grids is composed of electrons going at different speeds. In the drift space (between  $G_3$  and  $G_4$ ) there are no fields which could accelerate the electrons. The electron speed will be the speed at which each electron left the buncher grids. The electrons traveling at a faster rate than others will overtake the slower electrons and at a given point in the drift space, the electrons will form bunches due to their "jamming up."

The second resonant cavity near the end of the tube contains catcher grids ( $G_6$  and  $G_7$ ). Its position is at the point where the electron bunches form.

An r.f. voltage (at the cavity resonant frequency) is induced by the electron bunches in the catcher cavity, the action of which is analogous to a tuned  $L-C$  circuit. When the proper phase relationship exists between the induced r.f. voltage and the bunches, field action will slow down the electrons as they pass the catcher entry. Energy from the slowed electrons goes into the catcher cavity field and is removed by another coupling loop. The decelerated electrons continue on until they strike the collector which conducts them back to the cathode.

There is no *net* exchange of energy in the buncher cavity throughout a complete cycle of signal voltage because the electrons pass the buncher gap in a constant stream and the signal voltage has an equal positive and negative effect on the electron stream, *i.e.*, it slows down as many as it speeds up.

Amplification action of the klystron is due to the energy given by the slow electrons to the catcher field. This represents an increase in power which is greater than the applied signal voltage.

To obtain power outputs in the kilowatt power region, multi-cavity klystrons are available. These are made with two cavities and achieve much greater efficiency by cascading power gains.

For use as an oscillator at u.h.f. and s.h.f., the klystron operates by feedback action. That is, output from the catcher cavity is fed back to the buncher cavity in the proper phase, as in most tube oscillators, where there is plate to grid feedback.

For frequency multiplication the buncher cavity is made larger than the catcher cavity. The catcher cavity is then tuned to resonance at some multiple of the buncher cavity frequency.

### Reflex Klystron

The reflex klystron is shown in fig. 2. Note that only the resonant cavity and one set of grids are used. These grids act as both buncher and catcher for the electrons emitted from the cathode.

The two cavity klystron uses a collector, but the reflex klystron uses a repeller electrode instead. The electrode is negative with respect to the cathode and deflects the electrons back, rather than returning them to the external circuit.

Frequency and power output of the klystron are dependent on the time it takes the electrons to leave the gap and return in a bunch. The time in turn depends on the distance between gap and repeller and the supply voltage on the grids and repeller. A tube having a fixed distance between gap and repeller enables the control of frequency and power output by the repeller voltage.

The r.f. output of a reflex klystron may be taken through waveguide or coaxial cable.

The overall efficiency of a reflex klystron is very small, but this is no hinderance in most applications.

To modulate the circuit of fig. 2, the modulating signal can be connected in series with the repeller voltage supply, similar to plate modulation of a vacuum tube.

We hope that this will answer the requests to "simplify the explanation as to how klystrons work."

### Questions

**Doublet Transmission Line**—"I managed to get hold of some 'new' surplus W-110 field wire (twisted pair) used by the military forces. I plan to use some of it for a doublet antenna transmission line. Will it work okay?"

No. This wire is composed of steel and copper strands and does *not* have an impedance of 72 ohms or 300 ohms. With coaxial cable cheap as it is, use the 72 ohm type for the simple doublet, and 300 ohm flat line for the folded doublet.

**Overload 6146**—"The 6146 in my small transmitter only lasts about two months then out it goes. I am using about  $4\frac{1}{2}$  ma of grid drive, about 300 volts on the screen and 800 volts on the plate in a class C final. What gives?"

Under the conditions you describe, the tube, of course. Gosh, you've been overloading it, no wonder frequent replacement is necessary. Keep your grid drive down to 3 ma, plate voltage at 750 volts, screen voltage at 160 volts for c.w. For phone, 600 volts on the plate and about 160-175 volts on the screen.

**S.S.B. Exciter Power**—"What is an easy way to check the power output of a simple s.s.b. exciter?"

Connect the exciter to a dummy load (matching its output impedance). Across the load connect a vacuum tube voltmeter. Use the formula  $E^2/R = P$ . Your v.t.v.m. will read r.m.s. volts. It is assumed that you will apply tone modulation to the exciter. Your calculation will be average power, if you use an r.m.s. calibrated v.t.v.m.

**KWM-2 Modification**—"Do you have any information on modifying the KWM-2 transceiver so that I can shift my receiver frequency some distance away from my transmitting frequency without major 'butchering'?"

No. If anyone has such information we would be glad to publish it here. How about it anyone?

**Converter for Transistor Radio**—"I have been trying to make a 10 meter transistorized converter work with my BC transistor radio. However, I am stumped. I continue to receive BC signals after the converter is connected to the BC set's antenna coil. Any solution?"

If you don't shield the antenna coil you will continue to get BC pickup. Shield the coil and connect it via a coaxial cable to the output of your converter by placing a .001 mf capacitor in series with the cable's center lead. Ground the coax shield to the BC set chassis.

**Predictions**—"A few years ago you predicted that the Collins KWM-1 would be followed by *other transceivers*—seems you were correct. Got any other predictions hanging around?"

In 1967, 10 meter DX will be blooming; transceivers will be *completely* transistorized and be available in 500 watt units; there will be more hams than CB operators; hams will

[Continued on page 96]

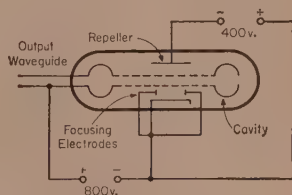
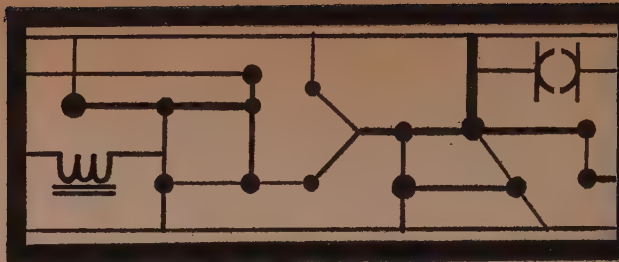


Fig. 2—Reflex Klystron oscillator circuit. Only one cavity is necessary to achieve oscillation.

# RTTY



BYRON H. KRETZMAN, W2JTP

## RTTY Operating Frequencies

Nets centered on frequencies given; operation usually  $\pm 10$  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 |

**A**MATEUR radioteletypers have been permitted to use narrow shift, that is, less than the previously authorized 850 cycles, since March 16, 1956. While most general RTTY operation is on 850 cycle shift, much experimentation with narrow shift has been going on, both on the air and on the bench, ever since. The advantages of n.f.s.k. (narrow frequency shift keying) are: less spectrum required, therefore less QRM; less receiver bandwidth required, therefore better signal-to-noise ratios are realized; less trouble from selective fading, therefore fewer resultant errors. What we are trying to say is that more reliable scheduled traffic circuits are possible when n.f.s.k. is utilized.

\*431 Woodbury Road, Huntington, N. Y.

## RTTY The Hard Way...No. 23



"I'm still not convinced those new gears are for 60 w.p.m."

The disadvantages of narrow shift are essentially technical. Let's face it: it isn't as easy to handle as 850 cycle shift. This, of course, doesn't daunt the serious RTTYer. Sure, it takes a little more effort, but this is the sort of thing that keeps amateur radio alive. Speaking now of h.f. operation, stability is a problem. A really stable receiver is required, and careful attention to the v.f.o. and its f.s.k. circuit is required. The receiving converter (TU) must be specially built to achieve completely satisfactory operation—that is, unless you have available the surplus CV-89 of the AN/URA-8A. (RTTY Column, *CQ*, June '62) The i.f. converters of the AN/URA-6 and -7 also have narrow shift built in. (RTTY Column, *CQ*, Sept. '62) A positive tuning indicator also is a vital necessity. Even the expert can't properly tune in n.f.s.k. by ear.

A few brief words are in order here on standards for narrow shift. The surplus converters are designed to operate with shifts of 200 cycles or less. Amateur RTTY has more or less standardized on 170 cycles, a commercial standard for tone telegraph. The actual value we use is not too important since most TU's for narrow shift are not of the tuned filter type but are of the discriminator type which will accept a reasonably wide range of shift, say 60 to 300 cycles. When an audio-type of TU is designed, the question arises, "What should the center frequency be?" The CV-89 uses 1000 cycles. Should we design around this or some other, perhaps more convenient, value?

## The Narrow Shift of W2JAV

A most fascinating demonstration of the latest in narrow shift equipment and techniques was given by Phil Catona, W2JAV, at the March 25th RTTY Meeting in New York. Most of you are acquainted with the simple transistorized 850 cycle shift equipment Phil developed to assist the newcomer in getting started. (RTTY Column, *CQ*, Feb., Mar., Apr., May '62) Well, Phil's narrow shift gear was designed in the same format. A printed circuit card contains the TU and another card the a.f.s.k. oscillator. The same connections are used, so changing from standard 850 cycle shift to narrow shift is simply a matter of switching around the printed circuit boards. Like the wide-shift gear, a polar relay in the output of the narrow shift TU is used to key the local



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, INC.**

A SUBSIDIARY OF ALTEC LANSING

801 SOUTH MAIN STREET, BURBANK, CALIFORNIA

For further information, check number 6, on page 110

# VHF

## AMATEUR

BOB BROWN, K2ZSQ, Editor



### In This Issue

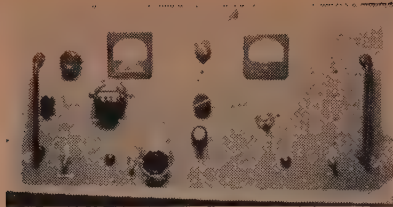
#### Departments

- VHF Sideband Column . . . 76
- DX Report Column..... 77
- UHF Roundup Column . . . 78
- Syracuse Roundup..... 73

#### Features

- Two Meter Kilowatt. *Bob Heil, K9EID, and Gus Budina, K9EBA* 72
- The VHF Amateur Reviews: The Clegg Thor 6 Transceiver  
*Bob Brown, K2ZSQ* 74

Cover Photo: Meet Les Watkins, WØWEQ, at the controls of his VHF sideband installation in Normandy, Missouri.  
Address all correspondence to: Bob Brown, K2ZSQ, Editor, *The VHF Amateur*, 300 W. 43rd St., New York, N.Y. 10036



**An effective 144 mc class ABT linear amplifier using 4X-250B's running 500 watts on a.m. phone and a full 1000 watts p.e.p. on s.s.b!**

## Two Meter Kilowatt!

BOB HEIL, K9EID\*  
402 Border Street  
Marissa, Illinois

GUS BUDINA, K9EBA  
305 North Cedar  
O'Fallon, Illinois

PAGING THROUGH THE LAST ten year's many amateur publications, I find that construction articles using 4X250B's are hard to come by, especially a good circuit for use on VHF. This was the basis for the kw amplifier at K9EBA. Gus had many headaches during the birth of this final amplifier, but after many hours of sketching and building, it was finished and today is working perfectly. This final would not be for the rank novice starting on his first building project, but rather is meant for the serious-minded VHF man who has intentions of using it on sideband. Note to ancient modulation men: This final also performs well on a.m.

The power supply and r.f. components are contained all in the same cabinet with all controls brought out to the front panel. The plate, screen, and grid of the 4X250B's are metered with a 0-750 ma. meter in the plate, and a 20 ma. meter being switched between the control grid and the screen grid. The tuned lines can be adjusted for length; the loading capacitor, plate capacitor, and grid variable are all tunable from the panel. The bias control is also accessible. Various switching for the filaments, high voltage, low voltage, etc., is also controlled from the front panel.

The plate tank and tube compartment was made from a  $7 \times 15 \times 6$ " aluminum box. To the base of this was added two  $7 \times 7 \times 2$ " aluminum chassis bolted on the bottom to form the grid compartment and a box for some of the power supply components. The grid compartment must have a bottom plate fastened to it, so it becomes a pressurized section onto which a blower of sufficient square-foot-per-minute can be mounted to keep the tubes cool.

\*VHF Sideband Editor, *The VHF Amateur*.

Top view of the linear amplifier showing the 4X250B's at the right connected by  $\frac{3}{4}$ " copper straps to the 11" copper bar. Shorting bar at the left is threaded and adjustable. Top plate (removed for photograph) is well ventilated.



The two tube sockets for the 4X250B's are mounted on one of the small  $7 \times 7 \times 2$ " chassis spaced  $\frac{3}{8}$ " apart arranged to clear the back of the plate line box. The plate tank is constructed by using two pieces of  $\frac{1}{2}$ " copper water pipe 11" long. The shorting bar is formed by a  $\frac{3}{4}$ " bronze rod with two sides filed flat to conform with the diameter of the  $\frac{1}{2}$ " copper plate line. By using some silver nitrate powder, the building can silver plate all of the copper parts in the tank circuit. The copper parts must be thoroughly cleaned and brightened by hard rubbing with steel wool. The silver nitrate powder is then rubbed onto the part to be silver plated. The silver nitrate is used by electrical firms to silver plate buss bars before silver soldering and is available under the trade name, *Kool Amp*.

The grid circuit is made from #14 wire bent into the proper shape as illustrated. The grid coil  $L_2$  is mounted right to the grid pins of the tube sockets.  $C_1$  is mounted on the front of the compartment and controlled from the front panel by a 5" length of  $\frac{1}{4}$ " rod connected to the shaft of  $C_1$ . The grid link  $L_1$  is connected to the coax fitting on the back panel, routed over the top of  $L_2$  and grounded to the chassis at a point in the center of the two tube sockets.

Neutralization of the amplifier is very easy by using some of the non-capacitance feed-thru insulators beside each tube socket and attaching the crossed grid leads to the bottom side of the feed-thru. On the top side of the chassis, a 6 inch length of #18 en. wire can be attached to the feed-thru. By moving these leads closer or further apart from the 4X250B's, proper neutralization of the amplifier is obtained.

Check all of the tuned circuits with a good grid dip meter to assure that all the coils are

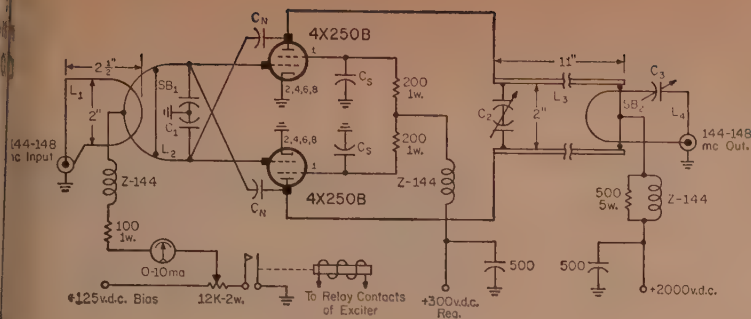


Fig. 1 — Schematic diagram of the described push-pull 1000 watt class AB<sub>1</sub> linear amplifier for 144 mc. This straight-forward linear can be excited with 10 to 15 watts of c.w., a.m., or s.s.b.

C<sub>1,2</sub>—Split-stator single rotor (single stator each side with approximately .2" gap).  
C<sub>3</sub>—15 mmf, double spaced variable capacitor.  
C<sub>4</sub>—Crossed 1" grid leads constructed of #18 e. through chassis near far side of each tube. See text for neutralization info.  
C<sub>5</sub>—Part of 4X250B tube socket.  
L<sub>1</sub>—2½" long hairpin loop of #14 spaced ⅝ to ¾" from L<sub>2</sub> and rigidly fastened.

L<sub>2</sub>—4" hairpin loop of #14, 1½" wide.  
L<sub>3</sub>—Tuned lines constructed of two 11" sections of ½" copper tubing spaced 2" apart, shorted with variable shorting bar as detailed in fig. 2.  
SB<sub>1</sub>—Piece of #14 copper wire used as shorting bar across L<sub>2</sub> so that C<sub>1</sub>, half meshed, will tune tank to approximately 146 mc.  
SB<sub>2</sub>—Adjustable threaded shorting bar for L<sub>3</sub>. See plate tank detail, fig. 2.

tuned lines are on the proper frequency and can all be tuned with adjustment of the correct capacitors in each circuit. After frequency is obtained and the amplifier is ready to fire, the first thing to check is to make sure the blower and the filaments are coming on at the same time. *Never operate the filaments without the blower running!*

Neutralization is to be accomplished next. By using the r.f. probe in the v.t.v.m., connect the probe to the center conductor of the coaxial output connector and ground the shield. With drive from the exciter applied, *B-plus off*, adjust the two stubs of #18 enameled wire along side of each tube for minimum reading on the v.t.v.m. B-plus and bias can now be applied and adjust the voltages to these values: plate voltage, 2000 v.d.c.; screen grid voltage, 300 v.d.c.; control grid voltage adjusted so that the plate current draws 200 ma. with no drive applied; heater voltage, 6 v.a.c., 2.1 amp.

Apply drive from the exciter again and load

the amplifier to the antenna system. You should now be able to load the plate to 400 ma. with no trouble with proper adjustment of the grid tank and plate lines. At this point the input will be 800 watts with a steady carrier (this will be more or less depending on the antenna system and the efficiency of the plate lines). One thing to remember about an amplifier of this type is that most of the problems encountered with parasitic oscillations and unstable operation are usually developed with excessive grid current (control grid and screen grid) which become very harmful to the tubes under prolonged operation.

Plate loading should be fairly heavy with a point of good output obtained while maintaining a minimum of screen current. The lower voltage and higher current is much more effective than low current and higher voltage. The screen dissipation is 12 watts per tube and this is one point that should be observed very closely. If the screen dissipation rating is exceeded, the tubes will be very short-lived and will die a horrible death.

By following the diagrams and photographs closely, one should be able to construct this final for two meters with a minimum of trouble; operation of it will become a terrific pleasure as soon as you get it on the air. The authors will be only too happy to answer any correspondence concerning this rig. *See you on two!* ■

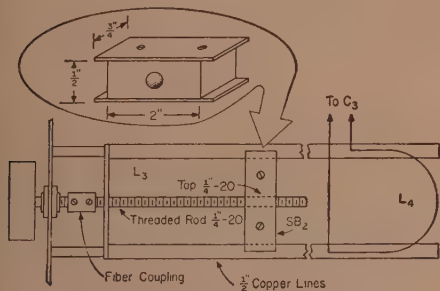


Fig. 2—Diagram of the tuned lines in the tank circuit of the 1000 watt linear amplifier for 144 mc. Note construction of the shorting bar, SB<sub>2</sub>. Length of tuned lines is 11 inches.

## SYRACUSE VHF ROUNDUP!

Register at noon Oct. 12th for the 9th Annual SYRACUSE VHF ROUNDUP to be held at the Three Rivers Inn on Route 57—only 10 miles north of Syracuse, N. Y. Guest speakers: Sam Harris W1FZJ, John Zimmer W2BVU, and Bob Guba W1QMN. Obtain tickets from: Joe Zippi K2BYU, 405 Edgerton, Minoa, N.Y. OL 6-9144.

# The Clegg Thor 6 Transceiver

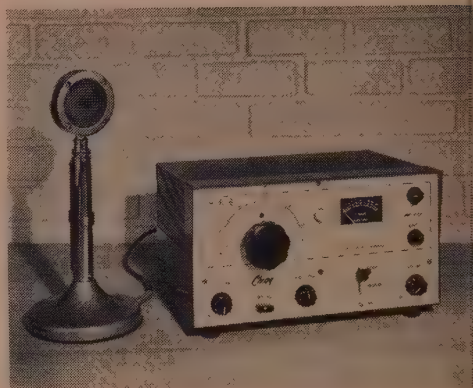
BOB BROWN, K2ZSQ\*

LONGTIME A PIONEER in VHF innovations, Clegg Laboratories of Mt. Tabor, New Jersey, recently introduced the Thor 6, a 50 mc transceiver featuring 60 watts input on a.m. and c.w. with v.f.o. control. This unit consists of two packages; one, the a.c. power supply and modulator and the other, the receiver and transmitter r.f. unit. Combining many of the well known characteristics of its predecessors, the Clegg Interceptor and Zeus, the Thor 6 comes very close to providing the ultimate in medium power VHF transceiving.

As can be seen in the accompanying block diagram, two methods of establishing transmitter frequency are provided. Crystal control is achieved through a conventional crystal oscillator with harmonic amplification, wherein one half of the 6U8 functions as the xtal osc./ harmonic generator with 25 mc output. Design is such that crystals may be either of the 8.33 or 12.525 mc variety, with 6U8 output at 25 mc regardless. The 12BA7 functions as a frequency doubler to 50 mc. V.f.o. operation is by heterodyne generation in the 12BA7 wherein the output of a 10.7 mc crystal oscillator, one half of the 6U8, is mixed with the output of the 39.3—41.3 mc v.f.o. The sum of these two frequencies is selected in the 12BA7 plate circuit and will automatically coincide with the 50-52 mc frequency to which the receiver is tuned.

The 6DJ8 first 50 mc amplifier is in a conventional cascode circuit and drives the 7558 as a Class C 50 mc second amplifier. The 6883 is a conventional Class C amplifier with modulation of both screen and plate voltage. Normal plate input is approximately 62 watts. A well designed pi-network tank circuit furnishes output efficiency in the order of 65-70%. A 12AT7 serves to amplify the microphone output to adequate voltage and power level for the input stage of the modulator. Audio gain is adjustable at the rear of the r.f. chassis.

For receiving, signals are amplified in the grounded grid 6CW4 r.f. stage; three tuned circuits are employed here to provide essentially flat response over the 50-52 mc range. The tunable oscillator and cathode follower, 6DJ8, tunes between 39.3 and 41.3 mc. This beats with the signal in the 6EH7, first mixer, for 10.7 mc output. A selective crystal lattice filter is used in the mixer plate circuit for maximum selectivity. The 6BL8 performs two functions: a pentode second mixer, and an 11.156 mc crystal oscillator which converts the 10.7 mc filter to 455 kc. Two transformers with associated capacitors produce a filter arrangement to supplement the selectivity of the 10.7 mc crystal filter.



View of the receiver and r.f. unit. Controls are (left right) BFO INJECTION, crystal socket, receiver-v.f.o. tuning dial (above), VFO-XTAL switch, SEND-RECEIVE-ANL, and (top to bottom, far right) final plate tuning, antenna loading and ON-OFF-VOLUME. The Thor 6 50 mc transceiver runs 60 watts input and is v.f.o. controlled. Not shown in photo is the modulator and power supply unit, located remote and connected by a 10 foot cable.

The 6EH7 functions as a conventional 455 kc i.f. amplifier with sufficient gain to assure linear operation of the detector circuit. An a.v.c. control is applied to the 6EH7 i.f. as well as the 6CW4 r.f. stage. A 12AL5 is used as both detector and a.v.c. rectifier. A 1N645 silicon diode serves as self-adjusting series peak noise limiter which is controllable from the front panel TRANSMIT-RECEIVE switch by simply injecting ANL. The two sections of the 6BM8 furnish more than 1½ watts of audio output, better than necessary to drive headphones or a speaker. The calibrated S meter indicates changes in the plate current of the a.v.c. stages. It might be added that this meter is much more reliable in giving out signal reports than most used today.

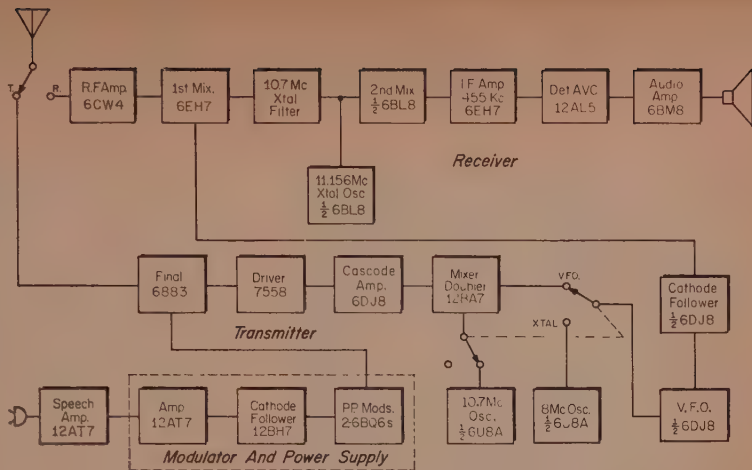
Selectivity specifications read 5 kc at 6 db down and 12 kc at 50 db down, something just short of the Interceptor for sharpness.

## Performance

On the air operation of the Clegg Thor 6 is a real pleasure. Once the 10 foot connecting cable is in place between the units, the modulator power supply can be stored out of the way, all controls except the AM-CW switch are on the r.f. unit. The Thor is wired for push-to-talk operation, although normal control methods are also available through the TRANSMIT-RECEIVE switch. A 3-8 ohm speaker should be connected to the jack on the rear apron of the r.f. unit. As the unit is turned on and the lamp illuminates the panel, it will be noticed that the S meter w

\*Editor, *The VHF Amateur*, 300 W. 43rd St., New York, N. Y. 10036.

Fig. 1—Block diagram of the new Clegg Thor 50 mc transceiver. Note that the transmitting v.f.o. also serves as the tunable oscillator in the receiving section. The 6883 final amplifier tube operates "straight through" at 50 mc and is conservatively rated at 60 watts input. Two 68Q6's operate in push-pull as modulators furnishing that "typical Clegg" effect. The v.f.o. (1/2 6DJ8) operates in the 39.3-41.3 mc range and is mixed with the 10.7 mc crystal oscillator output from 1/2 6U8 in the 12BA7.



swinging up to full scale initially, then gradually return to near zero during receiver warmup; this is normal for the circuitry employed.

