# ALL-WAVE RADIO

AUGUST • 1937

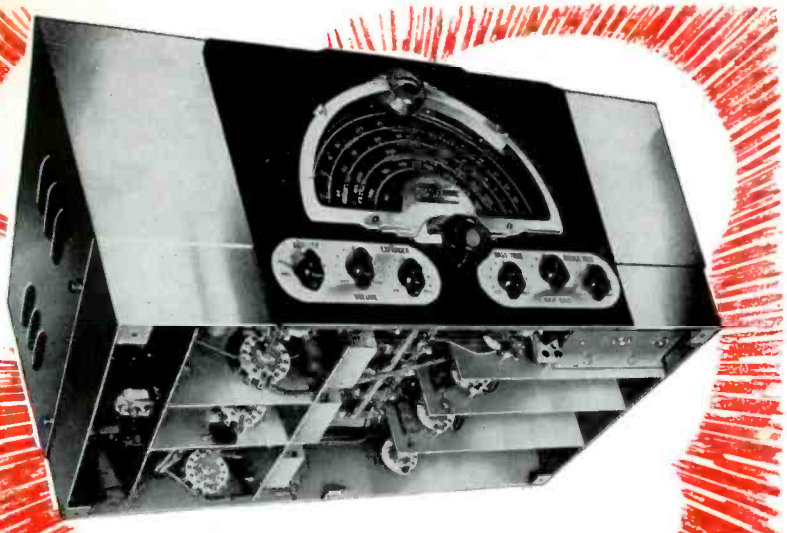
## TWO MODERN SUPERHETS

POLICE RADIO LISTS
*including all u-h-f stations*

A.C. BIAS SUPPLIES
*for phone and c.w. rigs.*

CODE-PRACTICE SET
*for loudspeaker operation*

25c U.S. and CANADA



# The New McMurdo Silver MASTERPIECE VI

## —the FINEST RECEIVER EVER BUILT!

It took twenty-six years experience building fine radio receivers to develop all the engineering superiorities combined in the New MASTERPIECE VI.

Imagine a radio so superbly *sensitive* that it will bring in stations all over the world using only an ordinary ice-pick for an antenna!

Imagine an altogether new idea in *selectivity*—the MULTI-BAND *interlocking* system—that gives you choice of *four* really startling degrees of selectivity at the flip of a switch! Imagine reserve *power* enough in your MASTERPIECE

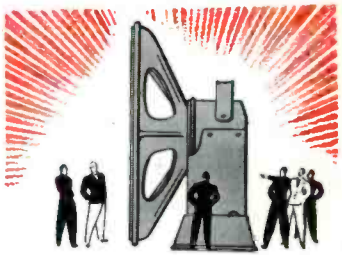
VI to use it as a Public Address system in an 18,000 seat auditorium!

Imagine the *tone* you get with BIFARIAN baffling, double tone controls, and the famous Jensen-McMurdo Silver 18" SUPER-GIANT twin-cone high-fidelity speaker!

Imagine a *control panel* allowing you to do everything that the broadcast station monitoring system can do!

Imagine all this coupled with the lowest tube and circuit noise found in any sensitive radio made today and you'll know why foreign reception is a pleasure with the MASTERPIECE VI — why engineers and scientific expeditions choose the MASTERPIECE VI.

Thirty-six distinctive technical features are built into your special and individually custom-built MASTERPIECE VI!



And it is shipped to you for a full thirty-day trial in your own home — with the sole judge as to whether it is "the finest receiver ever built."

And you can order your MASTERPICE VI on convenient monthly terms if you wish!

Write a letter or mail the coupon for complete technical details. Or see a MASTERPIECE VI on display at the Laboratories and Studio, 2900 South Michigan Boulevard, Chicago — or 63 Cortland Street, New York City.

"THE INDIVIDUALLY CUSTOM-BUILT RADIO"

MAIL THIS COUPON

McMurdo Silver Corp.
2900-R So. Michigan Blvd.
Chicago, U. S. A.

Please send me full details on the *New* custom-built MASTERPIECE VI.

NAME .....

ADDRESS .....

# MAKE WAY for ToMoRRoW!

One **WAY** to **MAKE** sure of keeping abreast of Radio's Advances **FOR TOMORROW** is by reading ALL-WAVE RADIO, TODAY!

Twelve Months • $2.50

50c additional postage charge to all foreign countries except Canada and the P. A. U.

*a big year in radio lies straight ahead–*

**MAKE WAY FOR ToMoRRoW NOW!**

**ALL-WAVE RADIO**

**16 East 43 Street, New York, N. Y.**

Starting with the ..... issue please send me ALL-WAVE RADIO for twelve successive months.

Enclosed please find $2.50.
in check ☐ money order ☐.

**Name** .....

**Street** .....

**City** .....**State** .....

# CONTENTS - AUGUST - 1937

ALL-WAVE RADIO

*Reg. U. S. Pat. Off.*

VOLUME 3 • NUMBER 8



**GENERAL**

PUBLISHED MONTHLY by the Manson Publications Corporation, 16 East 43rd Street, New York, N. Y. Entered as second-class matter August 27, 1935, at the Post Office, New York, New York, under the Act of March 3, 1879. Additional entry, as second-class matter, at East Stroudsburg, Pa., August 27, 1936. M. L. Muhleman, President and Secretary; Edwin W. Lederman, Vice President and Treasurer.

**SUBSCRIPTIONS**

YEARLY SUBSCRIPTION rate: $2.50 in the United States and Canada; $3.00 in foreign countries. Single copy price, 25 cents. Notice of change of address required two weeks prior to publication date, or the 15th day of the month. Notifications received after this date will become effective with second issue.

**ADVERTISING OFFICES**

EASTERN ADVERTISING Manager, Sanford L. Cahn, All-Wave Radio, 16 East 43rd St., New York, N. Y.
DETROIT OFFICE: Roy Buell, General Motors Building, Detroit, Mich.

**CONTRIBUTIONS**

MANUSCRIPTS ARE submitted at the author's risk and cannot be returned unless accompanied by postage. Notification of the acceptance or rejection of a manuscript is given within two weeks after receipt.

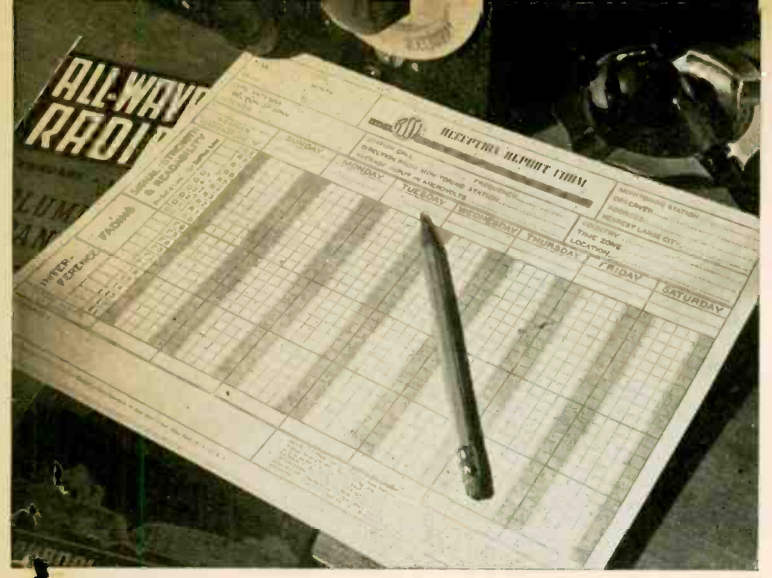
## COVER

*Group of verification cards from international short-wave broadcasting stations throughout the world, received by Mr. J. B. L. Hinds, editor of the "Globe Girdling" department.*

## FEATURES



## DEPARTMENTS




100 BLANKS TO EACH PAD

# FOR THE RSSL MEMBER

## • REPORT FORM BLANKS •

New in principle, these Report Form blanks have been specially designed for the recording of information essential in carrying on the work of the R.S.S.L. Printed in green ink on white bond paper, 8½x11, records can be made in either pencil or ink —each sheet covering a full week's report.

**$1.00 Per Pad • Postpaid**

***ARE YOU ELIGIBLE FOR MEMBERSHIP IN THE RADIO SIGNAL SURVEY LEAGUE?***

***There is only one requisite for Membership, namely: That you be sincere in your desire and efforts to assist the league in fulfilling its public service of "improving domestic and international radio transmission and reception conditions." Here is an opportunity to help make radio history and at the same time do a real public service.***

***JOIN THE R.S.S.L. TODAY! NO FEE! A POST CARD WILL FETCH YOUR APPLICATION BLANK.***

## • QSL CARDS •

No QSL Cards have, as yet, been prepared. In order that members may retain the individuality of their QSL Cards and at the same time indicate their association with the R.S.S.L., a Matrix ("Mat") has been prepared from which a metal cast can be readily made of the R.S.S.L. emblem at low cost. "Mats" can be had for either "Negative" (above) or "Positive" (right) type emblem. They are practically indestructible and are familiar to almost all printers. Be sure to specify "negative" or "positive." Above illustrations are actual size!

**"MATS" 25c Each Postpaid**

## METALETTE R.S.S.L. SEALS

Are gummed on one side. Blue embossed on Silver. Same size as above illustration. They have the handsome appearance of real metal. Can be used on stationery, letterheads, QSL cards, etc.

**25 Seals 15c • Postpaid**

***IMPORTANT:*** Above supplies may be purchased by **R.S.S.L.** members **ONLY!** Be sure to give your Monitoring Station number with order. No orders sent C.O.D. Be sure to enclose check, stamps or M.O. with order and send to:

**RADIO SIGNAL SURVEY LEAGUE**
**16 East 43 Street, New York, N. Y.**

## MEMBER STATIONERY

Every member will be proud to use this handsome R.S.S.L. Members' Stationery for his radio correspondence. Printed in blue ink on 8½ x 11 white bond paper, it bears the Radio Signal Survey League's official emblem.

**Note:** Those who prefer to design their own stationery or who would like to add the R.S.S.L. emblem to stationery they already have can secure "Mats" (Matrices) of the above two illustrations (actual size). For details see section headed "QSL CARDS."

**100 Sheets 50c • 250 Sheets $1.00**

FRONT-PANEL VIEW OF 2TP's 10-20-METER SUPERHETERODYNE

# ADVANCED 10-20 SUPERHET.

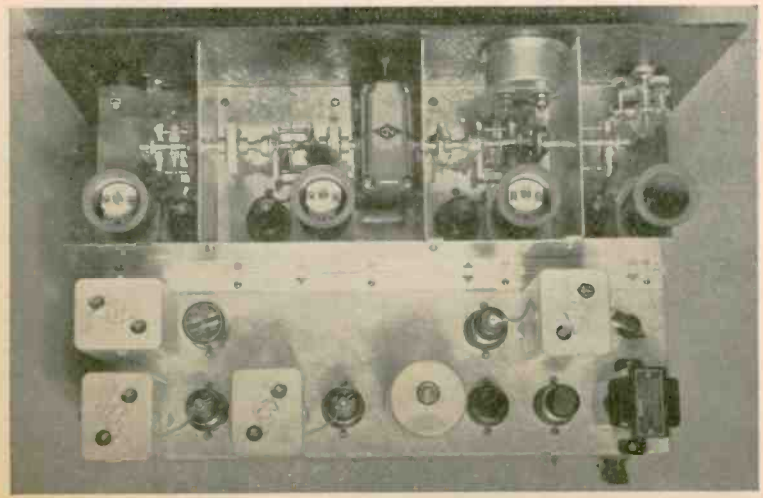
## With Carrier Level Meter, New Xtal Filter, and Noise Silencer

***By H. G. MUSTERMANN • W2TP***

THE activities at W2TP have always been concentrated on experimental development of the higher frequency amateur bands: i.e. 5, 10 and 20 meters. With the present high degree of occupancy of 5 and 20 meters the 10-meter band is now used exclusively. To this end the apparatus in the station is being revamped for peak efficiency on this latter band. A separate transmitter for 10 meters coupled to a rotatable beam antenna puts out quite a satisfactory signal. For reception this same antenna is switched over to the receiver. The gain from this beam is sufficient to make easily readable a 10-meter signal which is barely audible on an ordinary antenna.

The receiver in use up to the present was built in 1932, following closely Jim Lamb's original single-signal superhet. A noise silencer was a later addition. This receiver has proven fairly satisfactory for 10-meter reception, considering the fact that it was not designed originally for operation on this band.

In this article is described a receiver built specifically for 10-meter work. Nevertheless 20-meter coils are also provided, as a receiver that performs well on 10 always works a little better on 20. A set of 5-meter coils is contemplated for the near future. This will permit the reception of crystal controlled transmitters on this band.



*Looking into the chassis . . . note inter-stage shielding construction. The crystal "Transfilter" is directly behind the left metal tube at rear.*

### *High-Frequency Section*

High gain in the r.f. stages is of most importance for a 10-meter receiver and is most difficult of attainment. High-inductance coils and small tuning capacities are imperative if this high gain is to be realized. For this reason the somewhat odd construction shown in the high-frequency section is used. Four 20-mmfd. midget tuning condensers are ganged to a PW-0 type drive unit. The 500-degree scale of this unit provides adequate mechanical band spread. The coil sockets are placed as close as possible to the condensers in a raised position. This gives shortest tank leads. APC air trimmers are mounted right in the coils. The first r.f. stage is trimmed with a panel mounted condenser (C9). This takes care of antenna variations.

A shelf of ⅛" thick aluminum is mounted an inch above the chassis, and supports the entire high-frequency section with the exception of the drive unit. This is bolted direct to the chassis, being raised a half inch. Both the drive unit and the shelf are fastened to the chassis by means of long 6/32 bolts and

Cardwell half-inch spacers. Two of the latter make up the inch height for the shelf. This shelf should be fastened in about a dozen places to the chassis to keep it rigid.

Another set of half-inch spacers raises the tuning condensers to the proper height above the shelf for ganging to the drive unit. Great care should be exercised in lining up this unit with the four condensers. Shim brass washers should be added to the condenser mounting spacers to place the condensers at the exact height necessary. To check the alignment, loosen the couplings. They should be able to spin free on the shafts. The National type TX-9 were found to be superior to others in eliminating play. It is most important that there be no play between the drive unit and the oscillator condenser.

The resistors and bypass condensers for the high-frequency section are mounted beneath the shelf. They should be wired in place before the shelf is fastened to the chassis. Connection wires between this unit and the parts beneath the chassis are run through grommets in the chassis. They should be cut about a foot long and connected to the shelf first. Liberal use of double mounting lug strips, both beneath the shelf and beneath the chassis, tie all loose wires and small parts securely in place.

The back partition is fastened to the chassis with a length of half-inch aluminum angle. The interstage shields each have their rear and bottom edges turned over a half inch. Use of angle strips at these points instead of the turned-over edges would be an easier method of construction. The holes in these shields through which the shaft assembly runs should be large enough so that they do not touch. The hole in the panel through which the drive unit shaft extends should also be made quite large—about an inch in diameter.

*View of the combined power amplifier and power-supply chassis.*

## COIL-WINDING TABLE

### FOR 10-METER BAND

| Coils | No. Turns | Winding Length | Pri.-Sec. Spacing |
|---|---|---|---|
| L Pri. | 3 | Closewound | |
| L Sec. | 4½ | ½" | ¼" |
| L1 Pri. | 4 | Closewound | |
| L1 Sec. | 4¾ | ½" | ¼" |
| L2 Pri. | 4 | Closewound | |
| L2 Sec. | 4¾ | ½" | ¼" |
| L3 Cat. | 1½ | Closewound | |
| L3 Sec. | 4¼ | ½" | ⅛" |

### FOR 20-METER BAND

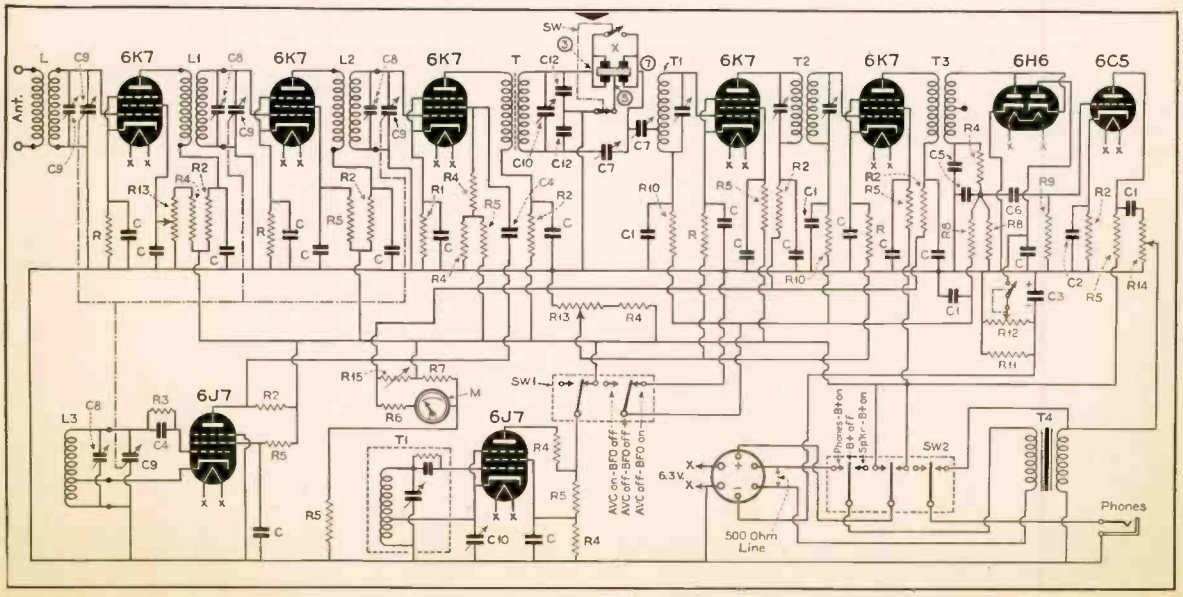
| | | | |
|---|---|---|---|
| L Pri. | 6 | Closewound | |
| L Sec. | 9¾ | ¾" | ¼" |
| L1 Pri. | 7 | Closewound | |
| L1 Sec. | 10¾ | ⅞" | ¼" |
| L2 Pri. | 7 | Closewound | |
| L2 Sec. | 10¾ | ⅞" | ¼" |
| L3 Cat. | 2½ | Closewound | |
| L3 Sec. | 11 | ⅞" | ⅛" |

All coils wound with No. 24 d.s.c. wire. Cathode sections of L3 coils are separate windings. APC-25 trimmers in L1, L2 and L3.

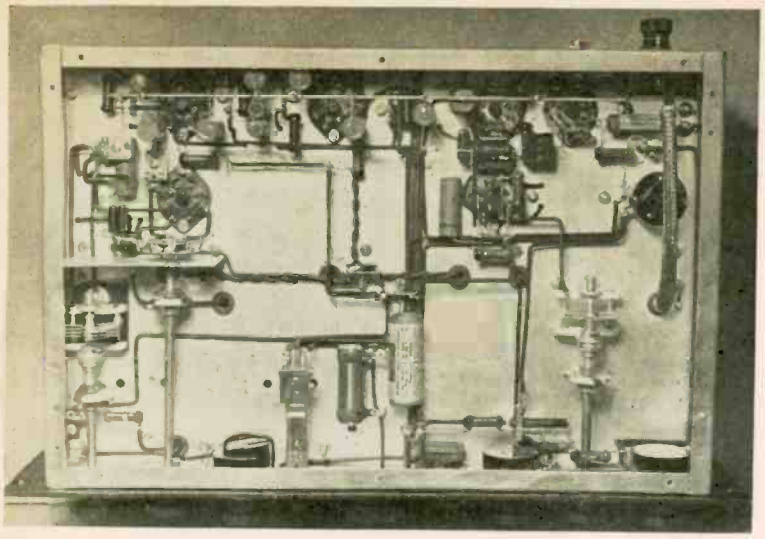
### *Intermediate-Frequency Amplifier*

The two-stage i.f. amplifier incorporates both a crystal filter and a noise silencer. Most of the 10-meter work at W2TP is done on phone, therefore a crystal filter favoring phone signals was felt to be most desirable. The new Brush Crystal Transfilter provides a bandwidth which is a compromise between that of the regular crystal filter and the straight transformer-coupled amplifier.

Jim Lamb's crystal filter circuit is used to provide best impedance match to and from the Transfilter, which is of low impedance. The crystal is across but half of the input transformer, while the




*Schematic diagram of the receiver proper. Note crystal filter circuit.*



*Under-chassis view of the 10-20-meter superhet., showing location of parts.*

output transformer is tapped down. Both of these transformers are of standard type, the output transformer being an ordinary beat oscillator type the same as used in the beat oscillator stage. The only difference is that the b.f.o. transformer used for crystal output has the internally mounted grid leak and condenser removed. This is a simple process.

Two mica fixed condensers are connected across the secondary of the Transfilter input transformer to provide a capacitative center tap. The 50- mmfd. condenser, C10, is mounted under the chassis and is controlled with an extension shaft and insulated coupling (Cardwell). As both sides of this condenser are above ground an insulated mounting is necessary. A small piece of bakelite does the trick. This condenser is the selectivity control when the Transfilter is switched in. With the filter switched out it serves to tune the input transformer secondary to resonance. The regular internally mounted secondary trimmer condenser, not shown in the diagram, is left in circuit. It is useful in determining the setting of C10, both being connected in parallel.

The crystal switch is mounted on a bracket under the chassis and is also controlled from the panel with an extension shaft and coupling. It should be wired so that when the crystal shorting section is closed the other section is opened, and vice-versa. This removes the crystal entirely from circuit in the "off" position of this switch.

Two mica trimmer condensers, C7, are also used in the filter circuit. One serves to adjust the coupling to the Transfilter output transformer, while the other is useful in balancing the crystal bridge circuit.

Four different types of transformers are used in the i.f. amplifier. The first, T, is of the iron-core type. This helps to offset any signal loss in the Transfilter circuit. The output transformer, T1, is a standard b.f.o. type, as previously mentioned, with the grid leak and condenser removed. T2 is of the air-core type, while T3 is a diode transformer with untuned, low-impedance secondary. The center tap of the secondary is unused.

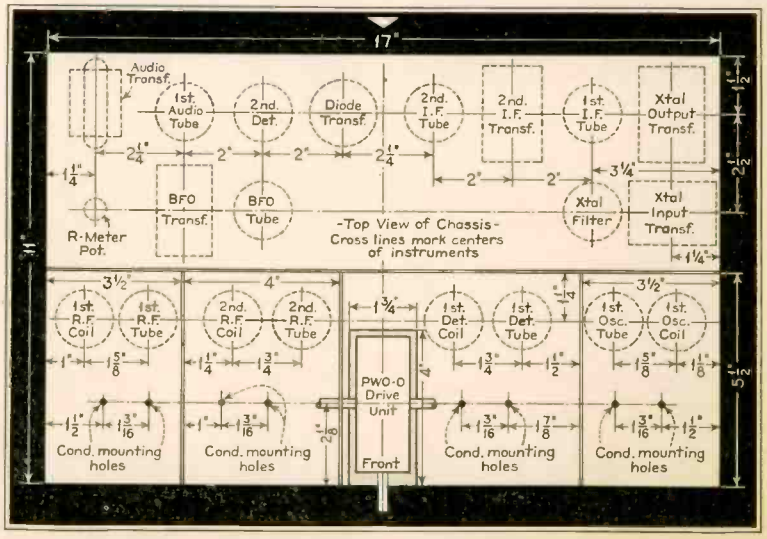
### The Silencer System

Various types of noise-silencer circuits were available for this receiver. The Lamb noise silencer, cut in ahead of the filter circuit, is theoretically the most effective. This would, however, involve the addition of three more stages, an extra i.f. stage and two silencer stages. The simplified Watzel-Bohlen second detector silencer circuit is therefore used. The Griffin "see-saw" automatic silencer was considered, as was an automatic version of the present silencer which was worked out for this receiver by Bohlen and Watzel. Both Griffin and Watzel recommended the manually-controlled circuits in preference to the automatic for most effective noise suppression on weak signals. More elaborate versions of the circuit used at present in the receiver are theoretically superior—in practice the present circuit is as effective as any, as well as being the simplest in point of number of parts necessary. The built-in switch on the noise silencer control cuts it completely out of circuit when reception of strong signals is desired without blocking.

The beat oscillator circuit is standard except for the addition of a panel vernier control. This is mounted under the chassis the same as the selectivity control condenser. As the frame of the condenser is at ground potential it is bolted directly to the chassis. Another extension shaft and coupling are used. Cardwell couplings are preferable for use under the cassis because they are small.

### Audio System

Two audio stages are employed, one on the receiver chassis and one on the power supply chassis. The 6C5 on the receiver proper switches either to a pair of phones or to an output transformer. This transformer has an output impedance of 500 ohms. A 500-ohm line-to-grid transformer on the power-supply chassis feeds the 6F6 pentode output tube. As a large Western Electric cone speaker is used, the output transformer has an impedance of 2000 ohms to match the speaker. The wattage output of the 6F6 is more than sufficient to take care of the cone speaker. Reasonable room volume is all that is required.




*Working drawing of receiver chassis. This also indicates location of units.*

A push-pull input transformer is used so that push-pull may be employed in the output stage at some future date by merely adding another tube and output transformer.

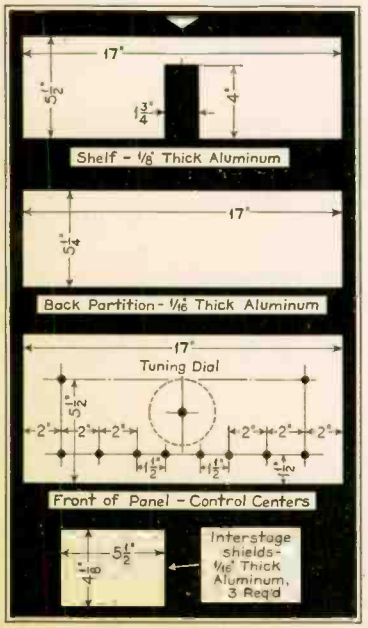
A common ground to the chassis is shown in the power supply diagram. If the receiver and power chasses are connected together this will short the noise resistors R11 and R12. It would be better to float the minus B lead in the power unit free of the chassis to avoid this.

### *Controls and Signal Strength Meter*

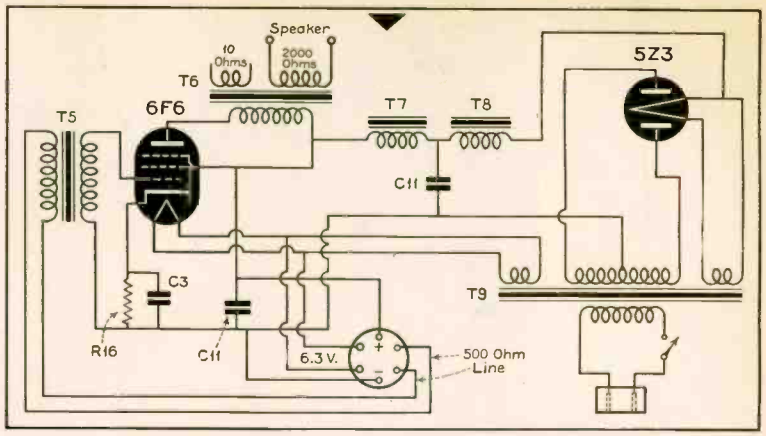
The best of receivers is handicapped if it cannot be easily and effectively controlled. A glance at the front panel photo shows that this receiver is quite adequately controlled. The upper left knob is the antenna trimmer, this being connected across the first r.f. coil in place of the APC trimmers used on the other high-frequency stages. This takes care of different antennas without resorting to a screwdriver adjustment. The corresponding control at the upper right of the panel is the i.f. gain control.

Eight controls are ranged along the bottom of the panel. That at the extreme left is the audio gain control. It is connected so as to be effective for both earphone and speaker use. The next control, reading from the left, is the beat oscillator vernier condenser. Next in line comes the r.f. gain control. This varies the screen voltage on the first r.f. stage. The small knob just to the left of the dial controls the phone-speaker-B

*(Continued on page 442)*




*Details of front panel and shield partitions for 2TP's superhet.*




*Schematic diagram of power amplifier and power-supply unit.*

## LEGEND

**BRUSH**

type A Transfilter

**CARDWELL**

type A couplings for extension shafts (3)

**CORNELL-DUBILIER**

C —type DT-4P1 .1 mfd. 400 volt tubular paper condenser (17)
C1 —type DT-4S1 .01 mfd. 400 volt tubular paper condenser (4)
C2 —type ED-3050 5 mfd. 50 volt tubular electrolytic condenser (1)
C3 —type ED-3250 25 mfd. 50 volt tubular electrolytic condenser (2)
C4 —type 2W-5T1 .0001 mfd. midget mica condenser (2)
C5 —type 2W-5T25 .00025 mfd. midget mica condenser (2)
C6 —type 1W-5D5 .006 mfd. midget mica condenser (1)
C11—type KR-588 dual 8-8 mfd. filter condenser (1)
C12—type 2W-5Q5 .00005 mfd. midget mica condenser (2)

**ELECTRAD (Mallory-Yaxley)**

R12— 10,000 ohm potentiometer (1)
R13— 25,000 ohm potentiometer (2)
R14—500,000 ohm potentiometer (1)
R15—500 ohm wire-wound potentiometer (1)

**GENERAL RADIO**

type 637A 1⅛" knob and pointer (6)
type 637J 1⅝" knob with skirt (2)

**HAMMARLUND**

C8 —type APC-25 air trimmer condenser (6)
C9 —type MC-20-S midget tuning condenser (5)
C10—type MC-50-3 midget tuning condenser (2)
type S-4 isolantite sockets for coil mountings (4)
type SWF-4 plug-in coil forms (8)

**HARDWICK-HINDLE**

R11— 500 ohm 25 watt resistor (1)
R16— 500 ohm 10 watt resistor (1)

**IRC**

R — 350 ohms, ½ watt (4)
R1 — 1,500 ohms, ½ watt (1)
R2 — 2,000 ohms, ½ watt (7)
R3 — 25,000 ohms, ½ watt (1)
R4 — 50,000 ohms, ½ watt (7)
R5 —100,000 ohms, ½ watt (7)
R6 — 500 ohms, ½ watt (1)
R7 — 1,000 ohms, ½ watt (1)
R8 —1 megohm, ½ watt (2)
R9 —2 megohms, ½ watt (1)
R10—200,000 ohms, ½ watt (2)

**NATIONAL**

T —type IFC (iron core) 465 kc. i.f. transformer
T1 type IFCO beat oscillator type transformer (2)
T2—type IFC (air core) 465 kc. i.f. transformer
T3—type IFD twin diode transformer
C7—type M30 mica trimmer condenser, 30 mmfd.
type PW-0 drive unit and TX-9 coupling
type TX-9 coupling for condenser ganging (3)

**PAR-METAL**

type SC-128 cabinet
type 1579 aluminum panel, 8¾" x 19"
type 15211 chassis, 11" x 17" x 2½"

**RCA**

type 6K7 tube (4)
type 6J7 tube (3)
type 6H6 tube (1)
type 6C5 tube (1)
type 6F6 tube (1)
type 5Z3 tube (1)

**RME**

Carrier level indicator

**THORDARSON**

T4—type T-6226 plate-to-line transformer
T5—type T-6194 line-to-single or P-P grids
T6—type T-6806 pentode to 10 or 2000 ohms
T7—type T-6409 150 ma. smoothing choke
T8—type T-7429 150 ma. swinging choke
T9—type T-7062 power transformer, 745 volt c.t. at 145 ma., 6.3 volts at 4.5 amps., 5 volts at 3 amps.

**YAXLEY**

SW —type 3242J switch
SW1—type 62 switch
SW2—type 763 switch
type A-1 single-circuit phone jack

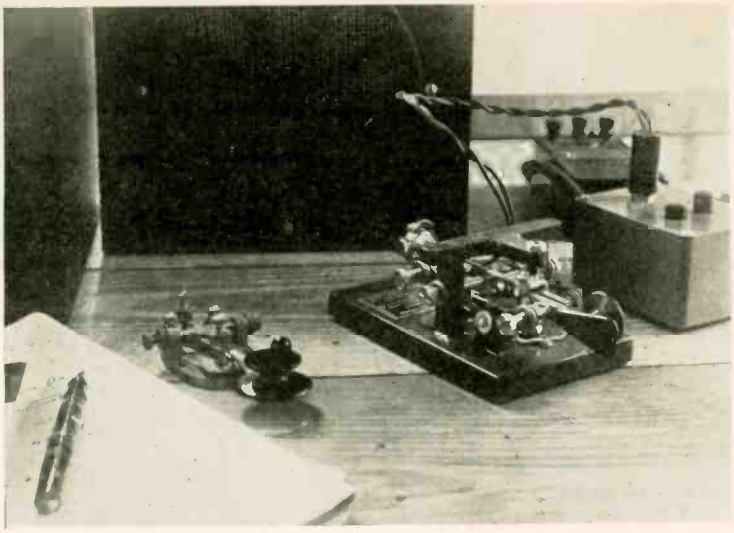


Fig. 1. DESIGNED FOR GIVING—A DELUXE "MAC-KEY"

# ANTIDOTES FOR BUG POISON

***By G. S. GRANGER***

PROBABLY the most useful and the most abuseful adjunction to radio telegraphic communication is the semi-automatic transmitting key—more commonly known as the "bug." Those double-distilled, horrifying code desecrators! And yet correctly designed and adjusted one of these cheerful insects can be the greatest little plaything in your shack.

The bug, in case you don't know it, differs from the straight key in that the movement of the lever is horizontal rather than vertical, and it makes contact on whichever side it is moved from an open or neutral position. Also, when the lever is moved to the right, a spring is set to vibrating which actuates the dotting mechanism and automatically makes as many dots as desired or until the spring stops vibrating. The dotting device works on the principle of the pendulum, and the number of dots made depends upon how long the lever is pressed to the right. If only for an instant, one dot will be made. If for a slightly longer period, two dots, or three, or four will be made. A delicate sense of timing determines just how many dots will be made. Pressing the lever to the left makes a dash exactly as a dash is made on a straight key.

### *Thus the Dots*

The rapidity with which the dots are automatically produced is governed by the position of a weight or weights on a rod mounted on the end of the vibrating spring—really the end of the pendulum. The rod also carries one of the dotting contacts. Moving the weights toward the end slows the dotting speed and moving it in the other direction speeds it up. Due to the law of the pendulum, the rate of dotting will be constant for a given speed—though the duration of each dot may vary toward the end of a prolonged dotting sequence—as the vibrations decrease in amplitude. However, the stationary dotting contact, as well as a dotting stabilizer, if the key is equipped with one, are adjusted so that there is no appreciable change in the dotting duration for the first six dots which is the greatest number of dots sent in a single sequence (the numeral 6 in the American Morse) and which is one more dot than the numeral 5, the longest dotting sequence in the International radio code.

From the foregoing it will be readily appreciated that there are plenty of possibilities for good and bad operating with the bug. Listen in some night—or early evening—on the 3.5-mc. ham band—and pick a group of trunk-line operators handling traffic, using break-in operation on the same frequency. If you're fairly good, you won't have much trouble copying their clean, beautiful 40-word-per minute sending. That's a bug! Then tune a few kc. on either side and listen to some other station falling all over itself and sounding like an imitation of code on a broadcast program calling for a sinking ship. That's a bug, too! (Though the "operator" would not necessarily do much better with a straight key.) And then tune in some commercial station handling traffic or sending press at around 40 words per minute distinguishable from tape transmission by an occasional (*very occasional*) error, and breaks. Pretty sending? Right—and it's a bug.

### *Why the Bug*

Let us consider the justification for the bug, and maybe we'll find a clue to rotten bug operating. There are two fundamental reasons for the semi-automatic key. Number one is—

*Tireless operation.* Due to the semi-automatic feature, it is possible to send for long periods on the bug without appreciable fatigue. This, however, is an asset to good operation and cannot be considered as a contributory cause to punk sending. The second reason for the bug is—

*Speed.* Comparatively few operators can top 30 words per minute with the straight key, while anyone, with relatively little practice, can hit forty on the bug! Ah—that's the rule, and there we place a finger on the basic cause of rotten bug technique. Giving a ham a bug is pretty much like presenting a kid in his teens with a 16-cylinder Alpha Romeo. Like the kid, the ham will display an utter lack of good judgment and go in for speed more than anything else. It may

be fun for him, but, in either case, it is usually much less interesting to anyone else involved. It's just plain poison!

However, the antidote will differ, depending largely upon the experience of the individual. The pill for the rank beginner, the tyro amateur, will be more in the form of an innoculation—an ounce of prevention. The dose for the established bug fiend—the lad who is convinced, if no one else is, that he is good—will be along the lines of a cure. While the medicine for the lad in-between—the chap who is a good operator on the straight key, but who is just taking up the bug—will be somewhat in the order of a compromise. There are some fundamentals, however, that will apply in all cases.

### *First Principles*

Mount the bug where it makes operating a pleasure. Not on the edge of the table, nor necessarily at right angles to the length of the table. Place it at about the angle you would a sheet of paper on which you are writing—and far enough in so that the elbow rests comfortably. Many operators sit at an angle, rather than directly facing the table, and this will increase the angle of the bug. The bug is shown correctly placed for such an operator in Fig. 1. The bug should be just high enough above the table top so that the thumb comes naturally opposite the dotting paddle and the index and middle fingers literally fall into contact with the dash button. For tireless operation, the movement should be largely that of the arm. However, the wrist and fingers should not necessarily be held stiff. Flexibility and some muscular effort here will contribute to precise, well-formed characters. But the bulk of effort should be produced by the arm. Those muscles are larger and can take it. Remember when you were a kid, how they tried to teach you the Palmer method of writing in public school—writing with the arm motion instead of the fingers? Darned few of us ever followed it up, but we must admit that it was fb so far as lack of fatigue was concerned, and you could make curlicues for hours that way that would tire the fingers in one minute. And the same applies to the bug (or straight key for that matter).

