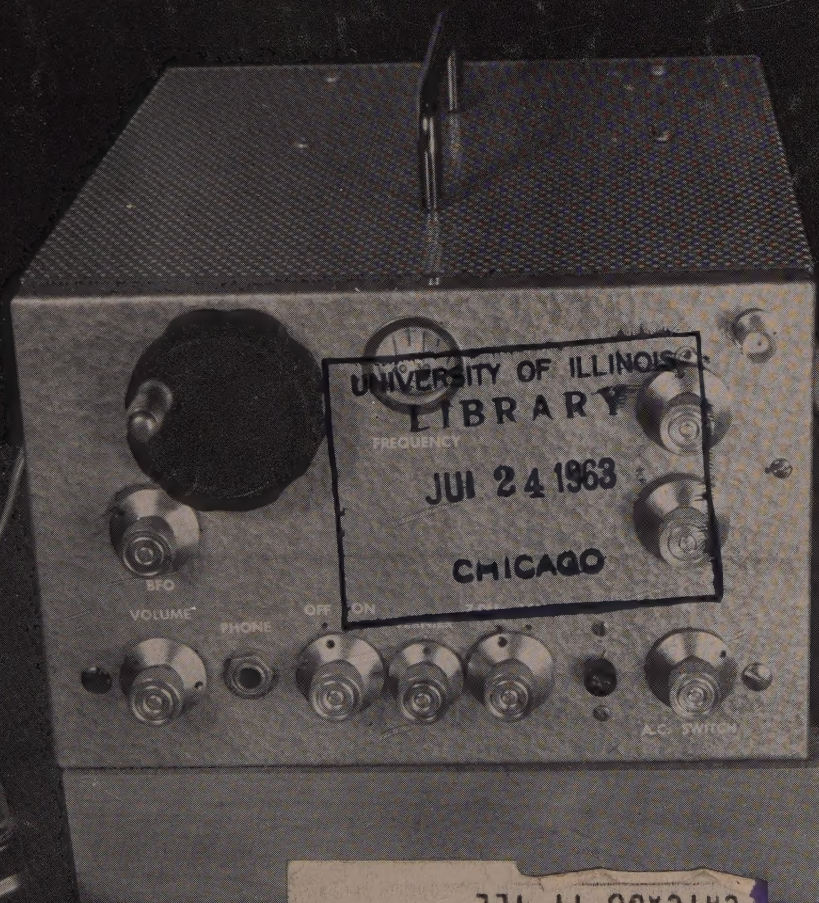


August 1963  
50¢

# CQ

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



4-62K2318CDEC 63  
UNIV OF ILL LIBRARY  
CHICAGO UNDERGRADUATE-  
NAVY PIER  
CHICAGO 11 ILL

The Radio Amateur's Journal

# OLDTIMER!

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



# SUREST WAY TO T9X

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

With PRs in your rig, you KNOW your signals are going out clear and strong and

right on the frequency. You get longer distance, clearer reception, less drift. Yes, PRs are the SURE ROAD TO T9X. Get them from your radio parts jobber. EVERY PR CRYSTAL IS UNCONDITIONALLY GUARANTEED.

## PR CRYSTALS

### AMATEUR TYPES

Fundamental, PR Type Z-2

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

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting;  $\pm 500$  cycles .....\$2.95 Net (All Z-2 Crystals calibrated with a load of 32 mmfd.)



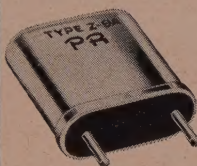
### AMATEUR TYPES

Third Overtone, PR Type Z-9A

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

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc.,  $\pm 15$  Kc.; .050" pins. ....\$4.95 Net



### CITIZENS BAND CLASS "D"

Type Z-9R, Transmitter

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



Type Z-9R, Receiver

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

Type Z-9R, Radio Control

FCC assigned frequencies in megacycles: 26.995, 27.045, 27.095, 27.145, 27.195, 27.255; calibrated to .005% (Be sure to specify manufacturer and model number of equipment.) .....\$2.95 Net

Type Z-1, MARS and CAP

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

Type 2XP

Suitable for converters, experimental etc. Same holder dimensions as Type Z-2. 1600 to 12000 Kc., (Fund.)  $\pm 5$  Kc. \$3.45 Net 12001 to 25000 Kc. (3rd Overtone)  $\pm 10$  Kc. ....\$4.45 Net



Type Z-6A, Frequency Standard

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

# PR Crystals

Since 1934

USE **PR** AND KNOW WHERE YOU ARE

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

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



## one good thing leads to another...

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

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

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

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

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

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



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

Export: Hallicrafters, International Dept., Commercial Div.

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

Canada: Gould Sales Co., Montreal, P.Q.



# The Radio Amateur's Journal

Vol. 19, No. 8

August 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  
BYRON KRETZMAN, W2JTP  
DX  
URB LE JEUNE, W2DEC  
YL  
LOUISA B. SANDO, W5RZJ  
HAM CLINIC  
C. J. SCHAUERS, W4VZO/HB9  
V.H.F.  
DONALD L. STONER, W6TNS  
SIDEBAND  
DOT STRAUER, K2MGE  
IRVING STRAUER, K2HEA

### BUSINESS STAFF

PUBLISHER  
S. R. COWAN  
ADVERTISING REPRESENTATIVES  
JACK 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, JUDson 2-4460

CQ—(Title registered U. S. Post Office) is published monthly by Cowan Publishing Corp. Second class postage paid at New York, N. Y. and at Garden City, New York. Subscription Rates: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year \$5.00; two years \$9.00; three years \$13.00. Pan-American and foreign, one year \$6.00; two years \$11.00; three years \$16.00. Printed in the U.S.A. Entire contents copyright 1963 by Cowan Publishing Corp. CQ does not assume responsibility for unsolicited manuscripts. Postmaster: send Form 3579 to CQ, 300 W. 43rd St., N. Y. 36, N. Y.

## Table of Contents

|                                                           |                                  |    |
|-----------------------------------------------------------|----------------------------------|----|
| An Economical TVI Free 6 Meter Transmitter.....           | Warren Rudolph, W4OHM            | 16 |
| The Swans of Abbotsbury.....                              | E. M. Wagner, G3BID              | 22 |
| A 10 Meter Mobile Converter.....                          | J. R. Harris, W8HJN              | 23 |
| The Simplest and Cheapest Rig.....                        | David T. Geiser, WA2ANU          | 24 |
| CQ Reviews:                                               |                                  |    |
| The Hallicrafters SR-150 Transceiver.....                 |                                  | 26 |
| The DPZ Vacationer Antenna System.....                    |                                  | 29 |
| The Water's Dummy Load-Wattmeter.....                     |                                  | 30 |
| Results of the 4th Annual CQ 160 Meter C. W. Contest..... | Charles M. O'Brien, W2EQS        | 31 |
| Reviewing the Radio Classics:                             |                                  |    |
| Single Layer Coils.....                                   | David T. Geiser, WA2ANU          | 37 |
| Announcing . . . The Summer, 1963 CQ V.H.F. Contest       |                                  | 38 |
| Results of the Spring, 1963 CQ V.H.F. Contest.....        | Bob Brown, K2ZSQ                 | 39 |
| The Tattooed Ranger.....                                  | David C. Yeoman, WØQWY           | 42 |
| A Quarter Wave 80 Meter Marconi.....                      | E. H. Marriner, W6BLZ            | 44 |
| Professor Samuel Finley Breese Morse                      |                                  |    |
| An Appreciation.....                                      | Dan McCoy, W8DG                  | 45 |
| The V.H.F. Amateur.....                                   |                                  | 69 |
| VHF in                                                    |                                  |    |
| Germany.....                                              | Dr. Karl Gerhard Lickfeld, DL3FM | 71 |
| Power Supplies for VHF                                    |                                  |    |
| Equipment.....                                            | Robert D. Frantz, W3AVU          | 72 |
| A New VHF Operation:                                      |                                  |    |
| F.M.....                                                  | Byron H. Kretzman, W2JTP         | 74 |
| Ignition Noise vs. Frequency..                            | Irwin Math, WA2NDM               | 76 |

## Departments

|                        |     |                            |    |
|------------------------|-----|----------------------------|----|
| Announcements .....    | 10  | QSL Contest .....          | 14 |
| Contest Calendar ..... | 51  | RTTY .....                 | 66 |
| DX .....               | 47  | Sideband .....             | 56 |
| Ham Clinic .....       | 58  | Space Communications ..... | 55 |
| Ham Shop .....         | 106 | USA-CA .....               | 59 |
| Letters .....          | 8   | VHF .....                  | 64 |
| Novice .....           | 62  | YL .....                   | 68 |
| Propagation .....      | 53  | Zero Bias .....            | 7  |

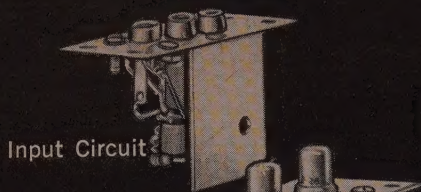
# NEW FROM INTERNATIONAL

**AN EXCITING  
NEW APPROACH  
TO DESIGN AND  
CONSTRUCTION**

**...AM-FM**

**-SSB**

**-DSB**



Nuvistor/Cascode  
Preamplifier

Innerstage  
Coupling Coil

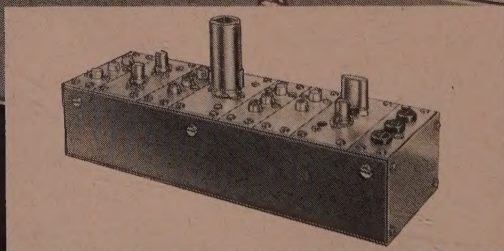
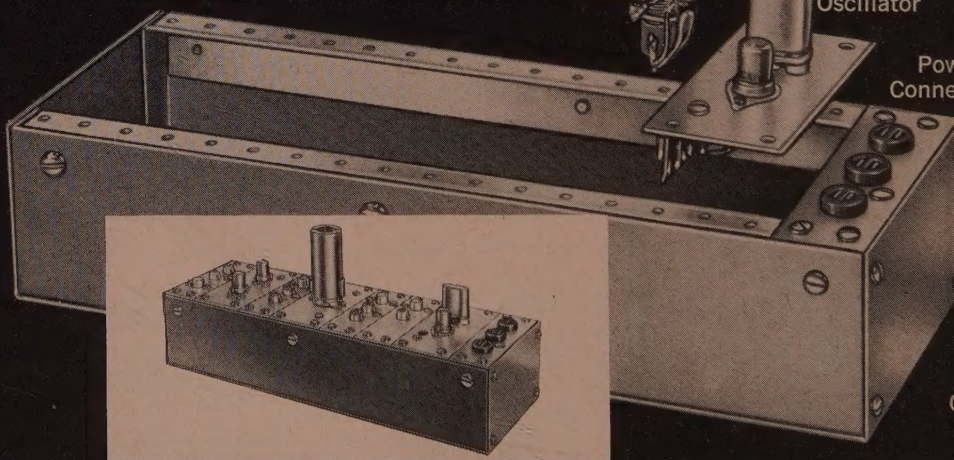
Mixer

IF Output Coil

Oscillator Tuning Coil

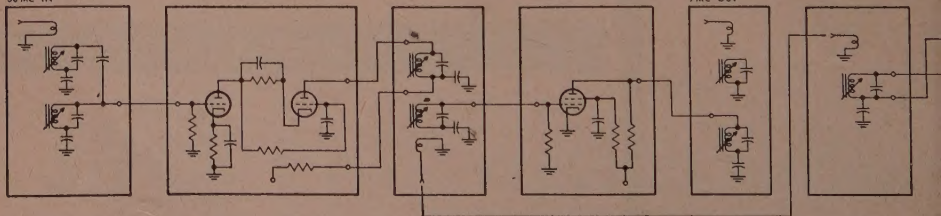
Oscillator

Power  
Connections



50 MC IN

7 MC OUT



# AOC\*

## \*Add - On - Circuits

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

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

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

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

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

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

## INTERNATIONAL ANTENNAS FOR 6 METERS

### BASE STATION VERTICAL

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

### MOBILE

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

For complete details, mail coupon today.



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.....

## **"Are you the POLY-COMM 6 TRANSCEIVER too?"**

Do you have a dual nuvistor  
rf amplifier?

Do you have a MINILOAD  
VFO with an adjustable  
differential capacitor?

Do you have an ultra  
sensitive squelch and noise  
limiter and illuminated  
S meter?

But I have a microphone and  
mounting bracket included  
in my price.

I sell for \$329.50 and there  
is no extra charge for  
C.D. units.

We make a pretty good team  
in any ham shack.

See you on the dealer's shelf,  
you rascal you!

## **"No I'm the POLY-COMM 2 TRANSCEIVER (that's T-W-O)!"**

Of course . . . and I've got the  
same unparalleled sensitivity  
as you. (.1  $\mu$ v at 6 db S N)

Sure do . . . and it maintains  
virtually zero drift under any  
and all adverse conditions.

Yes, and I even have 17  
tubes and 10 diodes.

So do I and I have 3 more  
nuvistors to really take  
advantage of low noise on  
two meters.

I sell for \$349.50 even  
though I have more tubes,  
and no extra charge for  
C.D. units.

The best !!! and don't  
forget the D.C. supply is  
built-in for mobile.

I'll be there and I'm not  
a rascal.



Write for free  
descriptive brochure.



88 Clinton Road • West Caldwell, New Jersey, 07007

For further information, check number 5, on page 110



# ZERO BIAS

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

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

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

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

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

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

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

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

The Class B and C licenses allowed all amateur privileges, except that phone operation was prohibited below eleven meters. (Since there

was no 15 meter band, and no phone was permitted on 40, this meant the Class B and C licensees were denied use of phone on 75 and 20 meters only).

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

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

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

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

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

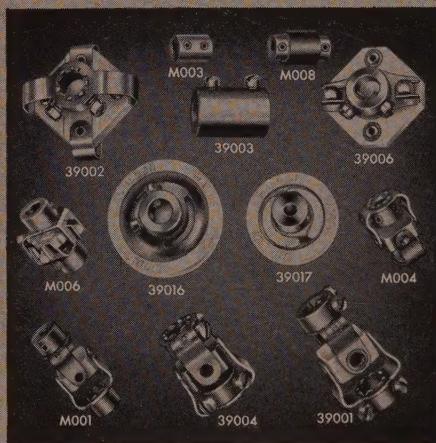
## OUR COVER

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

Designed for



Application



## COUPLINGS

Illustrated are a few of the stock miniature and standard Millen couplings. Flexible or solid — insulated or non-insulated — normal or high torque. Also available with inverted hubs to reduce length.

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

MAIN OFFICE AND FACTORY  
**MALDEN  
MASSACHUSETTS**



**LETTERS  
TO THE  
EDITOR**



### Cleveland Convention Cancelled

Editor, *CQ*:

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

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

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

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

**G. I. Patches**

Editor, *CQ*:

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

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

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

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

### "Creeping Meatballism"

Editor, *CQ*:

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



# COMMUNICATION ANTENNA SYSTEMS

—mean CERTIFIED PERFORMANCE!



## Electrical Specifications:

|                          |                                   |
|--------------------------|-----------------------------------|
| Final input impedance    | 50 ohms                           |
| Return loss              | 10 db                             |
| Return-to-back ratio     | 20 db                             |
| Maximum power input      | 250 watts                         |
| Final feedline           | RG-8A/U                           |
| Final terminal extension | 18" of RG-8A/U                    |
| Termination              | Type N male with Neoprene housing |
| SWR                      | 1.5:1                             |
| Bandwidth                | ±3%                               |
| Grounding protection     | Direct ground                     |

## Mechanical Specifications:

|                               |                              |
|-------------------------------|------------------------------|
| Size (size per side)          | 2' x 2'                      |
| Structural material           | High strength aluminum alloy |
| Radiating element material    | High strength aluminum alloy |
| Radiating element diameter    | 3/4"                         |
| Rated wind velocity           | 100 MPH                      |
| Rated thrust at rated wind    | 16 lbs.                      |
| Rated moment on mounting pipe | 16 ft. lbs.                  |
| Weight                        | 8 lbs.                       |

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

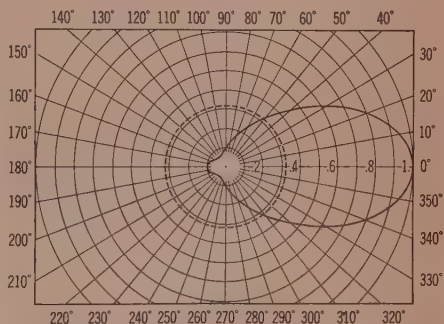
## Base Station Corner Reflector Advanced Design Antenna

(10X-Unidirectional Gain)

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

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

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



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



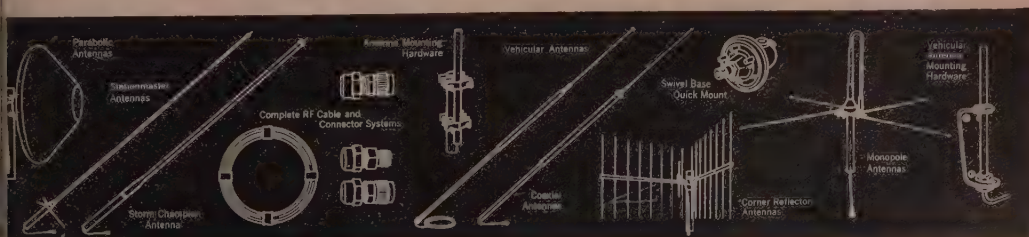
COMMUNICATION  
ANTENNA SYSTEMS  
FOR AMERICAN  
BUSINESS

*Communication Products Company*  
DIVISION OF

**PHELPS DODGE ELECTRONIC PRODUCTS**

CORPORATION

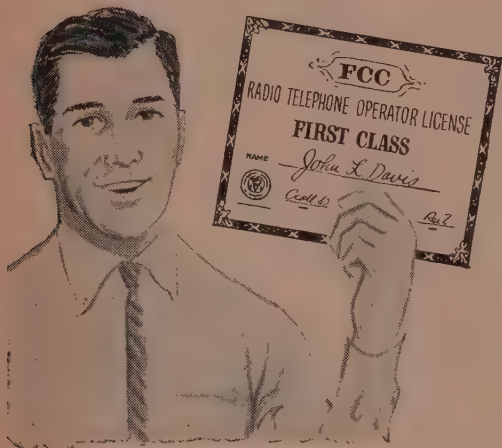
MARLBORO, NEW JERSEY — Telephone HOpkins 2-1880 (Area Code 201)  
LOS ANGELES 65, CALIF. — Telephone CHApman 5-1143 (Area Code 213)



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-4  
Cleveland 14, Ohio

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

#### CHECK AREA OF MOST INTEREST -

- |                                                 |                                                    |
|-------------------------------------------------|----------------------------------------------------|
| <input type="checkbox"/> Electronics Technology | <input type="checkbox"/> First-Class FCC License   |
| <input type="checkbox"/> Industrial Electronics | <input type="checkbox"/> Electronic Communications |
| <input type="checkbox"/> Broadcast Engineering  | <input type="checkbox"/> other _____               |

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

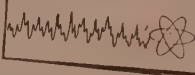
Name \_\_\_\_\_ (please print) Age \_\_\_\_\_

Address \_\_\_\_\_

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

Accredited Member National Home Study Council

### How to Succeed in Electronics



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

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

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

Editor, CQ:

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

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

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

John P. Stowe, K1UZY  
P.O. Box 31  
Newtown, Conn.

### "Our Boy"

Editor, CQ:

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

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

Ernest S. Pentland, M.D., VE3DWJ  
369 Queen Street E.  
Sault St. Marie, Ontario



## ANNOUNCING

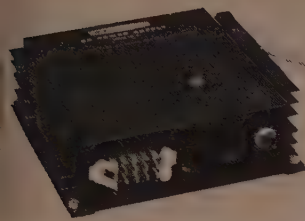
### Illinois

The Egyptian Radio Club will hold its annual ham boree on Sunday, September 15 at its club house on the levee at the Chain-of-Rocks Canal near Granite City, Illinois. Games and contests for entire family. Amp space to park and swap. Club located 200 yards south of U.S. 66 and 40 By Pass, 3/4 mile west of U.S. 6 Alternate, and 2 miles east of Mississippi River Bridge. Mobiles monitored on 29640, by club station W9AIU. For info contact Egyptian Radio Club, Inc., Box 130, R. R. 1, Granite City, Ill.

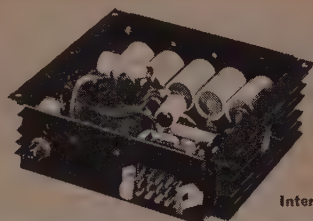
The Hamfesters Radio Club's 29th Hamfest will be held Sunday, Aug. 10, at Santa Fe Park, near Chicago. Tickets are \$1.00 in advance and \$1.55 at the gate. Contact Tom Campana K9DYW, 1209 W. 74th, Chicago 36, Ill. For further info Tom Campana K9DYW

# NEW HEATHKIT® SOLID-STATE POWER SUPPLIES

FOR ALL HAM TRANSCEIVERS



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

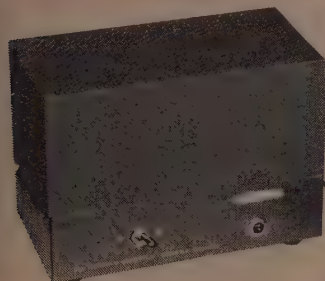


Interior

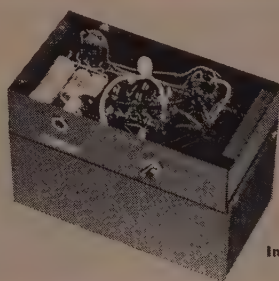
**NEW DC "MOBILE" POWER SUPPLY:** Furnishes power required by Heathkit and other makes of SSB transceivers and mobile gear. Features encapsulated high-efficiency "Deltamax-core" toroidal transformer, power rectifying transistors, silicon rectifiers, circuit breaker protection, and relay control of primary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

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 3/4" W x 7 1/4" L x 2 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, 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.

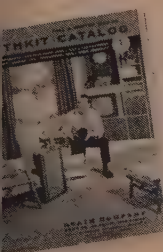
HP-23...18 lbs....no money down, \$5 mo.....\$39.95

**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 3/4" W x 8 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!



For further information, check number 8, on page 110

### 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.

# TURNER MICROPHONES... BEST FOR MOBILE AND BASE

## GOING...

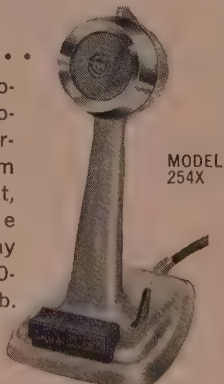
Convenient, top-performing, low-priced Model 350C from Turner: Rugged, dependable mobile mike... world's most popular. Why pay more... only \$16.80 list... buy the Turner 350C. Response: 80-7000 cps. Level: -54 db.



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



**THE TURNER MICROPHONE COMPANY**

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

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

## Aurora, Illinois

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

## Pittsburgh

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

## Alabama

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

## Wyoming

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

## Iowa

The Cedar Valley Amateur Radio Club of Cedar Rapids, Iowa will host an amateur radio convention on Aug. 31-Sept. 1 at the Town House Motel in Cedar Rapids. Two Collins 75S-3 communications receivers will be given away as main prizes. General Chairman for the event is Charles Carney, W0GDJ and the President is Bill Bradford, K0HDK. Amateurs should send their \$2.00 registration fee to Box 1346, Cedar Rapids, Iowa.

## Washington

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

## New Jersey

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

## Pennsylvania

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

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

[Continued on page 84]

# Best 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—bandswitching 80 through 10 meters... more than 60 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... compact units and interconnecting cables... RF it 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—sign and front panel make operating practically foolproof. 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 X 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 aligning necessary. Delivers a solid 200 watts CW input: 200 watts P.E.P. SSB input: 90 watts input on AM! 300 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 50 to 600 ohms adjustable. Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. With remote power supply, tubes and crystals.

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

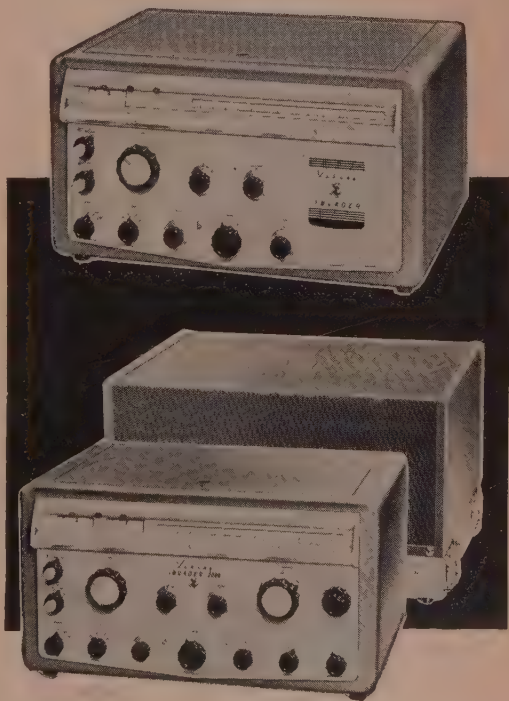
**"HIGH POWER CONVERSION"**—Take the features and performance of your "Invader"... add the power and flexibility of this unique Viking "Hi-Power Conversion" system... and you're "on the air" with the "Invader 2000". Wired, tested, includes everything you need—no ordering necessary—complete conversion 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 10, on page 110

August, 1963 • CQ • 13

# ELIMINATE HETERODYNES

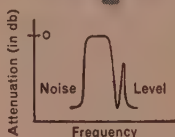
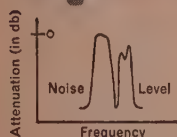
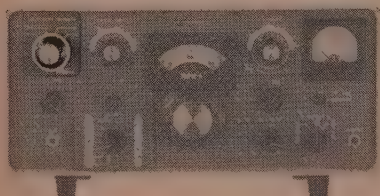
ON COLLINS 75S-1, KWM-2/2A WITH

## WATERS

### Q-MULTIPLIER/NOTCH FILTER



MODEL 340-A IN A COLLINS KWM-2A



Response of IF Passband for Various Positions of Q-Multiplier/Notch Filter

The Waters Q-Multiplier/Notch Filter will eliminate heterodynes and other unwanted signals in the IF passband of your Collins 75S-1 receiver or KWM-2/2A transceiver. It has a notch of over 40 db which can be tuned across the entire passband. The Q-Multiplier becomes an integral part of your 75S-1 or KWM-2/2A with a single tuning control on the front panel. The units come assembled ready for installation. Escutcheon plates and knobs are matched to the Collins panel so there is no discernable change in appearance of the equipment. No drilling is required for installation.

The Q-Multiplier/Notch Filter combines an isolating amplifier and a tunable LC Bridged-T network with a Q-Multiplier. The null of over 40 db is tunable over a 5 kc range, 2.5 kc on either side of the 455 kc center frequency.

Model 340-A permits use of the external PTO (Collins 399C or 312B5) when the KWM-2/2A is operated in fixed station with AC power supplies 516F-2 or PM-2.

Model 337-S1A for Collins 75S-1 Receivers \$39.95

Model 340-A for Collins KWM-2/2A Transceivers \$53.75

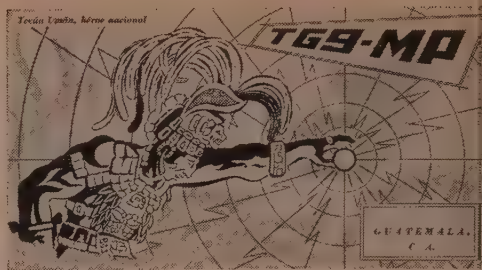
Available at leading distributors

### WATERS MANUFACTURING, INC., WAYLAND, MASS.

Other Waters Products: Coaxial Switches — Dummy Load/Wattmeter — "Little Dipper" (Transistorized Dip Oscillator)

For further information, check number 11, on page 110

## QSL contest



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

Honorable mention goes to: W1DBN, W1HIC, K6KVO, W7ABO, K7NCP, K7OYH, KL7ENV, HB9J and SV0WW.

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



W9WNV/PORTABLE

KG6R

ROYA ISLAND, MARIANAS  
DX'PEDITION



**SEND  
FOR  
YOUR**

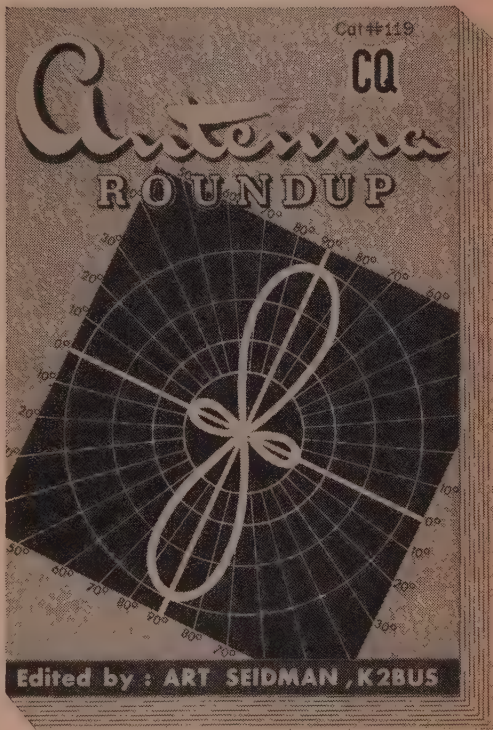
# ANTENNA ROUNDUP

**160 PAGES OF SHEER ENJOYMENT!  
47 INFORMATION-PACKED ARTICLES!**

he cream of antenna information—  
packed with all the dramatic excitement  
of the original articles when they first ap-  
peared in CQ—over the 12-year period of  
1950-1961.

ANTENNA ROUNDUP is a book that will  
dispel much of the mystery surrounding  
antennas. Its five sections contain facts  
every amateur needs to know about this  
important subject, bound for the first  
time in one book. In the section on AN-  
TENNA THEORY you will read about the  
significance of SWR measurements, T  
Match, Gamma Match, and Balun Theory  
and Design. Next comes a section on VHF,  
to help you understand 2 and 6 meter an-  
tennas. Section III covers BEAMS, QUADS  
and HORIZONTALS, plus an excellent ar-  
ticle on Indoor antennas. Section IV deals  
with VERTICAL ANTENNAS, with instruc-  
tions for building an 80 Meter Midget  
and a Gamma Matched 160 Meter Verti-  
cal, among others. Section V covers  
ACCESSORIES. Typical articles are  
"Lightning Protection for Your Station";  
"Automatic Antenna Switching"; and  
"Antennascope-54". These articles were  
written by well-known antenna experts—  
whose names read like a list of "Who's  
Who" in Ham literature.

Every ham will want a copy of this infor-  
mation-packed book. Builders will find  
complete information for building anten-  
nas and accessories that will be "just per-  
fect" for their stations. Operators will



find many ways to improve the efficiency  
of their equipment. This book will soon be-  
come the most worn out one in your shack!

**PRICE: \$3.00**

**SEND  
YOUR ORDER  
NOW!**

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 ANTENNA ROUNDUP.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

New York City Residents Add 4% Sales Tax

# An Economical TVI Free 6 Meter Transmitter

BY WARREN RUDOLPH\*, W4OHM

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

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

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

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

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

4. It must be compact and economical to construct.

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

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

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

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

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

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

\*743 Berryville Avenue, Winchester, Virginia.



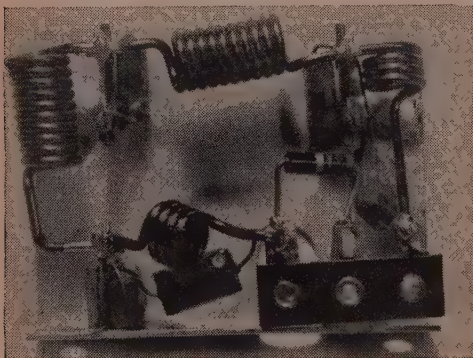
Bottom view of the transmitter shows the oscillator and driver multiplier in the left section shielded from the final section. The power feed filter network is located in the lower left of the chassis with the shield removed for the photo. In the final unit described in this article the neutralizing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



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

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

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



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

### TVI

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

This does not necessarily mean that you won't have any TVI when you go on the air, but it does mean that any TVI you do have will not be the fault of the transmitter. For example, upon putting this transmitter in operation at the 6 meter ham's home we had absolutely no TVI on any channel of TV sets operated in the same house and with one set even in the same room. One set had to be equipped with a high pass filter to eliminate the overload on channel 2 but the other sets operated entirely clean without the need for high pass filters. This "Hams Paradise" continued until the wind began to blow and then

pandemonium broke loose on the TV sets. We had TVI galore. As soon as the wind died down the TVI also disappeared. This was eventually traced to a rusty antenna tower and erratic electrical contact in the tower.

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

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

### Construction

The r.f. unit is constructed on a 5" × 10" × 3" aluminum chassis. The top shielded enclosure is 6" high and is allowed to lap ½" over the chassis making it actually 5½" high above the chassis. Drill plenty of ventilating holes but keep their maximum size ⅛" or a little more than 3/16" to minimize r.f. leakage. Fasten the shield to the chassis with self tapping screws and shakeproof washers spaced no more than 1½" apart. Fasten the top and bottom plates in similar fashion and be sure and drill plenty of ventilating holes in them also.

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

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

TVI suppression also depends, to a large degree, upon r.f. isolation in the low voltage lines. It is most desirable to place all the filter at the power feed point as shown in the photographs. The chokes (*L*<sub>1</sub>, *L*<sub>2</sub>, *L*<sub>3</sub>, *L*<sub>5</sub>) and capacitors are mounted between a pair of terminal strips and enclosed by a shield. The addition of the chassis bottom plate provides a completely sealed container except for the four ¼" slots

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

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

The final pickup link is made adjustable by elongating the screw holes in the "L" mounting bracket of the link tuning capacitor to allow about  $\frac{1}{2}$ " adjustment as shown in fig. 2. The output link capacitor is adjusted with a screw driver through a hole provided in the shield. Since this capacitor will normally be adjusted only occasionally, it is not necessary to bring an insulated shaft out for that purpose. In the event you should want to provide a shaft and dial for adjustment, be sure to use a fiber or polystyrene rod for the extension shaft so that no metal passes through the shield enclosure. It doesn't take much to radiate interference and even the short length of metal shafting can, under proper conditions, cause some trouble.

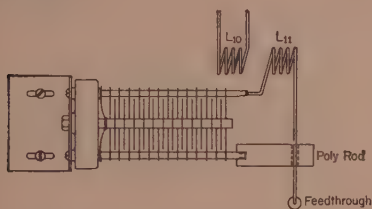


Fig. 2—Details of the variable coupling arrangement of the output. The coupling link is mounted on the capacitor by wedging a polystyrene rod on one of the stator studs. The rod then supports L<sub>11</sub>. As the capacitor bracket is positioned in the slots, the coupling is varied.

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

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

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

As originally supplied from the manufacturer, the TV coils used for the i.f.s have the mounting spring at right angles to the coil terminals and this prevents mounting the coils sufficiently close for maximum pickup. Carefully pry the coil mounting spring loose and turn it  $\frac{1}{4}$  turn so that the ears of the mounting spring project from the sides in the same direction as the coil terminals. When drilling the mounting holes for the coils, leave only about  $\frac{1}{8}$ " of metal between the holes to assure very close mounting of coils. Also be sure to use the end of the coil next to the chassis for the cold end of the coil and connect the end away from the chassis to the grid or plate of the tube.

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

## Power Supply

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

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

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

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

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

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



### Tuning Up

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

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

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

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

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

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

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

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

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

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

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

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

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

#### Low Pass Filter

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

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

It is suggested that initial tuneup be made using an external meter across the 10 ohm shunt. With the Viking II as the power source, plate voltage will be approximately 670 volts and a plate current reading of 200 ma will equal 134 watts input. Note this reading on the plate current meter of the existing transmitter. Due to screen current requirements also being read in this condition, the plate current reading will be between 224 and 230 ma. Use this as a reference for future tuning with the existing transmitter's plate meter. When excitation is removed, a meter connected across the shunt will show that the plate current has been reduced to a very low value. However, since the clamp tube will then be drawing plate current and since this tube gets its current through the existing transmitter plate current meter, the reading on the exist-

ing transmitter's meter will not fall nearly as low as the external meter. When drive is applied, the 6AQ5 is cut off and draws virtually no plate current.

#### A Few Final Comments

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

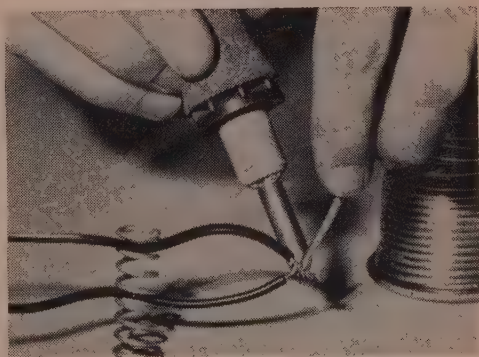
Choke  $L_4$ , the 6146 filament choke, is mounted right at the 6146 sockets and the .005 capacitors are grounded with as short leads as possible.

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

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

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

## Ham Hints



#### Spring Simplifies Soldering

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

# THE SWANS OF ABBOTSBURY

## A True Story With A Moral

BY E.M. WAGNER\*, G3BID

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

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

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

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

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

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

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

But perhaps the most interesting thing about the swans is the way they have maintained their numbers within reasonable limits throughout the centuries. Under normal circumstances, they rarely fall below 600, and they rarely exceed 1,200 or 1,300. These numbers are not maintained within these limits by the depredations of their enemies or by the destruction of the swan by human beings. The swan here has few enemies and the human beings do not kill swans

in any large quantities. It would have been reasonable to expect that their numbers would, therefore, have increased steadily but this has not been the case.

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

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

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

\* \* \* \* \*

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

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

There then began an intensive period of breeding.

Clubs were formed, the national associations

[Continued on page 102]

\*5 Ferncroft Avenue, London, N.W. 3, England.

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



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

### Metering

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

### Crystal Calibrator

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

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

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

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

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

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

Table I—H.F. Oscillator Crystal Frequencies

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

### Receiver Incremental Tuning

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

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

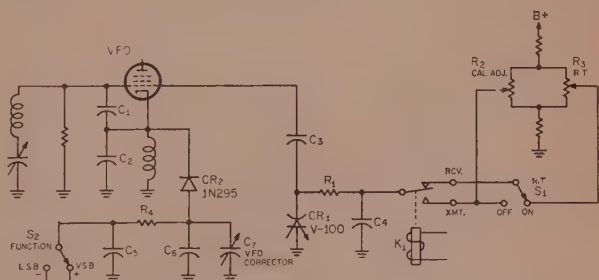
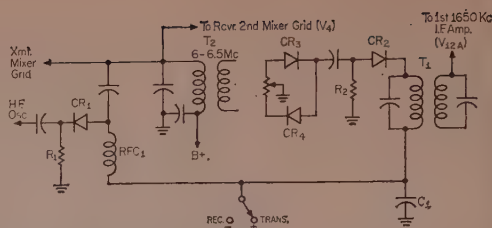


Fig. 3—Changeover diode switching circuits. The d.c. control circuitry is shown in simplified form for ease of explanation.  $CR_1$  and  $CR_2$  (1N295's) are the diode switches. When  $S_1$  is in the *transmit* position, the anodes of the diodes are at a positive potential with respect to their cathodes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

$CR_4$ , to  $T_1$  and then to the first 1650 kc amplifier which

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



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

### Panel Controls

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

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

### Performance and Operation

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

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

The main dial calibrations are in 5 kc increments on two 500 kc scales with each division on the vernier dial equal to approximately 1 kc. The latter varies somewhat over different sections of the range. Tuning is exceptionally smooth without backlash, making s.s.b. operation a pleasure. The 5 kc dial calibrations are quite near the top of the dial window, making observations a bit

difficult unless one crouches down, so it may be desirable to tilt the unit slightly upward. This is of special concern with mobile installations.

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

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

### Transmitter Performance and Operation

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

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

[Continued on page 108]

<sup>1</sup>Scherer, W. M., "IFNL, An SSB IF Noise Limiter," CQ, Apr. '60, p. 42.

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



## CQ Reviews:

### The DPZ Vacationer Antenna System

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

The arrangement consists of a 57-inch retractable whip which is screwed on to a special base insulator mounted on a substantial bracket made of anodized aluminum  $\frac{1}{4}'' \times 1\frac{1}{2}'' \times 12''$ . The bottom end of the bracket is bent in the form of a U, and together with a thumbscrew-type fastener makes it possible to secure the antenna to the frame or sill of a window, or to the rail of a porch or fence. With this mounting the antenna is positioned at a  $45^\circ$  angle. It also may be mounted vertically, where circumstances so permit, by means of a separate bracket and C-clamp which are supplied at slight extra cost.

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

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

#### Installation and Operation

Complete instructions are furnished for installation and adjustment. In this regard, after the correct loading coil, or the shorting bar, has been installed and with the whip adjusted to a specified length, the antenna should be clamped to the

frame or sill of a window. One precaution, in this respect, is that mounting should not be made on a metal surface. If such a situation occurs, a piece of wood or masonite board should be used as an insulator. This may be clamped to the metal surface with a C-clamp, and the antenna then attached to the board.

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

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

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

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

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

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

## CQ Reviews:

# The Waters Model 334 Dummy Load-Wattmeter

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

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

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



of oil seepage or spillage and it provides a warning of overheating the load element.

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

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

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

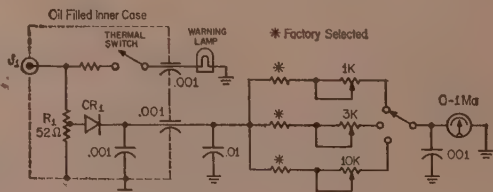
## Performance and Operation

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

[Continued on page 109]

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

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



## Results of the

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

## Best Conditions In Years Yield Record Turnout

BY CHARLES M. O'BRIEN\*, W2EQS

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

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

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

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

How many listened the week-end after the Contest? Gosh, were conditions ever poor. Even

the ARRL DX contest over the week-end of February 23-24 couldn't begin to compare to our conditions and the continuance of their contest over the week-end of March 23-24 was a complete washout, as far as 160 was concerned.