Tuning the receiver for the first time can be quite a shock to those uninitiated with the Thor's very selective tuning characteristics. With this transceiver, one tends to tune at a slower rate than usual, stopping to listen to the many stations now heard for the first time. A very sensitive receiver, the Thor makes Q5 copy out of even S1-2 signals! QRM is almost non-existent, since the selectivity permits separation of even the closest signals. If local noise becomes aggravating, simply injecting the ANL solves the problem. Tuning c.w. and s.s.b. is easy through a unique three-step b.f.o. control on the far left front panel of the r.f. unit. With the control in the AM position, no beat is present. Advancing it through the three b.f.o. positions to the right, however, injects a beat tone into the receiver in graduated degrees, depending on the strength needed to obtain the best readability on the received signal. For example, a local s.s.b. signal might require more signal injection than a weaker one 100 miles away. The Thor 6 handles them both supremely.

The transmitter is amazingly simple to operate. When you are in transmit, either through the TR switch or push-to-talk, the S meter converts to a relative output meter for transmitter loading; all controls are simply tuned for maximum output. With a 1:1 s.w.r. into a standard 52 ohm antenna, the meter registers approximately half-scale. Measured output under test conditions was 45 watts, a hefty signal to say the least! Effective low-pass circuitry kept TVI to a minimum at this QTH.

When using the Thor in the v.f.o. position, the transmitter is always "tracking" the receiver, i.e., the v.f.o. is on the same frequency as the receiver. This concept is altogether new to VHF, although a great number of lower frequency commercial s.s.b. transceivers have been using this principle for quite some time and have been well received. Basically, what it amounts to is this: when you answer a CQ, you answer on

frequency. When you are calling a CQ, you listen on frequency. If you start to tune the receiver after your CQ, you must return the dial to your original calling frequency before replying. An easy cure is simply to mention when calling CQ that you will reply on the frequency of the answering station. This way you can tune the entire band and any caller will know where to listen. Of course, you can always use the optional crystal control or an external v.f.o.

Modulation is what the local six meter gang terms "typical Clegg." Roughly translated: maximum audio, superb clipping characteristics. It's phenomenal how many stations comment on the fullness of "talk power" inherent in the Thor 6. "Really cuts through . . ."

Those whose eyes light up with talk of VHF mobiling will be interested to learn that the Thor with its 60 watts input can be used in the family buggy. An optional Clegg Model 418 transistorized 12 v.d.c. power supply/modulator is available which can be permanently installed in the car. The Thor r.f. unit can then be plugged into either the mobile supply, or the a.c. supply in the shack. Just connect the cable, and you're in business!

Of special interest is the Owner's Manual, shipped with each unit. This guide is a handy item, especially when the Thor 6 is to be put in the mobile, etc. Offering many hints and operating data for those unfamiliar with this type of transceiving, it suggests new ways of calling and working stations, making the most of each feature. Large fold-out schematics are included as well as parts layout sheets, enabling the purchaser to become well acquainted indeed with his new Clegg Thor 6.

At this writing with my Thor four weeks old, 936 different stations have been worked in 24 states. It went with me on vacation providing a convenient, compact 6 meter station for use at the trailer, home, mobile and mountaintopping. I was amazed at the number of stations amassed during the recent VHF contest, especially when compared to my usual totals. The Clegg Thor 6 is available through your dealer at \$349.95. ■

# VHF SIDEBAND

*an exclusive feature of The VHF Amateur*

BOB HEIL, K9EID\*

ONCE AGAIN THE Summer Sporadic E season is over and it leaves each of us to sit by the first fire in the fireplace pondering over some of the terrific contacts made during the season. Some of the VHF s.s.b. operators have much to think about, as I can see it from here! The activity grows more and more everyday and it shows up very well in a real good band opening.

## East Coast VHF Single Sideband Association

This is beginning to start a new trend in the VHF circles which has just been talked about but now, thanks to an aggressive group of VHF s.s.b.ers, something has been done. The East Coast VHF Single Sideband Association had their quarterly meeting in the middle of this DX season and elected Sam Berlin, WA2CVF, as President; Vito Bono, K2PXP, Vice President; and Abe Cutler, WA2ONB, as Secretary-Treasurer. The meeting was well attended by most of the active VHF sidebanders in the Philadelphia-New York area.

John Super, K2ZBX, is the outgoing President and he presented a very large and attractive trophy to the Association to be given to the first VHF Sidebander who works 48 states. This is the only organization to date that is offering an award of this type and it would certainly be quite an honor to win this trophy!

\*402 Border Street, Marissa, Illinois.

Abe Cutler, WA2ONB, is acting as custodian and all VHF s.s.b. stations that have worked the 48 States are welcome to send their cards to him! You will find Abe and the rest of the Association on 50.108 mc every Sunday morning at 11:00 AM. Be sure and look for them!

## W.A.S. VHF SSB Box

With such an attractive item in store for the first station to work the 48 on VHF s.s.b., it would be only appropriate to begin a *Worked All States* box for two-way s.s.b. VHF contacts on both 6 and 2 meters. All amateurs are invited to send in your standings (no cards please, yet). I will compile the list as soon as enough get them in and each of us will know where we stand. I am expecting a letter from each of you, now! Don't forget.

## Activities

Milt, K4EBT-W4RLX, finally got around to representing Tampa, Florida and wrote a nice letter. He is working stations like mad down in the "Land of Fun and Sun." Since June 1962, he has worked 38 states and 4 foreign countries on two meters! Nice work, Milt. Let's hear more . . . Jim, K9RKU, at Sparta, Illinois, has his Apache and SB-10 on two meters using the Halort mixer and the 8 over 8 "J" beam with a new Drake 2B and Parks to hear with . . .

[Continued on page 80]



This photo was taken during your columnist's recent trip to Florida. Left to right, W4GJO, K4HLA, W4WHF, K9EID and WA4BYR.

# DX REPORT

*an exclusive feature of The VHF Amateur*

BOB BROWN, K2ZSQ\*

AT THIS WRITING IT IS but a few days since total eclipse of the sun on July 20th. Many VHF-minded amateurs who otherwise might not have been on the air were observing conditions during that hour to see what would develop on the 50, 144, 220 and 432 mc bands. As CQ's able PROPAGATION columnist pointed out a while back, a total eclipse of the sun has the temporary effect of inverting existing conditions; that is, day changes into night briefly. Unfortunately in this section of W2 land an overcast condition existed which prevented much actual sighting of the event, although there were enough breaks in the clouds to permit a few fuzzy photographs. But what did happen on the VHF bands? Frankly, we wonder. So many reports have arrived here (mostly over the air) differing widely, that to say we're perplexed would be an understatement. Many areas have reported "greatly improved tropospheric conditions" on the bands above 144 mc while others have simply said that "things were normal here." On 50 mc, however, Sporadic-E was rampant during much of the day and it would be extremely difficult to attribute any of the excellent DX conditions to the eclipse alone. But contrary to this rather basic premise, many hundreds of six meter amateurs are currently expounding the "results of the eclipse" to all who will listen, even stating call letters of DX stations worked. Rather than to try to guess what actually did occur at this time, we'll wait a bit longer and try to present more extensive data next month. By that time all reports should be in and we'll be walking on firmer ground. In the meantime you can make preparations for the next near-total eclipse of the sun: 1970 . . .

## News From The Mailbag

**San Salvador, Bahamas:** Harold Lund, VP7CX, tells a bit about his recent trip to Santo Domingo.

"Haven't had much time for letter writing while on my trip. Got back here on the 4th of July. Glad to report that the trip was pretty much a success. Worked about 200 stations in W1-2-3-4-5-8-9-0, KP4, HI8 and YV5. Worked Florida almost every day, but the only real good opening to the East Coast was Tuesday, July 2. Worked about 125 stations that day.

"Cards for HI8XHL should go through W9ZDI. I will have special cards printed for the trip, so it will take a little time. I have received my new batch of VP7CX cards, so am now in the process of getting caught up. Hope everyone will be patient.

"There are some other stations on in Santo Domingo. HI8XAG is on 50.022, HI8XAG/m

\*Editor, *The VHF Amateur*, 300 West 43rd Street, New York, N. Y. 10036.



These two boys were caught in the act during the last contest, trying to bypass that resistor and get more soup out of the rig. Faces belong to (left) Bob DeFeo, K1YTF, and (right) Lou Marcarelli, W1JGU. Six meters, natch.

on 50.034, HI8RO on 50.150 mc. HI8RO is sometimes manned by other operators. Was operated by HI8ORC on July 2 during the opening.

"Worked FP8CB last Saturday afternoon (July 13th) and FP8CG Sunday morning. Also worked W0GNS in North Dakota Sunday for state number 38 on six meters." *Congratulations, Harold! We'll be looking forward to seeing your article on the Santo Domingo trip soon.*

## R.R.F. Notes

Reports have been slipping a wee bit lately, so I guess it's time we prodded you again. We have official Reader Reporting Forms 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 on the first page of the column requesting your supply. We can always use more reporters who can take the time to let us know what's been going on in their area. So get out the pen and ink and get with it!

K4NEH of Portsmouth, Virginia, has really been makin' hay on six lately. Skip contacts include VP7CX . . . WA0DJK wants skeds on six meters. Write Harry I. Silver, 611 Seward, Omaha, Nebraska, 68104 for further info. Harry's worked K7MAC in Salt Lake City, Utah, recently with 59+ sigs . . . K8REG been busy getting W8NAF/7, XE1OE, WA6MIC/7, K7OAE/m, K6JIC, and HI8XHL on six. "With my contact to Idaho through WA6MIC/7, I now have 48 states on 6 meters worked and confirmed." . . . VE3CVX snagged WA6YIT, WA6TYZ, W5UNU, W5CDG, K4BPB and

[Continued on page 81]

# UHF ROUNDUP

an exclusive feature of *The VHF Amateur*

ALLEN KATZ, K2UYH\*

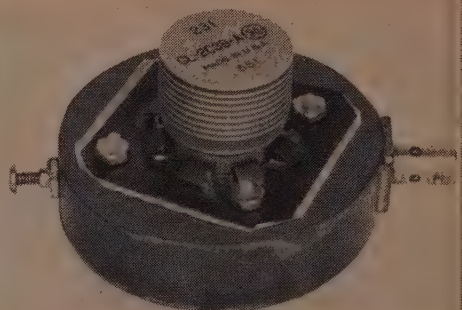
RIDING THROUGH THE MOUNTAINS of Scotland generates an eerie sensation—you almost feel a chill. If you've ever travelled on the plains at night, you might have an idea of what I am trying to express. Yet, it is different out here. Just a few hours ago we arrived at this rest point, about two miles from a half-deserted mining town called Lead Hills. I am told that it is the highest point in all Britain. To say the least, the view is fantastic. We arrived in Europe about two weeks ago and since then have been travelling across the country by motor scooter (a rebuilt '56 Lombretta). We have had our mishaps—the rear wheel came off—but on the whole, the trip so far has been rewarding. We are collecting some information and pictures on the European TV systems. The TV antennas here are bigger than those of amateurs back home.

The next big city we shall be in will be Amsterdam, Netherlands. Should be there in two or three days if all goes according to schedule. In the meantime, we'll go technical and show you a little gem of a 1296 amplifier.

## 1296 Mc Cavity Amplifier

K2CSM broke the transmitter barrier a while back when he designed the 1296 mc amplifier presented in the February, 1962, *The VHF*

\*48 Cumberland Avenue, Verona, New Jersey.



View of the plate cavity section of the K2CSM 1296 mc amplifier. The grid cavity is not attached, although it could be with no difficulty. We used a square capacitive plate on the top and bottom, although K2CSM's specifications for a complete circular plate might be preferable. BNC connector shown is the output loop connection, L<sub>2</sub>. Bent-over flanges act as retaining clips

*Amateur*. Not only is this transmitter small and highly efficient, but it is also extremely simple to construct. As arranged and presented in fig. 1, the amplifier runs approx. 30 watts input with 5 or 6 watts of 1296 mc driver output. An APX- makes an ideal exciter.

The amplifier consists of a cavity made from a  $\frac{3}{4}$ " length of 3" diameter copper pipe (see fig. 2). Two disks 3" in diameter are cut from copper sheeting. A  $1\frac{1}{4}$ " hole is drilled into the center of one disk and a  $\frac{3}{4}$ " hole in the other. The two disks are then soldered across the top and bottom of the  $\frac{3}{4}$ " high pipe. The side with the larger hole will be the plate side, and the smaller, the grid side.

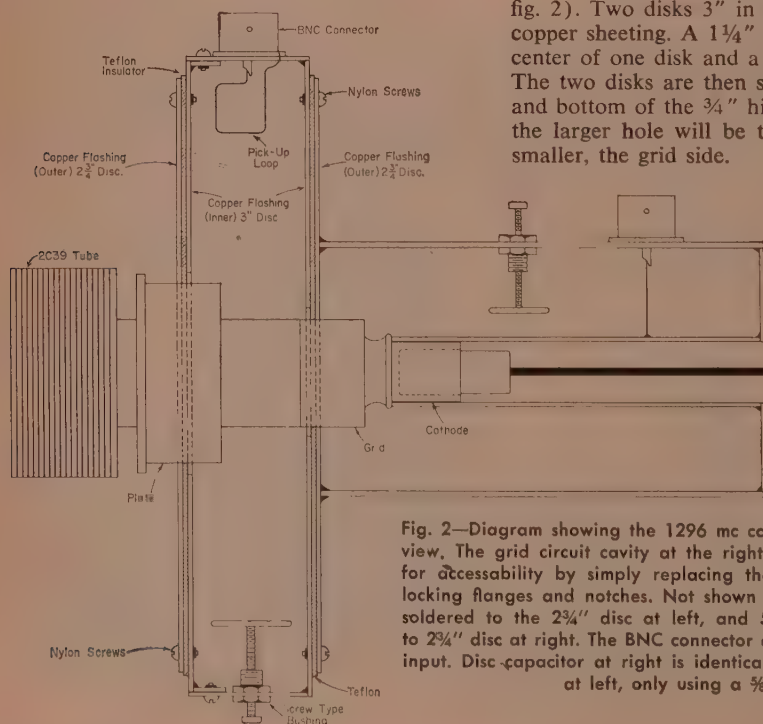


Fig. 2—Diagram showing the 1296 mc cavity amplifier in cutaway view. The grid circuit cavity at the right can be made detachable for accessibility by simply replacing the solder joints with interlocking flanges and notches. Not shown is RFC<sub>1</sub> in the B-plus line soldered to the 2 $\frac{3}{4}$ " disc at left, and 500 ohm resistor soldered to 2 $\frac{3}{4}$ " disc at right. The BNC connector at the far right is amplifier input. Disc capacitor at right is identical to plate cavity capacitor at left, only using a  $\frac{5}{8}$ " plate.

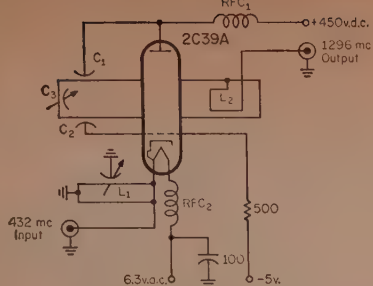


Fig. 1—Schematic diagram of K2CSM's cavity amplifier for 1296 mc. See text for data on  $C_1$ ,  $C_2$  and  $C_3$ .  $L_1$ —1" copper strip. See text.  $L_2$ —1" loop. See fig. 2. RFC<sub>1</sub>—3t. #18, 1/4" dia. RFC<sub>2</sub>—6t. #18, 1/8" dia.

Two more disks are cut 2 3/4" in diameter. In the center of one cut a hole 1-1/16 in diameter is drilled to snugly fit the plate of the 2C39A. The other hole should be 5/8" in diameter to accommodate the grid.

A 3/8" hole is drilled onto one side of the copper pipe for a BNC connector, onto which is soldered a 1" length of wire for an output pickup loop. On the opposite side of the pipe a 1/4" hole is drilled for a screw type bushing, through which a disk type capacitor (made from a 1/2" circle of sheet copper) can be controlled.

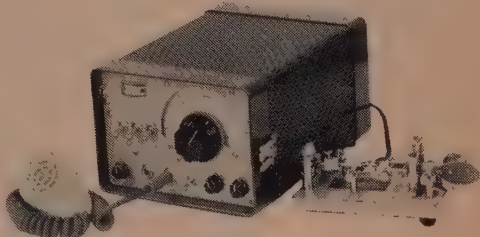
The 2 3/4" copper disk with the larger hole is centered over the plate side with a thin sheet of teflon (containing a hole of equal size) sandwiched between it and the cavity. Same procedure is followed for the disk with the smaller hole on the other side. Both disks are held in place by means of nylon screws.

The 2C39A is fitted through the cavity as shown in the photograph. A coaxial cavity on the grid side is now constructed (this is not shown). This cavity was not presented in the original *VHF Amateur* article, but is a recent origination of K2TKN's.

The input circuit cavity is made from a 1 1/2" diameter by 2 3/4" long section of copper pipe. The center conductor is made from a 3/8" diameter by 2 3/8" long piece of copper tubing which is soldered to the center of the 1 1/2" disk cut from a square of sheet copper. A 3/8" hole is drilled into the center of the 1 1/2" disk to pass a wire up the center of the copper tube to the 2C39A's heater connection. A 3/8" hole is drilled into the center of the 1 1/2" diameter pipe 3/4" (from the end which is soldered to the 1 1/2" disk) for a BNC connector. A lead is soldered to the BNC connector and the cavity center conductor. Another hole 1/4" in diameter is drilled for a screw type bushing in the 1 1/2" pipe (in line with the first hole), 1 1/2" from the pipe's end for a disk type capacitor (made from a 5/8" circle of copper).

With this work complete, and voltage applied as per fig. 1, she's ready to fire up on 1296 mc. The feed system's dimensions will depend on the driver and the size of the chassis the amplifier

# THE VERSATILE *Li'l Lulu*



## COMPLETE 50 MC. TRANSMITTER

DESIGNED BY

F. E. LADD, W2IDZ

If you like the best, check these features:

- Full-band coverage, 50 to 54 mc.
- Stabilized VFO, gang-tuned to amplifier stages.
- VFO filament and plate voltages fully regulated.
- 12DQ7 final power amplifier.
- Top quality audio.
- Clean c.w., shaped keying.
- Built-in antenna changeover relay.
- Low pass filter for minimum TVI.
- Built-in power supplies for both 115 v.a.c. and 12 v.d.c. (transistorized).
- Comprehensive instruction manual.
- One year warranty.

Price: \$225.00 through your dealer.

Schematic and full particulars available on request.  
Dealer inquiries invited.

FOR INFORMATION, WRITE

**WHIPPANY LABORATORIES, Inc.**  
1275 Bloomfield Ave., West Caldwell, N.J.

For further information, check number 19, on page 110



Come up out of the noise... let 'em know you're around with a new 60 Watt Clegg Thor 6 Transceiver. Sound good? Here's the rest of the story.



#### TRANSMITTER FEATURES:

- FULL 60 watts input on phone or CW to 6883 final.
- BUILT-IN VFO that automatically tracks the receiver or switches to crystal control for fixed frequency operation.
- ALL stages broadbanded for easy QSY.
- SPEECH-CLIPPING FOR MAXIMUM talk power.
- BUILT-IN PUSH-TO-TALK.
- BUILT-IN Keying relay for clean chirpless keying.

#### MOBILE OPERATION

Now you can run a mobile "power house" using your new Thor 6 transceiver and model 418 transistorized, mobile modulator/PWR sup.



#### RECEIVER FEATURES:

- NUOVISTORIZED front end for extreme sensitivity at lowest noise level.
- CRYSTAL lattice filter for maximum selectivity.
- BFO with variable carrier injection for SSB reception.
- ULTRA-STABLE tuneable local oscillator that also functions as VFO for transmitter.
- EXCELLENT audio characteristics. 2 watts into 3.2 ohm speaker.
- Sharp reduction in spurious responses and cross modulation.
- Effective noise limiter.

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).

Amateur net price for AC operation \$349.95.  
12V DC Mod./Pwr. Sup. \$100.

**Clegg**

See your Distributor  
or write for information.

LABORATORIES  
DIVISION OF SQUIRES-SANDERS, INC.  
RT. 53, MT. TABOR, N. J.  
OAKwood 7-6800

For further information, check number 11, on page 110

is mounted on. A little experimentation should yield the desired results.

I might also mention that a 3CX100A can be used in place of a 2C39A in this circuit with the 500 ohm resistor being replaced with a 3K resistor going directly to ground for phone operation.

#### Stand By

Next month we should be able to present you with a first rate column, since we plan to stay for a week and relax at the Italian Riviera. In the meantime, bear with us and *please* keep the letters coming. Well, must stop writing now. Lights go out at 10 o'clock, and it's just about that time now.

73, ALLEN, K2UYH/G

#### VHF Sideband [from page 76]

W9BLZ has a new SR-150 ahead of his SB... KØBST has moved to Indianapolis and the St. Louis area lost a tremendous VHF s.s.b. personality... WA4BYR has his real slick homebrew cavity filter on 6 meters and it works very well... VE3CUR, Ray, is on 50 mc with a fine signal... KØABY is representing Cedar Rapids on two meter s.s.b. and has a fine signal... K7OFR has made things active on 6 from Tucson and will give you a new state... Lafayette, Indiana, is well represented on two meters with the P&H gang getting active. W9GDS, Mow, es WQS are found on 145. each Sunday... WAØAHL, Dave, a new VHF s.s.b. station, has finished his SB-62 and is on two meter s.s.b. with his father's twenty meter station! Nice signal, Dave.

#### Late Minute Activities

W4CSN, Paul, has his 20A-Halort HM- and T-Bolt into the 8 over 8 "J" beam from Henderson, Ky., on 145.20 mc; take a look for him, he has a tremendous signal!... WØNY Ed, has his KWS-1 driving a new Halort HM- to T-Bolt combination into an 8 over 8 "J" beam from Overland, Mo. What a rock crusher from St. Louis! K9VWX is running wild from Wrona in the northern part with his T-Bolt a 64 element "J" up 100'.

#### Wind Up

The month of July brought a nice tornado Marissa so I have been busy cleaning up the 10 stick and antenna elements. The big 126 element antenna was a day from completion so it was saved. However, it is up now and be sure to drop me a card for a two meter schedule. Do forget to send in your W.A.S. score as you set up a schedule. Hope to start the W.A.S. book immediately—so let's keep those cards and letters coming in friends, the new ZIP code needs to be activated! CU all next month.

73, BOB, K9E

Watch for next month's feature article, "DXpedition to Santo Domingo," by Harold R. Lund, VP7CX/HI8XHL, in *The VHF Amateur*.

# Supreme SIX METER SSB Transmitter



Using The McCoy 48B1 Golden Guardian Crystal Filter • 75 Watts PEP Input,  
46 Final • USB—LSB—CW—AM Operation with Carrier injection • 7360  
Balanced Modulator • Unwanted Side Band Suppression greater than 55 db.  
VFO Controlled • Size—Width 15" Height 6 1/2" Dept. 7 1/2" Weight 9 3/4 lbs.

Model SSB-6B

Wired & Tested

**\$289.50**

For additional information, write:

*Supreme Electronics Inc.*

FRONT AND MAIN STS. • UPLAND, PA.

For further information, check number 21, on page 110

## DX Report [from page 77]

W4FLY during the first two days of July. . . . K8PEJ has gotten more than his share of DX lately, according to W8MBH. . . . K8JGF worked VE4MA, K6KOJ and VE3BBX back on June 26. . . . K9CNN worked on July 1 (all on six meter phone) K6ITZ, K6SYR, K7HAW, KØGIC, WA6MWB, WA6RQY, K6LWC, K7ILB and VE4FO. . . . WAØEIM in Omaha worked HI8XHL on June 29th in the Dominican Republic with 58 sigs. "Harold claimed I was his first zero-land contact from his location in Santo Domingo," sez Paul. WAØEIM would also like skeds with Oklahoma and North Dakota, c.w. or phone. QTH: 2316 North 69th Street, Omaha, Nebraska. . . . K4PZT's list of DX worked recently from Dave's Knoxville, Tennessee, QTH includes K7KVK, W7CTW, K7IQI, K7OFT, KØMVM, VE4MA, KP4BEO, CO5CN, WA6MIC/7, WØBIM, WB6DTA, and K7CIN. . . . W6IEY in La Mesa, California, in addition to numerous others snagged VE7ASM and VE6IP in June. Bill also reports hearing W5SFW and W5MJW calling "CQ KH6" on s.s.b. on June 30th. . . . Bill Leath, W4IMX, 2406 Sterling Road, Nashville, Tennessee, wants skeds (50 mc) to Georgia on 50.160 "any day, any time." Bill's list includes such notables as CO2GS and CO2DU. . . . W8PT writes, "still keeping skeds with K9UIF, W9OKB, W9BTI, W9OII and W8RQI on 432 mc with good results. No

new stations heard on 432 mc; no Sporadic-E or tropo openings on two." Jack (forgot to put in his home address) of Benton Harbor, Michigan, wants skeds to Maine on 144.080 c.w. . . . VE3CVX, 112 Cluny Drive, Toronto, Ontario, Canada, wants skeds to West Virginia on 2 meters on 145.225. Will move frequency, however. . . . K8REG, 4329 Renwood Drive, Dayton, Ohio, would like skeds with KL7 and KH6 on 50.085 mc Sundays and Wednesdays, 0500 GMT to 0515 GMT. "I will soon be on s.s.b. and c.w. only, at one kilowatt on both," adds Vince. . . . WAØDZH sez the best DX for him was on July 2 and 3rd, WØYSJ was worked with s.s.b., his sigs 58-9, 420 miles. Also worked WØEMS, 225 miles; KØGQG, 225 miles; WØLER, 225 miles; WØLFE, 180 miles, and K9UIF, 225 miles. "July 6: Just worked WØRSP, 340 miles, for my 11th state. His sigs 56, a.m." . . . K9YEN worked the following on 6 meters on July 14th: K7TGI, K7TCZ, K7JXX (Wash.), K7VCH (Wyoming), K7JLM (Mont.), VE7OE and VE6CG. Also heard VE1UW, VE1IF, VE1ABL, VE3CRB, VE7AYA, WAØBMB (South Dakota), WØGNS (North Dakota), K7DTH/7 (Wash.), K7EIC (Wash.), WØHDF (Minn.), K1YQD (Maine) and W1HPC (Conn.). . . . W2TND's 2 meter report for the month includes 8 states worth of DX. W1JZD, in Groton, Massachusetts, was a 230 miler. . . .