For all practical sending speeds, regardless of the dotting speed, the dotting mechanism should be so adjusted that there is an apprecible tone to the dot—not merely a click. In other words the dot should be of some duration, even though very short. This is accomplished by adjusting the stationary dotting contact and the dot stablizer, if your bug has one, and it should have. If the contact and stabilizer are so adjusted that the vibrator comes to a rest, with contacts closed, after about ten dots, the duration will be correct. If fifteen or more dots are required permanently to close the contacts (or if the vibrator stops with the contacts open) the duration will be too short. On the other hand, if the contacts remain closed after six or seven dots, there will be insufficient space between dots. This adjustment should be made at a relatively slow speed, and a distinct tone duration of the dots will be noticed. Then, if the weights are moved to speed up sending, the duration of each dot will also be lessened, but in correct proportion to the speed.

And now for the three pills—the common ingredient of which is—*don't send too fast!*

### *For the Beginner*

In the first place, learn code the right way. There is no place in this article for instruction on this subject. If possible obtain a good instructor—read up on code in the various manuals—or best of all, attend a good code school. If you want to learn at home, you can't do better than follow one of the home-study courses. And read over some of the issues of AWR containing advice to Barb and Ernest on learning code.

Study the bug simultaneously with the straight key. Then when you're ready to go on the air at all, you'll be ready to use the bug—probably more proficiently than you can the regular key. Choose a note that is pleasing to your ear for the practice—one that seems to make transmission easier, more perfect. This is really important. Some operators prefer a very low note—from 100 to 200 cycles—others a high note around 1000 cycles. Always adjust your dotting speed so that it's about as fast as you can send dots on the straight key. (That is for a few seconds or so—faster than you can send dots for any length of time on the straight key.) Though your dotting speed on the bug is now a little faster than that on the straight key, your words per minute should be about the same. There is no sense in sending much faster than you can receive. You are bound to develop bad keying habits if you do so, and on the air you only invite faster transmission than you can copy.

Give special practice to all numerals and the following letters—C, F, G, H, J, O, Q, V, W, X, Y, the "bk" sign - . . . - and the interrogation point. Every time you make an error, send an interrogation point and repeat the word—continuing to do so until it is "letter perfect."

### *To the Experienced Op.*

To the lad who has been using a bug for some time, there is not much that can be said. It might be pointed out, however, that there are many of you lads (and on straight keys as well) who cannot be copied without strenuous mental effort plus clairvoyance! Just why you should send "NN" for C, "BT" for - . . . -, "NST" for Test, and make two dots for "I" on your dash side at 10 words per minute when the rest of your transmission is at 35, is beyond reason. Make a record of your transmission—record some two to three hundred words from a newspaper on a phonograph record, and then play it back to yourself a week later. That'll slow you down a bit—like a state trooper ahead of you!

To the good op. who has decided to break in on the bug, follow pretty much the procedure outlined for the beginner. However, you have already developed a nice sense of timing (or haven't you??) and an abstract way of listening to your own stuff on the monitor. That is, you can be more or less unconscious of sending, and almost copy the monitor as if it were someone else transmitting. This won't do you much good on the straight key because your habits are firmly established there, but on the bug you'll be able to pick out your own flagrant derelictions.

In code practice, every time you make an error, send that letter, numeral or convention over and over again until you get it perfect. Then interpolate a question mark and repeat the word, numeral or abbreviation. (This, of

*(Continued on page 442)*

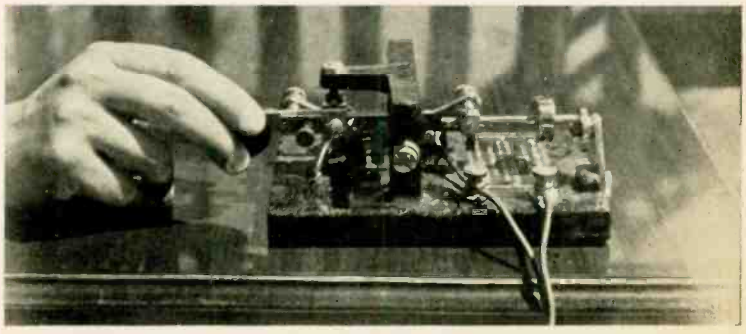
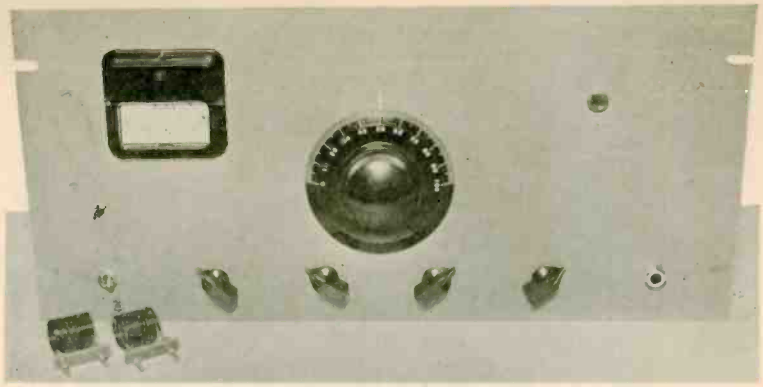


*Fig. 2. Proper operation of a "bug" calls for a bit of physical nonchalance: too many beginners freeze at the key. Correct "stance" is illustrated in conjunction with one of McElroy's DeLuxe Mac-Keys.*



FRONT-PANEL VIEW OF THE COMPLETED 5-AND-10 SUPERHET.

# A 5-AND-10 SUPERHET.

## With Autodyne Detector, Variable Selectivity and Noise Silencer

*By S. O. OEHMAN • W2HG*

THERE has been a marked reticence on the part of 5-meter adherents to employing superheterodyne receivers for this band. One objection has been the lack of a variable selectivity control—either the receivers respond excellently on crystal or m.o.p.a. signals and are useless on modulated oscillators, or else are so broad in their intermediates as to resemble strongly super-regenerative sets in lack of sharpness and discrimination between broad and controlled signals.

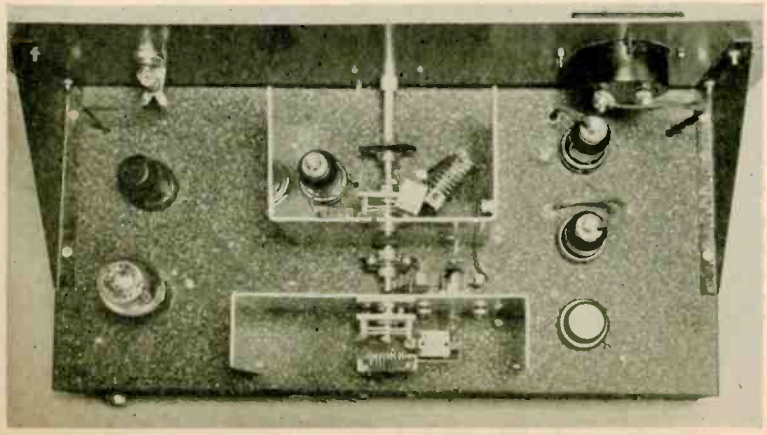
### *Noise Problem*

The second objection is noise. Two means of combating noise are utilized in this model. The first is a radio-frequency stage which really gives an excellent amount of gain and at the same time makes the detector tuning over a wide band of frequencies extremely smooth and stable. This is due to the effect of constant load which is offered by the r.f. stage to the input circuit of the detector. The r.f. stage also prevents "pulling" of the detector. This is very noticeable in receivers which have the antenna coupled to the detector circuit. It is caused by the loading effect of the resonant antenna and results in a large decrease in detector regeneration at one end of the band or the other. Therefore it is a distinct pleasure to operate a receiver perfectly smooth in regeneration over this extremely wide band.

The second combatant of noise is a silencer which really "goes to town." It is of the damping type, as shown in the circuit diagram, and has been tried and tested over and over again with equal success each time. It is foolproof, but will not work unless the terminals of the 6H6 tube are properly connected.

Since such great strides have been made in improving the stability of transmitters operating on the ultra-high frequencies, it seems only logical that some step must be taken in receiver design to realize and appreciate the benefits of a controlled signal.

This receiver was built with this in mind and in operation it gives preference to the better class of signal. Some very peculiar effects have been noticed in this respect. One of the queerest is the possibility of receiving a stable signal of R7 strength right through the middle of an R9 signal. This certainly is a boon to stable signals.



*Top of chassis, showing layout, and construction of double baffle shields.*

### *The Circuit*

The circuit consists briefly of a tuned-radio-frequency stage using a 956 acorn tube, a 6J7 *autodyne*, first detector, two stages of intermediate frequency, with 6K7s, using iron-core transformers and resistors which peak about 30 kc., a 6H6 second detector providing automatic volume control and noise silencing, and two stages of audio amplification using a 6C5 followed by a 41 power pentode.

Several advantages have been gained from the omission of the high-frequency oscillator. Generally, it is necessary to have a separate tuning control for the oscillator since it is almost impossible to keep an ultra-high-frequency oscillator tracking properly with the detector.

Aside from this fact, the proper degree of oscillator-to-detector coupling is a hard thing to reach. An optimum is almost impossible for both ends of the tuning range.

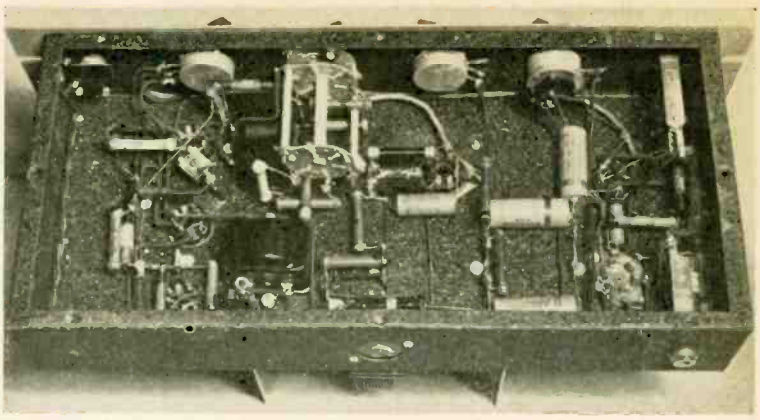
Several superhets tried were guilty of image interference and therefore much time was spent in eliminating this annoyance. Including the r.f. stage seemed to lessen to a degree much of this, but regeneration in the first detector is the answer.

Probably the most interesting part of the circuit is the L2-C7-C8-C9-C4-C5 portion in the r.f. stage. Stumbling upon this has certainly resulted in a great deal of extra gain and band-spread.

Referring to Fig. 1, C7 is the r.f. coupling condenser, C8 the tuning condenser, L2, the tuned plate and grid coil, and C4 and C5 by-passes for radio frequency. Notice that C7, the interstage coupling condenser, being in series with C8, (the tuning condenser) will also act as the band-setting condenser. C4 is used to return the bottom of L2 back to the grounding point of the r.f. stage, and C5 is used to return the ground of the grid circuit of the detector stage. This condenser is necessary since it completes the grid circuit and makes its return ground much shorter. Short ground leads and return condenser leads have as much control over performance as short grid and plate leads. C5 is also the return which completes the process of regeneration.

Though this circuit may not be new, it really has its advantages in ultra-high-frequency work, and the autodyne principle is practical, and satisfactory for use at frequencies as high as 56 megacycles.

The r.f. choke in the cathode of the first detector is made on a ¼-inch form and consists of one layer of No. 28 enameled wire close-wound to a length of 1¼ inches. It provides smooth regeneration and is not critical, but must not be placed too close to any large object such as the sub-base. In other words, its capacity to ground must be as low as possible.



*Under-chassis view of receiver, showing location of the special i.f. transformers and the variable-selectivity switch.*

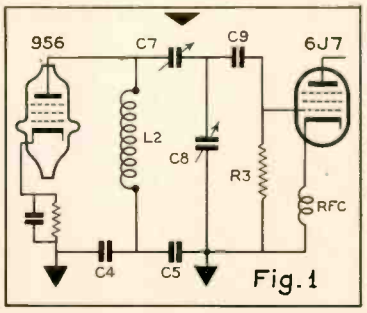
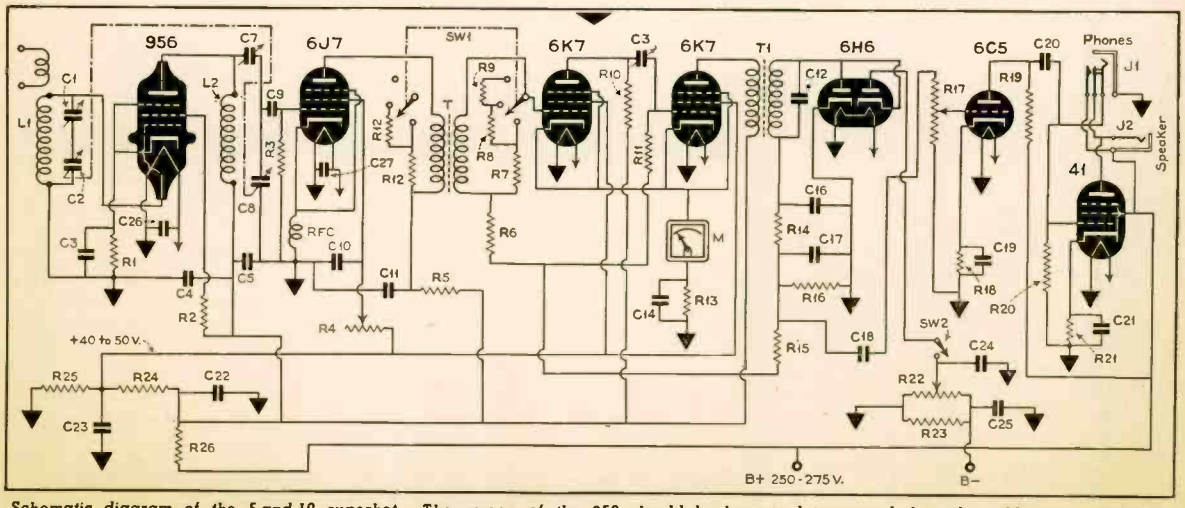



*Fig. 1. The unique r.f. circuit used in the 5-and-10.*

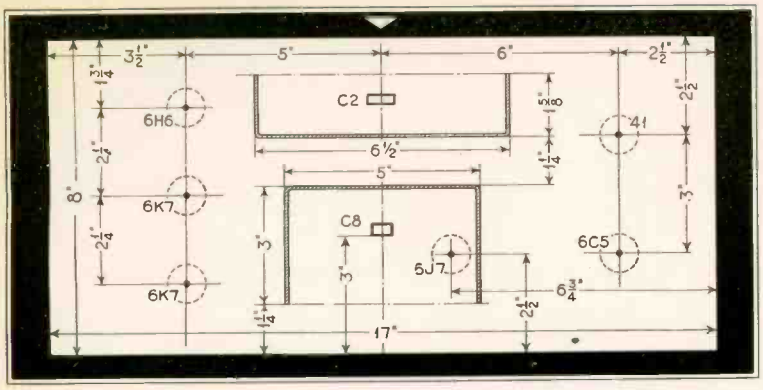
This brings up a point which is very pertinent at the frequencies herein considered. It is the problem of "capacity to ground." In this circuit especially a very low amount of capacity to ground is desirable because it is necessary to have the detector oscillate smoothly and weakly over a very wide band of frequencies. Therefore it is often advisable to concentrate more on this idea than it is to worry about short leads.

In order to secure better tracking the r.f. stage has also been fitted with a series band-setting condenser similar to C7. Incidentally, the tuning condensers had a capacity of 15 mmfd., but after much experimentation with different capacities the final result is the same r.f. tuning condenser minus the one back rotor plate. This value seems just about right for 75 or 80 degrees of band-spread on the actual 5-meter band, and allows some leeway at each end to receive some of the experimental stations operating nearby.

Numerous methods of coupling to the acorn tube grid circuit may be used and will probably be decided by one's own location and available antenna. However it is always necessary to load this grid enough to prevent self-oscillation of the r.f. stage.




*Schematic diagram of the 5-and-10 superhet. The screen of the 956 should be bypassed to ground through a .002 mfd. condenser. Shorting prongs not shown in speaker jack.*




*Working drawing of chassis and baffle shields for the 5-and-10 receiver.*

### Acorn Tube Mounting

The one part of the layout that is unique is the mounting of the acorn tube for short leads and the better shielding afforded by the *double* baffle. The shield partitions are made of 1/16-inch aluminum, scored and then bent to shape in a large vise. They are made from stock 4½ inches wide and bent as per the base layout sketch. The opening for the grid end of the 956 was punched with one of the ¾-inch electrolytic condenser hole punches. These punches do an excellent job and certainly save a lot of time. Incidentally, the socket holes were also punched out and their appearance leaves little to be desired.

The shields are anchored with the usual BCL type of shield can anchor, or spade lug as they are called.

The coils are air wound of heavy bare wire and are soldered to a jack strip as shown in the photograph. The coil jacks are mounted on strips of insulation and then on pillars salvaged from end rods of old variable condensers. Coils have also been made for 10 meters and results on this band have also been very gratifying. There is no doubt that the circuit will perform equally well on 120 mc., and coils can readily be wound for this band if desired. The one advantage of the coil system is the fact that it is possible to make coils for any frequency without regard to taps, and therefore a great deal of experimenting may be done with a minimum of effort.

### The I.F. Amplifier

The intermediate-frequency amplifier is a two-stage affair using 6K7 tubes. The general layout is as follows: the plate of the first detector is coupled to the input of the first 6K7 by a 30-kc. iron-core i.f. transformer. The output of this stage is resistance-capacity coupled to the second 6K7 which in turn is transformer coupled to the 6H6 circuit. These transformers were made by the General Radio Company and are just about right for use in this circuit.

No attempt has been made (with this model) to use transformer coupling throughout because of the extreme amount of gain already available and because, when tried before, the selectivity was of much too high an order for practical use at the present time. In certain services this may be helpful but it is just out of the question for amateur communication at these frequencies.

The coupling between the two intermediate-frequency stages is a 3-30 mmfd. mica trimmer condenser. Though it seems extremely small, experiment with a great range of condenser values has proven that this capacity is just about right for stable operation. Being so small in capacity it will not pass any unwanted audio frequency that might enter the intermediate-frequency stages from rectification by the detector.

Notice that no by-pass condensers are used on the a.v.c. line. A serious amount of loss was encountered when using any kind of by-pass in this part of the circuit.

Little need be said about the noise silencer except that it works, and months of use have proven that a good superhet with noise silencing is far superior to a good super-regenerative set. Aside from the advantages of greater selectivity, the sensitivity of the superhet adds a great deal of pleasure to operating.

### The Audio Amplifier

The audio may almost be forgotten since it is standard everyday practice. One point worth noting, however, is the preference in some cases of greater audio gain. Therefore, it may be advisable to use a 6F5 instead of a 6C5 in the first audio stage. Though this was not necessary in the present model, some constructors may be used to a great deal of gain and this is about the best way to obtain it.

The receiver is built on a standard relay rack base fitted to the standard 8¾-inch panel made of ⅛-inch aluminum. This heavy panel is important for several reasons, one of which is the elimination of microphonics. It is sprayed a battleship gray to give it a truly commercial appearance. The smooth gray finish does not hold dust as a crackle finish does, and therefore it is always neat and may be cleaned easily.

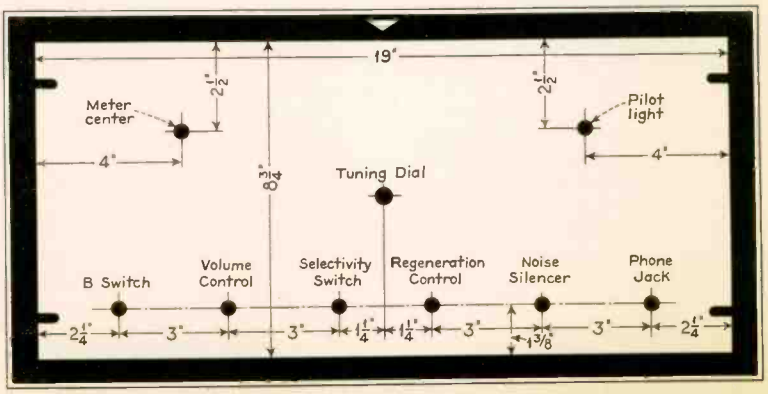
The reasons for not including the power supply and speaker are obvious. A serious bit of hum has been avoided by isolating the power supply, and a tremendous amount of microphonic feedback has been eliminated by using an external speaker. This microphonic feedback is very bothersome even on moderately strong signals and is enough at times to render a perfectly good signal unintelligible. It is well to note in this respect that a sensitive speaker is necessary for proper operation of the noise silencer. One of the new moving coil permanent-magnet types is therefore just about what is needed.

### The Power Supply

Any good power supply can be used that will deliver, under load, 6.3 volts a.c. and 250 to 275 volts d.c. However, some attention must be given it in order that it shall have good regulation.

It has been found desirable to ground one leg of all filaments (No. 2) and by-pass both the r.f. stage and first detector filaments (No 7) right at the socket back to ground. The grounds of the 956 stage must all converge at one point

*(Continued on page 439)*




*Working drawing of front panel for the 5-and-10 receiver.*

# Hamfest

By W8QMR
ex-2PI : LU4S

***sos service . . . more bootlegging . . . bloops on 56 mc . . . inquizition***

THE other evening as we pulled up to the curb in front of a well-known shack, we saw the owner thereof emerge from the office with a voluminous paper bag in hand. We raised our brows, smacked our lips anticipatorily, and asked him where he was rushing the can. Sez he—

"The receiver's gone sour. I think it's the tubes. I'm taking 'em down to the corner to get 'em tested."

MIM! That lad's old man owns the public utilities in a city of 100,000, and the boy himself has sunk some two to three thousand dollars in his rig. And yet not so much as a tube tester on the premises, and the closest thing to an oscillator is a half-kw. xmttr! When the family radio goes haywire, the old man has to call in an outside serviceman (who—to provide the exception proving the rule—happens to be a ham!).

We don't expect every ham to be a full-fledged service expert with a ton of manuals perched on top of his rig. But it doesn't seem logical to spend a thousand dollars or so on a flock of condensers, resistors and miscellaneous glassware and not a single cent to find out if it is all okay and stays that way! We've visited plenty of ham shacks, and outside of our own and those of hams who actually work at radio servicing, we can't recall having seen anything in the way of test equipment other than an occasional monitor and a checking rig for modulation. Nary a condenser tester, meter (except on the xmttr), ohmmeter or tube tester.

The primary expenditure in a ham shack is, of course, for the transmitter and receiver. But adequate test equipment can be had for about one-third the cost of a good receiver, and it will pay dividends over and over again in keeping the main rig in tip top shape. About the best combination instrument we've seen—and which just about fills every amateur requirement—is a combination tube, set, resistor, condenser tester and analyzer. It's worth looking into.

◆

W9ACE, working portable from Capital University, Columbus, Ohio, sends us a QSL card acknowledging a QSO in which our sigs were RST599X. Thanks a lot, OM—that's the way we like our peanut stand coming through. Unfortunately, it happens we never worked W9ACE. As a matter of fact, at the time of the supposed QSO we were 1500 miles away from our transmitter, basking in Florida sunshine and mint juleps.

We have previously acknowledged similar reports. So long as the bootlegger keeps up the good work, it's okay with us—though on general principles we have reported the matter to the FCC. But it seems to us that were we to bootleg a call we could pick a better one than W8QMR. We can't send it ourself without stumbling over W8QRM!

◆

WE FIGURED THAT we had about the worst call in the district — until we heard W8QCQ the other nite calling CQ. Kinda hard telling where the call ended and the sine began and vice versa. It was as bad as Groucho Marx necking the blonde in "A Day at the Races" with his classicism—"If I get much closer to you I'll be in back of you."

◆

"DOROTHY" (HALL) of W2IXY sends us the accompanying photo of the rig which has built a name for itself in the international ether almost overnight. It will be recalled that Dorothy recorded parts of the W4DLH - VU2CQ - SU1CH - HK1Z - G5ML - VK4LO all-continent round table and shot back their own transmissions to G5ML, HK1Z and W4DLH.

◆

A WRITER IN QST suggests a "phantom CQ"—that is, omit the CQ and merely sign, in our case, "de W8QMR de W8QMR, etc." This is an excellent idea on more counts than one. The CQ is understood—thus there is no need to transmit it. Also, any listener immediately knows the station and district calling—without having to wait for the sine, perhaps after an interminable CQ —and can tune elsewhere if not interested.

Best of all, the letters CQ are eliminated. Which helps a lot as only one ham out of ten can send 'em.

◆

AND ONE OF those one-out-of-ten happens to be W8FZZ who not merely has respect for the formation of the letters, but equally for the duration of the sequence!

*(Continued on page 440)*


*The shack at W2IXY, Dorothy Hall's internationally famous ham station.*

# Globe Girdling

## By J. B. L. Hinds

***why no power listings? . . . correct lima call . . . ceb, or what have you? . . . colombian s.w. tax . . . anent bbc veries . . . a.t.&t. phones***

WE have been asked on numerous occasions why we do not include transmitter powers in watts in the Short-Wave Station List. Many readers feel that this information would be valuable in determining the importance, in respect to its difficulty, of a given station "catch."

There are a number of reasons why transmitter power listings should be discouraged. In the first place, of all variable quantities, power is the greatest. Though a certain station may ordinarily employ a given power, there are instances when this power is increased or decreased, for reasons known only to the station. Unless such a change in power is announced, the listener presumes that the power given in a published list is the power used, and in consequence is led astray.

Secondly, there is a world of difference between "power input" and "radiated power," the first being the power in watts consumed by the transmitter and the second being the power in watts actually radiated by the antenna. The former is always far in excess of the latter, and, unfortunately, one broadcaster may give his power as based on transmitter consumption, whereas another broadcaster may state power in terms of the number of watts actually radiated by the antenna. The accuracy of the listings is therefore thrown completely out of line, and no accuracy can be assured until broadcasters standardize on one or the other method of power rating.

Thirdly, the use of a beam antenna makes a power rating almost valueless, for in such a case a radiated power of, say, one kilowatt will be equivalent to possibly five kilowatts or more in the direction of the beam, and less than a kilowatt in other directions. In other words, if two stations in the same locality both radiate a power of 1000 watts, but one of the stations employs a beam antenna while the other does not, the station having the beam antenna will out-do the other station by possibly five-to-one in the direction of the beam. As a consequence, though both stations radiate the same power, a listener in line with the beam would find it far more difficult to intercept signals from the station not using a beam antenna. The power ratings would therefore mean nothing.

Lastly, and of most importance, is the fact that in the short-wave bands an increase in station power does not go to say that the station will consistently cover greater distances or put in a stronger signal in a given area. So much depends on atmospheric conditions and the vagaries of the ionosphere that a station transmitter of low power may, for a period at least, "get out" better than another station operating at approximately the same frequency but with much higher power. The "skip effect" has a great deal to do with this, and conditions often change so much from day to day that a distant 1000-watt station may fade out completely and give way to a 10-watter at a more distant point.

It should be evident from the foregoing that station power means little if anything in the short-wave bands, and the listener who prides himself on having


*"Love on a horse"—hot veri from XEWW in four colors.*

### NEW STATIONS

| KC. | Meters | Call | Location |
|---|---|---|---|
| 15550 | 19.29 | CO9XX | Tuinucu, Cuba |
| 14940 | 20.06 | HJA3 | Barranquilla, Colombia |
| 14940 | 20.06 | HJA9 | El Centro, Colombia |
| 14940 | 20.06 | HI1I | Ciudad Trujillo, R.D. |
| 14485 | 20.71 | HRF | Tegucigalpa, Honduras |
| 13370 | 22.44 | WOJ | Hialeah, Florida |
| 11800 | 25.42 | COGF | Matanzas, Cuba |
| 11705 | 25.63 | SBG | Motala, Sweden |
| 9940 | 30.18 | YSG | San Salvador, Salvador |
| 9940 | 30.18 | HPF2 | Panama City, Panama |
| 9940 | 30.18 | TIZ2 | San Jose, Costa Rica |
| 9940 | 30.18 | HRF5 | Tegucigalpa, Honduras |
| 9720 | 30.86 | TGZ | Guatemala City, Guate. |
| 9500 | 31.58 | XEWW | Mexico City, Mexico |
| 9363 | 32.04 | COBC | Havana, Cuba |
| 9355 | 32.07 | WNK | Hialeah, Florida |
| 8790 | 34.13 | TIM | San Jose, Costa Rica |
| 8550 | 35.09 | HPI | Panama City, Panama |
| 6063 | 49.46 | SBG | Motala, Sweden |
| 4287 | 69.97 | WOM | Hialeah, Florida |
| 4097 | 73.20 | WND | Hialeah, Florida |

### STATION CHANGES

| New Frequency | New Call | Old Call | Old Frequency |
|---|---|---|---|
| 19260 | | PPU | 19270 |
| 15290 | | LRU | 15280 |
| 15040 | | RKI | 15145 |
| 14485* | | HRL5 | 14485 |
| 11801 | | OER2 | 11800 |
| 10370 | | EAJ43 | 10380 |
| 9666 | CR6AA | CR4AA | 9666 |
| 9616 | | HJ1ABP | 9620 |
| 9340 | OAX4J | OAX4I | 9340 |
| 7203† | | EAJ | 7203 |
| 6275 | | OAX4G | 6260 |
| 6109 | | VUC | 6110 |
| 6100 | YUA | Belgrade | 6100 |
| 4512 | | ZFS | 4510 |

* Location changed La Ceiba to La Lima.
† Location changed Is. Tenerife to Gomera.

### STATIONS DELETED

| KC. | Meters | Call | Reason |
|---|---|---|---|
| 9565 | 31.36 | VUY-VUB | Not in service |

### NON-AUTHENTICATED STATIONS

| Frequency | Call | Location |
|---|---|---|
| 11840 | KZRM | Philippine Is. (July) |
| 15155 | SM5SX | Sweden (Aug.) |
| 9570 | KZRM | Philippine Is. (July) |
| 9565 | HP5S | Panama (May) |
| 8910 | Radio Eritrea | Africa (May) |
| 8600 | HC1EC | Ecuador (May) |
| 7600 | HC1RJ | Ecuador (May) |
| 7200 | HC1AJ | Ecuador (May) |
| 6600 | HI6H | Dom. Rep. (May) |
| 6500 | YV1RM | Venezuela (May) |
| 6320 | HC1RE | Ecuador (May) |
| 6128 | OAX7A | Peru (May) |
| 6122 | OAX4P | Peru (May) |
| 6122 | OAX6A | Peru (May) |
| 6120 | HP5Z | Panama (June) |
| 6035 | CXA2 | Uruguay (June) |
| 6035 | SM5SX | Sweden (Aug.) |
| 6000 | OAX5C | Peru (May) |
| 5795 | TI2H | Costa Rica (July) |
| .... | HP5A | Panama (May) |

received a low-power station over a great distance may well be fooling himself.

The conditions in the standard broadcast band are not the same, with the result that power ratings in this instance really mean something—but that's another story.

### *Radiophone and Experimental*

KZYL, 14200 kc., Schooner "Latitude," located in Manila Harbor, heard several times on West Coast about 9:30 A.M.

ZMBJ "S.S. Awatea," 13600 kc., 8840 kc. and 4420 kc. Auckland, New Zealand *Star* states that the Broadcasting Board may assign new frequency to ZMBJ for transmitting programs.

IAC, 12865 kc., Pisa, Italy, phones ships in early evening. Reported heard in Lakewood, Ohio, several times of late.

HPF, 14485 kc., Panama City, heard by up-state New York listener contacting T1U, Cartago, Costa Rica, on same frequency at 6:45 P.M.

WQP, 13900 kc., and WQE, 18920 kc., Rocky Point, New York, heard by Ohio listener working with RKI, Moscow, in connection with landing of Moscow-San Francisco plane.

HBF, 18450 kc., and HBJ, 14535 kc., Geneva, Switzerland, reported by New York (up-State) listener as working New York at 1:40 P.M.

W2XGB, Hicksville, New York, reported by Long Island listener broadcasting special programs on 17310 kc. and 6435 kc. Address of Station: Press Wireless, Inc., P. O. Box 296, Hicksville, Long Island, New York. As only occasionally used for relay purposes the frequencies are not listed in station list.

U.S.S.R. radiophone stations with strong signals reported on the West Coast on 14540 kc. and 16450 kc. between 4 and 5 A.M., E.S.T. Can any one identify?

WOEH, near 13000 kc., Imperial Airways Flying Ship *Cavalier* reported from Ohio as heard at 11:30 A.M., one-half hour from Bermuda bound for New York and flying at 3000 feet.

### *Veri Slow*

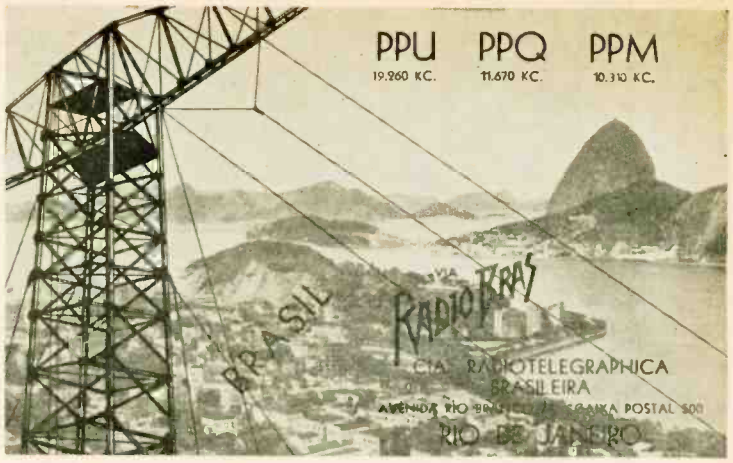
The following stations still remain slow in forwarding verifications covering reports filed by listeners:

HJ1ABB, HJ4ABD, HJ4ABB, Columbia; HCETC, Ecuador; HRN, Honduras; CB960, Chile; VP3BG, British Guiana, PZH, Dutch Guiana.

As HRN seems to be issuing veri cards it would be interesting to know the names of those who are still looking for one. Drop a line to the writer.

### *Broadcasters*

OAX4J, 9340 kc., Lima, Peru, is the correct call instead of OAX4I. Station list has been corrected. Several listeners have received verification cards from this station, but all show the frequency as 9520 kc., although the reception reports indicated that the station was heard on 9340 kc. It would seem that the station gave the assigned frequency. It may be their intention not to remain on 9340 kc., where they are still broadcasting. Address: Edificio, OAX4J, Antonio P. Vazquez, Gerente, Casilla 1166. Lima, Peru.



*From Rio, and veri striking . . . red mast and calls on brown background.*

CEB, 12300 kc., Santiago, Chile, still remains a mystery to the writer, who is also in receipt of a very pretty veri card, which conveys the following information: Radio Service, Estacion de Onda Corta de 1 kw. Card verifies reception but makes no mention of date of reception and gives no call letters, frequency, or time on the air. It would therefore seem that the call CEB is as good as any other.

OLR, Prague, Czechoslovakia, now sends veri cards for "OLR" and fills in the date of reception, time received, frequency on which heard. A very novel way of confirming all receptions, and a card of note.

VP3MR, 6010 kc., Georgetown, British Guiana, is reported being heard near 6064 kc., but announcing on 6070 kc.

T12H, close to 5795 kc., mentioned in July issue, is still transmitting nightly, but no English yet heard and reports indicate that call may be T12H, T12Y, T1CH2, or T1PH2. All are agreed that location is San Jose, Costa Rica. It is also heard as high as 5813 kc. Here is one for the Spanish students!

OAX4G, Lima, Peru, has changed frequency from 6260 to 6275 kc. They advise change was necessary on account of interference from other stations.

### *Last Minute Flashes*

ZHI, 6018 kc., Singapore, S.S., is off the air.

U. S. Department of Commerce bulletin states license granted to erect short-wave station at Havana, Cuba, on assigned frequencies 5810, 9350 and 12200 kc. Call CMKW. Writer is of opinion call may be COKW.

"Radio Liberte," Paris, France, probably new frequencies of Radio Colonial, Pontoise. Details later.

FIQA, Radio Tananarive, Madagascar, advises now on 50.00 and 31.50 meters simultaneously—12:30-12:45 A.M.; 3:30-4:30 A.M.; 10:00-11:00 A.M.

YV5RB, Caracas, Venezuela, now on 6158 kc. New transmitter with 3-kw. power under construction.

VP3BG is on 6130 kc. daily with 400 watts. Power soon to be increased to 1 kw.

JZJ, 1180 kc., transmits daily 8-9 A.M.; 3-4 P.M.; 4:30-5:30 P.M. JZK, 15160 kc., same hours with 12:30-1:30 A.M. added. Both with 50-kw. power.

"Radio Burma," Rangoon, Burma, reported heard in Australia 9:10 to 9:40 A.M. Announces on 6007 kc., 49.94 meters. Good signal, new station.

KZRM, Manila, P. I., reported heard on 11840 kc., 5-10 A.M. and also on 9570 kc. about 7 A.M.

HZA heard testing on 46 meters and announcing location as Jedah, Palestine. The letters "HZ" are assigned to Hedjah.

Can you figure out the station which broadcasts 6:15 to 6:30 P.M. daily, E.S.T. between COBC and COCH (closer to COCH)?

YV1RM, 6500 kc., Maricaibo, Venezuela, reported on the air.

What Spanish station is close to 9200 kc. evenings?

### *Colombian Tax*

HJ1ABE, 9500 kc., Cartagena, Colombia, regardless of interference from XEWW, Mexico City, is now broadcasting a non-stop broadcast from 6:45 A.M. to 11 P.M.