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

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

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

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

### Comments

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

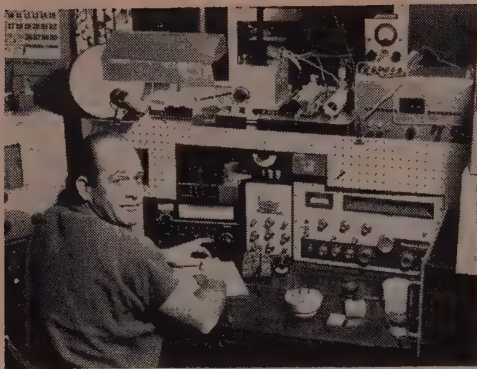
### 1st DISTRICT

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



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

\*48 Prospect Avenue, Westwood, New Jersey



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

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

#### 2d DISTRICT

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

#### 3d DISTRICT

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

#### 4th DISTRICT

WA4FJM: "Enjoyed the Contest. Am not much of a contest man except when the mood strikes. This was a good workout for the Top Band. It was a relaxing

change to work a contest in which there was no time limit to work against . . . means a person can sit back and stretch without having to worry about his average. Where, oh where, was neighbor South Carolina?" W4OMW: "Working hours prevented me from getting in contest but couldn't refrain from losing a few hours sleep to get in and work a few. Received an s.w.l. card from England so maybe now I'll be able to work into Europe what with being near the east coast and having wonderful propagation condx from here in North Carolina." W4HYY: "Antenna troubles with all the ice. Anyway, nice Contest." W4CHK: "Enjoyed the contest very much and worked my first European station on Top Band." W41QU: "Wotta Contest! Finally made it across the Atlantic on 160. GI6TK gave me a thrill like that of my first QSO 27 years ago. This contest gets better every year." W0VEH/4: "It sure was a lot more fun operating from VP9-land as I did last year (and getting 10 points per contact). However, it is a mighty fine contest and I hope you keep it going each year. W4KFC: [Purposely I held Vic's comments till last. Is there any contest this fellow isn't actually in?] "Put in much more time than I intended; with activity and conditions so good it was a great temptation to keep on going! Certainly was a thrill to hear 160 meters producing S8 signals from W0-land in broad daylight at both ends. What a surprise to hear the band alive with signals from all over the east in the middle of the afternoon and the W6/K6s coming through in early evening. Was chagrined to miss West Virginia which I can see on a clear day from the top of my tower." (There was only one station on from W. Va., Vic and he gave out exactly one QSO—Ed.)

#### 5th DISTRICT

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

#### 6th DISTRICT

WA6JPQ: "Real nice contest as usual. The big thrill was when some W3 told me that G5JU and G3s were calling me. Never heard them!" W6JTB: "This is quite a contest and all the operators here at the club really enjoyed it. (WA6s, ILG, IJH, GJW, K6PIY). See you again next year." W6GWQ: "Another fine contest even though the local noise level was quite high. Accessories included a TR switch with keying monitor, large coffee pot, large ash tray and an Understanding XYLI!" W6OST: "A great contest; always good operators; score going up each year. East Coast came through great the first night. What happened to the DX boys who were lamenting that nobody looked for them; never heard a one or one being called." W6YC: "I didn't find conditions too good here. Regardless, though, I enjoyed taking part." K6EIV: "The old proverb stands true, 'If you can't hear 'em you can't work 'em.' What I needed was an antenna . . . maybe next year." K6TSQ: "Condx seemed poor this year; possibly due to my makeshift antenna system. Still just as much fun as ever, though, and I intend to participate again next year. How about some of the gang hanging around 160 between contests?" WB6AFI: "I never heard so much QRM on 160 as in this year's contest. Many stations in the 'East' segment were rolling in."

#### 7th DISTRICT

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



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

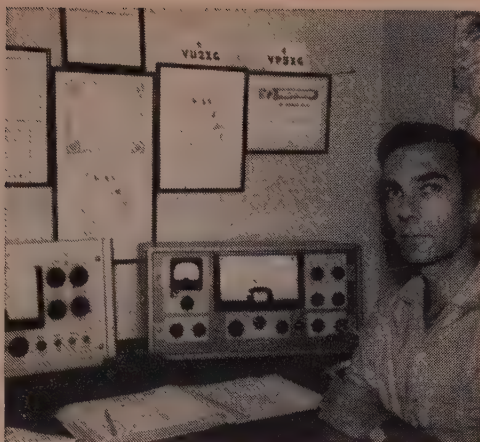
meter v.f.o. and I had traded off my only xtal. Suddenly, thoughts of a half junked ARC-5/T-18 somewhere in the attic came to mind. Well, after about 45 minutes I amazingly had it on the air. It was beginning to look as if I would get my feet wet after all. Then I realized I had no 160 meter antenna!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

#### 8th DISTRICT

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

#### 9th DISTRICT

W9PNE: "This was a terrific contest. There must have been 250 W/VE contestants." (There were 769, Brice—Ed.). "They were stacked many layers deep during the late evening hours. Condx the best I've heard on 160 in years. Europeans so thick they QRMd each other."



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

W9EWC: "Activity and band condx both amazing. Aside from excellent openings to Europe both nights, the east coast was readable all day long." W9YT: "I think we could have taken the State except for W9SZR at W9EWC. To make matters worse, he was a member of our Club for many years! (Badger Amateur Radio Society, University of Wisconsin)."

#### 10th DISTRICT

W0DK/Ø: Boulder, Colorado, Amateur Radio Club. "This was the first time that most of our ops had worked 160 and was the first 160 contest for all of us. We used the 185 foot towers of a local broadcast station but seemed to be hurt to the west as the towers were right against the foothills of the Rockies. Didn't know what these antennas would do for us but within a week QSLs began arriving from Europe and South America. Because of the contest interest in 160 sure has grown in the Boulder area." W0VXO: "You couldn't have picked a better weekend for the contest. Condx were the best I have ever heard on 160. The contest was a real thriller and yielded me several new countries. W0AIH: "My W0AIH/VE3 operation showed that it is much, much easier to work Europe from the Toronto area than from Minnesota! I just barely hear Europe from northern Minnesota. 160 meter contests have a thrill all their own." W0DJG: "This was the first time I ever participated in a contest of any sort and I must say that it sure was a lot of fun! Isn't it surprising what can be done with just 50 watts and a simple long wire?" W0OGC: "I worked part of one night last year so this was my first time to really enter the contest. It sure is a most enjoyable one and hope it goes on for a long time. My XYL just got her ticket (W0FAJ) so will have some relief during the next affair." W0BBS: "Well, the 1963 160 meter contest is over and I once again had a fine time. In late afternoon and early evening a good number of 1800-1825 kc stations were coming in (Nebraska) but none of them would call CQ wake or listen for us. We also need a larger 160 meter band as QRM was terrific." (We finally did get it, OM—Ed). W0FQB: First 160 meter contest worked since before WW II. Had a ball. Missed the power and break-in I used to have but look out for me next year! Thanks for plugging Top Band." W0SDN: "Condx much better this year. A fine contest and the most enjoyable one I've ever been in. I think the move from February to January a wise one. Shortly after "rat race" was over I received a number of heard cards from s.w.l.s in England."

#### CANADA

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

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

#### DX DX DX DX DX

EI9J: "Was looking forward to the Test but when the time came I had something else to occupy my mind. We were in the longest freeze-up most folks can remember. Two days before the Test the water feed pipe into house froze. Left us with what was in the tank in the roof space. This lasted 'til the Saturday of the Test so was pre-occupied with what to do. Only for that am sure I would have put in more time and enjoyed it better." G3IGW: "Thanks for a fine contest in terrific condx. The 11 Ws and VEs worked are only a small fraction of those heard from coast to coast." G5JU: "Over this week-end I worked more W/VE stations than on any previous occasion. Logged WA6JPQ at RST339 on 1998 kc. Heard several other signals around this frequency too weak to copy." G3GRL: "Regret was only able to get on for part of the time. Condx were excellent and a number of your countrymen were putting terrific signals in here from 0100 to 0800Z." G3NHE: "Enjoyed my first attempt very much and look forward to next year's event. Condx seemed exceptional both days. Some 60 W/VE/VO stns were heard." G5ZT: "Was off air several hours due to electric mains supply having been cut off due to terrible weather. Just before contest my 144 mc beam, Mosley TA-33 Jr and 600-foot long-wire blew down in a blizzard but managed to get the 600 footer up again in time. Expect many British amateurs had similar experiences." G3RSR: "Dozens of Ws were heard at RST599." G8PG: "Boy, what a FB contest!" G3HZL: "My first entry in this contest and it was very much enjoyed. Plenty DX heard." G3PEO: "Mains voltage varied constantly. Watched TV picture size as indication of when to go back into Contest—hi!" G3MWZ: "My first attempt at your 160 event and very enjoyable. My score would have been better but no mains electricity available for a long period of time." G16TK: "Heard W6KIP." [Many of you don't know it but G16TK is a blind operator. Our very sincerest thanks to W. Dougan, BRS-22700, who prepared and submitted Frank's logs—Ed]. GM3PBA: "Many thanks good contest and don't change a thing next year. Heard all W-districts except W7.

CT1CO: In spite of very meagre results I enjoyed this contest very much and hope to be there next year." PA0LOU: "I could have cried when I heard DL1FF work all those nice DX stations. I heard everything but W5/6/7. Called Ws and VEs for hours but nil. The



PA0LOU, not unknown in DX circles tried his hand at 160 and came out on top for The Netherlands.

misery of a poor antenna!" HR3HH: "The Contest was quite a success as far as I was able to observe but East/West conditions weren't as good as last year. Heard only 2 Gs and HC. Couldn't get much response from the west coast even though I called 'CQ West' many times." DL1FF: "What QRM! But the worst part of it was EUs calling W/VE/VO on their own freq. Messed things up terribly. We can work between only 1825-1835 and 1985-1992 kc." (West Coast please note for possible future skeds—Ed). KH6EOF: "Think I did better last year but condx were better too. There were four KH6s on: BI, DVD, EWD and myself." KH6DVD: "Was home for just a short time, including the contest, between business trips in the western Pacific and (now) S.E. Asia. Regular antenna was down leaving only an impossible 50' horizontal about 20' high worked against ground. Did get on, though, and even worked a new country as one of my 3 contacts—VR30." HC1DC: "Didn't hear as many west coast stations as last year. Lots of W/VEs didn't listen up to 1827 and missed me but in the U.S.-band I couldn't work much due to the terrific QRM."

VP5XG: "What fun it was joining in the CQ Top Band Contest. Thanks a million for inviting me to the session and for letting me know about it." W4WQQ/VP9: "Thanks for a most enjoyable contest. Many things were learned especially how the OLD DX hounds work. Most of the contacts were with the old contest pro's whom we have worked before but too many others weren't interested in DX. Many passed up the weak W4 station not realizing it was /VP9. Heard over 200 stns." ZL3RB: "I'm pleased I was able to check in on the band both nights. Condx were much better the 1st night. Was disappointed that VR30 wasn't tuning 1875-1900 kc as I could have worked him FB." XE2OK: "I'm sorry about my poor log but really don't know what happened. Run 100 watts but the QRM from the many W-stations prevented me from doing any better. Anyway conditions were much improved over 1962 and next year will probably even be better than 1963." XE1OK: "Worked nothing in DX Test this year. Friday night heard lots of W/K/VE S8 to S9 but couldn't get them. Called dozens of stations Friday plus lots of CQ DX but not even one station heard me. Worst I have seen." And last but by no means least an extremely rare one no matter what band and I speak of none other than Martin, VR30, Christmas Island. He managed only 4 QSOs but not too long ago I had the extreme pleasure of having had an eyeball QSO with him. He told me that the W/K boys were so thick out there in both segments of the band he, himself, didn't know what frequency to select for himself. What a shame for us to have missed such a rare one!



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

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

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

|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|-----------------------|----------------------|------------------------|
| The first column indicates the number of contacts, second is the multiplier, third is the number of different countries worked and the last column is the final score. |                            |                            |                            | W4ZJY ... 22 15 2 660 | W9MAK . 45 21 2 1890 | OK100 ... 73 9 9 2529  |
| Connecticut                                                                                                                                                            |                            |                            |                            | Virginia              | Indiana              | OK3CEA ... 71 9 9 2385 |
| W1TX ... 162 46 11 20,424                                                                                                                                              | W4KFC ... 241 51 11 28,254 | W9HLY ... 165 39 6 14,040  | OK2KOI ... 58 8 8 1576     |                       |                      |                        |
| W1WY ... 173 42 10 18,648                                                                                                                                              | W4CHK ... 125 35 6 9870    | K9YWO ... 136 33 3 9240    | OK1AEZ ... 54 7 7 1386     |                       |                      |                        |
| K1SDX ... 155 32 6 10,944                                                                                                                                              | W41QU ... 94 28 6 6160     |                            | OK1ZL ... 42 8 8 1176      |                       |                      |                        |
| W1AW ... 18 13 2 468                                                                                                                                                   | W4KXV ... 72 28 4 4480     | Wisconsin                  | OK1KNH 50 6 6 942          |                       |                      |                        |
|                                                                                                                                                                        | W0VEH/4 77 23 3 3726       | W9EWC ... 274 53 13 37,524 | (OK 1-15284)               |                       |                      |                        |
|                                                                                                                                                                        |                            | W9YT ... 180 42 5 16,128   | OK2QX ... 49 6 6 876       |                       |                      |                        |
|                                                                                                                                                                        | Arkansas                   | W9BQM . 31 18 2 1116       | OK2KGU ... 43 6 6 714      |                       |                      |                        |
|                                                                                                                                                                        | K5ALU ... 34 15 1 1020     |                            | OK2KJU ... 35 6 6 654      |                       |                      |                        |
|                                                                                                                                                                        | New Mexico                 | Colorado                   | OK1BM ... 30 7 7 651       |                       |                      |                        |
|                                                                                                                                                                        | W5SOT ... 53 24 3 2736     | W0DK/0 .154 41 6 13,940    | OK2OP ... 33 5 5 450       |                       |                      |                        |
|                                                                                                                                                                        |                            | Iowa                       | OK1PG ... 24 6 6 396       |                       |                      |                        |
|                                                                                                                                                                        | Oklahoma                   | W0HA ... 66 30 2 3960      | OK1PH ... 23 4 4 220       |                       |                      |                        |
|                                                                                                                                                                        | W5IPT ... 64 20 2 2560     | Minnesota                  | OK1ZW ... 30 3 3 216       |                       |                      |                        |
|                                                                                                                                                                        |                            | W0VXO ... 220 46 10 24,288 | OK1KTI . 19 3 3 132        |                       |                      |                        |
|                                                                                                                                                                        | Texas                      | W0AIH ... 215 42 6 19,404  | OK1AHZ . 19 2 2 82         |                       |                      |                        |
|                                                                                                                                                                        | K5LIW/5 .122 36 5 9648     | K0PAU ... 107 33 2 7062    | OK1KNH 25 1 1 50           |                       |                      |                        |
|                                                                                                                                                                        | California                 | W0RHI ... 92 32 3 6144     | (OK 1-577)                 |                       |                      |                        |
|                                                                                                                                                                        | W6KIP ... 139 40 8 13,680  |                            | OK1AHN 14 1 1 28           |                       |                      |                        |
|                                                                                                                                                                        | W6AJPQ .112 33 5 8448      | Missouri                   | Ecuador                    |                       |                      |                        |
|                                                                                                                                                                        | W6JTB ... 95 29 4 6206     | WA0DJG 108 30 3 6720       | HCIDC ... 59 25 6 14,250   |                       |                      |                        |
|                                                                                                                                                                        | W6GWQ ... 74 26 4 4544     | W0OGC ... 97 29 3 5800     |                            |                       |                      |                        |
|                                                                                                                                                                        | W6OST ... 72 22 2 3168     | W0UXQ ... 67 29 3 4176     | Eire                       |                       |                      |                        |
|                                                                                                                                                                        | W6APMK 59 15 2 1770        |                            | E19J ..... 66 21 8 10,395  |                       |                      |                        |
|                                                                                                                                                                        | W6YC ... 58 12 2 1740      | Nebraska                   | England                    |                       |                      |                        |
|                                                                                                                                                                        | K6EIV ... 55 11 2 1210     | W0BBS ... 83 36 2 5976     | G3IGW ... 165 20 16 13,685 |                       |                      |                        |
|                                                                                                                                                                        | K6TSQ ... 41 12 2 984      | W0FQB ... 52 22 2 2288     | G5JU ... 124 21 11 12,210  |                       |                      |                        |
|                                                                                                                                                                        | W6BAFI . 33 14 2 924       |                            | G3GRL ... 118 18 11 8334   |                       |                      |                        |
|                                                                                                                                                                        | W6OJW ... 18 6 2 216       | North Dakota               | G3NHE ... 114 12 12 4212   |                       |                      |                        |
|                                                                                                                                                                        |                            | W0SDN .140 42 5 12,768     | G3NIS ... 147 10 10 3940   |                       |                      |                        |
|                                                                                                                                                                        | Arizona                    |                            | G2DC ... 121 9 9 3150      |                       |                      |                        |
|                                                                                                                                                                        | K7ZZW ... 76 28 2 4256     | Hawaii                     | G5TZ ... 71 11 10 2794     |                       |                      |                        |
|                                                                                                                                                                        | W7ENA ... 45 16 2 1440     | KH6EOF . 16 6 3 786        | G3RSR ... 114 8 8 2432     |                       |                      |                        |
|                                                                                                                                                                        |                            | KH6DVD . 3 2 2 18          | G8PG ... 58 9 9 1476       |                       |                      |                        |
|                                                                                                                                                                        | Montana                    |                            | G3HZL ... 73 7 7 1379      |                       |                      |                        |
|                                                                                                                                                                        | K7CTI ... 64 24 3 3264     | Alberta                    | G3PEO ... 67 7 7 1316      |                       |                      |                        |
|                                                                                                                                                                        | W7EGN ... 29 18 3 1188     | VE6IZ ... 15 8 2 240       | G3JKY ... 50 8 8 1040      |                       |                      |                        |
|                                                                                                                                                                        |                            |                            | G3MWZ ... 34 7 7 749       |                       |                      |                        |
|                                                                                                                                                                        | Nevada                     | British Columbia           | Finland                    |                       |                      |                        |
|                                                                                                                                                                        | K7ICW ... 74 24 3 3744     | VE7EH ... 85 26 5 5044     | OH3NY ... 10 4 4 200       |                       |                      |                        |
|                                                                                                                                                                        |                            | VE7AKI . 82 28 4 5040      |                            |                       |                      |                        |
|                                                                                                                                                                        | Oregon                     | VE7AFB . 43 14 2 1204      | Germany                    |                       |                      |                        |
|                                                                                                                                                                        | K7MLO ... 53 18 3 2088     |                            | DL1FF ... 154 24 12 20,880 |                       |                      |                        |
|                                                                                                                                                                        | K7HDB ... 38 10 2 760      | Newfoundland               | DL1YA ... 14 3 3 201       |                       |                      |                        |
|                                                                                                                                                                        | W7JRI ... 36 10 2 720      | VO1DX ... 26 15 4 1260     |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            | Honduras                   |                       |                      |                        |
|                                                                                                                                                                        | Utah                       | Nova Scotia                | HR3HH ... 49 22 3 10,010   |                       |                      |                        |
|                                                                                                                                                                        | K7OEP ... 47 17 2 1598     | VE1EK ... 41 16 2 1312     |                            |                       |                      |                        |
|                                                                                                                                                                        |                            | Ontario                    | Jamaica                    |                       |                      |                        |
|                                                                                                                                                                        | K7EKD ... 91 27 3 5346     | VE3BWY .148 34 4 10,608    | VP5XG ... 42 20 6 8000     |                       |                      |                        |
|                                                                                                                                                                        | W7RGL ... 34 15 2 1020     | VE3QU ... 58 29 4 3828     |                            |                       |                      |                        |
|                                                                                                                                                                        | W7ZVY/7 30 10 2 600        | VE3DU ... 60 27 3 3456     | Mexico                     |                       |                      |                        |
|                                                                                                                                                                        |                            |                            | XE2OK ... 34 17 2 5780     |                       |                      |                        |
|                                                                                                                                                                        | Michigan                   | Quebec                     | Netherlands                |                       |                      |                        |
|                                                                                                                                                                        | K8TYS ... 80 26 3 4368     | VE2UQ ... 179 38 8 16,644  | PA0LOU . 52 10 10 2241     |                       |                      |                        |
|                                                                                                                                                                        | W8CXS ... 27 13 2 702      |                            | PA0VB ... 30 8 8 1152      |                       |                      |                        |
|                                                                                                                                                                        | W8ROV ... 6 6 1 72         | Saskatchewan               |                            |                       |                      |                        |
|                                                                                                                                                                        |                            | VE5DT ... 10 7 2 140       | New Zealand                |                       |                      |                        |
|                                                                                                                                                                        | Ohio                       |                            | ZL3RB ... 4 2 2 32         |                       |                      |                        |
|                                                                                                                                                                        | W8HGW .225 53 12 29,680    | Bahama Islands             |                            |                       |                      |                        |
|                                                                                                                                                                        | W8FGX ... 202 49 12 24,500 | VP7NY ... 15 10 2 1450     | North Ireland              |                       |                      |                        |
|                                                                                                                                                                        | W8BAR ... 168 36 7 13,248  |                            | GI6TK ... 117 24 12 17,232 |                       |                      |                        |
|                                                                                                                                                                        | W8QWI ... 161 37 4 12,506  | Bermuda                    |                            |                       |                      |                        |
|                                                                                                                                                                        | W8CAG ... 114 32 2 7040    | W4WQQ/                     |                            |                       |                      |                        |
|                                                                                                                                                                        | W8LOF ... 101 31 4 6758    | VP9 ... 46 17 2 7820       | Portugal                   |                       |                      |                        |
|                                                                                                                                                                        | K81QG ... 65 20 2 2600     |                            | CT1CO ... 16 4 4 720       |                       |                      |                        |
|                                                                                                                                                                        | W8AQ ... 24 11 3 616       | Colombia                   |                            |                       |                      |                        |
|                                                                                                                                                                        | K8EKG ... 24 11 1 528      | HK7ZT ... 4 4 3 120        | Scotland                   |                       |                      |                        |
|                                                                                                                                                                        |                            |                            | GM3PBA 101 10 10 5040      |                       |                      |                        |
|                                                                                                                                                                        | West Virginia              | Christmas Island           |                            |                       |                      |                        |
|                                                                                                                                                                        | W8VVE ... 1 1 1 2          | VR30 ... 4 2 2 80          | Switzerland                |                       |                      |                        |
|                                                                                                                                                                        |                            |                            | HB1WJ ... 50 6 6 1464      |                       |                      |                        |
|                                                                                                                                                                        | Illinois                   | Czechoslovakia             | Wales                      |                       |                      |                        |
|                                                                                                                                                                        | W9PNE ... 164 45 11 18,720 | OK1ZC ... 117 12 12 5820   | GW3JI ... 135 22 15 16,104 |                       |                      |                        |
|                                                                                                                                                                        | K9MBR ... 193 39 4 15,678  | OK1AAI .108 11 11 4851     |                            |                       |                      |                        |
|                                                                                                                                                                        | W9YYG ... 141 38 4 11,324  | OK2KGV .78 9 9 2673        |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |
|                                                                                                                                                                        |                            |                            |                            |                       |                      |                        |

# Reviewing The Radio Classics

## Single Layer Coils

BY DAVID T. GEISER\*, WA2ANU

Number 8 of a Series

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

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

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

$f$  = frequency in c.p.s.

$L$  = inductance in henries.

$C$  = capacitance in farads.

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

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

such a combination can short out the harmonics and have little effect on the desired signal.

To get greatest benefit from a coil, then, it is necessary to design it for lowest losses. If the coil is wound on a cylindrical form (solenoid), the best ratio of length to diameter is approximately  $2\frac{1}{2}:1$ . Losses increase gradually as length is shortened—a 1:1 ratio is still pretty good. If the length of the coil is increased the probability of poor magnetic flux linkage will increase losses more than inductance, and a shorter rather than longer coil is often desirable.

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

Reactance of a coil is:

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

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

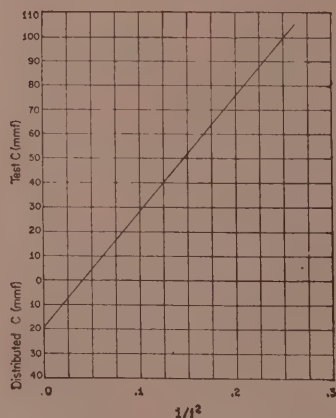


Fig. 1—Graphical solution of distributed capacitance. The coil in question resonates at 2 mc with 100 mmf and at 3.5 mc with 20 mmf. Plotting capacitance against  $1/f^2$ , a distributed capacitance of about 19 mmf is shown.

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

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

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

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

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

Generally, as all dimensions of a coil are in-

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

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

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

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

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

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

creased,  $Q$  increases in the coil for the desired inductance. For best  $Q$ , use the biggest wire diameter and maximum possible length and diameter of the coil.

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

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

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

$a$  = radius of the coil in inches.

$b$  = length of the coil in inches.

$N$  = number of coil turns.

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

### Tapped and Variable Coils

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

[Continued on page 94]

Announcing...

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

## AUGUST 24-25, 1963

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

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

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

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

### RULES

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

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

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

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

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

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

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

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

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

All contestants are expected to compute their own scores.  
[Continued on page 102]

### CQ V.H.F. CONTEST

Log For 50 Mc Band

Call K2ZZQ

(Use separate log for each band.)

Page 2 of 7 Pages

| DATE    | TIME | STATION | COUNTY & STATE       | SERIAL | NUMBER   | County |
|---------|------|---------|----------------------|--------|----------|--------|
|         |      |         |                      | Sent   | Received | Mult.  |
| 8/24/63 | 1301 | W4TTH   | Hesse, New Jersey    | 59001  | 59002    | 1      |
|         | 1305 | W4TTH   | Queens, New York     | 59002  | 59003    | 1      |
|         | 1308 | W4TTH   | Pasadena, New Jersey | 59003  | 59005    | 1      |
|         | 1313 | W4TTH   | Bergen, New Jersey   | 59004  | 59005    | 1      |
|         | 1315 | W4TTH   | Queens, New York     | 59005  | 59001    | 1      |
|         | 1316 | W4TTH   | Queens, New York     | 59006  | 59004    | 1      |
|         | 1319 | W4TTH   | Hesse, New Jersey    | 59007  | 59011    | 1      |
|         | 1323 | W4TTH   | Bergen, New Jersey   | 59008  | 59003    | 1      |
|         | 1330 | W4TTH/2 | Hesse, New Jersey    | 59009  | 59019    | 1      |
|         | 1333 | W4TTH   | Queens, New York     | 59010  | 59007    | 1      |
|         | 1337 | W4TTH   | Hesse, New Jersey    | 59011  | 59009    | 1      |
|         | 1339 | W4TTH/2 | Cape May, New Jersey | 59012  | 59017    | 1      |
|         | 1345 | W4TTH   | Harris, New Jersey   | 59013  | 59005    | 1      |
|         | 1347 | W4TTH   | Bergen, New Jersey   | 59014  |          |        |

|      |       |                         |       |       |   |
|------|-------|-------------------------|-------|-------|---|
| 1332 | W4TTH | Hesse, New Jersey       | 59017 | 59001 |   |
| 1333 | W4TTH | Union, New Jersey       | 59018 | 59011 |   |
| 1336 | W4TTH | Philadelphia, Penna.    | 59019 | 59011 | 1 |
| 1339 | W4TTH | Pasadena, New Jersey    | 59020 | 59019 | 1 |
| 1341 | W4TTH | Hockessin, Penna.       | 59021 | 59016 | 1 |
| 1345 | W4TTH | Hockessin, New York     | 59022 | 59019 | 1 |
| 1348 | W4TTH | Warren, New Jersey      | 59023 | 59016 | 1 |
| 1350 | W4TTH | Fairfield, Connecticut  | 59024 | 59001 | 1 |
| 1352 | W4TTH | Frederick, Rhode Island | 59025 | 59009 | 1 |

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

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

### CQ SUMMER V.H.F. CONTEST

Check if power multiplier (1.25) used. Station Call K2ZZQ

Band Operated 50 Mc State New Jersey

#### SCORING

Number of Contacts 238 x Number of Counties 11

x Number of Hours 24 x Power Multiplier 1.25

TOTAL SCORE: 282,360

Transmitter Description and Power: Homemade (800-0000, 25 watts input).

Receivers: National 161 with variable converter and preamplifier.

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

Other operating aids: VFO, checkbook, 24 hour clock, "No Dea."

Remarks (Suggestions, Criticisms, and Comments):

Sponsored-S operating from 0150 to 1345 Sunday, providing many new counties.

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

Name: BOB BROWN (USE BLOCK LETTERS) Call K2ZZQ

Street and Number: 67 Russell Avenue

City: Rahway County: Union State: New Jersey

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

CQ Form 1052, July, 1963

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

COMPILED BY BOB BROWN\*, K2ZSQ

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

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

For the uninitiated, perhaps a quick summing up of the aims of this contest are in store. The contest, run on the weekend of May 4-5, 1963, was of twenty-four hour duration. Competition categories were vastly different from anything run by *CQ* in the past. Basically, we presented three divisions: General, All-Band Multi-Operator, and Club Aggregate. Novice scores are also presented here, although their inclusion was not mentioned in the announcement. Under the General division, which encompasses most of the contest activity, were included multi-operator stations using only one band, and all single operator stations, regardless of band or bands used. In this manner multi- and single-operator stations in a given state could compete with one another on a fairly equal basis; whereas in the past, the two were in completely different competitions. The All-Band Multi-Operator division placed, for example, an

### HIGH SCORES

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

all-out club's mountaintopping efforts in competition with other groups operating both 6 and 2 meters, without effecting state totals for the single op's. For the first time in the history of *CQ*'s V.H.F. Contests, a Club Aggregate competition was offered, with top prize being an engraved trophy. And, as you can well see, quite a number of clubs took advantage of the offer. Rest assured that future Spring *CQ* V.H.F. Contests will feature club aggregate scores.

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

### All-Time Records Broken

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

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

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

\*Editor, *The VHF Amateur*.



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

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



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

This year was the first time that we've used a Novice competition in a contest, first in *The VHF Amateur* Twelve Hour Contest in March, and again in the Spring CQ affair. In both cases, WN2CUD took top honors, and deservedly so. And his status of third high in New Jersey was also no easy chore. But all good things must come to an end; next year will bring WB2CUD, eh?

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

#### Notes & Comments

WA2VLR—A fifteen minute delay at the start due to a blown fuse really started us off with a bang. Had to go out and *buy* them! Next year, we'll have a supply on hand before the contest... WA2WNO—Operating aids? V.f.o. which didn't work and 40' of pipe (antenna masting) which crashed to the ground... WA2YDN—Why don't you try to hold a contest when the skip isn't coming in; they were messing up my contacts... WA4JNL—Most enjoyable for all of us!... WA9ASZ—My first contest. It sure was fun hearing Colorado, Florida, Connecticut, etc., all calling 'CQ Contest'... K0GIC—Worked four VE4s within the contest period but couldn't get a QSO number from them... W0TRD—Very fine contest... W8KNC/7—Enjoyed contest. Was disappointed to get so many 001 contacts, though... WA4EEZ—This was my first contest and I did my best, but didn't make too many contacts at first. But then the band opened!... VP7CX—Will have to get more logsheets next time—had to stop at 200. QRM was very heavy down this way... K9DWR—Give YL, XYL, Novice, and Technician awards to stimulate more activity on the part of the glory seekers (like me)... WA9AVI—There should be more contests like this one...

WA9GLU—Went QRT at 0400 because of S9 noise level. It didn't stop all day... K0YJG—Congratulations on picking the day of the contest to coincide with a band opening... WA6ZLV—Great contest! Let's have another soon!... WA6PKO—My first contest—can

scarcely wait till the next... WA4GJU—This club, with membership of 22, had a total of 1 members present during the contest at our portable location... WA4FLU—Wonderful contest. Would like to have had it last until about 10 P.M. Sunday night with a 6 or 8 hour "recess (getting old)... K3KEL/3—Forgot about contest until it was almost half over. Is there an award for the lowest scoring station?... W3JMP/3—F.b. contest. Just wish I had more time to operate than I did... K3UCA—VP7CX was worked off the back of the beam, but even "head on" I couldn't snag WA2VLR... K7RI—One hour before the contest started the skip was coming in and three hours after it was over the skip came back in. *Nuts!* The contest was a lot of fun, though, and I had a chance to work

#### Club Scores

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

|                                      |         |        |
|--------------------------------------|---------|--------|
| Peninsula A.R. Klub (N.J.)           | WA2VLR  | 822,82 |
| Zephyr VHF Society, Inc. (N.J.)      | W2LST   | 704,55 |
| Mt. Airy VHF R.C., Inc. (Pa.)        | K3IPM   | 644,82 |
| Tri-State College A.R.C. (Ind.)      | W9BF    | 229,47 |
| Montachusett A.R.C. (Mass.)          | K1YLU/1 | 219,02 |
| VHF Repeaters, Inc. (Calif.)         | K6PXT/6 | 167,79 |
| Merrimac Valley A.R.C. (Mass.)       | W1EUI/2 | 149,76 |
| 6 Meter Club of Dallas               | W5EFH   | 135,88 |
| 6 & 2 Ham Club, Inc. (Ill.)          | K9DWR   | 135,78 |
| Manchester Memorial H.S.R.C. (N.H.)  |         |        |
|                                      | K1UGZ/1 | 104,47 |
| Six Meter Club of Chicago            | K9ZVW   | 97,14  |
| Cleveland A.R.C. (Tenn.)             | WA4GJU  | 77,98  |
| De Paul H.S.A.R.C. (N.J.)            | WA2WNO  | 73,80  |
| Marion VHF Hi-Banders, Inc. (O.)     | K8ZES   | 71,33  |
| Five Towns R.C. (N.Y.)               | WA2JUG  | 66,90  |
| Continental VHF DX Assoc.            | K2ZSQ/8 | 64,95  |
| Central Ohio VHF Society             | K8JZW/8 | 64,38  |
| Triangle R.C. (N.C.)                 | W4FDO/4 | 63,64  |
| Oxford Furnace VHF C. (Va.)          | WA4JNL  | 31,97  |
| Union County A.R.A. (N.J.)           | W2TND   | 27,54  |
| Greensboro R.C. (N.C.)               | W4BUZ   | 26,50  |
| Lake Washington A.R.C., Inc. (Wash.) |         |        |
|                                      | K7RIE   | 17,37  |
| Elmira A.R.A. (N.Y.)                 | W2ZJ    | 11,23  |
| West Allis R.A.C. (Wisc.)            | W9FLP   | 25,55  |
| South County A.R.S., Inc. (Calif.)   | WA6ZLV  | 13,85  |
| West Creek A.R.C. (N.Y.)             | K2CVD   | 6,66   |
| Connecticut Mobileers                | K1CRQ/8 | 3,20   |
| Dayton A.R.A. (O.)                   | W8DSN   |        |

ew stations . . . **WA6LYF**—Awards should be offered to the counties and not each individual state because competition with Southern California is quite difficult, if not impossible . . . **VA6QQI/6**—County idea appears to be the equalizer between the East and West coasts, as this political unit is rather uniform in extent . . . **WB6CKT**—My most enviable ability to stay

awake comes from preparing for finals . . . **K7OCG**—There just isn't any interest here in Arizona in a contest. They're all waiting for XD . . . **WA20OL**—Very enjoyable contest. Am looking forward to next year's . . . **WB2CWG**—Conditions were poor in the contest, but had a lot of fun . . . **K7IFE**—Not too much activity. Channel 2 has too many bluffed in this area! ■

## General Competition

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

**Alabama**  
K4BEI/4 . . . 77 33 17 6

**Alaska**  
KL7EMG . . . 5 1 4 2

**Arizona**  
K7OCG . . . 25 1 8 6

**California**  
W6YX . . . 94 26 24 6,2  
W6BB . . . 98 9 23 2  
WA6QQI/6 . . . 93 21 8 2  
K6SDZ/6 . . . 65 14 18 2  
W6SAW . . . 76 10 11 2  
WA6LYF . . . 62 7 17 2  
K6DPQ . . . 39 9 16 6  
WA6PKO . . . 35 8 13 6  
W6YKS . . . 31 6 12 6  
WA6UAM . . . 25 4 16 2  
WN6DAQ . . . 17 6 12 2  
WA6ZLV . . . 19 4 8 2  
WB6BIG . . . 16 4 7 2

**Colorado**  
W0HMT/0 . . . 71 30 19 6  
K0YJG . . . 70 36 16 6

**Connecticut**  
K1TLA . . . 53 19 19 6,2  
K1YEI . . . 32 9 11 2  
K1RTS . . . 9 18 8 2  
KN1ZLC . . . 20 3 9 2

**Florida**  
WA4EEZ . . . 64 19 18 6

**Georgia**  
K4YZE . . . 12 3 14 2

**Idaho**  
K7UGD . . . 14 8 6 6,2

**Illinois**  
K9DWR . . . 93 26 24 6,2,1/4  
K9ZWV . . . 82 19 24 6,2,1/4  
K9ZWW . . . 84 18 20 6,2,1/4  
WA9AVI . . . 88 20 17 6,2  
K9LAL/9 . . . 77 13 21 6  
WA9FGW/9 . . . 74 11 24 2  
K9CNN . . . 60 18 20 6  
K9AJY . . . 60 12 18 6,2  
W9CEK . . . 62 10 16 6,2  
WA9EJD . . . 52 11 13 6  
WA9FIH . . . 37 5 16 6  
K9ZPY . . . 36 11 14 6  
WA9GLU . . . 35 10 11 6  
K9RQU . . . 51 8 9 6  
WA9FXX . . . 46 9 9 6  
WA9CVX . . . 37 8 13 6  
W9CMD . . . 31 4 11 6  
K9VSW . . . 27 8 4 6  
K9ABH . . . 21 6 6 6  
K9IOG . . . 18 7 4 6  
K9DTB . . . 17 4 7 6  
K9BBN . . . 17 3 9 2

WA9AEN . . . 9 5 6 6,2  
K9KAE . . . 14 2 6 6  
K9SZZ . . . 13 5 2 6,2  
K9ZNE . . . 12 2 5 6  
K9ZNF . . . 13 2 5 6  
W9JNO/9 . . . 11 2 4 6  
K9YHH . . . 9 3 3 6  
W9RHZ . . . 10 3 2 6

**Indiana**  
K9OYD/9 . . . 95 24 24 6,2  
WA9ASZ . . . 67 14 16 6

**Kentucky**  
WA4CQG . . . 50 14 22 6

**Kansas**  
K0GIC . . . 26 20 33 6

**Michigan**  
WA8DOR . . . 91 12 21 6  
W8VRH . . . 61 19 18 2  
K8NGR . . . 42 10 16 2  
W8ZGW . . . 26 11 16 2

**Minnesota**  
W0TRD . . . 98 38 24 6

**Montana**  
W8KNC/7 . . . 38 33 8 6

**Nebraska**  
W0YOY/0 . . . 25 7 14 6,2  
WA0DJK . . . 20 4 10 6

**New Hampshire**  
K1UGZ/1 . . . 131 29 22 6

**New Jersey**  
W2LST . . . 305 77 24 6  
W1EUJ/2 . . . 160 39 24 6,2  
WN2CUD . . . 91 18 19 2  
W2TND . . . 72 17 18 2  
WB2CWG . . . 66 14 15 2  
K2ZSP . . . 40 18 8 6  
WB2BUR . . . 20 6 9 2  
WA2ZOW . . . 21 6 8 2  
WA2CMG . . . 18 13 4 2

**New York**  
K2CBA . . . 158 64 24 6,2  
WA2FXV/2 . . . 141 68 24 6  
WB2DFI . . . 133 46 24 6,2  
WA2IMG/2 . . . 142 40 24 6  
WA2SPL . . . 141 45 24 6  
WA2HFL . . . 94 34 24 6  
WA2PVG . . . 162 27 13 2  
WA2JUG . . . 35 12 5 2  
WA2YDN . . . 80 19 20 6  
WB2FCU . . . 60 18 19 2  
WA2TGC . . . 38 29 16 6  
WB2DUW/2 . . . 41 14 20 2  
W2BHS . . . 48 17 15 2  
W2RPZ . . . 43 14 16 2  
WA2SUG . . . 49 15 16 6  
W2ZJ . . . 52 18 12 6  
WA2NZA/2 . . . 41 12 13 6  
WA2OOL . . . 32 14 10 2  
K2CVD . . . 11 8 6 6

**North Carolina**  
K4OIF . . . 58 19 24 6,2  
K4MHS . . . 59 15 23 2  
WA4FLU . . . 49 14 20 6,2  
K4YYJ . . . 48 13 13 2  
W4BUZ . . . 46 9 13 2  
K4GPL . . . 49 9 15 2  
WN4MFG . . . 44 6 18 2  
WA4AJI . . . 35 10 12 6,2  
WN4MST . . . 35 7 15 2  
W4ACY . . . 34 8 10 2  
W4ACCK . . . 29 7 8 2  
WA4CUD . . . 32 4 10 2

338 W8HBI/8 . . . 332 94 24 6  
238 WA8AHU . . . 128 32 19 6  
163 K8ZES . . . 79 43 21 6,2  
150 K8JZW/8 . . . 74 29 24 6  
130 W8KKF . . . 73 22 24 6,2  
88 K8PXX . . . 38 14 14 6  
81 W8EWT . . . 51 12 7 6  
75 K8RQD . . . 11 7 5 2  
K1CRX/8 . . . 23 14 10 2  
WA8DSN . . . 1 1 1 6

**Oregon**  
K7IFE . . . 19 8 13 6

**Pennsylvania**  
K3IPM . . . 244 90 24 6,2  
K3LOM . . . 151 39 20 6  
W3ETB . . . 90 46 18 6,2  
K3UCA . . . 85 13 19 6  
W3JMP/3 . . . 69 21 10 6  
KN3WQC . . . 49 12 16 2  
K3RVS . . . 27 9 15 2  
K3KEL . . . 4 3 3 6

**South Dakota**  
K0LER . . . 12 7 6 6

**Tennessee**  
WA4GIU . . . 97 35 23 6  
W4IMX . . . 85 29 16 6  
WA4FOE . . . 69 27 20 6

**Texas**  
W5EEH . . . 115 21 24 6  
K5CMC . . . 92 28 20 6  
K5IVB . . . 66 16 20 6

**Virginia**  
WA4JNL . . . 49 29 18 6  
WA4JMO . . . 13 8 8 6

**West Virginia**  
K2ZSQ/8 . . . 55 42 20 6  
K8OHD . . . 42 24 22 6

**Washington**  
K7OQP/7 . . . 75 16 17 6  
K7RIE . . . 65 7 20 6  
W7ANI . . . 50 6 16 6  
K7JZP . . . 20 7 12 6,2

**Wisconsin**  
W9FLP . . . 34 5 12 6

**England**  
G2DHV/P . . . 54 14 8 2

**French West Indies**  
VP7CX . . . 197 94 13 6

## Novice Results

WN2CUD . . . 91 12 19  
KN3WQC . . . 49 12 16  
WN4MFG . . . 44 6 18  
WN4MST . . . 35 7 15  
WN6DAQ . . . 17 6 12  
KN1ZLC . . . 20 3 9

## All Band, Multi-Operator

(All Six & Two Meters)

WA2VLR . . . 408 84 24  
W9BF . . . 136 59 24  
K1YLU . . . 169 54 24  
K6PXT/6 . . . 231 29 24  
W6NLO/6 . . . 256 15 24  
K1PLR . . . 131 29 24  
WA2WNO/2 . . . 82 30 24  
W4FDO/4 . . . 78 34 24  
W1ALE . . . 70 23 17  
WA4CLF/8 . . . 52 16 24

\*Staff, ineligible for award.