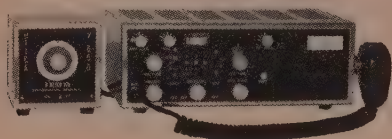
K7IQI in Bellevue, Washington, caught  
[Continued on page 83]



W9DIA—Terry

## Now for Only \$5<sup>61</sup> a month

you can get on 6 meters  
both in the car and at home



## UTICA "650" 6 Meter Transceiver and VFO

**\$189<sup>95</sup>**  
Complete

ONLY  
**\$5<sup>00</sup>** DOWN

Get peak "talkpower" in a 6 meter transceiver with the Utica "650." The brilliant chromed steel dual cabinets encase more features and quality than any other instrument in its price class. 22 watts input. VFO included. Has adjustable BFO, TVI filter spotting switch, "S" meter and power indicator. 2E26 final. Dual conversion. Squelch and RF gain. Operates on either 117VAC or 12VDC. Complete with microphone and 117VAC power cord. \$189.95. (12 V. cord \$3.95).

### STAY ON THE AIR PLAN

Yes—Now you can enjoy your new UTICA equipment without going off the air. You need not ship your trade-in in to us until you receive our shipment, and make sure that your new merchandise is in good working condition.



## AMATEUR ELECTRONIC SUPPLY

3832 West Lisbon Avenue  
MILWAUKEE 8, WISCONSIN • WEST 3-3262  
VISIT OR PHONE—do not write—our branch stores  
(they have no mail order facilities)

CHICAGO 31, ILL.  
6450 Milwaukee Ave.  
RODNEY 3-1030

ORLANDO, FLORIDA  
23 Azalea Park Sh. Center  
Phone 227-8231

IMPORTANT! Be sure to send all mail orders  
and inquiries to MILWAUKEE STORE, Dept. C

3832 WEST LISBON AVENUE, MILWAUKEE 8, WISC.

Ship me .....

I enclose \$.....; I will pay the balance

☐ C.O.D. ☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade

..... What's your deal?

Name .....

Address .....

City ..... Zone ..... State .....

☐ Send reconditioned equipment and sale bulletin

For further information, check number 20, on page 110

## A Letter to the Editor

Dear Bob:

Well, it's happened. I refer to an urge to hom brew a little gem offered in the April '63 issue of *The VHF Amateur* by those two stout fellows from nineland and oweland, Bob, K9EID. and Ken, KØKYZ. The article, "The Sixer—On DSE stirred my imagination and without a single drop being spilled, Mr. Reingold and I proceeded post-haste to the "well stocked junkbox" scrounge the mere eleven parts required in the balanced modulator. As the authors state, "they can be gotten from the junkbox if you have one of any size." Well, I have an entire cellar full and the XYL will regretfully verify but the real critical part, a dual 25 mickey mouse butterfly was nowhere to be found.

Has any reader ever tried to purchase a dual 25 mickey mouse butterfly? No easy task, this. Let me tell you, Mr. Editor, half of the part houses think you are overmodulating your marbles and the other half upon hearing the request will close their doors and go back to repairing Fleming Valves.

Having firmly started the project and driving a total of 653.7 miles with my message for Garcia ("Say Buddy . . . Ya wuddent have a dual 25 mickey mouse butterfly . . . wudga?") no other course was open save to fabricate the component myself. I retired to my well equipped, highly mechanized kitchen table with two dual mickey mouse butterflies purchased in a fit of desperation in a store in Teaneck (who repairs Fleming Valves by the way). I proceeded with the task at hand.

With great dexterity and perspiration normally found only in radio magazine offices at coffee time, I enjoined the two rotor shafts and four sets of plates in perfect axial alignment, yielding, at last, not a dual 25 mickey mouse butterfly, but a dual 24 mickey mouse butterfly. No if fortune should cause her countenance to smile upon me this would null my carrier evermore.

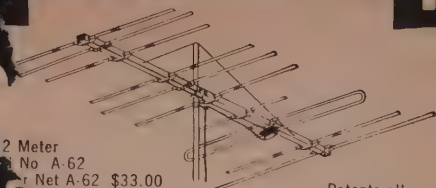
After two evenings of tedium (the author allowed only one hour for the total construction of the balanced modulator . . . apparently they take two or three for more sophisticated projects such as TV station, etc.), I was ready to assemble the various subunits and give the rig the smol test. The scientific method used here at WA2NZ is to plug 'er in first and call the fire department later. A pleasant surprise was in store for me, however, as the rig worked fine biz right from the start and has been going with vigor ever since.

It is then with great admiration that I compliment the designers and the Editor for bringing your readers the type of information heretofore described. If, however, you could produce similar designs for equipment the parts for which could be purchased at the A&P, I for one would be so grateful that I'd stop writing letters to the editor.

MARVIN SARAFAN, WA2NZ

# ANTENNAS IN 1

**AR**  
**VALUES**



Patents allowed  
and pending

2 Meter  
Kit No. A-62  
Net A-62 \$33.00  
Kit A-62 \$2.19

## The Only Single Feed Line 6 and 2 METER COMBINATION YAGI ANTENNA

another first from **FINCO®**

### ON 2 METERS

- 18 Elements
- 1 — Folded Dipole Plus  
Special Phasing Stub
- 1 — 3 Element Colinear Reflector
- 4 — 3 Element Colinear Directors

### ON 6 METERS

- Full 4 Elements
- 1 — Folded Dipole
- 1 — Reflector
- 2 — Directors

See your FINCO Distributor  
or write for Catalog 20-226

## THE FINNEY COMPANY

Dept. 19

Bedford, Ohio

For further information, check number 18, on page 110

## A Twoer With Super-Het Selectivity?

Why not . . . It is a super-het. At least those that have been modified with LE Kit No. 2NT6301. They now enjoy real super-het selectivity, increased sensitivity, terrific noise limiting—all inside original case. Complete kit with well illustrated manual, \$29.50. Average const. time, 5 hrs. Our 46 years experience will back you up. Lawrence Eng. Co., 36 Lawrence Rd., Hamden 18, Conn.

## VHF SPECIALISTS

Converters & Preamps for 50 mc, 144 mc,  
and 220 mc

The finest VHF equipment for the man who wants the best. See our catalog ads in the May, June, and July issues of CQ. Write today for spec. sheets.

## PARKS ELECTRONIC LABORATORIES

Route 2, Box 35—Beaverton, Oregon

## Free VHF News Bulletin

For several months now The VHF Amateur has been publishing a weekly one or two sheet bulletin containing letters of interest and up-to-date DX news. Send a supply of large self-addressed stamped envelopes to: VHF News Bulletin, 300 W. 43, N.Y. 36, N.Y.

73, Bob, K2ZSQ

# VHF

BCNU  
NEXT MONTH

# New

## POSTPAID!

### ALL BAND VERTICAL

## WRL

### WVG MARK II

New low cost vertical antenna which can be tuned to any amateur band 10-80 meters by simple adjustment of feed point on matching base inductor. Efficient radiator on 10, 15, 20, 40, 75 and 80 meters. Designed to be fed with 52 ohm coaxial cable.

Conveniently used when installed on a short 1-5/8" mast driven into the ground. Simple additional grounding wire completes the installation. Roof top or tower installation. Single band operation ideal for installations of this type. Amazing efficiency for DX or local contacts. Installed in minutes and can be used as a portable antenna.

#### Mechanical Specifications:

Overall height - 18' Assembled (5' Knocked down) Tubing diameter - 1 1/4" to 7/16". Maximum Wind Un-guaged Survival - 50 MPH. Matching Inductor - Air Wound Coil 3 1/2" dia. Mounting bracket designed for 1-5/8" mast. Steel parts irridite treated to Mils Specs. Base Insulator material - Fibreglas impregnated styrene.

#### Electrical Specifications:

Multi-band operation - 10-80 meters. Manual tap on matching inductor. Feed point impedance - 52 ohms (unbalanced). Maximum power - 1000 watts AM or CW-2KW PEP. Omni-directional. Vertically Polarized.

## WRL

### WORLD RADIO LABORATORIES

3415 W. Broadway, Council Bluffs, Iowa

☐ Check enclosed. ☐ Ship one WVG MK. II @ \$15.95 Postpaid.

Name \_\_\_\_\_  
Call \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_

## WVG MARK II

## \$15.95

## A Letter to the Editor

Dear Bob:

Well, it's happened. I refer to an urge to home brew a little gem offered in the April '63 issue of *The VHF Amateur* by those two stout fellows from nineland and oweland, Bob, K9EID, and Ken, K0KYZ. The article, "The Sixer—On DSE" stirred my imagination and without a single drop being spilled, Mr. Reingold and I proceeded poste-haste to the "well stocked junkbox" and scrounge the mere eleven parts required.

The modulator. As the power supply functioned the L-match network in the exciter. It is connected to the transmitter through 10 feet of RG-8 cable. The 2N384 is so stable in this oscillator circuit that it could actually be keyed on and off for c.w. by merely opening the 12 volt battery lead, with no chirp or frequency instability!

This v.f.o. has been in use at W3JHR for four months as of this writing. The batteries were replaced once, at the end of three months, when their combined voltage dropped to 7 volts under load (a few milliamperes!) This included several periods of being left on all night in error. The only noticeable effect of the low voltage was a slight decrease in output. Use of a pilot light while desirable from the standpoint of showing the ON condition, would run the batteries down much more quickly, so it was omitted.

The v.f.o. is used when operating on the Navy frequency of 4015 kc and it keeps me on frequency with better than the required stability of .003%, as evidenced by my stable zero beat with station NPG on that frequency. It is a constant source of joy when operating in the amateur bands also. There is absolutely no drift from this source anymore!

S.s.b. operators plagued by "driftitis" and a operators whose frequency shifts with modulation would do well to build and use this little gadget. You c.w. men can actually key it with a breakin! It is truly a "Synthetic Rock"!

## How Do You

... fold a piece of aluminum and make it come out right? How do you paint a panel and make it come out looking like it came from the factory? How do you lay out a chassis and make everything fit?

Simple problems, but almost every one has had trouble doing it at one time or another. Watch for the November Annual, packed with loads of how-to-do-it information on tools and workshop practices.

Our regular features will be on hand too.

For further information, check number 30, on page 110

by hams...  
for hams...  
Harvey is reliability

# 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.  
Amateur Net .....\$14.85



### 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

### TELETYPE PAGE PRINTERS REBUILT BY ALLTRONICS-HOWARD —

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

**WE SPEAK YOUR LANGUAGE** — and have for 37 years. It means orders from every corner of the world are handled personally and your instructions, in any language, are followed. It means we speak the universal language of all radio amateurs. And that gives you such ham-to-ham extras as consultation on your problems, meeting specific requirements, and — at your request, with no charge — opening sealed cartons for complete equipment check-out.

Send check or money order including shipping charges. We return any excess.

# Harvey

## RADIO CO., INC.

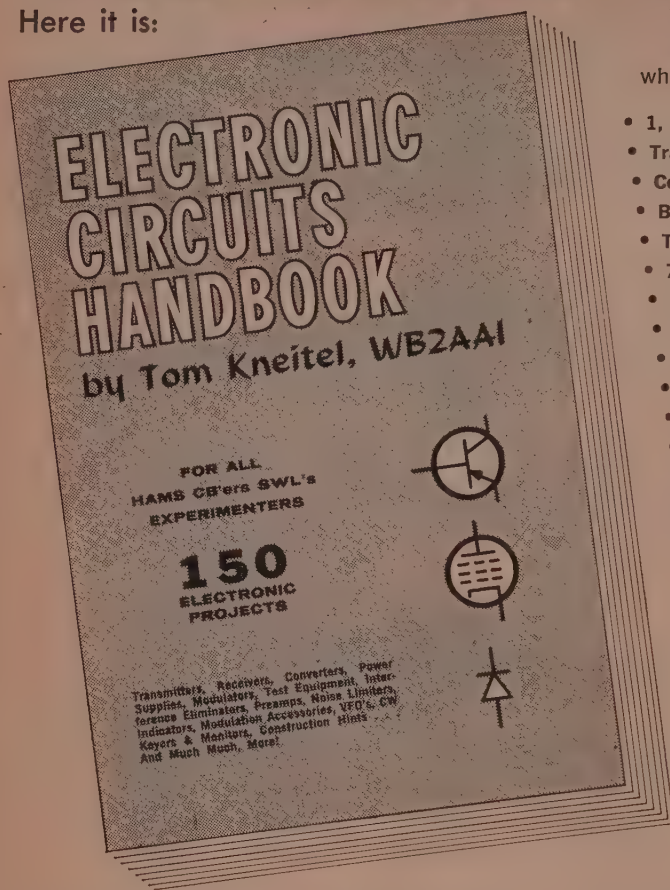


103 West 43 St., New York 36, N. Y. (212) JUdson 2-1500

For further information, check number 5, 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-nuovistor 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.

COWAN PUBLISHING CORP., BOOK DIVISION  
300 West 43rd Street  
New York 36, N.Y.

Sirs: My check (money order) for \$\_\_\_\_\_ is enclosed.  
Please send me \_\_\_\_\_ copies of Electronic Circuits Handbook (cat. #121).

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

New York City Residents Add 4% Sales Tax

**PRICE: \$3.00**

**RUSH YOUR ORDER  
TODAY**

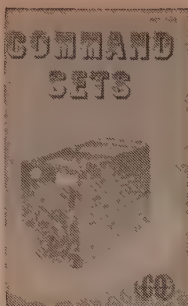
**AVAILABLE**

**NOW!**

# THE CQ HAM MART

## MOBILE HANDBOOK

Anyone who tries to go mobile without getting this book, should think twice before going ahead. *Bill Orr, W6SAI* has put everything you need to know in this book, Build-its by the dozen . . . solutions to ignition problems, keeping the battery charged, noise . . . only \$2.95 postpaid.

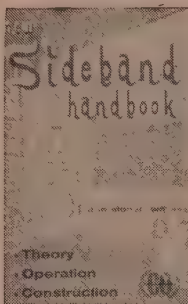


## COMMAND SETS

This is a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous pages, only \$1.50 postpaid.

## CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator. All this for only \$2.50.



## 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.

## THE NEW RTTY HANDBOOK

A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, operating procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, all written by *Byron Kretzman, W2JTP*, a well known authority in the field. This book is a must for your library! Only \$3.95.

## VHF FOR THE RADIO AMATEUR

You can't afford to be without this dynamic new handbook designed with the VHF amateur in mind. Filled from cover to cover with all new and original construction material presented so that you can understand it. Written by *Frank C. Jones W6AJF*, nationally acclaimed for his VHF pioneering. Available now for only \$3.50.

## COWAN PUBLISHING CORP.

### Book Division

300 West 43rd Street  
New York 36, N. Y.

|                                  |         |                          |
|----------------------------------|---------|--------------------------|
| ANTENNA ROUNDUP .....            | \$ 3.00 | <input type="checkbox"/> |
| ELECTRONIC CIRCUITS HANDBOOK.... | 3.00    | <input type="checkbox"/> |
| UNLIGHTED GLOBE .....            | 19.95   | <input type="checkbox"/> |
| ATLAS .....                      | 15.00   | <input type="checkbox"/> |
| COMMAND SETS .....               | 1.50    | <input type="checkbox"/> |
| CODE RECORD .....                | 3.50    | <input type="checkbox"/> |
| REGULAR LOG SHEETS (100).....    | 1.00    | <input type="checkbox"/> |
| SSB LOG SHEETS (100).....        | 1.00    | <input type="checkbox"/> |
| HAM'S INTERPRETER .....          | 1.50    | <input type="checkbox"/> |
| TVI HANDBOOK .....               | 1.75    | <input type="checkbox"/> |
| BINDER—YEAR WANTED .....         | 4.00    | <input type="checkbox"/> |
| VHF FOR THE RADIO AMATEUR.....   | 3.50    | <input type="checkbox"/> |
| CQ ANTHOLOGY I .....             | 2.00    | <input type="checkbox"/> |
| CQ ANTHOLOGY II .....            | 3.00    | <input type="checkbox"/> |
| HI-FI BOOK .....                 | 2.50    | <input type="checkbox"/> |
| SIDEBAND HANDBOOK .....          | 3.00    | <input type="checkbox"/> |
| CQ LICENSE GUIDE .....           | 2.50    | <input type="checkbox"/> |
| SURPLUS SCHEMATICS HANDBOOK....  | 2.50    | <input type="checkbox"/> |
| DX ZONE MAP .....                | 3.00    | <input type="checkbox"/> |
| NEW RTTY HANDBOOK.....           | 3.95    | <input type="checkbox"/> |
| DIODE SOURCE BOOK.....           | 2.50    | <input type="checkbox"/> |
| USA-CA RECORD BOOK .....         | 1.25    | <input type="checkbox"/> |
| "NEW" MOBILE HANDBOOK .....      | 2.95    | <input type="checkbox"/> |

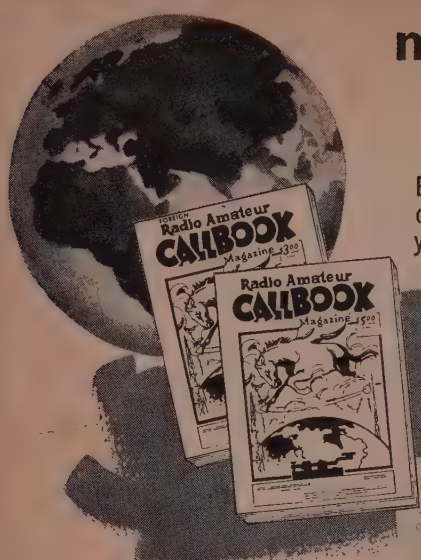
SIRS: My check (money order) for \$ \_\_\_\_\_ is enclosed. Please send the following items to:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

New York City Residents add 4% Sales Tax



**new issue just out!**

the radio  
amateur

# CALLBOOK

Essential QTH information for all radio amateurs and SWL's. E  
quarterly issue of the CALLBOOK is completely revised to br  
you the most up-to-date information on QTH's.

## PLUS THESE EXTRA FEATURES!

- Great Circle Bearings
- Great Circle Charts
- Prefixes by Countries
- International "Q" Signals
- World Time Chart
- International Postal Informa
- And many other features

## P.S. ORDER THESE VALUABLE RADIO AMATEUR GUIDES, TOO

**Radio Amateur DX Guide**—62 pages of vital data; 291 Great Circle Bearings for 22 major U.S. cities; Prefix Map, Time Conversion Table, DX Log, plus other features. . . . . \$2.00  
**World Prefix Map**—Full color, 29" x 42", shows prefixes on each country, DX zones, time zones, cities, cross referenced tables \$1.00  
**World Atlas**—Only Atlas compiled for amateurs. Polar projection, continents, prefixes on each country . . . full color, 16 pages. . . \$1.00

**CALLBOOK of United States Listings**  
(Over 250,000 K & W calls)  
Each quarterly issue. . . . . **\$5.00**

**CALLBOOK of Foreign Listings** (Over  
100,000 calls outside the U.S.A.)  
Each quarterly issue. . . . . **\$3.00**

Write for free, illustrated brochure

## RADIO AMATEUR CALLBOOK

Dept. C, 4844 W. Fullerton Ave., Chicago 39, Ill.

See your favorite dealer today for your latest issue or order direct from the publisher (add 25c for mailing)

# EMPLOYMENT OPPORTUNITY

We are constantly looking for the right men to work for our organization. We are interested in hearing from men who can repair or men who can sell—or better yet, a combination of both. Unlimited opportunity for the right men with one of nation's fastest growing distributors. Possible employment in any one of our three stores or possibly start new store. Write in confidence.

**Terry Sterman W9DIA**

## AMATEUR ELECTRONIC SUPPLY

**3832 W. LISBON AVE., MILWAUKEE 8, WIS.**

# \* TWO-WAY \* COMMUNICATION CRYSTALS



## UNCONDITIONALLY GUARANTEED FAST SERVICE

American specializes in two-way communications. Frequency correlation data. G.E., Motorola, R.C.A., Collins, La. Narco, Hallicrafter, Link, Gonset, Aerom, Heath, Bendix, Johnson, Globe, U.S. Go and many other companies. Send postcard

| Frequency Range<br>3 to 9.9 mc. | Com-<br>mercial<br>Oven<br>002% | Com-<br>mercial<br>Room<br>002% | Amat<br>01%<br>20mm |
|---------------------------------|---------------------------------|---------------------------------|---------------------|
| 3 to 9.9 mc.                    | \$4.25                          | \$3.65                          | \$2.85              |
| 15 to 2.99 mc. T.M.             | 4.25                            | 3.65                            | 2.85                |
| 30 to 50 mc.                    | 4.50                            | 3.65                            | 3.35                |
| 10 to 17 mc Fund                | 4.50                            | 4.00                            | 3.35                |
| 2 to 2.9 mc.                    | 4.50                            | 4.00                            | 3.35                |
| 50 to 60 mc.                    | 5.50                            | 5.00                            | 4.00                |
| 50 to 80 mc. F.M.               | 6.00                            | 5.50                            | 5.00                |
| 1.0 mc. to 2.99 mc.             | 8.50                            | 7.50                            | 6.50                |

CB dealerships inquires welcome

Two hundred transmitters and receivers on record

Do It Yourself Kits—three 7 mc Xtals, Two holders \$1.95  
Write for quantity discounts or phone Victor 2-5571

## AMERICAN CRYSTAL CO. P.O. BOX 2366 • KANSAS CITY 42, MO.

For further information, check number 29, on page

# Fantastic Inventory Clearance Sale

## f A-1 Reconditioned Gear—Now through Sept. 30, 1963—ACT NOW!

ms of Sale: ★ 30 Day Guarantee ★ Full Credit Within 6 Months on Higher Priced New Equipment ★ You can pay as  
as 10% down and take up to three years to pay—However—send CASH IN FULL whenever possible since CASH—NO  
ADE orders will take preference during this special sale which positively ends September 30, 1963. After that, write for  
rent listing. ORDER NOW—DIRECT FROM THIS AD.