And speaking of Colombia, it seems the radio authorities are again changing. It is understood that by a new ruling in effect July 1st Colombian stations on short waves will be asked to pay about $5,000.00 tax per year, in place of $400.00 heretofore and as a result many will have to go on long waves. It is also reported that most short-wave stations will be placed on the 62-meter band, which will make it rather difficult for them to be heard in Yonkers with a good R9 signal!

SBG, 11705 kc., and 6063 kc., Motala, Sweden, are now operating on hours as shown in station lists.

SM5SX, Stockholm, Sweden, is not out of the picture. Station has been rebuilt for higher power and is reported

in service on 15155 kc. from 11 A.M. to 5 P.M. It is also reported that they will transmit on 6035 kc. These frequencies will be added to lists later if correctly stated.

YN1PR, Managua, Nicaragua, since changing from 8670 to 8650 kc. appears closer to 8590 or 8600 kc.

W9XAA, Chicago, Ill., 6080 kc., 11830 kc. and 17780 kc. is out of service. Station is undergoing changes and 5-kw. transmitter will be installed. No definite schedule has as yet been planned in advance of its return to the air.

EAJ, 7203 kc., San Sebastian, is located on the island of Gomera, instead of Tenerife, but still in the Canary Islands, and station list has been corrected accordingly. Gomera lies to the west of Tenerife. A complete picture of these island possessions of the Spanish Republic may be seen by referring to the detailed map of the hydrographic office of the United States Navy Department.

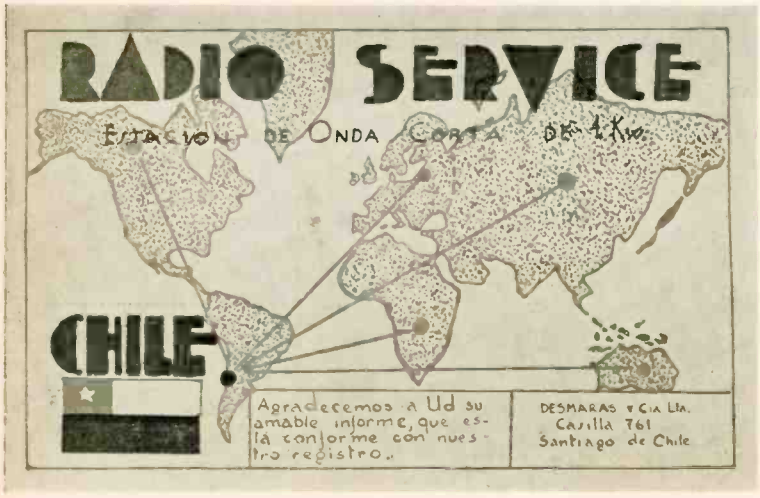
COBC, Havana, is the latest new station in Cuba and is relaying the programs of long wave station CMBC, whose address is Maximo Gomez, No. 139 Havana, Cuba. It is listed in this issue at 9363 kc., although it has been reported heard at several points between 9271 and 9375 kc.

### Mexican Stations

XEUZ, Mexico City, mentioned previously as not being heard, advises it relays the programs of XEFO, 940 kc., daily on 6120 kc. with 1-kw. power and on the hours shown in station list. Senor Stavoli, Chief Engineer, states they use five bells (chimes) at stated periods and open and close programs with the selection, "Marcha Dragona." Special DX transmissions are given each night with English and Spanish announcements between 11 P.M. and 12 A.M.

The Director General now advises that XEUZ has resumed operation on 6120 kc.

XEWW, Mexico City, Mexico, is assigned frequencies 9500 kc. and 6080 kc. according to advice from Director General of Mexican Radio Commission. It is also being heard near 15160 kc., but not as yet reported heard on 6080 kc. Station has been listed tentatively at 9500 kc. It is understood that power has recently been increased from 5 to 10 kw. Some report call on 15160 as XELU and XEWU. Veri card covering reception on 9500 kc. shows call as XEWW.




*Red and blue card, sans call, from Santiago de Chile.*

OXY, Skamleback, Denmark, is shown on 6060 kc. in station list and on the air as reported, according to last information from the station. In this section, in July, mention was made that it was being heard on the above frequency late in the evening. Recent reports are that OXY is now being heard on 11803 kc. and 15153 kc. up to 5 P.M. In this connection, attention is called to March, 1936 Globe Girdling. The assigned frequencies for OXY were then stated as 15300, 9495 and 6060 kc. It is possible that changes have since been made. Definite information from listeners would be appreciated.

A Mexican station is also reported heard at 9550 kc. but no one seems sure of call letters.

XETA, 11760 kc. Monterrey, Mexico, sends veri cards confirming reception of XET on 690 kc. There is, however, mention on address side of card of Onda Corta, 11760 kc., 1000 watts, but no call letters for short-wave transmitter. Apartado No. 203 is address.

2RO, Rome, Italy, is transmitting on 11810 kc. at times in afternoon and evening. Complete schedules for time on the air appears in station lists under 9635 and 11810 kc.

WTDV, WTDW, and WTDX 4295 kc., weather report stations in the Virgin Islands, have been turned over to the United States Marine Corps, stationed at St. Thomas, and are being used for plane-to-land communication. They have therefore been removed from short-wave station list.

### Moscow Frequencies

RKI, Moscow, U.S.S.R., is now broadcasting English programs nightly simultaneously with RAN, 9600 kc. or 31.25 meters, between 7 and 9:15 P.M. They announce RKI as transmitting on 19.95 meters, which would be near 15040 kc. although reports would indicate they are near 15140 kc.

We have accordingly listed RKI on 15040 kc. and change will be made at a later date if incorrect. The Moscow radio authorities could improve the situation as to their transmissions by announcing the frequencies in kilocycles as well as giving the wavelengths in meters, which would be more preferable as all receivers are now calibrated in megacycles and kilocycles.

In connection with RKI, it might be said that this station has heretofore been shown on 15145 kc. Another U.S.S.R. station is being heard close to 15040 kc. before 7 P.M., and it may develop that there are two stations on that band.

HP5J, 9590 kc., Panama City, broadcasts the correct time of Balboa, Canal Zone, at 7:15 P.M. daily, indicated by the stroke of a gong.

PJC1, Willemstad, Curacao, now advises that the opening signal beginning five minutes before the broadcast is an electrical gong which strikes four times, followed by a pause, this procedure being continued for the full five minutes.

HJ1ABP, Cartagena, Colombia, has been assigned the frequency of 9616 kc. by the Colombian Government and is now transmitting there. This change was made to avoid the interference caused by other stations working around and on 9600 kc.

W2XE, Wayne, N. J., is now relaying Columbia Broadcasting System programs on 21520 kc., 15270 kc. and 11830 kc. The frequencies 17760 and 6120 kc. are not being used at present. These programs are being relayed with antennas directed toward Europe and South America. It might be of special interest to many readers to know that Monday through Friday, every week, Mr. Alherto Zalamea presents a news broadcast in Spanish on 11830 kc. from 6 to 6:15 P.M., E.S.T.

### PPQ Point-to-Point

PPQ, 11670 kc., Rio de Janeiro, Brazil, was mentioned on page 299 of June

issue. Mr. R. Bouguie, Managing Director, advises while nightly programs were broadcast some two months ago between 7:45 and 8:15 P.M., they have since been temporarily suspended. This transmitter is used for point-to-point program transmissions between Rio de Janeiro, Buenos Aires and New York.

EAJ43, Santa Cruz, Tenerife, C. I., is now on 10370 kc. as stated in Last Minute Flashes in July issue. Special English broadcasts to the United States 7:20 to 8 P.M. This station uses the selection "Lady of Spain" in its opening and the Spanish National Anthem in closing.

"Radio Guardia Civil," Tetuan, Spanish Morocco, Africa, send a veri card showing frequency as 6580 kc. or 45.59 meters, although station is shown in station list at 6485 kc., near where it is usually heard.

Information is gathered from card that their news bulletin is broadcast daily at 2 P.M. in English and 7 P.M. in Spanish. Programs are begun with the "March of the Caliph" and closed with the Spanish National Anthem. Chimes used as signals in intervals. Call "Radio Guardia Civil," Tetuan. Reports from listeners as to frequency would be appreciated.

HRD, 6235 kc., La Ceiba, Honduras, has discontinued broadcasts on Sunday.

LRU, Buenos Aires, has changed frequency from 15280 to 15290 kc. and is relaying the programs of LR1 from 7 to 9 A.M. only.

LRX on 9660 kc. is now relaying similar programs from 9:30 A.M. to 11:30 P.M. daily.

YV5RF, 6375 kc. Caracas, Venezuela, is now known as "Ecos del Caribe." Note changes in time schedule in station list.

TILS, 5905 kc., San Jose, Costa Rica, is now correctly stated in station list as to time on the air. This station is known as "Pari Ti." Opening number "Washington and Lee Swing." Closing, "Adios Mi Chaparrita." No special signals.

*Photo of the transmitting and control room of station El Prado, at Riobamba, Ecuador.*

English announcements every half hour. Special programs on Sundays at different times, but no regular Sunday broadcasts.

W1XAL, Boston, Mass., will only broadcast news service daily from 5 to 5:30 P.M. on 11790 kc.

YUA, 6100 kc., Belgrade, Yugoslavia, mentioned in "Last Minute Flashes" in July issue, states that its new transmitter will be ready early next year. The power will be 10 kw. but information as to the frequencies to be used is not yet available. YUA broadcasts lectures in English several times each week beginning at 2 P.M. and English news period daily at 4:30 P.M., E.S.T. English broadcasts are preceded by call letters and frequency, and often by musical signal, which is a short musical phrase played on a flute.

"El Prado," 6618 kc., Riobamba, Ecuador, is now on the air each Thursday from 9:15 to 11:15 P.M. Announcements about every 15 minutes in English. Bugle calls at beginning of transmission as means of identification.

Department of Commerce Bulletins advise that station FIQA, Tananarive, Madagascar, has recently moved to new quarters and reported to be in possession of the most modern and perfected equipment. It is said to be transmitting experimental programs intended for European listeners simultaneously on 25, 31 and 50 meters. This station now appears in lists at 6000 kc. only. One report received from Australia states that "Radio Tananarive" was heard from 1:30 to 2:30 P.M. (E.S.T.) on 9590 kc. transmitting recordings and closed down with the playing of the "Marseillaise."

### *"B.B.C. Veries"*

The British Broadcasting Corporation states that despite reports appearing in the American Press to the contrary, they do not issue cards or letters which verify the reception of their short-wave transmitters at Daventry and wish it known that veri cards issued by others and worded in a manner to give the impression that they emanate from the B.B.C. are issued without the authority or approval of the Corporation. It is assumed that those obtaining such verifications understand the conditions under which issued.

Advice from India is that four 10-kw. stations and one 5-kw. station are to be placed in operation within the next year at Delhi, Bombay, Calcutta and Madras, and two transmitters to be installed at Delhi.

Additional foreign radiophone stations communicating with A.T.&T. Co. radiophone stations at Hialeah, Florida, are listed in station lists in this issue.

From advice received from Norway it is learned that the frequencies mentioned in January 1937 issue on page 21, are reserved for Norway. No new transmitters have been built for short-wave broadcasts and none contemplated for the present. Service is being maintained by LKJ1, 9530 and 6130 kc., with 500 watts power.

Brazil announces the erection of a 50-kw. short-wave transmitting plant to be constructed this year and is to be the largest and most powerful short-wave

*(Continued on page 444)*


*Black on yellow and very effective. Maybe the man is TILS's chief engineer. (He's got something there!)*

# A.C.-OPERATED BIAS SUPPLIES

PRACTICAL, concrete information about a.c. operated bias supplies seems to be one of the skeletons in the closet of the radio amateur family. The writer hopes that this article will prove helpful to those who might be in the "technical darkness" so seemingly prevalent about the subject.

Due to the requirements for the proper operation of phone transmitters being more exacting than those of c.w. transmitters, more attention will be given here to the bias supplies for phone rigs.

Batteries are splendid for bias purposes—as long as they last. Under even the best treatment, however, they charge up (producing unstable voltage) and become "noisy," both of which features are especially undesirable for phone transmission. One of the fundamental aims of every ham is to get the best results from his hobby with the least expense; if it were financially convenient for most of us to replace batteries as soon as they commence to give inferior service, resistor bias, cathode bias and a.c. operated bias supplies would not be quite as popular as they are. The cost of the bias supply shown here for grid-modulated phone rigs will scarcely exceed that of one set of batteries required to bias a medium or high-powered phone transmitter. The initial investment required for some of the other supplies shown will probably run higher, but once the supply is built it lasts indefinitely and the maintenance expense should hardly exceed $1.00 per year, if that much.

### Low-Voltage Supplies

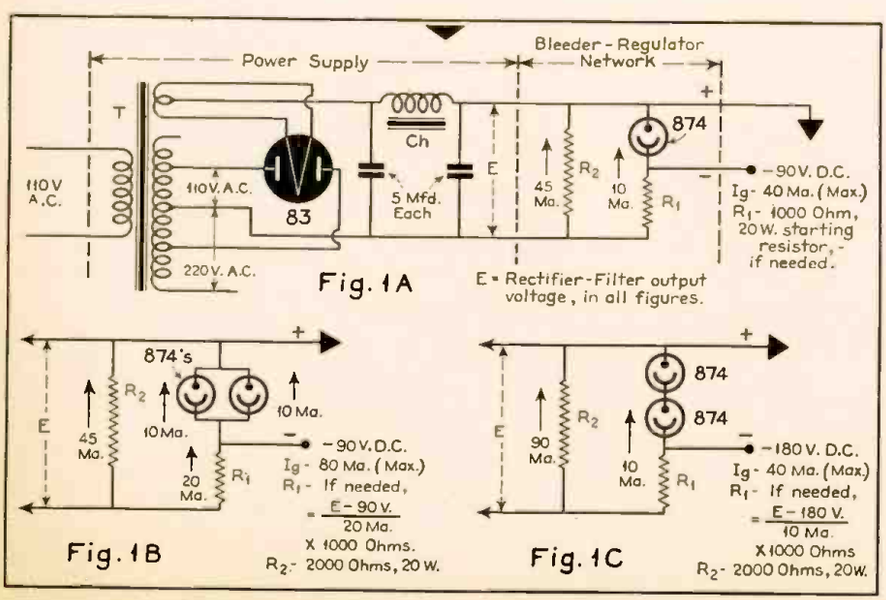
Fig. 1-A shows a bias supply suitable for transmitters requiring —90 volts bias at a grid current of 40 mils or less. This particular supply is adequate for a grid-modulated phone rig using two type '03-As in the modulated stage, or for a plate-modulated transmitter using one type '03-A.

The bias supply is simply a low-voltage unit which is connected to the network of the voltage-regulator and the two resistors, $R_1$ and $R_2$. The voltage-regulator, a type 874, is necessary in order to duplicate as closely as possible in the bias supply the constant-voltage service normally given by new batteries. The tube is reasonably priced and has an excellent life, if treated right. A reddish-purple glow is characteristic of the tube when operating, so have no fears that it's going up in smoke when the fireworks commence.

In designing your bias supply, first set down the voltage it must deliver and then proceed to find out how many regulator tubes are required to handle that voltage. Next consider the current capacity of the tube and see whether or not the grid current of your transmitter is excessive for that rating. Finally, the values of $R_1$, $R_2$, Ch., type of rectifier (ordinarily a type 82, 83 or 5Z3) and the voltage-current rating of the power transformer, T, are determined.

### The Voltage Regulator

A word or three now concerning the 874. It gives effective regulation only at 90 v.d.c. with a current fluctuation range of 10 to 50 ma. In order to place it in operation, 125 volts are required for "breakdown."




*Circuits, with constants, of low-voltage bias supplies.*

Now if the d.c. voltage available to the 874 from the power supply is only 90 volts, some means of getting 125 volts, or slightly more, to put it in operation must be provided; also, when the tube does break down, its voltage must instantly drop to 90 volts. The grid current from the transmitter is usually sufficient to start the tube; but, if not, a starting resistor ($R_1$) can be provided to help matters.

The maximum current that the tube can handle is 40 mils (its range being 10 to 50 ma.). If the stage to be biased has a grid current flow of not more than 40 ma., the single tube will be adequate. In this event, the current through the 874 when the transmitter is in *operation* will be adjusted to 50 mils; when the transmitter is *off* the current should be 10 mils through the tube.

For simplicity of explanation, and because it is likely to be the lowest bias voltage one would ever desire, our example will be a bias supply for an amplifier which has a grid current of 40 mils and which requires —90 volts for its bias. First we see that only one regulator will be required, and that the current through the regulator tube will be 10 ma. when the transmitter is *not* operating.

### Typical Design

Now if the power transformer we intend to use produces 95 v.d.c. at the output terminals of the rectifier-filter, the only way to break down the regulator tube is by the grid current from the amplifier which develops the needed increase in voltage by the result of its flow through the resistance of the bias supply. If difficulty is encountered in getting the tube to break down in this manner, the inclusion of $R_1$ in series with the tube (Fig. 1-A) should do the trick. About 1000 ohms proved satisfactory in our case. $R_1$ is also necessary if the d.c. output of the power supply proper is more than 90 v.d.c. This angle of the case will be taken up later.

Thus far we have accounted for the regulator tube, the inclusion and value of $R_1$ if difficulty is encountered with prompt "breakdown" of the 874 and the voltage-current limitations of same.

The power supply proper, in our case, is composed of an 83 which rectifies the output of the transformer, T, which furnishes either 110 v.a.c. or 220 v.a.c. each side of center-tap, according to whether 90 v.d.c. or 180 v.d.c. is required at the output terminals of the filter. Two 5-mfd. dry condensers and a 20-henry, 160-mil choke comprise the filter.

$R_2$, the bleeder resistor, is a 2000-ohm,

# FOR PHONE AND C. W. TRANSMITTERS

**By W. E. McNATT • W7GEZ ex W6FEW**

20-watt resistor which draws 45 mils from the supply.

If you have a transformer which gives a higher d.c. output voltage, it is necessary to give $R_1$ a value which will drop the voltage to the desired bias voltage at the instant the regulator tube begins to draw current. Now, for purposes of illustrating how this is done, we'll say that a transmitter is to have 90 volts bias and that its grid current is 40 mils. The transformer we have which will give a voltage anywhere close to that we need puts out 150 v.d.c. at the terminals of the filter, with a maximum of, say 100 mils. The current through the 874 will be 10 ma. when the transmitter is off. Our calculations, then, of $R_1$ will consider the 874 not as a tube, but as a fixed resistor in series with $R_1$. The total drop through the two being the voltage output of the power supply proper: 150 v.d.c. at a current of 10 ma. All of which gives

$$R_1 = \frac{150 - 90 \text{ v.}}{10 \text{ ma.}} \times 1000 = 6000 \text{ ohms.}$$

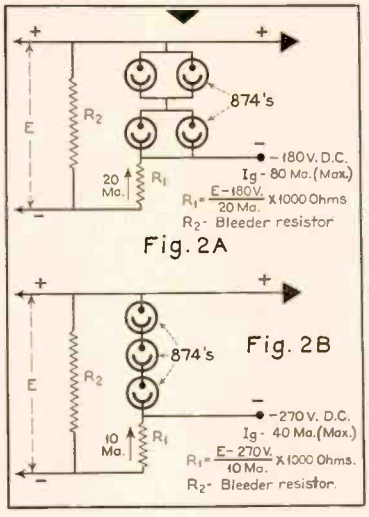
The factor, 1000, by which the voltage is multiplied is included in order to simplify the sometimes confusing conversion of milliamperes to amperes, and the added confusion caused by the decimals which would otherwise be involved in the division above.

In this arrangement, no difficulty will be had with the 874 failing to break down easily, as there will be 150 volts across its terminals when the bias supply is turned on. The instant it does break down, however, the 10 mils of current through $R_1$ will cause the voltage to drop to 90 volts across the 874. All of which is satisfactory. As the tube can handle an additional amount of current to the extent of 40 ma. without losing its high ability to regulate the voltage, the grid current flow set up by the operation of the biased stage will not affect that regulation as it (40 ma.) is not in excess of the tube's rating.

In selecting $R_1$ and $R_2$ it might be well to choose the tapped or "semi-variable" type in order to facilitate their adjustment to the proverbial "gnat's eyebrow."

### High-Voltage Units

Now for the cases in which higher bias voltage and grid current must be accommodated. Figs. 1-B and 1-C show the circuit arrangements required for —90 v.d.c. bias at a grid current of 80 ma., max., and -180 v.d.c. bias at a grid current of 40 ma., max., while Figs. 2-A




*Two voltage-regulator circuits.*

and 2-B show the circuits for —80 v.d.c. bias at a grid current of 80 mils and for —270 volts bias at 40 mils grid current, respectively. Since it is not particularly difficult to determine the rating of the power transformer voltages required, the values of $R_1$ and $R_2$, etc., there is no point in discussing them here.

As c.w. transmitters aren't quite as "particular" about their bias supply as is the phone rig, the voltage-regulator is not necessary and may be dispensed with, if desired. Fig. 3-A is a circuit of a bias-supply, which, if properly designed will give good results.

In this type of bias supply, the net resistance of the whole unit should be as low as possible. In order to meet this requirement it is seen that the bleeder resistance, R, should be as low as the current rating of the power transformer will permit. In other words, the power transformer should give a current which is comparatively high in relation to the voltage (d.c. output) which it can furnish. This in order that when the grid current flow from the biased stage is flowing there will be a variation in the bias voltage which is small compared to that required by the transmitter . . . i.e.—good regulation without the use of the voltage-regulator.

### The Power Transformer

There are available, at a reasonable price, several makes of transformers which were designed for such work: high current at low voltage, which is what is needed here. Our particular transformer is rated to deliver 160 milliamperes at either 90 or 180 v.d.c. at the rectifier-filter output.

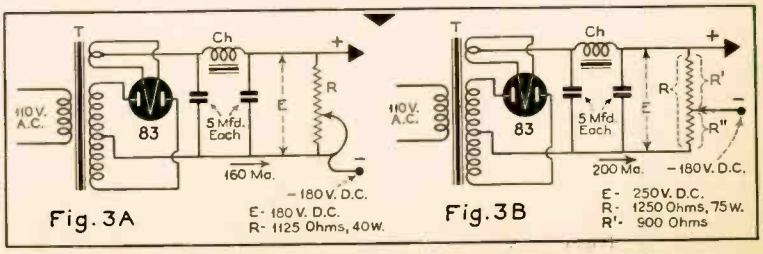
For example, if your transmitter requires —180 volts of bias, and if you have a transformer of the type mentioned above, we find the value of R by

$$R = \frac{180 \text{ v.}}{160 \text{ ma.}} \times 1000 = 1125 \text{ ohms with}$$

a wattage rating $W_r = 180 \times .160 = 28.8$ watts, which will be a 40-watt resistor when the possibility of 50 ma. grid current flow is accounted for. Of course the net resistance of the whole supply through which the grid current will flow will be far less than that of the bleeder, R, due to the very low resistance of the transformer, tube and choke being in parallel with R.

Fig. 3-B shows another circuit which is the same as that of Fig. 3-A with the exception that R is tapped, thereby making two resistors, R' and R". This combination is used in cases where the lowest available d.c. voltage is higher than the desired bias voltage. If the power transformer is capable of delivering high current, say 160 or 200 ma., the same or, with 200 ma. available, better regulation can be had. Let us assume that we desire 180 volts bias, and that the power transformer delivers 250 volts at the output terminals of the rectifier-filter, with 200 ma. as the maximum current.

*(Continued on page 443)*




*Two bias-supply circuits satisfactory for use with c.w. transmitters.*

# Night-Owl Hoots

## By Ray La Rocque

***contest winners . . . costa-rican list . . . station changes . . . owl hoots . . . new features on way . . . the coming dx season . . .***

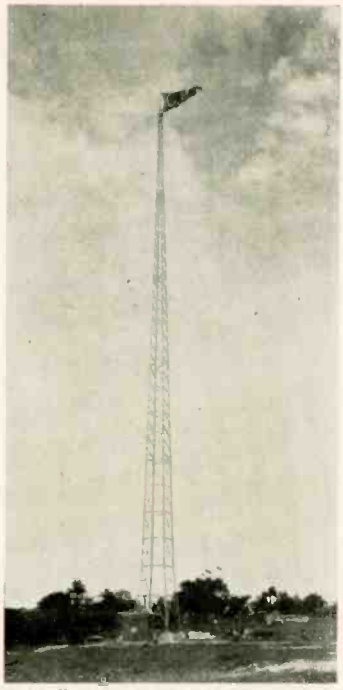
CRAMMED into the miniature strip of land abounding with verdant vegetation and multi-hued flowers that is the Republic of Costa Rica, and basking in the warmth of its tropical sunshine are no less than twenty-eight broadcasting stations! All of them are located in the capital city of San Jose except the renowned Cespedes' TINRH, whose towers reach skyward from the lofty little city of Heredia. Many lists of this country's broadcasters have been published—all of them very incomplete and most of them incorrect, so it is with quite a bit of pride that we are able to offer a complete list of stations operating in Costa Rica at the time of writing. The listing shows in the following order, the frequency in kilocycles, the call letters, the name or slogan, and the power in watts:

| | | | |
|---|---|---|---|
| 575 | TI5CV | "Ecos del Poas" | 100 |
| 600 | TIFA | "La Voz de Italia" | 250 |
| 625 | TIPG | "La Voz de la Victor" | 1000 |
| 650 | TIGP | "Alma Tica" | 1000 |
| 690 | TI4WX | "Costa Rica" | 250 |
| 730 | TIGH | "America Latina" | 1000 |
| 750 | TIRM | "Alma America" | 15 |
| 775 | TILJ | "San Jose" | 450 |
| 800 | TIXD | "La Voz de la Republica" | 100 |
| 830 | TIEP | "La Voz del Tropico" | 3000 |
| 860 | TIVL | "La Voz del Morazan" | 30 |
| 880 | TILS | "Para Ti" | 500 |
| 900 | TI3TS | "Ondas del Guarco" | 100 |
| 925 | TIRS | "Athenea" | 100 |
| 950 | TIRH | "Los Angeles" | 1800 |
| 980 | TINRH | "La Voz del Comercio" | 750 |
| 1000 | TIGPH | "La Neuva Alma Tica" | 1300 |
| 1030 | TIGZR | "Alma Criolla" | 15 |
| 1050 | TIPLB | "Ecos del Occidente" | 50 |
| 1070 | TICSM | "Espana" | 450 |
| 1090 | TING | "Reina del Espacio" | 375 |
| 1120 | TICA | "Ondas Tropicales" | 75 |
| 1150 | TICMP | "Titania" | 50 |
| 1175 | TIMC | "La Philco" | 100 |
| 1200 | TIRCC | "Accion Catolica" | 500 |
| 1225 | TIVCA | "La Voz de Centro America" | 500 |
| 1330 | TIFQ | "Moreno" | 250 |
| 1400 | TITI | "Thalia" | 250 |

It is a known fact that in Costa Rica anyone who has the necessary fee to purchase a license can operate a broadcasting station, and that most of these stations do not boast high-quality equipment, but just as "Time Marches On" in this country so does time march on in Costa Rica—and during its forward progress improvements doubtless will appear as the operators and owners begin to get the "hang of things." So, keep an ear peeled for those Costa Ricans next season!

### Contest Winners

Come closer, Night Owls! You are about to witness, via these pages, the crowning of the first ALL-WAVE RADIO DX Champion. For his superb DXing and efforts in the contest conducted during the past season we officially crown—or should we be a little gentler?—and say we present, Charles Hesterman, of Saskatoon, Saskatchewan, with a Pilot Super-Dragon IV receiver as first prize. Some crown, eh wot? The CDXR president amassed a total of 6733 points and attained his position by consistently good DXing. The Saskatoon Night Owl was not once high scorer during any month of the contest, but always kept at the heels of the high scorer, and when the others slipped in the final grind, he was ready to step into the lead just before crossing the finish line.



*The tall lattice-work steel tower which serves as the vertical radiator for station CMQ. Photo taken during construction period.*

In second place, by virtue of a grand last-minute spurt, is Enrique Hidalgo, of Cienfuegos, Cuba, who scored 6001 points. Our Cuban contestant, who entered the contest merely to prove that it was possible to DX on the BCB in the midst of the static and local QRM present on the isle, jumped into this position from fifth place during the final month. A Hallicrafters 1937 Super Sky Rider receiver is yours, Senor Hidalgo, for your efforts.

The race for third place was close and Carroll Weyrich of Baltimore, Md., wins an American Bosch Model 620 set


*Photo of the transmitter and administration building which will serve the new stations CMQ and COCQ.*

with his score of 5386. Only five points behind we find another Baltimorian, Bernard Ahman, who with a score of 5381 receives the fourth prize—a Peak Preselector.

George Brode of Philadelphia, Penna., receives the fifth prize—a 12-inch dynamic loudspeaker—for his score of 5174 points. Next, with 3890, is the Bronx Owl, Carl Forestieri. In seventh place, with 3346 points, is Joe Lippincott, Medford, Mass. Harry Gordon, Erie, Penna., won eighth prize, with a score of 1753.

C. Robert Wilson, Portland, Maine, finished in ninth place with a score of 1541. Leroy F. Nice, Souderton, Penna., took tenth place with a score of 1406. 1368 is Earl Lever's (Worcester, Mass.) score, which put him in eleventh place.

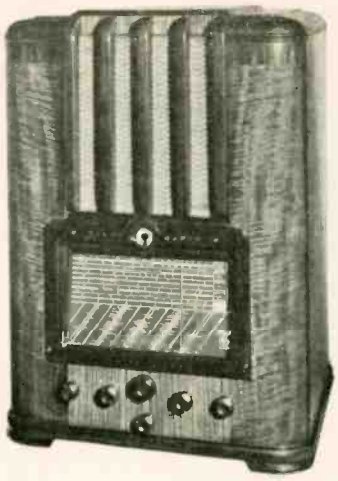
The following contestants each receive a subscription to ALL WAVE RADIO for one year: Kendall Walker, Yamhill, Oreg., 1179 points; John Gardner, New York, N. Y., 209 points; Bob Beadles, Salt Lake City Utah, 154 points; and Harry E. Snyder, Trenton, N. J., 111 points.

### *April Scores*

The month of April was the first month during the entire contest that did not show an increase in the number of reports over the previous month. In April, 808 reports were received on 108 stations for a grand total for the entire contest of 3463 reports! Scores for April were as follows: Hidalgo 2485, Hesterman 2197, Weyrich 1332, Brode 964, Forestieri 861, Lippincott 777, Gordon 681, Nice 330, Walker 321, Lever 237, Gardner 23, and Snyder 11. Bullseye's were made by the contestants as follows: Hidalgo 20, HIX, LS3, HJ1ABR, YV1RA, YV5RA, YV5RB, TG-1, TGW, XEFW, HP5C, TIGPH, HJ3ABX, LR1, XEL, HJ1ABJ, HJ4ABN, YV1RF, YV4RA, HIN and XET; Hesterman 18, KGMB, 5CL, 4QG, 3YA, 2NR, 4RK, 5CK, 3AR, 6WA, 2FC, 2CO, 3GI, 3WV, 7NT, 3TR, 3SR, and 2 NC; Weyrich 10, MTCY, Bucharest, KFBB, CMBZ, YV5RQ, London Regional, North Regional, Scottish Regional, Midland Regional, Strasbourg, and CJKL; Walker 2, XEAQ, and XEAL; Lippincott 2, LS2 and CMBD; Nice 2, CMGC and CMGE; Gordon 2, XEAF and WJAG; and Forestieri 1, CMCA.

Stations reported by more than one DXer during April are as listed below with the figure denoting the number of times reported: XENT 86, XERA 77, XEAW 64, CMQ 46, XEPN 39, CMCJ 36, CMX 33, XEW 26, CMCD 13, XEMO 13, WNEL 12, XEFO 10, CMCF 8, WFOY 8, CRCY 8, CKSO 8, CJIC 8, CJCB 7, CFCH 7, XEB 7, CFNB 6, CHSJ 6, CJLS 6, CFCY 6, CFCN 6, WLAC 6, CMHJ 6, CHRC

**FIRST PRIZE**



*The TG-520 Series Super-Dragon IV, twelve-tube all-wave receiver contributed to the DX Contest by the Pilot Radio Corporation.*

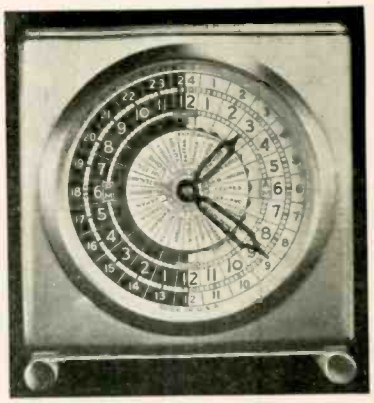
**SECOND PRIZE**

*The Super Sky Rider communications type receiver, contributed to the DX Contest by The Hallicrafters, Inc. This set is an eleven tuber.*

**THIRD PRIZE**

*The American-Bosch Model 620 a.c.-d.c. receiver, employing seven tubes and having three waveband ranges.*

**SEVENTH PRIZE**



*The Sky Pilot World Time Clock contributed as seventh prize by The Sky Pilot Organization.*

**FIRST PRIZE**
*(Pilot TG-520 Super-Dragon IV)*
CHARLES HESTERMAN
Saskatoon, Sask., Canada

**SECOND PRIZE**
*(Hallicrafters 1937 Super Sky Rider)*
ENRIQUE HIDALGO
Cienfuegos, Cuba

**THIRD PRIZE**
*(American Bosch Model 620)*
CARROLL WEYRICH
Baltimore, Md.

**FOURTH PRIZE**
*(Peak Preselector)*
BERNARD L. AHMAN, JR.
Baltimore, Md.

**FIFTH PRIZE**
*(Lafayette Dynamic Concert Speaker)*
GEORGE L. BRODE, SR.
Philadelphia, Penna.

**SIXTH PRIZE**
*(Kit of Radio Tubes)*
CARL FORESTIERI
New York, N. Y.

**SEVENTH PRIZE**
*(Sky Pilot World Time Clock)*
JOSEPH T. LIPPINCOTT
Dover, New Hampshire

**EIGHTH PRIZE**
*(Sky Pilot World Time Clock)*
HARRY M. GORDON, Erie, Penna.

**NINTH PRIZE**
*(Sky Pilot World Time Clock)*
C. ROBERT WILSON, Portland, Me.

**TENTH PRIZE**
*(Sky Pilot World Time Clock)*
LEROY F. NICE, Souderton, Penna.

**ELEVENTH PRIZE**
*(Sky Pilot World Time Clock)*
EARL LEVER, Worcester, Mass.

**TWELFTH PRIZE**
*(Year's Subscription to* ALL-WAVE RADIO*)*
KENDALL WALKER, Yamhill, Ore.

**THIRTEENTH PRIZE**
*(Year's Subscription to* ALL-WAVE RADIO*)*
JOHN GARDNER, *New York, N. Y.*

**FOURTEENTH PRIZE**
*(Year's Subscription to* ALL-WAVE RADIO*)*
BOB BEADLES, Salt Lake City, Utah

**FIFTEENTH PRIZE**
*(Year's Subscription to* ALL-WAVE RADIO*)*
HARRY E. SNYDER, Trenton, N. J.

5, CMCY 5, WKAQ 5, CMCG 5, KHBC 4, CMBY 4, CMBX 4, WLVA 3, CKCW 3, CRCS 3, KGU 3, XEBG 3, WPRP 3, XEOK 2, KWSC 2, WLLH 2, KOTN 2, XED 2, 1YA 2, XEAC 2, XEJ 2, CHNS 2, CMBC 2, and believe it or not XELO was not reported! That, Night Owls, is that for this season's contest. We hope you had many hours of pleasure added to your DXing by this contest and the chief knows that everyone appreciates the prizes which ALL-WAVE RADIO has awarded to the winners.

### Station Changes, U. S. A.

*New Stations:* The FCC granted two more permits for new stations this month. The first one is to be a 100 watter in Greenville, Texas, to operate daytime only on 1200 kc. The other grant was made for a station in Middlesboro, Ky., and is also to be a 100 watter. The Kentucky station, however, will have full time privileges on 1210 kc.

*Power Changes:* KRIS (1330) 250-500, KPFA (1210) 100-250, KMJ (580) 500-1000, WMBD (1440) 500-1000.

*Call Letters Assigned:* To the new station granted last month for Miami Beach, Fla., go the rather feline call letters WKAT, and WGTM has been chosen as the call to identify the new Wilson, N. C., station.

*Delete:* WNRI Newport, R. I., 1200 kc.

*Frequency Change:* KRMC from 1310 to 1370 kc.

### Station Changes, Foreign

*New Stations:*

| *Call* | *Location* | *K.C.* | *Watts* |
|---|---|---|---|
| ..... | Moravska Ostrava, Czechoslovakia | 1113 | 11200 |
| JBCK | Seishin, Korea | 850 | 10000 |
| YNPR | Managua, Nicaragua | 630 | ..... |
| YV1RK | Maracaibo, Venezuela | 1280 | ..... |
| YV5RA | Caracas, Venezuela (omitted) | 960 | 5000 |
| YV5RJ | Caracas, Venezuela | 1370 | ..... |
| ZHL | Singapore, Straits Settl. | 1333 | ..... |
| 2YD | Wellington, N. Z. (IDA) | 990 | 250 |

*Power Changes:* Kosice, Czech. (1150) 2600-10000; HSPJ (856) 2500-1500; YV1RA (1500) 100-200; 2YC (840) 250-5000 (IDA).

*Call Changes:* YV5RD (1200) to YV5RB, and OAX4I (1100) to OAX4J.

### With the Night Owls

Choice morsels extracted from the many letters received from Night Owls during the past month:

*Meredith M. Stroh,* Kitchener, Ontario: "In an address broadcast over the C.B.C. network recently Mr. Brockington announced that new 50,000 watt stations at Vercheres, Que., just east of Montreal, and Hornby, Ont., 30 miles northwest of Toronto, are expected to be in operation by October 1."