# The Tattooed Ranger

BY DAVID C. YEOMAN\*, WØQWY

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

**P**RESENTED here is a method of adapting the popular Viking Ranger transmitter for use with the "Tattoo II", which was featured in a previous issue of *CQ*<sup>1</sup>.

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

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

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

P.T.T.

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

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

### Modification

Now we are all even and can proceed together. In order not to mar the panel and still provide front panel control, the FUNCTION SWITCH,  $S_1$ ,

is mounted on a bracket behind the dummy knob covering the crystal socket. The bracket, pictured in fig. 1, is made of .040 aluminum scrap

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

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

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

<sup>2</sup>The nomenclature used here will be the same as that used in the instruction book.

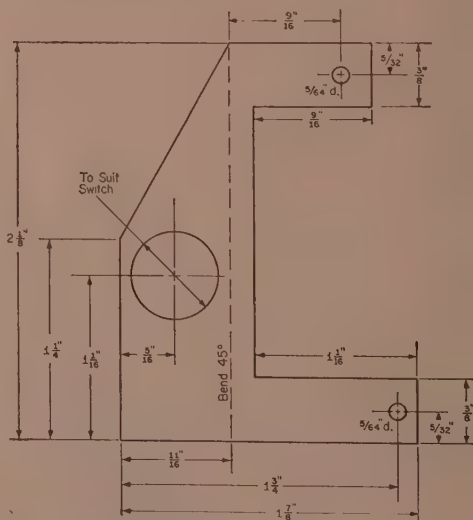


Fig. 1—Mounting bracket for the three position toggle switch to be mounted on the crystal socket of the Ranger. The left-hand section should be bent up.

\*R.R.1, Toddville, Iowa

<sup>1</sup>Gunn, R.C. "Tattoo II, Automatic Station Control", *CQ*, September 1961, p. 50.

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

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

The final leg follows. Remove the two black leads from clip 8 of  $SW_{4A}$ . Solder them to a  $1\frac{1}{2}$  inch length of wire and slip spaghetti over the joint. Now connect the other end of the  $1\frac{1}{2}$  inch wire to the bottom end of  $S_{1B}$ , the d.p.d.t. switch, along with an 8 inch wire.

Connect two wires to terminal 8,  $SW_{4A}$ . One about  $2\frac{1}{2}$  inches long, and the other about 4 inches. Drop the shorter wire below the chassis and connect to the common terminal of  $S_{1B}$ . The 4 inch wire and the loose 8 inch wire are now connected across the other set of normally open relay contacts.

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

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

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

## Operation

As for operation, if all is well, the following conditions should exist. With the switch toggle up, normal operation from the panel OPERATE switch should be obtained with no remote switching in either phone or c.w. With the switch in the middle "off" position, remote switching will operate in both phone and c.w. positions of the

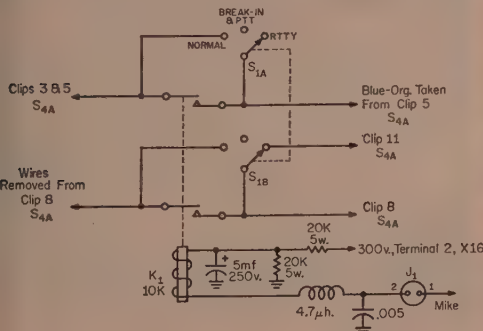


Fig. 2—Revised circuit showing the p.t.t. modification and the added three position toggle switch for the Ranger.

panel OPERATE switch. Flip the toggle down, and in the c.w. position of the OPERATE switch, an unmodulated carrier will be produced when the remote switching lead is grounded. Phone p.t.t. is still operative in this position.

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

## Connecting Tattoo II

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

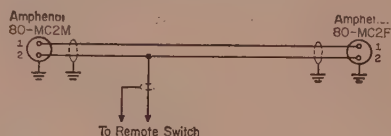
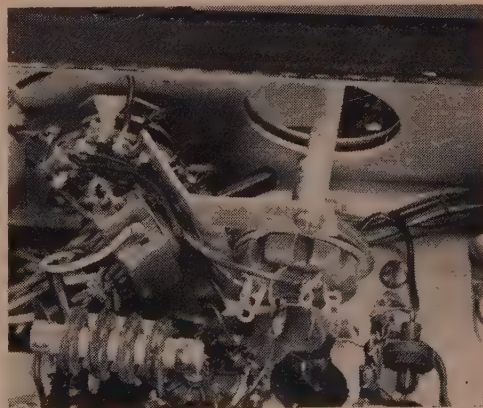


Fig. 3—Simple adaptor for connecting the Tattoo II to the Ranger through the mike connector.

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

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

[Continued on page 88]



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

# A Quarter Wave 80 Meter Marconi

BY E. H. MARRINER\*, W6BLZ

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

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

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

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

Reviewing the literature I found many construction hints on making a half wave antenna but none showing the quarter wave type. We decided to give it a try anyway and proceeded to hook 40 feet of wire from my chimney over to the mast and drop it down 20 feet to a tuner box. The tuner box had a 200 mmf variable capacitor in series with this wire and a tapped coil. A 15 feet of length of RG-8/U coax feed was buried in the ground at a depth of three inches running from the shack out of the mast. For a match to the antenna, the coax was tapped up from the ground end of the coil to the proper impedance point.

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

## Tuner Construction

A plywood box 12 x 12 x 10 inches high mounted at the base of the mast and painted  
[Continued on page 88]

\*528 Colima Street, La Jolla, California

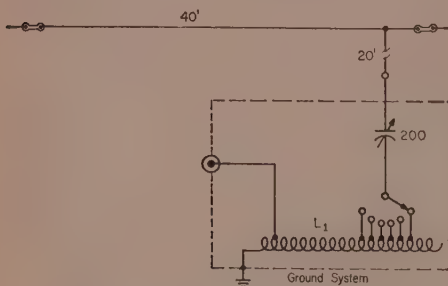
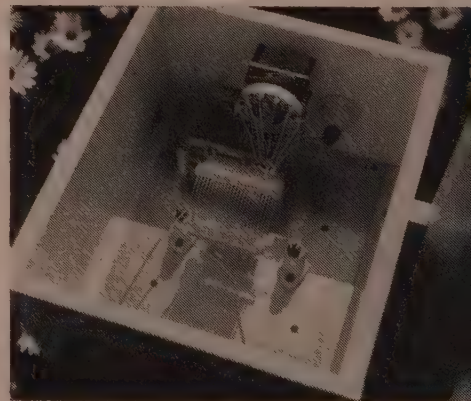


Fig. 1—Dimensions for the 80 meter quarter wave Marconi and the details for the tuning unit. The ground system is discussed in the text. The coil is 24 turns of Air Dux #2408 and the capacitor is a 200 mmf unit salvaged from a BC-375E tuning unit.



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

# Professor Samuel Finley Breese Morse

## An Appreciation \*

BY DAN McCOY†, W8DG

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

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

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

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

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

Through his father's help, he went to Charleston, South Carolina, a budding social and cultural center, and was introduced into the right circles. He rapidly gained fame there as a portrait painter and received commissions from most of the leading families. One of his portraits,

a picture of James Monroe, then President of the United States, hangs today in the Charleston City Hall.

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

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

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

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

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

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

†7546 Normandy Lane, Dayton 59, Ohio.

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

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

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

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

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

Morse then decided to string the wires on poles. Cornell invented an insulator for the wires

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

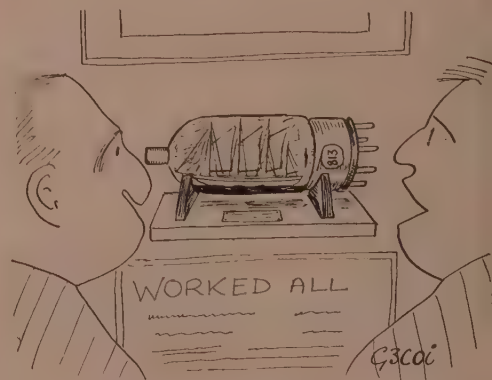
On May 24, 1844, by 8 A.M., an important crowd had assembled in the small Supreme Court chamber of the Capitol. A few minutes later, Miss Annie G. Ellsworth, daughter of the Commissioner of Patents and a friend of Morse arrived. She and her mother had been designated to select an appropriate text from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

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

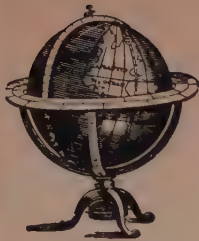
Three days later news from the Democratic Convention, then in session in Baltimore, was received by telegraph in Washington causing great excitement. Martin Van Buren seemed the likely winner of the Presidential nomination, but James Polk won. Hours after the news had been received by telegraph, it was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

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

[Continued on page 88]



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



# DX DX DX DX DX

URBAN LE JEUNE, JR., W2DEC

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

## CW WAZ

|      |        |                                  |
|------|--------|----------------------------------|
| 1803 | HA5KBP | Central Radioklub of<br>Budapest |
| 1804 | OH2BZ  | Markku Aalto                     |
| 1805 | OK1FV  | Vomocil Vaclav                   |
| 1806 | VK3AHQ | Henry Denver                     |
| 1807 | DJ2HI  | Jo Thiele                        |
| 1808 | DL3ZI  | Manfred Staar                    |
| 1809 | UA3FT  | Ivan Kazansky                    |
| 1810 | OH2A   | Suomen Radioamatooriilitto<br>RY |
| 1811 | DL1XS  | Ludwig Luther                    |
| 1812 | K8PUU  | Paul R. Nelson                   |
| 1813 | K6TQR  | W. J. Thompson                   |
| 1814 | SV0WZ  | Sergeant R. Horn                 |

## ALL-PHONE WAZ

|     |       |                     |
|-----|-------|---------------------|
| 199 | HK3LX | Edmundo Quinones P. |
|-----|-------|---------------------|

## TWO-WAY SSB WAZ

|     |       |                |
|-----|-------|----------------|
| 168 | K8NZD | H. C. Anderson |
|-----|-------|----------------|

## CW WPX

|     |       |                     |
|-----|-------|---------------------|
| 442 | UA9DT | Vadim V. Kozlov     |
| 443 | HA5BI | Istvan Biro         |
| 444 | W7DIS | Allen N. Davis      |
| 445 | DJ2SR | Ernst A. W. Munter  |
| 446 | PY4AP | Hipacid Gomes Marra |
| 447 | OH9PF | Teuvo Hulkko        |

|     |        |                      |
|-----|--------|----------------------|
| 448 | UA4PA  | Oleg A. Safullin     |
| 449 | K0IKL  | Mrs. Joyce L. Polley |
| 450 | G13JEX | David Butler         |
| 451 | WA2KSD | Brian Alsop          |

## PHONE WPX

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

## SSB WPX

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

## WPX ENDORSEMENTS

|        | Mdce  | Continent | Band |
|--------|-------|-----------|------|
| K1KPS  | CW    | E         |      |
| W7ABO  | CW    |           |      |
| W9GFF  | CW    | F         | 20   |
| DJ5VQ  | CW    | E         |      |
|        | Mixed | E         |      |
| DL9OH  | Phone | F         |      |
| F8HA   | Phone |           | 20   |
| KP4AOO | Mixed |           | 20   |
| OK3EA  | CW    |           | 80   |
| UA3FT  | CW    | E         |      |

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

## Here and There

**EA0 Spanish Guinea:** EA0AB seems to be quite active on 14032 kc c.w., 2000 GMT preferred. (Tnx VERON)

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

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

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

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

## 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    | L83KP | 450    | W4DKP | 410       | CT1PK | 600    | W5ERY  | 358        | K4PUS | 305       | W8JIN | 605    |       |     |
|          | W5LGG | 502    | W8JIN | 449    | W1CKU | 408       | W8WT  | 576    | W8JIN  | 356        | DJ3CP | 304       | W3OCU | 588    |       |     |
| W2HMJ    | 685   | W6YY   | 502   | W9U2S  | 447   | K41EX     | 408   | G3DO   | 576    | PY2CK      | 354   | K11XG     | 303   | K9EAB  | 578   |     |
| W8KPL    | 632   | DL7CS  | 502   | W8RQ   | 445   | K4JVE     | 407   | W9YSQ  | 471    | 5A5TO      | 353   | WA2SFP    | 300   | W6YY   | 570   |     |
| W5KC     | 629   | K2CPR  | 501   | W3APY  | 443   | W5AFX     | 407   | CT1HF  | 466    | W1ORV      | 351   | K2TDI     | 300   | W4BYU  | 557   |     |
| W2AIW    | 617   | W9SFR  | 501   | OE1FF  | 442   | W7HDL     | 405   | W9U2C  | 462    | LA5HE      | 351   | W3VSU     | 300   | W3AYD  | 552   |     |
| W2EQS    | 605   | W2EMW  | 500   | W3BQA  | 437   | W4YWX     | 404   | MP4BBW | 454    | W6USG      | 350   | W4NJV     | 300   | YU1AG  | 551   |     |
| W6KG     | 574   | W2FXA  | 500   | LA5HE  | 437   | G130QR    | 404   | PA8HBO | 453    | ZS6IW      | 350   | W4RLS     | 300   | H99EU  | 551   |     |
| W4OPM    | 571   | K2ZKU  | 500   | ON4FU  | 433   | KP4AOO    | 404   | W6YY   | 448    |            |       | K6RDP     | 300   | W2GT   | 528   |     |
| W9U0U    | 566   | K9EAB  | 497   | VE3ES  | 433   | ZS4MG     | 404   | G8KS   | 430    | S.S.B. WPX |       |           |       |        |       |     |
| K6CQM    | 565   | W2MUM  | 495   | W8U8R  | 429   | K2ZRO     | 403   | VK6RU  | 421    | MP4BBW     | 462   | WA2EQ     | 275   | W5LGG  | 509   |     |
| W5OLG    | 564   | W1WLW  | 494   | W8AUB  | 429   | W9DYG     | 403   | W3AYD  | 420    | W4OPM      | 451   | VE3ES     | 274   | K2ZKU  | 509   |     |
| DL1QT    | 552   | OK3DG  | 488   | W2RA   | 428   | W91HN     | 403   | F8PI   | 418    |            |       |           |       | W9WDQ  | 505   |     |
| W2UNT    | 550   | SM5CCE | 488   | K5LIA  | 428   | VE6VK     | 403   | PZ1AX  | 413    | G3AWZ      | 428   | K2JVF     | 266   | W48QY  | 505   |     |
| W11JB    | 546   | W4BYU  | 487   | OK1MB  | 428   | K4TEA     | 402   | K9EAB  | 412    | H89TL      | 423   | K2MGE     | 263   | W3KDP  | 501   |     |
| K2UKQ    | 546   | W8PQU  | 481   | W3CGS  | 426   | G8PL      | 402   | K2CJN  | 409    | W3NKM      | 402   | W3AYD     | 262   | W8UMR  | 500   |     |
| W9YSX    | 544   | W4HYW  | 478   | W1EIO  | 425   | WA2CBB    | 401   | DL3JT  | 404    | G3DO       | 402   | W4EEU     | 262   |        |       |     |
| W9GFF    | 538   | W3OCU  | 466   | KL7MF  | 424   | K9BVR     | 401   | W1UOP  | 402    | K9EAB      | 401   | VE3BKL    | 259   | LA5HE  | 500   |     |
| SM7MS    | 534   | K6SXA  | 464   | SM5WI  | 424   | W0VBQ     | 401   | G3NUG  | 400    | G8KS       | 400   | XE1CV     | 256   | DL3RK  | 493   |     |
| ON4QX    | 533   | W2KIR  | 463   | W0PGI  | 420   | IT1TAI    | 401   | VE3BQP | 386    | W3MAC      | 381   | G3FKM     | 255   | JA2JW  | 480   |     |
| W1EQ     | 528   | DJ2KS  | 462   | H89TL  | 419   | VE3JZ     | 401   | OE1FF  | 382    | G3NUG      | 356   | UR2AR     | 255   | W6MCX  | 476   |     |
| W2HO     | 526   | PY4OD  | 462   | G3HIW  | 418   | OE3WB     | 400   | SP7HX  | 381    | T12HP      | 356   | K5OGP     | 254   | W3CGS  | 475   |     |
| K9AGB    | 515   | JA2JW  | 461   | W81BX  | 416   | SP4JF     | 400   | TG9AD  | 381    | PZ1AX      | 345   | W6USG     | 252   | W9FVU  | 474   |     |
| KP4CC    | 515   | W9WCE  | 458   | W6MCX  | 416   | SP6FZ     | 400   | DL6VM  | 376    | VE3BQP     | 334   | TG9AD     | 252   | G3FKM  | 463   |     |
| IT1AGA   | 515   | W3BCY  | 457   | K2PFC  | 415   | VE1AE     | 400   | DJ3CP  | 375    | W2HXG      | 324   |           |       | DL1YA  | 456   |     |
| G2GM     | 513   | OK3EA  | 456   | VK3XB  | 415   | VE4OX     | 400   | PA8SNG | 369    | W2VCZ      | 320   | Mixed WPX |       |        | W8VBQ | 452 |
| W6WO     | 511   | UC2AR  | 456   | W5AWT  | 412   | VK3KB     | 400   | G3FKM  | 366    | W6YMV      | 320   |           |       | PA8LOU | 450   |     |
| W2GT     | 510   | DL3RK  | 454   | W5DA   | 412   |           |       | W8UMR  | 363    | W1UOP      | 318   | W4OPM     | 629   | G16TK  | 450   |     |
| W8LY     | 506   | PA8LOU | 451   | K5LZO  | 411   | Phone WPX |       |        | SM3AZI | 362        | W2YBO | 318       | W9YSX | 622    | HK3LX | 450 |
| W9DWQ    | 506   | W3PGB  | 450   | WA2DIG | 411   |           |       | SM3EP  | 361    | W8PQQ      | 315   | G3DO      | 617   |        |       |     |
| G3EYN    | 503   | DL1YA  | 450   | W2PTD  | 411   | W9WHM     | 600   | W1DGJ  | 358    | W1ORV      | 307   | W8WT      | 607   |        |       |     |

## Phone WPX

W9WHM .600

## S.S.B. WPX

|        |     |        |     |       |     |
|--------|-----|--------|-----|-------|-----|
| MP4BBW | 462 | WA2EQQ | 275 | W5LGG | 509 |
| VE3ES  | 274 | K2ZKU  | 509 |       |     |
| K2JVF  | 266 | W9WDQ  | 505 |       |     |
| K2MGE  | 263 | W48QY  | 505 |       |     |
| W3AYD  | 262 | W3KDP  | 501 |       |     |
| W4EEU  | 262 | W8UMR  | 500 |       |     |
| VE3BKL | 259 | LA5HE  | 500 |       |     |
| XE1CV  | 256 | DL3RK  | 493 |       |     |
| G3FKM  | 255 | JA2JW  | 480 |       |     |
| UR2AR  | 255 | W6MCX  | 476 |       |     |
| K5OGP  | 254 | W3CGS  | 475 |       |     |
| W6USG  | 252 | W9FVU  | 474 |       |     |
| TG9AD  | 252 | G3FKM  | 463 |       |     |
|        |     | DL1YA  | 456 |       |     |
|        |     | W8VBQ  | 452 |       |     |
|        |     | PA8LOU | 450 |       |     |
|        |     | G16TK  | 452 |       |     |
|        |     | K83LX  | 450 |       |     |

## Mixed WPX

|       |     |  |  |
|-------|-----|--|--|
| W4OPM | 629 |  |  |
| W9YSX | 622 |  |  |
| G3DO  | 617 |  |  |
| W8WT  | 607 |  |  |

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

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

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

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

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

"The four of us met Mr. M. W. Goding, the High Commissioner of TT and also Mr. José Benitez, the Deputy High Commissioner. They most certainly do not impress me as being "Buckpassers." We received every consideration and courtesy they could bestow upon us. Mr. Benitez even paid us a visit during our operations and it wouldn't surprise me if someday you work a KG6S? station and the ops. handle will be "José." Mr. John Welch handles licensing for TT. We had problems arise which were cordially and swiftly

resolved usually in our favor. Never once did anyone get unpleasant with us.

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

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

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



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



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

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

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

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

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

**KG6 Marcus:** KH6PD/KG6 and JA1FEB/KG6 are being helped by a new arrival K1NPN/KG6. (Tnx NCDXC)

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

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

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

**VK4 Willis Island:** Beginning June 13th, 1963 a change of personnel takes place on Willis Island. The new operator will have the call VK4JQ. He is John Copley ex-G3DYD/VR3N/JZ0PC/VK2AVU. He has Swan transceiver 14 mc only. For c.w. he has the following crystals 3506, 3410, 3520, 7025, and 7050. For s.s.b. the following crystals 7055, 7060, 7065. He hopes to be as active as conditions permit but will be limited by fuel, commercial skeds, weather and radiosonde work. Willis has one ship per year and is a completely isolated cyclone warning station 300 yards long and 100 yards wide. He will be there for one year. (Tnx VK2AGH)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### Norwegian Prefixes

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

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

#### W2CTN

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

#### LI DXA

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

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

#### Islas De Misteriosa

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

#### AWARDS

##### The WAGC Award

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

##### The 8 × 8 × 8 Award

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



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



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

KP4RK, Box 10525, Caparra Heights, P. R.

#### The Malayan Amateur Radio Transmitters Society DX Award

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

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

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

Ten in VS1; Ten in VS2/9M2; Two in VS4/V55 (One Area); One in ZC5.

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

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

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

[Continued on page 91]



# CONTEST

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

# CALENDAR

FRANK ANZALONE\*, WIWY

## CALENDAR OF EVENTS

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

\*Not yet officially announced.

### Illinois Party

Starts: 1600 GMT Saturday, August 3.

Ends: 2200 GMT Sunday, August 4.

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

### Chattanooga Party

Starts: 0001 GMT Sunday, August 4.

Ends: 2359 GMT Saturday, August 10.

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

### QRP QSO Party

Starts: 1800 GMT Saturday, August 17.

Ends: 2400 GMT Sunday, August 18.

This is the first annual QRP QSO party sponsored by the QRP Amateur Radio Club. Details

were rather skimpy but the object of the party seems to be for members to contact as many members and non-members as possible during the contest period. A station can be worked once on each band and mode, each contact counting one point.

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

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

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

### New Jersey Party

Starts: 2300 GMT Saturday, August 24.

Ends: 0400 GMT Monday, August 26.

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

### DARC WAE

#### C. W.

Starts: 0000 GMT Saturday, August 10.

Ends: 2400 GMT Sunday, August 11.

#### Phone

Starts: 0000 GMT Saturday, August 17.

Ends: 2400 GMT Sunday, August 18.

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

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

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

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

### Summer CQ V.H.F. Contest

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

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

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

\*14 Sherwood Road, Stamford, Conn.

**JARL DX**

Starts: 1000 GMT Saturday, August 24.

Ends: 1600 GMT Sunday, August 25.

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

**Classification:**

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

**Serial Numbers:**

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

**Points and Multiplier:**

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

**Scoring:**

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

**Awards:**

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

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

**S A C****C. W.**

Starts: 1500 GMT Saturday, September 14

Ends: 1800 GMT Sunday, September 15.

**Phone**

Starts: 1500 GMT Saturday, September 21.

Ends: 1800 GMT Sunday, September 22.

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

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

[Continued on page 90]

**1962 JARL CONTEST RESULTS**

| North America |     |      |  | W6AFI 14 1482 |  |  |  |
|---------------|-----|------|--|---------------|--|--|--|
| Alaska        |     |      |  | W0LIL " 396   |  |  |  |
| KL7DND        | M   | 372  |  | W6AYU " 366   |  |  |  |
| KL7DUZ        | 7   | 11   |  | W2WZ " 252    |  |  |  |
| Canada        |     |      |  | K1RTB " 110   |  |  |  |
| VE6TP         | 14  | 748  |  | W1GYE " 100   |  |  |  |
| VE2NV         | 7   | 72   |  | W6QAU " 75    |  |  |  |
| VE2AFC        | 21  | 9    |  | K7JCA " 39    |  |  |  |
| United States |     |      |  | Mexico        |  |  |  |
| WA6IVM        | M   | 1242 |  | XE1PJ 14 4    |  |  |  |
| K6IEC         | "   | 1017 |  | South America |  |  |  |
| K6SDR         | "   | 798  |  | Argentina     |  |  |  |
| W6WAW         | "   | 45   |  | LU8FBH 14 42  |  |  |  |
| K5UYF         | "   | 40   |  | Brazil        |  |  |  |
| W6ETR         | "   | 18   |  | PY4ABH M 28   |  |  |  |
| W7IEU         | "   | 16   |  | PY5OF 7 19    |  |  |  |
| W7ZVY         | 3.5 | 4    |  | PY5FO 14 12   |  |  |  |
| WA6SLU        | 7   | 38   |  |               |  |  |  |
| W8JIN         | "   | 26   |  |               |  |  |  |
| W7POU         | "   | 24   |  |               |  |  |  |
| W7DJU         | "   | 16   |  |               |  |  |  |

**RESULTS WAE 1962 CONTEST****C.W. RESULTS****Continental Winners**

|               |         |               |        |
|---------------|---------|---------------|--------|
| UA9DN         | 101,700 | HC1DC         | 21,114 |
| DJ3KR         | 80,520  | ZS6IW         | 16,720 |
| WA2WBH        | 55,388  | KH6DVG        | 102    |
| North America |         |               |        |
| United States |         |               |        |
| K1MEM         | 1691    | W9WCE         | 1650   |
| W1RWU         | 234     | W9WIO         | 60     |
| K1QFC         | 20,046  | W9GMS         | 1      |
| WA2WBH        | 55,388  | K0BPO         | 3784   |
| W2WZ          | 24,440  | Panama        |        |
| W2KVL         | 2916    | HP1AC         | 72     |
| W2QDY         | 867     | Bermuda       |        |
| W2EMW         | 840     | W5JDX/VP9     | 2376   |
| W2FXA         | 450     | Canada        |        |
| WA2WSB        | 189     | VE1ZZ         | 4788   |
| WA2VBW        | 4       | VE1AE         | 3060   |
| W3AFM         | 11,968  | VE1EK         | 1792   |
| W3WJD         | 9471    | VE4ZX         | 40     |
| W3BYX         | 6550    | VE7BFJ        | 4      |
| K3JIG         | 5518    | South America |        |
| W3KTU         | 4163    | Bolivia       |        |
| W3OCU         | 3801    | CP5EZ         | 2440   |
| W3QLW         | 1752    | Ecuador       |        |
| W3RNY         | 1710    | HC1DC         | 21,114 |
| K3MNT/3       | 102     | Columbia      |        |
| W3FSP         | 91      | HK3TH         | 280    |
| K4BAI         | 11,235  | HK7ZT         | 70     |
| K4LDR         | 1744    | HK7YC         | 40     |
| W4KFC         | 1264    | Brazil        |        |
| W4KXV         | 765     | PY1ADA        | 896    |
| W5WZQ         | 3968    | PY2BNX        | 494    |
| W5KC          | 896     | PY5OF         | 330    |
| W5LGG         | 800     | PY7MP         | 1206   |
| WA6SRO        | 1782    |               |        |
| WA6QUA        | 230     |               |        |
| W7POE         | 1003    |               |        |
| W9KXK         | 2662    |               |        |

**PHONE RESULTS****Continental Winners**

|               |        |               |       |
|---------------|--------|---------------|-------|
| DJ3KR         | 22,860 | OX3AI         | 2,730 |
| 9G1YL         | 12,446 | PY7MP         | 1,647 |
| EP3RO         | 5,379  |               |       |
| North America |        | Puerto Rico   |       |
| United States |        | KP4AVQ        | 16    |
| K10SY         | 1275   | Greenland     |       |
| W2WZ          | 1470   | OX3AI         | 2730  |
| W2QKJ         | 363    | Canada        |       |
| W2KVL         | 24     | VE8BC         | 520   |
| W3OCU         | 742    | Bermuda       |       |
| K4LDR         | 162    | W5JDX/VP9     | 1098  |
| K5MDX         | 728    |               |       |
| W5KC          | 91     | South America |       |
| K8CFU         | 300    | Brazil        |       |
| W8JXY         | 171    | PY2CDS        | 319   |
|               |        | PY7MP         | 1647  |



# PROPAGATION

GEORGE JACOBS, W3ASK

## LAST MINUTE FORECAST

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

## PREDICTED PROPAGATION CONDITIONS AND CIRCUIT QUALITY

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

Where:

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

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

ings are forecast for distances ranging between approximately 400- and 1,400- miles.

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

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

## VHF Ionospheric Openings

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

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

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

## Sunspot Cycle

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

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

## AUGUST & SEPTEMBER, 1963

Time Zone: EST (24-Hour Time)

EASTERN USA TO:

|                                   | 10/15<br>Meters                                                                                                                   | 20<br>Meters                                                                                                      | 40<br>Meters                                                  | 80/160<br>Meters                                                            |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------|
| Western & Central Europe          | 07-11 (1)<br>11-14 (2)<br>14-16 (1)                                                                                               | 05-08 (2)<br>08-11 (1)<br>11-13 (2)<br>13-15 (3)<br>15-17 (4)<br>17-18 (2)<br>18-20 (1)                           | 18-19 (1)<br>19-20 (2)<br>20-23 (3)<br>23-01 (2)<br>01-05 (1) | 19-21 (1)<br>21-00 (2)<br>00-01 (1)<br>21-00 (1)†                           |
| Eastern Europe & European USSR    | 09-14 (1)                                                                                                                         | 06-11 (1)<br>11-16 (2)<br>16-19 (1)                                                                               | 20-02 (1)                                                     | 21-00 (1)                                                                   |
| South-ern Europe & North Africa   | 07-10 (1)<br>10-12 (2)<br>12-14 (3)<br>14-15 (2)<br>15-17 (1)                                                                     | 05-07 (2)<br>07-12 (1)<br>12-14 (2)<br>14-17 (4)<br>17-19 (2)<br>19-22 (1)                                        | 18-19 (1)<br>19-20 (2)<br>20-00 (3)<br>00-02 (2)<br>02-03 (1) | 19-20 (1)<br>20-21 (2)<br>21-23 (3)<br>23-00 (2)<br>00-01 (1)<br>20-00 (1)† |
| South Africa                      | 11-14 (1)*<br>06-10 (1)<br>10-12 (2)<br>12-14 (3)<br>14-16 (2)<br>16-18 (1)                                                       | 12-14 (1)<br>14-16 (2)<br>16-18 (3)<br>18-19 (2)<br>19-22 (1)<br>05-07 (1)                                        | 18-19 (1)<br>19-21 (2)<br>21-23 (1)                           | 19-21 (1)                                                                   |
| Eastern Mediter-ranean            | 09-12 (1)<br>12-14 (2)<br>14-16 (1)                                                                                               | 05-07 (1)<br>11-14 (1)<br>14-16 (2)<br>16-20 (1)                                                                  | 19-23 (1)                                                     | NIL                                                                         |
| Central Asia                      | 19-21 (1)                                                                                                                         | 06-09 (1)<br>18-22 (1)                                                                                            | 18-21 (1)                                                     | NIL                                                                         |
| South-east Asia                   | 17-19 (1)                                                                                                                         | 07-10 (1)<br>16-20 (1)                                                                                            | NIL                                                           | NIL                                                                         |
| Far East                          | 16-19 (1)                                                                                                                         | 05-07 (1)<br>07-09 (2)<br>09-10 (1)<br>15-17 (1)<br>17-19 (2)<br>19-22 (1)                                        | 05-08 (1)                                                     | NIL                                                                         |
| Samoa, Pacific Area & New Zealand | 14-19 (1)*<br>08-10 (1)<br>13-17 (1)<br>17-19 (2)<br>19-21 (1)                                                                    | 18-20 (1)<br>20-23 (2)<br>23-07 (1)<br>07-09 (2)<br>09-12 (1)                                                     | 23-02 (1)<br>02-05 (3)<br>05-07 (2)<br>07-08 (1)              | 03-07 (1)<br>04-06 (1)†                                                     |
| Aus-tralia                        | 17-19 (1)*<br>08-10 (1)<br>15-17 (1)<br>17-19 (2)<br>19-22 (1)                                                                    | 06-07 (1)<br>07-09 (2)<br>09-12 (1)<br>17-21 (1)<br>21-23 (2)<br>23-01 (1)                                        | 02-04 (1)<br>04-06 (2)<br>06-08 (1)                           | 04-06 (1)<br>04-06 (1)†                                                     |
| South America                     | 09-13 (1)*<br>13-16 (2)*<br>16-18 (1)*<br>05-07 (1)<br>07-10 (2)<br>10-13 (1)<br>13-15 (2)<br>15-18 (4)<br>18-20 (2)<br>20-21 (1) | 05-07 (3)<br>07-08 (2)<br>08-14 (1)<br>14-16 (2)<br>16-17 (3)<br>17-21 (4)<br>21-23 (3)<br>23-01 (2)<br>01-05 (1) | 18-20 (1)<br>20-22 (2)<br>22-03 (2)<br>03-05 (2)<br>05-07 (1) | 20-22 (1)<br>22-03 (2)<br>03-06 (1)<br>01-04 (1)†                           |
| Mc-Murdo Sound, Ant-arctica       | 15-17 (1)*<br>13-16 (1)<br>16-18 (3)<br>18-19 (2)<br>19-21 (1)                                                                    | 14-16 (1)<br>16-19 (2)<br>19-21 (3)<br>21-22 (2)<br>22-00 (1)<br>07-09 (1)                                        | 00-05 (1)                                                     | NIL                                                                         |

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

CENTRAL USA TO:

|                          | 10/15<br>Meters                     | 20<br>Meters                                                  | 40<br>Meters                        | 80/160<br>Meters        |
|--------------------------|-------------------------------------|---------------------------------------------------------------|-------------------------------------|-------------------------|
| Western & Central Europe | 08-12 (1)<br>12-14 (2)<br>14-16 (1) | 05-06 (1)<br>06-07 (2)<br>07-14 (1)<br>14-16 (2)<br>16-19 (1) | 20-22 (1)<br>22-00 (2)<br>00-02 (1) | 21-00 (1)<br>21-23 (1)† |

|                                   |                                                                                                                                   |                                                                                                      |                                                               |                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------|
| Eastern Europe & Eastern USSR     | 08-13 (1)                                                                                                                         | 05-06 (1)<br>06-08 (2)<br>08-10 (1)<br>10-12 (2)<br>12-18 (1)                                        | 20-01 (1)                                                     | 21-00 (1)                                         |
| South-ern Europe & North Africa   | 06-10 (1)<br>10-13 (2)<br>13-15 (1)                                                                                               | 05-07 (2)<br>07-12 (1)<br>12-13 (2)<br>13-15 (3)                                                     | 18-20 (1)<br>20-23 (3)<br>23-01 (1)                           | 19-20 (1)<br>20-22 (2)<br>22-00 (1)<br>20-23 (1)† |
| Central Africa                    | 07-10 (1)<br>10-13 (2)<br>13-15 (3)<br>15-17 (2)<br>17-19 (1)                                                                     | 05-07 (1)<br>12-14 (1)<br>14-16 (2)<br>16-18 (3)<br>18-20 (2)<br>20-22 (1)                           | 18-20 (1)<br>20-21 (2)<br>21-22 (1)                           | 20-22 (1)                                         |
| Eastern Mediter-ranean            | 07-13 (1)                                                                                                                         | 06-11 (1)<br>11-12 (2)<br>12-17 (1)                                                                  | 19-22 (1)                                                     | 20-22 (1)                                         |
| Central Asia                      | 07-12 (1)<br>18-21 (1)                                                                                                            | 06-07 (1)<br>07-09 (2)<br>09-10 (1)<br>18-21 (1)                                                     | 19-21 (1)<br>05-07 (1)                                        | NIL                                               |
| South-east Asia                   | 10-13 (1)<br>18-21 (1)                                                                                                            | 07-09 (2)<br>09-12 (1)<br>20-00 (1)                                                                  | 05-07 (1)                                                     | NIL                                               |
| Far East                          | 07-10 (1)<br>14-16 (1)<br>16-18 (2)<br>18-20 (1)                                                                                  | 05-06 (1)<br>06-08 (2)<br>08-13 (1)<br>20-22 (1)                                                     | 05-08 (1)                                                     | NIL                                               |
| Samoa, Pacific Area & New Zealand | 13-20 (1)*<br>11-12 (1)<br>12-17 (2)<br>17-19 (3)<br>19-20 (2)<br>20-21 (1)                                                       | 17-19 (1)<br>19-21 (2)<br>21-00 (3)<br>00-04 (2)<br>04-07 (1)<br>07-09 (3)<br>09-11 (2)<br>11-13 (1) | 23-01 (1)<br>01-06 (3)<br>06-07 (2)<br>07-08 (1)              | 01-03 (1)<br>03-06 (2)<br>06-07 (1)<br>03-07 (1)† |
| Aus-tralia                        | 15-19 (1)*<br>08-10 (1)<br>13-16 (1)<br>16-20 (2)<br>20-21 (1)                                                                    | 20-22 (1)<br>22-00 (2)<br>00-07 (1)<br>07-09 (3)<br>09-10 (2)<br>10-11 (1)                           | 03-04 (1)<br>04-06 (2)<br>06-08 (1)                           | 04-05 (1)<br>05-06 (2)<br>06-07 (1)<br>04-07 (1)† |
| North-ern & Central South America | 08-16 (1)*<br>06-08 (1)<br>08-12 (2)<br>12-15 (3)<br>15-17 (4)<br>17-19 (2)<br>19-21 (1)                                          | 02-06 (1)<br>06-08 (2)<br>08-14 (1)<br>14-16 (2)<br>16-19 (4)<br>19-23 (3)<br>23-02 (2)              | 19-21 (1)<br>21-22 (2)<br>22-01 (3)<br>01-03 (2)<br>03-06 (1) | 21-23 (1)<br>23-02 (2)<br>02-05 (1)<br>23-05 (1)† |
| Argentina, Chile & Uruguay        | 09-13 (1)*<br>13-16 (2)*<br>16-18 (1)*<br>06-08 (1)<br>08-13 (2)<br>13-15 (3)<br>15-17 (4)<br>17-18 (3)<br>18-20 (2)<br>20-21 (1) | 14-16 (1)<br>16-18 (2)<br>18-20 (4)<br>20-01 (3)<br>01-03 (2)<br>03-05 (1)<br>05-07 (2)<br>07-09 (1) | 20-22 (1)<br>22-02 (2)<br>02-04 (1)                           | 23-03 (1)<br>23-03 (1)†                           |
| Mc-Murdo Sound, Ant-arctica       | 14-18 (1)*<br>11-15 (1)<br>15-17 (2)<br>17-19 (3)<br>19-20 (2)<br>20-21 (1)                                                       | 16-18 (1)<br>18-20 (2)<br>20-21 (3)<br>21-23 (2)<br>23-00 (1)<br>08-11 (1)                           | 23-06 (1)                                                     | NIL                                               |

TIME ZONE: PST (24-Hour Time)

WESTERN USA TO:

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

\*Predicted 10 meter openings.

†Predicted 160 meter openings.

[Continued on page 104]



## SPACE COMMUNICATIONS

GEORGE JACOBS\*, W3ASK

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

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

antenna is being used to receive satellite signals, it should be aligned at the same angle to the equator as the satellite's inclination. The satellite's "period" is the time (in minutes) that it takes for the satellite to complete an orbit. By timing strongest reception on successive orbits, it is often possible to identify a satellite by its period.

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

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

73, George, W3ASK

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

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

### FUTURE LAUNCHES

|        |          |      |                 |  |  |                                    |
|--------|----------|------|-----------------|--|--|------------------------------------|
| 136.02 | ECHO 2   | 0.02 | Late Fall, 1963 |  |  | C.w. beacon & Command telemetry.   |
| 136.17 | ECHO 2   |      |                 |  |  |                                    |
| 136.47 | SYNCOM 2 | 2.0  | Summer, 1963    |  |  | C.w. beacon & Command telemetry.   |
| 136.77 | SYNCOM 2 | 0.5  | Summer, 1963    |  |  | C.w. beacon for first 7 days only. |
| 136.98 | SYNCOM 2 | 2.0  | Summer, 1963    |  |  | C.w. beacon & Command telemetry.   |

# SIDEBAND

IRV & DOROTHY STRAUER\*, K2HEA/K2MGE

## SSB DX HONOR ROLL

|        |     |        |     |        |     |
|--------|-----|--------|-----|--------|-----|
| T12HP  | 279 | MP4BBW | 256 | WA2IZS | 235 |
| W8EAP  | 278 | W1LLF  | 254 | PJ2AA  | 232 |
| PY4TK  | 278 | W51YU  | 254 | W1ORV  | 230 |
| W2ZX   | 275 | K2MGE  | 252 | W8CVU  | 229 |
| VQ4ERR | 273 | PZ1AX  | 251 | W2VZV  | 227 |
| K8RTW  | 271 | W6RKP  | 249 | K4PUS  | 226 |
| W8PQQ  | 269 | G8KS   | 248 | K4AJ   | 226 |
| W2FXN  | 269 | G3NUG  | 248 | VE3BWY | 221 |
| W6UOU  | 265 | W3KT   | 248 | W0PGI  | 221 |
| K9EAB  | 263 | W2TP   | 248 | WA6HOH | 219 |
| H89TL  | 262 | W8YBZ  | 246 | G2PL   | 217 |
| K4TJL  | 262 | G3FKM  | 245 | VE3BQP | 206 |
| W2VCZ  | 262 | G2BVN  | 242 | W7DLR  | 206 |
| W0QVZ  | 260 | W6BAF  | 242 | OH2NB  | 204 |
| DL1IN  | 258 | W6PXH  | 242 | W9SFR  | 203 |
| W3LMA  | 257 | W6WNE  | 239 | K4JEY  | 202 |
| W40PM  | 257 | W1AOL  | 238 |        |     |

## SSB DX ENDORSEMENTS

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

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

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

of phone operation on 20 was by sidebanders. We have even more reason today to advocate this expanded use of the band.