|                |       |  |                     |       |  |                       |            |  |                      |       |  |                              |       |  |                             |          |  |
|----------------|-------|--|---------------------|-------|--|-----------------------|------------|--|----------------------|-------|--|------------------------------|-------|--|-----------------------------|----------|--|
| <b>ECO</b>     |       |  | <b>GLOBE</b>        |       |  | <b>HALLICRAFTERS—</b> |            |  | <b>JOHNSON—Cont.</b> |       |  | <b>PRECISION</b>             |       |  | <b>DRAKE</b>                |          |  |
| A Xmttr        | \$ 69 |  | LA-1 Lin            | \$ 69 |  | S-53A Rec             | \$ 49      |  | 6 & 2 Conv (14-18)   | \$ 39 |  | E-2000 Sig Gen               | \$ 49 |  | 584-A Pf Patch              | \$ 19    |  |
| Pwr Sup        | 24    |  | PA-1 Attenuator     | 9     |  | Con-Consta            | 149        |  | Invader 200          | 399   |  | RME                          |       |  | GLOBE                       |          |  |
| N              |       |  | PH-1 Pf Patch       | 19    |  | SX-62 Rec             | 149        |  | Invader 2000         | 795   |  | VHF-152A Conv                | \$ 34 |  | Chief Deluxe                | \$ 39    |  |
| 1 Lin (no cab) | \$125 |  | UM-1 Modulator      | 29    |  | <b>SX-71 Rec</b>      | <b>99</b>  |  | 6 & 2 Lin            | 325   |  | 4301 Slicer                  | 99    |  | CONSET                      |          |  |
| 20 Lin         | 175   |  | SS-3 Q-Mult         | 9     |  | SX-73 Rec             | 395        |  | 10m Messenger        | 69    |  | 4350 Rec                     | 119   |  | G-14 6 & 110 CB             | \$ 90    |  |
| Xmttr          | 149   |  | VHF-10 Control      | 9     |  | S-81 Rec              | 75         |  | Navigator            | 99    |  | 4350A Rec                    | 129   |  | G-14 12 & 110 CB            | 90       |  |
| S Xmttr        | 159   |  | VHF-62 Hi-Bander    | 99    |  | S-83 Rec              | 75         |  | Pacemaker            | 199   |  | 6900 Rec                     | 199   |  | G-15 6 & 110 CB             | 120      |  |
| B Xmttr        | 175   |  | 65-B Xmttr          | 44    |  | S-85 Rec              | 69         |  | Ranger               | 139   |  | REGENCY                      |       |  | G-76 Xcvr                   | 329      |  |
|                |       |  | SD-75A              | 79    |  | SX-88 Rec             | 275        |  | Ranger II            | 239   |  | ATC-1 Conv                   | \$ 39 |  | G-76 AC Sup                 | 115      |  |
|                |       |  | Chief 90            | 29    |  | S-95 Rec              | 34         |  | Thunderbolt          | 325   |  | SWAN                         |       |  | G-76 DC Sup                 | 115      |  |
|                |       |  | Chief 90A           | 34    |  | SX-96 Rec             | 125        |  | 122 VFO              | 75    |  | SW-120 Xcvr                  | 179   |  | 3311 88-108 FM              |          |  |
|                |       |  | Chief Deluxe        | 39    |  | SX-99 Rec             | 84         |  | Valiant              | 225   |  | SW-140 Xcvr                  | 169   |  | Conv 12V B-4                | 35       |  |
|                |       |  | DSB-100 Xmttr       | 49    |  | SX-100 Rec            | 179        |  | Viking I Xmttr       | 75    |  | TCM                          |       |  | 3357 6.2, 11.4 m VFO        | 59       |  |
|                |       |  | Champ 300           | 149   |  | SX-101 Rec            | 175        |  | "500" Xmttr          | 395   |  | GSB-1 Slicer                 | \$ 69 |  | 3275 6m Conv                | 29       |  |
|                |       |  | Champ 350           | 199   |  | SX-101 Mk III Rec     | 199        |  | Mobile Xmttr         |       |  | GPB-90 Rec                   | 299   |  | 3261 Super 12 Conv          | 59       |  |
|                |       |  | King 500            | 249   |  | <b>SX-101A Rec</b>    | <b>225</b> |  | As-Is                | 25    |  | TAPETONE                     |       |  | GENERAL CRYSTAL             |          |  |
|                |       |  | King 550A           | 275   |  | S-102 Rec             | 29         |  | As-Is                | 25    |  | XC-50N (30.5-34.5)           | \$ 29 |  | 40MA Ant                    | \$ 15    |  |
|                |       |  | 6 Meter VFO         | 29    |  | S-103 Rec             | 89         |  | KNIGHT               |       |  | XC-51 (10-14)                | 29    |  | 54-A Ant                    | 20       |  |
|                |       |  | 680 Xmttr           | 39    |  | SX-110 Rec            | 99         |  | T-55 Xmttr           | \$ 19 |  | XC-50 (14-18)                | 29    |  | HAMMARLUND                  |          |  |
|                |       |  | 680A Xmttr          | 44    |  | SX-111 Rec            | 169        |  | R-55 Xcvt            | 39    |  | XC-50C (26-30)               | 29    |  | HQ-145C Rec                 | \$200    |  |
|                |       |  | 755A VFO            | 39    |  | <b>SX-115 Rec</b>     | <b>325</b> |  | T-60 Xmttr           | 39    |  | TC-220G (20-25)              | 129   |  | HY-GAIN                     |          |  |
|                |       |  | Comm II 6m          | \$129 |  | SX-117 Rec            | 279        |  | R-100 w/S meter      | 79    |  | 345 Skysweep                 | 125   |  | 48D Ant                     | \$ 10    |  |
|                |       |  | Comm III 6m         | 149   |  | SX-120 Rec            | 69         |  | R-100A Rec           | 79    |  | TECRAFT                      |       |  | RBX-1 Rotor                 | 150      |  |
|                |       |  | Comm III 2m         | 179   |  | SX-140 Rec            | 39         |  | T-150 Xmttr          | 89    |  | 6m Xmttr                     | \$ 29 |  | JOHNSON                     |          |  |
|                |       |  | Comm IV 2m          | 269   |  | HAMMARLUND            |            |  | L&W                  |       |  | PTR-2 AC Sup                 | 19    |  | Ranger I kit                | \$200    |  |
|                |       |  | Comm IV 220 mc      | 199   |  | HK-1B Keyer           | \$ 25      |  | HW-50 Xmttr          | \$29  |  | 6m Conv (14-18)              | 24    |  | MOSLEY                      |          |  |
|                |       |  | GPP-1 Pf Patch      | 19    |  | HC-10 Slicer          | 79         |  | LAFAYETTE            |       |  | 22m Conv (15-30)             | 24    |  | CM-1 Spk                    | \$ 9     |  |
|                |       |  | G-28 10m Xcvt       | 119   |  | HX-50 Xmttr           | 299        |  | HE-10 Rec            | \$ 59 |  | TRANSCOM                     | \$ 20 |  | PHILMORE                    |          |  |
|                |       |  | G-43 Rec            | 79    |  | HQ-100 Rec            | 109        |  | HE-45 Xcvt           | 69    |  | 6m Xcvt AS-IS                | 24    |  | CR-5AC Rec kit              | \$ 25    |  |
|                |       |  | G-63 Rec            | 129   |  | HQ-100 Spk            | 9          |  | LAKESHORE            |       |  | PSA-63A AC Sup               | 19    |  | TC-612 CB kit               | 25       |  |
|                |       |  | G-66 Rec            | 69    |  | S-100 Spk             | 9          |  | Bandhopper VFO       | \$ 59 |  | SB-175 Xmttr                 | \$ 69 |  | POLYTONICS                  |          |  |
|                |       |  | G-66 Rec            | 79    |  | HQ-110C Rec           | 125        |  | Phasemaster II       | 119   |  | PSA-63A AC Sup               | 19    |  | PC-6 6m AC only             | \$225    |  |
|                |       |  | G-66B Rec           | 79    |  | HQ-110C Rec           | 139        |  | Phasemaster IIB      | 179   |  | 6m Conv (14-18)              | 24    |  | PR-2 6 & 110 CB             | 110      |  |
|                |       |  | 3-way Spk           | 19    |  | HQ-120 Rec            | 69         |  | LINCOLN              |       |  | CITIZEN'S BAND               |       |  | SC-N 23 CB                  | 250      |  |
|                |       |  | Thin Pak            | 19    |  | HQ-129X Rec           | 99         |  | L-2754 6m Xcvt       | \$ 39 |  | ECI                          |       |  | SONAR                       |          |  |
|                |       |  | G-76 Xcvt           | 199   |  | HQ-140 Rec            | 125        |  | LOUDBOOMER           | \$299 |  | Linear Amp                   | \$ 99 |  | 40m Xcvt                    | \$225    |  |
|                |       |  | G-76 AC Sup         | 69    |  | HQ-145 Rec            | 149        |  | Mk II Lin & Sup      |       |  | GLOBE                        |       |  | SWAN                        |          |  |
|                |       |  | G-76 DC Sup         | 59    |  | HQ-145X Rec           | 175        |  | WORROW               |       |  | CB-100 12 & 110              | \$ 49 |  | SW-140 Xcvt                 | \$200    |  |
|                |       |  | G-77 Xmttr          | 119   |  | HQ-160 Rec            | 199        |  | 3-band conv AS-IS    | \$ 10 |  | CB-110A                      | 59    |  | TECRAFT                     |          |  |
|                |       |  | G-77A Xmttr         | 139   |  | HQ-170 Rec            | 199        |  | 5-band conv AS-IS    | 20    |  | HALLICRAFTERS                |       |  | CC-220 Conv (28-30)         | \$ 20    |  |
|                |       |  | GSB-100 Xmttr       | 225   |  | HQ-170 Rec            | 199        |  | MBR-5 Rec            | 39    |  | CB-3 12 & 110                | \$ 89 |  | CC-3/21 15m Conv            |          |  |
|                |       |  | GSB-101 Linear      | 175   |  | HQ-180C Rec           | 299        |  | MB-6 Rec             | 59    |  | HAMMARLUND                   | \$149 |  | (3.5mc IF)                  | 10       |  |
|                |       |  | GC-105 2m           | 169   |  | HQ-180C Rec           | 299        |  | RVF-250 Sup          | 19    |  | CCS-144 2m Conv              |       |  | PC-26 6m AC only            | \$225    |  |
|                |       |  | GSB-10M Xcvt        | 99    |  | HARVEY WELLS          |            |  | MB-560 Xmttr         | 59    |  | HEATH                        |       |  | SC-N 23 CB                  | 250      |  |
|                |       |  | (148.14 mc)         | 99    |  | R-9A Rec              | \$ 49      |  | MB-565 Rec           | 49    |  | CB-1                         | \$ 29 |  | NEW DISPLAY                 |          |  |
|                |       |  | Tri-Band Conv AS-IS | 10    |  | APS-50 Sup            | 19         |  | RTS-600S AC Sup      | 29    |  | GW-10 110v                   | \$ 49 |  | The following items have    |          |  |
|                |       |  | Super 6 Conv        | 19    |  | IBS-50 Xmttr          | 29         |  | RTV-630 12v Sup      | 29    |  | GW-100 12v                   | \$ 49 |  | been on display for a short |          |  |
|                |       |  | 3066 6m Conv        | 24    |  | TBS-50C Xmttr         | 34         |  | MOSLEY               | \$119 |  | CONSET                       | \$ 69 |  | time in protective plastic  |          |  |
|                |       |  | Super 12 Conv       | 34    |  | TBS-500 Xmttr         | 39         |  | WM-1 Rec             | 39    |  | G-12 12 & 110                | \$ 49 |  | bags. All are complete with |          |  |
|                |       |  | Aircraft Rec        | 59    |  | T-90 Xmttr            | 59         |  | NATIONAL             | \$ 89 |  | G-14 6 & 110                 | 69    |  | guarantees, original boxes  |          |  |
|                |       |  | 6m Lin II           | 49    |  | 80T Xmttr AS-IS       | 25         |  | HFS Rec              | 125   |  | G-14 12 & 110                | 79    |  | —just like new, but at spe- |          |  |
|                |       |  | 3163 Marine Conv    | 39    |  | Any TBS-50 series     | 25         |  | HRO-50 Rec           | 125   |  | G-15 6 & 110                 | 79    |  | cial savings.               |          |  |
|                |       |  | Commander           | 39    |  | Xmttr AS-IS           | 25         |  | HRO-50T Rec          | 149   |  | KNIGHT                       |       |  | ELMAC                       |          |  |
|                |       |  | 3357 VFO            | 49    |  | HEATH                 |            |  | SW-54 Rec            | 29    |  | C-11 110v                    | \$ 19 |  | PMR-8 Rec                   | \$152    |  |
|                |       |  | 2m VFO & Pre-Amp    | 29    |  | Sixer                 | \$ 39      |  | CBM-27 6 volt        | 49    |  | AF-58 Xmttr                  | \$ 44 |  | AF-58 Xmttr                 | 165      |  |
|                |       |  | HALLICRAFTERS       |       |  | AT-1 Xmttr            | \$ 19      |  | HRO-60 Rec           | 249   |  | POLYTONICS                   |       |  | M-1070 Sup                  | 56       |  |
|                |       |  | HA-4 Keyer          | \$ 39 |  | CA-1 Alarm            | 29         |  | NC-88 Rec            | 64    |  | POLYCOM II 12 & 110          | \$ 69 |  | M-1071 kit                  | 40       |  |
|                |       |  | HA-5 VFO            | 29    |  | MP-1 12v Sup          | 29         |  | NC-98 Rec            | 79    |  | RCMA                         |       |  | HALLICRAFTERS               |          |  |
|                |       |  | 5R10A Rec           | 24    |  | MR-1 Rec              | 49         |  | NC-125 Rec           | 139   |  | RCM-P3A-5 12 & 110v          | \$ 79 |  | CB-3A CB                    | \$135.95 |  |
|                |       |  | HT-18 VFO           | 29    |  | MT-1 Xmttr            | 49         |  | NC-140 Rec           | 139   |  | REGENCY                      |       |  | CB-5 CB                     | 149.15   |  |
|                |       |  | SX-28 Rec           | 349   |  | QT-1 Q-Mult           | 149        |  | NC-155 Rec           | 139   |  | CBM-27 6 volt                | \$ 59 |  | HA-2 Transverter            | 249      |  |
|                |       |  | HT-32A Xmttr        | 399   |  | TX-1 Rec              | 169        |  | NC-173 Rec           | 79    |  | CB-27 110 volt               | 69    |  | HA-6 Transverter            | 249      |  |
|                |       |  | HT-32B Xmttr        | 475   |  | TX-1 Xmttr            | 149        |  | NC-183 Rec           | 179   |  | ED-27M 12 & 110              | 69    |  | P-26 AC Sup                 | 69       |  |
|                |       |  | HT-33 Lin           | 375   |  | VF-1 VFO              | 17         |  | NC-183D Rec          | 179   |  | UTICA                        |       |  | SX-100 Rec                  | 249      |  |
|                |       |  | HT-33B Lin          | 495   |  | VHF-1 Seneca          | 19         |  | NC-188 Rec           | 69    |  | MC-27                        | \$ 89 |  | SX-111 Rec                  | 199      |  |
|                |       |  | HT-33A Lin          | 375   |  | GO-1B Grid Dip        | 24         |  | NC-190 Rec           | 149   |  | NEW                          |       |  | PPM-200 Xcvt                | 1495     |  |
|                |       |  | SR-34AC Xcvt        | 225   |  | AR-3 Rec              | 29         |  | NC-240C Rec          | 69    |  | The following items are      |       |  | S-119 Rec                   | 24       |  |
|                |       |  | HT-37 Xmttr         | 325   |  | HG-10 VFO             | 29         |  | NC-270 Rec           | 159   |  | new, factory-sealed, offered |       |  | HAMMARLUND                  |          |  |
|                |       |  | S-38 Rec            | 19    |  | HP-10 DC Sup          | 59         |  | NC-300 Rec           | 179   |  | at special prices.           |       |  | CB-23 Xcvt                  | \$191.25 |  |
|                |       |  | S-38A Rec           | 24    |  | SB-10 SSB adapter     | 29         |  | 6m Conv              | 24    |  | CENTRAL                      |       |  | JOHNSON                     |          |  |
|                |       |  | S-38C Rec           | 29    |  | HD-11 Q-Mult          | 14         |  | 2m Conv              | 29    |  | ELECTRONICS                  |       |  | Messenger I CB              | 118.95   |  |
|                |       |  | S-38E Rec           | 29    |  | DX-20 Xmttr           | 24         |  | NC-303 Rec           | 275   |  | MM-2 kit                     | \$ 50 |  | Messenger I CB w/           |          |  |
|                |       |  | HT-40 Xmttr         | 59    |  | HP-20 AC Sup          | 29         |  | XCU-303 Calib        | 9     |  | COLLINS                      |       |  | new tunable rec             | 135.95   |  |
|                |       |  | S-40A Rec           | 49    |  | HR-20 Rec             | 39         |  | DI-1 Scope           | \$ 59 |  | 755-1 Rec                    | \$375 |  | The following kits are new  |          |  |
|                |       |  | S-40B Rec           | 49    |  | DX-40 Xmttr           | 59         |  | 6-150 Mixer          | 219   |  | COMMUNICATIONS,              |       |  | but for some reason have    |          |  |
|                |       |  | HT-41 Lin           | 275   |  | DX-100 Xmttr          | 99         |  | LA-400 Lin           | 79    |  | INC.                         |       |  | been opened. We guarantee   |          |  |
|                |       |  | SX-42 Rec           | 129   |  | DX-100 B Xmttr        | 149        |  | MARS                 |       |  | DAYSTROM                     |       |  | them all to be complete.    |          |  |
|                |       |  | SX-43 Rec           | 129   |  | O-11 Scope            | 29         |  | Thunderbird Xmttr    | \$ 39 |  | DM-348 CB kit                | \$ 50 |  | Save now!                   |          |  |
|                |       |  | R-46 Spk            | 69    |  | JOHNSON               |            |  | POLYTONICS           | \$279 |  | DEWALD                       |       |  | HT-40K Xmttr                | \$69     |  |
|                |       |  | R-46B Spk           | 69    |  | Adventurer            | \$29       |  | 62B Xcvt             |       |  | TR-850 6m Xcvt               | \$ 39 |  | SX-140K Rec                 | 89       |  |
|                |       |  | S-52 Rec            | 9     |  | Challenger            | 69         |  |                      |       |  |                              |       |  | S-119K Rec                  | 19       |  |
|                |       |  | S-53 Rec            | 44    |  | 6 & 2 Conv (28-30)    | 39         |  |                      |       |  |                              |       |  |                             |          |  |



**AMATEUR ELECTRONIC SUPPLY**  
3832 WEST LISBON AVENUE, Dept. C  
MILWAUKEE 8, WISCONSIN  
Phone—West 3-3262  
Visit our CHICAGO and ORLANDO Stores. See our full page ads in this magazine.

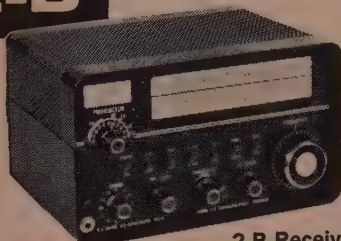
Ship Me: \_\_\_\_\_  
1st Choice \_\_\_\_\_  
2nd Choice \_\_\_\_\_  
I enclose \$ \_\_\_\_\_ and will pay balance  
☐ COD ☐ 1 Year ☐ 2 Years ☐ 3 Years  
NAME \_\_\_\_\_ CALL \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
☐ Send latest listing.

For further information, check number 15, on page 110

**NOW!  
IN STOCK**

**DRAKE  
2-B**

**"The most  
talked about  
HAM RECEIVER"**



**2-B Receiver  
\$279.95**

**ORDER NOW!**

Send check or money  
order. We prepay  
express charges.

**Q-Multiplier / Speaker  
2-BQ \$39.95**

WRITE OR CALL: BILL BRURING

**W9ZSO**

COMMUNICATIONS EQPT. CO.  
518 STATE ST., LA CROSSE, WISCONSIN

For further information, check number 23, on page 110



Here is Crank-Up Tower convenience  
at the flick of a finger!

**"Moto-Winch" by E-Z WAY**

When ordered with  
Tower.

**\$279.50**  
Am. Net.

When ordered as kit,  
\$309.50 Am. Net

- Pull-down & Crank-up action
  - Double worm gear drive
  - Push button control
- Write for details

**E-Z WAY TOWERS, Inc.**

P.O. BOX 3767

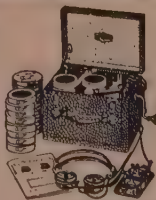
TAMPA 5, FLORIDA

**EASY TO LEARN CODE**

It is easy and pleasant to learn or increase speed the modern way—with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

**ENDORSED BY THOUSANDS!**

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the Instructograph System. Write today for full particulars and convenient rental plans.



**INSTRUCTOGRAPH COMPANY**

4711 SHERIDAN RD., CHICAGO 40, ILL.  
4700 Crenshaw Blvd., Los Angeles 43, Calif.

**PE-73 D.C. Source** [from page 32]

wires carefully up into the junction box on top of the unit, making sure they clear the rotating armature. A rheostat connected between these two wires will provide the output voltage adjustment.

The junction box on top provides a convenient place to mount the voltage control and the generator output terminals, as well as any metering desired.

An old car ammeter provides a cheap and helpful monitor of what the unit is doing. Also, a 30 amp fuse is put in the output to protect the armature in case the output is accidentally shorted.

Wire up the generator as shown in fig. 2.

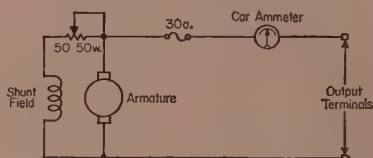


Fig. 2—Wiring diagram for the converted PE-73 dynamotor. Output voltage can be varied from 0-28 volts by the 50 ohm field control.

### Testing

Well, there's your low voltage generator! Hook the V-belt to a motor (about 1/2 hp) with a large enough pulley to turn the dynamotor about 4000-5000 r.p.m. in the same direction as the unit ran when it was hooked to the d.c. source in the initial checks.

The generator is now ready for your use. If it is to be used in a dirty location, the low voltage end cover may be partially cut away to provide clearance for the V-belt, and then put back in place.

If you desire a low voltage output from the generator, you may find that it is not obtainable when there is no load on the generator. This is normal, and the voltage will drop as soon as some load is applied to the generator.

The voltage regulation of the unit is quite good due to the compound winding of the dynamotor. As the load current increases, the series field produces a stronger magnetic field. This boosts the generated voltage to compensate for the increased drop in the armature, thereby tending to

[Continued on page 104]

**DX** [from page 50]

cago on September 14th. Things get under way at 1:00 P.M., Chicago time.

Mac Reynolds, W9EVI, is Chairman and Mac is also handling registrations. His QTH is 664 Caroline Ct., Deerfield, Ill.

All DXCC holders are invited and any non-W will be the dinner guest of the gang. DXCC is

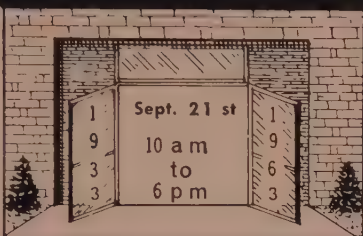
# 30th ANNIVERSARY OPEN HOUSE

for  
RADIO  
AMATEURS . . .

REFRESHMENTS & PRIZES!

SERVICING  
as well . . .

- ★ Personalized Service
- ★ Trade-ins
- ★ Time Payments
- ★ Engineering Dept.
- ★ Top Brand Lines



- ★ Dealers
- ★ Servicemen
- ★ Industry & Gov't.
- ★ Contractors
- ★ Hi-Fi Audiophiles
- ★ Citizens Band
- ★ Business Radio

## EVANS RADIO

*"Your Friendly Supplier"*

ROUTES 3A, 89, & 93 • BOW JUNCTION • CONCORD, N. H.

### COME PREPARED—MANY CASH SPECIALS

For further information, check number 44, on page 110

## PREMAX

### CENTER LOADED ANTENNAS

**Series B — For 2 to 8 Mc.,  
75, 20 and 10 meters.**

Includes 6-foot tapered stainless whip mounted above a loading coil, and 2-foot stainless base rod with couplings to fit any standard mounting. Coil has special hardwood core and is waterproofed.

**Shown: Style BXS.** Other styles and frequencies also available. Ask your dealer or write for free bulletin on complete line of antennas and accessories.

**PREMAX PRODUCTS**  
DIV. CHISHOLM-RYDER CO., INC.

6315 Highland Ave. • Niagara Falls, New York

## NOW—15% OFF ON PRECISION CRYSTALS!

**EXTRA SPECIAL • SEPT. ONLY!**

**\$1.95**

ANY FREQUENCY—7000-10,000 K.C.

HC-6/U Fundamental Plated Crystals

Finished to .005%

.093 Pins For This Special Only—15¢ extra

BOMAR CRYSTAL CO.

Dept. A., P.O. Box 481, Somerville, N.J.

HC-6/U Plated Crystals

| FREQUENCY RANGE | TYPE     | REG. PRICE | SPECIAL |
|-----------------|----------|------------|---------|
| 2500-6999 KC    | Fund.    | \$5.80     | \$3.65  |
| 7000-9999 KC    | Fund.    | 3.75       | 3.10    |
| 10000-15000 KC  | Fund.    | 4.25       | 3.50    |
| 15.0-21.9 MC    | 3rd Mode | 3.85       | 3.25    |
| 22.0-29.9 MC    | 3rd Mode | 3.85       | 3.30    |
| 30.0-45.0 MC    | 3rd Mode | 4.25       | 3.50    |

UPON REQUEST, FT-243 PINS (.093" dia.) CAN BE HAD ON ANY HC-6/U CRYSTAL AT NO EXTRA CHARGE.

All crystals finished to .005% tolerance. Fundamental crystals are supplied for oscillator circuits having 32  $\mu$ f capacity, unless otherwise specified. 3rd overtone crystals are supplied for series circuits unless otherwise specified.

Freq. and Quantity .....

Enclose: \$..... Check ☐ Money Order ☐

Name .....

Address .....

City..... Zone..... State.....