*Enrique Hidalgo,* Cienfuegos, Cuba: "I expect to go to Costa Rica to coach a track team in the Fourth Annual Central America Games this summer, and while there will send you articles about radio conditions and the work of stations, correct list of calls with frequency and power." (We're sure such information would be appreciated by every American DXer.)

*Isaac (Ike) Davis,* Elkhart, Texas: "A bit of a paradox the following: 2YC on 840 kc. is much more consistent and stronger with its 5000 watts, than 2YA of the same city which uses 60,000 watts! Another interesting fact about TP reception here in Texas is that 3GI, a 7000-watter on 830 kc. is actually stronger, and almost as consistent as the Melbourne short waver—VK3ME."

*Joe Miller,* Brooklyn, N. Y.: "ZHL, 1333 kc. in Singapore, Straits Settlements, opened for broadcasting on January 1, 1937. This station replaced ZHI on the short waves. Schedule of ZHL is weekdays 6-10:15 P.M., Saturday 12:45 P.M. to 2 P.M., and 6-11 P.M. Singapore Time."

*Fred L. Van Voorhees,* Miller Place, N. Y.: "What is the power of CMQ? I've heard everything from 250 up to 25000 watts!" (Information just received shows CMQ using 2500 watts, but they are about ready to go on the air with new equipment supplying an antenna power of 25000 watts.)

Thanks also are due to the following who have contributed information to the Chief this month: George Roche, Amesbury, Mass.; George Brode, Philadelphia, Penna.; Morton Blender, Chicago, Ill.; Mrs. A. C. Johnson, Henry, S. D.; Carl Forestieri, Bronx, N. Y.; Walter L. Chambers, Lexington, Mass.; Bernard L. Ahman, Baltimore, Md.; Nancy Lee Saxton, Chicago, Ill.; E. L. Peters, Westport, Nova Scotia; Carroll Weyrich, Baltimore, Md.; Harry E. Snyder, Trenton, N. J.; Charles Hesterman, Saskatoon, Saskatchewan; Joe Lippincott, Medford, Mass.; Raymond Prutting, Bridgeport, Conn.; Ray Geller, Bronx, N. Y.; Robert Wilson, Portland, Me.; Anthony C. Tarr, Seattle, Wash.; Harry Hawkins, Manchester, N. H.; Clarence Burnham, Gloucester, Mass.; Walter C. Snyder, Grand Rapids, Mich.; Frank Emery, New Castle, Penna.; C. Vassalo Gomez, HJ1ABK, Barranquilla, Colombia.

### Kilocycling Around

Due to the deletion of WNRI, WTHT now has full time on 1200 kc. . . . KRMC also increases its time to unlimited by virtue of its change in frequency from 1310 to 1370. . . . Schedule of VUB (855 kc.) is from 11 P.M. to 12:30 A.M. and 8 A.M. to 12:30 P.M. EST . . . A little shifting around in France changes the name of the "Nice PTT" station to "Nice—Cote d'Azur," which means Nice—Blue Hill in case you're interested. The former "Radio Cote d'Azur" will assume the title "Radio Meditteranee."

### Cheers and Jeers

Because next month is only 31 days away and next month marks the opening of the DX season, we have our only incentive for three cheers this month! The September Night Owl Hoots will, we hope, give the readers a few reasons to cheer. We will introduce a few new features for the coming season and follow these with a newly revised station list. So be on hand early next month and get in on the big things ahead.

Address all communications intended for this department to Ray La Rocque, 135 Highland St., Worcester, Mass.

## VERI OF SPECIAL "ALL-WAVE RADIO" PROGRAM

*Studio lounge at station CMHJ, Cienfuegos, Cuba . . . a photo-veri, this one being an acknowledgement of the reception by La Rocque of 14 selections played during the special "All-Wave Radio" program from this station.*

# Channel Echoes

## By Zeh Bouck

***windsor ties . . . a burp parisien . . . die-athermy . . . boake-quet***

IF any further demonstration is desired of the fact that all the world loves a lover, the statistical bureau of the N.B.C. states that the switchboard at Radio City was completely tied up two minutes before the farewell broadcast of King Edward VIII, and was similarly swamped immediately following His Majesty's few majestic words. However, not one single telephone call was received during the three minutes that the king was speaking.

It was hardly to be expected that the Coronation would establish a similar record — giving the telephone ops a full day off—but we'll wager they could have powdered their noses several times had the Duke's wedding been broadcast. Certainly the ceremony would have been listened to by an enthusiastic, well-wishing and sincere audience, in all parts of the world.

It would have made quite a broadcast at that. Starring Mrs. Wallis Warfield in Gone with the Windsor.

◆

A RECENT BROADCAST from TPA3, Paris, France, was a play entitled "A Breath of Disorder." We never could stand French cooking ourself.

◆

THIS MORNING, between 31 and 9 megacycles, we counted exactly 57 diathermy machines—or more correctly the radiations thereof. Somehow or another we were not grief-stricken the other day to read that a doctor had been electrocuted while treating his patient (and the listening world in general) with one of these contraptions. What happened to the patient is not chronicled, but it is reasonable to suppose that here is another doctor's bill that will not be paid.

◆

NO MATTER WHAT our location, those Cuban stations—COCQ, COCH and COCX—follow us with annoying persistence, and with the same unvarying crop of sporanodious voices, the same guitars, the same tenors and the same modest violent brand of advertising. Not to mention the same poor quality of modulation that wouldn't have been tolerated in a first-class amateur station vintage 1930. They pounded our loudspeaker all winter in Tampa, Fla., and they are with us here up north. There is a slight improvement though—the fading is delightfully consistent.

PLENTY OF READERS identified Graham McNamee as the gentleman appearing in the photograph gracing this department for June, and placed the scene just about everywhere from a bull fight in Mexico and the Indianapolis races without coming anywhere near the real event. So the contest still holds and a free subscription to AWR goes to anyone who can better the mark. Thus we eliminate the old timer's guessing contest for this month. But for those who like to look at pictures, we oblige with the shot appearing on this page. What is it? A fortune teller's booth? Turkish bath? No—just the drapes which the unwary wrapped around themselves when being televised back in those days, nine years ago, when "television had definitely arrived."

The moguls today are a little less definite—including Sarnoff. The latest information is to the effect that television will have made further progress by the time the World's Fair opens in New York. Architects' drawings of the proposed buildings all show structures of modernistic design with streamlined contours. Perhaps this will help television slide around the corner.

◆

EDWARD SCRIBNER, of Schoharie, N. Y., nominates the Berlin news broadcasts as the radiodor of the month, particularly in recognition of the bias and inaccuracies in reporting on the Spanish war—and thereby merits the monthly free subscription. We have occasionally commented upon the "German news bulletin in English," and have marveled that so intelligent a bureau of propaganda could be guilty of such stupid puerilities.

*Early Pilot television studio where performers played ducks and drapes.*

A recent *bulleti*n described the bombing successes of the "nationalist" (rebel to the rest of the world) planes against the "red" forces (the loyalists to the rest of the world!)—which planes, as is generally reported, are of German manufacture and largely piloted by German fliers. This interesting item was immediately followed with excerpts from an article written by Herr Dr. Goering, in which he described the *laisser faire* attitude of the Nazi political philosophy, declaring that every nation had its individual problems which could be solved only in its own individual way, and that Germany felt that every nation had a right to set up that form of government which its people wanted without intervention or influence or even criticism from other sources!

◆

BUT ONE CANNOT altogether criticize Germany for her bias in reporting the Spanish situation. Consider her interest in the melee! Had Daventry been a world broadcasting center in the days of our own Civil War, with England's tacit recognition of the Confederacy, her naval assistance and millions loaned to the rebel cause, we might have dialed down to London and heard news reports in Deutscher style but Oxford accent:

"A light skirmish has been reported at Gettysburg on the northern front—the Confederacy having pressed its advantage far into Yankee territory. It is stated that the Yankees sustained severe losses and that several northern generals were killed. Military stores and guns were captured by the Confederacy."

Later: "A conference has been reported between the Confederate commander, General Lee and the Yankee leader Grant at Appomattox. It is understood that concessions were made by the latter to the Confederate commander."

◆

SUMMER HAS BROUGHT the usual improvement to the 40-meter band. It is completely obliterated by static.

*(Continued on page 440)*

# R.S.S.L. NEWS

THE Radio Signal Survey League is a non-professional, non-profit organization of scientifically-inclined radio observers working together for the purpose of improving world radio conditions. Members undertake their appointed tasks with no thought of personal reward other than the satisfaction they derive from the knowledge that they are performing a worthwhile public service. However, the League does give recognition to those members who perform outstanding services.

### Aims of League

The primary aim of the R.S.S.L. is to survey radio broadcast and communication bands so that clear channels may be found for international shortwave broadcast stations; to assist any transmitting station in improving its coverage and the character of its emission, to cooperate with any station operating on an experimental basis; to reduce station interference, and to take a hand in the elimination of local noise conditions.

It is likewise an aim of the League to conduct long-range observations on signal propagation and characteristics under varying atmospheric and seasonal conditions for the purpose of learning more regarding the many freak conditions related to radio communication.

It is also an aim of the League to offer the services of its members in cases of emergency when a widespread standby for distress signals or the monitoring of communication bands becomes a matter of great importance.

### League Policies

The services of the League are offered free to any commercial, broadcast, or amateur station requesting a signal survey. The League serves no one group and at all times maintains an impartial attitude with regard to such matters as station and noise interference. It is not a policy of the League to assume a dictatorial attitude in such instances, but rather to present the findings of the membership network to offenders with suggestions as to means of correction that would prove mutually beneficial.

It is not a policy of the League to duplicate or otherwise trespass upon the activities of listeners' clubs at present devoted to the collection and compilation of data on DX stations. On the contrary, it is the policy of the League to cooperate with such clubs wherever and whenever it may.

### League Functions

The League is composed of a world-wide and ever-growing network of Monitoring Stations maintained and operated by its members, these Monitors being placed at the free disposal of individuals or companies desiring accurate data on signal transmissions. Such requests, together with frequencies and operating schedules, are published in ALL-WAVE RADIO magazine, the official organ of the Radio Signal Survey League. It is the duty, then, of each member to monitor the signals in question in his own locality, prepare a report at the termination of the schedule, and forward said report to the Section Manager in his state, province or territory. For the sake of uniformity, reports should preferably be made on the standard Reception Report Forms, which may be purchased from League Headquarters, but will be satisfactory if made on plain or graph paper and following the general style of the standard Report Form.

### League Divisions

There are five League Divisions. A member may serve one or all of the Divisions as he sees fit.

The *Standard Broadcast Division*, under the direction of Ray La Rocque, is given over entirely to the survey of signals in the standard broadcast band.

The *Short-Wave Broadcast Division*, under the direction of J. B. L. Hinds, handles surveys on short-wave broadcast and commercial phone stations.

The *Amateur Phone Division*, directed by Zeh Bouck, covers surveys on amateur phone stations in the 5-, 10-, 20-, 75- and 160-meter bands.

The *Amateur C. W. Division*, under the direction of Willard Bohlen, is set up not only to survey c.w. signals in all the amateur bands, but commercial c.w. stations as well.

The *Noise Survey Division*, under the direction of E. W. Lederman, is set up for the purpose of alleviating conditions of severe man-made electrical interference in local areas. In instances where League members are able to determine the source of such interference and the approximate area it covers, a detailed report to headquarters will be analyzed and the condition brought to the attention of the offender, and practical suggestions offered as to means, approximate cost, etc., of eliminating the disturbance.

### League Set-Up

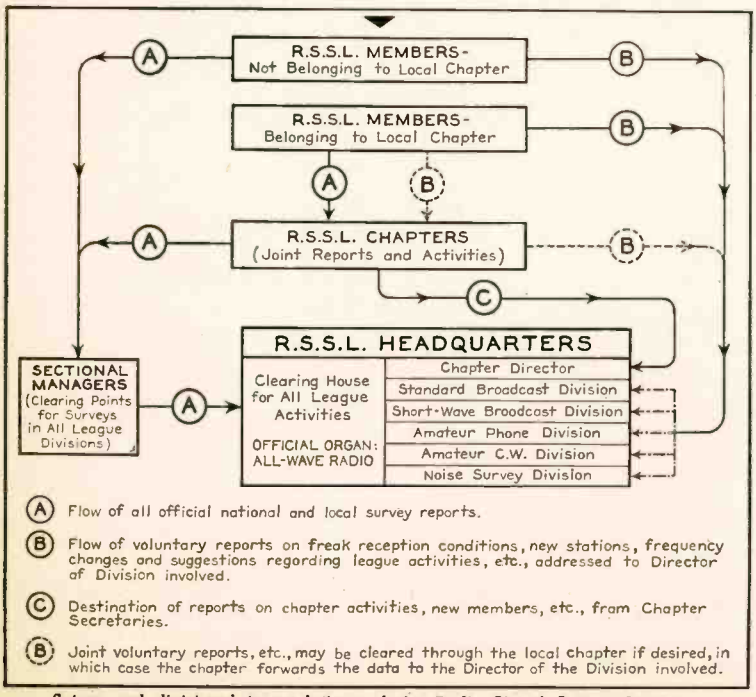
The supervisory section of the R.S.S.L. is composed of the Headquarters Staff, the Acting Director, the five Divisional Directors named above, and the Sectional Managers who are the League representatives in states, provinces and territories throughout the world.

Members are requested to communicate directly with Divisional Directors on all matters dealing with League regulations, suggestions, reports on unsolicited surveys, new stations heard, etc., directing the communication to the Director of the Division in question. For instance, should you hear a new station in one of the short-wave broadcast bands, or note an unusual fade-out condition, your report should be addressed to Mr. J. B. L. Hinds, Director, Short-Wave Broadcast Division, Radio Signal Survey League, 16 East 43rd St., New York, N. Y. The same address should be employed when communicating with the other League Directors, or directly with Headquarters. Letters, news items and general discussions regarding League activities, for publication in the R.S.S.L. News section of ALL-WAVE RADIO, should be forwarded to M. L. Muhleman, Acting Director, R.S.S.L., at the same address.

All reports and communications regarding official signal surveys, as announced from time to time in ALL-WAVE RADIO, should be sent to the Sectional Manager for your state, province or territory. You will find the name and address of the Sectional Manager for your locality in the accompanying list. If no Sectional Manager has been appointed for your state, province, territory or country, send your reports directly to the Acting Director at League Headquarters.

## CONCERNING THE R.S.S.L.

***A recapitulation of the aims, policies, departmental functions, regulations, and activities of the Radio Signal Survey League is presented here for the benefit of present and future members who will wish to keep this condensed data on file for future reference purposes.***




*Set-up and divisional inter-relations of the Radio Signal Survey League.*

A better idea of the inter-relations between League Headquarters, Division Directors, Sectional Managers, League Chapters, and Members, can be gained from the block diagram of Fig. 1. This illustrates the complete League set-up, and indicates the "direction of flow" of signal survey reports, etc., from members.

### R.S.S.L. Chapters

A minimum of five duly registered R.S.S.L. members is required to form a chapter. The territorial boundary of chapters shall in all cases be set by the Directors and stipulated in the chapter's charter. The Directors reserve the right, however, to modify the chapter's boundary in the event they consider it for the best interests of the R.S.S.L. The nature of the League and the irregular distribution of population reflected in its membership makes it necessary to allow elasticity in ruling on the setting of boundary lines for individual chapters. Certain key cities may rate several chapters within their limits whereas some entire states may be satisfactorily served by but two or three chapters. In addition to the problem of unequal geographical distribution of population, the R.S.S.L.'s growth is so rapid that a single chapter is apt to grow beyond practical size and become unwieldy. A county chapter, for instance, may grow so large that its members might find it convenient to divide it into a number of town or city chapters.

No regular membership dues in any form may be charged members by the chapter for the privilege of joining.

Chapter names should preferably indicate the section which they cover and must clearly state their affiliation with the R.S.S.L.

The Directors of the R.S.S.L. reserve the right to revoke charters of local chapters at any time should they feel that such chapters are not working for the best interests of the R.S.S.L.

Chapters are under the direct supervision of their Sectional Managers. All controversial matters outside the chapter itself should be reported through him to the Chapter Director who in turn will call a meeting of the Directors for a final decision.

A "Survey Supervisor" shall be elected by each chapter to act as the leader of the chapter in all official survey matters as well as chapter activities. Elected by majority vote, his term shall run from January 1st to December 31st for one full year. It is the Survey Supervisors duty to see that all chapter members are informed of forthcoming surveys. On conclusion of each survey he is to be responsible for the collection of the reports from chapter members participating, the proper sorting of such reports, and of forwarding them in collated form to the Sectional Manager.

In addition to the Survey Supervisor, each chapter shall elect by majority vote a Secretary whose duty it shall be to supervise chapter meetings, handle official chapter correspondence and transmit to League Headquarters, each month, news on chapter meetings, activities, new members, etc., the correspondence being addressed to the Chapter Director, R.S.S.L., 16 East 43rd St., New York, N. Y. Such reports should be mailed not later than the 20th of each month.

### Applications for Chapter Charter

All duly registered members of the R.S.S.L., with the exception of the Division Directors and Sectional Managers, may join local chapters, though Directors and Sectional Managers may become honorary members of one or more of the chapters in their locality, but under no circumstances may they hold office in any chapter.

A minimum of five R.S.S.L. members are required to form a local chapter. In the event that a group of less than five members experience difficulty in securing the necessary minimum, the Chapter Director will supply the group with the names of other R.S.S.L. members residing in their locality. If there is still difficulty in bringing together five members, it is suggested that the group wishing to form the chapter make a drive in their locality for a sufficient number of new members to meet the charter requirements. Membership Application Blanks can be obtained from Headquarters on request.

In making application for a chapter charter, proceed as follows:

(1) Draw up a petition signed by all interested members, giving their names, addresses and monitoring station identifications, and set forth:

(a) Proposed name of chapter.

(b) Suggested geographical boundaries of chapter.

(c) Names and addresses of Survey Supervisor and Secretary—both elected by majority vote.

(d) Proposed chapter headquarters and meeting place.

(e) Day of week or month selected for regular meetings.

(2) Submit the petition to the Chapter Director, Radio Signal Survey League, 16 East 43rd St., New York, N. Y.

Official notification of the acceptance of the charter petition will be given by letter and a charter certificate, including name of chapter, will be issued. Only those chapters so notified shall be recognized as being affiliated with the R.S.S.L.

### League Membership

Those wishing to become members should send a written request for a Membership Application Blank to the Radio Signal Survey League, 16 East 43rd St., New York, N. Y. There are no dues, and no obligations other than a sincere effort on the part of each member to assist in the survey work to the best of his ability. No special equipment is necessary.

Each member shall receive a membership card bearing his name and a coded identification number alloted to his Monitoring Station. Each station number carries the international prefix for the country in which the station is located—for instance, W for the United States, LU for Argentina, etc. Members are requested to use their identification number on all survey reports, correspondence, etc.

M. L. MUHLEMAN,
*Acting Director.*

## R.S.S.L. SECTIONAL MANAGERS

ALABAMA
Howard J. duMoulin, W10P1
1119 29th St., Birmingham

ARIZONA
John Binder, Jr., W26P2
1025 9th St., Phoenix

ARKANSAS
John Hartshorn, W15P1
905 Beech Street, Texarkana

CALIFORNIA
R. H. Swinford, W31J2
P. O. Box 456, Napa

CANAL ZONE
John D. Gallivan, K5Z1
Box 64, Balboa

COLORADO
Frank J. Billiams, W21K1
511 E. Platte Ave., Colorado Springs

CONNECTICUT
Louis B. Booth, W3G1
6 Longworth Ave., Middletown

DISTRICT OF COLUMBIA
Frank S. Walters, W5J9
4105 Wisconsin Ave., N. W., Washington

FLORIDA
L. Norman Henry, W6U1
1735 S. W. 8th St., Miami

GEORGIA
Karl D. Beckemeyer, W9Q1
Hq. & Hq. Co., 29th Infantry,
Fort Benning

IDAHO
Vick Wilson, W26C1
806 Coeur d'Alene Ave., Coeur d'Alene

ILLINOIS
J. O. Faris, Jr., W11J1
1803 N. Vermilion St., Danville

INDIANA
Bernard W. Hanefeld, W10H1
1320 Jackson St., Fort Wayne

IOWA
J. W. Sullivan, W14H2
510 E. Union St., Manchester

LOUISIANA
Wilbur T. Golson, W13P1
Radio Station, WJBO, Baton Rouge

MAINE
Willis E. Blanchard, W3E1
126 Grant Street, Bangor

MARYLAND
Carroll H. Weyrich, W5J2
4310 Evans Chapel Rd., Baltimore

MASSACHUSETTS
M. C. Nichols, W3F4
36 Hillcrest Ave., Worcester

MICHIGAN
Roger Park, W10G1
1707 Maplewood Ave., Lansing

MINNESOTA
Henry W. Birmo, W14E2
1514-B East 4th St., Duluth

MISSOURI
Harlan E. Wykoff, W13L2
5082a Kensington Ave., St. Louis

MONTANA
Edward J. Lousen, W24E1
300 Cherry Street, Butte

NEBRASKA
Lee P. Edwards, W16J2
2313 "G" Street, Omaha

NEVADA
Robert B. Jeppson, Jr., W31J6
Glenbrook, Lake Tahoe

NEW HAMPSHIRE
Chester L. Wheeler, W3F1
17 Clinton Street, Milford

NEW JERSEY
Kenneth E. Vroom, W4H26
44 Glenbrook Road, Morris Plains

NEW MEXICO
Theodore F. Douglass, W22N1
315 North Third St.,
Albuquerque

NEW YORK
Arthur C. Pforzheimer, W4H23
861 Broadway, Woodmere

NORTH CAROLINA
Miles I. Hart, W6M1
P. O. Box 76, Cary

OHIO
J. F. Satterthwaite, W9H1
544 Colonial Ct., Toledo

OKLAHOMA
Joe E. Hester, W16M1
1313 South Elwood, Tulsa

OREGON
Harold S. Allen, W29D2
3704 S. E. Tenino St., Portland

PENNSYLVANIA
Nathan Swerdlow, W4H9
1649 N. 29th St., Philadelphia

RHODE ISLAND
George Francis Baptiste, W3G8
P. O. Box 114, Howard

SOUTH DAKOTA
Clarence E. Brownson, W16F2
P. O. Box 310, Brookings

TENNESSEE
James M. Alexander, Jr., W10N2
401 East Brow Road, Lookout Mt.

TEXAS
Joseph Brown, Jr., W16S2
1937 Milby Street, Houston

UTAH
Bob Beadles, W25H1
634 South West Temple, Apt. 36,
Salt Lake City

VERMONT
Orrin H. Carpenter, W4E2
118 South Main Street, Waterbury

WASHINGTON
Ronald Ernest Greenwood, W29B1
3002-46th Ave., S.W., Seattle

WEST VIRGINIA
Carl Soendlin, W8L1
Oak St., P. O. Box 1094, Logan

WISCONSIN
Howard Allen Muir, W12G1
Box 296-R3, Racine

# Queries

*frequency ranges . . . radio ahoy! . . . antenna design*

*THE primary purpose of the Queries Dept. is to solve the technical and semi-technical problems of our readers who feel they require such assistance. However, questions, so long as they are related to radio, need not be of a technical nature. Every question will be answered personally — by mail. A self-addressed and stamped envelope should be included. Rather than publish the answers to many questions each month—in a necessarily abbreviated form—we shall select only one or two of general interest which will be elaborated upon and answered in detail. These questions will be numbered, an index will be published periodically, and, in time your files of this department should prove a valuable reference work.*

### QSY 40,000 METERS!

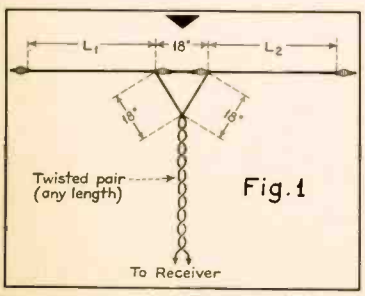
**Question No. 37:**

I am interested in purchasing a new receiver with a complete tuning range—particularly from 540 to 40,000 meters—and would appreciate your recommendation.—*J. S., St. Albans, L. I., N. Y.*

**Answer:**

"QSY" means change frequency or wavelength—and to QSY to 40,000 meters would be a pretty big order. As a matter of fact it is close to impossible as this would bring the frequency down within the audible region—to 7.5 kilocycles. The frequency-wavelength relationship is such that 300,000,000 divided by the wavelength in meters or the frequency in cycles per second will give the other factor. The quotient of 300,000,000 divided by 40,000 meters is 7,500 cycles—or 7.5 kilocycles. About the longest wavelength ever used for wireless transmission is 30,000 meters, which, at 10,000 cycles, is also within the upper fringe of audio frequencies. Of course there is no good reason why audio frequencies could not be used if they could be radiated, but it happens that the radiation effect drops off very quickly on wavelengths longer than 25,000 meters, and is practically nil when one gets down into the audible frequencies. The energy, instead of being radiated into space, is returned to the wire. Were it not for this fact, it would be very convenient to carry on wireless telegraphic communication using 60-cycle house current, but as we all know there is no radiation, as free energy, at this frequency.

As there is practically no transmission being carried on with frequencies below 100 kc. (wavelengths above 3000 meters), receivers are rarely designed to tune to lower frequencies (longer wavelengths). Short-wave channels are now carrying on much more effectively the work of the former long-wave transoceanic stations. Also, even with superheterodynes tuning as low as 100 kc., there is always a break of some 30 to 40 kilocycles in the neighborhood of the intermediate frequency which usually falls between 400 and 500 kilocycles. A superheterodyne cannot receive close to the i.f. due to the introduction of double frequencies, within audio frequencies of each other, into the intermediate-frequency channel. Assuming an i.f. of 465 kc., and a desired signal frequency of 460 kc.: The 460-kc. signal would be close enough to the intermediate frequency to force itself through the circuit. At the same time the 465-kc. replica would exist, caused by the oscillator at 925 kilocycles beating against the signal. The result would be an audible beat note of 5000 cycles.




*Illustrating the principles of antenna design for best results over a given frequency band.*

◆

### MOTORBOAT RADIOS

**Question No. 38:**

I should like to install a radio in my thirty-foot cabin type motorboat, and should appreciate your recommendation as to what sort of a set to buy.—*R. O. L., Greenwich, Conn.*

**Answer:**

There are several considerations involved in a nautical installation—the effects of humidity, particularly salt water air; antenna requirements; noise.

The modern automobile radio provides a satisfactory answer on all of these points. The receiver itself, with an external speaker, can be sealed airtight in any convenient box or cabinet, with the controls brought out, with the usual cables, to a panel on the box or cabinet. These receivers require no ventilation and are readily operable from the power sources available on small boats.

The sensitivity of the modern auto radio is very good, and they will operate exceedingly well from the shortest kind of an aerial—even on a rowboat—giving far better results than can be obtained when installed in a car.

Also, the filter circuit engineered into the up-to-date auto radio will be most effective in reducing or eliminating the electrical noise associated with the operation of small craft.

◆

### ANTENNA DESIGN

**Question No. 39:**

The following is a composite question from a good many readers of AWR: While I have experimented with various makes of commercial all-wave antennas, and have had good results, I should like to know how to design a noise-reduction antenna system which would give me *peak efficiency on a given band.* In other words, I should like to know the principles of such design and how to put them into practice.

**Answer:**

There are four principles involved in designing an aerial to give the best results over a narrow band of frequencies—for instance the 20-meter band. These are: 1—The antenna must be the correct length. 2—The lead-in should not pick up noise. 3—The impedance of the lead-in should match that of the antenna at the place where it connects. 4—The impedance of the lead-in must be matched to the impedance of the input of the receiver.

The doublet antenna shown in Fig. 1 can be made to answer the first three requirements. The total length, L1 plus L2, should be one-half wavelength long *on the wire.* As the wave travels more slowly along the wire than in space, the wave length will be shorter on the wire—about 5% shorter on frequencies between 30 and 3 megacycles. Thus a 20-meter antenna, cut to correct length (half wave) would be 95% of 20/2 or

*(Continued on page 444)*

USING THE SIMPLIFIED CODE-PRACTICE SET WITH LOUDSPEAKER.

# A SIMPLE A.C.-D.C. CODE-PRACTICE SET FOR PHONES OR LOUDSPEAKER

**By GUY FOREST**

THIS code oscillator is designed to operate a loudspeaker, and with it either one person or a roomful of persons can practice. However, in addition to a loudspeaker, any sort of earphone, headphones, or speaker unit can be plugged into the output jacks and the unit will function satisfactorily.

The power supply is taken from the house circuit of 110 volts, either a.c. or d.c., and as a result the unit is always ready for use even after being on the shelf for a year. The tubes used are a 6J7 audio oscillator and a 1-v rectifier. While capable of relatively high-power output and 110-volt operation, the set is built up from a surprisingly small amount of raw material. Exclusive of tubes, the cost of the parts adds up to less than $1.25.

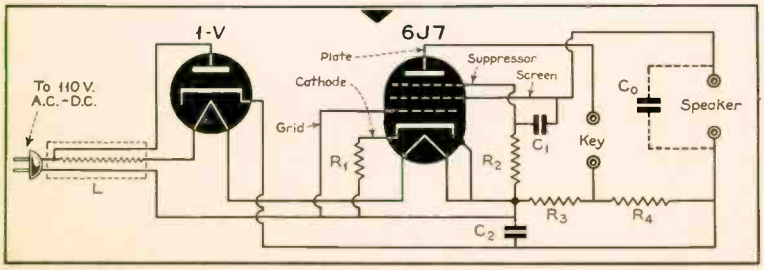
*View of the completed unit mounted in a painted cigar box. It's easy to build.*

### Construction

The set is assembled in a cigar box, which had best be given a coat of paint for appearance. A wooden block, about 2¼" x 5" is screwed to the inside of the box lid, and on this are mounted the tube sockets for the 1-v and 6J7. One tip-jack pair goes in the right corner of the lid, for the key; and the other, to the left, is for the speaker or headphones. The tube filaments connect in series with the line-cord resistor and the 110-volt source. A 16-mfd. electrolytic condenser constitutes the filter.

Other circuit details are as shown in the accompanying diagram. If a different tone is wanted, a condenser of from .005 mfd. to .05 mfd. may be connected across the loudspeaker tip jacks as shown by the $C_o$ and the dotted lines.

Should the oscillator be connected to 110 volts d.c. and fail to start after a sufficient warm-up period, the connector plug must be reversed in the outlet socket. In common with all a.c.-d.c. sets, it is possible under some circumstances to get a shock when touching both a grounded object and a part of the set wiring. Therefore, reasonable care should be exercised when touching or handling the key frame.




*Here is the schematic diagram of the code-practice set. The 1-v tube is the rectifier and the 6J7 tube the oscillator. The filaments are in series with a resistance line cord, L, and operate directly from the power line. Tip jacks are used for the key and the loudspeaker, these being mounted on the front panel. Headphones may be used if desired.*

**LIST OF PARTS**

L —Line-cord and combination resistor, 330 ohms
R1—400-ohm, 1-watt resistor
R2—500,000-ohm, ½-watt resistor
R3—4,000-ohm, 1-watt resistor
R4—10,000-ohm, 1-watt resistor
Co—.005 to .05 mfd. condenser for variable tone, if desired
C1—.01 mfd., 300-volt paper condenser
C2—16-mfd., 200-volt electrolytic condenser
1—4-prong socket for 1-v tube
1—8-prong octal socket for 6J7 tube
2—pair tip jacks
1—cigar box

# Backwash

### "One In A Million"

*Editor,* ALL-WAVE RADIO:

Wish to state here that J. B. L. Hinds is one grand fellow.

I have written him many times and his answers have been prompt and courteous. His letters are as up-to-the-minute as his department, "Globe Girdling."

Mr. Hinds is just "one in a million."

J. O. FARIS, JR.,
DANVILLE, ILL.

✦

### Mr. Deeds Goes To Town

*Editor,* ALL-WAVE RADIO:

Since most of us are endowed with the egotistical idea that no matter how good the other fellow is in his own line we could do it better if given half a chance, I, after reading your article in October, 1936 ALL-WAVE RADIO was of the very decided opinion that you had failed to do justice to the RCA Victor 10T. I was convinced that either you had gotten another set by mistake or had a pet peeve against Victor sets, since my then third consecutive Victor set, a Model 125, in my opinion could do all the things you claimed for the 10T over the previous occupant, the 125, a de luxe set like the 10T should have. This being the case, there was only one thing for me to do if the advancement of radio science was not to get a set-back and that was to obtain a 10T and make my own laboratory tests and send the collective data to you for future guidance in such matters. I might state that my partiality to Victor sets—this being my pet corn so to speak—had nothing to do with this decision. Nothing influenced me other than my determination that progress must not be retarded.

Of course, being one of those individuals who never has time to get into the fundamentals of anything, my knowledge of radio receivers has been limited to such articles as have come my way and which have consisted chiefly of ALL-WAVE RADIO since its first issue. This being true, some outside assistance seemed slightly necessary, more so because my to-be laboratory was very conspicuous by the absence of such unimportant but more or less necessary instruments as a tube tester, oscillator, oscilloscope, etc. Therefore, please pardon any future deviations from the first person singular to the plural status, since it is my sincere desire to give credit where credit is due. Also, I will take this opportunity to give my sincere thanks and gratitude to one of our local Victor dealer's service men for their cooperation during these tests even though they were at times most reluctant to assist in such a worthy cause.

Getting back to the subject—after rereading your article twice to be sure I hadn't gotten some other magazine by mistake, I rushed out to one of our local dealers for a 10T and ended up by telling that gentleman in no uncertain terms just what I thought of a dealer who tells a prospective buyer that he will have to wait three days because they don't have what you want in stock, and finally winning my point by getting him to admit that he could by extra effort, get it in two days. Thus, two days later, just previous to a point of working myself into a state of complete exhaustion, I sweep two or three pet ash trays on the floor to make room on ye old testing block for the increased size of the 10T over the previous occupant, the 125, and the age of miracles is at hand.

The first two or three weeks were rather uneventful since most of this time was consumed in aimless dial twistings with the ever-present hope of Hong Kong, Bombay, etc., at each step and generally ending up with something a couple of states removed to the leeward. This, however, is not to be taken seriously since this was just a period of limbering up and watchful waiting. Then, all at once, business begins to pick up in the form of a very hot and smelly power transformer accompanied shortly thereafter by the loss of one 5Z4 tube. This being more in the nature of the service expected from my assistants, a hurry-up call to them results in its replacement, and we're back to normal again. Nothing gained and nothing lost.

Another two rather uneventful weeks pass, then familiar symptoms appear and the second 5Z4 passes on. This time, being slightly irked at these interruptions to progress, I demanded of my assistants to make sure the next 5Z4 is up to par before placing it in service. This, they assured, would be done. Some three weeks later, being thoroughly convinced that they had done this one thing properly for a change, I decided I would not be unduly exposing my chin if I got down to serious business and called in a few of my critics to witness just what could be done with a super receiver under average conditions. Not overlooking the fact, of course, that one of these gentlemen had in the past made some rather nasty cracks about my ability to select receivers on a value received basis, thus leaving himself now wide open for the jolt I had in store for him, inasmuch as he was shopping around for a new set which I, very definitely, decided would have to be a Victor—thus ending the score at one all. So, getting the preliminaries out of the way as soon as possible and tuning in a not-too-hard-to-get distant station, I proceeded to do a little super sales spiel, using as my theme your aforestated article which, as fast as he could find its weak points were easily proven to be otherwise. Then, just as the hard part was past and we were nearing the end of your article, the now familiar odor around the house appears again and before I could get close enough to the receiver to shove it on the floor or otherwise accidentally put it out of commish, the 5Z4 goes on a one-way ride accompanied by a brilliant display of sparks and what not in the 6E5.

Well, to continue, about a week later having sufficiently placed myself under control to a point where manslaughter would be the worst I could expect, I make a call on my assistants at the local dealers and stated in no uncertain terms that these interruptions had ceased to be funny, along with the fact that besides not only ruining my usual sunny disposition they were ruining my prestige as well, and stated if they couldn't assure me uninterrupted service, I would dispense with their services and get someone that could. The final result being that they asked permission to call in an expert of their selection to assist in the solution. He, after thoroughly checking the receiver piece by piece, announced that other than the loss of some dielectric from the transformer plates, and the main tuning dial being slightly cockeyed or something, everything was perfect . . . omitting to state, of course, why a new 6E5 had appeared and why the 5Y3 made the former 5Z4 conspicuous by its absence—professional ethics and jealousy no doubt being the reason.

After this last major disaster, I was ready and waiting for anything to happen next. Well, I didn't have long to wait, although I was taken totally by surprise due to its having come from a totally unlooked for source. While knee deep in notes, data, etc., a very annoying noise, similar to a phonograph needle running wild on a record, emits from the speaker and persists in making itself a nuisance. Finally, having failed to diagnose the trouble, I jerked the plug and stalked out to find myself a few new assistants. When on returning I am very embarrassed to find the old girl is hitting on all ten with no sign of a squeak or groan from her. My new assistant, however, did not seem the least disturbed as he calmly remarked that it was probably a tube that had opened momentarily while hot and was now o.k. for the time being and that it would be his suggestion, after my data was complete, thus not invalidating what had gone on before, to throw the 5Y3 away and install a new socket for an 80, and if future troubles were experienced with the rest of the tubes, toss them out of the laboratory window and put in glass ones. I made him admit on this, however, that a realignment job would be probably necessary, and made him wonder how I had found out this information . . . I, of course, having neglected to mention—it being of trivial importance, anyway—that it came from that month's issue of ALL-WAVE RADIO.