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

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



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

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

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

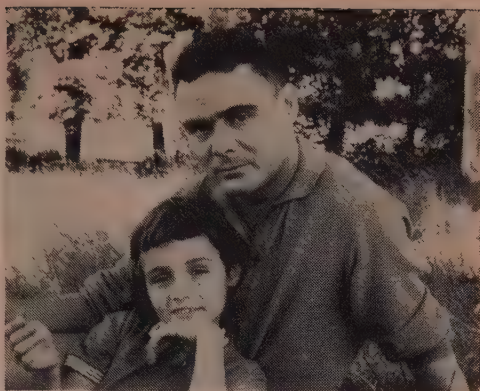
### Sideband Around The World

Reminiscing about the early days of sideband when often you'd have to wait for hours before another sidebander would come on the band, we listen with amazement to the current swell of sideband activity among old and new hams alike. Thinking back, questions arise as to what has happened to Sam, OH0NC; Mirko, YUIAD; Jim, VS4JT; Stan, ZC4DA; Cyril, VK3AEE; Jimmy, CX5AF; Jiri, OK7HZ; Paul, VQ4EO; and many more, all of whom were daily contacts some years ago. While it's wonderful to continue the old friendships, it's good to make new ones and we're bursting with news about the activities of some of today's active sidebanders.

Barry, K2IEG, and Doris, WA2HTI, became the parents of a baby girl, Denise; while Libby, K0MAS, welcomed her second grandchild. . . . Marc, W2GYQ, rapidly and successfully recovered from his operation and is again active on 20 meters with his group "The Zigga Zagga Hoi Hoi Hoi" boys . . . Albania may be, by now, represented on sideband through the generosity of SM5BLA who was planning to furnish a rig to YO3GK for a DXpedition to ZA-land. . . . It was a great delight to meet Carol, DL4LA, on the air from Frankfurt, Germany, particularly since we've had many contacts with her charming folks, Flo and Boris, K8JTB, of Detroit, Mich. . . .

Among recent visitors to our shack were Kurt, DL1CR, here to study American manufacturing methods; John, G3MSS, Vice-President of Collins Radio, Ltd. in London; and Phil, ZS1TP, and Anita, ZS1TZ, who visited many ham friends from California to New York. This delightful Capetown couple charmed all whom they met and we hope they enjoyed their visit as much as we enjoyed having them. . . . Still awaited are visits from Les, G13CDF, and Dave, G3HS. . . . Lou, ZS6IR, and his lovely wife, Jackie, were among other visitors to the states but, unfortunately, we did not meet them. . . . Marty, ex-DL4FC is now W5HNC/5, while Gene, ex-DL4FX, is using the call K8RJP/5. . . . George, W4UWC, is QSL manager for Bill, 7X2VX, who doesn't seem to have much time for hamming due to his more important duties as U.S. Ambassador to Algeria. . . . Ted, K4WUS, is an ophthalmologist and hopes to contribute to the establishment of an eye bank in the East similar to the one so successfully set up in the Midwest. . . . Gunther, OE6LQ, is a student at the Technical University in Graz, Austria, with still another two or three years ahead in which to finish his technical engineering studies.

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



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

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

Congratulations to the Greater Michigan

*[Continued on page 96]*



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



# HAM CLINIC

CHARLES J. SCHAUERS\*, W4VZO

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

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

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

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

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

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

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

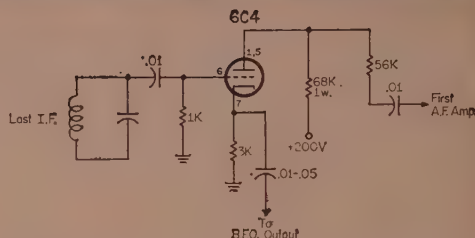


Fig. 1—A practical s.s.b. detector for nearly any receiver.

are considered, and the overall driving power figured in.

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

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

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

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

## Questions

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

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

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

[Continued on page 98]

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



# the USA-CA PROGRAM

CLIF EVANS\*, K6BX

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

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

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

## USA-CA HONOR ROLL

| 1500   |     | 1000    |
|--------|-----|---------|
| K9EAB  | 1   | W1GKJ   |
| 500    |     |         |
| W1UOT  | 223 | W3EFY   |
| K2ETC  | 224 | W1DMD   |
| W0CUC  | 225 | W9JQE/M |
| W4BWR  | 226 | HK1QQ   |
| KH6BLX | 227 | W8CSK   |
|        |     | W9GML   |
|        |     | W1SXX   |
|        |     | K0QJG   |
|        |     | W7GBL   |
|        |     | WA9AJF  |
|        |     | W0EXD/5 |
|        |     | 233     |
|        |     | 234     |
|        |     | 235     |
|        |     | 236     |
|        |     | 237     |
|        |     | 238     |
|        |     | 10      |

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

## We Get Letters and Questions

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

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

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

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

## U.S. Navy Supports Amateur Radio

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

It is common knowledge that our Defense



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

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



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

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

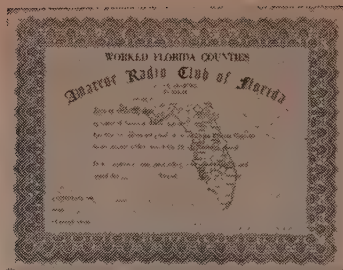
Another little publicized fact is that under a multitude of conditions our Defense Department permits crew members who are also licensed amateurs to engage in amateur radio operations from military, Coast Guard, and other government aircraft.

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

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

#### Massachusetts County Award Gets New Sponsor

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



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

#### New Florida Awards Support USA-CA

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

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

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

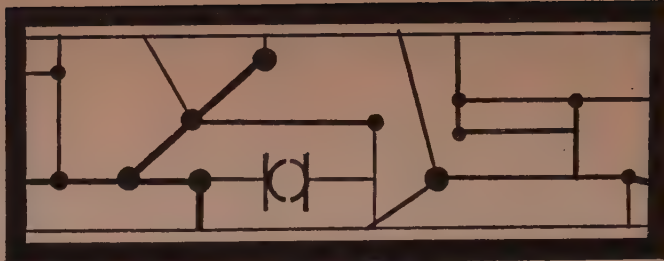
**SUN CITY AWARD:** Work 10 stations in "The Sun City," St. Petersburg, Florida, which includes Pinellas Park, Bay Pines, Indian Rocks, Largo, Treasure Island, Redington Beach, St. Petersburg Beach and the Greater St. Petersburg Area. Make application as stated above.

#### "Symbols of Freedom" Parade

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

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





WALTER G. BURDINE, WBZCV

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

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

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

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

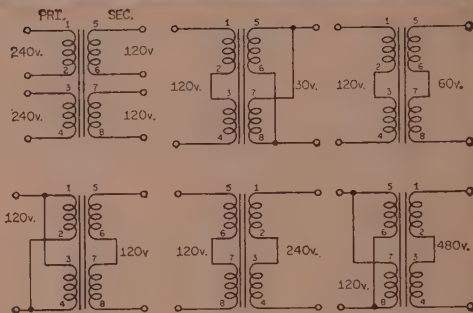


Fig. 1—Circuits using the transformer described in the text to obtain voltages from 30 to 480 volts. Other hookups are possible but will result in duplication of voltage outputs.

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

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

### Complete Homebrew Station

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

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

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

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

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

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

### Re Six Meter Converter

I have been asked about how to make the plate connection to the nuvistor tetrode and the answer is so simple: just use the grid cap connector for an old-fashioned octal tube; they fit perfectly. I use the type that was a double spiral spring with the wire soldered to one of the two wire ends. They are available for about 15 cents per dozen. The copper-clad laminate can be obtained from both Allied Radio and Lafayette at about \$1.50 for a 9x12 inch sheet. It can be cut with a hack-saw and the edges can be smoothed on a small grinder, you can also take out any small sawing mistakes the same way. Oh, yes I have a wonderful small power-supply for it, too.

### Letters

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

"I read your NOVICE Column every chance I get and I really enjoy the letters and pictures you get from people who are doing so well with the low-powered rigs, like the one in Texas using the AT-1 and Don Lindsey, W0EVZ with only 6 watts.

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

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

Edward L. Tobias, WA2VKK, 280 First Ave-

nue, New York 9, N.Y. writes: "Dear Walt, I never got down to writing you as a Novice, but thought I would as a Technician.

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

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

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

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

### Help Wanted

The following aspirants need help this month:

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

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

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

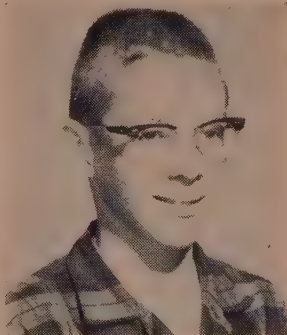
Larry Johnson, 3115 Hazel Street, Erie, Pa., needs help for his Novice.

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

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

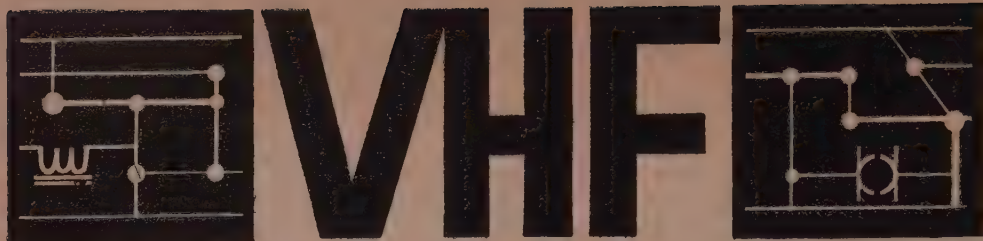
That's about all for this month. Can you help by writing a few letters and sending some pictures. Remember this column is yours, it's for both the Novice and the Technician license.

73, Walt



Robert Lucas, WA0DXZ, 26 Glendale Court, Iowa City, Iowa has worked 41 states with a T-60 and an SX-140.

He says ham radio is the best.



DONALD L. STONER\*, W6TNS

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

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

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

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

Several power supplies have been constructed for converting the RAX-1 to 117 volt a.c. operation. In all cases the power transformer and B+ choke are mounted on the rear apron. In one version, a 6X4 rectifier was mounted in the old power plug socket, while another used two series connected 400 p.i.v., 500

ma silicon rectifiers in place of each diode section in the 6X4. Virtually any power transformer which will deliver 150-170 v.d.c. after the filter choke, and which has 5 and 6 volt, 2 amp. filament winding can be used. One conversion, which employed a Stancor PC-8404, required about 700 ohms in series with the high voltage secondary centertap lead to bring the B+ down to 160 volts. This is wasteful of transformer capability but does have the advantage of providing a source of negative 60 volts for biasing off converter r.f. amplifiers, etc. A suitable circuit is shown in fig. 1, along with the proper connections for substituting silicon diodes for the 6X4. Note that the two filament windings must be correctly phased to provide 11.3 volts a.c. This is sufficient for the tube heaters. The choke may be any value rated at 60 ma or more.

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

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

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

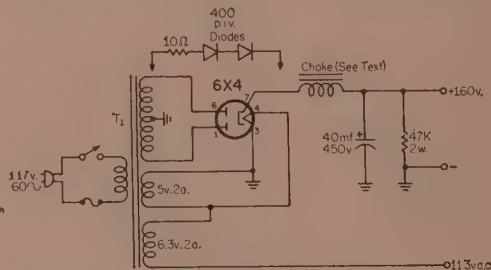


Fig. 1.—Power supply suitable for the RAX-1 (unit 3). Transformer  $T_1$  may be any type supplying 440 volts at 60 ma or more and having both 5 and 6.3 volt windings. The resistor/silicon diode circuit shown may be substituted for each session of the 6X4 if desired.

\*Alta Loma, California.

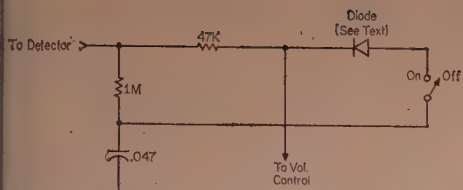


Fig. 2—Automatic noise limiter for the RAX-1 v.h.f. conversion.

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

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

Finally a Stancor A-8101 500 ohm line to 16 ohm transformer was added to match the receiver output to a speaker. This transformer was mounted above the choke on the rear of the cabinet.

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

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

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

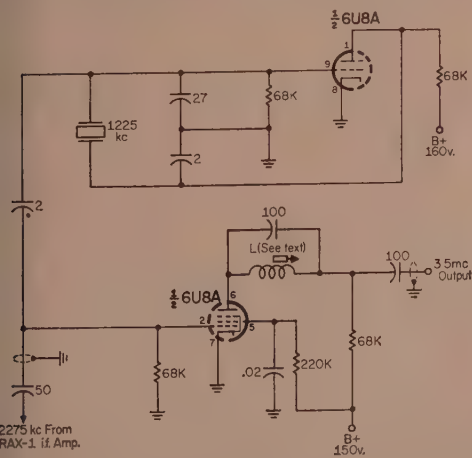


Fig. 4—Converter for adapting the 2275 kc RAX-1 i.f. to 3.5 mc for use with a ham-band-only receiver as a Q-fiver.

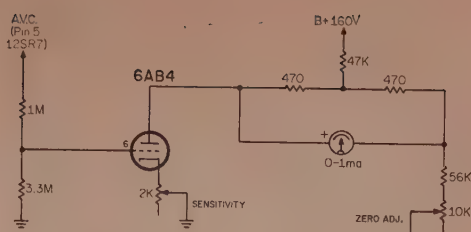


Fig. 3—S-meter used in the RAX-1 and suitable for use in any receiver having a.v.c.

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

A 6U8 is used as a mixer and 1225 kc oscillator. The sum frequency ( $2275 + 1225$  kc) of 3.5 mc is fed to the receiver. The i.f. signal is coupled from the plate (pin 8) of the 1st i.f. stage in the RAX. The 50 mmf capacitor is used to adjust the output level of this third conversion stage. Keep the output of the converter low or the receiver may not be able to handle the high signal level, even with the r.f. gain control reduced. The output coil for 3.5 mc consists of 75 turns of #28 scramble wound on a  $\frac{3}{8}$ " slug tuned form. Peak this coil for maximum signal at 3.5 mc. The crystal was purchased at U.S. Crystals and cost about \$2.50 plus tax and postage.

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

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

#### Who's News

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

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

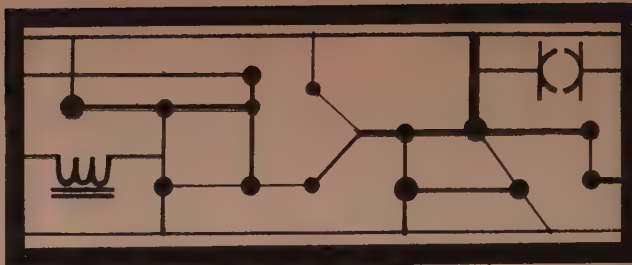
Walt, K1RTS, is currently mobiling with an ARC-4 and expects to finish his new 13 element beam shortly.

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

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

[Continued on page 91]

# RTTY



BYRON H. KRETZMAN\*, W2JTP

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

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

\*431 Woodbury Road, Huntington, N. Y.

## RTTY The Hard Way...No. 22



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

### 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 |

### Dual Identification Petition

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

#### SECTION 12.82 (a)(2):

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

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

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

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

W3MHD Pittsburgh, Pa., RTTY Station of Frank C. Gibson. Exciter: HA-5 modified for f.s.k.; Final Amplifier: 250-TH at 700 watts; Receiver: Drake 2-B; Terminal Unit: W6OWP; Antennas: TH-4, Half wave dipoles on 30 and 80; Teletype: Model 26 Page Printer; Model 14 Typing Repeater; Model 14 Transmitter-Distributor.



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

### On the Bauds

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

Last October K4KXQ and K4GRY made the first a.f.s.k. QSO on 52.60 f.m. in the Richmond, Va. area. Other stations now active are WA4EQG and W4PZY. Autostart is in use and a repeater is planned. K4YYO of Charleston Heights, N. C., has a Model 15 and wants to know how to f.s.k. his HT-32. (Watch for an article by W0AJL, DM!) WA4FIJ of Panama City, Florida, is on 30 and 40 with a Model 19 and W2JAV TU.

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

W8WYL reports that 150 attended the RTTY forum at the Dayton Hamvention. W8SLS won the Model 15 donated by W9KRW; and, K8ZRZ and K8BAX won copies of the *New RTTY*

*Handbook* donated by CQ. W8OMY of Columbus, Ohio, now has a Model 19 and reports increased activity in his area: W8ABO, K8RJI, W8ARP, W8BTW, W8TSE, W8UHZ, and W8ORL. K9IXS, the Radio Club of the Elkhart (Indiana) High School is on 80 with Models 15 and 26, and W2JAV and Twin City TU's. A kw amplifier is available.

K0JRG of Lincoln, Neb., has a CV-57 TU (455 kc i.f.) and an HQ-170 (60 kc i.f.) receiver, and wants to know what to do. (Sell or trade the CV-57, then build an audio TU, Stan!) W0ZOQ of Shawnee Mission, Kansas, worked K3ADS on 51.40 mc May 5th. W0VAA of Wisner, Neb., is building the W2JTP Tuning Fork Standard.

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

### Comments

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

73, Byron, W2JTP



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

K8MZT, Shirley, chairman, has announced a

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

new location for the convention: the Nation Inn, 4101 W. Broad in Columbus—this to provide more space since so much interest is expressed in the convention.

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

#### YL in Peace Corps

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

W8WUB was featured in this column in May '59, as a most attractive 15-year old high school sophomore at Huntington, W. Va. More recently her QTH has been Grand Rapids, Mich. Her mother Ethel is W8WUE, her daughter W8PFL, her twin sister Carolyn is ex-KN8C and there are several other hams in the family. Marolyn began as a Novice in '55 at age 11 and has been very active and holds many certificates.

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

[Continued on page 92]



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

Some of the members of the Buckeye Belles, hostess club for the 4th International YLRL Convention held at Columbus, Ohio, June 19-21, 1964. L. to r., K8GWF, W8LGY, W9YWH, K8ITF, K8DHF, K8HGD, unidentified, K8MZT, K8TFL, W8AHU, W8VWL, WN8ADS, W8VWL's jr. YL, K8VWW, K8TKS, K8URM. Buckeye Belles membership has grown to 200—enough for a convention right there!



# VHF

Vol. 5, No. 8—August, 1963

**AMATEUR**

**BOB BROWN, K2ZSQ, Editor**



## In This Issue

### Departments

|                         |    |
|-------------------------|----|
| VHF Roundup Column ..   | 75 |
| DX Report Column .....  | 77 |
| VHF News Bulletin ..... | 83 |

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

### Features

|                                                                |                             |    |
|----------------------------------------------------------------|-----------------------------|----|
| VHF In Germany! .....                                          | Dr. Karl G. Lickfeld, DL3FM | 71 |
| Power Supplies for VHF Equipment .....                         | Robert D. Frantz, W3AVU     | 72 |
| New Amateur Products: The Supreme Model SB6-LA Amplifier ..... |                             | 73 |
| A New VHF Operation: F.M. ....                                 | Byron H. Kretzman, W2JTP    | 74 |
| Ignition Noise vs. Frequency .....                             | Irwin Math, WA2NDM          | 76 |
| New Amateur Products: The Li'l Lulu 6 Meter Transmitter .....  |                             | 81 |

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

New from Gonset

# A HIGH QUALITY TRANSISTORIZED SSB TRANSCEIVER



that is

**ULTRA-COMPACT • LIGHT WEIGHT • low in cost**

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

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

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

## CHECK THESE DELUXE FEATURES AT YOUR LOCAL DISTRIBUTOR!

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

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

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

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

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

For further information, check number 1, on page 110

# VHF In Germany!

DR. KARL GERHARD LICKFELD, DL3FM\*

Klingenburgstrasse 30  
Mulheim (Ruhr) — Ickten, Germany

VHF IS QUITE THE THING HERE IN GERMANY. We've had activity on these bands since 1949, but up until 1960 VHF was synonymous with 144 mc (we have no 6 meter band). In recent years, however, we've been pushing efforts for the 432 mc band while activity is running up a steep climb. My own spare time is very, very short, being absent from home 12 to 13 hours every day. I had planned to be ready on 1296 mc in the summer of 1962, but things have since been postponed. The Swiss-German group around IB9RG has had the luck to make a "first" when they received their own echoes. There are other more or less semi-hidden groups of German amateurs who are on the way to a moon bounce program. What we all need, though, is more close cooperation with American amateurs who are the pacemakers. I think one must not look on just the tops of the present VHF art only, so we'll turn down again to the flat areas of normal VHF hamming.

On 144 mc (144-146 here) s.s.b. is becoming more and more popular. In most cases commercially made 14 mc boosters are used to get up to 144 mc, using homebrew mixing equipment. Filter-type exciters are the cry of the day, but should not be forgotten that once a German amateur *did* run a phasing-type s.s.b. transmitter on 144 mc. He was DL3NQ. He left Germany a couple of years ago. There's a big trend for phone-only on 2 meters, but the real old men among us are keeping an eye on c.w. phenomena all the time. Meteor scatter contacts have taken place between Germany and UR and OH land, so name only two real DX countries. The American boys should remember that our climate here does not catalyze superrefraction

\*VHF Editor, *das DL-QTC*.



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



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

as much as it does the climate of North America, especially along the coasts. Distances ranging around 1200 km (745.20 miles) can only be covered with the greatest difficulty here on 144 mc. Up to 20 different countries (*not counties!*) have been worked by German amateurs via aurora on 2 meters. At the beginning of December, 1962, a big opening occurred and contacts between England, Norway, Sweden, Denmark and Germany were commonplace on 432 mc. Crystal-controlled converters and transmitters are used here exclusively. And semi-conductors are being used more and more for 144 and 432 mc converters. Noise figures of 4 to 6 db have been obtained through their use on 432. Most power amplifiers in the medium power class for 2 meters are equipped with the QQE 03/12, an equivalent of the 6360. Higher power exhalers are proud of their QQE 06/40's or even their 4X150A's.

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

# Power Supplies for VHF Equipment

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

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

## Using Silicon Rectifiers

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

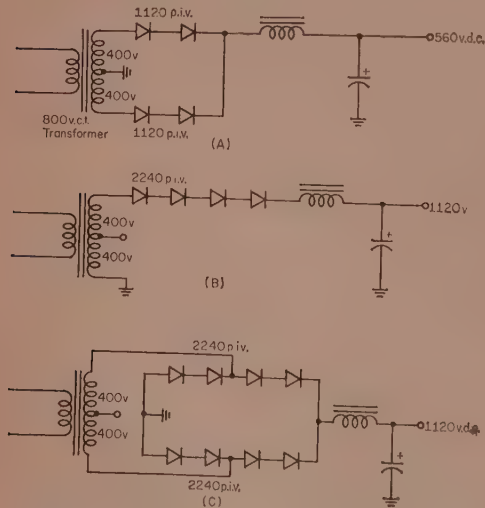


Fig. 1—Power supplies that can be built from a single transformer.

Remember that in Fig. 1 the diode inverse voltages shown are actual voltages that appear

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

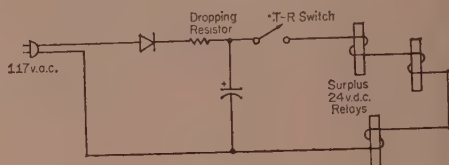


Fig. 2—Control circuit using silicon diode.

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

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

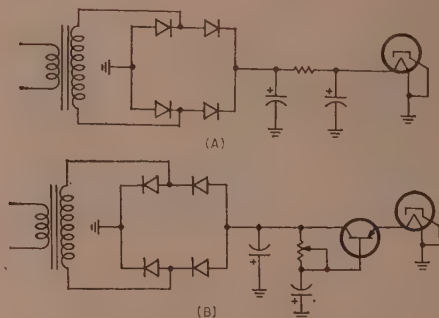


Fig. 3—Two methods of supply filaments with d.c.

## Adjustable Power Supplies

It seems that most amateurs are unfamiliar with adjustable, regulated power supplies, yet these supplies are invaluable for trying new recruits, or supplying the screens of large transmitting tubes. Even the simplest of electronic regulators will give more than adequate regulation for most amateur applications, and a couple of low cost surplus tubes will supply many watts of regulated power.

Two basic types of voltage regulators are shown in Fig. 4. The circuit of Fig. 4A is a series regulator. Operation of the circuit is best explained by means of an example set of conditions. Suppose that the desired output is 150 v. across a 5000 ohm load (30 ma). Also assume that the particular tube in the regulator will conduct 30 ma. when it has 300 v. plate to cathode, and -10 volts grid to cathode. Note that in the circuit of Fig. 4A, these conditions are met. Also note that the VR tubes have established a reference voltage that will not change with variations of the unregulated supply. If the voltage from the unregulated supply de-

creases, or the load resistance goes down (more load current), the voltage across the load will tend to decrease. Any decrease in load voltage decreases the regulator cathode voltage, making the grid voltage more positive with respect to the cathode, thus decreasing the drop across the tube. Any tendency for the load voltage to increase will cause an opposite reaction, and the drop across the tube will increase. It is obvious that the regulation is never perfect, since a small change in load voltage is required to operate the regulator tube. The output voltage is adjusted by moving the voltage tap on the potentiometer. In this circuit the regulator tube acts as variable resistor in series with the load, and dissipates maximum power when supplying high current at low voltage output. In most cases, the regulator tube heater must be supplied from a separate filament transformer, or the allowable heater cathode rating may be exceeded. Several tubes may be connected in parallel for increased current output.

### Shunt Regulator

The circuit of Fig. 4B shows a typical shunt regulator which is most useful as a source of regulated power for high voltage-low current devices, such as klystrons. In this circuit the unregulated d.c. source supplies current to the load and to the regulator tube. The cathode voltage of the regulator tube is fixed by the VR tube. If the load voltage tends to decrease, the voltage on the grid of regulator tube will decrease, making it more negative with respect to the cathode. The voltage change at the regulator grid will cause it to draw less current, and reduce the voltage drop across  $R_1$ . This type of regulator dissipates maximum power when operating with no load.

Many types of voltage regulators are possible, and a search through industrial engineering textbooks will reveal many circuit configurations. One thing to keep in mind is that any regulator (including the clamp tube) can produce parasitic oscillations, and could be a very elusive source of TVI! ■

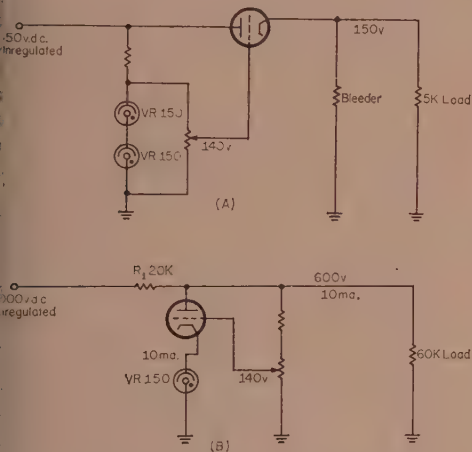
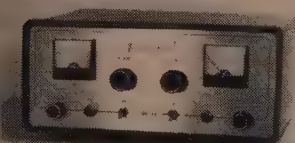


Fig. 4—Two types of voltage regulators.

## New Supreme 6 Meter KW Amplifier



New Supreme Model SB6-LA

THE UNIT PICTURED AT THE LEFT is the new Supreme SB6-LA, a six meter linear amplifier using an Eimac 3-400Z in grounded grid operation. The rating for s.s.b. with a driving power of 32 watts p.e.p. is a full kilowatt, while a.m. operators will have 600 watts input. C.w. power is also a k.w. In spite of these power levels, the unit is but  $6\frac{1}{2} \times 15 \times 9\frac{1}{2}$ " and weighing only 15 lbs. A quiet-operating 58 c.f.m. blower keeps the 3-400Z's cool. Plate voltage supply requirements are between 2500-3000 volts at 300 ma. Price, \$229.50.

The Supreme Model SSB-6B is another item of interest to VHF men (not pictured here). This item is a six meter s.s.b. transmitter with 75 watts p.e.p. input, 6146 final. It is capable of s.s.b. or l.s.b. at the flick of a front panel switch, c.w. or a.m., with carrier injection. A 7360 serves as balanced modulator. One major feature is its v.f.o. control, tuneable from the front panel as part of this fine package. The SSB-6B uses the McCoy 32B1 Silver Sentinel crystal filter. Carrier suppression better than 50 db, unwanted sideband suppression better than 40 db. This transmitter comes complete, wired and tested, for \$279.50. ■

# A New VHF Operation: F.M.

BYRON H. KRETZMAN,\* W2JTP

431 Woodbury Road  
Huntington, New York

PERHAPS WE SHOULD HAVE USED the word *different* rather than *new* in the title of this article, since f.m. is really not new to amateur radio. Have you tuned the high ends of the 6 and 2 meter bands lately? We have in mind the f.m. signals that can be found, for example, on 52.525 or 146.94 mc. You can copy these signals on a standard communications receiver equipped with a converter by the slope-detection method.

When you hear these f.m. stations, you will probably notice that operation is very brisk, to say the least. Break-in is rapid. No one fools around with repetitious calling. This is because everyone transmitting is on the same frequency and receivers are crystal controlled with a squelch circuit that quiets the speaker in the absence of signals. You may hear only a few of the stations working each other, but those obviously are having no difficulty. This might be partly because you are most likely using a horizontally polarized antenna while vertical polarization is used on VHF f.m. Another reason is that these stations are using very hot receivers, especially designed for f.m. reception. Characteristic of this mode, mobile stations are doing S9 work with stations quite distant, compared to their a.m. counterparts.

In certain areas you might even hear duplex operation. Shades of 5 meters! This is where the casual listener will have to do a bit of figuring to determine just what the heck is going on. Chances are that you're hearing a cross-band duplex operation, possibly between 6 and 2 meters. (This can be very confusing to the uninitiated!) Repeating that is the re-transmitting of signals automatically, is fairly common. Short beeps of different audio frequencies may also be heard. Read on! This VHF f.m. operation gets more fascinating by the minute.

## Equipment Being Used

Here is the straight dope: These VHF f.m. nets are making use of commercial surplus two-way radio equipment, formerly used in taxi cabs, police cars and the like. These commercial f.m. sets are available with ranges of 30-40 mc, 40-50 mc, and 150-170 mc. The low-band units require just the removal of padding capacitance and/or taking off turns on some coils. The high-

band sets require just the addition of capacitance across the tuned circuits to get to the 2 meter amateur band.

Naturally, most of the equipment available of the mobile variety with vibrator power supplies for the receivers and dynamotors for the transmitters. Power supplies for a.c. input have been built in order to use these units at the home station.

Believe it or not, there are even some rugged individualists who like to build their own VHF f.m. transmitters and receivers. (Frequency-modulating a v.f.o. is a lead pipe cinch; the receiver is a *bit* more complicated.) Other interesting technical aspects of this VHF f.m. operation consist of remote control, repeater control by tone bursts, the cross-band duplex mentioned earlier, and in-band duplex.

## Operation

It should be pointed out that this VHF f.m. is vastly different from the usual a.m. operation on 6 or 2 meters. There is no "DX chasing," almost no CQ'ing, and no one talks long enough for the 10 minute identification rule to apply. Fundamentally, an f.m. channel is a vast intercom network where there is real communication between hams.

The individuals you meet on these frequencies might well be called a new breed of hams, much different from the type found on 20 and 75 feet. This VHF f.m. gear cannot be bought over the counter. You have to look for it and really dig into it to make it work. No worries about ruining resale value! As a result, this kind of hamming, like RTTY, is developing a more technically competent breed of hams.

## Information on VHF F.M.

We couldn't possibly cover this entire subject here, except in a most general way. As mentioned previously, VHF f.m. is really not new. The ARRL had quite a promotion going in QST back in 1940. Almost nothing has appeared anywhere in over 20 years, except for one extremely good description of 2 meter VHF f.m. operation by Jim Aagaard, K9OJY, in QST.<sup>1</sup>

<sup>1</sup>Aagaard, James S., "Two Meter F.M. for Noise Free Local Communication," QST, July 1960. Operation on f.m. nets in the Midwest.

\*RTTY Editor, CQ.

*With deep regret we record the recent passing of two well-known VHF men, Benjamin A. Nardone, K2KDJ, and Karl G. Vincent, W3ASD.*

# UHF ROUNDUP

*an exclusive feature of The VHF Amateur*

ALLEN KATZ, K2UYH\*

I GUESS EVERYONE RUNS INTO the problem of balancing the budget at one time or another during the year. Bookkeeping can become an extremely intriguing subject, especially when the presence of a new 75A4 or a couple 8072's depend on how well you can juggle the figures.

But tell me, when was the last time you balanced the books on your u.h.f. communications potential? The results of this type of bookkeeping can be just as beneficial. On the credit side of the ledger you have such items as transmitter power, antenna gain, and perfect receiver power. On the debit side you have path loss, receiver noise, and transmission line loss. The balance tells you whether a contact is possible between two given points.

To make a balance sheet for your own set up, you can start on the credit side. First determine your transmitter power output. Usually you are doing quite well if you can achieve 50% efficiency on the u.h.f. frequencies, although some of the newer tubes claim better values. Convert your power output to a db gain (relative to one watt) by using the standard equation,  $\text{Gain} = 10 \log P_2/P_1$ . If you had a 1 kilowatt transmitter with 50% efficiency, your power output would be 500 watts, and your gain would be  $10 \log 500$  or 27 db. This value would be your first entry on the sheet.

The next important credit entry is antenna gain. Most fellows have some notion of their antenna's gain. Unfortunately all too often this notion is in error. This poor situation exists because figures for commercially available antenna are in many instances misleading, and antennas constructed from magazine articles are produced inaccurately or just given the wrong gain rating to start with. In the case of this balance sheet, the antenna gain used should be the value in db relative to a half wave dipole. The only way to truly know this value is measure it properly yourself. Here the article "How to Measure Antenna Gain" in November 1962 *CQ* is an excellent starting point. However, if you are too lazy to determine your antenna's gain and satisfied with just guess work, you can try and match your antenna with one in the *VHF Handbook* or use one of the many cookbook gain formulas around. Don't forget to add in the gain of the receiving antenna. This is a balance sheet for the total communications system.

The final entry on the credit side is perfect receiver power. It is the gain the receiver could generate, when no noise is added by the receiver. This gain is limited by two factors: the amount of noise present on the frequency of the receiver (measured as a temperature in degrees Kelvin), and the bandwidth of the receiver. The equation for the gain is  $10 \log Kt \Delta f$  where  $K$

## Sample Balance Sheet (432 mc)

|                                |          |            |
|--------------------------------|----------|------------|
| <b>Antenna Gain:</b>           |          |            |
| Transmitter (64 element beam)  | + 20 db  |            |
| Receiver (64 element beam)     | + 20 db  |            |
| <b>Transmission Line Loss:</b> |          |            |
| Transmitter (100' RG8U)        |          | - 5.8 db   |
| Receiver (100' RG8U)           |          | - 5.8 db   |
| <b>Perfect Receiver Power</b>  |          |            |
| (100 c.p.s.)                   | + 188 db |            |
| <b>Receiver Noise Figure</b>   |          |            |
| Path Loss (via the moon)       |          | - 6 db     |
| Transmitter Power              |          | - 250 db   |
| (500 watts output)             | + 27 db  |            |
| Total                          | + 265 db | - 261.6 db |
| Balance                        | + 3.4 db |            |

is Boltzmann's constant,  $-1.37 \times 10^{-23}$ . The only problem that you might encounter in calculating this gain is that of determining the noise temperature. Noise temperature decreases with frequency, however its value can vary all over the place depending on the level of man made noise and the sky conditions. Average values are: 1500°K for 2 meters, 550°K for 220 mc, 150°K for 432 mc, and 80°K for 1296 mc. Note these are average values; even on 2 meters the noise level can drop down to 250°K under ideal conditions.

On the debit side you can start your entries with the transmission line losses, the item accounting for the energy lost in the transmission line at both ends of the path. RG-8U has 3 db loss per 100 feet on 200 mc. Therefore if you were using 50' of RG-8U on 220 mc, the transmission line loss for your end of the path would be approximately 1.5 db (provided you have a 1:1 s.w.r.). To obtain the total transmission line loss, you would have to add the loss due to the feedline at the other end of the path.

The next item is receiver noise. This term is due to the noise your converter adds to the noise already coming in from the antenna. Receiver noise is almost completely equal to the noise figure in db of the first r.f. amplifier. On 220 a good nuvistor front end will buy you below 5 db in added noise. On 432 the level is a db or so higher.

The final item in our balance sheet is the path loss. Although its definition is not complicated—the amount of positive gain needed to communicate over a given distance with a 1 to 1 signal to noise ratio—it is probably the hardest term to determine accurately. For instance say you wished to communicate over a 500 mile path on 432 mc. Under normal conditions your lowest path loss would be via reflection from the moon (about -250 db). But add just a little tropospheric bending and your straight path loss could be well below 250 db. Sufficient data exists in radio engineering handbooks for the path losses over short distances. However, over the greater distances in which most amateurs are

\*48 Cumberland Avenue, Verona, New Jersey.

interested information becomes scarce. In most instances for distances over 500 miles, the moon bounce path can be considered the minimum one.

We have devoted a large portion of this column to comparing a communication system to a budget. In planning a budget you would not add green stamps and dollars, but it is just this type of mistake many amateurs are making in planning their u.h.f. stations. The importance of a clear understanding of the above system can not be over exaggerated. With it you will be able to see the weak points of equipment and what improvements will bring the greatest benefit.

### Reports

#### Ernie, W3UJG, Rockville, Maryland:

Ernie, who is active on 220 mc and 432 mc comes through with a report to show that the u.h.f. bands are really active down his way. On 220 he runs a pair of 4X150's at 500 watts on c.w., 350 watts on s.s.b. and 200 watts on phone into an eleven element yagi 40' up. On this band he holds skeds on s.s.b. every night with K2DZM in Rahway, N.J. The frequency used is 220.1 mc and the time is 2200 hours EDT. On Monday, Wednesday and Friday nights skeds are held with W4LTC at 2300 hours. And on Sunday morning W3ARW is QSOed at 1030. Ernie also mentioned to be on the lookout for a group of locals at 1100 hours on Sundays. Stations in the group include W4's UBY and VCG and W3LCC.

Among W3UJG's further contacts for the months of April and May are W2SEU in Long Island, N.Y., and W1GB/1 in Conn.

On 432 mc Ernie runs a single 4X150 final 120 watts to a 13 element yagi 45' up. His receiver consists of a 6CW4 to 1N21 mixer which converts down to 50 mc and then into a Drake 2A. On  $\frac{3}{4}$  meters Ernie holds no fixed skeds but reports plenty of local activity. W3's R1AHQ, AIR, LCC and W4UBY are some of the stations most often contacted by W3UJG. Ernie makes one other comment, that he plans to go on 432 mc s.s.b. soon and mentions that K2DZM and W3HFY are already on with s.s.b. **Ben, W9OVL, Hammond, Indiana:**

Ben, our Chicago area reporter, sends in a list of over 25 220 mc stations active in his area. On the top of his list are K9's DNG, WSZ and WA9FLV. Ben also sent along another example of the importance of low loss sockets on 220 mc. "We have run across many 220 rigs practically complete, but not on the air. K9JII has two Tecraft transmitters on 220 mc. One does a very fine job as Rudy has low loss feedline and his antenna is high up." Ben is another member of the fraternity who believes in low loss open wire line with no baluns. "The other one (identical to the first) will not work although everything checks through OK. The transmitter was brought back to life by replacing the last two 636 sockets with ceramic (porcelain) ones."

73, Allen, K2UY.

## Ignition Noise vs. Frequency

IRWIN MATH, WA2NDM  
126B Taylor Avenue  
East Brunswick, New Jersey

**D**UE to the increasing interest in mobile communications by amateurs, it was felt that an investigation of the frequency distribution of the r.f. energy radiated from the ignition system of automobiles would prove useful both to the amateur contemplating mobile operation and the amateur already engaged in this phase of the hobby.

Tests were conducted between the frequencies of 2-150 mc thus encompassing the 80 through 2 meter bands. For those frequencies between 2 and 30 mc, a Hallicrafters SX-100 was used and for frequencies above, a Civil Patrol 30-50 mc receiver; a 6 meter converter; and a 100-156 mc converter all using the SX-100 as a tunable i.f. In order to have some sort of reference, a Measurements Corporation #80 signal generator was used and all noise measured with respect to a 10 m.v. signal at the respective frequency. All readings were taken by a peak voltmeter placed across the receiver's voice coil leads, and were converted to db of noise readings vs. frequencies. Antennas used were  $\frac{1}{4}$  wave whips above 30 mc and a 12 foot length of copper rod through a variable impedance matching device below 30 mc. All antennas were placed where the whip antenna would normally be and vertically polarized. With hori-

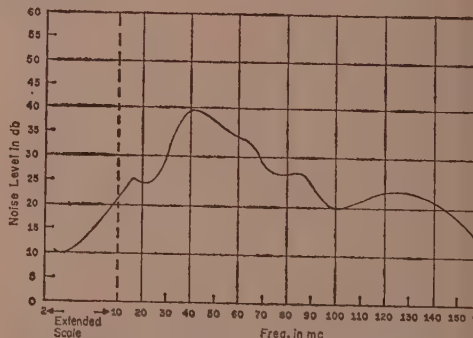


Fig. 1—Graph showing results of study by the author of automobile ignition noise. Note peak between 30-45 mc.

zontal polarization of the pickup antenna, results followed very closely but with somewhat lower noise amplitude. The auto used was not equipped with ignition suppression devices. Unfortunately one that was so equipped was not available and thus could not be tested.