For further information, check number 45, on page 110

For further information, check number 46, on page 110

September, 1963 • CQ • 91

## BARRY ELECTRONICS

**Squirrel-Cage Blower:** 115 VAC @60 CPS. Rectangular 3"x3" opening. W/mount flange. Fasco. R/E. 8½"x7"x8". 6 lbs. Order cat. #12-22. **\$9.75**

**Squirrel-Cage Blower:** 220 VAC @60 CPS. 2½" square opening. Fasco. W/flange. R/E. 8"x7"x7". 6 lbs. Specify phase desired. Cat. #12-20. Single phase. **\$9.95**

Three phase **\$12.95**

**Rotron 8" Diam. Fan:** 5 blades in aluminum housing. Blows air into cabinets or racks. R/E. 220 VAC @50 or 60 CPS. 1500 RPM. Cat. #12-21. **\$9.25**

**Hammarlund HX-50:** W/160 Band. \$479.50; HQ-110AC @ \$259.00; HQ-170AC @ **\$379.00**

**Hammarlund HK-1B Electronic Keyer:** \$39.95; HQ-180-AC \$449.00, HXL-1 Linear Amp. **\$395.00**

**Cush-Craft Blitz Bugs:** Type LAC-1 @ \$3.95; Type LAC-2 @ \$4.45; Type LAC-2N @ **\$5.95**

**Green-Glas-Line.** 500 lb. tensile strength. **\$3.75** per 100 ft. @ \$17.84 per 600 ft. reel.

**IF IT'S TUBES YOU WANT. BARRY HAS IT. WE HAVE THE LARGEST DIVERSIFIED STOCK IN THE COUNTRY. LISTED ARE A FEW TYPES. IF YOU DON'T SEE IT, ASK FOR IT.**

4-65A @ \$10.00; 4-1000 @ \$95.00; 4CX300A @ \$42.00; 4CX1000A @ \$145.00; 4E27 @ \$8.75; 811A @ \$3.75; 812A @ \$3.75; 816 @ \$2.50; 830B @ \$1.00; 866A @ \$1.65; 872A @ \$4.75; 5514 @ \$6.95; 5516 @ \$7.50; 5842/4174 @ \$5.90; 5847/404A @ \$3.90; 5894 @ \$18.90; 6146 @ \$3.25; 6360 @ \$3.90; 6383(RCA) @ \$2.25;

**Operator's Headset—W.E. Type #52-A.** This is the regular headset used in telephone switchboards and monitor boards and ideal for Ham-Radio Operator's use. Complete with cord and plug. **\$19.50**

**Dolly—** for moving furniture, Ham-Gear, equipment, etc. Excel, constructed wooden dolly with ball-bearing wheels. 27"x17"x5½". Order the Dolly-O. Only **\$14.95**

**Roanwell Handset Style #300,** with push-to-talk button, and 12 ft. retractable coil (5 conductor), and connector (Amphenol #AN-3057-6). **\$17.50** each

**Sale Clegg 99'er: \$135.; Clegg Zeus: \$595. Clegg Interceptor: \$389**

**RCA WR-61B Color Bar Generator (Reg. net \$259.50)**  
Sale price: **\$156**

**RCA WR-46A Video-Dot/Crosshatch Generator (reg. net \$179.50)**  
Sale price: **\$108**

**Model 706A Deluxe Signal Generator:** 150 KCS thru 55 MCS fundamental frequency in 6 bands. 55MCS thru 220 MCS by use of harmonics. Operates on 115 VAC @60 CPS. Brand new, orig. boxed w/leads and book. Sale price **\$39.90**

**Telex Boom Mike Dual Headset #BCW-02.** Sensitivity: 120 db above. 0002 dynes per sq. cm per 1 milliwatt of input. Freq. Resp: entire system covers range up to 5000 Cy. Imped: Receiver 500 Ohms Carbon mike: 50 Ohms. 3½ Ozs. Excel. for Amateur Radio, Aircraft, TV Studios, Receptionists, etc. Complete with cord and plug (similar to PL-55 & PL-68) **\$39.00**

**Adapt your F.M. Radio for Multiplex (Stereo) Reception.**  
Order Model H-119 Stereo-Multiplex Demodulation Cartridge. Factory wired: **\$14.95**

**Johnson Viking II Ranger—Factory Wired.** 6 thru 160 Meters. 75 watts CW/65 Watts AM. **\$359.50**

**24 Volt Center-tapped @50 A. Xfmr. Pri: 115 VAC @60 CPS.** 28 lbs. @ **\$27.00**

**50 Amp. Choke.** Matches above Xfmr. **\$22.00**

**National NCX-3 Tri-Band SSB Transceiver.** Only 19 lbs. **\$369.00**

**COME IN AND BROWSE. MONDAY TO FRIDAY—Thousands of items that we cannot list in an ad. MON. TO FRI. 9 to 6. SATURDAYS 10 to 2 PM (Free parking on Street Sat.) Mon. to Fri. parking lot 501 Broadway, WRITE FOR BARRY'S Green Sheet #11.**

**BARRY ELECTRONICS Dept. C-9**  
512 BROADWAY, NEW YORK 12, N. Y.  
WALKER 5-7000 (Area Code: 212)

☐ Enclosed is money order or check and my order. Prices FOB NYC. Shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs., include sufficient postage. Any overage will be refunded. Fragile tubes shipped via Railway Express.

☐ Send copy of new 1963 "Green Sheet" Catalog #11

☐ Send information on: .....

☐ I have available for trade-in the following: .....

Name ..... Title .....

Company .....

Address .....

City ..... State .....

not required of non Ws. It looks like a sweet show, as usual, so get in touch with Mac as soon as possible.

### Awards

**ALL-PUERTO RICO AWARD** Issued by the D. Club of Puerto Rico for confirmed postwar contacts with the seven Puerto Rican districts of San Juan, Arecibo, Aguadilla, Mayaguez, Ponce, Guayama and Humacao. If in doubt about a location, check Directory of Post Offices (PO Publication 26) where each town is listed with its corresponding district, or inquire at the club with self-addressed, stamped envelope. Endorsed all one band/mode. Send list, certified by two hams (amateurs) showing date, band, mode and QTH. Send fee of \$1.00 or 10 IRC to DX Club of Puerto Rico, P. O. Box 10525, Caparra Heights, Puerto Rico.

**E. W. MAYER MEMORIAL AWARD** Issued by the Puerto Rico CHC Chapter 20 in memory of the late KP4KD for confirmed contacts with 5 members of the Certificate Hunters' Club in Puerto Rico, on or after year station contacted became club member. Endorsed all one band/mode mixed. Special endorsement for having worked KP4KD at any time. Send list certified by two hams showing date, mode and band with \$1.00 or 10 IRC fee to CHC Chapter 20, P. O. Box 10525, Caparra Heights, P. R.

### QTHs and QSL Managers

**CP5EZ—via W2CTN**  
**CR9AH—via W7ZAS**  
**ET3MEN—USAID P. O.**  
Box 1014, Addis Ababa, Ethiopia.

**FG7XL—Box 109, Pointe a Pitre, Guadeloupe.**

**FP8CA—via K2OJD**  
**FU8AG—via K7GGN**  
**H8MMN—via WASDAJ**  
**HK3AMA—Box 3127,**  
Bogota, Columbia.

**HK3RQ—via W2CTN**  
**HK9LX—via HK3LX**  
**HL9TD—Det. B. 304 Sig**  
Bat, APO 970, San Francisco, Calif.

**JT1CA—Box 639, Ulan Bator, Mongolia.**

**W5BRX/KJ6—Box 130,**  
APO 105, San Francisco, Calif.

**OA3M—via Box 42, Chimbote, Peru.**

**OA4NKY—Juan Krakenberger, Box 2965, Lima, Peru.**

**OA4PO—Box 761, Lima, Peru.**

**PX1IK—via HB9KU**  
**PX1OK—via HB9DX**  
**PX1OX—via DL2OX**  
**PX1VW—via F9VW**  
**T19RC—via W4ECI**  
**W1DBN/VO2—54th Air**  
Rescue Sqdn., Box 79, APO 677, N. Y.

**VP2AB—Box 229, Antigua, B.W.I.**  
**VP2CC/C—via W8EWS**  
**VP2GAC—via W8EWS**

**VP6ZX—via W9JFJ**  
**VP5DB—via WA2IFY**  
**VP5LG—via K4UTE**  
**VP7BC—via W4CNS**  
**VP7CT—via W3LBJ**  
**VP6GAC—via W8EWS**  
**V5SCW—via VSICW B**  
777, Singapore.

**VS9ASS—via W4ECI**  
**V9KDV—via W4ECI**  
**VS9OC—Twynnham Elev**  
R.A.F., Masirah, B.F.P.O. 69.

**XE1VT—W. Asche, B**  
907, Mexico, DF, Mexico

**YI2WS—via SMSCCE**  
**YS1RGM—Box 1339, S**  
Salvador, El Salvador

**YV5AST—Box 2285,**  
Caracas, Ven.

**YV5BKW—Box 2285,**  
Caracas, Ven.

**ZD3A—P. Scarrow, Box**  
285, Bathurst, Gambia

**ZD6HK—via W2ELW**  
**ZD6OL—via G3JUL**  
**ZM7AD—via K6ERV,**  
Jack Broilier, Box 177, San Mateo, Calif.

**W4BPD/4W1—via W4E**  
**5A1TR—Box 1525, A**  
231, N. Y.

**5X5IU—R. Roberts, B**  
355, Kampala, Uganda

**7X2VX—via 4UWC**  
**9A1AI—via W4VPD**  
**9M2GV—via W7EMU**  
**9N1MM—via W3KVQ**  
**9Q5CP—Emile, Box 12**  
Leopoldville, Congo.

73, Urb, W2DI

f articles on proper operating techniques, would realize that their *own* behavior on the bands could well stand improvement? It is usually, They must mean that other guy; it couldn't e me!" Well, just this once, let's assume that he spotlight is on *you*—how do *you* measure p when it comes to the following suggestions or better operating.

1. Make sure that your own signal meets the highest standards of sideband operation—mini- num suppression of at least 35 db on unwanted sideband and carrier; 2.1 to 3 kc audio band- width; and use of minimum power necessary to maintain contact. While it is preferable that you constantly monitor your own signal with a scope, if this is not possible, you can make use of your receiver to check your signal. You should be- come thoroughly familiar with the character- istics of your rig by carefully reading the equip- ment manual that accompanied it.

2. If you must test your signal on the air, it should be done only at times when the band is not busy and then only for not more than 10 seconds. If prolonged testing is necessary, it should be done with a dummy load, one of which should be in every ham's shack.

3. Master the use of vox operation. Too often, we hear operators say that they are bothered by the relay's clicking and, therefore, they resort to manual operation. This leads to unnecessarily long transmissions and makes it impossible for the conversational nature of sideband to be pre- served.

4. Listen on a frequency before calling CQ or another station. If the frequency seems to be clear, take the added precaution and ask, "Is this frequency being used?" several times with pauses for replies before proceeding to operate on the frequency.

5. Don't break into a conversation unless you can hear both sides or unless you know the station well enough whom you are hearing to be sure that your interruption will be welcome. In sideband, where break-in operation is so com- mon, it is very rude to keep calling a station who, though he may be hearing you, prefers to con- tinue speaking to his original contact without interruption. If you are not acknowledged after one or two attempts, stand by on the frequency until the station you wish to contact is free to listen for your call.

6. Give honest reports! Whether or not you are asked for a qualitative report, take a moment to check sideband suppression, carrier suppres- sion and audio bandwidth and clarity. Then, in a gracious and friendly manner, let the other station know if there are any improvements to be made. Many operators continue to put a poor signal on the air simply because they have not been told that there is anything wrong.

7. Speak with connected thoughts and phrases. Give the other station a chance to answer you immediately after you have made a point or asked a question. Don't force him to remember

# NEW!! COMPLETE TRI-BAND NOVICE ANTENNA SYSTEM

—FOR—  
80-40-15  
METERS

## FEATURES:

- New Tri-ex trapless an-  
tenna
- Single feedline (coax)
- Overall height 46 ft.
- Tri-ex crankup tower in-  
cluded
- One man installation
- Performance proven
- Cement foundation not  
required
- Mount your 2 meter  
beam on top! (All band  
novice operation)
- Price complete deliv-  
ered anywhere in U.S.A.

Write  
For  
Details

**NOVA I  
ONLY \$97.<sup>50</sup>**

Order from your favor-  
ite radio store or di-  
rect with payment in full

**tri-EX TOWER CORPORATION**  
127 East Inyo Street • TULARE, CALIFORNIA  
Telephone MUrdock 6-3411

For further information, check number 24, on page 110

**B&W**

**TR  
SWITCH**

(TRANSMIT/RECEIVE SWITCH)

**MODEL 381B**

**\$60.00**

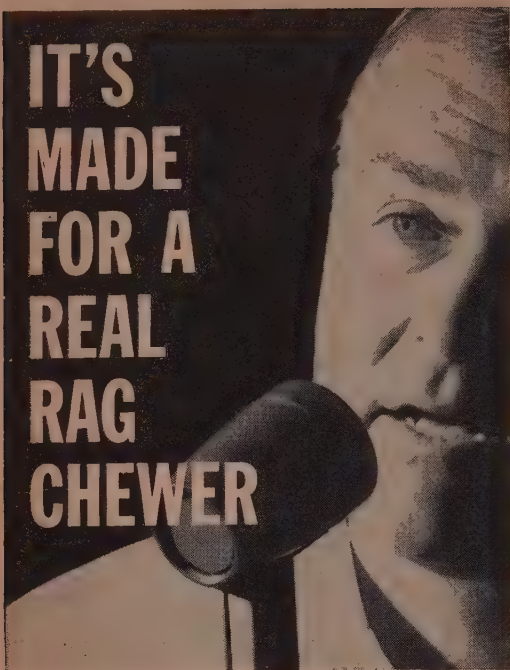
An electronic antenna changeover switch. Transmitter is continuously connected to antenna; antenna circuit to re- ceiver is blocked during transmit. No switch contacts to arc or burn. Switching is instantaneous. Selectable band-switching insures no loss in receiver sensitivity. Substantial gain in receiver sensitivity results in most installations. Ideal for break-in operation on CW, SSB and AM. Bandswitch conveniently located on front. Three coax connectors are mounted on rear. Conservatively de- signed for full legal power. Operates from 115 volts, 60 cycles. For 52-75 ohm lines.

Size 4 3/4" x 4" x 5 1/2"

**BARKER & WILLIAMSON, Inc.**  
Radio Communication Equipment Since 1932  
BRISTOL, PENNSYLVANIA • STillwell 8-5581

For further information, check number 25, on page 110

# IT'S MADE FOR A REAL RAG CHEWER



At last! A quality microphone designed *specifically* for the ham. Features galore that hams have asked for. Tops in voice punch, intelligibility. Unique convenience features to minimize operator fatigue. Great for AM & FM, unsurpassed for SSB. • "Shaped" response—cuts off sharply above 3000, below 300 cps with rising characteristic to curve: gets message through with top audio punch! • Push-to-talk bar-switch with optional locking feature to control relay and mike muting circuits. • Separate slide-switch gives choice of press-to-talk or VOX operation. • Exclusive adjustable height stand. • Rugged Shure Controlled Magnetic element (U.S. Patent 2,454,425). • Field replaceable cartridge and cable. • ARMO-DUR case and stand—can't rust, peel, crack, or dent. Write for data sheets!

**SHURE BROTHERS, INC.**  
222 Hartrey Ave., Evanston, Illinois

## ADJUSTABLE HEIGHT



ALL NEW

**SHURE**

**444**

HAM MICROPHONE

only \$2550 amateur net

a lengthy, disjointed transmission or to take copious notes.

8. Avoid repetition by not repeating what the other fellow has just said. If you have heard and understood everything he has said, just say so; don't try to prove it!

Whether you are an old-timer or one whose license has recently been earned, it would be well for you to give some thought to the above suggestions to determine whether or not there is some facet of your operating technique that could be improved. None of us are perfect; all of us fall into bad habits which, with a little effort, can be corrected. It's all very well to complain about bad operating on the amateur bands and blame the other fellows. With a little improvement in everyone's operating technique, it could mean a lot more enjoyment of sideband for all. That means *you* and him and us!

## Space Age Sideband

Surrounded by the space age the average citizen rarely gets to peek behind the scenes attendant to missile launchings and space probes. So too, the average ham seldom sees space-age radio at work. Thanks to the Collins Radio Co. *Signal*, we can acquaint you with a small aspect of the use of single sideband to provide reliable communications for the missile ranges and astronaut program.

The Pacific Missile Range, an agency of the Navy's Bureau of Naval Weapons, supports missile and satellite programs from the Army, Navy, Air Force, Marine Corps, NASA and other government agencies. Of particular interest to sidebanders is the extensive use of s.s.b. for communication. In the air with the "Willie Victor's," big, extensively equipped and specially designed *Constellations* carrying kilowatt s.s.b. equipment, to extensively equipped receiving buildings, s.s.b. is making a substantial contribution to the space effort.

PMR makes its headquarters at Point Mugu, California and operates sites at various places in the far flung islands of the Pacific to provide a vast network of data and information. It is not unusual to monitor a radio conversation from Point Mugu which originates with the launch control officer at a Vandenberg missile block house, travels 150 miles south via cable and microwave relay to Laguna Peak, continues by s.s.b. from the peak to a site several thousand miles downrange and then returns via the same route back to the receiver building. The impression received is one of listening to an intercom in the same building. In fact, personnel at the Laguna Peak facility have established and maintained 100% contact with a "Willie Victor" sitting on the runway of an airfield near Manila in the Philippines.

We fully well realize that to s.s.b. operator this is no real reason for raised eyebrows—why do it all the time. Now all we need do is convince NASA that they include an s.s.b. transmitter in the next space capsule.

73, Dorothy & In

For further information, check number 26, on page 110

local oscillator to make tuning less critical.

The antenna at W6DNG is a sight to behold. It consists of three home-brew long yagis phased 20° apart with the elements forming three spokes in a circle. By proper phasing this array produces the circular polarization required for moonbounce work.

The antenna at OH1NL's QTH in Nikkila is shown in the photograph. Len uses 2 × 26 elements for transmitting and 6 × 12 dipoles, series coupled, for receiving.

Bill recently acquired a Pacific Semiconductors Hi-Q Varicap® for use in a new parametric amplifier. This should permit him to break through bigger and better v.h.f. frontiers.

**DX**—Although it's rather old news, by now, Eastland easterners may be interested in scatter nets between Northern and Southern California.

The ham club at Stanford (W6YX) in Palo Alto has been successful in working many stations in the bottom end of the state. W6PJA, W6NGX, WA6MLX, K6HMS, W6NLZ, K6LZC are among the many hams successful in punching a signal through into Northern California. Considering the obstacles, this feat is comparable to working Florida, on two meters, from Maine without the aid of a band opening.

That circularly polarizes us for another 30.

For now, 73, DE W6TNS

## Lil Lulu [from page 37]

Lil Lulu is "well built" with heavy gauge material and she uses the highest-quality components for her makeup. She cuts a neat figure in a satin-finished aluminum panel with black knobs and lettering. Her fickleness is easy to see on the nicely lit v.f.o. dial with calibrations every 100 kc from 50 to 54 mc. She is clothed in a sturdy perforated dark gray case. Dimensions?—5½" H × 8" W × 9½" D. Weight?—16 lbs. Lil Lulu can be had with a one-year warranty for \$225, complete with a.c. and d.c. power cables, from Whippany Laboratories, Inc., 1275 Bloomfield Ave., West Caldwell, N.J.

—W2AEF

Lil Lulu is "well built" with heavy gauge material and she uses the highest-quality components for her makeup. She cuts a neat figure in a satin-finished aluminum panel with black knobs and lettering. Her fickleness is easy to see on the nicely lit v.f.o. dial with calibrations every 100 kc from 50 to 54 mc. She is clothed in a sturdy perforated dark gray case. Dimensions?—5½" H × 8" W × 9½" D. Weight?—16 lbs. Lil Lulu can be had with a one-year warranty for \$225, complete with a.c. and d.c. power cables, from Whippany Laboratories, Inc., 1275 Bloomfield Ave., West Caldwell, N.J.

## Space [from page 51]

Now underway in an effort to raise gain, drop the primary power requirement still further, and decrease intermodulation distortion. While these problems are complex, progress is being made, but it now appears that a 1963 launch date may be too optimistic unless a "breakthrough" is made in the design of the transistorized linear amplifier, or the power supply. As it now stands, the package is designed to function with either a "one shot" battery supply (with an approximate

## TEST EQUIPMENT

### GUARANTEED GOOD CONDITION

|                                                                            |                            |
|----------------------------------------------------------------------------|----------------------------|
| SIGNAL GENERATOR, URM-25, 10K.C.-50 M.C.                                   | \$195.00                   |
| SIGNAL GENERATOR, URM-26B, 5-405 M.C.                                      | 250.00                     |
| SIGNAL GENERATOR, URM-25D, 10 K.C.-50 M.C.                                 | 250.00                     |
| SCOPE, Tektronix #511                                                      | 175.00                     |
| SCOPE, Tektronix #511 AD, with delay line                                  | 250.00                     |
| SCOPE, Dumont                                                              | #304H 85.00                |
|                                                                            | #241 65.00                 |
|                                                                            | #208 49.00                 |
| SCOPE, Western Electric, TS-34A or #80                                     | 39.00                      |
| SCOPE, Browning Labs. #ON-5                                                | 69.00                      |
| SCOPE, Precise, 300-C, 7 inch                                              | 89.00                      |
| TUBE TESTER, Weston OCL                                                    | 29.00                      |
| TUBE TESTER, Precise #116                                                  | 49.00                      |
| SQUARE WAVE generator, Hewlett-Packard 210A                                | 45.00                      |
| SIGNAL GENERATOR, Ferris 18C                                               | 45.00                      |
| FREQ. METER                                                                | Navy LM 115V. supply 15.00 |
| SIGNAL GENERATOR, Triplett 3433, FM/AM, 100KC-120MC                        | 69.00                      |
| MARCONI 148-017 Master Oscillator, 2-4 MC fundamental, very high harmonics | 75.00                      |
| RECORDER, Leeds & Northrup, 50 Mill volt.                                  | 95.00                      |
| V.T.V.M., for A.C., Ballantine 300                                         | 59.00                      |
| SIGNAL GENERATOR, General Radio LR                                         | 95.00                      |
| SIGNAL GENERATOR, General Radio 605 PL                                     | 95.00                      |
| IMPEDANCE BRIDGE, General Radio 650A                                       | 125.00                     |

## TRANSMITTERS & RECEIVERS

### GUARANTEED GOOD CONDITION

|                                             |                           |
|---------------------------------------------|---------------------------|
| COSMOPHONE #35, with power supply, like new | \$325.00                  |
| ELDICO SSB-500, 500 Watt linear amplifier   | 175.00                    |
| HAMMARLUND HQ-180C, like new                | 279.00                    |
| HAMMARLUND HQ-140X, very clean              | 149.00                    |
| JOHNSON VIKING II #135.00                   | HEATH DX-60 75.00         |
| HEATH DX-100 125.00                         | VIKING ADVENTURE 33.00    |
| VIKING #122 VFO 29.00                       | TURER 59.00               |
| DX-40 & VFO 65.00                           | EICO #720 49.00           |
| VIKING MOBILE 49.00                         | GLOBE CHIEF DELUXE 49.00  |
| GLOBE CHIEF 90 39.00                        | LETTINE #246 45.00        |
| LETTINE #240 45.00                          | HALLICRAFTERS-S-76 89.00  |
| RME #4350 145.00                            | S-108 95.00               |
| NATIONAL NC-125 89.00                       | S-106 35.00               |
| NC-300 225.00                               | SX-140 89.00              |
| NC-188 79.00                                | HAMMARLUND HQ-129 125.00  |
| NC-98 75.00                                 | SUPER-PRO. #779 95.00     |
| MILITARY HRO 69.00                          | SUPER-PRO. to 40MC 125.00 |
| RBS or RBM, 2-20 MC 49.00                   |                           |
| ELMAC AF-67 89.00                           |                           |
| VIKING CHALLENGER 79.00                     |                           |

**SPECIAL:** 4-400A tube, socket, chimney & Fil. transformer, all are new ..... **\$49.95**

## MISCELLANEOUS

|                                              |         |
|----------------------------------------------|---------|
| COLLINS mechanical filter, F-455-D-3L, New   | \$35.00 |
| APR-1 receiver \$45.00, tuning units         | 14.00   |
| TCS Xmitter                                  | 35.00   |
| TCS receiver                                 | 35.00   |
| ART-13 Xmitter, a very good buy              | 49.00   |
| TBS Xmitter, 100 Watt, 60-80 MC, make-6 mtr. | 29.00   |
| TBS Receiver, 60-80 MC. for 6 Mtr.           | 19.00   |
| VARIACS-10 Amp. \$14.00; 18 Amp.             | 24.00   |
| WILCOX receivers, F-3 or CW-3                | 15.00   |
| RG-8 Coax Cable, new, 100 ft.                | 6.75    |

All prices F.O.B. Hempstead.  
Avoid delay—enclose sufficient postage—excess will be returned.  
25% with C.O.D. orders.

# ALGERADIO

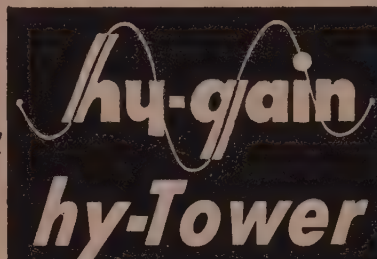
## ELECTRONICS CO.