Now, preparatory to a general summary, it may be well to list a few of the more minor difficulties which occurred during this six months test. Shortly after the last mentioned squeaks and squawks, the 6E5 decided to get contrary and stay partly open on one of our locals when before it

*(Continued on page 445)*

# RADIO PROVING POST

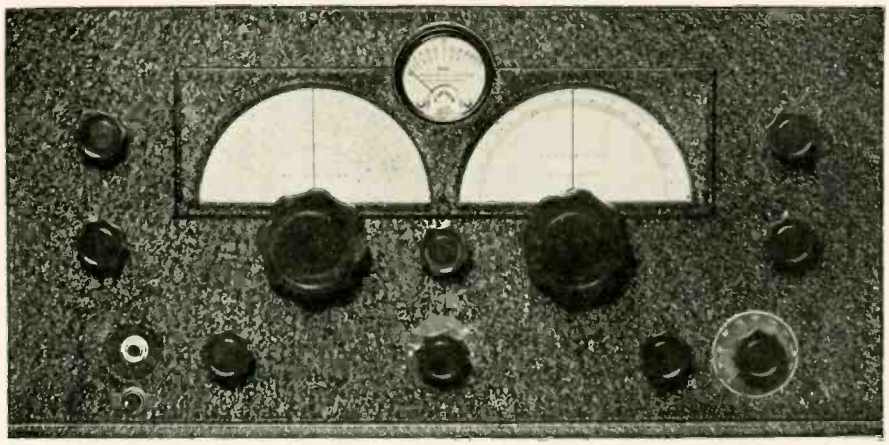


FIG. 4. THE FEATURES OF THE RME-69 WILL APPEAL BOTH TO THE AMATEUR AND THE VETERAN SHORT-WAVE LISTENER.

# THE RME-69 RECEIVER

To many amateurs the RME-69 requires no introduction. Its acknowledged merits have made it one of the two or three most popular communications receivers in the medium-price field. However, the qualifications of this receiver from a communications angle necessarily recommend it to the serious short-wave listener, and, to an extent, this article is intended to point out the advantages such a receiver offers the dyed-in-the-wool fan. At the same time we appreciate that there are many readers of AWR who are embryonic hams, as well as experienced amateurs who are beginning to give serious thought to their receiving problems. It was with this latter consideration in mind that the RME-69 was subjected to extensive air tests, under actual operating conditions, at W8QMR.

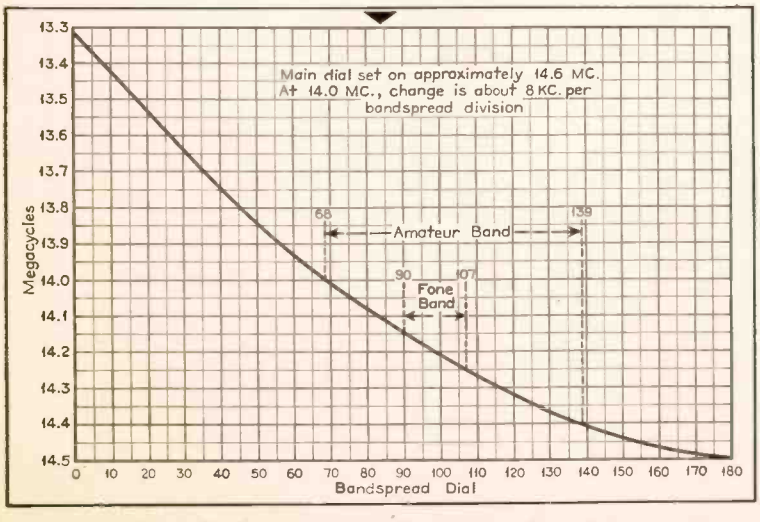



*Fig. 2. Bandspread tuning in the 14-megacycle region.*

### *Stock vs. Communications Receivers*

The principal difference between a typical all-wave receiver and a communications type is that in the latter all other considerations are secondary to those of efficiency and flexibility. This does not mean that many stock all-wave receivers are not highly efficient, but rather that the communications receiver is capable of functioning under conditions in which the average listener would not be interested. The stock all-wave receiver in any price class aims to combine maximum results with a minimum of operating effort or some compromise. The communications receiver, in any price class, endeavors to provide maximum results with no compromise or giving a hoot about ease of operation aside from the mechanical excellence of the controls.

A good stock all-wave receiver in the same price class with the RME will have the same number of essential tubes and circuits, an on-off switch volume-control, tone control, speech-music con-

trol, band switch, main tuning control and a high-fidelity switch—a total of six controls. The RME-69 has a tone control on-off switch combination, beat-frequency pitch control, head-fone jack, a.v.c.-manual gain control, main tuning dial, trimmer, band switch, band-spread dial, volume control (with send-receive monitor combination), crystal filter switch, crystal phase adjustment and perhaps a noise silencer control—a total of thirteen controls. The stock receiver will be designed for perfect quality high power output. This is not a primary consideration in a communications receiver, though the RME-69 gives good quality with adequate output.

Radios can be compared to cameras. The average person can take much better pictures with a good, simplified folding camera (comparable to an excellent stock all-wave radio) than he—or particularly she—could with an expensive and complicated reflex (analogous to the communications job). At the same time, there will be occasions where the expert can get shots with the reflex that could not be touched with less elaborate equipment.

It should be borne in mind that we are comparing stock all-wave receivers with communications types in *the same price class.* It should not be assumed that a communications type receiver selling for around $75.00 can necessarily be made to out-perform a stock receiver selling for four times that much.

It follows therefore that one type of SWL will be interested more in the

*Fig. 3. The RME in the lab previous to the actual air tests.*

all-wave broadcast receiver and another, perhaps in the minority, will find the communications receiver of particular appeal. (There is no questioning, of course, the amateur's need of a communications receiver.) If you are of the latter class of SWL, or an amateur, read on!

### The Circuit

The circuit diagram of the standard RME-69, is shown in Fig. 1, drawn up in AWR's road map style. The unconventionality of this receiver lies more in its refinements than in variations from the usual circuits. Switches $S_1$ and $S_2$ at C-2 and C-6 control the band selection in the r-f. and first detector stages respectively. These switches are ganged with $S_3$ and $S_4$ (at I-6 and L-6.) which control the oscillator bands. These circuits are tuned by the three groups of condensers located at C-3.5, C-7.5 and J-8.5. The right hand condensers tune on bands 2, 3, 4, 5 and 6, while on the standard broadcast band the left-hand condensers are thrown in parallel. The six wave bands cover the following ranges.

| *Switch Position* | *Range in Megacycles* |
|---|---|
| 1 | .55—1.5 |
| 2 | 1.5—3.1 |
| 3 | 3.1—6.8 |
| 4 | 6.8—13.0 |
| 5 | 13.0—20 |
| 6 | 20.0— 32 |

There is adequate overlap on all bands.

The center condensers of the three groups are also ganged and provide electrical bandspread over any portion of the main dial. The main or left-hand dial in the illustration is the main tuning dial and is calibrated directly in megacycles on all scales. The right-hand dial, reading from zero to 180, is bandspread. The main dial is calibrated to read accurately when the bandspread dial is on 180. Frequency increases with increasing figures (as is logical) on both dials.

### Bandspread

The bandspread arrangement is a major feature on the RME-69. Fig. 2 is a curve showing the bandspread across the 14-megacycle region. With the bandspread dial at 180, the main dial was adjusted for resonance with a calibrated

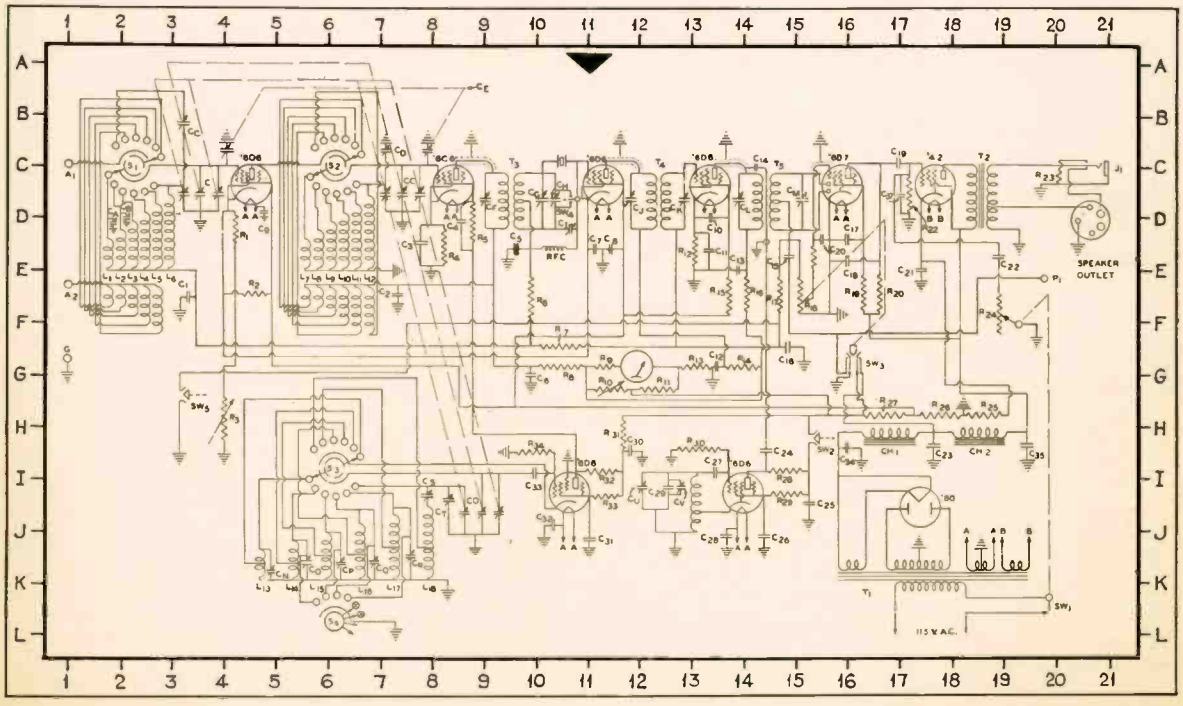



*Fig. 1. The RME-69, less noise silencer, on paper, road-map style.*

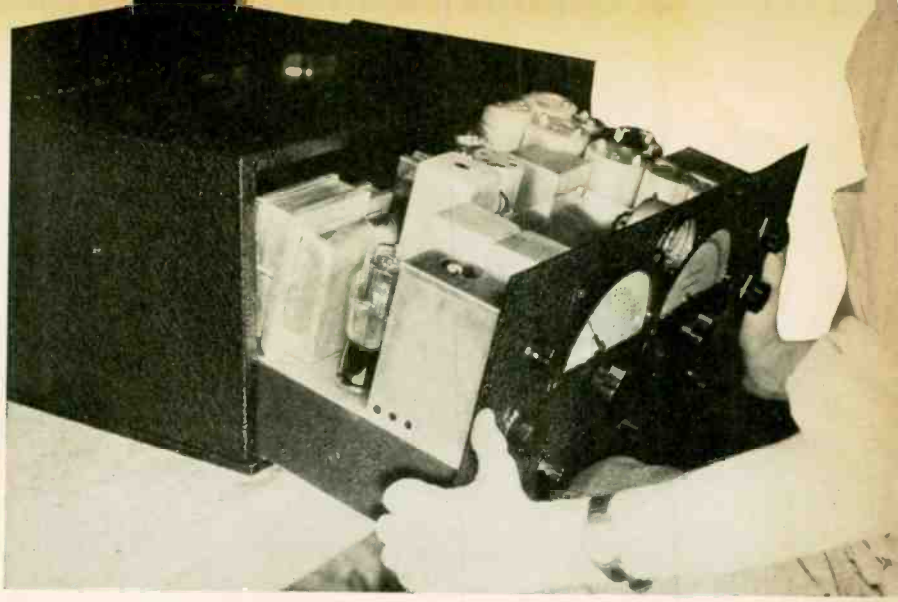
quartz-crystal oscillator at 14.5 mc., which came to approximately 14.6 mc. on the main dial. This is about the largest discrepancy noted in the tests—and at that it is only something less than .7 of 1%. (Calibration is consistently good on the RME tested.) It will be noted that the 14-mc. amateur band is spread over 71 dial divisions, and the phone sub-band over 17 dial divisions. At 14.0 mc. the variation is approximately 8 kc. per dial division. As it is very easy to read the lance dial without parallax, frequencies can be spotted to within close to 2 kc.—an unusual degree of precision—if the curve is plotted on Keuffel & Esser No. 358-11 coordinate paper. This greatly facilitates logging, station identification, giving QRGs as well as checking one's own frequency. It goes without saying the curve must be accurately plotted—preferably against an oscillator such as the RCA Piezo-Electric Calibrator, or stations of known frequency closely bunched.

Due to the altered slope of the curve, greater bandspreading will be experienced toward the high end of the bandspread dial. This can be taken advantage of if desired by adjusting the bandspread dial to about 160 and tuning as closely as possible on the main dial.

The bandspread effect is even greater, of course, on the lower frequencies. The average variation on the standard broadcast band is only 600 cycles per division!

### The "Resonator"

Another tuning feature is the trimmer or "resonator"—the condenser ganged as $C_E$ and located at C-4 and C-8. This condenser makes it possible to maintain the *exact* optimum frequency difference between the oscillator and r-f. sections on all bands, thus contributing consistent peak efficiency. The adjustment remains practically constant for each band. A slight trimming effect will also be noticed with $C_B$, the crystal selectivity condenser, located at D-11. With the crystal control switch $SW_4$, also located at D-11 on "off," this condenser functions as a trimmer across the i-f. secondary of $T_3$.



*Pulling the RME chassis . . . note compact construction.*

### The Crystal Filter

Three crystal positions (C-10.5) are available—off, series and parallel. In the series position, the usual crystal sharpness is experienced, the crystal cutting nicely a few hundred cycles off resonance. This adjustment is useful for fone as well as c.w. reception. While the quality of fone reception is seriously impaired with the series crystal adjustment, speech is still perfectly understandable, and stations can be received which otherwise would be lost in interference. In the parallel position, the crystal phase control can be used to reduce or eliminate an interfering carrier (causing a whistle) on *one* side of the desired wave.

### The "R" Meter

The "R" meter (G-12) on the RME-69 is of considerable assistance in giving RST reports, doing much to eliminate the human element in judging carrier level. With 100 microvolts providing full power or R9 output, and taking each R-level step as being the equivalent of 6 db. (as was determined experimentally), the meter was calibrated down to zero level, or .4 microvolt, 48 db. below R9. This checked nicely with tests conducted in the AWR lab employing various inputs of known difference. The R-meter is also calibrated in decibels.

### Monitor Circuit

By connecting a short piece of wire (stretched in the immediate field of the antenna) to post $P_1$ at E-20, one's own phone transmission can be monitored on the RME-69 by pulling out switch $SW_3$ at G-16, which removes the ground from the monitoring antenna (connected through $P_1$ to the diode section of the 6B7 at C-16), and breaks the plate circuit to the i-f. tubes.

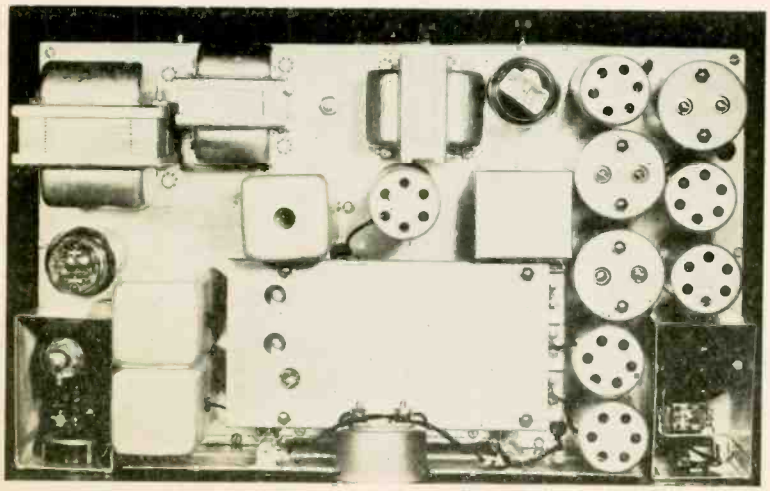
The output tube is a 42, delivering about 4 watts output to a permanent-magnet dynamic speaker. When fones are plugged into this same output, at jack $J_1$ (C-21), the limiting resistor $R_{23}$ (C-20) is shunted across the headset.

The beat-frequency oscillator is the 6D6 at J-14, controlled by switch $SW_2$ located on the diagram at I-15. The tone control, $R_{24}$ at F-19 is conventional, and operates in conjunction with the on-off switch at K-20. Switch $SW_5$ (H-3) cuts in and out the a.v.c., and permits manual gain control with $R_3$ (H-4) when in the a.v.c. off position.

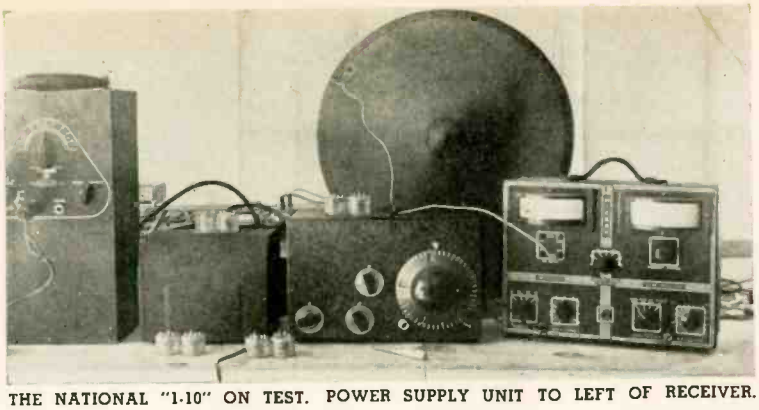
### Operation

During a month of operation at W8QMR, the RME-69 performed in

*(Continued on page 441)*



*Looking down on the RME chassis. Main and bandspread tuning condensers are contained in central, shielded compartment.*



THE NATIONAL "1-10" ON TEST. POWER SUPPLY UNIT TO LEFT OF RECEIVER.

# THE NATIONAL "1-10"

## NON-RADIATING SUPER-REGENERATOR COVERING 1 TO 11 METERS

THE National 1-10 is an improved super-regenerative receiver covering all wavelengths from approximately 1 to 11 meters. Super-regeneration is exactly what the name implies—regeneration carried beyond the limits imposed in the ordinary regenerative receiver. We are all familiar with the benefits derived from regeneration—the amplification secured by feeding amplified plate energy (by any one of several methods) back to the grid circuit to reinforce impulses existing therein. Maximum regenerative amplification is achieved just before the limit is reached when the tube circuit falls into a state of self-oscillation. Beyond this point there is ordinarily no further regenerative amplification.

*Center control is R.F. Trimmer, lower left control is Regeneration and lower right control is Audio Gain.*

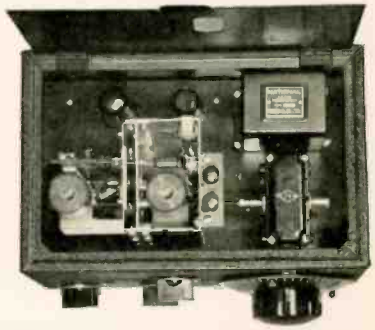
The idea of super-regeneration was conceived by Armstrong better than fifteen years ago, and followed the logical sequence of thought that, if it were possible to subdue or "quench" the tendency to self-oscillation, a far greater degree of regenerative amplification could be secured. As oscillations can exist only under favorable conditions of grid bias, it was correctly argued that a superimposition of an unfavorable grid voltage at super-audible frequencies (so that the quench frequency would not be heard) would permit the anticipated extension of the beneficial regeneration range. In super-regenerative receivers, the quench frequency may be obtained from a separate tube, or from the detector tube itself through a grid-leak and condenser blocking action. The latter type receivers are known as self-quenching, and it is in this category that the National 1-10 falls.

When the super-regenerative receiver was introduced by Armstrong in 1922, it was more of a curiosity than anything else—a single-tube receiver capable of producing loudspeaker results. It was inherently of the radiating type, tuned very broadly, and efficient super-regeneration was difficult to obtain on the lower radio frequencies. The circuit remained practically unexploited until the advent of ultra-high frequency transmission, when its high efficiency with a minimum of tuned circuits (with attendant complications above 30 megacycles) refocused attention upon its possibilities. Also, the broad tuning characteristics, a detriment on low-frequency channels, became a selling point as it compensated frequency modulation and carrier shift in the relatively unstable ultra-high-frequency transmitters.

In the Type 1-10 Receiver super-regeneration is advanced to a highly developed stage, plus an r.f. amplifier made efficiently possible by the type 954 acorn tube. The r.f. stage contributes an optimum degree of selectivity while at the same time prevents radiation. This last factor is of considerable importance, for the general use of super-regenerative receivers for 56-megacycle amateur reception has resulted in a serious radiation problem. In many instances the radiations from such receivers can be heard almost as far as the transmitters!

### *The Circuit*

The circuit, which is too simple to require our usual road map style of presentation, is shown in Fig. 1. The r.f.



*Interior view of National "1-10" showing integrated r.f. unit. Note small, enclosed plug-in coils.*

stage is tuned by condenser $C_1$ and the trimmer condenser $C_{1a}$. $C_1$ is ganged with $C_2$ which tunes the super-regenerative detector circuit operating with a 955 acorn type triode. The detector circuit may be described as a series-fed Hartley oscillator, with regeneration controlled by the variable resistor $R_3$. Super-regeneration is effected by the grid condenser $C_3$ and the 20,000,000-ohm gridleak, $R_2$. It will be observed that the latter does not return to filament or cathode, but is connected directly between grid and plate, thereby completing a quench circuit. The choke $L_1$ is required only on the higher frequencies and is incorporated as part of the corresponding plug-in coils.

The output of the detector tube is

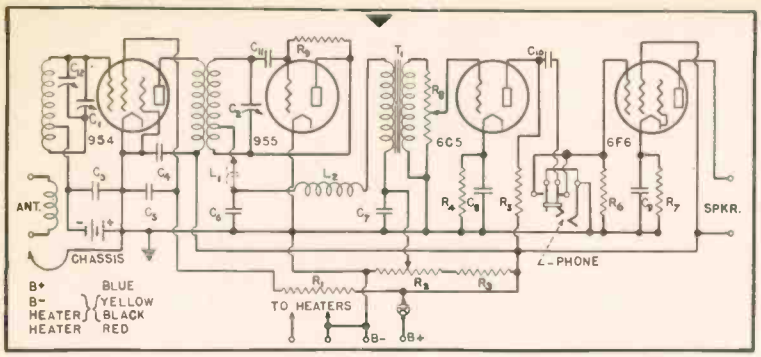



*Fig. 1. The schematic diagram of the National "1-10" ultra-high-frequency receiver.*

transformer-coupled to the 6C5 first a.f. amplifier, with a resistor $R_4$ functioning as volume control in the usual manner. The 6C5 is resistance-coupled to the power-amplifier pentode—a type 6F6. A telephone jack is provided in the plate circuit of the 6C5. The C-bias battery in the r.f. circuit is of the pencil type and is clipped-in connected on the chassis. It requires replacement only about once a year—at the termination of its shelf life. (It supplies no current.)

### Design

While the circuit itself exhibits little out of the ordinary, the mechanical and mechanico-electrical design of the receiver is wholly unconventional, and these factors contribute to the outstanding success of this receiver in ultra-high-frequency performance. The National 1-10 exemplifies low-loss construction carried to the nth degree. The heart of the receiver is the National Ultra H. F. Tuning Unit which was designed with the main thought of reducing all stray capacitance and inductance to an absolute minimum. The amount of attention directed to such considerations is evidenced by the fact that, if the coils are not plugged in all the way, the added inductance of the prongs is sufficient to throw the receiver out of calibration! The maximum capacity of the tuning condensers is 15 mmfd.—which is less than the minimum capacity of the average all-wave receiver tuning condenser. All r.f. insulation—variable condenser supports, coil forms, bases, sockets, etc.—is made of Victron, a material having exceptional electrical characteristics.

The dial and vernier drive unit is the National PW-0 which provides 500 dial divisions spaced approximately one-quarter inch apart. The equivalent scale length is about 12 feet. The tuning condensers are driven through a 20-to-1 reduction gear. The receiver is furnished with six sets of coils, giving the tuning ranges shown in Fig. 2.

The voltage divider is built in, and the receiver can be operated from any convenient power supply—battery or line-power unit—supplying 1.6 amperes at 6 volts for the filaments and heaters and 35 milliamperes at 180 volts for the plate and grid circuits. If lower voltages must be used, as in portable operation, resistors $R_1$ and $R_2$ can be shorted out permitting normal operation from 90 volts. The 1-10 is especially designed for operation from the National type 5886 AB supply.

It is unfortunate that, at the time the National 1-10 was at the AWR Proving Post, the 10-meter band was absolutely dead. Tests on this wavelength were therefore necessarily limited to those of a laboratory nature. However, it was readily determined that the 1-10 is considerably more effective on this frequency than an all-wave communications type receiver with which comparison was made. This, of course, was to be expected as the 1-10 is designed with no other consideration than that of attaining peak efficiency at such frequencies. Similar tests, but of course no comparisons, were also made on the high-frequency ranges using harmonics of standard oscillators with encouraging results that are stimulating further experiments between 1 and 2 meters in the AWR laboratory.

The 56-megacycle tests were made both in the laboratory and in the field, and definitely demonstrated the superiority of the National 1-10 over the straight super-regenerative receiver. On several occasions 5-meter signals were received which were inaudible on other receivers—the 1-10 being located in a deep and narrow valley with the transmitter over 30 miles away and across intervening mountains. During field tests, no radiations from the 1-10 could be picked up on a mobile receiver 500 feet distant.

*(Receiver loaned for test through courtesy of Sun Radio Co.)*

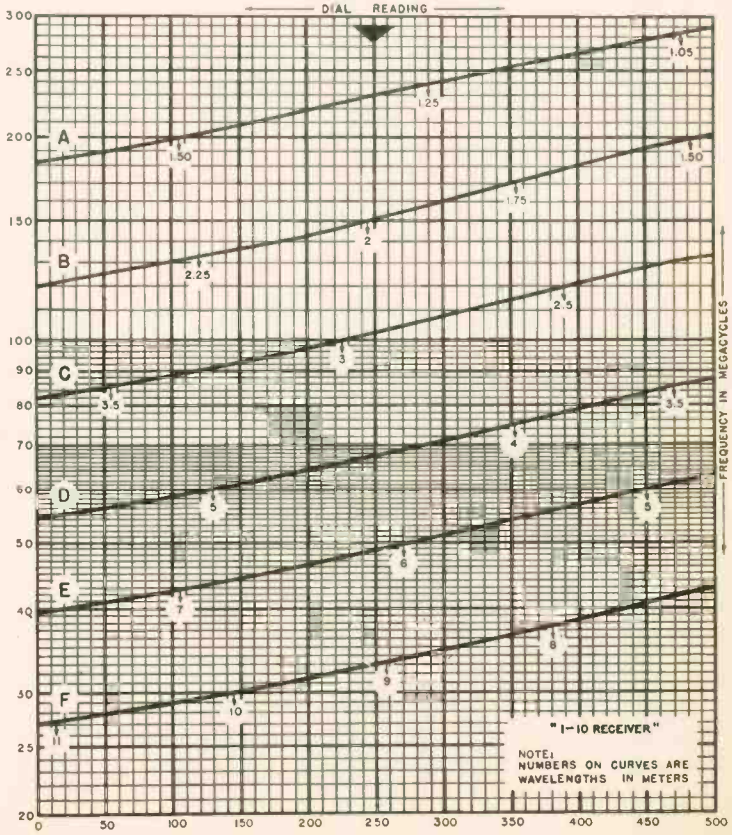



*Fig. 2. The tuning range for each of the six sets of coils supplied with the "1-10" receiver.*

# U. S. POLICE RADIO STATIONS

## 1700-KILOCYCLE BAND

| Call | Location | K.C. | Watts |
|---|---|---|---|
| KACC | Fairfield, Iowa | 1682 | 500 |
| KACD | Atlantic, Iowa | 1682 | 500 |
| KACU | Longview, Tex. | 1712 | 100 |
| KAPA | State of Calif. | 1682 | 25 |
| KAPI | Grass Valley, Calif. | 1682 | 25 |
| KGHK | Palo Alto, Calif. | 1674 | 20 |
| KGHO | Des Moines, Iowa | 1682 | 400 |
| KGHY | Whittier, Calif. | 1712 | 50 |
| KGJX | Pasadena, Calif. | 1712 | 400 |
| KGPC | St. Louis, Mo. | 1706 | 500 |
| KGPJ | Beaumont, Tex. | 1712 | 100 |
| KGPL | Los Angeles, Calif. | 1712 | 500 |
| KGPQ | Honolulu, T. H. | 1712 | 100 |
| KGZB | Houston, Tex. | 1712 | 200 |
| KGZQ | Waco, Tex. | 1712 | 50 |
| KGZT | Santa Cruz, Calif. | 1674 | 100 |
| KGZY | San Bernardino, Calif. | 1712 | 50 |
| KHTP | Houston, Tex. | 1712 | 200 |
| KIUK | Jefferson City, Mo. | 1674 | 1000N. |
| KNFJ | Pomona, Calif. | 1712 | 50 |
| KNFN | Waterloo, Iowa | 1682 | 400 |
| KNFO | Storm Lake, Iowa | 1682 | 400 |
| KNGF | Cleburne, Tex. | 1712 | 50 |
| KNGI | Galveston, Tex. | 1712 | 50 |
| KNGX | Los Angeles, Calif. | 1712 | 200 |
| KNHD | Redwood Falls, Minn. | 1658 | 400 |
| KOHA | *Astoria, Ore. | 1705 | 50 |
| KOHB | *Baker, Ore. | 1706 | 10 |
| KOHC | *Coquille, Ore. | 1706 | 10 |
| KOHD | *The Dalles, Ore. | 1706 | 50 |
| KOHE | *Eugene, Ore. | 1706 | 50 |
| KOHF | *State of Ore. | 1706 | 10 |
| KOHG | *Grants Pass, Ore. | 1706 | 10 |
| KOHH | *State of Ore. | 1706 | 10 |
| KOHI | *State of Ore. | 1706 | 10 |
| KOHJ | *State of Ore. | 1706 | 10 |
| KOHK | *Klamath Falls, Ore. | 1706 | 1000 |
| KOHL | *LaGrande, Ore. | 1706 | 1000 |
| KOHM | *Milwaukee, Ore. | 1706 | 50 |
| KOHN | *Bend, Ore. | 1706 | 50 |
| KOHO | *State of Ore. | 1706 | 10 |
| KOHP | *Pendleton, Ore. | 1706 | 10 |
| KOHR | *Roseburg, Ore. | 1706 | 50 |
| KOHS | *Salem, Ore. | 1706 | 1000 |
| KOHU | *Burns, Ore. | 1706 | 50 |
| KOHV | *State of Ore. | 1706 | 10 |
| KOHW | *State of Ore. | 1706 | 10 |
| KOHX | *State of Ore. | 1706 | 10 |
| KOHY | *State of Ore. | 1706 | 10 |
| KOHZ | *State of Ore. | 1706 | 10 |
| KRPW | Galveston, Tex. | 1712 | 50 |
| KSBC | *San Bernardino, Calif. | 1712 | 500 |
| KSW | Berkeley, Calif. | 1658 | 500 |
| KVP | Dallas, Tex. | 1712 | 500 |
| KVPA | Dallas, Tex. | 1712 | 500 |
| WAKF | Everett, Mass. | 1712 | 50 |
| WAKJ | Duval Co., Fla. | 1698 | 350 |
| WAKR | Pensacola, Fla. | 1698 | 350 |
| WAKS | Orlando, Fla. | 1698 | 350 |
| WAKT | Tampa, Fla. | 1698 | 350 |
| WAKU | Fort Meyers, Fla. | 1698 | 350 |
| WAKV | Fall River, Mass. | 1712 | 50 |
| WAKY | State of Md. | 1698 | 250 |
| WAKZ | W. Palm Beach, Fla. | 1698 | 350 |
| WAMF | State of Penna. | 1674 | 500 |
| WDSP | *New Castle, Del. | 1698 | 500 |
| WEVN | Belaire, Md. | 1698 | 250 |
| WPDB | Chicago, Ill. | 1712 | 500 |
| WPDC | Chicago, Ill. | 1712 | 500 |
| WPDD | Chicago, Ill. | 1712 | 500 |
| WPDU | Pittsburgh, Pa. | 1712 | 400 |
| WPEV | State of Mass. | 1666 | 50 |
| WPEW | Northampton, Mass. | 1666 | 1000N. 5000D. |
| WPFA | Newton, Mass. | 1712 | 50 |
| WPFN | Fairhaven, Mass. | 1712 | 100 |
| WPGC | S. Schenectady, N.Y. | 1658 | 1000 |
| WPGF | Providence, R. I. | 1712 | 150 |
| WPGG | Findlay, Ohio | 1682 | 500 |
| | | **1596 | 500 |
| WPGQ | Columbus, Ohio | 1682 | 400 |
| | | **1596 | |
| WPGU | Cohasset, Mass. | 1712 | 50 |
| WPGV | Boston, Mass. | 1712 | 500 |
| WPHC | Massilon, Ohio | 1682 | 400 |
| | | **1596 | |
| WPHE | Indianapolis, Ind. | 1634 | 1000 |
| WPHG | Medford, Mass. | 1712 | 50 |
| WPHK | Wilminton, Ohio | 1682 | 400 |
| | | **1596 | |
| WPHS | Culver, Ind. | 1634 | 1000 |
| WPHT | Cambridge, Ohio | 1682 | 400 |
| | | **1596 | |
| WPHU | Jasper, Ind. | 1634 | 1000 |
| WPSP | Harrisburg, Pa. | 1674 | 1000 |
| WQFL | Oak Park, Ill. | 1712 | 50 |
| WQFT | State of Ohio | 1692 | 100 |
| WQFE | Seymour, Ind. | 1634 | 1000 |
| WQFR | State of New York | 1658 | 250 |
| WQFT | State of Ohio | 1682 | 100 |
| | | **1596 | |
| WQFW | Columbia City, Ind. | 1634 | 1000 |
| WQFX | Waukegan, Ill. | 1712 | 100 |
| WQPC | *Chicago, Ill. | 1610 | 1000 |
| WQPD | Duquoin, Ill. | 1610 | 1000 |
| WQPF | Effingham, Ill. | 1610 | 1000 |
| WQPG | *Sterling, Ill. | 1610 | 1000 |
| WQPM | *Macomb, Ill. | 1610 | 1000 |
| WQPP | *Pontiac, Ill. | 1610 | 1000 |
| WQPS | Springfield, Ill. | 1610 | 1000 |
| WRDP | Paw Paw, Mich. | 1642 | 1000 |
| WRDS | East Lansing, Mich. | 1642 | 1000N. 5000D. |
| WWSG | *Salisbury, Md. | 1698 | 250 |