The maximum value of ignition interference seemed to center around 30-45 mc. In fact, about 40 mc, noise was about 30-40 db above any other frequency examined. This would indicate why equipment such as six meter transceivers are so plagued with ignition interference.

# DX REPORT

*an exclusive feature of The VHF Amateur*

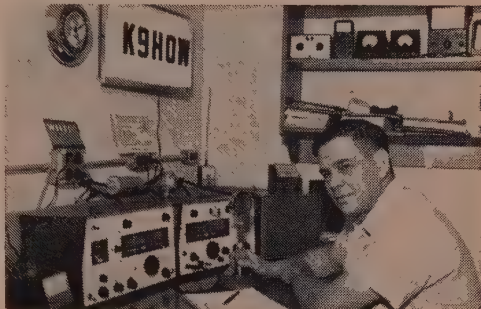
BOB BROWN, K2ZSQ\*, Editor

THOSE OF US WHO OBSERVE SIX METERS from the East Coast have been fortunate enough this year to experience first hand one of the oldest and most accepted characteristics of ionospheric propagation, whether it arrives in the form of *F2*, *TE*, or *Sporadic-E*. As past studies have found (brought out most extensively during the *IGY*) skip signals above 50 mc riding any of the above mentioned forms of propagation will occur most frequently over a North-South path. During our last sunspot cycle when stations from Maine to Florida were working into South America with good regularity, this "North-South phenomena" was brought to light not just as a theory, but as a known fact. Although variations have occurred, even now in 1963 we are seeing every day further evidence of its existence. Judging from the number of 6 meter operators enjoying *Sporadic-E* skip this season along with the numbers of "DX'ers," it would be fair to say that the interest aroused in propagation at the VHF's is more intense today than ever before. And for good reason: there is DX to be worked.

With few exceptions *Sporadic-E* skip of the most common single-hop variety observed at K2ZSQ has developed over an almost predictable path on 50 mc. At the very start of the opening, the state of Florida would be heard breaking through. Later, if movement was to occur at all, we'd not only be working the W4's in Florida, but also into Alabama, Georgia and Tennessee. Then we'd snag a few W5's and W0's before it moved to the Midwest, the W8's and W9's. Usually at this point our DX would either die out or return to Florida for another cycle. But always our DX started with the W4's. This pattern hasn't changed much in all the years we've been on 50 mc. At times our skip wouldn't be much more than Florida, for the "cloud would lift" before any movement had a chance to develop. But the W4's were always first. In more recent years, however, we observed another interesting occurrence: we were hearing KP4's first. Now that six meter activity in Puerto Rico has reached to a substantial intensity and there always seems to be someone on, we'd hear our Spanish speaking neighbors right in there with the W4's, or more often than not, first.

The reason is quite simple. As in past years during the peak of the sunspot cycle, the first skip signals heard and worked were always the ones South of us, over the proverbial North-South path. Since Florida and Puerto Rico are almost directly south of W2-land, we'd work them first. Okay; this brings us up to 1963.

But with this season something happened to



Believe it or not, this is K9HOW's QSL card! Aside from producing nice photographic cards, however, Paul manages to keep the VHF bands quite busy from his Chicago, Illinois, QTH.

further alter this set of circumstances. Harold Lund, VP7CX, of San Salvador, Bahamas, ventured his foot inside the 6 meter door. As we all know, now Harold is probably the most sought after DX figure of the year. And he's always in there. VP7CX breaks through when we hear nothing else from that direction. VP7CX breaks through when we're working the KP4's, and the W4's. VP7CX breaks through while we're working the W0's. VP7CX breaks through when we're working the locals!

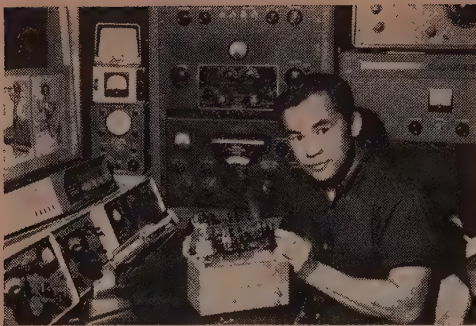
A quick glance at a map tells the story. While Puerto Rico and Florida are both more or less s.s.w. of us, San Salvador is almost directly South. Since VP7CX fits into the North-South path factor perfectly, it explains his many "visits." When FG7XT started making appearances on 6 meters, he, too, fell into Harold's striking force area. We feel that the actual location of these stations is more a determining element than anything else. Regardless of the propagational causes, however, I think we'll all concede that the end result has been a most pleasant one for DX'ers!

## News from the Mailbag

**Misawa Air Base, Japan:** Art Roberts (KØZQR), now KA8AR, writes with his lunchbox news from this exotic country.

"Bob, first off I want you to know I enjoy *The VHF Amateur* very much." *Good start, eh?* —ED. "I am writing to let you know about some of the 6 meter activity here in Japan. When I came here I knew there was activity on 6, but I figured it would all be in the Tokyo area. I was wrong! Misawa A.B. is about 400 miles North of Tokyo, but there is real activity! I am using a Heathkit Sixer with a 55" piece of wire up the wall on the second floor of the barracks. Well, I get 'S9 plus' reports from hams on the Southern part of Japan. Best so far is Hiroshima, about 800 miles. Planning to get a beam up and am

\*The VHF Amateur, 300 West 43rd Street, New York 36, New York.



Step right up and meet George Chong, W6BUR, VHF enthusiast extraordinaire, holding a homebrew 50 mc low level sideband-mixer. Photo courtesy of Cal Cape.

working on a badly needed converter. I hear that the JA boys work VK's and ZL's every once in a while. I am listening! We are restricted to 50 watts on 6. I hope to get a transmitter of about that power built soon.

"When I get a beam up I'll be listening for any possible openings to KH6, KL7 and the States. My frequencies are 50.250 and 50.533 mc. Also have rigs for the d.c. bands, mainly 20 meters (30 watter) and a BC-779." *For shame!*—ED. "Have an SCR-522 for 2 meters, no QSO's though. Also have an APX-6 that works, if you like to listen to TACAN and radar—hi! Well, enough for now. I'll keep you filled in on the KA8 situation." *You do that, Art, and don't forget photo's!*—ED.

**San Salvador, Bahamas:** Harold Lund, VP7CX, sends in another newsy letter regarding skip and his planned trip. Space doesn't permit our including all of VP7CX's notes and letters, although they have been appearing on a regular basis in the *VHF News Bulletin* each week. We highly urge you to send in your self-addressed stamped envelopes, by the way, for your weekly issues so you won't miss out on the latest DX scoop from VP7CX and others.

"Not too much to report this week. Did pick up California on c.w. Have worked all continental U.S. call areas now. Had good openings into Arizona, Michigan, and Oklahoma.

"Trip to HI8 land seems pretty well set. Leaving here June 21st and will return the 4th of July. Am taking along a Clegg Thor VI and a portable 3 element beam. Will probably use the call HI8XHL . . . I received some new QSL's this week and will start to get them out between band openings. I expect it will take some time though. Might take a month or two to get caught up. If the band stays in this shape, though, I might *never* get caught up—hi! VP7CT caused a little excitement on the band. He ended up with a total of only about 25 contacts as he was only on two days before going to the States on Vacation. The transmitter sent down by Ed Lipps, W3BWU, seems to be working okay; however, the converter does not work. Evidently the crystal was damaged in the mail. The transmitter has already been shipped to VP2SY. Crystal fre-

quencies are 50.060 and 50.063. I will send down a 3 element beam and my Johnson 6N2 converter to him this week. (This will mean I'll be off two meters until I get it back.)

"I heard a W6 working a VP4 on six c.w., so there must be some activity down that way. Didn't catch the call . . . Would appreciate it if the fellows sending QSL's would mark their county and any club affiliation on it. When the bands go dead, I'll go through the cards and see if I can get some wallpaper. By the way, I would appreciate it very much if the fellows would use GMT on QSL's. Would make it much easier checking back against the log! That's about it for now. Will drop you a line when I collect some more news. I worked a few more Kentucky stations this week." *Good for you, Harold! I think you're doing better with Kentucky this year than we are. Let us know how your trip worked out.*—ED.

**Saddle Brook, New Jersey:** James F. O'Connor Jr., WB2DQS, tells us what he's been doing on two meters.

"I have really enjoyed the *VHF News Bulletin* every week. They are very informative and quite interesting. Enclosed is my second batch of envelopes, more to follow. I haven't too much to report; the station is not completely set. Now running 100 watts to a CushCraft "Big Wheel" on 2 meters. Recently worked a little under 200 miles for a new and fifth state on 2." *What was it?*—ED. "Soon will be running 100 watts to 6 elements on 50 mc at 55' and 6 elements up 65' for 2. Right now looking for skeds anywhere but especially to Rhode Island and Delaware on 2. School is almost out now, so any time of day will do; my frequency is 145.008 mc." *Okay boys, you have the scoop. Write Jim at 74 South Broadway.*—ED.

**Louisville, Kentucky:** Dale Peterson, WA4CQG, faithful reporter from the land of blue grass, proposes a new contest. See how you feel about his ideas.

"Bob, I was very much interested in your April EDITORIAL. I try to participate in as many VHF contests as I can. As you, I believe that contests play an important role in the testing of equipment and the operating ability of the operator . . . However I find fault with all these affairs in that there is very little c.w. operation. I would be very happy to see a c.w. VHF contest. There are many operators around this general area (200 miles) whose operation is 90% c.w. Maybe this will, or maybe this won't be, a big hit. But I wish you would try it, at least on time. I think you will be surprised with the response. While I am writing I might as well mention that CQ took a giant step further when they started publishing *The VHF Amateur*. Please inform me whether you will or will not consider a c.w. VHF contest. I think you're making a big mistake if you don't." *Okay fellows, we'll leave it up to you. If you think Dale has the right idea, don't keep it to yourself. Drop a card with your ideas to: C.W. Contests*

elo The VHF Amateur, 300 West 43rd Street, New York 36, New York. We'll let you know what happens.—ED.

**Argentia, Newfoundland:** Bill Graham, WA4DKS, writes on what he hears from the North country.

"This evening myself (WA4DKS) and my friend Sam Leach (K3KLC/VO1) were scanning the bands with an NC-270 and 100 ft. long wire antenna and were happy to note a band opening on 6 meters. We logged the following calls at approximately 2135 GMT, May 27: K1IXS, K1FIL, K1RPW and K1RXS. K1FIL and K1RPW were 59 plus here. Many other signals were heard, most of them readable." Thanks, Bill, for your enlightening note. Next thing in store for you is a 6 meter rig, and antenna!—ED.

**Ozone, Tennessee:** Reliable Joe, WA4EPY, sends us notes on his observations during May.

"This was one of the most remarkable periods of skip openings in recent years. This station noted and/or worked skip all but three or four days during the entire month.

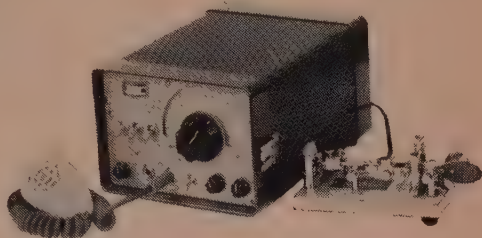
"Many of the openings were brief and sporadic, sometimes lasting only four or five minutes. Several days the openings moved in a clockwise direction from New England to Bermuda, Bahamas, Cuba, W5 and up to W0 within a period of two or three hours. At least twice the openings reversed 180°. On May 5, for example, after working several W0's between 10:20 and 10:55 EST, we heard and worked VP5BB on Grand Turks at 10:55 and then several New York and Massachusetts stations. The same day at 1750 we worked WA8DDB in Michigan and at 1810 K4PGL/VP9 in Bermuda. We noted on one or two occasions some short skip—the coast of North Carolina and Virginia to East Tennessee. Every call area in the U.S. was worked; also every call area in Canada except VE5. Seven countries were worked: Canada, Bermuda, Bahamas, Turks & Caicos, Guadalupe, Cuba and Mexico. Several times again we noted what seems to be a high altitude duct between this station and VP7CX. Harold was heard or worked at this QTH (1700' above sea level) from 15 to 30 minutes before he was heard at lower altitudes. And it was noted that he was audible here from 15 to 30 minutes longer than at lower altitudes several times.

"Many of the openings were daytime and not too many extended into the evening hours, though on the 1, 2, 5, 6, 15, 16, 18, 23, 24 and 28th there were openings of longer or shorter duration after 1700 EST. Unlike last year, when so many openings fell on week-ends, this year very few did. All in all this was one of the most exciting periods of skip propagation we can recall."

**Plainfield, New Jersey:** Ted Schapack, WB2CIY, writes about his Summer activities.

"I will be portable-one this Summer for about 65 days in Ferrisburg, Vermont, just South of

# THE VERSATILE *Lil' 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.

BRAND NEW FROM CLEGG LABS . . . THE

# POWER PACKED

## THOR 6

TRANSCIVER  
FOR 6 METERS.



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:

- NUVISTORIZED 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.



See your Distributor  
or write for information.

LABORATORIES  
DIVISION OF TRANSISTOR DEVICES, INC.  
RT. 53, MT. TABOR, N. J.  
OAKWOOD 7-6800

For further information, check number 14, on page 110

Burlington. The sked times will probably be between 0000 and 0400 GMT. Please have the b write for skeds at WB2CIY/2, c/o Hawk Ferrisburg, Vermont.

"Bob, maybe we'll work each other, altho I don't think you'll need Vermont, and I tainly don't need New Jersey!" *We'll give it a just the same, Ted. Ought to be fun!*—ED.

### R.R.F. Notes

Before we start sorting through this month's Sporadic-E bonanza, a reminder is due re program. We have official Reader Report Forms available in any reasonable quantity those of you who would like to become contributing reporters. Just drop a line to me at the address shown requesting your supply. We always need more reporters who can take the time to let us know what they've been working and hearing. Okay, now into the stacks!

KØFPC in Harrisonville, Missouri, snagged W4USZ and K8ULT for his first Georgia contacts in Michigan, respectively. Bob sez, "WAØBPC Butler works Omaha (200 miles) groundwave with a Clegg 99'er—WOW! My best groundwave with Sixer and dipole is 70 miles so far" . . . WA5EOG in Arkansas is getting more than his share of DX these days . . . WB2AAI also ports having a ball with Sporadic-E . . . K4P Knoxviz, Tennessee, recently added CO5 VE1IB, VE4MA, WAØBMB (S.D.), and VP7 to his growing list of DX . . . WAØDJK in Ontario snagged K5ILD in Dallas for a 680 mileer. K9CIF has all the luck: K7EMO, W7BKI (Woming), W1JCV (Maine), W4KYN (S.C.), worked, while he heard FG7XT, KP4A KP4EVR, KP4BZR, KP4AAN, KP4BIU WA6PVE . . . WAØDZH worked on 2 me W8KAY on recent aurora, and heard W8I and W4HJQ. "WØGXB is on 144.060 mc looking for contacts anywhere. WØDLB is active in the Cedar Rapids area. Not much DX to report, but will keep listening!" . . . WA4ITK Miami sez he'll soon be operating, or rather "hilltopping," from Smoky Mountain National Park, near Gatlinburg, and along Blue Ridge Parkway near Blowing Rock, N.C. Intend to camp out and power Communicator III and beam with Volkswagen *Say hello to "Brown for me, Verne.*—ED. . . W8CUP, K4JPD K4UVD worked in one day by K7OCG, Phoenix . . . K1RTS (2 meters, Conn.) got K1Y K1JSG and K1RGO/1 during the Spring VHF Contest.

Tommy Roe, WB2DQO, of Yorktown Heights, New York, reports a staggering list of DX and sez that the K4HIL QSL card is on its way and behold and rejoice. Also sez that TVI K3HNP neglected sending him a QSL! Tommy is moving to Virginia soon . . . K7OCG worked VE6OH, VE6CC, VE6AJX, and VE6CG May 9 . . . John (K7OCG) says, "Thanks a lot, Bob, for all the glory you gave me in the June issue of *The VHF Amateur*. Now I won't be able to make a local contact—hi!" . . . W4UA has been working well into the northeast on skip

# One KW 6 Meter Linear!

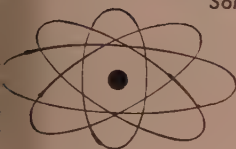


*Supreme*  
Model SB6-LA  
ONLY

\$229.<sup>50</sup>

- Full Legal Input Power on Six Meters, CW & SSB.
- 600 Watts Input as AM linear amplifier
- Driving Power Requirements: 32 Watts PEP
- Quiet Operating 58 CFM Blower
- EIMAC 3-400Z in Grounded Grid
- Size: Height 6½", Width 15", Depth 9½". Weight 15 Lbs.
- Voltage Requirements: Plate Supply 2500 to 3000 Volts @ 300 Ma.

Solid state power supply available. Matching Unit, \$199.50.



*Supreme Electronics Inc.*

FRONT AND MAIN STS. • UPLAND, PA.

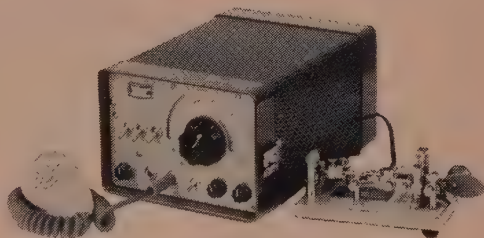
For further information, check number 15, on page 110

W5KMQ in New Mexico was caught by W6IEY for a nice 800 miler . . . WA4FJF of Panama City, Florida, succeeded in racking up Arkansas, West Virginia, Kansas, Colorado, California, Washington, Montana, and New Mexico during May. *Congratulations, Ellen!* . . . K5RCG/Ø in Nebraska sent in his staggering list of 6 meter skippers, too long to print here . . . K1PLR up in Stamford, Connecticut, recently snagged W1BU and W3BDK on 2 . . . K9TFJ's spouting with s.s.b. from Greenwood, Indiana. Caught K4YSN on d.s.b. . . . WB6BZX busy fishing out K7SMP, K7PAG, KØZKD, K7GWE, VE6OH, W5FRK, K7CML, K7ALE, K7EMO, K7LME, etc. These represent some choice areas like S.D., Mont., N.C., Idaho, Ariz., Wyo., & Utah! . . . K7NJS of Phoenix sez, "John, K7OCG, asked me to write to let you know there are other stations in Phoenix interested in your column." Jay's caught W8BBD, K8BKB, K5UMK, WØHPK, WA6YAN, K3NNZ . . . K4IXC, Melbourne, Florida, heard on two meters W9UNN/Ø in Wichita, Kansas on 144.091 mc on 6/2/63. He peaked 10 db over S9. Es? . . . VE3CVX worked K8WIQ, W8QLU, W8YIO, K8PBA, W8AOE, and K8ORA on June 2 . . . WAØDZH in Marion, Iowa, worked WØAWK, WØRSP, and K9GAQ.

WA6LRF's on 6 and busy working K7VMT, K1JDH/7, K7PLO, W5DNA, WA4BMC, VE7-ALP, VE6MO, K7NJJ and VE6UV . . .

[Continued on page 83]

## New Six Meter Transmitter



OF SPECIAL INTEREST TO 6 meter enthusiasts is the new Whippany Laboratories Li'l Lulu 50 mc transmitter, designed with the mobile ham in mind. This transmitter has been popular for years as a construction item for club projects, etc., originally designed by Ed Ladd, W2IDZ. Now available with many added features, the Li'l Lulu comes as a complete package with v.f.o. control, gang-turned to amplifier stages, a 12 v.d.c. and 110 v.a.c. power supply, effective low pass filter, etc. The v.f.o. tunes 50 to 54 mc for full band coverage.

This transmitter offers in addition shaped keying for clean c.w., v.f.o. heater and plate voltages well regulated. Detail manual is supplied with each unit. Price, wired and tested, \$225.00 through your dealer. ■

# Top Trades on CLEGG From

# W3BAH

BUY AT HAM BUERGER'S



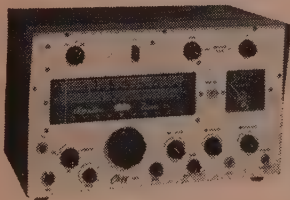
"HAM" BUERGER

*Electronic Equipment Distributor*

RICES MILL ROAD AT GLENSIDE AVENUE • WYNCOTE, PA., U.S.A.

## CLEGG'S ZEUS

Top Performance on 6 and 2 Meters



### 6 and 2 m. Transmitter

Up to 185 watts input possible on a.m. or c.w.

Full coverage of the amateur 6 and 2 meter bands and associated Mars frequencies, with maximum TVI suppression. Automatic modulation control with up to 18 db of speech

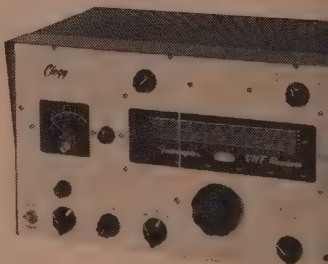
HAM NET \$695.00

clipping provides magnificent audio with "talk power" greater than many kilowatt rigs. Ultra-stable VFO.

### 6 and 2 m. Receiver

Designed for the serious operator on 6 and 2 meters. Exactly matching the famous Zeus Transmitter, the Interceptor offers reception with virtually no cross modulation.

Nuvistor RF stages provide an extremely low noise figure with high sensitivity. Stability is ideal for the exacting requirements of SSB and CW.



HAM NET \$475

## CLEGG'S THOR 6 6 Meter Transceiver

The Thor 6 is of two unit construction . . . The Receiver—RF unit for convenient desk top operation and the modulator/pwr. sup. unit may be located remotely by a 10' interconnecting cable (provided).

12V DC Mod./Pwr. Sup. \$100.

HAM NET \$349.00



WE GIVE



For further information, check number 16, on page 110

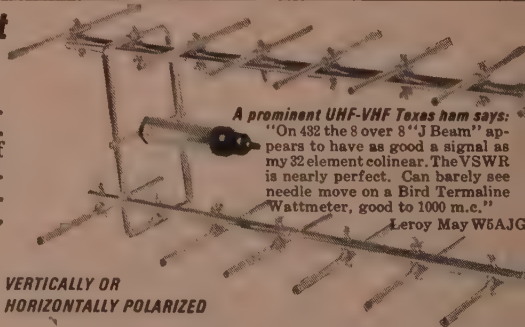
## "J" BEAM —the world's finest 144 m. c. antenna—Also 220-432

Add elements anytime for added gain. No tuning, even when elements added. 50 ohm models include waterproof balun. Lightweight; heavy wall tubing. Larger "J Beams" supported at center. Fittings and hardware of special alloy.

MADE IN ENGLAND

Priced Low as **\$18.95** (300  $\Omega$  model)

VERTICALLY OR  
HORIZONTALLY POLARIZED



A prominent UHF-VHF Texas ham says: "On 432 the 8 over 8 'J Beam' appears to have as good a signal as my 32 element colinear. The VSWR is nearly perfect. Can barely see needle move on a Bird Terminal Wattmeter, good to 1000 m.c."

Leroy May W6AJG

Commercial Models Now Available for all VHF Frequencies / **GAIN INC.** Full details free—write Bill 1209 W. 74th St. Chicago 36, Ill.

For further information, check number 17, on page 110

## DX Report [from page 81]

on June 2 on two meters . . . "Heard Bill, V4YXT, and Doc, WA4ELH, (both Kentucky) working K9LTC, K9HDE, K9EVA about 50.21 mc between 1 AM and 2 AM."—Joan, K9YEN . . . K9DNW/7, Pinedale, Wyoming, worked K7KSZ and K7EEK, both in Washington. Jim uses a Sixer and dipole . . . K4YHG, Tampa, Florida, accumulated a huge list of DX recently including KP4AAN and VP5CW . . . K8REG, Dayton, Ohio, snagged K7MAC (Utah), W8NAF/7 (Ariz.), and VE7ASM (Abbotsford, B.C.) in late May and early June . . . W2TND, Elizabeth, New Jersey, works 2 meters and snagged K4EUS, W1BU, K3OEK, W3IBH, K1RJH, W3ADK (using a 150' dish), W2LWI and W1RJA during late May . . .

Worcester County, Maryland, is now available on 6 through K3NXH/3 in Ocean City. Charlie's already worked W4MMP (N.C.), K4TKP (Norfolk), K3LOM (Pa.), and many New Jersey stations. "I am trying to put Worcester County on the USA-CA map!" . . . K4EBT/W4RLX worked 247 stations in 63 counties with 16½ watts input during the March contest, altho he didn't submit a log. Milt sez he's worked 1106 DX stations on 6 meters in 42 states during the first six months of 1963

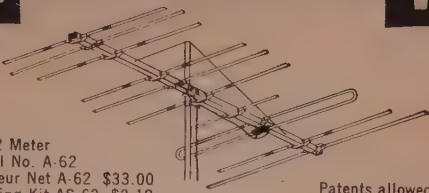
WA2DRK of Long Beach, New York, sent us a huge list of 2 meter DX heard but, unfortunately, not worked. "I don't think they tune to 145.00 mc," comments Harry. Some of these include: W1ALE, W1SCC, VE1QY, W1COP, K1NBF, K1VXL, K1BZA, W8KAY . . . KØDQG (Boone, Iowa) floods us with another skip list. Richard's really been going to town! . . . KØECG, St. Louis, snagged KØYCX, WØZMT, KØHIO, KØSLO and KØCCK on June 10-11 . . . WA9CVD in Richmond, Indiana, (our old stompin' grounds!—ED.) reports some nice 2 meter groundwave in early June to K9VTT/9, K9VUX, K9RVG, K9PFI, and K8OEN/8

### Flowers

Thanks to the fine cooperation between VHF DX men and *The VHF Amateur* (through our Reader Reporting Forms and the free *VHF News Bulletin*) we are proud to report 217 separate contributions to this column this month. 87% of these arrived on our official *RRFs*, the rest cards and letters. Although creating a job like Ye Editor's never dreamt of in his most horrible nightmares, it is gratifying to see the enthusiasm among the VHF fraternity toward our publication and efforts. Our heartfelt thanks for a job well done.

73, BOB, K2ZSQ

**2 ANTENNAS IN 1**



6 & 2 Meter  
Model No. A-62  
Amateur Net A-62 \$33.00  
Stacking Kit AS-62 \$2.19

Patents allowed  
and pending

### 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 Directores

#### ON 6 METERS

- Full 4 Elements
- 1 — Folded Dipole
- 1 — Reflector
- 2 — Directores

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.

# VHF

BCNU  
NEXT MONTH

and evening September 7, 1963. It will be held on the club grounds on the Old Pittsburgh Road, just 2 miles north of Uniontown, Pa. Refreshments will be available. Registration is \$2.00.

California

Anyone wanting to join a hip Southern California net write to: Les Cammer, K6VWK, Navy 830, Box 18, c/o FPO, San Francisco, Calif.

Kansas-Nebraska

The annual Kansas-Nebraska Radio Club will hold their hamfest on Sunday, Aug. 11 at the Concordia, Kansas, National Guard Armory. This event will honor the memory of Ray "Bake" Baker, W0FNS. A complete program is planned. The club's address is P.O. Box 157, Concordia, Kansas.

Florida

The Daytona Beach A.R.A. will hold its hamfest on the Labor Day Weekend at the "Sun Rise" and "Blue Bird" Motels four miles north of Ormond Beach, Florida on Highway A1A. The club QTH is P.O. Box 88, Daytona Beach, Fla.

Delaware

The second annual Delaware hamfest will take place at the Dover Air Force Base picnic grounds on August 18 (rain date, Aug. 25). Registration \$1.00 in advance, \$1.50 at the gate. For more information and tickets contact W3LQE, 17 N. Avon Drive, Wilmington 3, Del.

Ohio

The Newton Falls Community Center, Newton Falls, Ohio will house the 6th Annual hamfest sponsored by the Warren Amateur Radio Ass'n. The date is Sunday, Aug. 25 and time is 12 noon to 5 p.m. Tickets and registration at \$1.50 may be obtained from Imogene Kalkan, 112 Shirley Lane N.W., Warren, Ohio.

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington 25, D.C.

In the Matter of

Amendment of Parts 2 and 12 of the Commission's Rules to modify the availability of frequencies in the band 1800-2000 kc for use by the Amateur Service on a shared basis with Loran stations.

RM-298

REPORT AND ORDER

By the Commission:

1. The Commission's Order of February 13, 1963, in the above-captioned matter (FCC 63-137) was published in the Federal Register on February 22, 1963 (28 F.R. 1734). Among other things, that Order relieved certain restrictions on amateur operation in the band 1800-2000 kc.

2. The Commission's Report and Order adopted on April 10, 1963, in the same matter (FCC 63-318) was published in the Federal Register on April 16, 1963 (28 F.R. 3696). This Report and Order further relieved restrictions on amateur operation in the 1800-2000 kc band but advised the public that it would become necessary to extend the Loran-A system of radionavigation operations on 1900 kc to the area of the Gulf of Mexico beginning June 1, 1963. The Report and Order stated further that the Commission would amend its Rules to restrict amateur operation in other respects in the bands 1875-1900 and 1900-1925 kc as a consequence of the extended Loran-A operation.

3. The Commission has now been advised that Loran-A operations on 1900 kc will not commence until July 1, 1963. The revised sharing conditions reflect some relaxation of the sharing criteria with the radio-navigation system as a result of higher powered Loran transmitters and the use of improved receivers, and are made with a

precautionary note that prompt and appropriate adjustment of the amateur radio service restrictions will be necessary if interference should be caused to the Loran-A service.

4. Because of the nature of Government requirements and the national defense considerations involved herein, the Commission finds that it is impracticable, unnecessary and contrary to the public interest to comply with the public notice and effective date requirements of Section 4 of the Administrative Procedure Act.

5. In view of the foregoing, IT IS ORDERED, That, pursuant to the authority contained in Section 4(i), (j) and 303(c), (f) and (r) of the Communications Act of 1934, as amended, Parts 2 and 12 of the Commission's Rules are amended as set forth in the Appendix hereto, effective June 30, 1963.

FEDERAL COMMUNICATIONS COMMISSION  
BEN F. WAPLE  
Acting Secretary

\$2.106 [Amendment]

2. Section 12.111 (b) (3) is amended to read as follows:  
\$12.111 Frequencies and types of emissions for use of amateur stations.

- (a) \* \* \*
  - (b) \* \* \*
- (3) Amateur operation shall be limited to:

| Area                                                                                | Maximum D. C. Plate Input Power in Watts |       |                 |       |                 |       |                 |       |
|-------------------------------------------------------------------------------------|------------------------------------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|
|                                                                                     | 1800 to 1825 Kc                          |       | 1875 to 1900 Kc |       | 1900 to 1925 Kc |       | 1975 to 2000 Kc |       |
|                                                                                     | Day                                      | Night | Day             | Night | Day             | Night | Day             | Night |
| Alabama                                                                             | 200                                      | 50    | No oper.        |       | No oper.        |       | 100             |       |
| Alaska                                                                              | 200                                      | 50    | 200             | 50    | No oper.        |       | 500             |       |
| Arizona                                                                             | 100                                      | 25    | 100             | 25    | 100             | 25    | No oper.        |       |
| Arkansas                                                                            | 200                                      | 50    | No oper.        |       | No oper.        |       | 200             |       |
| California                                                                          | No operation                             |       |                 |       | 200             | 50    | 500             | 2     |
| Colorado                                                                            | 200                                      | 50    | 100             | 25    | 100             | 25    | 500             | 1     |
| Connecticut                                                                         | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Delaware                                                                            | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Dist. of Col.                                                                       | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Florida                                                                             | 100                                      | 25    | No oper.        |       | No oper.        |       | No operation    |       |
| Georgia                                                                             | 100                                      | 25    | No oper.        |       | No oper.        |       | No operation    |       |
| Hawaii                                                                              | No operation                             |       |                 |       | 100             | 25    | 100             |       |
| Idaho                                                                               | 100                                      | 25    | 200             | 50    | 200             | 50    | 500             | 1     |
| Illinois                                                                            | 200                                      | 50    | 100             | 25    | 200             | 50    | 200             | 2     |
| Indiana                                                                             | 200                                      | 50    | 100             | 25    | 100             | 25    | 100             |       |
| Iowa                                                                                | 500                                      | 100   | 100             | 25    | 100             | 25    | 200             |       |
| Kansas                                                                              | 500                                      | 100   | 100             | 25    | 100             | 25    | 200             |       |
| Kentucky                                                                            | 200                                      | 50    | 100             | 25    | 100             | 25    | 100             |       |
| Louisiana                                                                           | 200                                      | 50    | No oper.        |       | No oper.        |       | No oper.        |       |
| Maine                                                                               | 500                                      | 100   | 100             | 25    | No oper.        |       | No operation    |       |
| Maryland                                                                            | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Mass.                                                                               | 500                                      | 100   | 100             | 25    | No oper.        |       | No operation    |       |
| Michigan                                                                            | 500                                      | 100   | 100             | 25    | 100             | 25    | 200             |       |
| Minnesota                                                                           | 500                                      | 100   | 100             | 25    | 100             | 25    | 200             |       |
| Mississippi                                                                         | 200                                      | 50    | No oper.        |       | No oper.        |       | 100             |       |
| Missouri                                                                            | 200                                      | 50    | 100             | 25    | 100             | 25    | 200             |       |
| Montana                                                                             | 100                                      | 25    | 200             | 50    | 200             | 50    | 500             | 1     |
| Nebraska                                                                            | 500                                      | 100   | 100             | 25    | 100             | 25    | 500             | 1     |
| Nevada                                                                              | 100                                      | 25    | 200             | 50    | 200             | 50    | 500             | 2     |
| New Hampshire                                                                       | 500                                      | 100   | 100             | 25    | No oper.        |       | No operation    |       |
| New Jersey                                                                          | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| New Mexico                                                                          | 200                                      | 50    | 100             | 25    | 100             | 25    | 500             | 1     |
| New York                                                                            | 500                                      | 100   | 100             | 25    | No oper.        |       | No operation    |       |
| North Carolina                                                                      | 200                                      | 50    | No oper.        |       | No oper.        |       | No operation    |       |
| North Dakota                                                                        | 500                                      | 100   | 200             | 50    | 200             | 50    | 500             | 1     |
| Ohio                                                                                | 200                                      | 50    | 100             | 25    | 100             | 25    | 100             |       |
| Oklahoma                                                                            | 500                                      | 100   | No oper.        |       | No oper.        |       | 200             |       |
| Oregon                                                                              | No operation                             |       |                 |       | 200             | 50    | 500             | 1     |
| Pennsylvania                                                                        | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Rhode Island                                                                        | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| South Carolina                                                                      | 100                                      | 25    | No oper.        |       | No oper.        |       | No operation    |       |
| South Dakota                                                                        | 500                                      | 100   | 100             | 25    | 100             | 25    | 500             | 1     |
| Tennessee                                                                           | 200                                      | 50    | No oper.        |       | No oper.        |       | 100             |       |
| Texas                                                                               | 500                                      | 100   | No oper.        |       | No oper.        |       | 200             |       |
| Utah                                                                                | 100                                      | 25    | 100             | 25    | 100             | 25    | 500             | 1     |
| Vermont                                                                             | 500                                      | 100   | 100             | 25    | No oper.        |       | No operation    |       |
| Virginia                                                                            | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Washington                                                                          | No operation                             |       |                 |       | 200             | 50    | 500             | 1     |
| West Virginia                                                                       | 200                                      | 50    | 100             | 25    | No oper.        |       | No operation    |       |
| Wisconsin                                                                           | 500                                      | 100   | 100             | 25    | 100             | 25    | 200             |       |
| Wyoming                                                                             | 200                                      | 50    | 100             | 25    | 100             | 25    | 500             | 1     |
| Puerto Rico                                                                         | 200                                      | 50    | No oper.        |       | No oper.        |       | 100             | 25    |
| Virgin Islands                                                                      | No operation                             |       |                 |       | 100             | 25    | 100             |       |
| Swan Island                                                                         | 500                                      | 100   | No oper.        |       | No oper.        |       | No oper.        |       |
| Serrana Bank                                                                        | 500                                      | 100   | No oper.        |       | No oper.        |       | No oper.        |       |
| Roncador Key                                                                        | 500                                      | 100   | No oper.        |       | No oper.        |       | No oper.        |       |
| Navassa Island                                                                      | No operation                             |       |                 |       | No oper.        |       | No oper.        |       |
| Baker, Canton, Enderbury, Guam, Howland, Jarvis, Johnston, Midway & Palmyra Islands | No operation                             |       |                 |       | 500             | 100   | 500             |       |
| American Samoa                                                                      | 500                                      | 200   | 500             | 200   | 500             | 200   | 500             |       |
| Wake Island                                                                         | 500                                      | 100   | 500             | 100   | No oper.        |       | No operation    |       |

Correction

"A Solid State Fixed-Tuned Receiver" in the July issue has a resistor mislabeled. The vertical resistor from the -12 volt line, to the center tap of the driver transformer which is labeled 47 ohms should be 4.7K. Sorry.

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.

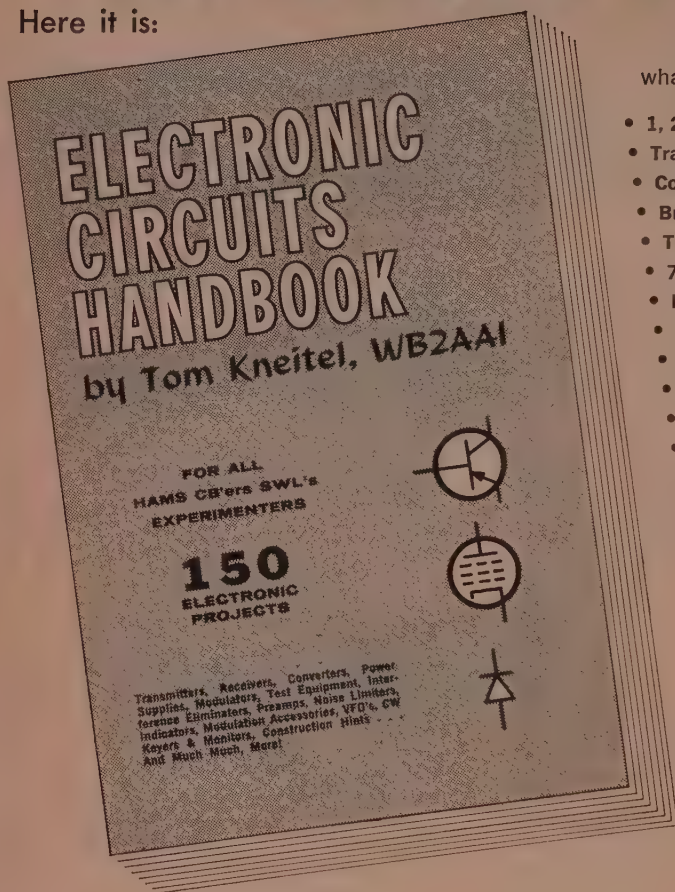
103 West 43 St., New York 36, N. Y. (212) JUdson 2-1500



For further information, check number 19, on page 110

# YOU ASKED FOR IT!

Here it is:



Here's just a sample of what you'll find in its chapters:

- 1, 2 and 3 tube transmitters
- Transmitting tube rejuvenator
- Comprehensive coil winding data
- Brute force power line filters
- Transistorized CW monitor
- 750 watt linear amplifier circuit
- Four good VFO circuits
- 75 Watt Novice "gallon" circuit
- All band preselector circuit
- All-nuistor 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, CV 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!**

# LAFAYETTE RADIO

## Quality AMATEUR GEAR Since 1923

### THE LAFAYETTE HE-30 Professional Quality Communications Receiver



**8995**

- Tunes 550 KCS to 30 MCS in Four Bands • Built-In Q-Multiplier for Crowded Phone Operation • Calibrated Electrical Bandspread on Amateur Bands 80 Thru 10 Meters
- Stable Oscillator and BFO for Clear CW and SSB Reception • Built-In Edgewise S-Meter

Sensitivity is 1.0 microvolt for 10 db. Signal to Noise ratio. Selectivity is  $\pm 0.8$  KCS at  $-65$ db with Q-MULTIPLIER.

### STARFLITE 90-WATT Phone and CW Transmitter Kit

MADE IN U.S.A.



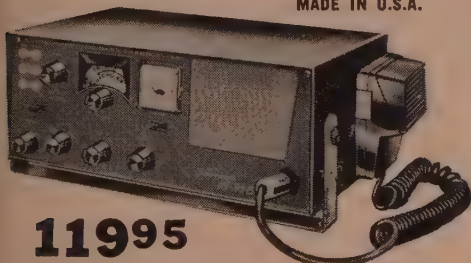
**6950**

- 90 Watts Phone or CW on 80 Thru 10 Meters • Built-in 3-Section Low-Pass Filter • Clear, Chirpless, Grid Block Keying

Dollar for dollar you can't beat this new Lafayette Starflite transmitter. Easy to build and operate, it glistens with quality and performance all-over.

### LAFAYETTE HE-45B DELUXE 6-METER TRANSCEIVER

MADE IN U.S.A.



**11995**

- High Efficiency—Up To 100% Modulation • New Modulation and Power Transformers plus 7868 Power Pentode
- New Heavy-Duty Communications Vibrator • Front Panel Antenna Loading Controls • New Standby Switch: VFO Power Jack • Sensitive Superhetrodyne Receiver • Built-in 117 VAC and 12 VDC Power Supplies • Rugged Push-to-Talk Ceramic Microphone

#### LAFAYETTE HE-50A 10-METER TRANSCEIVER

Similar to above except for 10-meter operation ..... **89.95**

### LAFAYETTE 6 AND 2 METER CONVERTERS



- Self-Powered
- 7-11 MC Output
- Sensitivity better than  $1 \mu\text{v}$  for 10 db S/N ratio
- Image Rejection: in excess of 40 db
- Antenna Input Impedance 52 ohms
- For 117V 50/60 cycles AC

**2995** HE-56  
6-METER

**3295** HE-71  
2-METER

Deluxe ruggedly built converters designed to respond to the weakest signals. Crystal Frequency, HE-56: 43MC; HE-71: 45.66 MC. Shpg. wt., 6 lbs.