37 Greenwich Street, Hempstead, N. Y.

Phone Area Code 516 IV 9-0808

Extends  
to 50  
feet

# Completely Self-Supporting MULTI-BAND VERTICAL



COVERS 10, 15, 20, 40 AND 80 METERS  
WITH SUPERB EFFICIENCY

Unique stub decoupling method makes possible extremely high radiation efficiency and low SWR. NO TRAPS USED! Feed directly with single 52 ohm coax. SWR less than 2:1 on all bands. Tower height: 24 ft. 2" OD to 3/4" OD aluminum top mast extends hy-Tower to total height overall of 50 ft. No guy lines required ... Completely self-supporting in high wind velocities. Net weight: 90 lbs. Easy 2-man installation. Can be mounted on 2 sq. ft. of real estate. Ground rods (not furnished) required. Write for complete information.

ONLY

**\$139<sup>50</sup>**  
Complete

**\$13 DOWN—Easy Terms Arranged**

**SPECIAL OFFER LIMITED TIME**

ORDER YOUR

**hy-gain  
hy-tower**

NOW and receive  
24 HOUR ELECTRIC  
MASTER-  
CRAFTER WORLD  
CLOCK FREE \$8.97  
VALUE



Chrome finish. 8" diameter. Sweep Second Hand shows times of the Zones of the World. Self starting, U/L Approved. Inner dial has South Polar projector.

**THE Lew & Bonn co.**

Distributors of Nationally-Known Amateur Equipment  
Dept. CQ963, 1211 LaSalle, Minneapolis 3, Minn.

life of 3-4 weeks), or with a combination of battery and solar charging cells for extended life. A final decision will be made shortly on the choice of power supply to be used. More information on this subject will appear in this column as soon as the situation clears.

## OSCAR Communication Network

Bob Walton, W6CYL, has taken charge of the communication facilities for Project Oscar. At this time, it is planned to transmit OSCARgrams on 80, 40 and 20 meter RTTY, on 80, 40 and 20 meter s.s.b., and on 160 and 2 meter a.m. Arrangements have been made to have the OSCARgrams relayed through the International Telecommunication Union Radio Club station 4UIITU in Geneva, Switzerland. Direct transmissions will also be made from OSCAR Control station W6EE to I.A.R.U. member societies for relay in other areas of the world. The communication network is in the early stage of development at the present time, and stations desiring to participate in the network can receive further information direct from Bob Walton at Project OSCAR headquarters.

## OSCAR Smithsonian Display

On August 31, 1963, a model of the OSCAR I beacon satellite will be presented formally to the Smithsonian Institution in Washington, D.C., for inclusion in the Institution's space flight exhibit. If you visit Washington for the ARRL Atlantic Division Convention, be sure to plan to attend the Smithsonian ceremonies. As far as can be determined at press time, OSCAR will be the first piece of radio amateur equipment to be included in a Smithsonian exhibit, and it will be standing alongside John Glenn's capsule and other history making American space relics!

73, George, W3ASK

## Ham Clinic [from page 67]

have their own high flying Telestar type satellite for 2 and 6 meters; and the President of the U.S. will be a ham operator. Enough? ? ?

**DX-40 Prize**—The DX-40 offered as a prize by HAM CLINIC has been awarded to Brother Mike Gill, Maryglade Seminary, Memphis, Michigan. If any of you fellows have some spare equipment around which you would like to donate to a good cause, send it to Brother Gill. The missionary students can surely use it—especially if we are fortunate enough to receive reciprocal operating privileges.

**Servo Rotators**—"Where can I get some information on servo rotators?"

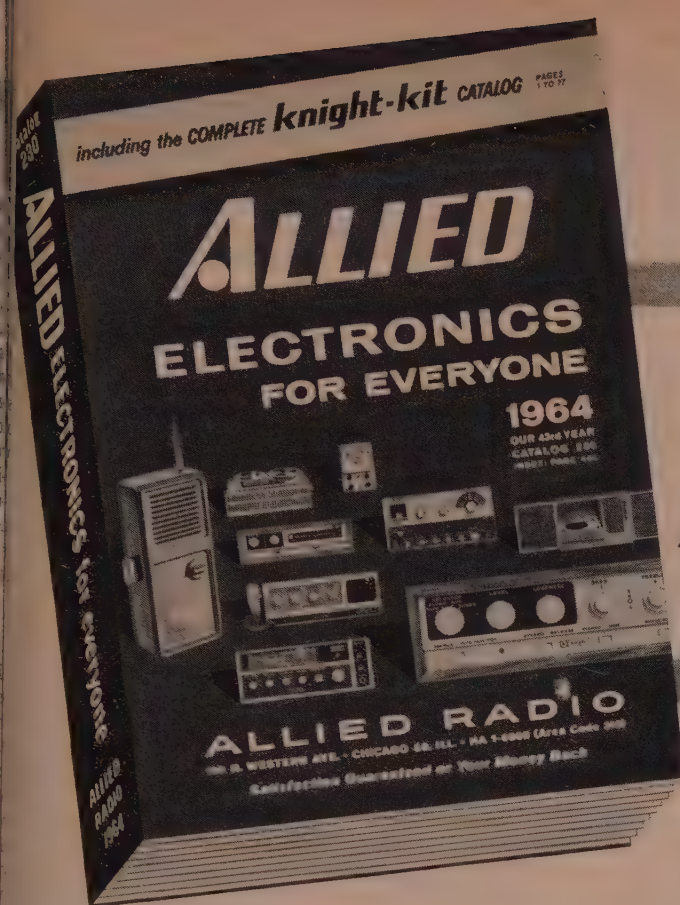
Try CQ for November 1953.

**More Modulation for TBS-50**—"In what issue was there information on increasing the modulation for my Harvey Wells TBS-50?"

Look at the October 1955 CQ.

**SX-71 Improvement**—"Any late information on improving the SX-71 receiver?"

No, but see the September 1954 issue of CQ for some good info.



# FREE

send today for  
your 444-page

## ALLIED 1964 CATALOG

world's largest  
electronics catalog

**BIGGEST SELECTION  
BIGGEST SAVINGS**

## EVERYTHING IN ELECTRONICS FOR THE AMATEUR

*get every ham  
buying advantage*

### LARGEST SELECTION

ALLIED stocks the station gear you need—at lowest, money-saving prices. Same day shipment from the world's largest stocks.

### HAM-TO-HAM HELP

Our staff of more than 60 licensed hams goes all-out to give you the personal help you want. Whether you write, call, or visit our Ham Shack, you'll like the friendly interest and attention you always get at ALLIED.

### NO MONEY DOWN

Get Top Buying Power with Your ALLIED Credit Fund Plan—up to 24 months to pay.

**ALLIED RADIO**  
*serving the Amateur for 43 years*

- Ham Receivers and Transmitters
- World's Largest Stocks of Station Supplies
- New Build-Your-Own Ham Knight-Kits®
- Citizens Band 2-Way Radio
- Electron Tubes and Semiconductors
- Test Instruments and Meters
- Everything in Stereo Hi-Fi
- Tape Recorders and Tape
- Everything in Electronic Parts, Tools & Technical Books

**SEND FOR YOUR COPY TODAY**

**FREE**

ALLIED RADIO, Dept. 12-J  
100 N. Western Ave., Chicago 80, Ill.

☐ Send FREE 1964 ALLIED Catalog

Name \_\_\_\_\_  
PLEASE PRINT

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



For further information, check number 7, on page 110



# GET YOUR NEW SWAN SW-240 NOW!

Low Monthly Payments  
**ONLY \$11.47**



**3 YEARS TO PAY—ONLY \$5 DOWN**

**Terrific Trades on Single  
Band Swans — Or ANY Gear!**

Here's all you pay each month after \$5 Down Payment

|                       | Ham Net  | 3 Years |
|-----------------------|----------|---------|
| SW 240 .....          | \$320.00 | \$11.57 |
| SW 12 DC .....        |          |         |
| DC Power Supply ..... | 115.00   | 3.97    |
| SW 117 AC .....       |          |         |
| AC Power Supply ..... | 95.00    | 3.25    |

**Reconditioned SWAN TRANSCEIVERS**

Models SW-120, SW-140, SW-175 ..... **\$189<sup>95</sup>**

## STAY ON THE AIR PLAN

Yes—Now you can enjoy your new SWAN equipment without going off the air. You need not ship your trade-in in to us until you receive our shipment, and make sure that your new merchandise is in good working condition.



# AMATEUR ELECTRONIC SUPPLY

3832 West Lisbon Avenue

MILWAUKEE 8, WISCONSIN • West 3-3262

VISIT OR PHONE—do not write—our branch stores  
(they have no mail order facilities)

CHICAGO 31, ILL.  
6450 Milwaukee Ave.  
Rodney 3-1030

ORLANDO, FLORIDA  
23 Azalea Park Sh. Center  
Phone 227-8231

**IMPORTANT!** Be sure to send all mail orders  
and inquiries to MILWAUKEE STORE, Dept. C

3832 WEST LISBON AVENUE, MILWAUKEE 8, WISC.

Ship me .....

I enclose \$.....; I will pay the balance

☐ C.O.D. ☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade

What's your deal?

Name .....

Address .....

City .....

Zone .....

State .....

☐ Send reconditioned equipment and sale bulletin

For further information, check number 36, on page 110

98 • CQ • September, 1963

**AF-67 to 6 Meters**—"In what issue was the article on putting the AF-67 transmitter on 6 meters?"

See the October 1958 CQ.

**Gonset 10-11 to 6 Meters**—"Will you please tell me how I can convert my Gonset 10-11 meter converter for 6 meter operation?"

See the November 1958 issue of CQ.

**5X-99 Intermittent**—"I have a good old work-horse 5X-99 receiver, but during the last couple of weeks it would be operating and then suddenly quit. Flipping the ON-OFF switch will return it to operation. Any clues to what may be causing the trouble?"

Sure. First check the interstage coupling capacitor  $C_{32}$  (270 mmf between  $V_2$  and  $V_3$ . Next check  $C_{45}$  (.022 mf) between  $V_5$  and  $V_6$ . You can generally tell which capacitor is "acting up" by touching the grid terminal of the tube it feeds. Touching the terminal will "shock" the stage into operation, i.e., make the capacitor again operative. I hope you have checked all the tubes on a good gm tube tester.

**HQ-170 S-Meter**—"I cannot seem to zero the S-meter in my HQ-170. What should I look for?"

First check  $V_{13B}$  (12AU7). Next check  $R_{20}$  (ZERO ADJUST) for a short. Check  $R_{22}$  and  $R_{88}$  for changed resistance. These resistors are 5% units.

**KWM-2**—"I have an early used model Collins KWM-2 transceiver. How can I obtain improvement of the correlation between frequencies on the different bands?"

By adding a 27 mmf capacitor to the grid circuit of the h.f. oscillator tube  $V_{13}$ . This will result in less need for p.t.o. zero hairline adjustment when switching between bands. Install the capacitor between  $V_{13}$ , pin 2 and the center shield of  $V_{13}$ . This modification does not apply to the later KWM-2 or KWM-2A units. Collins Bulletin No. 3, dated July 12, 1960 applies.

## Thirty

Thus far in our stay here in Europe, we have seen most European countries and have traveled to parts of Africa (Congo, Liberia, Ghana and Morocco). Wherever we went we always met someone who read CQ and of course our column, HAM CLINIC. Every ham contacted agreed that reciprocal operating privileges with the United States would be a wonderful thing. If Bill S-920 is not passed when this is printed, do write your congressman requesting that he endorse it. Its passage can only create much international good will and improve radio communications technology the world over. Don't you have just five minutes and a postcard? You'll truly be helping the thousands of Americans overseas who can now only listen. And of course, you'll be helping yourself—for perhaps one day you will be fortunate enough to take a vacation and visit strange lands. It would be nice for you to be able to talk to the folks back home and make friends with the people of the country which you are visiting.

For this month then, 73, 75, and 72 to hams everywhere.

Chuck

# telrex

## "BEAMED-POWER" ANTENNAS and ANTENNA SYSTEMS

The Choice of the Discriminating  
Communication Engineer...the  
Man who Never Settles for Any-  
thing Less than THE-VERY-BEST!

You too — can enjoy World renowned TELREX  
performance and value!

Send for PL77 condensed data and pricing cata-  
log, describing the World's most Popular an-  
tennas from \$6.95 to \$999.00. Expanded data  
sheets — your favorite band, also available.

"The  
performance  
line"  
— with a  
MATERIAL DIFFERENCE!"

ANTENNAS

SINCE  
1921

Communication and TV Antennas  
**telrex** LABORATORIES

ASBURY PARK 25, NEW JERSEY, U.S.A.

For further information, check number 22, on page 110

### GUARANTEED TUBES

W.E.416B—8.50 W.E.404A—2.75 W.E.417A—4.50 2C39A—4.75  
T.W.T.—Eimac EM178—\$250.00 M2204AF—\$100.00 HA-9-B—  
\$100.00 Klystrons 6310 bomac—\$85.00 QK436 Ray.—\$80.00  
Magnetrons—5J29—3.50 2J38—7.50 2J48—10.00 Thyratrons 1754/  
5043—37.50 6044—7.50 R.F. Amp. 6161—25.00.

### MID-WEST ELECTRONIC SUPPLY

54 Mia Avenue

Dayton 27, Ohio

### "HOW TO MAKE MONEY IN Mobile Radio Maintenance"

AUTHORITATIVE GUIDEBOOK  
ABOUT THE BOOK IN TWO-WAY MOBILE-RADIO;  
GIVES FACTS FIGURES, PAY RATES.  
WRITE TODAY!

FREE

LAMPKIN LABORATORIES, INC., Electronic Div. BRADENTON, FLA.

## new issue just out!

the radio  
amateur

# CALLBOOK

Essential QTH information for all radio amateurs and SWL's. Each  
quarterly issue of the CALLBOOK is completely revised to bring  
you the most up-to-date information on QTH's.

### PLUS THESE EXTRA FEATURES!

- Great Circle Bearings
- Great Circle Charts
- Prefixes by Countries
- International "Q" Signals
- World Time Chart
- International Postal Information
- And many other features

### P.S. ORDER THESE VALUABLE RADIO AMATEUR GUIDES, TOO!

Radio Amateur DX Guide—62 pages of vital data; 291 Great Circle  
Bearings for 22 major U.S. cities; Prefix Map, Time Conversion Table,  
DX Log, plus other features.....\$2.00

World Prefix Map—Full color, 29" x 42", shows prefixes on each  
country... DX zones, time zones, cities, cross referenced tables \$1.00

World Atlas—Only Atlas compiled for amateurs. Polar projection, six  
continents, prefixes on each country... full color, 16 pages.....\$1.00

**CALLBOOK** of United States Listings  
(Over 250,000 K & W calls)

Each quarterly issue.....\$5.00

**CALLBOOK** of Foreign Listings (Over  
100,000 calls outside the U.S.A.)

Each quarterly issue.....\$3.00

Write for free, illustrated brochure!

## RADIO AMATEUR CALLBOOK

Dept. C, 4844 W. Fullerton Ave., Chicago 39, Ill.

See your favorite dealer today for your latest issue or order direct from the publisher (add 25c for mailing)

**BE AMONG  
THE FIRST TO  
OWN ONE!**



**COLLINS**  
NEW **62S-1**

## VHF CONVERTER

*\* for 6 and 2 meters*

The 62S-1 will more than double your frequency coverage. The 62S-1 may be used to cover 49.6 to 54.2 mc plus 143.6 to 148.2 mc. Provides transmit and receive functions in 14.0-14.2 mc. range with the 32S, 75S and KWM series. No cable changing when moving from HF to VHF.

**10% down \$89.50 (\$895.00)**

Order Today for Immediate Delivery  
from Hamateur Headquarters

**THE Lew & Bonn co.**

Distributors of Nationally Known Amateur Equipment

Dept. CQ 9-63, 67 South 12th St., Minneapolis 3, Minn.

Call, write or use coupon

Attn: Joe Hotch Federal 9-6351

☐ Place my order for immediate delivery.

Enclosed find \$

☐ Send complete specifications on Collins 62S-1.

Name \_\_\_\_\_ Call letters \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

For further information, check number 37, on page 110

## Novice [from page 59]

son Chapter No. 1. Ralph was the first handicapped member to get his license with the aid of the club. His call is K8PUS.

The Ragchewers meet at 3:00 P.M. the first Sunday of every month at Lakewood House. They would be glad to help any group in forming a club to aid their local handicapped. This surely would be an interesting club to visit if you are in the area at the time of their meeting.

We have no "Help Wanted" aspirants or net announcements for this month. If I can be of help to you through this column let me know and send your news and pictures to me, Walter G. Burdine, W8ZCV R.F.D. 3, Waynesville, Ohio, 45068. That's about all for this month except to wish you good DX and plenty of long ragchews on the air and at your local hamfests. See you there.

73, Walt, W8ZCV

## RTTY [from page 69]

### Adjustment

Tune-up of the n.f.s.k. TU is not difficult if you have a fairly accurate source of test tones. The most practical way to do this is to set up Phil's a.f.s.k. oscillator (RTTY Column, CQ Mar., May '62) for 2040 cycles *mark* and 2210 cycles *space*. Another oscillator, set up for 2125 cycles, is required to begin. Remove  $Q_3$  and feed in 2125.  $L_1$  is peaked by adjusting either the number of turns or by the capacitance of  $C_1$ , which should be about 0.066 mf. Put  $Q_3$  back in and, with  $L_3$  disconnected, peak  $L_2/L_5$ . Resonance is observed with either a v.t.v.m. or a 'scope connected across the coil being tuned. Next, remove  $Q_4$  and  $Q_5$  and put the 500K pot at electrical zero. With the v.t.v.m. across the pot, tune  $L_3$  for zero volts.  $C_3$  ends up around 0.066 mf. Now, with a 'scope across the  $L_2/L_5$  combination and the v.t.v.m. across the 500K pot, vary the input frequency above and below resonance. There should be two peaks approximately 85 cycles above and below resonance, which should occur at 2125 cycles. If the above conditions are not achieved, retrim  $C_2$  and  $C_3$  for best balance at peaks and cross-over at center frequency.

With  $Q_4$  and  $Q_5$  plugged in, short the input and check the reading of the meter in the collector circuit of  $Q_6$  and  $Q_7$ . If the meter does not read zero, juggle the output transistors to get balance. Do not play with the pot to do this. Now, put in a weak signal, just below limiting first *mark* (2040) then *space* (2210). Adjust the 500K pot to get the same reading on the meter. Another way of doing this is to feed in the a.f.s.k. oscillator keyed by the dot generator and to set the pot then for zero meter reading.

### Operation

As we said, a positive tuning indicator is a necessity. Recommended is the phase-shift 'scope type (*The New RTTY Handbook*, page 149, but set up for 2125 cycle center. Also necessary

TRANSCIVER HANDICAP



Y 300 WINS IN THE STRETCH. A tough race all the way — it was neck and neck from the start (but Galaxy, through superior breeding (research and development), workouts (field-home-testing), and the best owner/trainer (World Radio Laboratories), came through in the end and is paying off big for hundreds of cheering hams. When you buy the Galaxy 300 (300W B/AM/CW transceiver, covering 80-40-20-meters) you've got a winner — \$299.95 wired, plus a daily double with deluxe matching power \$99.95. Like a full run-down? Mail the coupon... then you'll know why hamdicappers everywhere are choosing the Galaxy 300.



WORLD RADIO LABORATORIES  
 3415 West Broadway, Council Bluffs, Iowa

SEND ME FREE: ☐ RUNDOWN SHEET ON "GALAXY 300" ☐ ALL NEW WRL HAM CATALOG  
☐ QUOTE ME "TRADE-IN" ON ATTACHED LETTER.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

WORLD RADIO LABORATORIES

is a band-pass input filter to keep the limiters from providing interfering signals from beat notes at  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ , etc. of the signal beat notes. The TU saturates at 0.07 volts r.m.s. When fully saturated, up to 300 cycles can be accepted. Cross-over is 40 cycles, well below minimum. By the way, make sure you set the receiver b.f.o. 2125 cycles off the i.f. center instead of 2550 (*The New RTTY Handbook*, pages 137 and 138).

### Comments

Next month we will try to bring you the dope on Phil's band-pass input filter and some information on circuit values for the a.f.s.k. oscillator on n.f.s.k. Stay tuned in, will you?

73, Byron, W2JTP

**YL** [from page 65]

with wonderful memories, she has much praise for the International Ham Hop Club. She says it is especially well organized in England (where it began) and in Sweden, and adds, "Truly those Swedes were so hospitable that when we got to Germany we didn't contact IHHC because thought if they were as hospitable as the Swedes we'd never get out of Germany!" (She did visit DL3LS, Ursula, however.)

IHHC, or North American Ham Hop Assn, as it is called here, is an organization devoted to making international travel and visits among hams of the world easier and more economical. When one contacts the hospitality organizer in

a country he finds where you want to go a contacts hams in each town who arrange to meet you, keep you in their homes, etc. Not American officers are: President, W4WH; hospitality organizer, W9AMF; P/C, W9YZ; treasurer, W8SZF; North American representative, W6THN/1.

Flo feels that if DX hams could get in Greyhound's "99 dollars for 99 days" bus tour and could arrange to stay overnight with hams along the way, we'd have a lot of DX visits and create a wonderful bit of international goodwill, and provide a truer understanding of the United States.

### LCL Certificate

New certificate custodian for the Load Clothes Line YL Net is Helen Drake, K5EQ, 1717 Virginia St. N.E., Albuquerque, N.M.

### 1964 YL Funfest

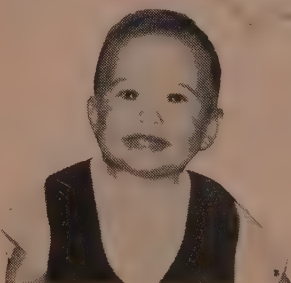
The Camellia Capital Chirps are deep in plans for the 1964 All Calif. YL Funfest. Dates: March 6-7, 1964 and will coincide with the Camellia Festival in Sacramento (March 6-10). K6ENK is prize chairman. She would like you to help on a unique prize—a recipe box file with autographed recipes. Put your favorite recipe on 3 × 5 cards, sign them, and mail to Warren Gluck, 8847 Pershing Ave., Orangevale, Ca. Be sure to use 3 × 5 cards so they can go directly into the file box.

33, W5R

**CQ Magazine**  
300 West 43rd St.  
New York 36, N.Y.

B F J E P N K H M G O R Z I \*

1 year, \$5; 2 years, \$9; 3 years, \$13  
in U.S. Possessions, APO & FPO,  
Canada & Mexico



\*TRANSLATED MEANS: **bfjepnkhmgorz!**  
Let's face it. This doesn't make sense. It also doesn't make any sense if you don't have your subscription copy of **CQ** waiting for you at your shack come the first of each month. Yes, **CQ** is your baby with the right formula.

Enclosed is \$ ..... for a ..... year ☐ new ☐ renewal subscription to **CQ**,

to be sent to: Name ..... Call .....

Address .....

City ..... Zone ..... State .....

Pan-America and all other foreign: 1 yr. \$6; 2 yrs. \$11; 3 yrs. \$16.

# This is the **NUVISTAPLUG**



## NOW YOU HEAR IT!

The NUVISTAPLUG is a highly effective nuvistor amplifier designed as an exact replacement for the present rf amplifier tube in most communications receivers.

The NUVISTAPLUG will replace 7 pin miniature pentodes only. It will operate in almost 80% of all receivers using a 7 pin miniature pentode as the rf amplifier, reducing the noise level quite noticeably, and thus making weak signals pop out above the noise level.

**ONLY \$19.95**

N.Y. C. Residents add 4% City Sales Tax  
postpaid (No C.O.D.'s)

A review of The NUVISTAPLUG appeared in the Sept. 1962 issue of CQ on page 26.

## NOW YOU DON'T!

The NUVISTAPLUG is sold on a money-back guarantee in the event that it doesn't improve your particular receiver. More than 2,000 Nuvistaplugs are currently in operation, and the manufacturing facilities have been stepped up heavily.

NUVISTAPLUGS are now available in large quantity for immediate delivery. Be certain to specify exactly which model is desired. Don't delay! Your receiver most likely will be greatly improved by adding a NUVISTAPLUG. You'll never know unless you try it.

# RAYTRONICS

c/o CQ Magazine  
300 West 43rd Street  
New York 36, New York

# W8IYK

## FB-3D CALL SIGNS

Order your call in neat 2 inch die cut letters with base. Just right for the shack. You assemble. Letters: 3/32" silver show-rod stock. Base: Satin finish black plastic. Price \$1.50 Postpaid.

New Products, Dept. B., Box 481 Grand Haven, Mich.

## BE A HAM

Afternoon or evening classroom courses in Code and Theory for the General license. Call GR 8-3245.

# RON REED ELECTRONICS INSTITUTE

11671A San Vicente Boulevard

West Los Angeles 49, California

Granite 8-3245

## ALL BAND TRAP ANTENNA!



Reduces interference and Noise on All Makes Short Wave Receivers. Makes World Wide Reception Stronger. Clearer on All Bands!

For ALL Amateur Transmitters. Guaranteed for 500 Watts Power for Pi-Net or Link Direct Feed, Light, Neat, Weatherproof.