* Construction Permit Only
** Conditional and Temporary

## 2400-KILOCYCLE BAND

| Call | Location | K.C. | Watts |
|---|---|---|---|
| KACA | Atchison, Kans. | 2422 | 50 |
| KACB | State of Washington | 2490 | 10 |
| KACE | Olympia, Wash. | 2414 | 50 |
| KACF | Chickasha, Okla. | 2450 | 50 |
| KACG | State of Washington | 2490 | 10 |
| KACH | State of Washington | 2490 | 10 |
| KACI | Eureka, Calif. | | |
| KACJ | Wenatchee, Wash. | 2414 | 250 |
| KACK | Bellingham, Wash. | 2414 | 50 |
| KACL | Altus, Okla. | 2450 | 50 |
| KACM | Big Spring, Tex. | 2458 | 50 |
| KACN | San Buenaventura, Cal. | 2414 | 50 |
| KACO | Tracy, Calif. | 2414 | 15 |
| KACP | Ponca City, Okla. | 2450 | 50 |
| KACQ | Kalaloch, Wash. | 2490 | 10 |
| KACR | Seminole, Okla. | 2450 | 50 |
| KACS | Bakersfield, Calif. | 2414 | 500 |
| KACT | Oklahoma Co., Okla. | 2450 | 20 |
| KACV | Walla Walla, Wash. | 2414 | 50 |
| KACW | *State of Wash. | 2490 | 10 |
| KAPB | Cushing, Okla. | 2450 | 50 |
| KAPC | *Drumright, Okla. | 2450 | 50 |
| KAPD | *El Dorado, Kans. | 2450 | 50 |
| KAPE | Norman, Okla. | 2450 | 100 |
| KAPF | Okmulgee, Okla. | 2450 | 50 |
| KAPG | *Iola, Kans. | 2450 | 50 |
| KAPH | *Stockton, Calif. | 2414 | 400 |
| KAPJ | *Sweetwater, Tex. | 2458 | 40 |
| KAPK | *Enid, Okla. | 2450 | 50 |
| KAPL | *Hoquiam, Wash. | 2414 | 50 |
| KGHA | State of Wash. | 2490 | 10 |
| KGHB | State of Wash. | 2490 | 10 |
| KGHC | State of Wash. | 2490 | 10 |
| KGHD | Seattle, Wash. | 2490 | 50 |
| KGHE | Snoqualmie Pass, Wash. | 2490 | 50 |
| KGHG | Los Vegas, Nev. | 2474 | 50 |
| KGHK | Palo Alto, Calif. | 2470 | 20 |
| KGHM | Reno, Nev. | 2474 | 50 |
| KGHN | Hutchinson, Kans. | 2450 | 50 |
| KGHP | Lawton, Okla. | 2450 | 50 |
| KGHQ | Chinook Pass, Wash. | 2490 | 10 |
| KGHR | Chinook Pass, Wash. | 2490 | 10 |
| KGHS | Spokane, Wash. | 2414 | 100 |
| KGHT | Brownsville, Tex. | 2382 | 100 |
| KGHU | Austin, Tex. | 2442 | 100 |
| KGHV | Corpus Christi, Tex. | 2382 | 50 |
| KGHW | Centralia, Wash. | 2414 | 50 |
| KGHX | Santa Ana, Calif. | 2490 | 400 |
| KGHZ | Little Rock, Ark. | 2406 | 100 |
| KGOZ | Cedar Rapids, Iowa | 2466 | 50 |
| KGPA | Seattle, Wash. | 2414 | 500 |
| KGPB | Minneapolis, Minn. | 2430 | 400 |
| KGPD | San Francisco, Calif. | 2466 | 400 |
| KGPE | Kansas City, Mo. | 2422 | 500 |
| KGPF | Santa Fe, N. Mex. | 2414 | 25 |
| KGPG | Vallejo, Calif. | 2422 | 50 |
| KGPH | Oklahoma City, Okla. | 2450 | 250 |
| KGPI | Omaha, Neb. | 2466 | 400 |
| KGPK | Sioux City, Ia. | 2466 | 100 |
| KGPM | San Jose, Calif. | 2466 | 100 |
| KGPN | Davenport, Ia. | 2466 | 100 |
| KGPO | Tulsa, Okla. | 2450 | 100 |
| KGPP | Portland, Ore. | 2442 | 500 |
| KGPR | Minneapolis, Minn. | 2430 | 400 |
| KGPS | Bakersfield, Calif. | 2414 | 50 |
| KGPW | Salt Lake City, Utah | 2406 | 100 |
| KGPX | Denver, Colo. | 2442 | 400 |
| KGPZ | Wichita, Kans. | 2450 | 250 |
| KGZA | Fresno, Calif. | 2414 | 500 |
| KGZC | Topeka, Kans. | 2422 | 50 |
| KGZD | San Diego, Calif. | 2490 | 500 |
| KGZE | San Antonio, Tex. | 2482 | 500 |
| KGZF | Chanute, Kans. | 2450 | 25 |
| KGZG | Des Moines, Ia. | 2466 | 100 |
| KGZH | Klamath Falls, Ore. | 2442 | 25 |
| KGZI | Wichita Falls, Tex. | 2458 | 200 |
| KGZJ | Phoenix, Ariz. | 2430 | 100 |
| KGZM | El Paso, Tex. | 2414 | 100 |
| KGZN | Tacoma, Wash. | 2414 | 100 |
| KGZO | Santa Barbara, Calif. | 2414 | 100 |
| KGZP | Coffeyville, Kans. | 2450 | 50 |
| KGZR | Salem, Ore. | 2442 | 50 |
| KGZU | Lincoln, Neb. | 2490 | 200 |
| KGZV | Aberdeen, Wash. | 2414 | 125 |
| KGZW | Lubbock, Tex. | 2458 | 150 |
| KGZX | Albuquerque, N. M. | 2414 | 50 |
| KNFA | Clovis, N. M. | 2414 | 50 |
| KNFB | Idaho Falls, Idaho | 2458 | 500 |
| KNFC | State of Wash. | 2490 | 50 |
| KNFD | State of Wash. | 2490 | 50 |
| KNFE | Duluth, Minn. | 2382 | 400 |
| KNFF | Leavenworth, Kans. | 2422 | 100 |
| KNFG | Olympia, Wash. | 2490 | 50 |
| KNFH | Garden City, Kans. | 2474 | 50 |
| KNFI | Mt. Vernon, Wash. | 2414 | 50 |
| KNFK | Bellingham, Wash. | 2490 | 50 |
| KNFL | Suksan, Wash. | 2490 | 10 |
| KNFM | Compton, Calif. | 2490 | 25 |
| KNFP | Everett, Wash. | 2414 | 40 |
| KNFQ | Skykomish, Wash. | 2490 | 10 |
| KNFR | State of Wash. | 2490 | 10 |
| KNFS | State of Wash. | 2490 | 10 |
| KNFT | State of Wash. | 2490 | 10 |
| KNFU | State of Wash. | 2490 | 10 |
| KNFV | State of Wash. | 2490 | 10 |
| KNFW | State of Wash. | 2490 | 10 |
| KNFX | Ellensburg, Wash. | 2490 | 10 |
| KNFY | Bear River Camp, Wash. | 2490 | 10 |
| KNFZ | Hell's Crossing Camp, Wash. | 2490 | 10 |
| KNGA | Satus Pass Camp, Wash. | 2490 | 10 |
| KNGB | Yakima, Wash. | 2490 | 50 |
| KNGC | Vancouver, Wash. | 2490 | 50 |
| KNGD | Walla Walla, Wash. | 2490 | 10 |
| KNGF | Sacramento, Calif. | 2422 | 400 |
| KNGJ | Dodge City, Kans. | 2474 | 50 |
| KNGH | El Centro, Calif. | 2490 | 100 |
| KNGK | Duncan, Okla. | 2450 | 50 |
| KNGM | Rapid City, S. Dak. | 2450 | 50 |
| KNGN | Norfolk, Neb. | 2490 | 25 |
| KNGO | Oklahoma Co., Okla. | 2450 | 50 |
| KNGP | Schreveport, La. | 2430 | 100 |
| KNGQ | Wenatchee, Wash. | 2490 | 50 |
| KNGR | Spokane, Wash. | 2490 | 50 |
| KNGT | Muskogee, Okla. | 2450 | 50 |
| KNGU | Yakima, Wash. | 2414 | 100 |
| KNGV | Salina, Kans. | 2422 | 50 |
| KNGW | Brownwood, Tex. | 2458 | 50 |
| KNGY | Lodi, Calif. | 2414 | 40 |
| KNGZ | Ephrata, Wash. | 2490 | 10 |
| KNHA | State of Wash. | 2490 | 50 |
| KNHB | Green Bay, Wisc. | 2382 | 100 |
| KNHC | Ada, Okla. | 2450 | 50 |
| KNHE | Fort Smith, Ark. | 2406 | 100 |
| KNHG | Prescott, Ariz. | 2430 | 10 |
| KNHM | Fargo, N. D. | 2442 | 100 |
| KVPB | Huron, S. D. | 2450 | 40 |
| WAGR | *Urbana, Ill. | 2458 | 40 |
| WAKA | Huntington, Ind. | 2490 | 50 |
| WAKB | New London, Conn. | 2466 | 50 |
| WAKC | Freehold, N. J. | 2366 | 100 |
| WAKE | Oshkosh, Wisc. | 2382 | 100 |
| WAKG | Clearwater, Fla. | 2466 | 250 |
| WAKH | Bloomfield, N. J. | 2430 | 50 |
| WAKI | Sandusky, Ohio | 2474 | 50 |
| WAKK | Frankford, Ind. | 2490 | 50 |
| WAKL | St. Clairsville, Ohio | 2430 | 100 |
| WAKN | Herkimer, N. Y. | 2414 | 50 |
| WAKO | Fort Lauderdale, Fla. | 2442 | 50 |
| WAKX | York, Pa. | 2442 | 40 |
| WAKW | *Miami, Fla. | 2442 | 40 |
| WAMB | Connersville, Ind. | 2442 | 40 |
| WAME | *Baton Rouge, La. | 2430 | 100 |
| WAMG | *Kalamazoo, Mich. | 2442 | 100 |
| WAMH | *Shelby, Ohio | 2474 | 25 |
| WAMI | *Bluffton, Ind. | 2490 | 50 |
| WANN | Lorain, Ohio | 2458 | 50 |
| WCPD | Charleston, S. C. | 2430 | 50 |
| WCK | Belle Isle, Mich. | 2414 | 500 |
| WMDZ | Indianapolis, Ind. | 2442 | 400 |
| WMJ | Buffalo, N. Y. | 2422 | 500 |
| WMO | Highland Pk., Mich. | 2414 | 50 |
| WNEP | Niagara Falls, N. Y. | 2422 | 125 |
| WPDA | Tulare, Calif. | 2414 | 150 |
| WPDE | Louisville, Ky. | 2442 | 200 |
| WPDF | Flint, Mich. | 2466 | 150 |
| WPDG | Youngstown, Ohio | 2458 | 250 |
| WPDI | Columbus, Ohio | 2430 | 200 |
| WPDK | Milwaukee, Wisc. | 2450 | 500 |
| WPDL | Lansing, Mich. | 2442 | 50 |
| WPDM | Dayton, Ohio | 2430 | 400 |
| WPDN | Auburn, N. Y. | 2382 | 50 |
| WPDO | Akron, Ohio | 2458 | 250 |
| WPDP | Philadelphia, Pa. | 2474 | 500 |
| WPDR | Rochester, N. Y. | 2422 | 200 |
| WPDS | Saint Paul, Minn. | 2430 | 500 |
| WPDT | Kokomo, Ind. | 2490 | 50 |
| WPDV | Charlotte, N. C. | 2458 | 250 |
| WPDW | Washington, D. C. | 2422 | 400 |
| WPDX | Detroit, Mich. | 2414 | 500 |
| WPDY | Atlanta, Ga. | 2414 | 400 |
| WPDZ | Ft. Wayne, Ind. | 2490 | 200 |
| WPEA | Syracuse, N. Y. | 2382 | 400 |
| WPEB | Grand Rapids, Mich. | 2442 | 500 |
| WPEC | Memphis, Tenn. | 2466 | 400 |
| WPEE | Brooklyn, N. Y. | 2450 | 400 |
| WPEF | New York, N. Y. | 2450 | 400 |
| WPEG | New York, N.Y. | 2450 | 500 |
| WPEK | NewOrleans, La. | 2430 | 250 |
| WPEM | Woonsocket, R. I. | 2466 | 50 |
| WPEP | Kenosha, Wisc. | 2450 | 100 |
| WPES | Saginaw, Mich. | 2442 | 100 |
| WPEC | Muskegon, Mich. | 2442 | 50 |
| WPEE | Reading, Pa. | 2442 | 100 |
| WPEG | Jacksonville, Fla. | 2442 | 400 |
| WPEH | Baltimore, Md. | 2414 | 200 |
| WPEI | Columbus, Ga. | 2414 | 50 |
| WPEK | Hackensack, N. J. | 2430 | 500 |
| WPEM | Birmingham, Ala. | 2382 | 400 |
| WPEO | Knoxville, Tenn. | 2474 | 400 |
| WPEP | Clarksburg, W. Va. | 2490 | 30 |
| WPEQ | Swarthmore, Pa. | 2474 | 50 |
| WPES | Asheville, N. C. | 2474 | 500 |
| WPET | Lakeland, Fla. | 2442 | 50 |
| WPEU | Portland, Me. | 2422 | 100 |
| WPEV | Pawtucket, R. I. | 2466 | 50 |
| WPEW | Bridgeport, Conn. | 2466 | 50 |
| WPEX | Palm Beach, Fla. | 2442 | 50 |
| WPEY | Yonkers, N. Y. | 2442 | 400 |

| Call | Location | K.C. | Watts |
|---|---|---|---|
| WPFZ | Miami, Fla. | 2442 | 500 |
| WPGA | Bay City, Mich. | 2466 | 50 |
| WPGB | Port Huron, Mich. | 2466 | 50 |
| WPGD | Rockford, Ill. | 2458 | 50 |
| WPGH | Albany, N. Y. | 2414 | 300 |
| WPGI | Portsmouth, Ohio | 2430 | 100 |
| WPGJ | Utica, N. Y. | 2414 | 100 |
| WPGK | Cranston, R. I. | 2466 | 50 |
| WPGL | Binghamton, N. Y. | 2442 | 400 |
| WPGN | South Bend, Ind. | 2490 | 100 |
| WPGO | Huntington, N.Y. | 2490 | 25 |
| WPGP | Muncie, Ind. | 2442 | 100 |
| WPGS | Mineola, N. Y. | 2490 | 400 |
| WPGT | New Castle, Pa. | 2482 | 50 |
| WPGW | Mobile, Ala. | 2382 | 400 |
| WPGX | Worcester, Mass. | 2466 | 100 |
| WPGZ | Johnson City, Tenn. | 2474 | 50 |
| WPHA | Fitchburg, Mass. | 2466 | 50 |
| WPHB | Nashua, N. H. | 2422 | 50 |
| WPHD | Steubenville, Ohio | 2458 | 100 |
| WPHF | Richmond, Va. | 2450 | 400 |
| WPHI | Charleston, W. Va. | 2490 | 50 |
| WPHJ | Fairmont, W. Va. | 2490 | 100 |
| WPHM | Orlando, Fla. | 2442 | 50 |
| WPHN | Tampa, Fla. | 2466 | 100 |
| WPHO | Zanesville, Ohio | 2430 | 50 |
| WPHP | Jackson, Mich. | 2466 | 50 |
| WPHQ | Parkersburg, W. Va. | 2490 | 50 |
| WPHV | Bristol, Va. | 2450 | 50 |
| WPHY | Elizabethton, Tenn. | 2474 | 100 |
| WPHZ | Oil City, Pa. | 2482 | 50 |
| WQFA | New Haven, Conn. | 2466 | 100 |
| WQFB | Macon, Ga. | 2414 | 50 |
| WQFC | Ganesville, Fla. | 2466 | 50 |
| WQFF | Monessen, Pa. | 2482 | 50 |
| WQFG | Roanoke, Va. | 2450 | 100 |
| WQFH | Lynchburg, Va. | 2450 | 50 |
| WQFI | Petersburg, Va. | 2450 | 250 |
| WQFJ | Oneonta, N. Y. | 2414 | 50 |
| WQFM | Wilkes-Barre, Pa. | 2442 | 100 |
| WQFO | Lancaster, Ohio | 2430 | 50 |
| WQFQ | Lafayette, Ind. | 2442 | 50 |
| WQFU | Sharon, Pa. | 2482 | 50 |
| WQFV | Augusta, Ga. | 2414 | 250 |
| WQFY | Mansfield, Ohio | 2474 | 50 |
| WQFZ | Ottawa, Ill. | 2452 | 500 |
| WRBH | Cleveland, Ohio | 2458 | 500 |
| WRDQ | Toledo, Ohio | 2474 | 400 |
| WRDR | Grosse Pointe, Mich. | 2414 | 50 |

* Construction Permit Only

## ULTRA-HIGH FREQUENCY BAND

| | | | |
|---|---|---|---|
| W1XAB | Springfield, Mass. | 3 | 50 |
| W1XAH | Worcester, Mass. | 1 | 7.5 |
| W1XAO | Boston, Mass. | 7 | 1500 |
| W1XAX | Brookline, Mass. | 6 | 50 |
| W1XBL | Quincy, Mass. | 1 | 150 |
| W1XBY | Medford, Mass. | 2 | 15 |
| W1XCE | Cambridge, Mass. | 1 | 50 |
| W1XDK | West Hartford, Conn. | 1 | 25 |
| W1XDT | Manchester, N. H. | 1 | 50 |
| W1XDW | Hull, Mass. | 4 | 10 |
| W1XE | Darien, Conn. | 1 | 15 |
| W1XEE | Hull, Mass. | 4 | 10 |
| W1XEL | Salem, Mass. | 1 | 25 |
| W1XEO | Providence, R. I. | 2, 5 | 7.5 |
| W1XEP | Westerly, R. I. | 3 | 25 |
| W1XEW | Everett, Mass. | 1 | 15 |
| W1XFH | New London, Conn. | 2 | 10 |
| W1XFQ | Hingham, Mass. | 4 | 30 |
| W1XFT | Scituate, Mass. | 4 | 20 |
| W1XHC | Hartford, Conn. | 1 | 150 |
| W1XHM | Springfield, Mass. | 3 | 50 |
| W1XHX | Lowell, Mass. | 4 | 50 |
| W1XHY | Norwood, Mass. | 1 | 20 |
| W1XLA | Boston, Mass. | 4 | 500 |
| W1XLB | Boston, Mass. | 2, 4 | 500 |
| W1XLW | Plymouth, Mass. | 1 | 40 |
| W1XOU | Sharon, Mass. | 3 | 5 |
| W2XAJ | Port Jervis, N. Y. | 2 | .5 |
| | | 1 | 10 |
| W2XCA | Union City, N. J. | 6 | 25 |
| W2XCJ | Bayonne, N. J. | 1 | 25 |
| W2XCT | Eastchester, N. Y. | 6 | 25 |
| W2XDD | Deal, N. J. | 6 | 20 |
| W2XEM | Newark, N. J. | 2 | 50 |
| W2XEN | Roselle, N. J. | 2, 3 | 25 |
| W2XEP | Pontiac, Mich. | 3 | 50 |
| W2XES | Englewood, N. J. | 1 | 15 |
| W2XFA | Jersey City, N. J. | 8 | 100 |
| W2XFU | Plainfield, N. J. | 6 | 25 |
| W2XGC | Poughkeepsie, N.Y. | 1 | 100 |
| W2XGI | Roselle, N. J. | 1 | 20 |
| W2XGK | Harrison, N. Y. | 6 | 50 |
| W2XGP | Kenilworth, N. J. | 1 | .5 |
| W2XHK | Scarsdale, N. Y. | 1 | 25 |
| W2XHL | New Rochelle, N. Y. | 5 | 50 |
| W2XHP | Kingston, N. Y. | 1 | 15 |
| W2XHQ | Millburn, N. J. | 1 | 30 |
| W2XHW | Union, N. J. | 5 | 7.5 |
| W2XIC | Woodbridge, N. J. | 1 | 25 |
| W2XIF | Belmar, N. J. | 4 | 25 |
| W2XIJ | New York, N. Y. | 1 | 250 |
| W2XIO | Westfield, N. J. | 1 | 25 |
| W2XIX | Cranford, N. J. | 1 | 15 |
| W2XIZ | Syracuse, N. Y. | 1 | 5 |
| W2XJA | West New York, N. J. | 5 | 25 |
| W2XJK | Verona, N. J. | 1 | 50 |
| W2XJP | Long Branch, N.J. | 1 | 50 |
| W2XKJ | East Orange, N. J. | 1 | 50 |
| W2XKQ | Elizabeth, N. J. | 6 | 25 |
| W2XKR | New York, N.Y. | 4 | 17 |
| W2XKW | Secaucus, N. Y. | 1 | 15 |
| W2XKZ | Fanwood, N. J. | 1 | 9 |
| | | 1 | 10 |
| W2XLV | Nutley, N. J. | 1 | 25 |
| W2XLZ | Livingston, N. J. | 1 | 25 |
| W2XMA | Garden City, N. Y. | 4 | 35 |
| W2XMS | Greenburgh, N. Y. | 1 | 50 |
| W2XMW | Piermont, N. Y. | 1 | 12 |
| W2XNK | Rahway, N. J. | 5 | 5 |
| W2XNR | Mt. Vernon, N. Y. | 1 | 50 |
| W2XNU | Spring Valley, N. Y. | 1 | 9 |
| W2XOL | Rye, N. Y. | 1 | 25 |
| W3XAG | Elkins Park, Pa. | 2, 3, 4 | 50 |
| W3XAQ | Camden, N. J. | 1 | 25 |
| W3XAV | Suffolk, Va. | 1 | 15 |
| W3XBA | Bethlehem, Pa. | 6 | 25 |
| W3XBD | Atlantic City, N. J. | 6 | 60 |
| W3XBG | Norfolk, Va. | 1 | 25 |
| W3XBJ | Harrisburg, Pa. | 1 | 25 |
| W3XBP | Wilmington, Del. | 1 | 100 |
| W3XDA | Plainfield, N. J. | 1 | 25 |
| W3XEG | Charlottesville, Va. | 1 | 15 |
| W3XEJ | Fredericksburg, Va. | 1 | 15 |
| W3XEK | Trenton, N. J. | 1 | 100 |
| W3XET | Morristown, N. J. | 1 | 15 |
| W3XF | Ventnor City, N. J. | — | 25 |
| W3XFB | Longport, N. J. | 6 | 25 |
| W3XFC | Princeton, N. J. | 4, 5 | 15 |
| W3XFG | Collingswood, N. J. | 1 | 25 |
| W3XGC | West Chester, Pa. | 2, 3, 4 | 25 |
| W3XGL | Baltimore, Md. | 1 | 6 |
| W3XGV | Haddonfield, N. J. | 1 | 25 |
| W3XS | Ardmore, Pa. | 2, 3, 4 | 15 |
| W3XT | Lansdowne, Pa. | 2, 3, 4 | 15 |
| W3XZ | Danville, Va. | 2, 5 | 25 |
| W4XAC | Salisbury, N. C. | 1 | 20 |
| W4XAG | Rome, Ga. | 1 | 25 |
| W4XAH | Columbia, S. C. | 1 | 25 |
| W4XAI | Kingsport, Tenn. | 1 | 25 |
| W4XAM | Savannah, Ga. | 1 | 25 |
| W4XAN | Tallahassee, Tenn. | 1 | 25 |
| W4XAP | Kinston, N. C. | 3 | 25 |
| W4XAQ | Brunswick, Ga. | 1 | 15 |
| W4XAR | Pensacola, Fla. | 1 | 25 |
| W4XAU | Nashville, Tenn. | 1 | 50 |
| W4XBN | Clinton, S. C. | 1 | 8 |
| W4XBQ | Rocky Mount, N. C. | 1 | 15 |
| W4XBU | Jacksonville, Fla. | 3 | 5 |
| W4XBV | Spartanburg, S. C. | 1 | 25 |
| W4XBY | St. Augustine, Fla. | 1 | 15 |
| W4XCD | Gadsen, Ala. | 1 | 15 |
| W4XCE | Raleigh, N. C. | 1 | 25 |
| W4XCG | Wilson, N. C. | 1 | 15 |
| W4XCK | State of Fla. | 1 | 1000 |
| W4XDG | Tampa, Fla. | 1 | 16.5 |
| W4XG | Miami Beach, Fla. | 1 | 50 |
| W4XI | St. Petersburg, Fla. | 1 | 15 |
| W4XJ | Winston-Salem, N. C. | 1 | 25 |
| W4XK | Durham, N. C. | 1 | 50 |
| W4XL | Hickory, N. C. | 1 | 25 |
| W4XM | Chattanooga, Tenn. | 1 | 15 |
| W4XR | High Point, N. C. | 1 | 15 |
| W4XS | La Grange, Ga. | 1 | 15 |
| W4XT | Tuscaloosa, Ala. | 3 | 50 |
| W4XU | Raleigh, N. C. | 1 | 25 |
| W4XV | Greensboro, N. C. | 1 | 25 |
| W4XW | Greensville, S. C. | 2, 3 | 15 |
| W5XAC | Enid, Okla. | 1 | 5 |
| W5XB | Ft. Worth, Tex. | 1 | 15 |
| W5XBI | Tyler, Tex. | 3, 4 | 30 |
| W5XBO | Houston, Tex. | 1 | 50 |
| W5XF | Amarillo, Tex. | 3 | 15 |
| W6XBF | Piedmont, Calif. | 3 | 500 |
| | | 1 | 5 |
| W6XDL | Modesto, Calif. | 1 | 100 |
| W6XEH | Long Beach, Calif. | 1 | 100 |
| W6XFE | Alhambra, Calif. | 2 | 50 |
| W6XFY | Merced, Calif. | 4 | 15 |
| W6XFZ | Visalia, Calif. | 4 | 10 |
| W6XGC | San Gabriel, Calif. | 1 | 50 |
| W6XGG | Turlock, Calif. | 1 | 5 |
| W6XGM | Orange, Calif. | 1 | 4.5 |
| W6XHE | San Bernardino, Calif. | 3 | 10 |
| | | 2 | 10 |
| | | 1 | 12 |
| W6XHG | San Anselmo, Calif. | 1 | 5 |
| W6XHO | Santa Rosa, Calif. | 1 | 10 |
| W6XHR | Monrovia, Calif. | 1 | 12 |
| W6XIA | Oceanside, Calif. | 3, 4 | 2.5 |
| W6XID | Beverly Hills, Calif | 1 | 50 |
| W6XJK | Burlinghame, Calif. | 1 | 50 |
| W6XIU | Petaluma, Calif. | 3, 4 | 10 |
| W6XKH | Marysville, Calif. | 2, 3, 4 | 15 |
| W6XKM | Ogden, Utah | 1 | 25 |
| W6XKR | San Mateo, Calif. | 1 | 5 |
| | | 2 | 7 |
| W6XKW | Alameda, Calif. | 2 | 50 |
| W6XLC | Palm Springs, Calif | 1 | 36 |
| W6XLE | Signal Hill, Pa. | 1 | 4.5 |
| W6XLR | Sacramento, Calif. | 1 | 10 |
| W6XM | Stockton, Calif. | 1 | 15 |
| W6XMW | Arcadia, Calif. | 1 | 50 |
| W6XOR | Martinez, Calif. | 3 | 250 |
| W6XPA | Belvedere Dist., Calif. | 1 | 15 |
| W6XQK | Phoenix, Ariz. | 2 | 10 |
| W7XAB | Yakima, Wash. | 1 | 10 |
| | | 1 | 25 |
| W7XBY | Boise, Idaho | 3 | 15 |
| W8XAC | Lincoln Park, Mich. | 3 | 25 |
| W8XAE | Dayton, Ohio | | |
| W8XAO | Dearborn, Mich. | 1 | 50 |
| W8XAQ | Canton, Ohio | 1 | 5 |
| W8XAU | Huntington, W. Va. | 1 | 25 |
| W8XBB | Detroit, Mich. | 1 | 150 |
| W8XBE | McKeesport, Pa. | 3 | 100 |
| W8XBP | Lima, Ohio | 1 | 15 |
| W8XBQ | Highland Pk., Mich. | 1 | 50 |
| W8XBT | Springfield, Ohio | 1 | 50 |
| W8XCP | Cleveland, Ohio | 1 | 100 |
| W8XCR | Clairton, Pa. | 2, 3, 4 | 15 |
| W8XCY | Royal Oak, Mich. | 1 | 25 |
| W8XDH | Geneva, N. Y. | 1 | 50 |
| W8XEC | Scranton, Pa. | 1 | 100 |
| W8XEK | Erie, Pa. | 4 | 50 |
| W8XEN | Alpena, Mich. | 2 | 25 |
| W8XEP | Pontiac, Mich. | 3 | 50 |
| W8XEY | Chillicothe, Ohio | 1 | 15 |
| W8XF | Hamilton, Ohio | 1 | 150 |
| W8XFH | Monroe, Mich. | 3 | 35 |
| W8XGC | Hornell, N. Y. | 1 | 15 |
| W8XGE | Wheeling, W. Va. | 1 | 50 |
| W8XGM | Ecorse, Mich. | 2 | 25 |
| W8XIF | Ypsilanti, Mich. | 1 | 35 |
| W8XIS | Grosse Pointe, Mich. | 1 | 5 |
| W8XIX | Utica, N. Y. | 2, 3 | 10 |
| W8XJA | Grosse Pointe, Mich. | 2 | 10 |
| W8XJX | Hamtramck, Mich. | 1 | 5 |
| W8XLB | Muskegon, Mich. | 2, 3, 5 | 15 |
| W8XLV | Williamsport, Pa. | 2 | 25 |
| W8XM | Belle Isle, Detroit, Mich. | 1 | 250 |
| W9XAC | Paducah, Ky. | 3 | 15 |
| W9XAS | Ashland, Ky. | 1 | 15 |
| W9XAU | Chicago, Ill. | 1 | 15 |
| W9XB | River Forest, Ill. | 5 | 100 |
| W9XBA | Peoria, Ill. | 6 | 100 |
| W9XBP | Joplin, Mo. | 2 | 25 |
| W9XCA | Kansas City, Kans. | 1 | 100 |
| W9XCS | Hammond, Ind. | 1 | 100 |
| W9XDO | Springfield, Mo. | 1 | 15 |
| W9XDQ | Wheaton, Ill. | 3 | 25 |
| W9XDN | Elmhurst, Ill. | 4 | 30 |
| W9XEC | Wheaton, Ill. | 4 | 300 |
| W9XEH | Evanston, Ill. | 2 | 50 |
| W9XEK | Decatur, Ill. | 1 | 100 |
| W9XEN | Danville, Ill. | 1 | 15 |
| W9XEQ | Highland Park, Ill. | 1 | 15 |
| W9XGC | Peru, Ill. | 1 | 50 |
| W9XGD | Chicago Heights, Ill. | 1 | 15 |
| W9XGE | Sioux Falls, So. Dak. | 1 | 7.5 |
| W9XGN | Alton, Ill. | 2 | 15 |
| W9XHG | Terre Haute, Ind. | 1 | 25 |
| W9XHX | Carondelet Township, Mo. | 2 & 3 | 50 |
| W9XIE | Cape Girardeau, Mo. | 2 & 5 | 30 |
| W9XIG | Ottawa, Ill. | 1 | 100 |
| W9XIH | Streator, Ill. | 1 | 100 |
| W9XIK | Oglesby, Ill. | 1 | 100 |
| W9XIY | Elgin, Ill. | 3 | 50 |
| W9XJD | Whiting, Ind. | 1 | 15 |
| W9XJJ | Kenilworth, Ill. | 2 | 5 |
| W9XKC | St. Joseph, Mo. | 3 | 50 |
| W9XKP | Gary, Ind. | 1 | 75 |
| W9XLR | Red Wing, Minn. | 2 | 100 |
| W9XLS | Racine, Wis. | 1 | 25 |
| W9XM | Winnetka, Ill. | 1 | 15 |
| W9XMM | Joliet, Ill. | 3 | 15 |
| W9XMR | Lawrence, Kans. | 2 | 16 |
| | | 6 | 5 |
| W9XNA | Evanston, Ill. | 1 | 50 |
| W9XOV | Springfield, Ill. | 1 | 50 |
| W9XOY | La Salle, Ill. | 1 | 100 |
| W9XPA | Park Ridge, Ill. | 1 | 15 |
| W9XPF | Rochester, Minn. | 1 | 5 |
| W9XPO | Waukegan, Ill. | 3 | 15 |
| W9XQ | Aurora, Ill. | 1 | 50 |
| W9XQI | St. Charles, Mo. | 2 | 15 |
| W9XQJ | Vincennes, Ind. | 1 | 25 |
| W9XQQ | Lake Forest, Ill. | 1 | 5 |
| W9XQZ | Grand Island, Neb. | 1 | 25 |

(1) 30100 kc., 33100 kc., 37100 kc., 40100 kc.
(2) 30100 kc.
(3) 33100 kc.
(4) 37100 kc.
(5) 40100 kc.
(6) Same as (1) plus 86000 to 400,000 kc., 401,000 kc. and above.
(7) Same as (1) plus 35600 kc.
(8) Same as (1), (2) and (3) plus 31900 kc.

## ZONE AND INTERZONE C.W. STATIONS

| | | | |
|---|---|---|---|
| KGPB | Minneapolis, Minn. | A & B | 400 |
| KGPC | St. Louis, Mo. | A & B | 750 |
| KGPE | Kansas City, Mo. | A & B | 500 |
| KGPH | Oklahoma City, Okla. | A & B | 200 |
| KGPO | *Tulsa, Okla. | C | |
| KHTP | Houston, Tex. | A & B | 500 |
| KIUK | Jefferson City, Mo. | A & B | 100 |
| KNFF | *Leavenworth, Kans. | D | 75 |
| KNGK | *Duncan, Okla. | A & B | 250 |
| KNHD | *Redwood Falls, Minn. | B | 500 |
| WCK | Detroit, Mich. | A & B | 500 |
| WMDZ | Indianapolis, Ind. | A & B | 800 |
| WMJ | *Buffalo, N. Y. | A & B | 500 |
| WPDE | Louisville, Ky. | A & B | 500 |
| WPDH | *Richmond, Ind. | D | 250 |
| WPDM | *Dayton, Ohio | B | 500 |
| WPDY | *Atlanta, Ga. | A & B | 150 |
| WPEB | Grand Rapids, Mich. | E | 500 |
| WPEC | *Memphis, Tenn. | A & B | 500 |
| WPEK | New Orleans, La. | A & B | 500 |
| WPGQ | *Columbus, Ohio | A & B | 700 |
| WPHE | *Indianapolis, Ind. | A & B | 600 |
| WRBH | *Cleveland, Ohio | A & B | 500 |

* Construction Permit Only
(A) Interzone Communication: 2812 kc. (5135 kc. day only).
(B) Zone Communication: 2040 kc. and 2044 kc. working, 2036 kc. calling.
(C) 2804 kc., 2036 kc., 5195 kc. calling; 2808 kc., 2040 kc., 2044 kc., 5195 kc. working.
(D) 2804 kc., 2036 kc., 5195 kc. calling; 2808 kc., 2044 kc., 2040 kc., 5140 kc. working.
(E) Same as (D) minus 2040 kc.