HE-56 6-Meters ..... **29.95**  
HE-71 2-Meters ..... **32.95**

**LAFAYETTE  
RADIO  
ELECTRONICS**

SYOSSET, L. I., N. Y.  
111 Jericho Tpk.

JAMAICA, N. Y.  
165-08 Liberty Ave.

NEW YORK, N. Y.  
100 6th Ave.

BRONX, N. Y.  
542 E. Fordham Rd.

NEWARK, N. J.  
24 Central Ave.

PLAINFIELD, N. J.  
139 W. 2nd St.

SCARSDALE, N. J.  
691 Central Ave.

PARAMUS, N. J.  
182 Route 17

NATICK, MASS.  
1400 Worcester St.

BOSTON, MASS.  
110 Federal St.

For further information, check number 9, on page 110

August, 1963 • CQ • 87

## Morse [from page 46]

was their life and living. In their day the men of the clicking relays and sounders were the true nerve centers of the nation—yes of the world. No news, no secret was hidden from them.

The outgrowth of Morse's discovery, that electricity could be made to carry intelligence instantly over many miles of wire, played a dramatic part in National and World developments since. Here in the U.S. the Pony Express was replaced by the swifter wires. Our railroads for many years depended upon the telegraph for their proper and safe operation. Transcontinental telegraph service and transatlantic cables were also an outcome of Morse's invention.

Morse at one time commented, "if the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted instantaneously by electricity." In that prophesy we have today's television.

Truly, we radio Amateurs owe a massive debt of gratitude to this great scientific pioneer. It is indeed fitting and proper that we honor his birthday tonight. ■

### SOURCES

1. Private correspondence Lew Tucker, Sec'y-Treasurer, Toledo Chapter, Morse Telegraph Club, Inc. and D. C. McCoy.
2. Ezra Cornell—*A Commemoration*, Cornell University, May, 1957.
3. *The Life of Samuel Finley Breese Morse—Inventor of the Telegraph*, American Heritage, April, 1961.
4. *A Pictorial History of Radio*, Irving Settel, The Citadel Press, New York City, 1960.

## Ranger [from page 43]

you can dream up to get it grounded, to be used.

A thought worth mentioning is that the d.p.d.t. switch positions may be reversed due to the internal connections of the particular switch being used. Try this before giving up on the whole thing. Another word of caution; whenever the rig is operated with the remote switching, care must be taken when using the spotting switch. The operate switch must be returned to the standby position before spotting. Otherwise the rig will be keyed with no load. Don't blame me for that one, that's the way it works with the factory designed p.t.t. on phone. ■

## Marconi [from page 44]

with Z-Spar boat paint. An aluminum plate of 16 gauge sheet is placed at the bottom of the box and on one side. Then a 24 turn length of Air-Dux #2408 is mounted on a couple of insulators. One end of the coil goes out through a bolt fastened to the aluminum plate for a ground connection. A 5 foot rod driven into the ground, and a few odd pieces of #12 wire buried a few inches in the lawn constitute the ground system. The other end of the coil goes to a variable 200 mmf capacitor taken from a defunct BC-375E surplus tuner unit. This capacitor is

mounted on insulators and an insulated shaft runs out to a tuning knob. The five position switch in the BC-375E tuner serves as a switch to tap turns on my coil for the various parts of the band. The circuit is shown in fig. 1.

### Tuning Adjustments

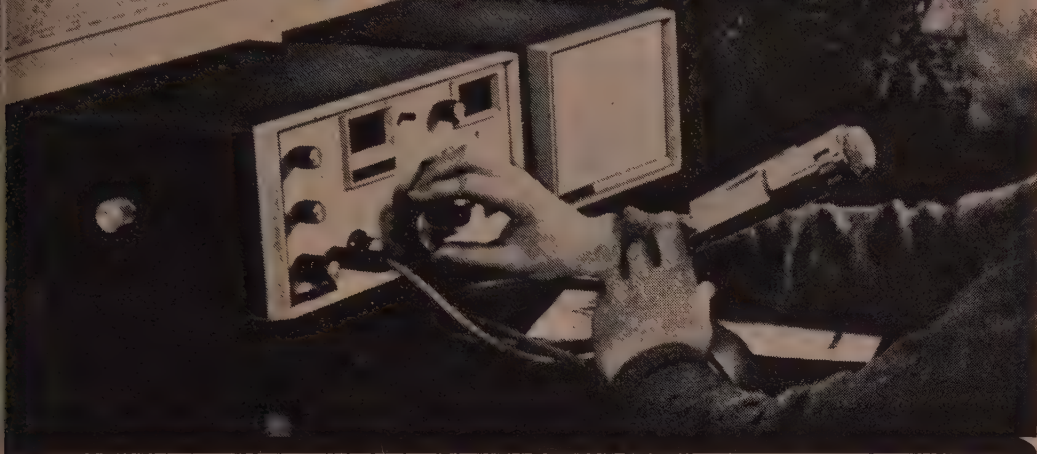
There are various ways to tune this type of antenna, but here is how I tuned mine. I unscrewed the coax from the tuner box and clipped a lead from the aluminum to the center conductor on the coax fitting. Setting the series capacitor at just about full mesh, I took the grid-dripper and tried to find out where the antenna resonated with the 24 turn coil. I found that by tapping down until I had 19 active turns my system would resonate at 3.5 mc. The following chart indicates the active turns per frequency:

|        |    |               |
|--------|----|---------------|
| 3.5 mc | 19 | active turns. |
| 3.6 mc | 18 | " "           |
| 3.7 mc | 17 | " "           |
| 3.8 mc | 16 | " "           |
| 3.9 mc | 15 | " "           |
| 4.0 mc | 14 | " "           |

Note that it required tapping one turn per 100 kc. As my most frequent operating position was at 3850 kc I grid-dipped my antenna system on the 3.8 mc tap and varied the capacitor just slightly for a nice deep null position. I was now ready to apply power and so connected on the coax feeder and placed the lead from the fitting on to the coil one and a quarter turns up from the ground end. This later proved to be the right spot. A rough field check can be made by applying a little power from the transmitter at 3850 kc and while watching the field strength meter, move the tap back and forth a half turn at a time. It will be possible to observe variation in output going away from this tap. Fasten it down at the point where you get the most radiation.

For a more precise adjustment of the tap you will have to use an s.w.r. indicator in the shack. First tune the transmitter up to a 50 ohm non-inductive resistor and then switch it to the antenna and measure the s.w.r. at 3850 kc. If it is not 1:1 and you want it the best, you can run back out to the tap and move it one way or the other slightly until the best or lowest s.w.r. is obtained. If you move the tap too far up the coil, the transmitter will not load into it. I found the vicinity of one turn about right. With the s.w.r. of 1:1 on 3850 kc I found I could move 50 kc either side with a maximum s.w.r. of 1.2:1 without going out to the tuner. In fact I tune most of the phone band without changing the tap. I could go down into the c.f. band to 3.6 mc with only 1.5:1 s.w.r. which isn't too bad. A purist could have a double pole switch and change both taps moving around the band but it has not been necessary here. This indicates that the coax matching tap can be left at one turn up from the bottom of the coil and the tuning capacitor rotated with a motor if the operator would like to keep the antenna at complete resonance at all times.

**NEW**



## NEW NATIONAL NCX-3 TRI-BAND TRANSCEIVER AT LEW BONN COMPANY

The newest and hottest sideband rig on the market — a complete SSB/AM/CW station with a conservative 200 watts of SSB punch at a price less than competitive transmitters or receivers only! Complete coverage of the 80, 40 and 20 meter phone and CW bands with no extra crystals to buy. VOX or push-to-talk operation, SSB/CW fast attack, slow decay AGC, grid-block break-in CW keying with adjustable pi-network output. The aluminum front panel is anodized, not painted, for maximum protection, with solid brushed aluminum dial.

### TECHNICAL DATA

Electrical performance exceeds the most critical requirements — SSB generation with National 5.2 MC. high frequency 2.5 KC. crystal lattice filter, together with a 7360 sheet beam balanced modulator provide 40 db suppression of unwanted sideband and 50 db minimum suppression of carrier. 1 microvolt for 10 db S/N minimum receiver sensitivity. Receiver uses transmitting filter for superb skirt selectivity and adjacent channel rejection. Parallel 6GJ5

pentodes in final amplifier assure conservative operation, even under extended key-down conditions.

May be used on RTTY with AFSK audio injection, and a high power final may be easily added as a result of incorporation of external control relay terminals. Matching NCXA AC supply/speaker console and NCXD transistorized D.C. supply system-engineered for use with NCX-3.

*Before you buy your next sideband rig, compare the NCX-3 with all others available — dollar for dollar, feature for feature, watt for watt and band for band — it can't be beat.*

10% DOWN

**\$36<sup>90</sup>**  
(\$369.00)

110 volt power supply \$110.00  
D.C. power supply \$119.00

ORDER NOW FROM  
AMATEUR HEADQUARTERS

**THE Lew & Bonn CO.**

67 South 12th St.,  
Minneapolis 3, Minn.

☐ Place my order for IMMEDIATE DELIVERY of the NEW NCX-3.

Enclosed find \$\_\_\_\_\_

☐ Please send more details & literature.

Distributors of Nationally Famous Amateur Equipment

CALL, WRITE or USE COUPON  
Dept. CQ8 — ATT: Joe Hotch FEDERAL 9-6351

Name \_\_\_\_\_ Call Letters \_\_\_\_\_

Address \_\_\_\_\_

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

For further information, check number 21, on page 110

August, 1963 • CQ • 89

## INFORMATION REQUIRED FOR A TIME PAYMENT PURCHASE AT AMATEUR ELECTRONIC SUPPLY

(see our ads in this magazine  
on pages 91, 93, 94, 95, 100, 104, 105, 106, 108,  
109, 112)

Even if you are not ready to make a purchase on credit today, send me the following information on a separate piece of paper. Do not put it in the body of a letter. If you have a message to send us enclose it with the credit application on a separate piece of paper. Once your credit has been ok'ed you will receive an attractive card showing that you are a preferred credit customer. All at no cost to you. List the following information on a separate piece of paper very carefully, accurately, and complete in every detail for quick credit approval: **NOTE:**

1. Your full name. Your age. Your Driver's License Number and state in which it is issued.
2. Your wife's name (if any). Her age. Number of children (if any) and their ages.
3. Your complete home address. How long have you lived there? Your telephone number, or nearest phone where you can be reached.
4. List your previous address. How long were you there?
5. If you rent, show the amount of payment. Also name, address, and phone number of landlord.
6. If you own your own home, show the amount of payment (if any). The mortgage holders name, address, and phone number.
7. Show name of employer, his address, and phone number. Your occupation. How long you have been there. Salary by the week.
8. Show previous employer, his address, and how long there.
9. If your wife is employed, show name of employer, address and phone number. Her occupation, and weekly salary.
10. If own a car, show year and model. If it is financed, show by whom and their address.
11. If you own your furniture, state so. If it is being financed, show by whom and their address.
12. List the names and addresses of banks with whom you do business with.
13. List at least five credit references, giving the complete street address, city and state. If you owe anything to these people, show the amount owed, and briefly the items purchased.
14. List at least two relatives and one friend not living with you.
15. Indicate the amount of credit desired and the length of time you desire credit. For instance, \$1,000, for 36 months.

Send the above information to speed  
a time payment purchase to:

### AMATEUR ELECTRONIC SUPPLY

3832 W. LISBON, MILWAUKEE 8, WISCONSIN

## Performance

On c.w. there has been no difficulty working the east coast and on day-time s.s.b. anywhere works on 80 meters anyway. I think you will find this antenna works real fine; if you don't think so, give it a try as it isn't much work to have one together.

## Calendar [from page 52]

1. Two classifications, single and multioperator. Club stations will be considered as multioperator even though only operated by one member.

2. Use all bands 3.5 thru 28 mc.

3. The usual five and six digit serial number signal report plus a three figure progressive contact number starting with 001.

4. Each contact is worth one point.

5. A multiplier of one for each country worked on each band, a maximum of eight per band. (LA/p will count as only one country even though there are three countries under that prefix.)

6. The final score will be the total QSO points multiplied by the sum of the multiplier from all bands. (There is no single band classification.)

7. Certificates will be awarded to the highest scoring stations in both classes, c.w. and phone, in each country and each W/K call area. The committee may issue additional awards pending on the returns.

Logs should show in this order—Date/Time in GMT, station worked, numbers sent and received, band used and note each new multiplier worked. A separate sheet for each band is necessary, however a summary sheet showing the score for each band is requested.

The summary sheet should also include essential information regarding equipment used, other comments. Don't forget the usual signal declaration that all rules have been observed. And most important, your name and full address in **BLOCK LETTERS**.

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

## Ed. Note

As usual no word from down South America so I have nothing to report on the tentative listed activities. It is assumed that the dates will hold as in previous years and there are no rule changes, if you are interested.

Rules for our World Wide DX contest month. No rule changes anticipated. Most of the letters received favored continuing the changes made last year for at least another year. The only one that stirred up any criticism was the 2 points for contacts between North American stations. Most of the favorable comments came from phone stations. However if the change is continued for another year it will be for both sections of the contest. We see.

73 for now, Frank, W

**DX** [from page 50]

3. A list of contacts with date, time, frequency, and mode of operation.
  4. Overseas applicants send 10 IRC or \$1 (US). Local applicants free.
  5. That reports are not less than Readability 3 and Tone 8.
- Applications are to be made to the Awards Manager, MARTS, P. O. Box 777, Kuala Lumpur, Malaya.

### QTHs & QSL Managers

KM6BI has cards on file for the following ex-KM6s: FAA, AM, BA, BF, BK, BO, BQ, BT, BU, BW, BZ, CB, CC, CG, and CJ. The above-mentioned stations will receive their QSLs if they send their present QTH to James Wichman, KM6CX, Navy 3080, AEWBARRONPAC, Midget c/o FPO, San Francisco, Calif.

**DU1JC**—via W6ZJY.  
**FL5A**—via W4ECI.  
**FM7WN**—F. Sifflet, Distillerie Rosiere, St. Joseph, Martinique.  
**FP8CB**—via WA2WBH.  
**FU8AG**—via K7GGN.  
**H8AJ**—Dr. Abraham Jaar, POB 1213, Santo Domingo, Dominican Republic.  
**H8AKU**—Johnny Jaar, POB 1213 Santo Domingo.  
**H8JSM**—J. S. de Madrena, Box 521, Santo Domingo.  
**H8XAA**—via W8NWO.  
**HS1P**—via W4CKB.  
**JT1AD**—Box 639, Ulan Bator, Mongolia.  
**K3KLC/V01**—Sam Leach, VW-11 Radio, Navy 103, FPO, N. Y., N. Y.  
**KG6ID**—via W9VZP.  
**TF2WHB**—via K4MQD.  
**ex-VK4HG**—(Willis Is.) 545 Crown St., Surrey Hills, N. S. W. Australia.  
**VK4JQ**—(Willis Is.) via W6HYG.  
**ex-VK4WV**—(Willis Is.) 8 Dedrick St., Braybrook, Vic., Australia.  
**VP5LG**—via VP7LG.  
**VQ4ERR**—via K0LFY.  
**VQ8BFA**—via G8KS.  
**VR1N**—c/o Hammarlund, General POB 7388, New York 1, N. Y.  
**VR30**—now WA6MFY.  
**VS9ASS**—via W4ECI.  
**V89KDV**—via W4ECI.  
**W6FAY/KP6**—Box 11173, San Diego 11, Calif.  
**XW8AL**—via K4KTR.  
**ZB1CH**—Clive R. Burchell, Officers Mess, RAF, Luqa, Malta.  
**ZD7BW**—via G3PEU.  
**5N2JKO**—via W4MCM.  
**5U7AH**—via K9EAB.  
**6N5X**—via W6ZY.  
**9U5BH**—Box 81, Butare, Rwanda.  
**9U5JH**—Box 76, Kitega, Burundi.

**VHF** [from page 65]

station sending in the report). So that old listings may be corrected also, please list any frequencies which have been used for f.m. operation, but which are no longer used for this purpose. One person may report for more than one county if desired, but please list a separate liaison for each county. Send all information to: Thomas A. McKee, K4ZAD, 1306 Grove Road, Lynchburg, Va. Information is needed by September 1. All those sending in information will receive a copy of the complete directory."

From George Haylock, G2DHV/m: "Have been operating as ON5ZQ and PA9DHB/M mobile on 144 mc on the European continent. I agree with your May, 1963 article on reciprocal



W9D1A—Terry



**ONLY \$13<sup>17</sup>**  
**a month — with**  
**just \$5<sup>00</sup> DOWN**

**delivers a New**  
**NATIONAL**

**NCX-3**

TRANSCIVER  
 FOR  
 80-40-20

**3 YEARS TO PAY!**

### Get Terry's Terrific Trade-In Deal!

| Model | Type              | Price    | Monthly Payments               |
|-------|-------------------|----------|--------------------------------|
|       |                   |          | after \$5.00 down<br>(3 years) |
| NCX-3 | Transceiver ..... | \$369.95 | \$13.17                        |
| NCXA  | AC Supply .....   | 110.00   | 3.79                           |
| NCXD  | DC Supply .....   | 119.95   | 4.15                           |

All other National equipment also in stock—same EZ terms apply.

We have Complete National Line in Stock at A.E.S. Any item can be purchased for \$5 down; up to 3 years to pay. Order today—Just send \$5.00—tell us how much time you need to pay.

**STAY ON THE AIR PLAN**—I will give you a good trade-in allowance for your old equipment, and you can use it until you get my shipment. Then send me your trade-in.



**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 23, on page 110

## 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

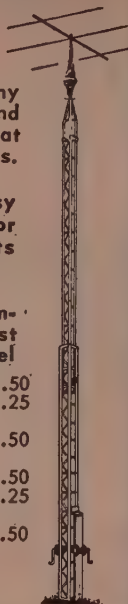
|                                           |          |
|-------------------------------------------|----------|
| Model HD-40 Painted...                    | \$ 99.50 |
| Model BAHD-40 Painted (Building Attach)   | 106.25   |
| Model GPKHD-40 Painted (Ground Post Tilt) | 149.50   |
| Model HD-40 Galv. ....                    | 134.50   |
| Model BAHD-40 Galv. .. (Building Attach)  | 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 24, on page 110

## NEW SSB ZERO BIAS TRIODE

The UE572A is a zero bias triode and has been specifically designed for Single Side Band applications.

The UE572A will serve as a direct replacement for the 811A and with its plate dissipation of 160W, it is capable of handling twice the power of the 811A. Two UE572A's in parallel will permit a total power input of one kilowatt.

D.C. Plate Voltage...2750V  
D.C. Plate Current...350 ma  
Filament: Bonded Thoriated  
Voltage .....6.3 volts  
Current .....4 amperes



For a technical bulletin, write to section 261

**UNITED ELECTRONICS  
COMPANY** a subsidiary of

**GENERAL  
ELECTRICS**

42 Spring Street • Newark 4, New Jersey • HU 4-6300

**ASSURANCE OF RELIABILITY**

For further information, check number 25, on page 110

permits, and such calls as G2DHV/W1 would also solve the QSL identity problem. Previous calls were ON4IE/2, DJ0AA, and 3A2CK. Two other stations operating were PA9NMR/M and PA9FPK.

At the recent Fresno hamfest, I ran across Loren Parks, K7AAD, who manufactures just about the finest 2 and 6 meter converter and preamplifiers you have ever seen. One 2 meter converter was connected to W6NGN's famous "weak signal source". Ed says the converter is pretty good which, for him, means it's super! Drop a line to Loren at Route 2, P.O. Box 33, Beaverton, Oregon.

Amperex has a new transistor, their 2N2780 which is rated at 400 mw output at 180 mc with a 10 db power gain. Two meters here we come!

For now, 73, de Don, W6TN

### YL [Continued from page 53]

with classes running from 6:45 A.M. to 8:30 P.M., with 5 or 6 hours of Spanish instruction per day. She says if she passes the course (we're sure you will, Marolyn!), she hopes to be sent to Colombia, S.A. Asked if she'd be able to take her rig along, she replied the Colombian government had turned down her request, but that the Peace Corps officials are trying to work out some arrangement.

### Here and There

Floridara officers elected at the club's annual birthday party: President, K4RDX; Vice President, K4PPX; Secretary, WA4FJF; Treasurer, K4HSC; Publicity Chairman, K4RHL; Certificate Custodian, K4RNS. The Floridara s.s.b. net frequency has been changed to 3933 kc. The Floridaras now offer stickers to be added to their certificate for each additional ten members worked.

Los Angeles YLRC officers installed at the club's June meeting held at QTH of W6NZ include: President, W6VDP; V.P., W6QY; recording secty., WA6BJB; corres. secty., WA6PQI; treasurer, K6ELO.

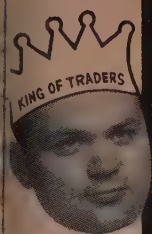
New officers for the San Diego (Missions Missiles) Club: President, W6WDL; Vice President, K6YGJ; Corresponding Secretary, WA6EAI; Treasurer, WA6CQS; Publicity Chairman, K6UTO; Certificate Custodian, W6GGX.

Congrats to YLRL editor, K1EKO, Edie, and her OM on the arrival of Janet Lee on April 1. She kindly arrived between issues of YL Hammonics.

### Silent Key

We regret to record the passing of June Hengels, W9RBP, on May 19. June got her ham ticket in 1934 while studying at RCA for a commercial operator ticket. She became the YL of Henry, W9RTY, two years later. They had 3 daughters and a son and several grandchildren. Prewar, June was very active on 160 phone and more recently on 10, 20 and 40 phone.

33, W5RZ



TERRY  
W9DIA

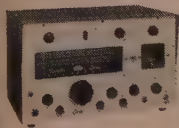
# TIRED OF QRM?

## GO TO 6 and 2 METERS with CLEGG!

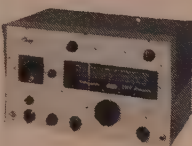
We'll make it EASY...because we want to become the biggest CLEGG dealer in the entire country... therefore

## WE'RE TRADING WILD!

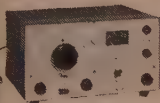
pay shipping charges when you order  
clegg equipment without a trade-in.



CLEGG ZEUS



CLEGG INTERCEPTOR



CLEGG THOR VI

**\$5 DOWN DELIVERS ANY CLEGG EQUIPMENT . . .  
LOOK AT THESE LOW MONTHLY TERMS**

|                                            | 1 Year  | 2 Years | 3 Years |
|--------------------------------------------|---------|---------|---------|
| Zeus 6 and 2 Meter Transmitter...\$695.00  | \$63.25 | \$34.50 | \$24.91 |
| Interceptor 6 and 2 Meter Receiver. 473.00 | 42.83   | 23.33   | 17.91   |
| Clegg '99er 6 Meter Transceiver.. 159.95   | 14.11   | 7.70    | 5.56    |
| Thor VI 6 Meter Transceiver..... 349.95    | 31.62   | 17.25   | 12.45   |
| Available Soon—DC Supply for Clegg Thor    |         |         |         |
| Model 372 Low Pass Filter..... 14.95       |         |         |         |

### THE REASON YOU SHOULD BUY YOUR RECONDITIONED EQUIPMENT FROM US:

- ✓ Full credit within 12 months toward purchase of higher priced new equipment
- ✓ Full credit within 90 days toward purchase of other higher priced reconditioned gear
- ✓ Free Two Week Trial
- ✓ 30 Day Guarantee
- ✓ 10% Down—36 months to pay

See our reconditioned equipment listings in our big special ad on page 112 of this magazine.

### EMPLOYMENT OPPORTUNITY

Either Chicago or Milwaukee. We need highly qualified men to recondition ham gear. Must be tops and fully experienced. Excellent opportunity.



## 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 allowance, 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 information on separate sheet and enclose with this order: Name, address, age, married? children? Employed by? Salary? How long? Own or Rent Home? To whom renting? or buying from? Wife employed? Own car?—who buying from? Three to five credit references. The more information you give, the faster we can approve your credit.



**EVEN IF YOU'RE NOT ORDERING  
TODAY, SEND ABOVE INFORMATION  
FOR ATTRACTIVE CREDIT CARD**

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

☐ Check for latest reconditioned bulletin.

For further information, check number 33, on page 110

August, 1963 • CQ • 93

# Complete E. F. Johnson Line Available at A.E.S.



any item you want

## Only \$5 Down

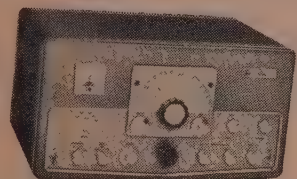
Take <sup>UP</sup> <sub>TO</sub> 36 months to pay

Terry  
W9DIA

### VIKING VALIANT II

Kit—\$375.00

Wired—\$495.00



### HERE'S ALL YOU PAY AFTER \$5 DOWN PAYMENT

| Description                            | Ham Net  | Monthly Payments (3 years) |
|----------------------------------------|----------|----------------------------|
| Valiant II kit .....                   | \$375.00 |                            |
| Valiant II wired .....                 | 495.00   | 17.96                      |
| 6N2 VFO kit .....                      | 34.95    |                            |
| 6N2 VFO wired .....                    | 54.95    |                            |
| Ranger II kit .....                    | 249.50   | 8.82                       |
| Ranger II wired .....                  | 359.50   | 12.80                      |
| Adventurer kit .....                   | 69.95    | 6.03*                      |
| Challenger kit .....                   | 124.75   | 5.61**                     |
| Challenger wired .....                 | 169.75   | 5.94                       |
| 6N2 transmitter kit .....              | 149.50   | 5.21                       |
| 6N2 transmitter wired .....            | 194.50   | 6.84                       |
| Invader 200 .....                      | 619.50   | 22.19                      |
| Hi-Power conversion .....              | 619.50   | 22.19                      |
| Invader 2000 .....                     | 1229.00  | 44.20                      |
| SSB adaptor .....                      | 369.50   | 13.16                      |
| Courier wired .....                    | 289.50   | 10.27                      |
| Thunderbolt wired .....                | 659.00   | 23.61                      |
| 6N2 Thunderbolt wired .....            | 549.00   | 19.66                      |
| Five-hundred wired .....               | 1050.00  | 37.73                      |
| Kilowatt power amplifier .....         | 1595.00  | 57.41                      |
| 10 meter Messenger .....               | 139.75   | 6.73**                     |
| Low pass filter 52 ohms .....          | 14.95    |                            |
| 275 w. Matchbox w/coupler .....        | 94.93    | 8.24*                      |
| Whipload—6 wired .....                 | 22.95    |                            |
| Crystal calibrator wired .....         | 18.95    |                            |
| Kilowatt Matchbox w/coupler .....      | 154.50   | 5.39                       |
| Directional coupler (SWR) wired .....  | 11.75    |                            |
| Directional coupler indic. (SWR) ..... | 25.00    |                            |
| TR switch .....                        | 29.95    |                            |
| Adventurer modulator kit .....         | 12.25    |                            |
| 6N2 converter kit .....                | 59.95    | 5.20*                      |
| 6N2 converter wired .....              | 89.95    | 7.78*                      |
| Phone patch .....                      | 25.00    |                            |

\*payments on these items are shown for 12 months.

\*\*payments on these items are shown for 24 months.

payments for unstarred items are shown for 36 months.

### TOP TRADE-IN ALLOWANCE GIVEN

Johnson Equipment Ordered Without  
Trade-In Is Shipped PREPAID



## AMATEUR ELECTRONIC SUPPLY

ORDER TODAY—Use Order Coupon in one of  
our large full page ads in this magazine.

3832 W. Lisbon Ave., Dept. C  
Milwaukee 8, Wisconsin

### Radio Classics [from page 37]

There are continuously variable coils, such as the common inductors found in Command sets in surplus. These inductors may have some difficulty with dead-end effects, but not usually on the band of the transmitter. More modern roller inductors will have spaced turns whose spacing varies with inductance to minimize dead-end effects. Roller inductors should not be varied with full transmitter power applied or the wire surface will be damaged from sparking. Collins, however, has used an interesting variation with two drums, one metal and the other ceramic. A tape of metal is wrapped around the ceramic drum as a coil, one end attached to the metal drum. The metal and ceramic drums are held apart by springs and both drums are rotated the same direction at the same time. This rolls the tape from the ceramic to the metal drum, completely avoiding friction contacts and unused parts of a coil. (The tape on the metal drum just looks electrically like a part of that drum.)

If part of a coil is wound in a direction opposing the majority of turns it will cut down the effective value of the inductance. Occasionally the last half turn will be wound "on air" so it can be twisted to aid or slightly oppose the majority inductance, permitting fine adjustment of the actual inductance.

Much the same inductance-reducing effect may be obtained by moving a conductive slug (usually silver or copper plated) into the vicinity of the coil. The inductance is decreased, as is also the  $Q$ .

### Slug-Tuned Coils

More recently there has been an emphasis on permeable slugs to increase the coil inductance. Polydorf in the 1930's and 40's worked with various configurations and applications of the permeable slug. Considerable inductance increases may be obtained, but the usual cost is at some expense of  $Q$ . The advantages of small size and easy adjustment usually outweigh any disadvantages. There are permeable slugs for all purposes—permalloy dust (in a plastic binder) is common for low frequencies, but ferrites are used for the higher frequencies. Ferrite cores sintered mixtures of iron oxide and other "secret ingredients", can be tailored for almost any part of the radio spectrum. Such cores, however, should be used only in the frequency range recommended and are not "general purpose". There are few cores suitable for power stages of transmitters, and types usable at the kilowatt level are strictly special.

Radio Instruments and Measurements gives excellent discussions of practically every configuration that the ham can imagine. The endurance of the work in present electronic handbooks attests to its initial quality.

\*I believe this is essentially the same form as a variable resistor attributed to Wheatstone in the 1886 Edition of Kempe's *Electrical Handbook*.

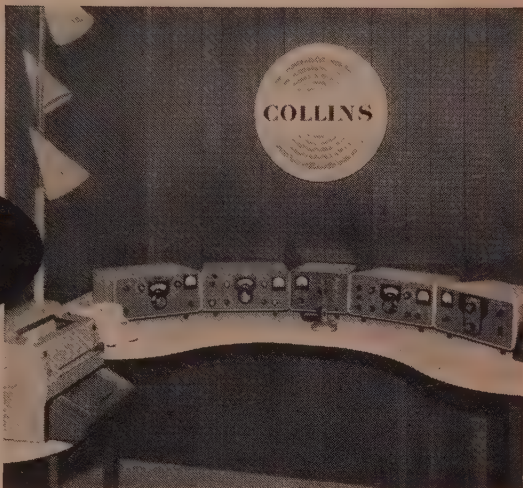


TERRY W9DIA

**"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**
- ✓ **Full 36 months to Pay**
- ✓ **\$5 or Your Trade is Your Down Payment**
- ✓ **Large Stocks Assure Immediate Shipment**

Working Collins displays in all our three stores. Shown here is the complete Collins station at our Chicago store.



**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 625-1 SSB converters.**

Pictured here in our Chicago display, left to right: 625-1 VHF SSB Converter, \$895.00 (\$20.01 per month); 75S-3 Receiver, \$680.00 (\$15.20 per month); 312B-4 Console \$195.00 (\$2.57 per month); 32S-3 Transmitter, \$750.00 (\$15.81 per month); 30L-1 Linear Amplifier, \$520.00 (\$11.62 per month).

**THE REASON YOU SHOULD BUY YOUR RECONDITIONED EQUIPMENT FROM US:**

- ✓ **Full credit within 12 months toward purchase of higher priced new equipment**
- ✓ **Full credit within 90 days toward purchase of other higher priced reconditioned gear**
- ✓ **Free Two Week Trial**
- ✓ **30 Day Guarantee**
- ✓ **10% Down—36 months to pay**

See our reconditioned equipment listings in our big special ad on page 112 of this magazine. . . .

**EMPLOYMENT OPPORTUNITY**

Either Chicago or Milwaukee. We need highly qualified men to recondition ham gear. Must be tops and fully experienced. Excellent opportunity. Should be Collins factory trained.



**AMATEUR  
ELECTRONIC  
SUPPLY**



Steve W9EAN



Doc W9HJS



Phil W9DVM/4

**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 allowance, 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 information on separate sheet and enclose with this order: Name, address, age, married? children? Employed by? Salary? How long? Own or Rent Home? To whom renting? or buying from? Wife employed? Own car?—who buying from? Three to five credit references. The more information you give, the faster we can approve your credit.

**EVEN IF YOU'RE NOT ORDERING TODAY, SEND ABOVE INFORMATION FOR ATTRACTIVE CREDIT CARD**

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
☐ Check for latest reconditioned bulletin.

For further information, check number 31, on page 110

- Hammarlund HX-50 with 160 Meter Band, SSB/CW/AM Transmitter. ....\$479.50
- Hammarlund HK-1B Electronic Keyer .....\$39.95
- 1500 Watt Isolation Step Down Xfmr. Pri: 185, 195, 205, 215, or 225 V. RMS @ 50/60 CPS. Sec: 115 V. RMS @ 1500 V. A. Herm. sealed. Ratings clearly stenciled and extremely conservative. 10" x 7 3/4" x 7 1/2". Net Wt: 64 lbs. ....\$29.00
- Porcelain Insulator: 1/2" Diam, 4 1/4" long. Center to center dimension of holes: 3" apart. Ten for \$1.00—100 for .....\$8.00
- Grundig Hi-quality deluxe Closed Circuit TV Camera. Operates in any standard TV Receiver. Excellent high-resolution picture. Ready-to-go. Camera and power supply in original cartons. Camera, lens, vidicon and power supply @ .....\$595.00
- Sangamo Capacitors: 10,000 Mfd @ 25 VDC (40 VDC surge) .....\$1.00
- Mallory Capacitors: 5,000 Mfd @ 25 VDC \$1.00; 8,000 Mfd @ 55 VDC @ .....\$2.95
- GE Oil Capacitors 2 Mfd @ 7500 VDC .....\$14.00
- "Dolly-O". Excellent constructed wooden Dolly for moving equipment, furniture, etc. 27" x 17" x 5 1/2". With Ball-Bearing Wheels. Only .....\$14.95
- Aerovox .01 mfd @ 5000 VDC Capacitor. ....\$1.00
- Power Resistor 100 ohm 38 Watt. ....45¢
- 30 Watt Mobile Transmitter: Uses 5618 xtal oscillator into CBS 5516 amplifier. Modern design. Only 7 lbs. net wt. including built-in 6V. vibrator power supply. Enclosed in aluminum cabinet. Furnished with xtal that doubles near 10 meter band. Will require slight and easy modification for 10 meter operation. A real beauty. With tubes. ....\$9.95
- C.D. AR—22 Rotator .....\$31.95
- "Ham-M" Rotator .....\$119.50
- 10 Hy @ 250 Ma. Choke. Herm.—sld. /80 Ohms DC resistance. 10 lbs. ....\$2.50
- Ballantine Model 310A Electronic Voltmeter. Like new condition. ....\$125.00
- Operator's Headset, Type H92/U. Idea for Ham or other communication equipment. Army surplus, new unused, in original cartons. Mfd. by Rownell. Rubberized outer insulation on unit. With 4 conductor rubber cord. Adjustable mike and removable headband if hand operation is desired. ....\$14.00
- Drake Low-Pass Filter Model TV-CB-LP. 52 Ohms 100 Watts. Up to 30 mcs. ....\$6.95
- IN STOCK:
- Cush-Craft Blitz Bugs: Type LAC-1 @ \$3.95, LAC-2 @ \$4.45, LAC-2N @ .....\$5.95
- Ferris Microvoltage Model 18C (Range: 5 thru 175 Mcs). ....\$125.00
- Marion 2 3/4" Round Meter. 0 to 50 VDC. Herm. sealed. ....\$2.95
- Weston Model 507: 0 to 4 Amps RF Ammeter, with bit-in thermocouple. ....\$4.95
- Lab type 0-15 Amp DC Mirror-Scale Ammeter in case with test leads. Only .....\$9.95
- 100 ft open-wire 300 Ohm transmission line (100' @ \$2.55, 500' @ \$12.56)
- 5" Pole type Open Wire Stand-off insulator furnished with clamp for above, 2 for .....33¢
- 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.
- CLOSED FOR VACATION: July 29th to Aug. 11th. (Will RE-OPEN August 12th.) Please anticipate your needs and order early.

## BARRY ELECTRONICS

Dept. C-8

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 .....

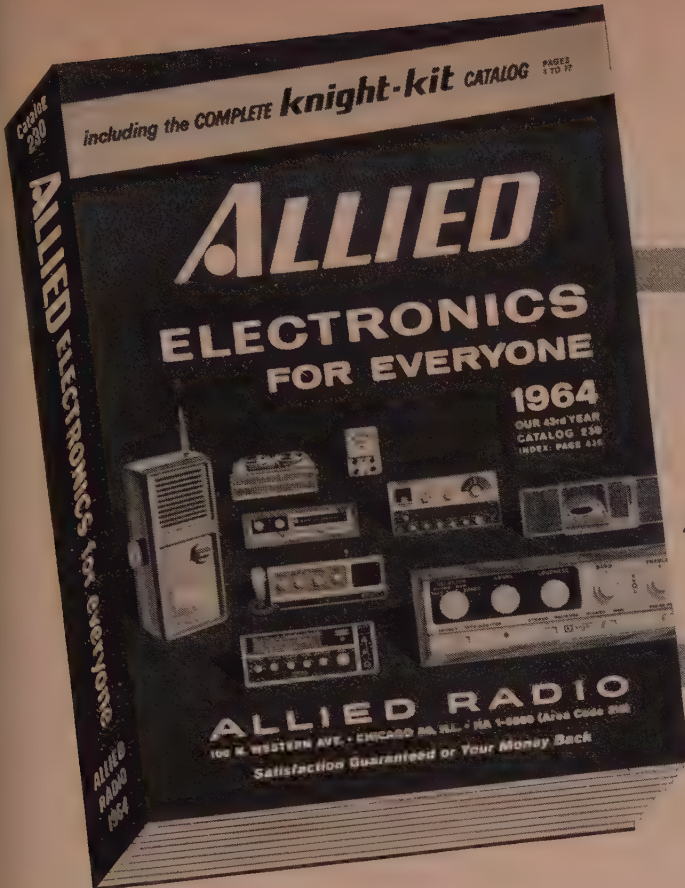
## Sideband [from page 57]

Foundation which had such enthusiastic boosters for "Michigan Week." Talk about good public relations—everyone's attention was focused on Michigan during the third week in May when its hams went to town, enticing contacts for special certificates to be awarded for working five Michigan hams . . . Speaking of certificates, our hearty congratulations to members of the Certificate Hunters Club and its organizer, Clif Evans K6BX, for the sane and sensible way in which their early June Contest was conducted. The contestants stuck to the top end of the band, caused little or no interference to other operators, and seemed to be having a great time. . . . Hansheinrich, DL1IN, better known as "Father Neptune," is now acting as the DARC DX bulletin station, dispensing the latest in DX news, in English and German, every Friday on 80 meters for the European amateurs. Hans writes that it is often difficult to find something new and interesting to talk about but this was before the current wealth of DX activity that is now with us. . . . Talk about rare DX—what could be more rare than JT1CA on sideband from Mongolia. Operated by Vlad, UA3CA, the station is active on about 14.108 kc.

Jim, WA6HOH, has finally tracked down Marge Dennis, the only 9N1 YL operator ever, and is pleased to report that Marge and Ralph are finally going to settle down in a home of their own. . . . Bill, W0EEE, is now QSL manager for Robby, VQ4ERR, from his home station, K0LFY to which requests should be sent (in GMT only) with s.a.s.e. . . . From August 1st to August 11th, look for OK5SSB, the special call of a camping-out of Czechoslovak s.s.b. amateurs in South Bohemia. They will operate all bands, sideband only. This will be the first OK5 call on the air—WPX hunters, please take notice!

That boy, Cliff, K9EAB, never ceases to amaze us . . . 300 for DXCC; 276 on s.s.b.; 412 total awards to date, and probably the first to work 1500 Counties! He's even gotten his Dad into the act. Cliff, Sr., WA9CDQ, traveled 2200 miles in 70 hours in a marathon county expedition, operating in exactly 100 counties in Illinois, Indiana, and Kentucky! . . . David, G2MA, one of the first active sidebanders in the U.K., had to forego the London Sideband Dinner because of the celebration of his son, Doug's 21st birthday, but hopes to meet the sideband group next year. . . . Les, G8KS, and his charming wife, Peggy, celebrated another important occasion—the engagement of their daughter, Judy. . . . Robby, LX1RK, 9Q5RK, is now enjoying a well-earned holiday with his family back in Luxembourg. . . . Glen, ex-9N1GW, (remember the pile-ups he caused as the first 9N1 on sideband?) has again changed QTHs and is operating as K4KMX in Warner Robins, Georgia. . . . You fellows who would like to get your wives interested in ham radio had better check the hows and wherefores with Ip, OZ5KQ. Latest word has it that his XYL, Lillian, recently earned her

For further information, check number 28, on page 110



# 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-H  
100 N. Western Ave., Chicago 80, Ill.

☐ Send FREE 1964 ALLIED Catalog

Name \_\_\_\_\_  
PLEASE PRINT

Address \_\_\_\_\_

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

For further information, check number 29, on page 110

August, 1963 • CQ • 97

# 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



For further information, check number 30, on page 110

**SINGLE POLE, SIX-THROW**

## COAXIAL RELAY

**FOR MOUNTING ON MAST AND  
REMOTE SWITCHING UP TO 6 ANTENNAS**



**DOW-KC 71**

Weatherproof, electro-magnetic, less than 1.1:1 VSWR at 100 mc, 1 kw power rating, available in UHF, N, BCN, TNC, C connectors. Continuous duty, over 1,000,000 operations. 5/4" x 2 3/4", silver plated connectors.

**DKC-71**  
with UHF Connector

**\$4950**

Manufactured and Guaranteed by

**DOW-KEY COMPANY**

THIEF RIVER FALLS, MINNESOTA

license, OZ5QM! Lillian must first fulfill necessary requirements before coming on meter sideband and we are eagerly awaiting appearance.