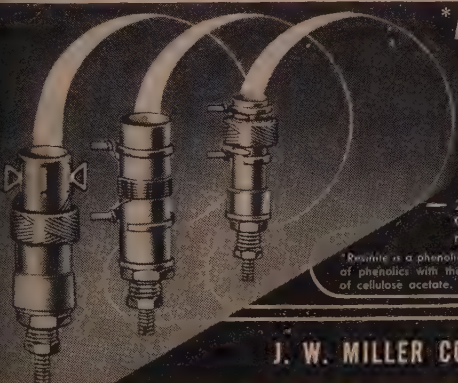
Complete as shown total length 102 ft. with 87 ft. of 72 ohm balanced feedline, Hi-impact molded resonant traps. (Wt. 3 oz. 1" x 5" long). You just tune to desired band for beamlike results. Excellent for ALL world-wide short-wave receivers and amateur transmitters. For NOVICE AND ALL CLASS AMATEURS! NO EXTRA TUNERS OR GADGETS NEEDED! Eliminates 5 separate antennas with excellent performance guaranteed. Use as Inverted V for all band power gain. NO HAYWIRE HOUSE APPEARANCE! EASY INSTALLATION! Complete Instructions.

|                                                       |         |
|-------------------------------------------------------|---------|
| 80-40-20-15-10 meter bands. Complete                  | \$14.95 |
| 40-20-15-10 meter bands. 54-ft. ant. (best for swl's) | 13.95   |
| 20-15-10 meter bands. 24-ft. antenna                  | 12.95   |

SEND ONLY \$3.00 (cash, ck., mo) and pay postman balance C.O.D. plus postage on arrival or send full price for postpaid delivery

Free technical information  
WESTERN RADIO • Dept. AC-9 • Kearney, Nebraska

## \* RESINITE ADJUSTABLE R. F. COILS



— 20A000RB1 (form only). 1/2" dia. x 13/16" long. Coils wound on this form have an inductance range of 0.79 uh to 1.25 mh.

— 21A000RB1 (form only). 3/8" dia. x 1 1/8" long. Coils wound on this form have an inductance range of 0.68 uh to 12.5 mh.

— 22A000RB1 (form only). 1/2" dia. x 1 1/4" long. Coils wound on this form have an inductance range of 5.70 uh to 125.0 mh.

\* Resinite is a phenolic impregnated tubing which combines the mechanical and dielectric advantages of phenolics with the high dielectric strength, moisture resistance and non-corrosive properties of cellulose acetate. Resinite can be certified to MIL-P-798 Type PBG.

# J. W. MILLER COMPANY

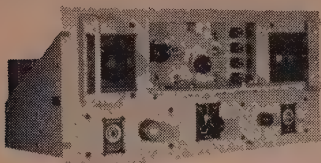
5917 South Main St., Los Angeles 3, Calif.

(AVAILABLE THROUGH YOUR LOCAL DISTRIBUTOR)



For further information, check number \*52, on page 110

# TELETYPE REGENERATIVE REPEATER



BRAND NEW

TT-63A

U. S. Gov't Surplus

- Accepts teletype signals in audio (on/off) form or in DC from a loop (polar or neutral) having up to 45% bias distortion and regenerates them electronically to perfect signals.
- Serves as RTTY converter when fed single tones from receiver
- Switchable for 60, 75 and 100 wpm.
- False-start gate prevents noise pulse errors
- Front panel range control
- Also provides perfect TTY signals for transmitting
- 14 tubes, plus rectifier
- 110V, 60 cycle power supply part of unit

Cost government over \$500.00

**BRAND NEW, Complete with tubes and power cord**

(Ohio residents add 3% sales tax)

F.O.B. Cleveland, Ohio.

Shipping weight: 35 lbs.

**\$39<sup>95</sup>**

**TELEMETHODS INTERNATIONAL**  
3075 E. 123rd Street • Cleveland 20, Ohio

For further information, check number 54, on page 110



**PRICES  
REDUCED**

CENTRAL  
ELECTRONICS  
MM2 R. F. ANALYZER

**\$89<sup>50</sup>**

Originally \$149.50  
**ONLY 10% DOWN**

Only \$7.42  
a month

**LIMITED QUANTITY • ORDER NOW**

MM2 ADAPTERS

RM 50

for 50 kc... \$12.50

RM 80

for 80 kc... 12.50

RM 455 for 455—

500 kc IF... 12.50

We bought the entire factory stock and Terry says, "Clear 'em out at \$99.50!" Analyzes every transmitter RF and AF function... also analyzes IF patterns of incoming signals. No tuning. Just plug it in and it's ready to use. Complete with tubes, scope and instruction book. No more at this price. Only \$5 down!

Amateur Electronic Supply  
3832 Lisbon Ave., Dept. C  
Milwaukee 8, Wisconsin

Send check in  
full—We'll prepay!

Enclosed \$..... Ship me.....  
I will pay balance in ☐ 1 year ☐ C.O.D.

Name.....

Address.....

City..... Zone..... State.....

☐ Send latest Reconditioned Equipment Bulletin

For further information, check number 55, on page 110

PE-73 D.C. Source [from page 84]

ing to hold the output voltage constant.

The converted unit makes a nice battery charger for extra batteries used for motor servicing, by running it with an electric motor. Another real handy use is for field day—the unit can be attached to a gas engine and used to charge six, twelve, or twenty-four volt batteries just by adjusting the voltage control.

This generator provides a cheap supply of current at high current, in addition to providing a source for one of those 28 volt dynamotors you've been kicking around. Next time you need lots of current of low voltage d.c., think of this and take a few hours off to build yourself this handy generator.

## D.C. Machine Theory

For those who would like to improve their understanding of the operation and conversion of this generator, presented here is a review of some basic d.c. machine theory.

We are only concerned with the low voltage part of the dynamotor, so let us consider the portion alone from a linear equivalent circuit point of view. The d.c. motor may then be represented as shown in fig. 3:

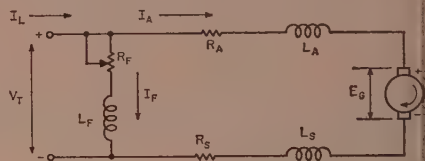


Fig. 3—Equivalent circuit of the motor.

where  $V_T$  is the applied voltage,  $I_L$  is the current drawn from the line,  $R_F$  is the shunt field resistance,  $L_F$  is the shunt field inductance,  $I_A$  is the armature current,  $R_A$  and  $L_A$  are the armature resistance and inductance,  $R_S$  and  $L_S$  are the series field resistance and inductance, and  $E_G$  is the back voltage generated by the moving armature. The only element requiring further comment is  $E_G$ , which represents the armature reaction. This is an opposing voltage generated by the armature windings moving through the magnetic field produced by the field coils. The  $E_G$  accounts for the built-up voltage drop within the motor, and is slightly less than  $V_T$ . This generated voltage is proportional to the motor speed  $N$ , the shunt field current  $I_F$ , and the armature current  $I_A$ , related by the constants  $K_1$  and  $K_2$ .

We shall now analyze the circuit to see the motor speed dependence on the circuit parameters.

Since we are working with d.c. and are concerned with steady state behavior, the inductances do not enter the calculations. From the circuit we see that:

$$I_L = I_F + I_A$$

$$I_F = \frac{V_T}{R_F}$$

$$V_T = E_G + I_A (R_A + R_S)$$

$$E_G = K_1 N [I_F + K_2 I_A]$$

Combining these equations we obtain:

$$V = \frac{V_T - I_A (R_A + R_S)}{K_1 [I_F + K_2 I_A]} = \frac{V_T - I_A (R_A + R_S)}{K_1 \left[ \frac{V_T}{R_F} + K_2 I_A \right]}$$

From a look at this equation we see that the motor speed,  $N$ , may be easily controlled by changing  $R_F$ ; increasing  $R_F$  increases the motor speed. We will see this to be exactly opposite of the voltage output control exercised by  $R_F$  in d.c. generator operation.

If we now turn the armature in the same direction by some external means, our d.c. machine becomes a generator. The same equivalent circuit holds except for the form of the input and output powers, and the current directions. In motor operation we put in electrical power and derive mechanical power; in generator operation the powers are reversed. Also, for generator operation, the direction of the line current  $I_L$  and the armature current  $I_A$  reverse.

The equivalent circuit is now as shown in fig. 4.

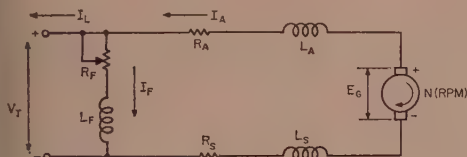


Fig. 4—Equivalent circuit of the generator.

Following a similar analysis and solving for the electrical output of the generator, we see that:

$$V_T = K_1 N I_F + I_A [K_1 K_2 N - (R_A + R_S)]$$

and

$$I_F = \frac{V_T}{R_F}$$

These equations say that, for constant driving speed  $N$ , the output voltage may be varied by changing the field current  $I_F$ , which is varied by changing  $R_F$ . We also see that the output voltage is inversely proportional to  $R_F$ ; just the opposite of the motor speed control by  $R_F$ . Another observation from these equations is that if  $(R_A + R_S)$  is appreciable, then the output voltage will drop as increasing load current ( $I_L$ ) is drawn. However, if  $(K_1 K_2 N) = (R_A + R_S)$ , then the output voltage is independent of the load current drawn. This condition represents what is known as "flat compounding"; when the action of the series field compensates for the voltage drop within the generator to maintain the output voltage constant.

Now that we understand the operation of the d.c. machine from a circuit standpoint, we are in a better position to appreciate the operation of the PE-73. ■

## BARGAINS

Clearance on new display models, full factory warranty

|                                                           |          |
|-----------------------------------------------------------|----------|
| INVADER 2000 2 KW PEP SSB transmitter, \$1229 value ..... | \$899.00 |
| INVADER 200 SSB transmitter, \$619.50 value .....         | \$449.00 |
| ELMAC AF-68, PMR-8, M-1070, \$464 value, now only .....   | \$299.00 |
| RME 6900 receiver, \$379 value, save at .....             | \$299.00 |
| NATIONAL NC-270 receiver, \$279.95 value, for just .....  | \$179.95 |

Used gear at similar savings; here are a few samples:

|                                                            |          |
|------------------------------------------------------------|----------|
| PACEMAKER and THUNDERBOLT, 2 KW, PEP, both for a low ..... | \$499.95 |
| GLOBE CHAMPION 350, 275W AM/350W CW, 400W PEP linear ..... | \$259.95 |
| VALIANT with SB-10, SSB, AM and CW, the works for .....    | \$359.95 |
| VIKING II, VFO, 6N2, 160 thru 2 meters, all for .....      | \$219.95 |

Terms: CASH, no trades. Finance with your local bank and save!

**H&H ELECTRONIC SUPPLY, INC.**  
506-510 Kishwaukee St. Rockford, Ill.  
TELEPHONE WO 8-8875

For further information, check number 39, on page 110

MAKES SENDING A PLEASURE

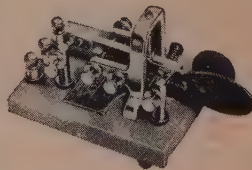
With **VIBROPLEX X**



No special skill required. Just press the lever — Vibroplex DOES THE REST. All parts precision machined and key is adjustable to any speed. Will not tire the arm. Five models, priced at \$17.95 to \$33.95.

### VIBRO-KEYER

In building electronic transmitting units, Vibro-Keyer supplies the perfect part. With a finely polished base 3 1/4" by 4 1/4" and a weight of 2 1/2 lbs. Has same contacts and finely finished Vibroplex parts. Standard, at \$17.95. Deluxe, with Chrome Plated Base, priced at \$22.45.



Order today at your dealers or direct.

**THE VIBROPLEX CO., INC.**  
833 Broadway New York 3, N. Y.

FREE  
Folder



**FREE!! FREE!! FREE!!**

Send for free copy of The Ham Trader if you are looking to swap, buy or sell equipment with other hams. Or subscribe now 6 issues \$1.50.

**THE HAM TRADER**

Box 153C Franklin Square, N. Y.

## Here is E-Z WAY QUALITY for only \$99<sup>50</sup>

- Supports a Quad or any small beam having a wind area of 4.0 sq. ft. or less at 40 ft. in 60 MPH winds. NO GUYS!
- Cranks up or down for easy access to beam and rotor
- Diagonal Bracing combats twist and torque
- Electric Arc Welded
- Dip Painted, tower is completely covered with rust resistant aluminum enamel

|                                           |          |
|-------------------------------------------|----------|
| Model HD-40 Painted ...                   | \$ 99.50 |
| Model BAHD-40 Painted (Building Attach)   | 106.25   |
| Model GPKHD-40 Painted (Ground Post Tilt) | 149.50   |
| Model HD-40 Galv. ....                    | 134.50   |
| Model BAHD-40 Galv. ..                    | 141.25   |
| Model GPKHD-40 Galv. (Ground Post Tilt)   | 184.50   |

**FREIGHT PREPAID  
ANYWHERE 48 U.S.A.**

### E-Z WAY TOWERS, Inc.

P.O. BOX 5767

TAMPA 5, FLORIDA



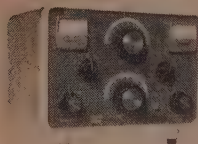
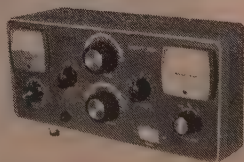
For further information, check number 40, on page 110

## E-HUNTER-E

### LINEARS NOW IN STOCK AT A. E. S.

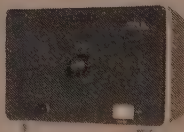
**BANDIT  
2000 A  
(2000 watts PEP)  
\$575.00**

Only \$5 Down  
**\$2056** a month  
(36 months)



**NEW Medium  
Power Linear  
L 1000A  
(1000 watts PEP)  
\$299.00  
\$5 Down  
\$1061** a month  
(36 months)

**POWER SUPPLY  
for L 1000A  
\$186.00  
\$5 Down  
\$655** a month  
(36 months)



### PLUS TERRY'S TERRIFIC TRADE-IN DEAL



To order Use Coupon from other A.E.S.  
ads in this magazine

**AMATEUR ELECTRONIC SUPPLY**  
3832 West Lisbon Ave., Milwaukee 8, Wis.

For further information, check number 41, on page 110

## 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 cannot vouch for the merchandise listed therein. We reserve the right to reject advertising which we feel is not of an amateur radio nature.

**QSL's?? WPE?? CB??** Best samples 25¢ (refunded) WBL Sackers, Holland, Michigan.

**CALL CARDS** Badges, decals, goodies, illustrated literature v samples 25¢. Enrol Engraving Att: K1VR0, Westfield, Mass.

**QSL's—Plain or Fancy—Flat printing or raised.** Copper embossed, sequin, sparkle. Many styles, colors. Samples, catalog, Frier Specialties, Harvard Street, Schenectady.

**FINE QSL's . . . Dime . . .** Filmcrafters, Martins Ferry, O.

**QSL CARDS** Largest selection—Lowest prices. Samples & cat 25¢. Refund or 25 extra cards with your first order. Debb Printing, 1309-C, North 38th Street, Milwaukee, Wis. 53208

**QUESTION** Want to design a QSL card? Sampler Instruction 25¢. Wow! what cards you can create. \$1.50 and up 100. Sar Box 203, Wyantskill, N. Y. 12198

**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. 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 "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, 1154, Biloxi, Miss.

**QSLs** four colors glossy stock, forty designs—send \$5 for 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, 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, R bottom Printing, Box 237F, Kirksville, Missouri.

**RUSPRINT** QSLs—SWLs 100 2-color glossy \$3 postpaid. QSO cards \$1 per 100. Rusprint Box 7507 Kansas City 16, Mo.

**QSLs** SWLs XYL-OMs (Sample assortment approximately 9) covering designing, planning, printing, arranging, mailing, catching comic, sedate, fantabulous. DX-attracting. Protosnazy, unparagoned cards. (Wow!) Rogers, K0AAB, 961 Ar St., St. Paul 6, Minn.

**QSL's—100—\$2.50.** Samples. Dime. AMEE's Printery—W9F Box 138, Oak Lawn Illinois.

**QSL** Cards Brownie, W3CJ1—3110 Lehig, Allentown, Pa., Cat with samples 25¢.

**QSL** Samples, dime. Print Shop, Corwith, Iowa

**SELLING** out and going to college. Viking Ranger, excellent edition, \$200. Also Gonset GPP-1 Patch, \$30; TA-33 Jr., 40 tower, and rotor, complete \$120. WA2HTR, Box 166, Albion, N.Y.

**COLLINS** KWM-2, two months old, spinner knob, \$285; 7 immaculate, \$475; George Barnes, 3451 Ridge Avenue, Dayton 14, Ohio. Phone 513 2770409.

**FOR SALE** SX-110 Receiver \$110 or make me an offer. All mail letters answered. PFC James Wood, Box 598, 9th US Field Station, APO 34, San Francisco, California.

**SEATTLE AREA** For sale DX-100, \$125; Heathkit Tener transceiver with crystal and GP-11 power supply, \$40; RME VHF152A converter, \$25; RME preselector DB-23, \$30; Heathkit vfo v \$10; Vibroplex Presentation with case and cord, \$25; John Signal Sentry, \$15; B&W T-R switch 380B, \$18. W7ZRZ, 13rd N.E., Seattle, Wash.

**ID Spark Gap Times**, journal of the Old Old Timers Club. irely different from all other radio publ. Free to members. ible for membership if you made a two-way contact at least years ago. Initiation fee covers life membership. No further s. Sole publisher of exact copies of first 1913 Gov't Call k (\$3.00), supplements 1-2-3 (\$3.00) and 1909-1910 Blue k (\$3.00). Write Secy-Treas., W2EG, 507 Wayside Road, Nep- e, New Jersey.

**CTRONICS**, radar, unusual surplus bargains, free flyer. MDC- 1 W. Schiller, Phila. 40, Pa.

**L SX-101A**—\$260; HC-10 ssb converter—\$75; kw Linear SSB 00F Eldico—\$350; Transtenna T-R switch, outboard model— 0. all like new. Lamb, 1219 Yardley Rd., Morrisville, Penna.

**ROID RTTY Kit**: Mark-Space Discriminator and Bandpass filters. ludes 4-88 mh and 1-44 mh uncased, like new toroids; In- mation sheet, mounting hardware and six mylar capacitors. 00 Postpaid. Toroids: Specify 88 or 44, less capacitors, 00 ea., 5/\$4.00 Postpaid. KCM Products, Box 88, Milwaukee Wis.

**ROIDS Uncased** 88 mh like new. Dollar each. Five \$4.00 p.p. Paul, 309 South Ashton, Millbrae, Calif.

**R SALE**: Complete instructions including 28 page booklet and "x 36" schematic for converting the ART-13 transmitter to n. and s.s.b. Satisfaction guaranteed. \$2.50 Sam Appleton, 1 N. Maxwell St., Tulsa, Texas.

**ULTIPLEX Adapter**—Circuit board set of 5 coils, sockets and mplete instructions \$15.00. D. L. Stoner, Box 7388Q, Alta ma, California.

**EADY CASH** for your AN/GRC, PRC, TRC, TCC, ARC, all Military m munications Equip't. Also test gear: TS-, AN/UPM, URM, etc. e Pay Freight. Call K2BCC collect at TR 8-5222 or Write Space lectronics Co., 218 W. Tremont Ave., Bronx 53, New York.

**RADE-ins** accepted on purchases of demos and brand new Ham, 3, Marine and Hi-Fi equipment. We are one of the largest ailers in the country and carry complete lines of new quipment of almost all manufacturers in stock. Time payments up to 24 months—arranged. We will also buy your used equip- ment for high cash prices. Many specials available. Call Bob Crown Electronics, 64 Cortland Street, N. Y. 7, N. Y. Worth 0790 for real money saving deals, whether you have something o trade-in or not.

**ANTED** old radios manufactured before 1925, especially Grebe, urad, Paragon and Zenith. J. Worcester, R.D. 1, Frankfort, N.Y. ighly-EFFECTIVE home study review for FCC Commercial Phone xams. Free literature! Wallace Cook, Box 10634, Jackson 9, ississippi.

**OOKING?** Shopping? Trading? Trying to save money? Write ob Graham for special deals on new and reconditioned used ear. Cash or Budget. Graham Radio, Dept. B., Reading Massachu- etts, Tel: 944-4000.

**T-159B/URC-4** with battery cable \$25. C. Gutman, 7526 Mount- atten Rd., Montreal 29 Que., Canada.

**TTENTION** Exchange equipment, components with other hams! Many interesting offers to trade, sell, buy everything imaginable n "Equipment Exchange." 10 big issues \$1. Sample free. Write: Brand, publisher, Sycamore, Illinois.

**11J4** for sale. Serial #3881 with 1, 3, 5 kc mechanical filters. Apply apt. 5 South, 747 9th Avenue, New York 19, New York.

**NEED** an old Grebe radio. Can anybody supply one? Will also buy other pre-1925 radios. Worcester, R.D. 1, Frankfort, N.Y.

**TRADE** KWS-1 Mint condition for like KWM-2 plus small difference or sell. Frank Lindsay, Holdrege, Nebraska.

**CAN ANYONE** supply an old Federal radio? Will also buy other pre-1925 radios. Worcester, R.D. 1, Frankfort, N.Y.

**FOR SALE** Heath Apache and SB-10 excellent condition \$260. Will deliver within 150 miles. K2ENM 197 Watchung, Chatham, N.J. Tel: Mercury 5-5727.

**DOES ANYBODY** have an old radio made by Mignon? Will also buy other pre-1925 radios. Worcester, R.D. 1, Frankfort, N.Y.

**AM LOOKING** for the oldest manufactured tube radio. Does anybody have a candidate? Will also buy other pre-1925 radios. Worcester, R.D. 1, Frankfort, N.Y.

**FOR SALE** Knight T-150 transmitter 150 watts 80m-6m \$150. SX-99 receiver \$100; Ameco 6m nuvistor converter \$35; 6N2 meter vfo Globe \$25. W2MHD, K. Radziejewicz, 112 Pulaski St., Newark 5, N.J.

**FOR SALE** complete station. Gosnet GR-212 receiver, \$79; Knight -60 all band xmt, \$39; Clegg 99'er Transceiver, \$95; All units \$200. Excellent Condition. K9GGZ, 1311 No. Church, Rockford, Ill.

**SELL** HQ-110C with matching speaker in excellent condition \$200. Ranger with PTT in good condition \$180. 6 Meter Com- municator III like new \$150. Make offer. K4RIG, John England RMR Box 5377 Eglin AFB, Florida.

**Q's** 1945, 46, 47, 48 bound, 49 and some 50 unbound. \$15 per ear, \$60 lot. Add postage. QST 46 to 50. Other radio magazines, ooks, Earl Huss, 705 Cedar, Charles City, Iowa.

**COLLEGE** bound 75A-2 mint condx w/prod.det., \$230. Phasing sb'er—perfect—like Nov. '59 QST. All band, 60 w./p.s.— 115. K8PSV, Lowell, Mich.

# P & H "Spitfire"

## KILOWATT MOBILE (or fixed)



## LA-500M LINEAR AMPLIFIER

- ★ 1000 WATTS PEP POWER
- ★ SINGLE KNOB TUNING
- ★ BUILT IN ANTENNA SWITCHING
- ★ 6 TUBES IN GROUNDED GRID
- ★ LOW TUBE REPLACEMENT COST
- ★ CHROME PLATED CABINET 3"X12"X15"
- ★ REQUIRES 900 to 1200 VDC AT 500 MA AVERAGE — 1 AMP PEAK
- ★ AIRCRAFT TYPE METER ILLUMINATION

**PRICE \$189.95**

Amateur Net

**Available NOW**  
Thru Your Distributor

Power Supplies For LA-500M

Model PS-1000 115 V.A.C. For Fixed  
Station \$119.95

Model PS-1000B 12 V.D.C. For  
Mobile Station \$179.95

P & H

ELECTRONICS, INC.

424 COLUMBIA STREET •
LAFAYETTE, INDIANA

For further information, check number 38, on page 110

## FREE Catalog

OF THE WORLD'S FINEST  
ELECTRONIC GOV'T  
SURPLUS BARGAINS

**HUNDREDS OF TOP QUALITY  
ITEMS —** Receivers, Transmitters,  
Microphones, Inverters, Power Supplies,  
Meters, Phones, Antennas, Indicators, Fil-  
ters, Transformers, Amplifiers, Headsets,  
Converters, Control Boxes, Dynamotors, Test  
Equipment, Motors, Blowers, Cable, Keys,  
Chokes, Handsets, Switches, etc., etc. Send  
for FREE CATALOG—Dept. CQ.

**FAIR RADIO SALES**  
2133 ELIDA RD. • Box 1105 • LIMA, OHIO

# ROHN Superior Design

## CRANK-UP TOWERS

### Versatile • All-Purpose

**ROHN Crank-Up Towers** are especially engineered for amateur and experimental use. They represent the finest, most practical towers of their kind available. ROHN Crank-Ups feature (1) construction of welded steel; (2) hot-dipped galvanizing after fabrication throughout; (3) special roller guides between sections on SD & HD Series to eliminate friction for smooth raising and lowering. Also, ROHN towers assure uniform structural strength regardless of tower extension from highest to lowest height! Available in 37', 54', 71', 88', 105' and 122' heights. Prices start at less than \$100.

Also available are ROHN communication and microwave, TV reception, amateur radio and general purpose towers for all heights to 800'; telescoping masts and roof towers; and complete accessories including microwave passive reflectors and lighting equipment.