One of the more fascinating sidebanders we run across is Bill, W4PR, with whom the v of conversation never runs dry. Latest fr Bill's bailiwick in Birmingham, Alabama, is t his eldest daughter, who is interested in cine direction and production has achieved a schol ship to a very famous European school of cinem . . . Harold, KL7DQB/K4HBZ, has had a an international existence: originally hail from New South Wales, Australia, he became "male war bride" by marrying a gal from Geor in Tokyo, returned with her to Orlando, Flori and is now operating in the Aleutians! Have y noticed how many of our southern boys who in the military wind up in some of the cold outposts we have?

A lot of sidebanders are spending their va tions on camping trips this summer; listening Dale, KØHMP, it's not hard to see why the joyment! In fact, if the band hadn't chang Dale might have finally sold us on the idea tenting out, so contagious was his enthusia . . . Whether you are camping, boating, swi ming, golfing, or just relaxing in the garc under a shady tree, we hope that you are hav a wonderful summer and enjoying your sideba activities.

73, Irv and Doro

## Ham Clinic [from page 58]

both a 52 or 72 ohm capability and usable all bands, for I go up for my General lice soon. Help me?"

Sure. My recommendation which will cost y the small sum of \$14.95 is Allied Radio's M P-2 SWR/Power Meter Kit. It was reviewed the March 1963 issue of CQ. The reasons I it: it can be left in the line at all times; can used with 52 or 72 ohm antennas; measures t ward and reflected power; will handle a kilow covers a fantastic range—1.8 to 432 mc; is e to assemble and not complicated to calibr requires no a.c. power or batteries; has coax c nectors; is much better than 10% accurate; u a 100 microamp meter; reads s.w.r. from to 20:1; has a sensitivity adjustment and instruction manual gives you additional in mation on its use—for example, determining resonance of an antenna. It is a fine bargain. Transistor V.F.O.—"Tell me, how is it that do not see more transistorized v.f.o.s? It see to me that there should be more."

The big deterrent is heat, but voltage regu tion also plays a major role in the stability o transistorized v.f.o.

**Tube Equivalents**—"Seeing that you are Europe, perhaps you can give me the Ameri equivalent tube types for the following Europ tubes: B329, EC84, ECC81, EK90, EI X32, L63, U78, EF94 and BPM04.

In order: 12AU7, 6AJ4, 12AT7, 6BE6, 6B 5V4, 6J5, 6X4, 6AU6 and 6AQ5.

# 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 catalog, describing the World's most Popular antennas from \$6.95 to \$999.00. Expanded data sheets — your favorite band, also available.

"The performance line"  
"— with a MATERIAL DIFFERENCE!"

ANTENNAS

SINCE  
1921

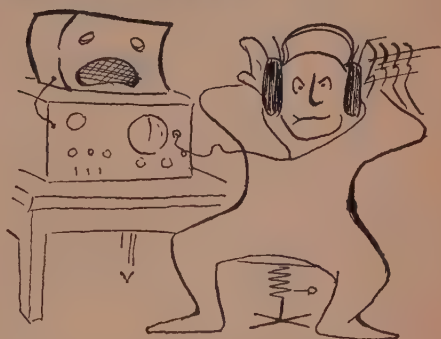
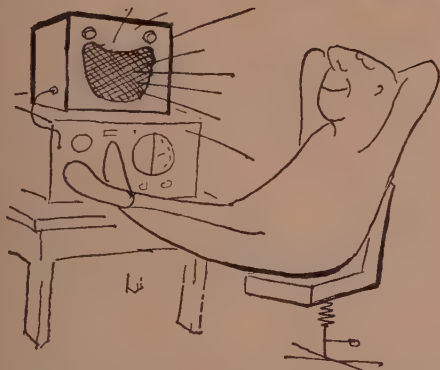
Communication and TV Antennas  
**telrex** LABORATORIES

ASBURY PARK 25, NEW JERSEY, U.S.A.

For further information, check number 27, on page 110

*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)

See page 26 Sept. CQ for a review of the NUVISTAPLUG.

### 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

Post Office Box 672  
Times Square Station  
New York 36, New York

*"Your Friendly Supplier"*

## OFFERS

### THE LARGEST INVENTORY of USED EQUIPMENT in the NORTHEAST. SEE SAMPLES BELOW.

|                                     |          |
|-------------------------------------|----------|
| Collins 32V1                        | \$189.95 |
| " 32V2                              | 249.00   |
| NEW 755-1 w/ NB, Filter & BFO       |          |
| Xtal. Display Unit. Reg. Net 712.50 | 599.00   |
| Hallcrafters SX-96                  | 149.95   |
| " SX-100                            | 199.00   |
| " SX-101 Mk 1A                      | 239.00   |
| " SX-110                            | 119.00   |
| Hammarlund HQ-110C                  | 189.95   |
| " HQ-160                            | 259.00   |
| " PRO-310                           | 354.00   |
| Johnson Invader                     | 495.00   |
| " Pacemaker                         | 255.00   |
| National NC-173                     | 119.95   |
| NC-300                              | 224.95   |

### "AUGUST SPECIAL"

|                    |         |
|--------------------|---------|
| Johnson Challenger | \$90.00 |
| National NC-98     | 89.95   |

WRITE FOR LATEST COMPLETE LIST

# Evans RADIO

P.O. BOX 312 FONE 603-22-52358 CONCORD, N. H.

For further information, check number 32, on page 110

## BARRY ELECTRONICS

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; 4-1000A @ \$95.00; 4CX300A @ \$42.00;  
4CX1000A @ \$145.00; 4E27 @ \$8.75; 4X150A @ \$12.50;  
4X250B @ \$22.00; 35T5 @ \$2.95; 450TL @ \$33.00; 806  
@ \$10.00; 811A @ \$3.75; 812A @ \$3.75; 816 @ \$2.50;  
830B @ \$1.00; 866A @ \$1.65; 872A @ \$4.75; 5514  
@ \$6.95; 5516 @ \$7.50; 5842/417A @ \$5.90; 5847/404A  
@ \$3.90; 5894 @ \$18.90; 6146 @ \$3.25; 6360 @ \$3.90;  
6383 (RCA) @ \$25.00; 8008 @ \$4.75.

Johnson Type "L" Butterfly capacitor. 4.3 to 26 mmfd  
per section. .... 95¢

Johnson Type "L" Miniature capacitor. 3.5 to 27 mmfd  
per section. .... 75¢

Lokalt Socket for 4x150A and other lokalt tubes. .... 10¢

Send remittance with order to Barry Electronics,  
512 Broadway, New York 12, N. Y.

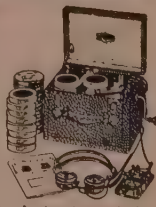
For further information on ordering see BARRY's  
ad on PAGE 96 of the issue.

## 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.

**Transceiver Recommendation**—"I have heard the air that you will not recommend equipment unless it is good. They say that I can depend on your recommendation with fullest confidence, so, tell me, what transceiver should I buy in the \$400 to \$600 price class?"

I'm glad that the word has finally got around. When I recommend something OM, willing to stake my professional reputation on it. With due respect to advertisers and anyone else, until I have actually checked out all transceivers now available I shall reserve personal recommendations. After checking equipment on a purely technical and impersonal basis, I then look for what pleases me. I should be able to help you with the first but not the second, for every ham has their own personal likes and dislikes. In the meantime, I suggest you read the reviews in *CQ* and other magazines and compare. If possible, operate the different sets at your distributors—if he does not have an operating room he should have.

**S.S.B. Channel Separation**—"How many db does a signal have to be on the receiver filter characteristic for sufficient channel separation?"

When allowance is made for the frequency stability of the emitted s.s.b. signal, the separation (between channels close to each other) must only be great enough to insure that the nearest frequency of the interfering signal is 40 db down on the receiver filter characteristic. See: *Reference Data for Radio Engineers*, 4th Edition.

**Inducto-Tuner V.H.F. Converter**—The last article which appeared on using a Mallory Inducto-Tuner for making a converter usable in any of the ham-bands was in the November issue of *CQ*. Evidently, these tuners are available somewhere in quantity—but where? We have been receiving letters requesting info on using this tuner.

**Reference Manual of Transistor Circuits**—"Would you please refer me to a good book of transistor circuits that does not cost a fortune? Not an engineer's manual, please!"

One of the best manuals I have seen (and above) is published in England for about \$1.00 postpaid and obtainable from Mullard Ltd., The Mullard House, Torrington Place, London W.C.1, England. This is a book of 307 pages and contains 28 chapters. The most important information is presented to the largest number of users in such a way that it can be absorbed as readily as possible. If you do not know how to use transistors for your ham experiments after reading this book then you'll never learn. I recommend it wholeheartedly.

**SX-101 Mark III**—"I have been experiencing erratic S-meter action in my SX-101 Mark III receiver. What checks do you suggest?"

First check the 6BA6 S-meter tube (V1). Then check each of the resistors in its circuit, especially  $R_{88}$  and  $R_{80}$  (pots). If  $R_{88}$  and  $R_{80}$  are dirty there can be erratic action. Check (AVC SWITCH) for proper contact too.

**HQ-105TR**—"I purchased a Hammarlund HQ-105TR transceiver which can be operated e

# 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.

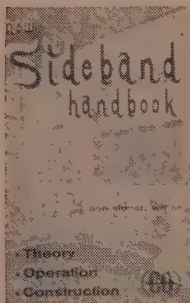


## COMMAND SETS

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!! 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.

Write  
For  
Details

NOVA I

ONLY

**\$97.50**

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



**Tri-EX TOWER CORPORATION**

127 East Inyo Street • TULARE, CALIFORNIA  
Telephone MURdock 6-3411

For further information, check number 34, on page 110

Something new under the sun  
the "Vacationer" ...  
a portable antenna for 20 through 2 meters!



- A light-weight, compact telescopic whip ... Complete with hardware, coax, accessories.
- Mountable anywhere and always ready to put on the air ... Ideal for shack, cottage, hotel, motel, boat.
- Heavy duty chrome-plated with exclusive weather-proof center loaded plastic base ... complete with interchange coils and shorting bar for 2 thru 20 meters.
- Extremely low SWR on all bands!
- Telescopes and retracts to less than 18 inches (fits into KWM-2 carrying case).

\*Pat. Pending

**\$22.50**

Available immediately from;  
HARRISON RADIO CORP.

"Ham Headquarters U.S.A.,®"

225 Greenwich St., New York 7, N. Y.

**DPZ CORPORATION, Electronics Division**  
30 Broad Street, New York 4, New York

For further information, check number 35, on page 110

102 • CQ • August, 1963

on 10 meters or on CB frequencies. I intend use it for both. My question: if the transmitter goes out while operating on 10 meters can I use it without a radiotelephone operator's license (second class)?"

The answer is yes, if you then stick to the ham bands. But if you want to operate on the CB and have touched the alignment and/or frequency adjustments, then the set must be checked by someone holding a radiotelephone second class license.

### Thirty

We appreciate the many letters of encouragement from our readers. We want you to know that we get great satisfaction from using most of our available sparetime to help hams throughout the world-over with their technical problems.

73 and 75. Chuck. W4VZO/HK

### VHF Contest [from page 40]

scores. Log should be checked for duplication at proper point and multiplier credit before submission. All logs become the property of CQ and cannot be returned. Be sure to retain your own station log copy for FCC purposes.

Include a signed pledge stating that all rules have been obeyed and that all logged data is accurate. The pledge is included on standard summary forms available free from CQ.

**SCORING:** Scores will be computed by multiplying contact points × county multiplier, × hour multiplier, power multiplier.

|          |                                   |
|----------|-----------------------------------|
| EXAMPLE: | 100 Contacts                      |
|          | × 10 Counties                     |
|          | 1,000                             |
|          | × 10 Hours                        |
|          | 10,000                            |
|          | × 1.25 Power Multiplier (If Used) |
|          | 12,125 Final Score                |

**AWARDS:** Certificates will be awarded to the highest scoring station in each state on each band. Additional awards will be made in this category at the discretion of the Contest Committee. In addition, certificates will be issued highest scoring Novice stations in each state. An engraved trophy will be presented to the highest scoring station in the Novice competition (Donated K2ZSQ).

**DISQUALIFICATION:** Violation of the amateur rules of the rules of this contest, unsportsmanlike conduct, insufficient log data will be deemed adequate cause for disqualification. Amateurs entering this contest agree to abide by the decision of the Contest Committee.

**DEADLINE:** All logs must be postmarked NO LATER than September 15, 1963. Logs received after this date will be used for checking purposes only. Results of this contest will be published in CQ for November. Send logs directly to:

CQ V.H.F. CONTEST COMMITTEE  
300 West 43rd Street  
New York 36, New York

### Swans [from page 22]

of the different countries encouraged the local clubs to run courses to teach short wave listeners to get their licenses; publicity was initiated, contests were organized and almost every man known to modern high-powered salesmen

were used to improve the "image" of the radio amateur and encourage recruitment into this hobby.

Today there are over 300,000 radio amateurs in the world and according to many of the articles published in the amateur-radio press the growth is becoming alarming.

Are we to prove that the species radio amateur is less intelligent than the swan? The task of keeping our numbers in bounds is surely much easier. There is no biological urge to become a radio amateur. Surely all we need to do is to stop encouraging people to become radio amateurs. We should not, of course, prevent one single person who genuinely wishes to become a radio amateur, from doing so; but need we devote so much effort, energy and high powered salesmanship to persuade people to become radio amateurs, to organizing contests, etc.? It is one of the oddest phenomena of this age that the very magazines, clubs and associations which publish articles lamenting the QRM, and bemoan the increased growth of the amateur-radio population, also regret a decline in traffic handling on certain traffic nets, express disappointment if a contest attracts fewer entries than the previous year, and congratulate themselves if a contest has broken all previous records for activity.

It is surely a completely inconsistent policy to bemoan the QRM and over-crowding on the one hand and to congratulate oneself on the creation of this QRM by bigger and more QRM creating contests.

There have even been articles suggesting the rationing of time on the air. Yet in the very same journals one finds encouragement to clubs to increase their recruiting drive for more radio amateurs.

There is no need for any legislative action; there is no need for rationing; there is even no need for voluntary restriction. All we need is a relaxation of the insensate urge to encourage more and more people to join, becoming more and more active in a hobby which so many people already regard as overcrowded. It is not a conflict between those who think it is overcrowded and those who think it is not. The curious phenomenon is that it is the same people, the same journals, the same organizations which bemoan the over-crowding which go out of their way to create it.

Let us show that we are not less intelligent than the swans; that by the exercise of a little restraint, without actively discouraging people from becoming amateurs, we devote no more effort to encourage them to do so.

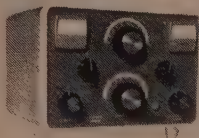
It is appreciated that there are commercial interests who, for purely business reasons wish to increase the number of radio amateurs. What is not understandable is why the non-profit making organizations, and non-profit amateur associations continue to devote so much effort to recruiting new members and more activity, to what they themselves regard as an already overcrowded hobby. ■

# E-Z HUNTER E

## LINEARS NOW IN STOCK AT A. E. S.

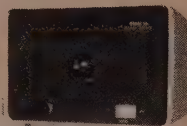
**BANDIT**  
2000 A  
(2000 watts PEP)  
\$575.00

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 38, 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 5767 TAMPA 5, FLORIDA

## BACK ISSUES FOR SALE \$1.00 per copy

|                                         |                                                       |
|-----------------------------------------|-------------------------------------------------------|
| 1950-Jan., July, Oct.                   | 1957-All issues, except Jan., Feb., May, and Nov.     |
| 1951-All issues, except Nov.            | 1958-All issues, except Jan., June, July, Sept., Oct. |
| 1952-All issues, except June, Aug.      | 1959-All issues, except Jan. and June                 |
| 1953-All issues, except May, July, Dec. | 1960-All issues, except May                           |
| 1954-All issues, except Feb.            | 1961-All issues                                       |
| 1955-All issues, except Nov.            | 1962-All issues, except Jan.                          |
| 1956-All issues, except April           | 1963-All issues                                       |

BC-603 Conversion article  
(Sept. & Oct., 1958 CQ)

Reprints available at 50¢ per set.

**CQ MAGAZINE**

300 West 43rd St., New York 36, N. Y.



TERRY  
W9DIA

# 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 **\$18995**

**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. ORLANDO, FLORIDA  
6450 Milwaukee Ave. 23 Azalea Park Sh. Center  
RODNEY 3-1030 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 37, on page 110

104 • CQ • August, 1963

Prop. [from page 54]

|                            | 10/15<br>Meters                                                                                                                                | 20<br>Meters                                                                                         | 40<br>Meters                                                  | 80/160<br>Meters                                 |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|
| South Africa               | 06-10 (1)<br>10-13 (2)<br>13-15 (1)                                                                                                            | 05-13 (1)<br>13-16 (2)<br>16-18 (1)<br>21-23 (1)                                                     | 18-19 (1)<br>19-20 (2)<br>20-21 (1)                           | 19-21 (1)                                        |
| Eastern Mediterranean      | 08-11 (1)                                                                                                                                      | 06-12 (1)<br>19-21 (1)                                                                               | NIL                                                           | NIL                                              |
| Central Asia               | 16-19 (1)                                                                                                                                      | 06-07 (1)<br>07-09 (2)<br>09-16 (1)<br>16-18 (2)<br>18-21 (1)                                        | 05-07 (1)                                                     | NIL                                              |
| South-east Asia            | 09-15 (1)<br>15-18 (2)<br>18-20 (1)                                                                                                            | 07-08 (1)<br>08-10 (2)<br>10-12 (1)<br>19-00 (1)                                                     | 03-07 (1)                                                     | 03-06 (1)                                        |
| Far East                   | 12-14 (1)<br>14-18 (2)<br>18-20 (1)                                                                                                            | 06-07 (1)<br>07-10 (2)<br>10-19 (1)<br>19-21 (2)<br>21-23 (1)                                        | 00-02 (1)<br>02-06 (2)<br>06-08 (1)                           | 03-07 (1)<br>04-06 (1)                           |
| Samoa & Pacific Islands    | 16-19 (1)*<br>09-11 (1)<br>11-18 (2)<br>18-20 (1)                                                                                              | 07-08 (1)<br>08-11 (2)<br>11-18 (1)<br>18-20 (2)<br>20-23 (4)<br>23-01 (2)<br>01-03 (1)              | 21-22 (1)<br>22-05 (3)<br>05-07 (2)<br>07-08 (1)              | 22-01 (1)<br>01-04 (2)<br>04-06 (1)<br>02-06 (1) |
| New Zealand                | 12-18 (1)*<br>09-10 (1)<br>10-12 (2)<br>12-15 (1)<br>15-17 (2)<br>17-19 (3)<br>19-20 (2)<br>20-22 (1)                                          | 17-19 (1)<br>19-21 (2)<br>21-23 (4)<br>23-01 (3)<br>01-03 (2)<br>03-07 (1)<br>07-09 (2)<br>09-11 (1) | 22-23 (1)<br>23-01 (2)<br>01-05 (3)<br>05-07 (2)<br>07-08 (1) | 00-02 (1)<br>02-05 (2)<br>05-07 (1)<br>02-06 (1) |
| Australia                  | 14-18 (1)*<br>12-16 (1)<br>16-20 (2)<br>20-22 (1)                                                                                              | 18-20 (1)<br>20-22 (2)<br>22-00 (3)<br>00-02 (2)<br>02-07 (1)<br>07-09 (2)<br>09-13 (1)              | 01-02 (1)<br>02-03 (2)<br>03-05 (3)<br>05-07 (2)<br>07-08 (1) | 02-03 (1)<br>03-05 (2)<br>05-06 (1)<br>03-05 (1) |
| South America              | 08-12 (1)*<br>12-15 (2)*<br>15-17 (1)*<br>05-06 (1)<br>06-07 (2)<br>07-09 (3)<br>09-13 (2)<br>13-15 (3)<br>15-17 (4)<br>17-19 (2)<br>19-21 (1) | 14-16 (2)<br>16-18 (3)<br>18-20 (4)<br>20-00 (3)<br>00-02 (2)<br>02-06 (1)<br>06-08 (2)<br>08-14 (1) | 19-21 (1)<br>21-00 (3)<br>00-02 (2)<br>02-05 (1)              | 21-23 (1)<br>23-01 (2)<br>01-03 (1)<br>23-01 (1) |
| Mc-Murdo Sound, Antarctica | 12-17 (1)*<br>11-16 (1)<br>16-18 (2)<br>18-21 (1)                                                                                              | 07-09 (1)<br>16-18 (1)<br>18-20 (2)<br>20-22 (3)<br>22-23 (2)<br>23-00 (1)                           | 00-07 (1)                                                     | NIL                                              |

### Explanation of Forecast Ratings

The numerical ratings appearing in parenthesis following each predicted time of band opening indicate the total number of days during each month of the forecast period that the opening is expected to occur, as follows:

- (1) Less than 7 days.
- (2) Between 8 and 13 days.
- (3) Between 14 and 22 days.
- (4) More than 22 days.

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

The CQ DX Propagation Charts are based upon double-sideband a.m. effective radiated power of 6 watts, a single-sideband e.r.p. of 300 watts, and a c.e.r.p. of 150 watts, at antenna radiation angles less than thirty degrees. The Eastern USA Chart can be used for the 1, 2, 3, 4 and 8 amateur call areas; the Central USA Chart in the 5, 9 and 0 areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid through September 30, 1963. Propagation information contained in the Charts is derived from basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

# Ham Shop

Rates for the Ham Shop of 5¢ per word for advertising which in our opinion, is non-commercial in nature. A charge of 25¢ per word is made to all commercial advertisers or organizations. Since we do not bill for Ham Shop advertising, full remittance must accompany all orders.

Closing date is the 15th of the 2nd month preceding date of publication. Your copy should be typewritten, double spaced on one side of the page only.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchandise listed therein. We reserve the right to reject advertising which we feel is not of an amateur radio nature.

LS?? CB's?? WPE's?? Largest variety samples 25¢ (refunded). ckers, W8DED, Holland, Michigan.

TESTION What to design a QSL card? Sampler Instruction Kit 9¢. Wow! What cards you can create. \$1.50 and up 100. Samco, X 203, Wynantskill, N. Y.

LS's . . . Samples 10¢ . . . Filmcrafters, Martins Ferry, Ohio.

LS Large selection styles including photos. Fast service. mples, dime. Ray, K7HLR, Route 3, Twin Falls, Idaho.

LS free samples. Fast service. Bolles, 7701 Tisdale, Austin, xas.

LS's 3-color glossy. 100 \$4.50. Rutgers Vari-typing Service. ee Samples, Thomas Street, Riegel Ridge, Milford, N. J.

LS Samples 25¢ Rubber stamps; name, call, address \$1.55. rry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

LS—\$2.00 per 100 postpaid U.S. only. Glossy, red and green. ee sample. Hobby Print Shop, Umatilla, Fla.

LS SWLs that are different, colored, embossed card stock and (romekote." Samples 10¢. Home Print, 2416 Elmo, Hamilton, io.

LS Kromekote 3-color . . . order 200 get 25 each of 8 different yles . . . many styles. Samples 10¢. Progress Printing, Box 154, Biloxi, Miss.

LS four colors glossy stock, forty designs—send \$5 for 200 nd get surprise of your life. 48 hour service. Satisfaction guar- teed. Constantine Press, Blandensburg, Md.

LS—SWLs samples 10¢. Malgo Press. Box 375 M.O., Toledo 1, io.

LS Cards in 3 colors \$2.50 per 100. Free samples and catag- ue. Garth Printing, Box 51Q, Jutland, New Jersey.

LS cards: 2 color, glossy; 100 for \$2.50. Samples, Dime, Rams- ottom Printing, Box 237F, Kirksville, Missouri.

LSPRINT QSLs—SWLs 100 2-color glossy \$3 postpaid. QSO file eds \$1 per 100. Rusprint Box 7507 Kansas City 16, Mo.

LS SWLs XYL-OMs (Sample assortment approximately 94¢) overing designing, planning, printing, arranging, mailing, eye- tching comic sedate, fantabulous. DX-attracting. Protoday, azzy, unparagoned cards. (Wow!) Rogers, K0AAB, 961 Arcade ., St. Paul 6, Minn.

LS's—100—\$2.50. Samples. Dime. AMEE's Printery—W9FXQ— ox 138, Oak Lawn Illinois.

LS Cards Brownie, W3CJ1—3110 Lehigh, Allentown, Pa., Catalog ith samples 25¢.

LS Large Selection Styles including Photos, Fast service. Sam- es dime. Ray, K7HLR, Route 3, Twin Falls, Idaho.

LS Samples, dime. Print Shop, Corwith, Iowa.

AM name pins. Get your first name and call letters permanently ngraved on plastic. Special price to ham operators, 55¢. Send ame and money or write for sample. PINCO, P.O. Box 11077, t. Petersburg, Florida.

OGFQ, Leo, has big discounts on overstock of used equipment, ue to so many trades on the fabulous new Galaxy SSB Trans- iver. Now's the time to save on reconditioned equipment. rite for our latest list—over 1,000 items. World Radio Labora- ries, Box 919, Council Bluffs, Iowa.

TRANS-NITION Electronic ignition eliminates point arcing inter- ference in mobile rigs. Coil, Manual Special \$8.50. Complete kit 20.00 Negative ground, \$25.00 Positive ground. Manual \$2.00. nderson Engineering, Wrentham, Massachusetts.

OBILE station, Like new Conset G-77 xmtr, Super-Six and uperceiver combination, all bands, 6 or 12 volts, independent f b.c. rcver, all cables, manuals; Master-Mobile all band an- nna; all perfect. Best offer takes all. Smith, WYBYT, 3 Wood- wn Drive, Williamstown, Mass.

OR SALE complete GE 2-way radio system on business frequency 5.94mc. Base station \$200. Antenna & line \$50. Mobile unit, 2v, 60w, \$175. 6v, 50w, \$50. Philip Petersen, 3001 St. Charles ad, Bellwood, Illinois.

## GUARANTEED CRYSTALS!

ALL MARINE FREQ.—FT-243, DC-34 Holders. Tol. .005. \$2.50  
POLICE, C.A.P., CD, MARS. Tol. .01% \$2.00  
CITIZENS BAND—11 METERS—.005% Tol.  
26.965 to 27.225 MC, 3rd Over. Herm. Seal or FT-243 \$2.95  
13.4825 to 13.6125 MC, 2nd Harm.Herm. Seal or FT-243 \$2.95  
6741.25 to 6806.25 Kc, 4th Harm. FT-243 only..... \$2.50

### SPECIAL! STOCK CRYSTALS

FT-243 Holders 5700 KC to 8700  
KC in steps of 25 KC's

**\$1.19**  
ea.

### SEND FOR FREE CATALOG

DC-34 Holders 1690 KC to 4400 KC steps of 10 KC ea \$1.19

### NOVICE BAND FT-243 Fund.

80 Meter 3701-3748—Steps of 1 KC. FT-243  
40 Meter 7150-7198—Steps of 1 KC. FT-243 ea.  
Dbl. to 40 Meter 3576-3599. Steps of 1 KC. FT-243  
15 Meter 5276-5312—7034-7083 Steps of 1 KC. FT-243

FT-243—2 Meters (Steps of 1 KC) ..... \$1.49  
FT-243—6 Meters (Steps of 1 KC) ..... \$1.49  
FT-243—From 3000-4000 ..... \$1.49  
FT-243—From 1005-2999 (Steps of 5 KC) ..... \$2.50  
FT-241 SSB Low Freq. Xtals 370 to 540 KC  
(Steps of 1.852 and 1.388) ..... \$ .69  
FT-241 SSB Matched Pairs ..... \$2.39

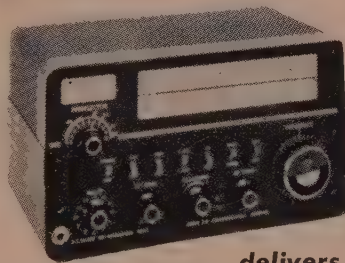
Include 5¢ per crystal for postage (U. S. Only) Calif. add 4% Tax. No C.O.D.'s. Prices subject to change. Ind. 2nd choice; substitution may be necessary. MIN. ORDER \$2.50

"The House of Crystals"

**U. S. CRYSTALS, Inc.**

1342 S. La Brea Ave. Los Angeles 19, Calif.

For further information, check number 36, on page 110



**JUST  
\$5  
DOWN  
and \$9.95  
A MONTH**

*delivers a brand new*

## DRAKE 2 B RECEIVER

Here's all you pay after \$5 down payment

|                        | Amateur Net Price | Monthly Payments |         |         |
|------------------------|-------------------|------------------|---------|---------|
|                        |                   | 1 year           | 2 years | 3 years |
| 2B Receiver .....      | \$279.95          | \$25.20          | \$13.74 | \$9.92  |
| 2AC Calibrator .....   | 16.95             | 1.62             | .81     | .54     |
| 2BS Speaker .....      | 16.95             | 1.62             | .81     | .54     |
| 2BQ Combo .....        | 39.95             | 3.53             | 1.76    | 1.26    |
| Available Soon         |                   |                  |         |         |
| TR-3 Transceiver ..... | 495.00            | 44.91            | 24.50   | 17.69   |
| RV-3 V F O .....       | 99.95             | 9.15             | 4.99    | 3.60    |
| M-S 3 Speaker .....    | 19.95             | 2.28             | 1.14    | .76     |
| AC-3 Supply .....      | 79.95             | 7.32             | 3.99    | 2.88    |
| DC-3 Supply .....      | 129.95            | 11.90            | 6.49    | 4.69    |

AMATEUR ELECTRONIC SUPPLY — Dept. C  
3832 West Lisbon Ave., Milwaukee 8, Wis.

Terry: Rush me a Drake.....I enclose \$5  
deposit and I will pay balance ☐ COD ☐ 1 Year ☐ 2 Years  
☐ 3 years.

I have to trade .....

I want a.....What's your deal?.....

Name .....

Address .....

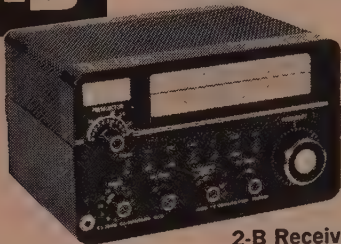
City ..... Zone ..... State .....

For further information, check number 39, on page 110

# NOW! IN STOCK

## DRAKE 2-B

**"The most  
talked about  
HAM RECEIVER"**



**ORDER NOW!**

Send check or money  
order. We prepay  
express charges.

**2-B Receiver**

**\$279<sup>95</sup>**

**Q-Multiplier / Speaker**

**2-BQ \$39.95**

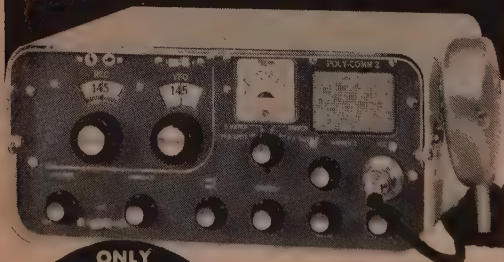
WRITE OR CALL: BILL BRURING

## W9ZSO

COMMUNICATIONS EQPT. CO.  
518 STATE ST., LA CROSSE, WISCONSIN

For further information, check number 40, on page 110

## POLYCOM 6 AND 2 METER TRANSCEIVERS IN STOCK AT A.E.S.



**ONLY  
\$5 DOWN  
PAY ONLY  
\$11<sup>71</sup>  
MONTHLY  
Polycom 6  
(36 months)**

Look How Little You Pay Monthly  
After \$5 Down Payment

|                   | 3 years |
|-------------------|---------|
| Polycom "6"—AC/DC |         |
| \$329.50          | \$11.71 |
| Polycom "2"—AC/DC |         |
| \$349.50          | 12.44   |

Pictured above is the Polycom "2" 2 meter transceiver. It has 17 tubes, 10 diodes, triple conversion, and dual NuVistor RF amplifier. Mini-load VFO, 17 watts input, supersensitive noise limiter, ultra stable squelch.

**PLUS TERRIFIC TRADE IN ALLOWANCE ON YOUR PRESENT GEAR**



Use Order Coupon from other ads in this magazine

## AMATEUR ELECTRONIC SUPPLY

3832 West Lisbon Ave., Milwaukee 8, Wis.

For further information, check number 41, on page 110

READ Spark Cap Times, Journal of the Old Old Times. Entirely different from all other radio publ. Free to mem. Eligible for membership if you made a two-way contact at 40 years ago. Initiation fee covers life membership. No dues. Sole publisher of exact copies of first 1913 Gov't Book (\$3.00), supplements 1-2-3 (\$3.00) and 1909-1910 Book (\$3.00). Write Secy-Treas., W2EG, 507 Wayside Road, tune, New Jersey.

**ELECTRONICS**, radar, unusual surplus bargains, free flyer. M 923 W. Schiller, Phila. 40, Pa.

**SELL** all unused V-80 Gotham Vertical, 2 meter transmitter p.s. and modulator-6146 final, 100' RG-59U coax, vhf recd. P.E. September 1961, broadcast band transmitter, Telre meter conical antenna with mast, 5' tower, accurate in ments—Model 156 Genometer, Superior Instruments—Mode Supermeter, parts, tubes. Interested? Write: Stephen C. WA2TYF, 800 West End Avenue, N. Y. 25, N. Y.

**E.E. STUDENT** needs money for college; must sell immacul HT-37. Purchased a year ago; used less than 10 hours; new, not a scratch; in factory carton; \$395. All inquiries swered. Dan Marshall, K5UTV, ASC Box 311, Arlington, Tex.

**FOR SALE** 75S-1 with 500 cycle filter, excel condx. best over \$365. HT-37 with push-to-talk, good condx. best offer \$325. W5LNL, 910 19th Street, Plano, Texas.

**FOR SALE** Transformer modulator RCA Pri. 5500 ohms 1.14 sec. 5500 ohms 1.95 amp. d.c. \$10.00. Radio receiver, t mitter BC-654A \$10.00. Radio receiver, transmitter, modu BC-186, -187, -188 A, 2400 to 2700 kilocycles. \$100. C Phillips W5KJ, 444 Hammond Ave., San Antonio, Texas.

**TRADE** Hallicrafters S-108, HT-40 transmitter, which has been used. Also Tasco 2.4" Equatorial Telescope, for used driven receiver. Tom Skene, 1568 So. Genesee, Los Angeles, WE-93667.

**SELL** DX-100 \$135; NC-98 \$80; Six and three foot rack pa electronic keyer; 813 modulators; four 250TH 800 watt rf and other surplus equipment; chokes; transformers; Blaup am auto radio, inquire: Lt. Cheatham, K4BUI, Box 332, N. D.

**SELL** SX-101A—\$260; HC-10 ssb converter—\$75; kw Linear -1000F Eldico—\$350; Transtenna T-R switch, outboard mo \$50. all like new. Lamb, 1219 Yardley Rd., Morrisville, Pa.

**PEORIA** hamfest 15 September 1963, Exposition Garden weather site. For tickets write Stan Kujawa, 1612 West Col Terrace, Peoria, Illinois.

**HEATH** O-6 oscilloscope, \$20; Pilot fm tuner, \$15; Astatic crystal mike, desk stand, \$4; VM 3-speed record-changer, plifier, speaker, \$15; Astatic G press-to-talk mike stand "Ted" Hein, 418 Gregory, Rockford, Illinois.

**PANADAPTOR** wanted for 455 if. Wiot. KHGEW.

**WANTED** kw final, pp triodes only, 80/40/20/15/10—power, ulator/rack not wanted. W1BB.

**SELL** Gonset GSB-100, \$320; Drake 2A, \$210; or \$500 toge Excellent condition. K8DIO, L. Korb, 1838 Maywood, Clev 21, Ohio.

**COLLINS** 75A-4. Excellent. Priced to sell. Will ship. KHGEW.

**TOROID RTTY Kit**: Mark-Space Discriminator and Bandpass fi Includes 4-88 mh and 1-44 mh uncased, like new toroid; formation sheet, mounting hardware and six mylar capac \$5.00 Postpaid. Toroids: Specify 88 or 44, less capac \$1.00 ea., 5/\$4.00 Postpaid. KCM Products, Box 88, Milw 13, Wis.

**TOROIDS** Uncased 88 mh like new. Dollar each. Five \$4.00 DePaul, 309 South Ashton, Millbrae, Calif.

**7000 volt** variable air capacitors 300 mmf \$14.95. Hinckley Rutland, Vt.

**220mc.** Information Frequency, Equipment, Schedules. Po Returned W9D1.

**STILL LOOKING** for old wireless gear before 1925. Will pay money or trade and particularly want certain spark equip a C.R.L. Paragon with amplification or matching tube pane Forest Type O radiotelephone with tubes, catalogs, govern call books and other books. File of QST's is almost com but need a few issues of 1916, 1917, 1919 and 1923. If yo lucky, enough to own any copies I need, I will pay real m for them. I want them that badly. Also need quenched se number SE1001 for SE1075 ship transmitter. In writing p give complete information plus price or specify what you. W5VA/WSA1, T. Frank Smith, P.O. Box 840, Corpus Christi,

**FOR SALE**: Complete instructions including 28 page bookle 22" x 36" schematic for converting the ART-13 transmit a.m. and s.s.b. Satisfaction guaranteed. \$2.50 Sam App 501 N. Maxwell St., Tulsa, Texas.

**MULTIPLEX** Adapter—Circuit board set of 5 coils, socket complete instructions \$15.00. D. L. Stoner, Box 7388Q Loma.

**READY CASH** for your AN/GRC, PRG, TRC, TCC, ARC, all m communications Equip't. Also test gear: TS-, AN/UPM, URN We Pay Freight. Call K2BBC collect at TR 8-5222 or Write Electronics Co., 218 W. Tremont Ave., Bronx 53, New York

ADDED-ins accepted on purchases of demos and brand new Ham, Marine and Hi-Fi equipment. We are one of the largest mailers in the country and carry complete lines of new equipment of almost all manufacturers in stock. Time payments up to 24 months—arranged. We will also buy your used equipment for high cash prices. Many specials available. Call Bob Crown Electronics, 64 Cortland Street, N. Y. 7, N. Y. Worth \$790 for real money saving deals, whether you have something to trade-in or not.

**COMMUNICATOR III**, 6m, \$160, Super 12 converter \$35, Gonset commander mobile xmttr (needs a few plug-in coils) \$30 or best offer. Cleaning shack. f.o.b. Bill Thiele, K9RCV, 22 Vernon Lane, Lafayette, Ind.

**ANT 220 432 gear. W9DJ.**

**NEED MONEY?** Get that new rig now—no need to do without! Borrow money to buy it quickly, confidentially, as thousands are doing, from National Loans by mail. Easily arranged, repay in small monthly amounts. Borrow \$100 to \$600 without co-signers or collateral. For our quick 73, write, tell us how much you need. National Loans, Dept. Q, 101 S. Tejon, Colorado Springs, Colo.

**ELL SX 101A** \$250; HC-10 s.s.b. converter \$75; Transtenna T-R switch Model 102, outboard \$50; all like new and F.O.B. . . . Amb, 1219 Yardley Rd., Morrisville, Penna.

**RO-60** one owner guaranteed perfect, recently aligned, coils or 500 kc thru 30 mc \$349. Don Parrott, Box 277, Idaho Springs, Colorado.

**ANTED** old radios manufactured before 1925, especially Grebe, Jurad, Paragon and Zenith. J. Worcester, R.D. 1, Frankfort, N.Y.

**OR SALE** Eico 720 transmitter excellent condition \$65, antenna play excellent \$7. Clark Cramer, 817 Macon Place, Raleigh, N. Carolina.

**CHICAGO** area, for sale NC-300 serial 481-0038 and matching speaker; Gonset monitor; Stancor 202A cw xmttr 100W; DeLuxe Vibroplex; vertical antenna 10-15-20 and miscellaneous \$275 or offer. W9RFO, 163 Maple Ave., Elmhurst, Ill.

**ANNUAL** Wyoming Hamfest August 10-11. Ham vacation in the beautiful Big Horn mountains. For information write Box 141, Sheridan, Wyoming.

**IGHTWEIGHT** but sturdy "Space Guns" added to your present 1-band or 20 meter beam's driven element, provided it is fed directly with co-ax and does not employ any type of match such as the Gamma, etc., gives you a rotatable dipole on 40 meters with a figure 8 pattern. Four band operation on one feed line. Simple tuning and installation instructions included. Immediate delivery. Net \$39.95 per pair, f.o.b. Nettles Manufacturing Co., Inc., Box 614, Denver, Colorado, U.S.A.

**IGHTLY-EFFECTIVE** home study review for FCC Commercial Phone exams. Free literature! Wallace Cook, Box 10634, Jackson 9, Mississippi.

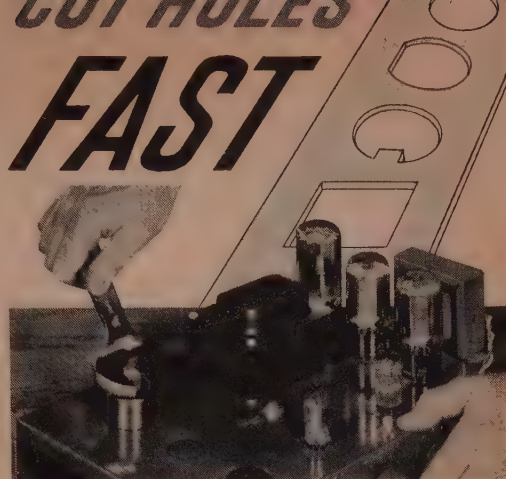
**OR SALE** Reconditioned, excellent teletype 60 wpm sunc. M15 /keyboard \$90. W/automatic-return-line-feed \$150; M19 /table & TD \$240; M19 keyboard \$55; M14 typing reperiators /keyboard \$125; w/o keyboard high or low base \$75; with no count switch and/or distributor (requires external tape head) \$15 each, extra. FPR5H \$45; 9 channel TD \$150; tri-channel TD 90; (AN/TG C cover QJ January 63) ANTGC set (tri channel TD - 2 typing-reperi.) \$175; Automatic Electric auto-tape relay quip. AN/GGC-2 75 wpm available, 60 wpm. Excellent cond. Dual channel \$325. Single channel with tape in storage \$245. Repairs and reconditioning. M14, M15, M19. Frank Holloway, Jr. 513 N. Inehurst Ave., Salisbury, Md.

**AMS** Convert any television to sensitive, big-screen oscilloscope. Simple changes. No electronics experience necessary. Illustrated plans, \$2.00. Relcoa, Box 10563, Houston 18, Texas.

**TTY** WE255A relays \$3.50. Sockets for same \$1.00 postpaid. Jerry Copeland K8OQI, 8423 Newells Lane, Kalamazoo, Mich.

**WO METER** package, Heath Twoer transceiver with field strength meter and one Novice band crystal, \$45. 8 el. 2 meter beam, 10. Both for \$50. Bob Brown, K2ZSQ, Box 528, Rahway, New Jersey.

**ELL** Filter King 2 meter converter, 28-30 mc i.f., 2 switched crystals, ideal for 75A-4, etc. \$30. UTC CVM-3 125 watt mod. trans., used, \$12. S-22 250 watt mod. trans., used, \$16. Drake V-1000-LP filter, \$6. Matched pair Gold Lion KT-88's, GZ-34, wo B-759's, brand new, all for \$10. K2EEK, 75-15 177 St., flushing 66, N. Y., JA 3-5420.



## GREENLEE CHASSIS PUNCHES

Make accurate, finished holes in 1½ minutes or less in metal, hard rubber and plastics. No tedious sawing or filing—a few turns of the wrench does the job. All standard sizes . . . round, square, key, or "D" shapes for sockets, switches, meters, etc. At your electronic parts dealer. Literature on request.

**GREENLEE TOOL CO.**   
2028 Columbia Ave., Rockford, Illinois

For further information, check number 42, on page 110

## MAKES SENDING A PLEASURE

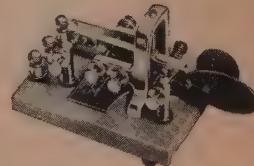
With **VIBROPLEX X**



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 3¼" by 4¼" and a weight of 2¼ lbs. Has same contacts and finely finished Vibroplex parts. Standard, at \$17.95; DeLux, 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



3 KW PEP  
"SA UN"

**NEW!**  
MODEL 1V5CB1  
**ONLY \$13.95**

ALSO AVAILABLE  
3 KW PEP MODEL  
1V5CB1 \$17.95

A COMPLETE MONO-BAND KIT INCLUDES  
5C1080 "BALUN" WIRE, INSULATORS  
AND COMPLETE INSTRUCTIONS  
TO PROPERLY INSTALL  
on 80 or 40 or 20 or 15  
or 11 or 10 Meter  
HIGH PERFORMANCE INVERTED "Y"  
ANTENNA

MFG. IN U.S.A. REG. PAT. NO. 2,516,929  
TELREX LABORATORIES ASBURY PARK N.J.



1 KW  
PEP  
"BALUN"  
**\$12.95**

WRITE FOR FREE PL-77 DESCRIBING THE WORLD'S MOST POPULAR ANTENNAS

# 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



**FREE!! FREE!! FREE!!**

Send for free copy of *The Ham Trader* if  
you are looking to swap, buy or sell equip-  
ment with other hams. Or subscribe now  
6 issues \$1.50.

**THE HAM TRADER**

Box 153C Franklin Square, N. Y.

## "HOW TO MAKE MONEY IN Mobile Radio Maintenance"

AUTHORITATIVE GUIDEBOOK  
ABOUT THE BOOM IN TWO-WAY MOBILE-RADIO:  
GIVES FACTS, FIGURES, PAY RATES.  
**WRITE TODAY!**

**FREE**

LAMPKIN LABORATORIES, INC. Electronic Div., BRADENTON, FLA.



**NEW LOW  
PRICE!!**

CENTRAL  
ELECTRONICS  
MM2 R. F. ANALYZER

**\$99<sup>50</sup>**

Originally \$149.50  
**ONLY \$5 DOWN**

2 Years to Pay  
(\$5.74 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. Com-  
plete 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

Enclosed \$..... Ship me.....  
I will pay balance in ☐ 1 year ☐ 2 years

Name.....

Address.....

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

☐ Send latest Reconditioned Equipment Bulletin

For further information, check number 43, on page 110

SELL SP-400X with power supply and speaker \$125. Bargains  
tubes and parts; write for list. W3CNS.

NCX-3 with power supply; brand new never opened. First \$4  
Hallicrafter HT-18 Good condition \$45. K5GNU, Bill Zapotoz  
Midkiff, Texas.

FOR SALE Knight T-60 and mike—\$45 or offer. Going sideba  
K7SSG, RTE 1, Box 505, Snohomish, Wash.

FOR SALE near new Heath MR-1; HP-20 power supply; Dow-  
12 vac relay; Mosley 3 band dipole; 100 ft. each of 52 and  
ohm coax, and two 30 ft. masts. Cost \$275. Sell for \$160 or  
piece. Dick Farrell, 9950 Broadway, Temple City, Cal.

FOR SALE Apache and SB10 Adapter; Heathkit Scope; HQ-11  
3 El. Hornet Tri-Band Beam; 16 El. Cush Craft 2 meter Collin  
antenna; VM Tape Recorder; 4-400; 4-125; 813 final with mo-  
lator; exciter power supply; final power supply in 6 ft.  
Sell or swap to best bidder. Richard Greene K5IUN, 2101  
17th Street, McAllen, Texas.

FOR SALE HQ-140X; 10B; vfo; model B slicer; \$300 or best of  
W7ZOS, Box 278, Saratoga, Wyoming.

KWM-2 with PM-2 and CC1; 10D mike and stand; Waters reject  
tuning 900. 30L1 new \$450 or both \$1300. Ham-M new sea  
carton \$90. W5UV.

WANTED Coil Sets E, F, G, H, J, AA, AB, AC and associated  
scales; NFM 83-50 adapter; Select-O-Ject data sheet, all  
HR0-50-T-1. Also 200-V transmitter. All must be in good work-  
order. For Sale or Trade: Gonset G-76 Transceiver, best or  
over \$285. K1RFX/7, Dave Flinn, 8076 Maple, Fairchild A  
Washington.

WANT low freq (15 kc) receiver, surplus or used OK. Prefer sup-  
het but will consider regen. Must have 110 vac supply. Sl  
lowest price first letter. Box S9, CQ.

SELL Gonset Super Six Converter \$25.00 or swap for He  
HP-20AC power supply. Ronald Kaullin, 6326 Blue Flag A  
Harrisburg, Penna.

VIBRO-KEYER \$12. Neidich, 921 Walt Whitman Rd., Hunting  
Station, N.Y.

TRANSFORMERS How to design them \$1.50. Ralph Dev  
WA2UYW 48 Woodruff Ave., Brooklyn, N.Y.

LOOKING? Shopping? Trading? Trying to save money? W  
Bob Graham for special deals on new and reconditioned u-  
gear. Cash or Budget. Graham Radio, Dept. B., Reading Massac  
setts. Tel: 944-4000.

WYOMING hamfest Aug 10-11. Ham Program, banquet. Tou  
mobiles invited. See "Hamfest" section this issue, or con  
any Wyoming ham.

SELL HQ-170, \$250; C.E. Model 10-B Exciter \$87.50; Heat  
Seneca \$140; Johnson 1002 mmfd. 3500v \$7.50; Johnson I  
216 mmfd. 4500v variable \$10; PE103 Dynamotor \$10; Mod-  
tion transformer for pair 805 \$15; Sola Autotransformer 80-1  
\$15; Sola constant voltage transformer 500 kva \$15. All ex  
lent FOB W5APM, Box 3209. San Marcos, Texas.

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.

POWER Supply 680 or 1360 vdc, 500 ma. Best offer. Neid  
K2ENN, 931 Walt Whitman Rd., Huntington Station, N.Y.

CRYSTAL Lattice filters Hycon 2215KA(3 kc); 2215KB (.5  
10MF (3 kc at 10.7 mc); SX-42 and speaker, re-aligned, ex  
\$85; SX-28 and speaker, re-aligned, v. good, \$65; Johnson  
switch, like new, \$15; Bruning 2699PC drafting machine  
new, trade or offer, W0LWZ, 1030 So. Dudley, Denver  
Colorado.

WANTED Teletype printers, perforators, reperforators, trans-  
ter-distributors test equipment; Model 14, 15, 19, 26, 28,  
All types Collins receivers, 51J, R-388, R-390, 75A, etc. Cas-  
trade for new amateur equipment. Write Tom, W1AFN, Alitron  
Howard Co., Box 19, Boston 1, Mass. Richmond 2-0048.

FREE Interesting sample "Equipment Exchange Bulletin."  
gains! Swaps wanted! Write: Brand, publisher, Sycamore, IL

COLLINS 75S-2; \$395 Optional filter and xtal; \$50. K2J  
238-73 116 Rd. Elmont L.I., CU 5-5859.

## SR-150 [from page 28]

quick tuneup time is *not* needed to prevent dam-  
age to the tubes.

The selection of mox (push-to-talk) or vox  
operation is included in the SR-150. For c.w.,  
either manual or break-in operation is possible.  
The vox works very smoothly. Controls for vox  
level, anti-trip, vox delay and meter zero are ac-  
cessible for screw-driver adjustment on the left  
side of the cabinet. Reference must be made to  
the instruction manual for the identity of these  
controls and, although adjustment is not fre-

quently needed, it will be found helpful to mark these with homemade labels secured to the case with Scotch tape.

Since the output circuit is fixed to match only a 50-ohm load, use with other impedance antenna systems, such as may be encountered at temporary or portable locations particularly with the lower-frequency bands, will require a separate antenna matching or coupling system.

The Hallicrafters Model SR-150 is priced at \$650, which is about what one might expect to pay for a high quality and versatile unit of this type. The Model PS-150-120 a.c. power supply is \$99.50, the Model PS-150-12 12-volt supply is \$109.50 and the Model MR-150 mobile mount is \$39.95—W2AEF.

**Waters Dummy Load** [from page 30] will be transferred to the connecting cable. This may require a high temperature cable (RG-87 A/U) if operation at maximum power is conducted for extended periods of time.

After the transmitter has been tuned up for the desired input, the output power may be read directly on the meter. The manufacturer's specifications of power accuracy are as follows: 2-30 mc, 5% full scale; 30-150 mc, 7.5% full scale; 150-230 mc, 10% full scale. The v.s.w.r. is given as less than 1.3 to 1 up to 230 mc. Our tests indicated the performance of the Model 334 to be well within the specified tolerances.

The wattmeter diode will be destroyed if peak-power levels of 1000 watts are exceeded. This means that if a linear amplifier, capable of a p.e.p. output of more than this amount is involved, the input power during measurement or tuneup will have to be reduced accordingly. When this is required, the power at maximum capabilities (in excess of 1000 watts) can be estimated from the efficiency realized at the lower level.

Note that the power limitation is for peak values. This also means, that in the above case, full modulation should not be applied. The wattmeter is highly damped, so modulated-power readings will not be indicative of true values anyway. This precaution also applies to a.m. transmitters having more than 250 watts of output carrier power.

In cases where the dummy load generally is used for tune-up purposes, the employment of a coaxial switch (such as Waters Model 335 or 341) will make it convenient to rapidly change from dummy load to an antenna.

The Model 334 provides a simple means for the measurement of r.f. loss in coaxial cable. It also is an excellent termination for checking the accuracy and balance of a s.w.r. meter or r.f. bridge.

Since this device is a completely self-contained laboratory-type instrument of high accuracy over a wide frequency range and power range, it should prove to be a very popular item. The Waters Model 334 Dummy Load-Wattmeter is priced at \$79.75. It is produced by Waters Manufacturing, Inc., Wayland, Mass.—W2AEF

Hey OM—It's Mobile Time—



and nobody, but nobody gives you a better deal on Hallicrafters new **SR-150 Transceiver**



**ONLY \$23.29 a month —3 years to pay— ONLY \$5.00 DOWN Terrific Trades**

Doe, W9HJS, our Chicago Store Manager is punching S.S.B. holes in the band with the 150 PEP of his new Hallicrafters SR 150 mobile rig. Listen for him on 80 and 40! He uses it fixed at his home QTH, too!

**LOW MONTHLY PAYMENTS!**

| MODEL                                 | Amateur Net Price | Monthly Payments (3 Years) |
|---------------------------------------|-------------------|----------------------------|
| SR-150 Fixed/Mobile Transceiver ..... | 650.00            | 23.29                      |
| P-150AC Supply for SR-150 .....       | 99.50             | 3.41                       |
| P-150DC Supply for SR-150 .....       | 109.50            | 3.77                       |
| MR-150 Mobile Mount for SR-150 .....  | 39.95             | 1.26                       |

**Two More Hot Hallicrafters Items!**

|                          |          |         |
|--------------------------|----------|---------|
| S X 117 Receiver .....   | \$379.95 | \$13.54 |
| H T 37 SSB Xmitter ..... | 495.00   | 17.69   |

Complete Hallicrafters line in stock at A E S! Any item \$5 down and 36 months to pay. Just send \$5 and tell us how long you need to pay balance.

**STAY ON THE AIR PLAN!**—I will give you a good trade-in allowance for your old equipment, and you can use it until you get my shipment. Then send me your trade-in.



**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

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

# DOW-KEY DK60 SERIES

4 VERSATILE  
MODELS  
A.C. or D.C.



2 3/4 x 3 3/4 x 1 1/2  
Less than 1 lb. oz.

## COAXIAL RELAYS

Also Available  
with Type C,  
TNC, BNC, N &  
UHF Connectors

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.)
- ★ Weatherproof models available at slightly higher cost.
- ★ Ganged, multiple position switch arrangement available for remote control selection of antennas.

★ See one of our 700 dealers and distributors in U. S. and Canada for catalog sheets or write:

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 45, on page 110

### READER SERVICE

## CQ Magazine, Dept. RS

300 WEST 43rd STREET  
New York 36, N. Y.

Void after  
Aug. 28, 1963



Please send me more information on your ads in the Aug., 1963 CQ keyed as follows:

|    |    |    |    |    |    |    |    |    |    |   |
|----|----|----|----|----|----|----|----|----|----|---|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | A |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | B |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | C |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | D |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | E |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |   |

Total Inquiries ☐

NAME \_\_\_\_\_  
(Please Print)

Type of work (specify) \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_ STATE \_\_\_\_\_



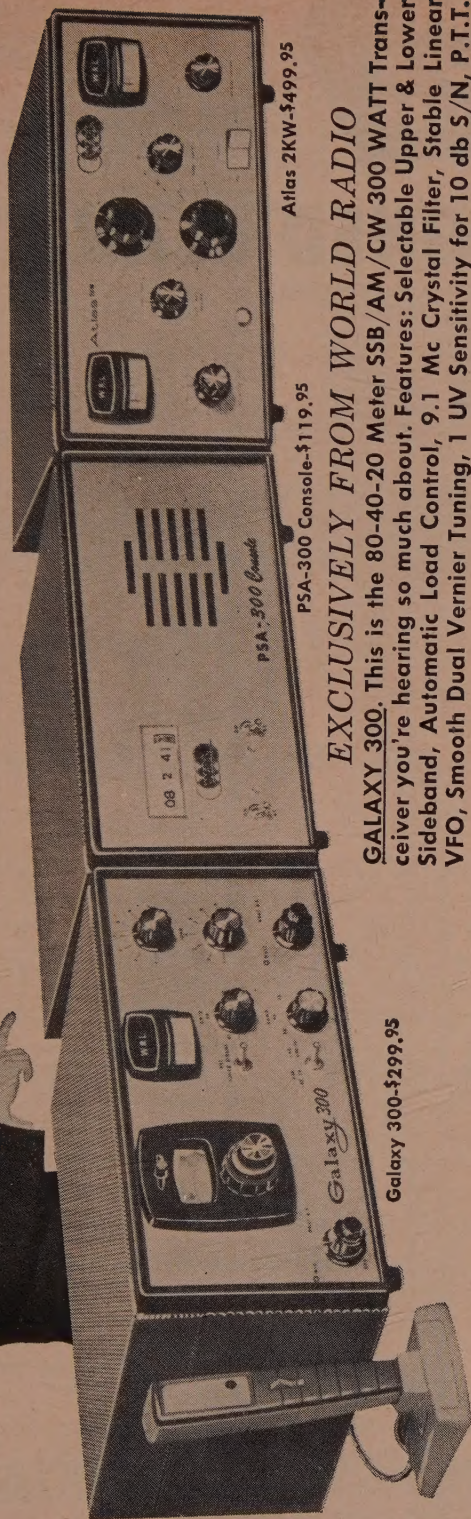
|                                       |                                                  |
|---------------------------------------|--------------------------------------------------|
| Allied Radio                          |                                                  |
| Amateur Electronic Supply             | 90, 91, 93, 94, 95, 100, 104, 105, 106, 108, 109 |
| Antenna Roundup Handbook              |                                                  |
| Barry Electronics                     | 96                                               |
| Bonn, Lew Co., The                    |                                                  |
| Clegg Laboratories                    |                                                  |
| Cleveland Institute of Electronics    |                                                  |
| Collins Radio Company                 | Cover                                            |
| Communications Equipment Co.          |                                                  |
| Communication Products Company        |                                                  |
| Dow-Key Company                       | 98                                               |
| DPZ Corporation                       |                                                  |
| Electronic Circuits Handbook          |                                                  |
| Evans Radio                           |                                                  |
| E-Z Way Towers, Inc.                  | 92                                               |
| Fair Radio Sales                      |                                                  |
| Finney Company, The                   |                                                  |
| Gain, Inc.                            |                                                  |
| Gonset                                |                                                  |
| Greenlee Tool Company                 |                                                  |
| Hallcrafters Company                  |                                                  |
| "Ham" Buerger                         |                                                  |
| Ham Mart                              |                                                  |
| Ham Shop                              |                                                  |
| Ham Trader, The                       |                                                  |
| Harvey Radio                          |                                                  |
| Heath Company                         |                                                  |
| Instructograph Company                |                                                  |
| International Crystal Mfg. Co., Inc.  |                                                  |
| Johnson, E. F. Company                |                                                  |
| Lafayette Radio                       |                                                  |
| Lampkin Laboratories, Inc.            |                                                  |
| Lawrence Engineering Co.              |                                                  |
| Millen, James Mfg. Co., Inc.          |                                                  |
| National Radio Company Inc.           | Cover                                            |
| P & H Electronics                     |                                                  |
| Parks Electronics Laboratories        |                                                  |
| Petersen Radio Co. Inc.               |                                                  |
| Polytronics Laboratories Inc.         |                                                  |
| Raytronics                            |                                                  |
| RCA Electronic Components and Devices | Cover                                            |
| Supreme Electronics Inc.              |                                                  |
| Telrex Laboratories                   | 99                                               |
| Tri-Ex Tower Corp.                    |                                                  |
| Turner Microphone Co.                 |                                                  |
| United Electronics                    |                                                  |
| U.S. Crystals, Inc.                   |                                                  |
| Vibroplex Co. Inc.                    |                                                  |
| Waters Manufacturing, Inc.            |                                                  |
| Western Radio Co.                     |                                                  |
| Whippany Laboratories, Inc.           |                                                  |
| WRL, World Radio Laboratories         |                                                  |

Leo I. Meyerson  
WØGfq

# The NEW Galaxy 300 WATT

SELECTABLE SIDEBAND • SSB/AM/CW  
TRANSCIEVER **\$299.95**  
WIRED

**IMMEDIATE  
DELIVERY**



## EXCLUSIVELY FROM WORLD RADIO

**GALAXY 300.** This is the 80-40-20 Meter SSB/AM/CW 300 WATT Transceiver you're hearing so much about. Features: Selectable Upper & Lower Sideband, Automatic Load Control, 9.1 Mc Crystal Filter, Stable Linear VFO, Smooth Dual Vernier Tuning, 1 UV Sensitivity for 10 db S/N, P.T.T.

...and VOX Operation (Vox Opt'l \$24.95). Both MOBILE and FIXED STATION. ALL for only \$299.95. PSA 300 CONSOLE. Here's a real rugged, well regulated AC Power Supply, housed in a matching cabinet to the GALAXY. The ONLY Power Supply built to run the Galaxy at FULL POWER. Standard Power Supply \$99.95. With Clock \$119.95. 12 VDC Supply \$119.95 — Mobile Mount \$14.95. ATLAS 2KW LINEAR. Perfect matching 2KW SSB (PEP) companion Linear to the Galaxy. With internal AC supply (115-220VAC). Features: Hypersil 1 Amp., transformer, grounded grid operation, dual blowers, internal relays. Covers 80-40-20 M.

Priced at \$499.95.

† Twice average DC

# WORLD RADIO LABORATORIES

3415 West Broadway • Council Bluffs, Iowa  
• Phone: 328-1851

**NEW WRL**  
**'64 Catalog**  
Available August  
**RUSH ME:**

☐ New '64 Catalog  
☐ "Galaxy" Brochure  
☐ Quote "Trade-Ins" on Attached Letter

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY & STATE \_\_\_\_\_

For further information, check number 46, on page 110



# NOBODY BUT TERRY OFFERS SUCH LIBERAL POLICIES

## RECONDITIONED GEAR

Limited Quantities  
Subject to Prior Sale

### Summer Clearance Sale—Act Now! and Save

The New Display items listed here carry **FULL NEW Manufacturer's Guarantee, etc.**—Most of the New Display items have not been taken out of their protective plastic display bags.

|                             |       |                               |       |
|-----------------------------|-------|-------------------------------|-------|
| <b>B &amp; K</b>            |       | <b>ELMAC</b>                  |       |
| 1050 Dyna-Scan              | \$ 69 | PSR-612 DC Sup                | \$ 19 |
| <b>B &amp; W</b>            |       | PMR-7 Receiver                | 79    |
| LPA-1 Line (no cab)         | \$149 | PMR-8 Receiver                | 109   |
| 51SB adaptor                | 119   | A-54 Xmttr                    | 34    |
| 51SB-B adaptor              | 109   | A-54H Xmttr                   | 39    |
| 651 matchmaster             | 139   | AF-67 Xmttr                   | 119   |
| L-1000A Linear              | 199   | AF-68 Xmttr                   | 119   |
| 5100 Xmttr                  | 179   | PSA-500 AC Sup                | 39    |
| 5100S Xmttr                 | 189   | M-1070 DC/AC                  | 39    |
| 5100X Xmttr                 | 199   | <b>GLOBE</b>                  |       |
| <b>CENTRAL ELECTRONICS</b>  |       | UM-1 modulator                | \$ 29 |
| Mod A slicer                | \$ 19 | 65B Scout                     | 44    |
| Mod B slicer                | 29    | SD-75 Scout                   | 79    |
| GC-1 gated comp             | 29    | VHF-62 Hi-bander              | 99    |
| MM-1 analyzer               | 49    | 90 Chief Xmttr                | 29    |
| 10B SSB exciter             | 89    | 90A Chief Xmttr               | 34    |
| 20A SSB exciter             | 129   | DSB-100 Xmttr                 | 59    |
| 200V Xmttr                  | 595   | 300 Xmttr                     | 149   |
| 45B VFO (C.E.)              | 39    | 300A Xmttr                    | 169   |
| 45B VFO/10m                 | 19    | 350 Xmttr                     | 219   |
| MM-2 analyzer               | 69    | 500 King Xmttr                | 269   |
| MM-2 kit NEW                | 59    | 500A King Xmttr               | 289   |
| <b>CLEGG</b>                |       | 680 Scout Xmttr               | 39    |
| 99'er Xcvt                  | \$ 99 | 680A Scout Xmttr              | 44    |
| Zeus Xmttr                  | 495   | <b>GONSET</b>                 |       |
| NEW DISPLAY Zeus Xmttr      | 599   | Comm III 6m.                  | \$129 |
| NEW DISPLAY                 |       | Comm III 6m.                  | 149   |
| Interceptor Rec             | 399   | Comm III 2m.                  | 179   |
| NEW DISPLAY                 |       | Comm IV 220mc.                | 199   |
| Thor IV Xcvt                | 139   | Comm IV 2m.                   | 269   |
| <b>COLLINS</b>              |       | 3156B aircraft                | 59    |
| KWM-1 Xcvt                  | \$399 | C-28 10m Xcvt                 | 119   |
| KWM-1 console               | 69    | G-43 Receiver                 | 79    |
| KWM-1 Mount                 | 139   | G-63 Receiver                 | 129   |
| KWS-1 Xmttr (ser. 0-500)    | 795   | G-66 Receiver                 | 89    |
| KWS-1 Xmttr (ser. 500-1000) | 795   | G-66B Receiver                | 89    |
| MP-1 DC Sup                 | 139   | 3-way Rec Sup                 | 24    |
| KWM-2 Xcvt                  | 849   | Thin Pak                      | 239   |
| PM-2 AC Sup                 | 109   | G-76 Xcvt                     | 69    |
| 30L-1 linear                | 399   | G-76 AC Supply                | 69    |
| 30S-1 linear                | 469   | G-76 DC Supply                | 119   |
| 32S-1 Xmttr                 | 895   | G-77 Xmttr                    | 119   |
| 32V-1 Xmttr                 | 169   | G-77A Xmttr                   | 139   |
| 32V-2 Xmttr                 | 169   | GSB-100 Xmttr                 | 249   |
| 75A-1 Rec                   | 349   | GSB-101 linear                | 199   |
| 75S-1 Rec                   | 389   | G-105 2m Xmttr                | 179   |
| 75S-1/blanker               | 399   | Super 12 Conv.                | 39    |
| 75S-1/500 cycle             | 479   | Tri-band Conv. (Cash As-Is)   | 10    |
| 51J-4 (rack) LATE           | 995   | <b>SPECIAL CLOSE-OUT—TGE</b>  |       |
| 75A-2 Rec                   | 229   | <b>FOLLOWING ITEMS ARE IN</b> |       |
| 75S-2/blanker               | 479   | <b>FACTORY-SEALED CARTONS</b> |       |
| 75A-3 Rec                   | 329   | G-76 Xcvt                     | \$329 |
| 75A-4 Rec (ser. 0-1000)     | 429   | G-76 AC Sup                   | 115   |
| 75A-4 Rec (ser. 1000-2000)  | 495   | G-76 DC Sup                   | 115   |
| 75A-4 Rec (ser. 2000-3000)  | 495   | 3311 88-108 mc                |       |
| 75A-4 Rec (ser. 3000-4000)  | 495   | FM Conv 12v B+                | 35    |
| 310B-3 exciter              | 79    | GR-111 Receiver               | 59    |
| 516F-1 AC Sup               | 129   | GR-112 Receiver               | 59    |
| 516F-2 AC Sup               | 79    | 3275 6m Conv                  | 29    |
| NEW KWM-1 mount             | 50    | 3261 Super 12 Conv            | 59    |
| NEW KWM-1 DX adaptor        | 395   | <b>HALLICRAFTERS</b>          |       |
| NEW 75S-1 Rec               | 925   | HT-32 Xmttr                   | \$369 |
| NEW DISPLAY                 |       | HT-32A Xmttr                  | 419   |
| KWM-2 #10549                | 544   | HT-32B Xmttr                  | 495   |
| <b>DRAKE</b>                |       | HT-33 linear                  | 249   |
| 1A Rec                      | \$149 | HT-33B linear                 | 599   |
| 2A Rec                      | 189   | HT-37 Xmttr                   | 349   |
| 2B Rec                      | 209   | HT-41 linear                  | 295   |
| 2BQ combo                   | 245   | HT-40 Xmttr                   | 59    |
| NEW DISPLAY 2B Rec          | 29    | S-40A Receiver                | 49    |
| NEW DISPLAY 2BQ combo       | 35    | S-40B Receiver                | 49    |
| <b>EICO</b>                 |       | SX-42 Receiver                | 129   |
| 720 Xmttr                   | \$ 49 | SX-43 Receiver                | 89    |
| 730 Xmttr                   | 39    | SP-44 panadaptor              | 49    |
| <b>ELDICO</b>               |       | S-53 Receiver                 | 44    |
| SSB-1000 linear             | \$175 | SX-71 Receiver                | 109   |
| SSB-1000F linear            | 275   | SX-73 Rk-Mt                   | 495   |
|                             |       | S-85 Receiver                 | 69    |
|                             |       | SX-62 Receiver                | 179   |
|                             |       | SX-88 Receiver                | 295   |
|                             |       | SX-96 Receiver                | 129   |
|                             |       | SX-99 Receiver                | 89    |
|                             |       | SX-100 Receiver               | 189   |

|                            |       |
|----------------------------|-------|
| <b>HALLICRAFTERS—Cont.</b> |       |
| SX-101 Receiver            | \$199 |
| SX-101 Mk III Rec          | 219   |
| SX-101A Receiver           | 249   |
| SX-110 Receiver            | 109   |
| SX-111 Receiver            | 129   |
| SX-115 Receiver            | 349   |
| SX-117 Receiver            | 279   |
| SX-140 Receiver            | 69    |
| SR-34 (AC) XCVR            | 249   |
| FOLLOWING ARE NEW DISPLAY  |       |
| HA-6 Transvertor           | \$249 |
| 10m Messenger              | 249   |
| P-26 AC Supply             | 69    |
| SX-100 Receiver            | 249   |
| SX-111 Receiver            | 199   |
| FPM-200 Xcvt               | 1495  |
| <b>HAMMARLUND</b>          |       |
| HC-10 slicer               | \$ 79 |
| HC-50 Xmttr                | 319   |
| HQ-100 Receiver            | 119   |
| HQ-100C Rec                | 114   |
| HQ-110C Rec                | 149   |
| HQ-120 Rec                 | 159   |
| HQ-125X Rec                | 69    |
| HQ-140X Rec                | 139   |
| HQ-145 Rec                 | 169   |
| HQ-145C Rec                | 174   |
| HQ-145X Rec                | 189   |
| HQ-150 Rec                 | 189   |
| HQ-170 Rec                 | 219   |
| HQ-170C Rec                | 225   |
| HQ-180C Rec                | 309   |
| NEW HQ-145C Rec            | 225   |
| <b>HARVEY WELLS</b>        |       |
| TBS-50 Xmttr               | \$ 29 |
| TBS-50C Xmttr              | 34    |
| TBS-50D Xmttr              | 39    |
| APS-50 AC Sup              | 19    |
| T-90 Xmttr                 | 59    |
| R-9A Rec                   | 49    |
| <b>HEATH</b>               |       |
| MR-1 Receiver              | \$ 59 |
| MT-1 Xmttr                 | 125   |
| RX-1 Receiver              | 189   |
| TX-1 Apache                | 179   |
| VF-1 VFO                   | 179   |
| VHF-1 Seneca               | 159   |
| HA-10 linear               | 219   |
| HC-10 VFO                  | 29    |
| HP-10 DC Supply            | 29    |
| HP-20 Supply               | 29    |
| HR-20 Receiver             | 24    |
| HX-20 Xmttr                | 34    |
| DX-35 Xmttr                | 179   |
| DX-40 Xmttr                | 39    |
| DX-60 Xmttr                | 59    |
| DX-100 Xmttr               | 149   |
| DX-100B Xmttr              | 149   |

|                           |       |
|---------------------------|-------|
| <b>HUNTER</b>             |       |
| NEW DISPLAY               |       |
| Bandit 2000A              | \$495 |
| <b>HY-GAIN</b>            |       |
| RBX-1 NEW                 | \$160 |
| <b>JOHNSON</b>            |       |
| Adventurer                | \$ 34 |
| Challenger                | 69    |
| Invader 200               | 419   |
| Invader 2000              | 879   |
| 275w matchbox             | 39    |
| 275w matchbox w/SWR       | 39    |
| Mobile Xmttr (Cash As-Is) | 30    |
| Navigator                 | 99    |
| Pacemaker                 | 219   |
| Ranger I                  | 139   |
| Ranger II                 | 239   |
| 6N2 Thunderbolt           | 339   |
| Thunderbolt               | 339   |
| Valent I                  | 239   |
| Viking I                  | 79    |
| Viking II                 | 109   |
| "500" Xmttr               | 445   |
| 122 VFO                   | 19    |
| Mobile VFO                | 19    |
| <b>NEW FACTORY-SEALED</b> |       |
| Ranger I w/t              | 225   |
| Valent I kit              | 250   |
| <b>KNIGHT</b>             |       |
| T-50 Xmttr                | \$ 29 |
| 62 Xcvt                   | 29    |
| <b>NEW FACTORY-SEALED</b> |       |
| R-100 Receiver            | 69    |
| T-150 Xmttr               | 89    |
| <b>LAKESHORE</b>          |       |
| Bandhopper VFO            | \$ 59 |
| Phasemaster II            | 119   |
| Phasemaster IIB           | 179   |
| <b>LAMPKIN</b>            |       |
| 105B freq. meter          | \$149 |
| <b>LOUDENBOOMER</b>       |       |
| Mk III linear/Sup         | \$299 |
| <b>MARSH</b>              |       |
| NEW CCTV-2 Camera         | \$350 |
| 7" Monitor                | 125   |
| 17" Monitor               | 175   |
| <b>MOSLEY</b>             |       |
| CM-1 Receiver             | \$129 |
| TT-31 portable ant        | 175   |
| <b>MORROW</b>             |       |
| MB-6 Receiver             | \$ 59 |
| MB-560 Xmttr              | 59    |
| MB-565 Receiver           | 49    |
| RVP-260B DC Sup           | 19    |
| TRS-600S AC Sup           | 29    |

|                           |       |
|---------------------------|-------|
| <b>MORROW—Cont.</b>       |       |
| RTV-630 Supply            | \$ 29 |
| 3-band Conv (Cash As-Is)  | 10    |
| 5-band Conv (Cash As-Is)  | 20    |
| <b>NATIONAL</b>           |       |
| HFS Receiver              | \$ 89 |
| HRD-50 Receiver           | 149   |
| SW-54 Receiver            | 29    |
| NC-57 Receiver            | 49    |
| HRD-60 Receiver           | 279   |
| NC-88 Receiver            | 69    |
| NC-100 Receiver           | 89    |
| NC-125 Receiver           | 84    |
| NC-155 Receiver           | 149   |
| NC-173 Receiver           | 89    |
| NC-183 Receiver           | 119   |
| NC-183D Receiver          | 159   |
| NC-190 Receiver           | 159   |
| NC-240 Receiver           | 169   |
| NC-270 Receiver           | 169   |
| NC-300 Receiver           | 179   |
| NCX-3 Xcvt                | 289   |
| NCXA AC Supply            | 79    |
| <b>P &amp; H</b>          |       |
| LA-400 linear             | \$ 79 |
| 6-150 SSB Xmttr           | 99    |
| 1-L Scope                 | 219   |
| <b>POLYTRONICS</b>        |       |
| 62B Xcvt                  | \$279 |
| 62 Xcvt                   | 249   |
| <b>NEW FACTORY-SEALED</b> |       |
| PC-6 6m (AC)              | \$245 |
| <b>RME</b>                |       |
| VHF-126 Conv              | \$ 99 |
| 4300 Receiver             | 99    |
| 4301 slicer               | 99    |
| 4350 Receiver             | 129   |
| 4350A Receiver            | 139   |
| 6900 Receiver             | 249   |
| <b>REGENCY</b>            |       |
| ATC-1 Conv                | \$ 39 |
| <b>SONAR</b>              |       |
| NEW 40m Xcvt              | \$250 |
| <b>SWAN</b>               |       |
| SW-120 Xcvt               | \$189 |
| SW-140 Xcvt               | 189   |
| SW-175 Xcvt               | 189   |
| NEW SW140 Xcvt            | 225   |
| <b>TAPETONE</b>           |       |
| 345 Skysweep              | \$129 |
| <b>TMC</b>                |       |
| GPR-90 Receiver           | \$329 |
| GSB-1 slicer              | 69    |

CB'ers—Write for our free list of reconditioned citizen's band equipment. Prices Subject to Change Without Notice. Limited Quantities—ACT NOW!  
**SEND CASH IN FULL WHENEVER POSSIBLE**  
THIS IS A PARTIAL LISTING  
SEND FOR A COMPLETE ONE



## AMATEUR SUPPLY

Dept. C, 3832 West Lisbon Ave., Milwaukee 8, Wis.

Ship me \_\_\_\_\_  
Second Choice \_\_\_\_\_  
I enclose \$ \_\_\_\_\_ and will pay balance:  
☐ C.O.D. ☐ 1 Year ☐ 2 Years ☐ 3 Years  
(10% deposit)  
NAME \_\_\_\_\_ CALL \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
☐ Send latest reconditioned bulletin

For further information, check number 47, 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 not 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 soldering . . . **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 humorous 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 the NCX-3—complete CW coverage of the 80, 40 and 20 meter bands as well as the phone sections . . . peak-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, all 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.

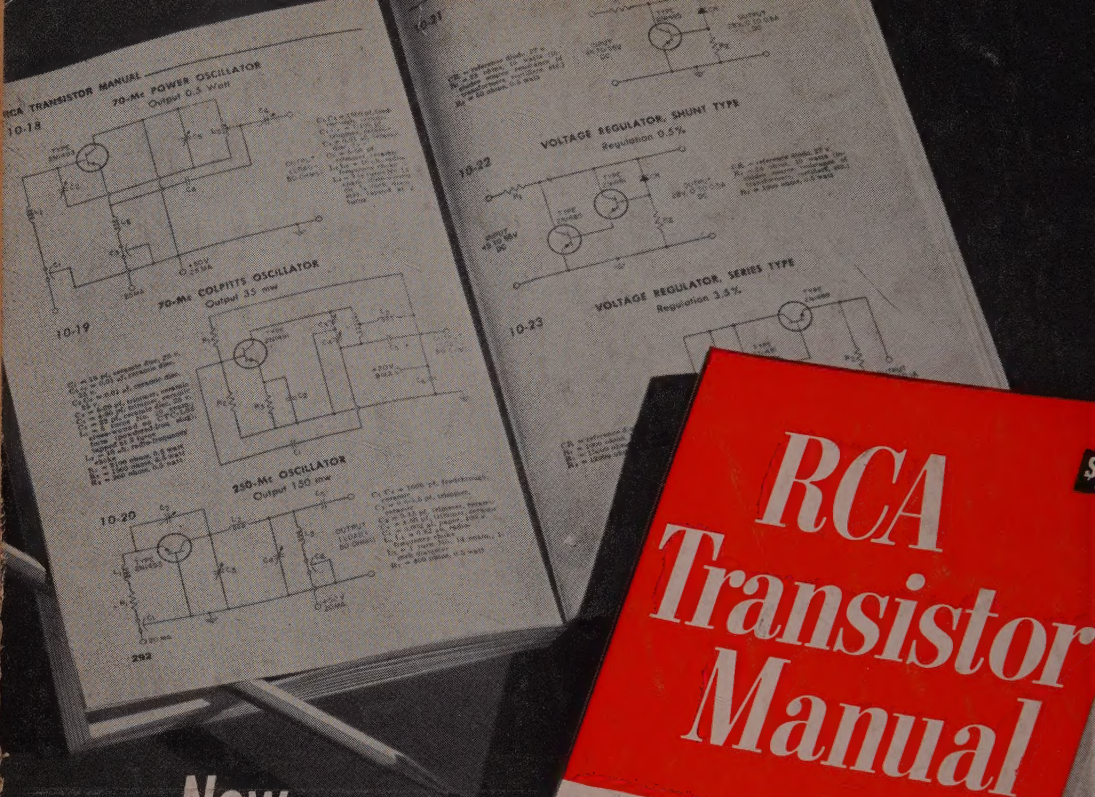


## National Radio Company

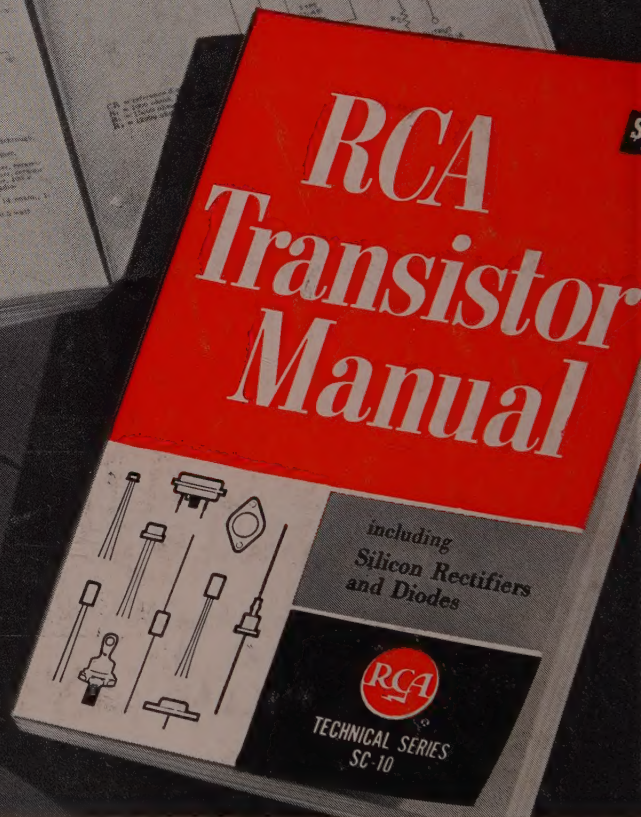
A Wholly Owned Subsidiary of National Company, Inc.  
37 Washington St., Melrose 76, Mass.

World Wide Export Sales: Ad Auriema Inc., 85 Broad St., N.Y.C.

Canada: Tri-Tel Associates, 81 Sheppard Ave., W. Willowdale, Ontario



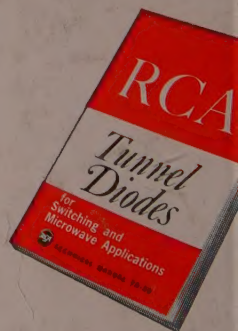
# New "Answer Book" on Transistors



Covering nearly 400 different RCA transistors, silicon rectifiers, and diodes in 304 fact-filled pages, this authoritative ham-shack reference is the indispensable guide for every amateur now using transistors—or planning soon to build around them.

Here, in handy form are the straight-to-the-point facts on "how-it-works" and "how-to-do-it"... over 40 practical working transistor circuits... accurate interpretations of data... 4 full pages of quick-selection charts for specific circuit applications... more than a hundred operating characteristics curves.

For your copy of the RCA Transistor Manual—the most complete reference of its kind in amateur radio—see your RCA Semiconductor Distributor. Or send \$1.50 to Commercial Engineering, Section H-15-SD, RCA Electronic Components and Devices, Harrison, N. J.



## Just Off the Press

See your RCA Semiconductor Distributor for your copy of the new RCA Tunnel Diodes Manual on RCA Tunnel Diodes. \$1.50 to Commercial Engineering, Section H-15-SD RCA Electronic Components and Devices, Harrison, N. J.



THE MOST TRUSTED NAME IN ELECTRONICS