WRITE FOR FREE LITERATURE AND FULL FACTS AS TO WHY ROHN CRANK-UPS ARE BEST! See for yourself before you buy.

## ROHN

### Manufacturing Company

P. O. Box 2000 • Peoria, Illinois

"World's largest exclusive manufacturer of TV-Communication towers - Representatives world-wide"

For further information, check number 58, on page 110



**DOW  
KC  
71**

## SINGLE POLE, SIX-THROW COAXIAL RELAY

FOR MOUNTING ON MAST AND  
REMOTE SWITCHING UP TO 6 ANTENNAS

Weatherproof, electro-magnetic, less than 1.1:1 VSWR at 100 mc. 1 kv power rating, available in UHF, N, BCN, TNC, C connectors. Continuous duty, over 1,000,000 operations. 5% x 2 3/4", silver plated connectors.

**DKC-71**  
with UHF  
Connector  
**\$4950**

Manufactured and  
Guaranteed by

**DOW-KEY COMPANY**

THIEF RIVER FALLS, MINNESOTA

NATIONAL NC-155 w/spkr, 1DP1 tube, 15m conv., info, Wa 165 Wash. St., Doylestown, Pa.

**FOR SALE** new Heathkit Model HO-10 monitor scope, guaranteed perfect \$50. Collins SM-2 microphone \$25. H. Martin, Box 12 Bluefield, W. Va.

**FOR SALE** Tetrax type 511 scope \$195, in good condition converted ARB rcvr \$24; BC-1000 \$15, fair condition. La Lockwood, 515 Birch St., McMinnville, Oregon.

**FOR SALE** Heath DX-35 transmitter \$35; Hallicrafters SX receiver \$145; Both for \$165. Larry Rudner, 70 Joseph St. New Hyde Park, N.Y., FL 4-7462.

**WILL TRADE** L.C. Smith 12 ga. dbl barrel shotgun for ham receiver. William E. Kriegs, P.O. Box 695, Soulsbyville, Cal.

**EICO** 723-60 watt cw transmitter, two 40 m xtals, 50 ft RG all for \$40. WB2BEV, George Roberts, 763 Eastern Parkway Brooklyn 13, N.Y.

**SELL-TRADE** 2 mobile stations, 12 watts input, one for other for 160 meters, vibrapack, mike, xtal, coax and mod converter included, each station \$45. 15 watt 6 meter ph transmitter \$35. 10 watt 10 meter mobile xmtr \$25. Several one band mobile converters for 75 and 160 meters, \$10 ea. Everything in mint condition. Need BC-348, BC221, BC779, t checker, grid dipper or??? Stan, WB8QKU, 2748 Meade, Detroit 12, Mich.

**HT-37** excel. cond. Any reasonable offer considered. Ed Laus WA2MXW, 209-14 82 Ave., Queens Village 27, N.Y. Tel: HO 8-53

**ALUMINIUM** For every ham need. Write to Dick's, 62 Ché Avenue, Tiffin, Ohio, for list of tubing, angle, channel, casting plain and perforated sheet, and complete beam kits. Also, in business for sale. Sons gone into Service; too much business for me.

**SX-111** receiver less than year old, excellent condition, b apron jack for monitor scope; otherwise unmodified, R matching speaker, both for \$150 fob. Will ship in original cartons with manual. WA5CSG, Meisner, 3500 Lucy Lane, Smith, Ark.

**TOROIDs**, Ferrite, Tape Powdered Iron machine wound. Guaranteed. Send specifications. W2UMR, Jos. Niehaus, Dunkirk, N.Y.

**SELL** Webster 50-watt amplifier, \$30; Precise III tube test \$30; VM 3-speed record-changer, \$10; Bogen 5-station intermaster, \$10; GE Model 250 portable radio (needs new storage battery) \$5; Astatic crystal mike, stand, \$4; V. R. Hein, Gregory, Rockford, Illinois.

**COLLINS** 75S-1, Ser. 3201, new condition with manual, \$ cash or consider trade on mobile ssb rig. Selling because intensive traveling does not allow time for use. WA4LZB, 3 Keniston Lane, Jacksonville 11, Fla.

**CLUBS** New illustrated literature, badges, decals. All goodies. Errol Engraving, Att: K1VR0, Westfield, Mass.

**PROP PITCH** motors, Medium ok tested \$29.50, excellent overhauled \$39.50. FOB Okla. City, Box 19232, Oklahoma City, Okla.

**PRINTED CIRCUIT** boards Hams, Experimenters. Silver Ser vto, \$2.85; Converter March CQ \$1.50 Free catalogue F Electronics. Box 6288 Seattle 88, Washington.

**A-1** reconditioned equipment. On approval. Trades. Ter Hallicrafters S-85, \$79; SX-99, \$99; SX-110, \$119; SX-101 \$159; SX-101A, \$229; Hammarlund HQ-100, \$119; HQ-110, \$139; HQ-170, \$239; Collins 75S-1, 75A-4, 32S-1, National, Gon Elmac, Heath, Johnson, RME and many others. Write us for list. Henry Radio Company, Butler, Missouri.

**WANTED** Commercial, military, all types, ARC, ARN, ARM, GRC, PRC, TRC, URR, URM, TS, 618S, 17L, 51R, others. Ritco, P.O. Box 156 Annandale, Va.

**W0GFQ** Leo has big discounts on overstock of used equipment due to so many trades on the fabulous new Galaxy ssb transmitter. 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.

**WANTED** early issues CQ 1945-Jan, Feb, Mar, May, July, A Sept; 1946-Feb; 1951-Oct; 1952-Jan. Write price and condition. A. Dorhoffer, K2EEK 75-15 177 Street, Flushing 66, N.Y.

**FOR SALE** Good, clean HT-37 that I'd like to sell for \$325. Write: Bob Heil, K9EID, 402 Border St., Marissa, Ill.

**FOR SALE** Ameco TX-86 transmitter, 60 watts, 80 thru 6 meters. Perfect condition with power supply, \$99. Also Tecraft 2 m transmitter, new tubes, 20 watts, 2 Novice band crystals, v power supply. Perfect condition, \$79. Write: Ron Brown, WB2A 513 Linden Avenue, Rahway, New Jersey.

**WANTED** Collins 51J-2,3,4, R-388, R-390, R-390A, R-391, 41 Teletype, test equipment. Cash or trade for new amateur equipment. Sell: 200V \$649; Ranger \$159; 75A2A \$269; URA8A C parator \$95; FRR-23 low freq. receiver \$245; Boehme Autom cw keyer \$125; cw tape perforator 1705. Alltronics Howard Box 19, Boston 1, Mass. (Richmond 2-0048).

**SELLING** Collins 51J3 receiver, excel. condx., best offer \$400, Hallicrafters SR-34 6&2 meter xcvr \$200 firm, Gon 6/2/220 VFO \$25. Box #TK2, CQ, 300 West 43rd St., N.Y. 36



It takes a banker  
to know a good buy

... **Collins**

S S B EQUIPMENT ...

and it takes Terry, W9DIA



to come up with  
a **LOW LOW**

**5% CARRYING CHARGE**

"I'm Lowell McNeil, W9PTN, president of the West State Bank in Racine, Wisconsin. As a banker, I can assure you that Collins radio equipment is an excellent investment. It has quality, performance and top trade-in value. These are the things we bankers look for. Many banks offer special finance rates on Collins equipment, but as Terry is offering here, I have KWM-1 at the office and a complete Collins station at home. I've been 'all Collins' for many years."

**LOW AS 10% DOWN PAYMENT — TAKE 1-2-3 YEARS TO PAY!**

|                                 | Amateur<br>Net | (1 yr.)<br>(10% Down) | (2 yrs.)<br>(20% Down) | (3 yrs.)<br>(30% Down) |
|---------------------------------|----------------|-----------------------|------------------------|------------------------|
| DL-1 Linear Amplifier .....     | \$ 520.00      | \$ 40.95              | \$ 19.06               | \$ 11.62               |
| DS-1 Linear Amplifier .....     | 1556.00        | 122.53                | 57.05                  | 34.79                  |
| 2S-3 Transmitter .....          | 750.00         | 59.06                 | 27.50                  | 15.81                  |
| 2S-1 VHF Converter .....        | 895.00         | 70.48                 | 32.81                  | 20.01                  |
| 3S-3 Receiver .....             | 680.00         | 53.55                 | 24.93                  | 15.20                  |
| 3S-3A Receiver .....            | 750.00         | 59.06                 | 27.50                  | 15.81                  |
| WM-2 Transceiver .....          | 1150.00        | 90.56                 | 42.16                  | 25.71                  |
| WM-2A Transceiver .....         | 1250.00        | 98.43                 | 45.83                  | 27.95                  |
| 1J-4 Receiver .....             | 1464.00        | 115.29                | 53.68                  | 32.73                  |
| 1S-1 Receiver .....             | 1828.00        | 143.95                | 67.02                  | 40.87                  |
| 51D-2 Mobile Mount .....        | 120.00         | 9.45                  | 4.40                   | 2.68                   |
| 1P-1 14V DC Power Supply .....  | 198.00         | 15.59                 | 7.26                   | 4.42                   |
| M-2 Portable Power Supply ..... | 150.00         | 11.81                 | 5.50                   | 3.33                   |
| C-2 Carrying Case .....         | 85.00          | 6.69                  | 2.99                   | 1.90                   |
| C-3 Carrying Case .....         | 107.00         | 8.42                  | 3.92                   | 2.28                   |
| 16F-2 AC Power Supply .....     | 115.00         | 9.05                  | 4.21                   | 2.57                   |
| 12B-4 Speaker Console .....     | 195.00         | 15.35                 | 7.15                   | 4.36                   |
| 12B-5 PTO Console .....         | 350.00         | 27.56                 | 12.83                  | 7.82                   |
| 99C-1 PTO Speaker .....         | 164.00         | 12.91                 | 6.01                   | 3.66                   |

LOW 5% FINANCE RATE APPLIES  
TO NEW COLLINS EQUIPMENT  
PURCHASED WITHOUT TRADE IN

**Only Terry  
Offers  
Low**

**5%**

**CARRYING CHARGE**

**AMATEUR ELECTRONIC  
SUPPLY** *Three Stores to Serve You*  
**PLEASE SEND MAIL ORDERS  
TO MILWAUKEE STORE**

3832 West Lisbon Ave., MILWAUKEE 8, WIS.  
Phone WEst 3-3262

CHICAGO 31, ILLINOIS  
6450 Milwaukee Ave.,  
Phone RO 3-1030

ORLANDO, FLORIDA  
23 Azalea Park  
Shopping Center  
Phone 277-8231

**IMPORTANT: Send all mail orders and inquiries to:**  
**AMATEUR ELECTRONIC SUPPLY Dept. C**  
3832 W. Lisbon Ave., Milwaukee 8, Wisconsin

Ship me .....

I enclose ..... I will pay the balance

☐ 1 Year (10% Down) ☐ 2 years (20% Down) ☐ 3 years (30% Down)

This special low 5% interest rate subject to withdrawal without notice.

Name .....

Address .....

City ..... Zone ..... State .....

☐ Send latest reconditioned equipment bulletin.

For further information, check number 48, on page 110

# DOW-KEY DK60 SERIES



4 VERSATILE  
MODELS  
A.C. or D.C.

## COAXIAL RELAYS

Also Available  
with Type C,  
TNC, BNC, N &  
UHF Connectors

2 3/4 x 3 3/4 x 1 1/8  
Less than 9 oz.

Outstanding favorite for amateurs... Versatile combinations for industrials! Low VSWR — less than 1.15:1 from 0 to 500 mc. LOW LOSSES — High Contact Pressures. LOW CROSS-TALK through use of patented "isolated connector" arrangement. HIGH POWER RATING. All coils encapsulated in epoxy resin for quieter operation and resistance to moisture.

- ★ UNCONDITIONAL GUARANTEE for one year. (We will repair if faulty within 1 year.)
- ★ See one of our 700 dealers and distributors in U. S. and Canada for catalog sheets or write:
- ★ Weatherproof models available at slightly higher cost.
- ★ Ganged, multiple position switch arrangement available for remote control selection of antennas.

STANDARD RELAYS: DK60, DK60-G, DK60-2C and DK60-G2C —

PRICED FROM . . . \$12.45

## DOW-KEY COMPANY

Thief River Falls, Minnesota

For further information, check number 56, on page 110

### TRANSISTOR IGNITION

Improves gas mileage and acceleration. Extends plug and point life. Complete kit including integrated heat sink, 3 top brand transistors, and top quality components for rapid assembly. Instructions included. 1 Year guarantee  
Complete kit—only \$14.95

Wired & Tested \$19.95

Postpaid U.S.A.

### A & F ELECTROMART

1616 S. 81st Street

Milwaukee 14, Wis.

### READER SERVICE

## CQ Magazine, Dept. RS

300 WEST 43rd STREET  
New York 36, N. Y.

Void after  
Sept. 28, 1963

Please send me more information on your  
ads in the Sept. 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 |   |

Total Inquiries ☐

NAME \_\_\_\_\_

(Please Print)

Type of work (specify) \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_ STATE \_\_\_\_\_

A & F Electro Mart  
Algeradio Electronics Company  
Allied Radio  
Amateur Electronic Supply  
82, 88, 89, 98, 104, 106, 109  
American Crystal Company  
Antenna Specialists Company

Barker & Williamson, Inc.  
Barry Electronics  
Bomar Crystal Company  
Bonn, Lew Company

Clegg Laboratories  
Cleveland Institute of Electronics  
Collins Radio Company  
Communications Equipment Co.  
Communication Products Company, Inc.

Dow-Key Company  
EICO Electronic Insti. Co., Inc.  
E-Z Way Towers, Inc.  
Electronic Circuits Handbook  
Evans Radio

Fair Radio Sales  
Finney Company, The

Gonsel Inc.

H & H Electronic Supply, Inc.  
Hallcrafters Company  
Hammarlund Manufacturing Company  
Ham Mart  
Ham Trader, The  
Harvey Radio Company, Inc.  
Heath Company  
Hy-Gain Antenna Products Corporation

Instructograph Company  
International Crystal Mfg. Co., Inc.

Johnson, E. F. Company

Lafayette Radio  
Lampkin Laboratories, Incorporated  
Lawrence Engineering Co.

Master Mobile Mounts, Inc.  
Mid-West Electronic Supply  
Millen, James Mfg. Co., Inc.  
Miller, J. W. Co.  
Mosley Electronics, Inc.

National Radio Company, Incorporated  
New Products  
New-Tronics Corporation

P & H Electronics  
Parks Electronics  
Penta Laboratories, Inc.  
Petersen Radio Co., Inc.  
Premax Products

Radio Amateur Call Book  
RCA Electric Components and Devices  
Raytronics  
Reed, Ron Electronics  
Rohn Manufacturing Company

Shure  
Subscription  
Supreme Electronics, Inc.  
Swan Electronics Corp.  
Syracuse V.H.F. Club

Telemethods International  
Telrex, Laboratories  
Tri-Ex Tower Corp.  
Turner Microphone Co.

Vibroplex Co., Inc.

Western Radio Co.  
Whippany Laboratories, Inc.  
WRL, World Radio Labs, Inc.



**"BECAUSE WE'RE STILL NOT THE LARGEST  
COLLINS DEALER WE HAVE TO GIVE YOU A  
BETTER DEAL AND MORE PERSONALIZED SERVICE"**

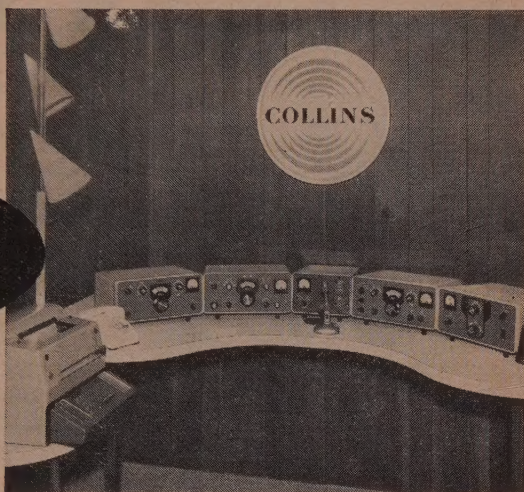
**Before You Buy Collins** With or Without  
a Trade-In **Get Our Deal!**

**Guaranteed Personal Service—**  
All our male and some of our female  
employees are licensed active hams  
Sales and Service Personnel Collins  
Factory-Trained  
All 36 months to Pay  
5 or Your Trade is Your Down Payment  
Large Stocks Assure Immediate  
Shipment

**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.**



### CHICAGO HAM WINS 7553

Here is Howard S. Wayman, W9GVA, 6760 N.  
Ionia Ave., Chicago, Illinois, accepting the  
7553 Receiver he won at the Big Open House  
held recently at Chicago Store.



## AMATEUR ELECTRONIC SUPPLY

### MILWAUKEE 8, WIS.

**3832 West Lisbon Ave. • Phone We. 3-3262**

Hours: Monday and Friday, 9 A.M. to 9 P.M.  
Tuesday, Wednesday & Thursday, 9 A.M. to 5:30 P.M.  
Saturday, 9 A.M. to 3 P.M.

### CHICAGO 31, ILL.

**6450 Milwaukee Ave. • Phone: Ro. 3-1030**

Hours: Monday, Wednesday & Thurs., 12 P.M. to 9 P.M.  
Tuesday & Friday, 12 P.M. to 5:30 P.M.  
Saturday, 9 A.M. to 3 P.M.

### ORLANDO, FLA.

**23 Azalea Pk. Shop. Ctr. • Phone 277-8231**

Hours: Monday, Tues., Thurs. & Friday, 1 P.M. to 9 P.M.  
Wednesday, 1 P.M. to 5:30 P.M.  
Saturday, 9 A.M. to 5:00 P.M.

### IMPORTANT!

**Send all Mail Orders and  
Inquiries To: Terry, W9DIA at our Milwaukee  
store, c/o Department (C)**

**Get Our Quote Today, No Obligation**

Terry: I want to buy \_\_\_\_\_

I have to trade \_\_\_\_\_ (what's your deal?)

#### STAY ON THE AIR PLAN

Not only will I give you a terrific trade-in allow-  
ance, but you can keep your equipment until you  
receive your shipment.

Ship Me: \_\_\_\_\_

I enclose \$ \_\_\_\_\_ and will pay balance

☐ C.O.D. ☐ 1 Year ☐ 2 Years ☐ 3 Years  
(10% deposit)

If ordering on terms, please list following infor-  
mation 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.



**EVEN IF YOU'RE NOT ORDERING  
TODAY, SEND ABOVE INFORMA-  
TION FOR ATTRACTIVE CREDIT CARD**

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

☐ Check for latest reconditioned bulletin.

For further information, check number 51, on page 110



# ALL IT TAKES IS 917 PARTS



## PLUS

**Patience, Workmanship, Integrity, Experience and Know-how**

It takes more than parts to produce a rig like National's NCX-3 SSB transceiver . . . It takes vital intangibles listed on any spec sheet or schematic. **PATIENCE** to design carefully and conservatively . . . **WORKMANSHIP** assuring meticulous attention to the smallest detail of component placement and tolerancing . . . **INTEGRITY** to avoid fanciful claims, and to ship only fully tested, quality-approved units, backed up by a One-Year Guarantee and a nation-wide network of warranty repair stations . . . **EXPERIENCE** with every phase of the communications equipment business—from the design and manufacture of atomic frequency standards and super-sophisticated military SSB equipment to the least morous choke, knob, or drive . . . and just plain **KNOW-HOW**—the know-how you expect after nearly half a century of building ham equipment—know-how to put the features **you** want in a rig like NCX-3—complete CW coverage of the 80, 40 and 20 meter bands as well as the phone sections . . . built-in keying . . . built-in VOX . . . smooth SSB/CW AGC and product detector action . . . built-in S-meter . . . built-in AM detector for compatible AM operation . . . mobile mount at no extra charge . . . In fact, of the features and performance you want and need for fixed station as well as mobile/portable use. Whether your choice is the NCX-3 at \$369.00 or any one of National's other equipment products from \$100.00 to \$1000.00, you can be confident that you've also bought the **plus** factors that assure you of continuing enjoyment and long-term reliability.



## National Radio Company

A Wholly Owned Subsidiary of National Company, Inc.  
37 Washington St., Melrose 76, Mass.  
World Wide Export Sales: Ad Auriema Inc., 85 Broad St., N.Y.C.  
Canada: Tri-Tel Associates, 81 Sheppard Ave., W. Willowdale, Ontario

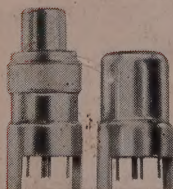
# RCA NUVISTOR QUICK-SELECTION CHART

| RCA TYPE                                      | CLASSIFICATION                                  | INTENDED APPLICATIONS                                                         | RCA DARK HEATER Volts/Amp. | CHARACTERISTICS, CLASS A <sub>1</sub> , AMPL. |                            |           |             | MAX. RATINGS, Design—Max. Values |            |             |                         |
|-----------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------|----------------------------|-----------------------------------------------|----------------------------|-----------|-------------|----------------------------------|------------|-------------|-------------------------|
|                                               |                                                 |                                                                               |                            | Amplification Factor                          | Transconductance $\mu$ hos | Plate ma. | Plate Volts | Grid Volts<br>Neg. Bias.         | Pos. Bias. | Cathode ma. | Plate Dissipation Watts |
| 2CW4                                          | High- $\mu$ <sub>a</sub> Triode                 | TV, FM VHF Tuners                                                             | 2.1/0.450                  | 65                                            | 9800                       | 7         | 135         | 55                               | 0          | 15          | 1.5                     |
| 2DS4                                          | High- $\mu$ <sub>a</sub> Triode*                | TV, FM VHF Tuners                                                             | 2.1/0.450                  | 63                                            | 9000                       | 6.5       | 135         | 55                               | 0          | 15          | 1.5                     |
| 6CW4                                          | High- $\mu$ <sub>a</sub> Triode                 | TV, FM VHF Tuners                                                             | 6.3/0.135                  | 65                                            | 9800                       | 7         | 135         | 55                               | 0          | 15          | 1.5                     |
| 6DS4                                          | High- $\mu$ <sub>a</sub> Triode*                | TV, FM VHF Tuners                                                             | 6.3/0.135                  | 63                                            | 9000                       | 6.5       | 135         | 55                               | 0          | 15          | 1.5                     |
| 13CW4                                         | High- $\mu$ <sub>a</sub> Triode                 | Antenna-System<br>Booster Amplifiers                                          | 13.5/0.060                 | 65                                            | 9800                       | 7         | 135         | 55                               | 0          | 15          | 1.5                     |
| Types subjected to special tests and controls |                                                 |                                                                               |                            | MAX. RATINGS, Absolute—Max. Values            |                            |           |             |                                  |            |             |                         |
| 7586                                          | Medium- $\mu$ <sub>a</sub> Triode               | General-Purpose<br>RF Amplifier to 400 Mc<br>RF Oscillator to 800 Mc          | 6.3/0.135                  | 35                                            | 11500                      | 10.5      | 110         | 55                               | 4*         | 15          | 1                       |
| 7587                                          | Double-Ended<br>Sharp-Cutoff<br>Tetrode         | General-Purpose<br>RF Amplifier to 250 Mc<br>RF Oscillator to 850 Mc          | 6.3/0.150                  | —                                             | 10600                      | 10        | 250         | 55                               | 2*         | 20          | 2.2                     |
| 7895                                          | High- $\mu$ <sub>a</sub> Triode                 | General-Purpose<br>RF Amplifier to 400 Mc<br>RF Oscillator to 800 Mc          | 6.3/0.135                  | 64                                            | 9400                       | 7         | 110         | 55                               | 2*         | 15          | 1                       |
| 8056                                          | Medium- $\mu$ <sub>a</sub> Triode               | Low B+ Type (12 to 50 V)<br>RF Amplifier to 400 Mc<br>RF Oscillator to 800 Mc | 6.3/0.135                  | 11.5                                          | 7500                       | 8.7       | 50          | 55                               | 2*         | 15          | 0.45                    |
| 8058                                          | Double-Ended<br>High- $\mu$ <sub>a</sub> Triode | Cathode-Drive Amplifier to<br>1200 Mc<br>RF Oscillator to 1200 Mc             | 6.3/0.135                  | 70                                            | 12400                      | 10        | 150         | 55                               | 0          | 15          | 1.5                     |

\*Having special cutoff characteristic approaching that of a semi-remote cutoff tube

# Peak-positive value

## Which RCA Nuvistor for your Circuit?



RCA Nuvistors—actual size

This chart shows you at a glance the ratings and characteristics you will want to know when selecting nuvistors for that new high-frequency job.

Nuvistors are the high-efficiency, small-size electron tubes that are making VHF history in high-gain, low-noise rf-amplifier and rf-oscillator applications.

AVAILABLE THROUGH YOUR AUTHORIZED RCA DISTRIBUTOR

RCA Electronic Components and Devices, Harrison, N.J.



Call or write today for your copy of the new RCA Nuvistor Brochure ICE-280. It's available now from your authorized RCA Distributor. Or write Commercial Engineering Sect. 1-15-Z, RCA Harrison, N.J.



The Most Trusted Name in Electronics