# SHORT-WAVE STATION LIST

**BROADCAST STATIONS INDICATED BY DOTS • PHONE (P) • EXPERIMENTAL (E) • HOURS IN E.S.T.**

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 31600 | 9.4 | W1XKA | • Boston, Mass. | 7 A.M.-1 A.M. Daily |
| 31600 | 9.4 | W1XKB | • Springfield, Mass. | 7 A.M.-1 A.M. Daily |
| 31600 | 9.4 | W8XKA | • Pittsburgh, Pa. | 9 A.M.-1 A.M. Daily |
| 31600 | 9.4 | W3XKA | • Philadelphia, Pa. | 10 A.M.-11 P.M. Daily |
| 31600 | 9.4 | W8XWJ | • Detroit, Mich. | Sunday 2:30-7:30 P.M. Daily 6:15 A.M.-12:30 P.M., 2-5 P.M., 7-10 P.M. |
| 27800 | 10.79 | DGF | Nauen, Germany | (P) Phones irreg. |
| 27400 | 10.95 | DGE | Nauen, Germany | (P) Phones irreg. |
| 26800 | 11.19 | DGX | Nauen, Germany | (P) Phones irreg. |
| 26100 | 11.49 | GSK | • Daventry, England | Not in use |
| 25950 | 11.56 | W6XKG | • Los Angeles, Calif. | Continuously 24 hours each day |
| 24380 | 12.3 | CRCX | • Bowmanville, Ont. | Experimental |
| 24300 | 12.35 | DGV | Nauen, Germany | (P) Phones irreg. |
| 23350 | 12.85 | DGT | Nauen, Germany | (P) Phones irreg. |
| 22800 | 13.16 | DGS | Nauen, Germany | (P) Phones irreg. |
| 21550 | 13.92 | GST | • Daventry, England | Not in use |
| 21540 | 13.92 | W8XK | • Pittsburgh, Pa. | 6:30 A.M.-9 A.M. daily |
| 21530 | 13.93 | GSJ | • Daventry, England | 5:45-8:55 A.M., 9:15 A.M.-12 noon daily |
| 21520 | 13.94 | W2XE | • Wayne, N. J. | Weekdays 6:30-9 A.M. Sundays 7-9 A.M. |
| 21520 | 13.94 | JZM | • Nazaki, Japan | Irregular |
| 21500 | 13.95 | NAA | Washington, D. C. | (E) Time signals |
| 21470 | 13.97 | GSH | • Daventry, England | 5:45-8:55 A.M., 9:15 A.M.-12 noon daily |
| 21460 | 13.98 | W1XAL | • Boston, Mass. | Irregular |
| 21450 | 13.99 | OLR6A | • Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 21420 | 14.01 | WKK | Lawrenceville, N. J. | (P) Phones LSN - PSA daytime; HJY - OCI-OCJ irregular |
| 21260 | 14.11 | WBU | Rocky Point, N. Y. | (P) Irregular |
| 21220 | 14.14 | WQA | Rocky Point, N. Y. | (P) Irregular |
| 21160 | 14.19 | LSL | Buenos Aires, Arg. | (P) Phones GAA mornings; DFB-DHO-PSE-EHY irreg. |
| 21140 | 14.19 | KBI | Manila, P. I. | (P) Tests and relays P. M. irregular |
| 21080 | 14.23 | PSA | Rio de Janeiro, Brazil | (P) Phones WKK-WLK daytime |
| 21060 | 14.25 | KWN | Dixon, Calif. | (P) Phones afternoon irregular |
| 21020 | 14.29 | LSN | Buenos Aires, Arg. | (P) Phones WKK-WLK daily; EHY, FTM irregular |
| 20910 | 14.35 | PSB | Rio de Janeiro, Brazil | (P) Phones N. Y. and Madrid irreg. |
| 20860 | 14.38 | EHY | Madrid, Spain | (P) Phones LSM-PPU-LSY mornings |
| 20860 | 14.38 | EDM | Madrid, Spain | (P) Phones LSM-PPU-LSY mornings |
| 20835 | 14.40 | PFF | Kootwijk, Holland | (P) Phones Java days |
| 20830 | 14.40 | PFF | Kootwijk, Holland | (P) Phones Java days |
| 20825 | 14.41 | PFF | Kootwijk, Holland | (P) Phones Java days |
| 20820 | 14.41 | KSS | Bolinas, Calif. | (P) Phones Far East A.M. |
| 20500 | 14.63 | DGQ | Nauen, Germany | (P) Phones irreg. |
| 20380 | 14.72 | GAA | Rugby, England | (P) Phones LSL mornings; LSY-LSM-PPU irregular |
| 20140 | 14.90 | DGW | Nauen, Germany | (P) Phones irreg. |
| 20040 | 14.97 | OPL | Leopoldville, Belgian Congo, Africa | (P) Tests with ORG mornings and noon |
| 20020 | 14.99 | DFZ | Nauen, Germany | (P) Phones PPU-LSM-PSA-LSL-YVR A.M. |
| 19987 | 15.01 | CFA | Drummondville, Que. | (P) Phones North America irregular |
| 19980 | 15.02 | KAX | Manila, P. I. | (P) Phones KWU evenings; DFC - JVE A.M.; early A.M. |
| 19947 | 15.04 | DLO | Rehmate, Germany | (P) Phones irreg. |
| 19820 | 15.14 | WKN | Lawrenceville, N. J. | (P) Phones GAU A.M. |
| 19720 | 15.21 | EAQ | Madrid, Spain | (P) Relays & tests A.M. |
| 19700 | 15.23 | DFJ | Nauen, Germany | (P) Phones irreg. |
| 19680 | 15.24 | CEC | Santiago, Chile | (P) Phones OCI - HJY afternoons |
| 19620 | 15.29 | VQG | Nairobi, Kenya, Africa | (P) Phones GAD 7-8 A.M. |
| 19600 | 15.31 | LSF | Buenos Aires, Arg. | (P) Phones and tests irregularly |
| 19530 | 15.36 | EDR2 | Madrid, Spain | (P) Phones LSM-PPU-YVR mornings |
| 19530 | 15.36 | EDX | Madrid, Spain | (P) Phones LSM-PPU-YVR mornings |
| 19520 | 15.37 | IRW | Rome, Italy | (P) Phones LSM-PPU mornings. Broadcasts irregularly |
| 19500 | 15.40 | LSQ | Buenos Aires, Arg. | (P) Phones daytime irregularly |
| 19460 | 15.42 | DFM | Nauen, Germany | (P) Phones irreg. |
| 19355 | 15.50 | FTM | St. Assise, France | (P) Phones LSM-PPU-YVR mornings |
| 19345 | 15.52 | PMA | Bandoeng, Java | (P) Phones Amsterdam 3-11 A.M. |
| 19260 | 15.58 | PPU | Rio de Janeiro, Brazil | (P) Phones DFB-EHY-FTM mornings |
| 19220 | 15.61 | WKF | Lawrenceville, N. J. | (P) Phones GAS - GAU mornings |
| 19200 | 15.62 | ORG | Brussels, Belgium | (P) Phones OPL A.M. |
| 19160 | 15.66 | GAP | Rugby, England | (P) Phones Australia A.M. |
| 19140 | 15.68 | LSM | Buenos Aires, Arg. | (P) Phones DFB-FTM-GAA-GAB A.M. |
| 19020 | 15.77 | HS8PJ | • Bangkok, Siam | Mondays 8-10 A.M. |
| 18970 | 15.81 | GAQ | Rugby, England | (P) Phones ZSS A.M. |
| 18960 | 15.82 | WQD | Rocky Point, N. Y. | (E) Tests LSY irreg. |
| 18920 | 15.85 | WQE | Rocky Point, N. Y. | (E) Programs, irreg. |
| 18910 | 15.86 | JVA | Nazaki, Japan | (P) Phones Europe days to 8:30 P.M. |
| 18890 | 15.88 | ZSS | Klipheuvel, So. Africa | (P) Phones GAQ-GAU mornings |
| 18880 | 15.89 | WQH | Rocky Point, N. Y. | (P) Irregular |
| 18825 | 15.94 | PLE | Bandoeng, Java | (P) Phones San Francisco 7-8:30 A.M. Tokyo 8:30 P.M.-7 A.M. |
| 18776 | 15.98 | TYD-3 | Paris, France | (P) Phones Madagascar |
| 18700 | 16.04 | DFQ | Nauen, Germany | (P) Phones irreg. |
| 18680 | 16.06 | OCI | Lima, Peru | (P) Phones CEC - HJY days; WKK-WOP noon |
| 18640 | 16.09 | PSC | Rio de Janeiro, Brazil | (P) Phones N. Y. and B. A. irreg. |
| 18620 | 16.11 | GAU | Rugby, England | (P) Phones VWY - ZSS early A.M.; Lawrenceville daytime |
| 18545 | 16.18 | PCM | Kootwijk, Holland | (P) Relays and phones Java early A.M. |
| 18540 | 16.19 | PCM | Kootwijk, Holland | (P) Relays and phones Java early A.M. |
| 18535 | 16.20 | PCM | Kootwijk, Holland | (P) Relays and phones Java early A.M. |
| 18480 | 16.23 | HBH | Geneva, Switzerland | (E) Relays to N. Y. mornings irreg. |
| 18450 | 16.26 | HBF | Geneva, Switzerland | (E) Commercial; irreg. |
| 18440 | 16.25 | HJY | Bogota, Colombia | (P) Phones CEC - OCI noon; music irreg. |
| 18410 | 16.29 | PCK | Kootwijk, Holland | (P) Phones PLE - PMC early A.M. |
| 18405 | 16.30 | PCK | Kootwijk, Holland | (P) Phones PLE - PMC early A.M. |
| 18400 | 16.31 | PCK | Kootwijk, Holland | (P) Phones PLE - PMC early A.M. |
| 18388 | 16.31 | FZS | Saigon, Indo-China | (P) Phones FTK early mornings |
| 18340 | 16.36 | WLA | Lawrenceville, N. J. | (P) Phones GAS A.M. |
| 18310 | 16.38 | GAS | Rugby, England | (P) Phones WLA-WMN mornings |
| 18295 | 16.39 | YVR | Maracay, Venezuela | (P) Phones DFB-EHY-FTM mornings |
| 18270 | 16.42 | IUD | • Addis Ababa, Ethiopia | Irregular |
| 18250 | 16.43 | FTO | St. Assise, France | (P) LSM-LSY A.M. |
| 18220 | 16.46 | KUS | Manila, P. I. | (P) Phones Bolinas nights |
| 18200 | 16.48 | GAW | Rugby, England | (P) Relays and phones N. Y. irreg. |
| 18190 | 16.49 | JVB | Nazaki, Japan | (P) Phones Java early mornings, U. S. evenings |
| 18180 | 16.51 | CGA | Drummondville, Que. | (P) Phones GBB A.M. |
| 18135 | 16.54 | PMC | Bandoeng, Java | (P) Phones Amsterdam 3-11 A.M. |
| 18115 | 16.56 | LSY3 | Buenos Aires, Arg. | (E) Phones DFB-FTM-GAA-PPU A.M.; evening broadcasts occasionally |
| 18090 | 16.58 | TYE-1 | Paris, France | (P) Phones New York evenings |
| 18075 | 16.59 | PCV | Kootwijk, Holland | (P) Phones PLE early mornings |
| 18070 | 16.60 | PCV | Kootwijk, Holland | (P) Phones PLE early mornings |
| 18065 | 16.61 | PCV | Kootwijk, Holland | (P) Phones PLE early mornings |
| 18060 | 16.61 | KUN | Bolinas, Calif. | (P) Phones Manila afternoons and nights |
| 18040 | 16.63 | GAB | Rugby, England | (P) Phones LSM noon |
| 18020 | 16.65 | KQJ | Bolinas, Calif. | (P) Phones afternoons; irregular |
| 17980 | 16.69 | KQZ | Bolinas, Calif. | (E) Tests and relays to LSY irreg. |
| 17940 | 16.72 | WQB | Rocky Point, N. Y. | (E) Tests with LSY, A.M. |
| 17900 | 16.76 | WLL | Rocky Point, N. Y. | (E) Relays to Geneva and Germany, A.M. |
| 17850 | 16.81 | LSN | Buenos Aires, Arg. | (P) Phones S. A. irreg. |
| 17790 | 16.86 | GSG | • Daventry, England | 5:45-8:55 A.M., 9:15 A.M.-12 noon, 12:15-4 P.M., 4-6 P.M. 11:30 P.M.-1:45 A.M. daily |
| 17785 | 16.87 | JZL | • Nazaki, Japan | Irregular |
| 17780 | 16.87 | W3XAL | • Bound Brook, N. J. | Sun. 7 A.M.-6:30 P.M. Weekdays—6:30 A.M.-6:30 P.M. |
| 17780 | 16.87 | W9XAA | • Chicago, Ill. | Not in use |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 17770 | 16.88 | PHI | ●Hilversum, Holland | Sun. 7-10 A.M., Mon., Tues., Thurs., Fri. 8-9:30 A.M. Sat. 8-10 A.M. |
| 17760 | 16.89 | W2XE | ●Wayne, N. J. | Not in use |
| 17760 | 16.89 | DJE | ●Zeesen, Germany | 12:05-5:15 A.M., 5:55-11 A.M. daily. Sun. 11:10 A.M-12:25 P.M. |
| 17755 | 16.90 | ZBW5 | ●Hong Kong, China | Daily 11:30 P.M.-1:30 A.M. ex. Sat. Mon. & Thurs. 4-10 A.M. Tues., Wed., Fri., Sun., 3-10 A.M. Sat. 3-11 A.M., 9 P.M.-1:30 A.M. |
| 17750 | 16.91 | IAC | Pisa, Italy | (P) Phones and tests to ships A.M. |
| 17740 | 16.91 | HSP | Bangkok, Siam | (P) Phones DFB early A.M. |
| 17710 | 16.94 | CJA-3 | Drummondville, Que. | (P) Phones Australia and Far East early A.M. |
| 17699 | 16.95 | IAC | Pisa, Italy | (P) Phones and tests to ships A.M. |
| 17650 | 17.00 | XGM | Shanghai, China | (P) Phones irreg. |
| 17620 | 17.03 | IBC | San Paolo, Italy | (P) Irregular |
| 17545 | 17.10 | VWY | Poona, India | (P) Phones GAU-GBC-GBU mornings |
| 17520 | 17.12 | DFB | Nauen, Germany | (P) Phones PPU-YVR-KAY mornings |
| 17480 | 17.16 | VWY | Poona, India | (P) Phones GAU-GBC-GBU daytime |
| 17341 | 17.30 | DGR | Nauen, Germany | (P) Phones irreg. |
| 17280 | 17.36 | FZE8 | Djibouti, French Somaliland, Africa | (P) Irregular |
| 17265 | 17.38 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 17260 | 17.37 | CMA5 | Havana, Cuba | (P) Phones and tests evenings |
| 17260 | 17.37 | DAN | Nordenland, Germany | (P) Phones ships A.M. |
| 17120 | 17.52 | WOO | Ocean Gate, N. J. | (P) Phones ships daytime |
| 17120 | 17.52 | WOY | Lawrenceville, N. J. | (P) Phones England irregularly |
| 17080 | 17.56 | GBC | Rugby, England | (P) Phones ships daytime |
| 16910 | 17.74 | IZD | Nazaki, Japan | (P) Phones ships irreg. |
| 16385 | 18.31 | ITK | Mogdishu, Somaliland, Africa | (P) Irregular |
| 16305 | 18.39 | PCL | Kootwijk, Holland | (P) Special relays and phones irreg. |
| 16300 | 18.44 | WLK | Lawrenceville, N. J. | (P) Phones England irreg. |
| 16250 | 18.46 | FZR | Saigon, Indo-China | (P) Phones FTA-FTK early A.M. |
| 16240 | 18.47 | KTO | Manila, P. I. | (P) Phones JVE-KWU evenings |
| 16140 | 18.59 | GBA | Rugby, England | (P) Phones Argentina & Brazil irreg. |
| 16117 | 18.62 | IRY | Rome, Italy | (P) Phones IDU-ITK A.M. |
| 16050 | 18.69 | JVC | Nazaki, Japan | (P) Phones Hong Kong early A.M. |
| 16030 | 18.71 | KKP | Kahuku, Hawaii | (P) KWU A.M. & P.M. Tests JVF-KTO-PLE mornings |
| 15930 | 18.83 | FYC | Pontoise, France | (P) Phones 9:00 A.M. and irreg. |
| 15880 | 18.89 | FTK | St. Assise, France | (P) FZR-FZS-LSM-PPU-YVR mornings |
| 15860 | 18.90 | JVD | Nazaki, Japan | (P) Phones Shanghai early A.M.; to KWU 4 P.M. and 4 A.M. daily |
| 15860 | 18.90 | CEC | Santiago, Chile | (P) Phones OCJ A.M. |
| 15810 | 18.97 | LSL | Buenos Aires, Arg. | (P) GAA, A.M.; GCA, PSE, PSF, P.M. |
| 15800 | 18.99 | XOJ | Shanghai, China | (E) Phones GBA 6-7 A.M., KWO-KWU 8-11 P.M. |
| 15760 | 19.04 | JYT | Kemikawa-Cho, Japan | (E) Tests KKW-KWE-KWU evenings |
| 15740 | 19.06 | IIA | Chureki, Japan | (P) Nazaki early A.M. |
| 15700 | 19.11 | WJS | Hicksville, L. I., N. Y. | (P) Phones Ethiopia irregular |
| 15670 | 19.15 | WAE | Brentwood, N. Y. | (E) Tests afternoons |
| 15660 | 19.16 | JVE | Nazaki, Japan | (P) Phones PLE early A.M.; KTO eves. |
| 15625 | 19.20 | OCJ | Lima, Peru | (P) Phones CEC days |
| 15620 | 19.21 | JVF | Nazaki, Japan | (P) Phones KWO-KWU after 4 P.M. |
| 15550 | 19.29 | CO9XX | Tuinucu, Cuba | (E) Irregular |
| 15530 | 19.32 | HSC-2 | Bangkok, Siam | (P) Phones JVE late P. M. and early A.M. |
| 15530 | 19.32 | HS8PJ | ●Bangkok, Siam | Mondays 8-10 A.M. occasionally |
| 15505 | 19.36 | CMA-3 | Havana, Cuba | (P) Phones and tests irregularly |
| 15490 | 19.37 | KEM | Bolinas, Calif. | (P) Phones Java and China; irregular |
| 15475 | 19.39 | KKL | Bolinas, Calif. | (P) Phones Manila and Japan; irregular |
| 15460 | 19.41 | KKR | Bolinas, Calif. | (P) Phones Manila and Japan; irregular |
| 15450 | 19.42 | IUG | Addis Ababa, Ethiopia | (P) Phones irregular |
| 15430 | 19.44 | KWE | Bolinas, Calif. | (P) Tests JYK-JYT-PLE evenings |
| 15415 | 19.46 | KWO | Dixon, Calif. | (P) Phones JVF evenings |
| 15370 | 19.52 | HAS3 | ●Budapest, Hungary | Sunday 9-10 A.M. |
| 15360 | 19.53 | DZG | ●Zeesen, Germany | Irregular |
| 15355 | 19.54 | KWU | Dixon, Calif. | (P) Phones Japan, Manila and Java evenings |
| 15340 | 19.56 | DJR | ●Zeesen, Germany | 8-9 A.M., 4:50-10:45 P.M. daily |
| 15330 | 19.56 | W2XAD | ●Schenectady, N. Y. | 10 A.M.-3 P.M. daily |
| 15320 | 19.58 | OLR5B | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 15310 | 19.60 | GSP | ●Daventry, England | 6:20-8:30 P.M. daily |
| 15300 | 19.61 | CP7 | ●La Paz, Bolivia | No regular schedule |
| 15300 | 19.61 | XEBM | ●Mazatlan, Mexico | Daily 9-10 A.M., 1-2 P.M., 8-10 P.M. |
| 15290 | 19.62 | LRU | ●Buenos Aires, Arg. | 7-9 A.M. daily |
| 15280 | 19.63 | HI3X | ●Ciudad Trujillo, R. D. | Sundays, 7:40-10:40 A.M.; weekdays, 12:10-1:10 P.M. |
| 15280 | 19.63 | DJQ | ●Zeesen, Germany | 12:05-5:15 A.M., 6-8 A.M., 8:15-11 A.M., 4:50-10:45 P.M. daily. Sun. 11:10 A.M.-12:25 P.M. |
| 15270 | 19.64 | W2XE | ●Wayne, N. J. | Weekdays 2-5 P.M. Sundays 12-3 P.M., 4-5 P.M. |
| 15260 | 19.66 | GSI | ●Daventry, England | 12:15-4 P.M., 9-11 P.M. daily |
| 15252 | 19.67 | RIM | Tashkent, U.S.S.R. | (P) Phones RKI early mornings |
| 15250 | 19.67 | W1XAL | ●Boston, Mass. | Not in use |
| 15243 | 19.68 | TPA2 | ●Pontoise, France | 6-11 A.M. daily |
| 15230 | 19.70 | OLR5A | ●Prague, Czechoslovakia | Daily, 9:25-11:20 A.M. 2-2:15 P.M. |
| 15220 | 19.71 | PCJ | ●Hilversum, Holland | Tues., 4:30-6 A.M., Wed., 8-11 A.M. |
| 15210 | 19.72 | W8XK | ●Pittsburgh, Pa. | 9 A.M.-7 P.M. daily |
| 15200 | 19.74 | DJB | ●Zeesen, Germany | 12:05 A.M.-5:15 A.M., 5:55-11 A.M., 11:10 A.M.-12:25 P.M., 4:55-10:45 P.M. daily. 8-9 A.M. Sun. only. |
| 15190 | 19.75 | ZBW-4 | ●Hong Kong, China | Daily ex. Sat. 11:30 P.M.-1:30 A.M. Mon. & Thurs. 4-10 A.M. Tues., Wed., Fri., Sun., 3-10 A.M. Sat., 3-11 A.M., 9 P.M.-1:30 A.M. |
| 15183 | 19.76 | RV96 | ●Moscow, U.S.S.R. | Not in use |
| 15180 | 19.76 | GSO | ●Daventry, England | 5:45-8:45 A.M., 9:15 A.M.-12 noon, 4-6 P.M., 6:20-8:30 P.M., 11:30 P.M.-1:45 A.M. daily |
| 15160 | 19.79 | OLR5C | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 15160 | 19.79 | JZK | ●Nazaki, Japan | 9-10 A.M., 2:30-3:30 P.M., 4-5 P.M., 12-1 A.M. |
| 15150 | 19.80 | YDC | ●Soerabaja, Java | 5:30-10 A.M., 6-8:30 P.M., 10:30 P.M.-2 A.M. daily |
| 15140 | 19.82 | GSF | ●Daventry, England | 4-6 P.M., 9-11 P.M. daily |
| 15121 | 19.84 | HVJ | ●Vatican City, Vatican | 10:30-10:45 A.M. weekdays |
| 15110 | 19.85 | DJL | ●Zeesen, Germany | 12-2 A.M., 8-9 A.M., 11:35 A.M.-4:30 P.M. daily. Sunday 6-8 A.M. |
| 15070 | 19.91 | PSD | Rio de Janeiro, Brazil | (P) Phones B. A. irreg. |
| 15040 | 19.95 | RKI | ●Moscow, U.S.S.R. | 7-9:15 P.M. daily |
| 15055 | 19.92 | WNC | Hialeah, Fla. | (P) Phones daytime |
| 15040 | 19.95 | HIR | Ciudad Trujillo, R. D. | (P) Phones WNC days |
| 14985 | 20.02 | YSL | San Salvador, Salvador | (P) Phones days irreg. |
| 14980 | 20.03 | KAY | Manila, P. I. | (P) Phones DFC-DFD-GCJ early A.M.; KWU evenings |
| 14970 | 20.04 | LZA | ●Sofia, Bulgaria | Weekdays 5-6:30 A.M., 12-2:45 P.M. Sundays 12 A.M.-4:30 P.M. |
| 14940 | 20.06 | HJB | Bogota, Colombia | (P) Phones WNC-PPU-YVQ days |
| 14940 | 20.06 | HJA-3 | Barranquilla, Colombia | (P) Phones 8 A.M.-8 P.M. |
| 14940 | 20.06 | HJA-9 | El Centro, Colombia | (P) Phones 8 A.M.-8 P.M. |
| 14940 | 20.06 | HI1I | Ciudad Trujillo, R. D. | (P) Phones 8 A.M.-8 P.M. |
| 14935 | 20.07 | PSE | Rio de Janeiro, Brazil | (P) Phones LSL-WLK day irreg.; EDM-EHY 8 A.M. Broadcasts irreg. |
| 14920 | 20.11 | KQH | Kahuku, Hawaii | (P) Tests irregularly |
| 14910 | 20.12 | JVG | Nazaki, Japan | (P) Phones Formosa and broadcasts 1-2:30 A.M. irreg. |
| 14845 | 20.19 | OCJ2 | Lima, Peru | (P) Phones HJY and others daytime |
| 14800 | 20.27 | WOV | Rocky Point, N. Y. | (E) Tests Europe irreg. |
| 14790 | 20.28 | RIZ | Irkutsk, U.S.S.R. | (P) Calls RKI 9:30 A.M. |
| 14770 | 20.31 | WEB | Rocky Point, N. Y. | (E) Tests with Europe; irregular |
| 14730 | 20.37 | IQA | Rome, Italy | (P) Phones Japan and Egypt; sends music at times |
| 14690 | 20.42 | PSF | Rio de Janeiro, Brazil | (P) Phones LSL-WLK-WOK daytime |
| 14665 | 20.46 | DFD | Nauen, Germany | (P) Phones irreg. |
| 14653 | 20.47 | GBL | Rugby, England | (P) Phones Nazaki early A.M. |
| 14620 | 20.52 | EHY | Madrid, Spain | (P) Phones LSM mornings irreg. |
| 14620 | 20.52 | EDM | Madrid, Spain | (P) Phones PPU-PSA-PSE mornings |
| 14605 | 20.54 | DGZ | Nauen, Germany | (P) Phones irreg. |
| 14600 | 20.55 | JVH | ●Nazaki, Japan | (E) Phones DFB-GTJ-PCJ-TYB early mornings. Broadcasts irreg. |
| 14590 | 20.56 | WMN | Lawrenceville, N. J. | (P) Phones England days |
| 14535 | 20.64 | HBJ | ●Geneva, Switzerland | Phones irregular BC-6:45-8:30 P.M. Satur- |

## Short-Wave Station List

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| | | | | days |
| 14530 | 20.65 | LSN | Buenos Aires, Arg. | (P) Phones PSF-WLK-WOK irreg. |
| 14485 | 20.71 | TIR | Cartago, Costa Rica | (P) Phones WNC days |
| 14485 | 20.71 | TIU | Cartago, Costa Rica | (P) Phones WNC days |
| 14485 | 20.71 | YNA | Managua, Nicaragua | (P) Phones WNC days |
| 14485 | 20.71 | HPF | Panama City, Panama | (P) Phones daytime |
| 14485 | 20.71 | HRF | Tegucigalpa, Honduras | (P) Phones 8 A.M.-8 P. M. |
| 14485 | 20.71 | HRM | Tela, Honduras | (P) Phones WNC days |
| 14485 | 20.71 | TGF | Guatemala City, Guat. | (P) Phones WNC days |
| 14485 | 20.71 | HRL5 | La Lima, Honduras | (P) Phones WNC 5:45 P.M. |
| 14480 | 20.72 | PLX | Bandoeng, Java | (P) Phones Europe and B.C. irregular to 3 P.M. |
| 14470 | 20.73 | WMF | Lawrenceville, N. J. | (P) Phones England day time |
| 14460 | 20.75 | DZH | ●Zeesen, Germany | Irregular |
| 14440 | 20.78 | GBW | Rugby, England | (P) Phones Lawrenceville daytime |
| 14410 | 20.82 | DOT | Konigs W'n, Germany | (P) Phones irreg. |
| 14410 | 20.82 | IBC | San Paolo, Italy | (P) Irregular |
| 14250 | 21.00 | W10XDA | Schooner Morrissey | (P) Irregular |
| 13990 | 21.44 | GBA2 | Rugby, England | (P) Phones Argentina & Brazil irreg. |
| 13900 | 21.58 | WQP | Rocky Point, N. Y. | (E) Test daytime |
| 13820 | 21.70 | SUZ | Cairo, Egypt | (P) Phones DFC-DGU-GBB daytime |
| 13780 | 21.77 | KKW | Bolinas, Calif. | (P) Special relays; tests afternoon and evening |
| 13760 | 21.80 | TYE-2 | Paris, France | (P) Phones U. S. days |
| 13745 | 21.83 | CGA-2 | Drummondville, Que. | (P) Phones Europe irreg. |
| 13738 | 21.82 | RIS | Tiflis, U.S.S.R. | (P) Tests with Moscow irregular |
| 13720 | 21.87 | KLL | Bolinas, Calif. | (P) Special relays; tests afternoon and evening |
| 13690 | 21.91 | KKZ | Bolinas, Calif. | (P) Tests Japan and Java early A.M.; days Honolulu |
| 13667 | 21.98 | HJY | Bogota, Colombia | (P) Phones CEC afternoons |
| 13635 | 22.00 | SPW | ●Warsaw, Poland | 12:30-1:30 P.M. Mon., Wed., Fri. |
| 13610 | 22.04 | JYK | Kemikawa-Cho, Japan | (E) Tests irregular A.M. |
| 13600 | 22.06 | ZMBJ | ●"TSS Awatea," Wellington, N. Z. | See 8840 kc. |
| 13595 | 22.07 | GBB2 | Rugby, England | (P) Phones Canada days |
| 13585 | 22.08 | GBB | Rugby, England | (P) Phones CGA3-SUV-SUZ daytime |
| 13560 | 22.12 | JVI | Nazaki, Japan | (P) Phones Manchukuo irregularly |
| 13465 | 22.28 | WKC | Rocky Point, N. Y. | (E) Tests and relays irregular |
| 13435 | 22.33 | WKD | Rocky Point, N. Y. | (E) Tests and relays irregular |
| 13415 | 22.36 | GCJ | Rugby, England | (P) Tests with JVH afternoons |
| 13410 | 22.37 | WCT | San Juan, P. R. | (P) Phones WNC 5:45 P.M. |
| 13410 | 22.37 | YSJ | San Salvador, Salvador | (P) Phones WNC days |
| 13390 | 22.40 | WMA | Lawrenceville, N. J. | (P) Phones GAS-GBS GBU-GBW daily |
| 13380 | 22.42 | IDU | Asmara, Eritrea, Africa | (P) Phones Italy early A.M. and sends music |
| 13370 | 22.44 | WOJ | Hialeah, Florida | (P) Phones 8 A.M.-8 P. M. |
| 13345 | 22.48 | YVQ | Maracay, Venezuela | (P) Phones WNC-HJB days |
| 13285 | 22.58 | CGA3 | Drummondville, Que. | (P) Phones England days |
| 13275 | 22.60 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 13240 | 22.66 | KBJ | Manila, P. I. | (P) Phones nights and early A.M. |
| 13220 | 22.70 | IRJ | Rome, Italy | (P) Phones Japan 5-8 A.M., and works Cairo days |
| 13180 | 22.76 | DGG | Nauen, Germany | (P) Relays to Riverhead days |
| 13100 | 22.90 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 13020 | 23.04 | IZE | Nazaki, Japan | (P) Phones ships irreg. |
| 13000 | 23.08 | TYC | Paris, France | (P) Phones CNR A.M. |
| 12985 | 23.10 | DFC | Nauen, Germany | (P) Phones KAY-SUV-SUZ early A.M. |
| 12865 | 23.32 | IAC | Pisa, Italy | (P) Phones ships irreg. |
| 12860 | 23.33 | RKR | Novosibirsk, U.S.S.R. | (P) Daily, 7 A.M. |
| 12840 | 23.36 | WQO | Ocean Gate, N. J. | (P) Phones ships days |
| 12830 | 23.37 | HJC | Barranquilla, Colombia | (P) Phones HJB-HPF-WNC days |
| 12830 | 23.38 | HJA-3 | Barranquilla, Colombia | (P) Phones HJB-HPF-WNC days |
| 12830 | 23.38 | CNR | Rabat, Morocco | (P) Phones FYB-TYB-FTA near 4 P.M. |
| 12830 | 23.38 | CNR | ●Rabat, Morocco | Special broadcasts irreg. |
| 12795 | 23.45 | IAC | Pisa, Italy | (P) Phones ships and tests Tripoli, irreg. |
| 12780 | 23.47 | GBC | Rugby, England | (P) Phones VWY early A.M. |
| 12500 | 24.00 | HIN | ●Ciudad Trujillo, R.D. | 11:40 A.M.-1:40 P.M., 7:10-9:50 P.M. ex. Sunday |
| 12300 | 24.39 | CEB | ●Santiago, Chile | 11 A.M.-1 P.M., 4-8 P. M., 10-11 P.M. daily |
| 12300 | 24.39 | PLM | Bandoeng, Java | (P) Phones 2ME near 6:30 A.M. |
| 12295 | 24.40 | ZLU | Wellington, N. Z. | (P) Phones ZLJ early A.M. |
| 12290 | 24.41 | GBU | Rugby, England | (P) Phones Lawrenceville days |
| 12280 | 24.43 | KUV | Manila, P. I. | (P) Phones early A. M. |
| 12250 | 24.49 | TYB | Paris, France | (P) Phones JVH-XGR and ships irreg. |
| 12235 | 24.52 | TFJ | Reykjavik, Iceland | (P) Phones England days |
| 12235 | 24.52 | TFJ | ●Reykjavik, Iceland | English broadcast each Sun., 1:40-2:30 P.M. |
| 12220 | 24.55 | FLJ | Paris, France | (P) Phones ships irreg. |
| 12215 | 24.56 | TYA | Paris, France | (P) Algeria days |
| 12150 | 24.69 | GBS | Rugby, England | (P) Phones Lawrenceville days |
| 12130 | 24.73 | DZE | ●Zeesen, Germany | Irregular |
| 12120 | 24.75 | TPZ | Alger, Algeria, Africa | (P) 12-1 A.M. Irreg. |
| 12100 | 24.79 | CJA | Drummondville, Que. | (P) Tests VIY early A. M. and evenings |
| 12060 | 24.88 | PDV | Kootwijk, Holland | (P) PLE-PLV-PMC early mornings |
| 12035 | 24.93 | DGL | Nauen, Germany | (P) Phones irreg. |
| 12055 | 24.89 | PDV | Kootwijk, Holland | (P) PLE-PLV-PMC early mornings. |
| 12050 | 24.90 | PDV | Kootwijk, Holland | (P) PLE-PLV-PMC early mornings |
| 12020 | 24.95 | VIY | Rockbank, Australia | (P) Tests CJA6 early A.M. and evenings |
| 12000 | 25.00 | RNE | ●Moscow, USSR. | Sun. 6-7 A.M., 10-11 A. M., Wed. 6-7 A.M., Sun., Mon., Wed., Fri., 4-5 P.M. |
| 11991 | 25.02 | FZS | Saigon, Indo-China | (P) Phones FTA-FTK early A.M. |
| 11960 | 25.08 | HI2X | ●Cuidad Tryillo, R. D. | Tues. & Fri., 8-10-10:10 P.M. |
| 11955 | 25.09 | IBC | San Paolo, Italy | (P) Irregular |
| 11955 | 25.09 | IUC | ●Addis Ababa, Ethiopia | 12-1 A.M.; music at times |
| 11950 | 25.11 | KKQ | Bolinas, Calif. | (P) Relays programs to Hawaii eve. |
| 11940 | 25.13 | FTA | St. Assise, France | (P) Phones FZS-FZR early A.M. |
| 11935 | 25.14 | YNA | Managua, Nicaragua | (P) Cent. and S. A. stations, days |
| 11900 | 25.21 | XEWI | ●Mexico City, Mexico | Sun. 12:30-2 P.M. Mon., Wed., Fri., 3-4 P.M., 9 P.M.-12 A.M. Tues., Thurs.,, 7:30 P.M.-12 A.M. Sat., 9 P.M.-12 A.M. (see 6015 kc.) |
| 11900 | 25.21 | OLR4D | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11895 | 25.22 | XEXR | ●Mexico City, Mexico | 6-11:30 P.M. |
| 11895 | 25.22 | HP5I | ●Aguadulce, Panama | 7:30-9:30 P.M. daily |
| 11885 | 25.24 | TPA3 | ●Pontoise, France | 4-5 A.M., 12:15-6 P.M. daily |
| 11880 | 25.25 | XEXA | ●Mexico City, Mexico | 8-11:30 A.M., 3-5 P.M., 7-11 P.M. ex. Sunday |
| 11875 | 25.26 | OLR4C | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11870 | 25.26 | W8XK | ●Pittsburgh, Pa. | 7-9 P.M. daily |
| 11860 | 25.29 | YDB | ●Soerabaja, Java | 10:30 P.M.-2 A.M. daily |
| 11860 | 25.29 | GSE | ●Daventry, England | Not in use |
| 11855 | 25.31 | DJP | ●Zeesen, Germany | Irregular |
| 11840 | 25.34 | OLR4A | ●Prague, Czechoslovakia | Daily 2:30-4:30 P.M. Mon. & Thurs. 8-10:10 P.M. |
| 11830 | 25.36 | W2XE | ●Wayne, N. J. | 6-11 P.M. daily |
| 11830 | 25.36 | W9XAA | ●Chicago, Ill. | Not in use |
| 11820 | 25.38 | XEBR | ●Hermosillo, Mexico | 1-4 P.M., 9 P.M.-12 A. M. daily |
| 11820 | 25.38 | GSN | ●Daventry, England | Not in use |
| 11810 | 25.40 | 2RO4 | ●Rome, Italy | 6:43 A.M.-12:30 P.M. (See 9635 kc.) |
| 11800 | 25.42 | COGF | ●Matanzas, Cuba | 8 A.M.-11 P.M. daily |
| 11801 | 25.42 | OER-2 | ●Vienna, Austria | Weekdays 9 A.M.-5 P. M. Saturdays to 6 P. M. |
| 11800 | 25.42 | OAX5A | ●Ica, Peru | Daily 1 A.M.-12 noon, 4-11 P.M. |
| 11800 | 25.42 | JZJ | ●Nazaki, Japan | 9-10 A.M., 4-5 P.M., 2:30-3:30 P.M., 12-1 A.M. daily |
| 11795 | 25.43 | DIO | ●Zeesen, Germany | Irregular |
| 11790 | 25.43 | WIXAL | ●Boston, Mass. | News 5-5:30 P.M. daily |
| 11770 | 25.49 | DJD | ●Zeesen, Germany | 11:35 A.M.-4:30 P.M., 4:50-10:45 P.M. |
| 11760 | 25.50 | XETA | ●Monterrey, Mexico | 7-11 P.M. daily |
| 11760 | 25.51 | OLR4B | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11750 | 25.53 | GSD | ●Daventry, England | 12:15-4 P.M., 6:20-8:30 P.M., 9-11 P.M., 11:30 P.M.-1:45 A.M. daily |
| 11740 | 25.55 | RKF | Moscow, U.S.S.R. | (P) Calls U.S.S.R. phones often |
| 11740 | 25.55 | HP5L | ●David, Panama | 4-7 P.M. daily |
| 11730 | 25.57 | XETM | ●Villahermosa, Mexico | 6-11 P.M. daily |
| 11730 | 25.57 | PHI | ●Hilversum, Holland | Not in use |
| 11720 | 25.60 | CJRX | ●Winnipeg, Manitoba | Week Days 6 P.M.-12 A.M. Sundays 5-10 P.M. |
| 11720 | 25.60 | TPA4 | ●Pontoise, France | 6:15-8:15 P.M., 10 P.M.-1 A.M. daily |
| 11718 | 25.60 | CR7BH | ●Lourenco Marques, E. Africa | Sundays 6-8 A.M., 10 A. M.-12:30 P.M., 1:30-3:30 P. M. Weekdays, Mon. to Sat., 11:45 P. M. (Sunday)-12:30 A. M., 4:30-6:30 A.M., 9:30-11 A.M., 12:30-4 P.M. |
| 11710 | 25.62 | Philco Radio | ●Saigon, Indo-China | Daily 6:30-9:30 A.M. News: French 9-9:10 A.M. |
| 11710 | 25.62 | VK9MI | ●Sydney, Australia; "S.S. Kanimbla" | 11 P.M., 8 A.M. and later |


| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| | | | | Sun. 7-10 A.M., Mon., Tues., Thurs., Fri. 8-9:30 A.M. Sat. 8-10 A.M. |
| | | | | Not in use |
| | | | | 12:05-5:15 A.M., 5:55-11 A.M. daily. Sun. 11:10 A.M-12:25 P.M. |
| | | | | Daily 11:30 P.M.-1:30 A.M. ex. Sat. Mon. & Thurs. 4-10 A.M. Tues., Wed., Fri., Sun., 3-10 A.M. Sat. 3-11 A.M., 9 P.M.-1:30 A.M. |
| | | | | (P) Phones and tests to ships A.M. |
| | | | | (P) Phones DFB early A.M. |
| | | | | (P) Phones Australia and Far East early A.M. |
| | | | | (P) Phones and tests to ships A.M. |
| | | | China | (P) Phones irreg. |
| | | | , Italy | (P) Irregular |
| | | | ndia | (P) Phones GAU-GBC-GBU mornings |
| | | | Germany | (P) Phones PPU-YVR-KAY mornings |
| | | | India | (P) Phones GAU-GBC-GBU daytime |
| | | | , Germany | (P) Phones irreg. |
| | | | ti, French Somali- | (P) Irregular |
| | | | I, Africa | |
| | | | deich, Germany | (P) Phones ships irreg. |
| | | | Havana, Cuba | (P) Phones and tests evenings |
| | | DAN | Nordenland, Germany | (P) Phones ships A.M. |
| | 17.52 | WOO | Ocean Gate, N. J. | (P) Phones ships daytime |
| 20 | 17.52 | WOY | Lawrenceville, N. J. | (P) Phones England irregularly |
| 17080 | 17.56 | GBC | Rugby, England | (P) Phones ships daytime |
| 16910 | 17.74 | JZD | Nazaki, Japan | (P) Phones ships irreg. |
| 16385 | 18.31 | ITK | Mogdishu, Somaliland, Africa | (P) Irregular |
| 16305 | 18.39 | PCL | Kootwijk, Holland | (P) Special relays and phones irreg. |
| 16300 | 18.44 | WLK | Lawrenceville, N. J. | (P) Phones England irreg. |
| 16250 | 18.46 | FZR | Saigon, Indo-China | (P) Phones FTA - FTK early A.M. |
| 16240 | 18.47 | KTO | Manila, P. I. | (P) Phones JVE-KWU evenings |
| 16140 | 18.59 | GBA | Rugby, England | (P) Phones Argentina & Brazil irreg. |
| 16117 | 18.62 | IRY | Rome, Italy | (P) Phones IDU - ITK A.M. |
| 16050 | 18.69 | JVC | Nazaki, Japan | (P) Phones Hong Kong early A.M. |
| 16030 | 18.71 | KKP | Kahuku, Hawaii | (P) KWU A.M. & P.M. Tests JVF - KTO - PLE mornings |
| 15930 | 18.83 | FYC | Pontoise, France | (P) Phones 9:00 A.M. and irreg. |
| 15880 | 18.89 | FTK | St. Assise, France | (P) FZR - FZS - LSM - PPU-YVR mornings |
| 15860 | 18.90 | JVD | Nazaki, Japan | (P) Phones Shanghai early A.M.; to KWU 4 P.M. and 4 A.M. daily |
| 15860 | 18.90 | CEC | Santiago, Chile | (P) Phones OCJ A.M. |
| 15810 | 18.97 | LSL | Buenos Aires, Arg. | (P) GAA, A.M.; GCA, PSE, PSF, P.M. |
| 15800 | 18.99 | XOJ | Shanghai, China | (E) Phones GBA 6-7 A.M., KWO-KWU 8-11 P.M. |
| 15760 | 19.04 | JYT | Kemikawa-Cho, Japan | (E) Tests KKW-KWE-KWU evenings |
| 15740 | 19.06 | JIA | Chureki, Japan | (P) Nazaki early A.M. |
| 15700 | 19.11 | WJS | Hicksville, L. I., N. Y. | (P) Phones Ethiopia irregular |
| 15670 | 19.15 | WAE | Brentwood, N. Y. | (E) Tests afternoons |
| 15660 | 19.16 | JVE | Nazaki, Japan | (P) Phones PLE early A.M.; KTO eves. |
| 15625 | 19.20 | OCJ | Lima, Peru | (P) Phones CEC days |
| 15620 | 19.21 | JVF | Nazaki, Japan | (P) Phones KWO-KWU after 4 P.M. |
| 15550 | 19.29 | CO9XX | Tuinucu, Cuba | (E) Irregular |
| 15530 | 19.32 | HSC-2 | Bangkok, Siam | (P) Phones JVE late P. M. and early A.M. |
| 15530 | 19.32 | HS8PJ | ● Bangkok, Siam | Mondays 8-10 A.M. occasionally |
| 15505 | 19.36 | CMA-3 | Havana, Cuba | (P) Phones and tests irregularly |
| 15490 | 19.37 | KEM | Bolinas, Calif. | (P) Phones Java and China; irregular |
| 15475 | 19.39 | KKL | Bolinas, Calif. | (P) Phones Manila and Japan; irregular |
| 15460 | 19.41 | KKR | Bolinas, Calif. | (P) Phones Manila and Japan; irregular |
| 15450 | 19.42 | IUG | Addis Ababa, Ethiopia | (P) Phones irregular |
| 15430 | 19.44 | KWE | Bolinas, Calif. | (P) Tests JYK - JYT - PLE evenings |
| 15415 | 19.46 | KWO | Dixon, Calif. | (P) Phones JVF evenings |
| 15370 | 19.52 | HAS3 | ● Budapest, Hungary | Sunday 9-10 A.M. |
| 15360 | 19.53 | DZG | ● Zeesen, Germany | Irregular |
| 15355 | 19.54 | KWU | Dixon, Calif. | (P) Phones Japan, Manila and Java evenings |
| 15340 | 19.56 | DJR | ● Zeesen, Germany | 8-9 A.M., 4:50-10:45 P.M. daily |
| 15330 | 19.56 | W2XAD | ● Schenectady, N. Y. | 10 A.M.-8 P.M. daily |
| 15320 | 19.58 | OLR5B | ● Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 15310 | 19.60 | GSP | ● Daventry, England | 6:20-8:30 P.M. daily |
| 15300 | 19.61 | CP7 | ● La Paz, Bolivia | No regular schedule |
| 15300 | 19.61 | XEBM | ● Mazatlan, Mexico | Daily 9-10 A.M., 1-2 P.M., 8-10 P.M. |
| 15290 | 19.62 | LRU | ● Buenos Aires, Arg. | 7-9 A.M. daily |
| 15280 | 19.63 | HI3X | ● Ciudad Trujillo, R. D. | Sundays, 7:40-10:40 A.M.; weekdays, 12:10-1:10 P.M. |
| 15280 | 19.63 | DJQ | ● Zeesen, Germany | 12:05-5:15 A.M., 6-8 A.M., 8:15-11 A.M., 4:50-10:45 P.M. daily. Sun., 11:10 A.M.-12:25 P.M. |
| 15270 | 19.64 | W2XE | ● Wayne, N. J. | Weekdays 2-5 P.M. Sundays 12-3 P.M., 4-5 P.M. |
| 15260 | 19.66 | GSI | ● Daventry, England | 12:15-4 P.M., 9-11 P.M. daily |
| 15252 | 19.67 | RIM | Tashkent, U.S.S.R. | (P) Phones RKI early mornings |
| 15250 | 19.67 | W1XAL | ● Boston, Mass. | Not in use |
| 15243 | 19.68 | TPA2 | ● Pontoise, France | 6-11 A.M. daily |
| 15230 | 19.70 | OLR5A | ● Prague, Czechoslovakia | Daily, 9:25-11:20 A.M. 2-2:15 P.M. |
| 15220 | 19.71 | PCJ | ● Hilversum, Holland | Tues., 4:30-6 A.M., Wed., 8-11 A.M. |
| 15210 | 19.72 | W8XK | ● Pittsburgh, Pa. | 9 A.M.-7 P.M. daily |
| 15200 | 19.74 | DJB | ● Zeesen, Germany | 12:05 A.M.-5:15 A.M., 5:55-11 A.M., 11:10 A.M.-12:25 P.M., 4:55-10:45 P.M. daily. 8-9 A.M. Sun. only. |
| 15190 | 19.75 | ZBW-4 | ● Hong Kong, China | Daily ex. Sat. 11:30 P.M.-1:30 A.M. Mon. & Thurs. 4-10 A.M. Tues., Wed., Fri., Sun., 3-10 A.M. Sat., 3-11 A.M., 9 P.M.-1:30 A.M. |
| 15183 | 19.76 | RV96 | ● Moscow, U.S.S.R. | Not in use |
| 15180 | 19.76 | GSO | ● Daventry, England | 5:45-8:45 A.M., 9:15 A.M.-12 noon, 4-6 P.M., 6:20-8:30 P.M., 11:30 P.M.-1:45 A.M. daily |
| 15160 | 19.79 | OLR5C | ● Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 15160 | 19.79 | JZK | ● Nazaki, Japan | 9-10 A.M., 2:30-3:30 P.M., 4-5 P.M., 12-1 A.M. |
| 15150 | 19.80 | YDC | ● Soerabaja, Java | 5:30-10 A.M., 6-8:30 P.M., 10:30 P.M.-2 A.M. daily |
| 15140 | 19.82 | GSF | ● Daventry, England | 4-6 P.M., 9-11 P.M. daily |
| 15121 | 19.84 | HVJ | ● Vatican City, Vatican | 10:30-10:45 A.M. weekdays |
| 15110 | 19.85 | DJL | ● Zeesen, Germany | 12-2 A.M., 8-9 A.M., 11:35 A.M.-4:30 P.M. daily. Sunday 6-8 A.M. |
| 15070 | 19.91 | PSD | Rio de Janeiro, Brazil | (P) Phones B. A. irreg. |
| 15040 | 19.95 | RKI | ● Moscow, U.S.S.R. | 7-9:15 P.M. daily |
| 15055 | 19.92 | WNC | Hialeah, Fla. | (P) Phones daytime |
| 15040 | 19.95 | HIR | Ciudad Trujillo, R. D. | (P) Phones WNC days |
| 14985 | 20.02 | YSL | San Salvador, Salvador | (P) Phones days irreg. |
| 14980 | 20.03 | KAY | Manila, P. I. | (P) Phones DFC-DFD-GCJ early A.M.; KWU evenings |
| 14970 | 20.04 | LZA | ● Sofia, Bulgaria | Weekdays 5:6:30 A.M., 12-2:45 P.M. Sundays 12 A.M.-4:30 P.M. |
| 14940 | 20.06 | HJB | Bogota, Colombia | (P) Phones WNC-PPU-YVQ days |
| 14940 | 20.06 | HJA-3 | Barranquilla, Colombia | (P) Phones 8 A.M.-8 P.M. |
| 14940 | 20.06 | HJA-9 | El Centro, Colombia | (P) Phones 8 A.M.-8 P.M. |
| 14940 | 20.06 | HI1I | Ciudad Trujillo, R. D. | (P) Phones 8 A.M.-8 P.M. |
| 14935 | 20.07 | PSE | Rio de Janeiro, Brazil | (P) Phones LSL-WLK day irreg.; EDM-EHY 8 A.M. Broadcasts irreg. |
| 14920 | 20.11 | KQH | Kahuku, Hawaii | (P) Tests irregularly |
| 14910 | 20.12 | JVG | Nazaki, Japan | (P) Phones Formosa and broadcasts 1-2:30 A.M. irreg. |
| 14845 | 20.19 | OCJ2 | Lima, Peru | (P) Phones HJY and others daytime |
| 14800 | 20.27 | WOV | Rocky Point, N. Y. | (E) Tests Europe irreg. |
| 14790 | 20.28 | RIZ | Irkutsk, U.S.S.R. | (P) Calls RKI 9:30 A.M. |
| 14770 | 20.31 | WEB | Rocky Point, N. Y. | (E) Tests with Europe; irregular |
| 14730 | 20.37 | IQA | Rome, Italy | (P) Phones Japan and Egypt; sends music at times |
| 14690 | 20.42 | PSF | Rio de Janeiro, Brazil | (P) Phones LSL-WLK-WOK daytime |
| 14665 | 20.46 | DFD | Nauen, Germany | (P) Phones irreg. |
| 14653 | 20.47 | GBL | Rugby, England | (P) Phones Nazaki early A.M. |
| 14620 | 20.52 | EHY | Madrid, Spain | (P) Phones LSM mornings irreg. |
| 14620 | 20.52 | EDM | Madrid, Spain | (P) Phones PPU-PSA-PSE mornings |
| 14605 | 20.54 | DGZ | Nauen, Germany | (P) Phones irreg. |
| 14600 | 20.55 | JVH | ● Nazaki, Japan | (E) Phones DFB-GTJ-PCJ - TYB early mornings. Broadcasts irreg. |
| 14590 | 20.56 | WMN | Lawrenceville, N. J. | (P) Phones England days |
| 14535 | 20.64 | HBJ | ● Geneva, Switzerland | Phones irregular BC-6:45 - 8:30 P.M. Satur- |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| | | | | days |
| 14530 | 20.65 | LSN | Buenos Aires, Arg. | (P) Phones PSF-WLK-WOK irreg. |
| 14485 | 20.71 | TIR | Cartago, Costa Rica | (P) Phones WNC days |
| 14485 | 20.71 | TIU | Cartago, Costa Rica | (P) Phones WNC days |
| 14485 | 20.71 | YNA | Managua, Nicaragua | (P) Phones WNC days |
| 14485 | 20.71 | HPF | Panama City, Panama | (P) Phones daytime |
| 14485 | 20.71 | HRF | Tegucigalpa, Honduras | (P) Phones 8 A.M.-8 P. M. |
| 14485 | 20.71 | HRM | Tela, Honduras | (P) Phones WNC days |
| 14485 | 20.71 | TGF | Guatemala City, Guat. | (P) Phones WNC days |
| 14485 | 20.71 | HRL5 | La Lima, Honduras | (P) Phones WNC 5:45 P.M. |
| 14480 | 20.72 | PLX | Bandoeng, Java | (P) Phones Europe and B.C. irregular to 3 P.M. |
| 14470 | 20.73 | WMF | Lawrenceville, N. J. | (P) Phones England day time |
| 14460 | 20.75 | DZH | ●Zeesen, Germany | Irregular |
| 14440 | 20.78 | GBW | Rugby, England | (P) Phones Lawrenceville daytime |
| 14410 | 20.82 | DOT | Konigs W'n, Germany | (P) Phones irreg. |
| 14410 | 20.82 | IBC | San Paolo, Italy | (P) Irregular |
| 14250 | 21.00 | W10XDA | Schooner Morrissey | (P) Irregular |
| 13990 | 21.44 | GBA2 | Rugby, England | (P) Phones Argentina & Brazil irreg. |
| 13900 | 21.58 | WQP | Rocky Point, N. Y. | (E) Test daytime |
| 13820 | 21.70 | SUZ | Cairo, Egypt | (P) Phones DFC-DGU-GBB daytime |
| 13780 | 21.77 | KKW | Bolinas, Calif. | (P) Special relays; tests afternoon and evening |
| 13760 | 21.80 | TYE-2 | Paris, France | (P) Phones U. S. days |
| 13745 | 21.83 | CGA-2 | Drummondville, Que. | (P) Phones Europe irreg. |
| 13738 | 21.82 | RIS | Tiflis, U.S.S.R. | (P) Tests with Moscow irregular |
| 13720 | 21.87 | KLL | Bolinas, Calif. | (P) Special relays; tests afternoon and evening |
| 13690 | 21.91 | KKZ | Bolinas, Calif. | (P) Tests Japan and Java early A.M.; days Honolulu |
| 13667 | 21.98 | HJY | Bogota, Colombia | (P) Phones CEC afternoons |
| 13635 | 22.00 | SPW | ●Warsaw, Poland | 12:30-1:30 P.M. Mon., Wed., Fri. |
| 13610 | 22.04 | JYK | Kemikawa-Cho, Japan | (E) Tests irregular A.M. |
| 13600 | 22.06 | ZMBJ | ●"TSS Awatea," Wellington, N. Z. | See 8840 kc. |
| 13595 | 22.07 | GBB2 | Rugby, England | (P) Phones Canada days |
| 13585 | 22.08 | GBB | Rugby, England | (P) Phones CGA3-SUV-SUZ daytime |
| 13560 | 22.12 | JVI | Nazaki, Japan | (P) Phones Manchukuo irregularly |
| 13465 | 22.28 | WKC | Rocky Point, N. Y. | (E) Tests and relays irregular |
| 13435 | 22.33 | WKD | Rocky Point, N. Y. | (E) Tests and relays Irregular |
| 13415 | 22.36 | GCJ | Rugby, England | (P) Tests with JVH afternoons |
| 13410 | 22.37 | WCT | San Juan, P. R. | (P) Phones WNC 5:45 P.M. |
| 13410 | 22.37 | YSJ | San Salvador, Salvador | (P) Phones WNC days |
| 13390 | 22.40 | WMA | Lawrenceville, N. J. | (P) Phones GAS-GBS GBU-GBW daily |
| 13380 | 22.42 | IDU | Asmara, Eritrea, Africa | (P) Phones Italy early A.M. and sends music |
| 13370 | 22.44 | WOJ | Hialeah, Florida | (P) Phones 8 A.M.-8 P. M. |
| 13345 | 22.48 | YVQ | Maracay, Venezuela | (P) Phones WNC-HJB days |
| 13285 | 22.58 | CGA3 | Drummondville, Que. | (P) Phones England days |
| 13275 | 22.60 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 13240 | 22.66 | KBJ | Manila, P. I. | (P) Phones nights and early A.M. |
| 13220 | 22.70 | IRJ | Rome, Italy | (P) Phones Japan 5-8 A.M., and works Cairo days |
| 13180 | 22.76 | DGG | Nauen, Germany | (P) Relays to Riverhead days |
| 13100 | 22.90 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 13020 | 23.04 | IZE | Nazaki, Japan | (P) Phones ships irreg. |
| 13000 | 23.08 | TYC | Paris, France | (P) Phones CNR A.M. |
| 12985 | 23.10 | DFC | Nauen, Germany | (P) Phones KAY-SUV-SUZ early A.M. |
| 12865 | 23.32 | IAC | Pisa, Italy | (P) Phones ships irreg. |
| 12860 | 23.33 | RKR | Novosibirsk, U.S.S.R. | (P) Daily, 7 A.M. |
| 12840 | 23.36 | WQO | Ocean Gate, N. J. | (P) Phones ships days |
| 12830 | 23.37 | HJC | Barranquilla, Colombia | (P) Phones HJB-HPF-WNC days |
| 12830 | 23.38 | HJA-3 | Barranquilla, Colombia | (P) Phones HJB-HPF-WNC days |
| 12830 | 23.38 | CNR | Rabat, Morocco | (P) Phones FYB-TYB-FTA near 4 P.M. |
| 12830 | 23.38 | CNR | ●Rabat, Morocco | Special broadcasts irreg. |
| 12795 | 23.45 | IAC | Pisa, Italy | (P) Phones ships and tests Tripoli, irreg. |
| 12780 | 23.47 | GBC | Rugby, England | (P) Phones VWY early A.M. |
| 12500 | 24.00 | HIN | ●Ciudad Trujillo, R.D. | 11:40 A.M.-1:40 P.M., 7:10-9:50 P.M. ex. Sunday |
| 12300 | 24.39 | CEB | ●Santiago, Chile | 11 A.M.-1 P.M., 4-8 P. M., 10-11 P.M. daily |
| 12300 | 24.39 | PLM | Bandoeng, Java | (P) Phones 2ME near 6:30 A.M. |
| 12295 | 24.40 | ZLU | Wellington, N. Z. | (P) Phones ZLJ early A.M. |
| 12290 | 24.41 | GBU | Rugby, England | (P) Phones Lawrenceville days |
| 12280 | 24.43 | KUV | Manila, P. I. | |
| 12250 | 24.49 | TYB | Paris, France | |
| 12235 | 24.52 | TFJ | Reykjavik, Iceland | |
| 12235 | 24.52 | TFJ | ●Reykjavik, Iceland | |
| 12220 | 24.55 | FLJ | Paris, France | |
| 12215 | 24.56 | TYA | Paris, France | |
| 12150 | 24.69 | GBS | Rugby, England | |
| 12130 | 24.73 | DZE | ●Zeesen, Germany | Ir |
| 12120 | 24.75 | TPZ | Alger, Algeria, Africa | (P |
| 12100 | 24.79 | CJA | Drummondville, Que. | (P) |
| 12060 | 24.88 | PDV | Kootwijk, Holland | (P) P early |
| 12035 | 24.93 | DGL | Nauen, Germany | (P) Phon |
| 12055 | 24.89 | PDV | Kootwijk, Holland | (P) PLE early |
| 12050 | 24.90 | PDV | Kootwijk, Holland | (P) PLE - early m |
| 12020 | 24.95 | VIY | Rockbank, Australia | (P) Tests CJ A.M. and |
| 12000 | 25.00 | RNE | ●Moscow, USSR. | Sun. 6-7 A.M., 1 M., Wed. 6-7 Sun., Mon., Wed., 4-5 P.M. |
| 11991 | 25.02 | FZS | Saigon, Indo-China | (P) Phones FTA - FZ early A.M. |
| 11960 | 25.08 | HI2X | ●Cuidad Tryillo, R. D. | Tues. & Fri., 8-10-10:10 P.M. |
| 11955 | 25.09 | IBC | San Paolo, Italy | (P) Irregular |
| 11955 | 25.09 | IUC | ●Addis Ababa, Ethiopia | 12-1 A.M.; music at times |
| 11950 | 25.11 | KKQ | Bolinas, Calif. | (P) Relays programs to Hawaii eve. |
| 11940 | 25.13 | FTA | St. Assise, France | (P) Phones FZS - FZR early A.M. |
| 11935 | 25.14 | YNA | Managua, Nicaragua | (P) Cent. and S. A. stations days |
| 11900 | 25.21 | XEWI | ●Mexico City, Mexico | Sun. 12:30-2 P.M. Mon., Wed. Fri., 3-4 P.M., 9 P.M.-12 A.M. Tues., Thurs.,, 7:30 P.M.-12 A.M. Sat., 9 P.M.-12 A.M. (see 6015 kc.) |
| 11900 | 25.21 | OLR4D | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11895 | 25.22 | XEXR | ●Mexico City, Mexico | 6-11:30 P.M. |
| 11895 | 25.22 | HP5I | ●Aguadulce, Panama | 7:30-9:30 P.M. daily |
| 11885 | 25.24 | TPA3 | ●Pontoise, France | 4-5 A.M., 12:15-6 P.M. daily |
| 11880 | 25.25 | XEXA | ●Mexico City, Mexico | 8-11:30 A.M., 3-5 P.M., 7-11 P.M. ex. Sunday |
| 11875 | 25.26 | OLR4C | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11870 | 25.26 | W8XK | ●Pittsburgh, Pa. | 7-9 P.M. daily |
| 11860 | 25.29 | YDB | ●Soerabaja, Java | 10:30 P.M.-2 A.M. daily |
| 11860 | 25.29 | GSE | ●Daventry, England | Not in use |
| 11855 | 25.31 | DIP | ●Zeesen, Germany | Irregular |
| 11840 | 25.34 | OLR4A | ●Prague, Czechoslovakia | Daily 2:30-4:30 P.M. Mon. & Thurs. 8-10:10 P.M. |
| 11830 | 25.36 | W2XE | ●Wayne, N. J. | 6-11 P.M. daily |
| 11830 | 25.36 | W9XAA | ●Chicago, Ill. | Not in use |
| 11820 | 25.38 | XEBR | ●Hermosillo, Mexico | 1-4 P.M., 9 P.M.-12 A. M. daily |
| 11820 | 25.38 | GSN | ●Daventry, England | Not in use |
| 11810 | 25.40 | 2RO4 | ●Rome, Italy | 6:43 A.M.-12:30 P.M. (See 9635 kc.) |
| 11800 | 25.42 | COGF | ●Matanzas, Cuba | 8 A.M.-11 P.M. daily |
| 11801 | 25.42 | OER-2 | ●Vienna, Austria | Weekdays 9 A.M.-5 P. M. Saturdays to 6 P. M. |
| 11800 | 25.42 | OAX5A | ●Ica, Peru | Daily 1 A.M.-12 noon, 4-11 P.M. |
| 11800 | 25.42 | JZJ | ●Nazaki, Japan | 9-10 A.M., 4-5 P.M., 2:30-3:30 P.M., 12-1 A.M. daily |
| 11795 | 25.43 | DIO | ●Zeesen, Germany | Irregular |
| 11790 | 25.43 | W1XAL | ●Boston, Mass. | News 5-5:30 P.M. daily |
| 11770 | 25.49 | DJD | ●Zeesen, Germany | 11:35 A.M.-4:30 P.M., 4:50-10:45 P.M. |
| 11760 | 25.50 | XETA | ●Monterrey, Mexico | 7-11 P.M. daily |
| 11760 | 25.51 | OLR4B | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 11750 | 25.53 | GSD | ●Daventry, England | 12:15-4 P.M., 6:20-8:30 P.M., 9-11 P.M., 11:30 P.M.-1:45 A.M. daily |
| 11740 | 25.55 | RKF | Moscow, U.S.S.R. | (P) Calls U.S.S.R. phones often |
| 11740 | 25.55 | HP5L | ●David, Panama | 4-7 P.M. daily |
| 11730 | 25.57 | XETM | ●Villahermosa, Mexico | 6-11 P.M. daily |
| 11730 | 25.57 | PHI | ●Hilversum, Holland | Not in use |
| 11720 | 25.60 | CJRX | ●Winnipeg, Manitoba | Week Days 6 P.M.-12 A.M. Sundays 5-10 P.M. |
| 11720 | 25.60 | TPA4 | ●Pontoise, France | 6:15-8:15 P.M., 10 P.M.-1 A.M. daily |
| 11718 | 25.60 | CR7BH | ●Lourenco Marques, E. Africa | Sundays 6-8 A.M., 10 A. M.-12:30 P.M., 1:30-3:30 P. M. Weekdays, Mon. to Sat., 11:45 P. M. (Sunday)-12:30 A. M., 4:30-6:30 A.M., 9:30-11 A.M., 12:30-4 P.M. |
| 11710 | 25.62 | Philco Radio | ●Saigon, Indo-China | Daily 6:30-9:30 A.M. News: French 9-9:10 A.M. |
| 11710 | 25.62 | VK9MI | ●Sydney, Australia; "S.S. Kanimbla" | 11 P.M., 8 A.M. and later |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 11705 | 25.63 | SBG | ● Motala, Sweden | Daily 1:20-2:05 A.M., 6-9 A.M., 11 A.M.-1:30 P.M. |
| 11680 | 25.68 | KIO | Kahuku, Hawaii | (P) Phones Far East early A.M. |
| 11670 | 25.62 | PPQ | Rio de Janeiro, Brazil | (P) Phones WCG-WET-LSX evenings |
| 11660 | 25.73 | JVL | Nazaki, Japan | (P) Phones Taiwan eve. Broadcasts irreg. 1-2:30 A.M. |
| 11595 | 25.87 | VRR4 | Stony Hill, Jamaica | (P) Phones WNC 5:45 P.M. |
| 11570 | 25.93 | HH2T | ● Port-au-Prince, Haiti | Sp'l programs irreg. |
| 11560 | 25.95 | CMB | Havana, Cuba | (P) Phones New York irreg. |
| 11538 | 26.00 | XGR | Shanghai, China | (P) Tests irregularly |
| 11500 | 26.09 | XAM | Merida, Mexico | (P) Phones XDF-XDM-XDR irreg. |
| 11500 | 26.09 | COCX | ● Havana, Cuba | 8 A.M.-1 A.M. daily |
| 11495 | 26.10 | VIZ3 | Rockbank, Australia | (P) Tests CJA4 early A.M. |
| 11413 | 26.28 | CJA4 | Drummondville, Que. | (P) Phones VIZ3 early A.M. |
| 11402 | 26.31 | HBO | ● Geneva, Switzerland | Phones irreg. BC 6:45-8:30 P.M. Saturdays |
| 11340 | 26.46 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 11275 | 26.61 | XAM | Merida, Mexico | (P) Phones XDR-XDM irregular |
| 11050 | 27.15 | ZLT | Wellington, N. Z. | (P) Phones VLZ early mornings |
| 11040 | 27.17 | CSW | ● Lisbon, Portugal | 12-6 P.M. daily |
| 11000 | 27.27 | PLP | ● Bandoeng, Java | Phones Makasser 2-5 A.M., 8:30-10:30 P.M., BC 5-10 A.M., 6-8:30 P.M., 10:30 A.M. - 2 A.M. daily |
| 10975 | 27.35 | OCI | Lima, Peru | (P) Phones CEC - HJY days |
| 10975 | 27.35 | OCP | Lima, Peru | (P) Phones HKB early evenings |
| 10960 | 27.37 | JZB | ● Nazaki, Japan | Irregular |
| 10955 | 27.38 | HSG | Bangkok, Siam | (P) Phones irregularly |
| 10940 | 27.43 | FTH | St. Assise, France | (P) Phones So. America irreg. |
| 10910 | 27.50 | KTR | Manila, P. I. | (P) Phones DFC early A.M. irreg. |
| 10850 | 27.63 | DFL | Nauen, Germany | (P) Relays programs afternoons irreg. |
| 10840 | 27.68 | KWV | Dixon, Calif. | (P) Phones Japan, Manila, Hawaii, A.M. |
| 10795 | 27.79 | GCL | Rugby, England | (P) Phones Japan days |
| 10790 | 27.80 | YNA | Managua, Nicaragua | (P) Phones So. America days, irreg. |
| 10770 | 27.86 | GBP | Rugby, England | (P) JYS and XGR irreg.; Phones VLK early A.M. & P.M. |
| 10740 | 27.93 | IVM | ● Nazaki. Japan | 4-7:30 A.M., irregular. |
| 10680 | 28.09 | PLQ | Bandoeng, Java | (P) Phones Knala Lumpur, Medan and Makasser 5:30-9 A.M., 10 P.M.-2 A.M. |
| 10675 | 28.10 | WNB | Lawrenceville, N. J. | (P) Phones ZFB daytime |
| 10670 | 28.12 | CEC | Santiago, Chile | (P) Phones HJY - OCT daytime |
| 10670 | 28.12 | HPH | Panama City, Panama | (P) Phones 4:15-4:15 P. M. |
| 10670 | 28.12 | CEC | ● Santiago, Chile | Daily ex. Sat. and Sun., 7-7:20 P.M. (see CED. 10230 KC.) |
| 10660 | 28.14 | PSG | Rio de Janeiro, Brazil | (P) Phones N. Y., B. A., Madrid |
| 10660 | 28.14 | JVN | Nazaki, Japan | (P) Phones JIB early A.M.; Relays JOAK irreg. |
| 10660 | 28.14 | JVN | ● Nazaki, Japan | 4-7:40 A.M., irregular |
| 10620 | 28.25 | WEF | Rocky Point, N. Y. | (E) Relays program service irregularly |
| 10620 | 28.25 | EHX | Madrid, Spain | (P) Phones CEC and EHZ afternoons |
| 10610 | 28.28 | WEA | Rocky Point, N. Y. | (E) Tests Europe irreg. |
| 10550 | 28.44 | WOK | Lawrenceville, N. J. | (P) Phones LSN - PSF - PSH-PSK nights |
| 10530 | 28.49 | JIB | Tawian, Japan | (P) Phones JVL - JVN early mornings to 8 A.M.; sp'l be's 3-4 A.M. Sun. |
| 10520 | 28.52 | VK2ME | Sydney, Australia | (P) Phones GBP - HVJ early A.M. |
| 10520 | 28.52 | VLK | Sydney, Australia | (P) Phones GBP - HVJ early A.M. |
| 10520 | 28.52 | CFA-4 | Drummondville, Que. | (P) Phones N. Am. days |
| 10480 | 28.63 | ITK | Mogdishu, Somaliland, Africa | (P) Irregular |
| 10440 | 28.74 | DGH | Nauen, Germany | (P) Phones HSG - HSJ - HSP early A.M. |
| 10430 | 28.76 | YBG | Medan. Sumatra | (P) Phones PLV - PLP early A.M. |
| 10430 | 28.76 | TYE-3 | Paris, France | (P) Phones U.S.A. irreg. |
| 10420 | 28.79 | XGW | Shanghai, China | (P) Tests GBP - KAY early A.M. Musical tests 10:45 A.M.-3 P.M. |
| 10420 | 28.79 | PDK | Kootwijk, Holland | (P) Phones PLV A.M., and special programs irreg. |
| 10415 | 28.80 | PDK | Kootwijk, Holland | (P) Phones PLV A.M., and special programs irreg. |
| 10410 | 28.82 | PDK | Kootwijk, Holland | (P) Phones PLV A.M., and special programs 3:30-4 P.M. |
| 10410 | 28.82 | KES | Bolinas, Calif. | (P) Phones S. A. and Far East irreg. |
| 10400 | 28.85 | KEZ | Bolinas, Calif. | (P) Phones Hawaii and Far East irreg. |
| 10390 | 28.87 | KER | Bolinas, Calif. | (P) Phones Far East, early evening |
| 10380 | 28.90 | WCG | Rocky Point, N. Y. | (E) Programs, irreg. |
| 10375 | 28.92 | JVO | Nazaki, Japan | (P) Manchuria and Dairen early A.M. |
| 10370 | 28.93 | EAJ-43 | ● Santa Cruz, Tenerife, C. I. | 2:15-3:50 P.M., 6-7 P.M., 7:10-9:30 P.M. daily |
| 10370 | 28.93 | EHZ | ● Tablero, Tenerife, C. I. | (P) Phones EDN 3:30-6 A.M.; B.C. 3-4 P.M., 6-8:15 P.M. |
| 10350 | 28.98 | LSX | ● Buenos Aires, Arg. | Mon., Tues., Fri., 5-6 P.M. |
| 10335 | 29.03 | ZFD | Hamilton, Bermuda | (P) Phones afternoons |
| 10330 | 29.04 | ORK | ● Brussels, Belgium | 1:30-3 P.M. daily |
| 10310 | 29.10 | PPM | Rio de Janeiro, Brazil | (P) Tests New York and B.A. evenings |
| 10300 | 29.13 | LSQ | Buenos Aires, Arg. | (P) Phones GCA - HJY - PSH afternoons |
| 10300 | 29.13 | LSL | Buenos Aires, Arg. | (P) Phones GCA - HJY - PSH afternoons. Broadcasts irreg. |
| 10290 | 29.15 | DZC | ● Zeesen, Germany | Used irregularly |
| 10290 | 29.15 | HPC | Panama City, Panama | (P) Phones C. A. and S. Am. daytime |
| 10260 | 29.24 | PMN | ● Bandoeng, Java | BC Phones Sydney and Medan 8:30-10:30 P.M., 2-5:30 A.M., 5:30-10 A.M., 6-8:30 P.M., 10:30 P.M. - 2 A.M. daily |
| 10250 | 29.27 | LSK3 | Buenos Aires, Arg. | (P) Afternoons |
| 10230 | 29.33 | CED | ● Antofagasta, Chile | Retransmits programs of CEC, 10670 KC., daily ex. Sat. and Sun., 7-7.20 P.M. |
| 10220 | 29.35 | PSH | Rio de Janeiro, Brazil | (P) Phones LSL-WOK evenings; broadcasts irreg. |
| 10210 | 29.38 | DGD | Nauen, Germany | (P) Phones irreg. |
| 10160 | 29.53 | RIO | Bakou, U.S.S.R. | (P) Phones RIR-RNE irreg. A.M.; Newa irreg. 11 P.M.-3 A.M. |
| 10140 | 29.59 | OPM | Leopoldville, Belg.-Congo | (P) Calls 7-11 A.M. daily. Phones ORK afternoons |
| 10135 | 29.60 | CQN | ● Macao, China | Mon. & Fri., 7-8:30 A.M. |
| 10128 | 29.62 | DON | Konigs W'n., Germany | (P) Phones irreg. |
| 10120 | 29.64 | PSI | Rio de Janeiro, Brazil | (P) Phones LSL irreg. |
| 10080 | 29.76 | RIR | Tiflis, U.S.S.R. | (P) Phones RIM-RKI 7-11 A.M. |
| 10070 | 29.79 | EDN | Madrid, Spain | (P) Phones YVR afternoons |
| 10055 | 29.84 | ZFB | Hamilton, Bermuda | (P) Phones WNB days |
| 10055 | 29.84 | SUV | Cairo, Egypt | (P) Phones DFC-DGU-GCA-GCB days |
| 10042 | 29.87 | DZB | ● Zeesen, Germany | Irregular |
| 10040 | 29.88 | HJA3 | Barranquilla, Colombia | (P) Tests early evenings, irreg. |
| 9990 | 30.03 | KAZ | Manila, P. I. | (P) Phones JVQ-KWX-PLV early A.M. |
| 9966 | 30.08 | IRS | Rome, Italy | (P) Tests irregularly |
| 9950 | 30.13 | GBU | Rugby, England | (P) Phones WNA evenings |
| 9940 | 30.18 | YSG | San Salvador, Salvador | (P) Phones 8 A.M.-8 P.M. |
| 9940 | 30.18 | HPF-2 | Panama City, Panama | (P) Phones 8 A.M.-8 P.M. |
| 9940 | 30.18 | TIZ-2 | San Jose, Costa Rica | (P) Phones 8 A.M.-8 P.M. |
| 9940 | 30.18 | HRF-5 | Tegucigalpa, Honduras | (P) Phones 8 A.M.-8 P.M. |
| 9940 | 30.18 | WCU | San Juan. P. R. | (P) Phones WNC irreg., 6-8 P.M. daily |
| 9940 | 30.18 | CSW | ● Lisbon, Portugal | 6-8 P.M. daily |
| 9930 | 30.21 | HKB | Bogota, Colombia | (P) Phones CEC - OCP-PSH - PSK afternoons |
| 9930 | 30.21 | HJY | Bogota, Colombia | (P) Phones LSQ afternoons |
| 9920 | 30.24 | DGM | Nauen, Germany | (P) Phones irreg. |
| 9890 | 30.33 | LSN3 | Buenos Aires, Arg. | (P) Phones WOK-WLK; broadcasts evenings irregular |
| 9870 | 30.40 | WON | Lawrenceville, N. J. | (P) Phones and tests; England irreg. |
| 9860 | 30.43 | EAQ | ● Madrid, Spain | Saturday 1-3:30 P.M.; daily 5:15-9:30 P.M. |
| 9840 | 30.47 | FYC-2 | Paris, France | (P) Phones U.S.A. irreg. |
| 9840 | 30.47 | JYS | Kemikawa-Cho, Japan | (E) Tests irregular |
| 9830 | 30.50 | IRM | Rome, Italy | (P) Phones JVP - JZT - LSX-WEL A.M. |
| 9800 | 30.59 | GCW | Rugby, England | (P) Phones Lawrenceville eve. and nights |
| 9800 | 30.59 | LSI | Buenos Aires, Arg. | (P) Relays very irreg. |
| 9760 | 30.74 | VLJ | Sydney, Australia | (P) Phones PLV - ZLT early A.M. |
| 9760 | 30.74 | VLZ | Sydney, Australia | (P) Phones PLV - ZLT early A.M. |
| 9750 | 30.77 | COCQ | ● Havana, Cuba | Weekdays 6:55 A.M.-1 A.M. Sundays 6:55 A.M.-12:01 A.M. |
| 9750 | 30.77 | WOF | Lawrenceville, N. J. | (P) Phones GCU irreg. |
| 9720 | 30.86 | TGZ | Guatemala City, Guatemala | (P) Phones 8 A.M.-8 P.M. |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 9710 | 30.88 | GCA | Rugby, England | (P) Phones LSL afternoons |
| 9700 | 30.93 | LQA | Buenos Aires, Arg. | (P) Tests and relay-early evenings |
| 9675 | 31.00 | DZA | Zeesen, Germany | Irregular |
| 9670 | 31.02 | TI4NRH | Heredia, Costa Rica | Daily 9-10 P.M., 11:30 P.M.-12 A.M.; Sat. night to 2 A.M. Sun. |
| 9666 | 31.04 | CR6AA | Lobito, West Africa | 2:45-4:30 P.M. Wed. & Sat. (see 7177 kc.) |
| 9660 | 31.06 | LRX | Buenos Aires, Arg. | 9:30 A.M.-11:30 P.M. daily |
| 9660 | 31.06 | PSJ | Rio de Janeiro, Brazil | (P) Irreg., Argentina |
| 9650 | 31.09 | CT1AA | Lisbon, Portugal | Tues., Thurs., Sat., 4-7 P.M. |
| 9650 | 31.09 | DGU | Nauen, Germany | (P) Phones SUV in A. M. Relays irreg. |
| 9645 | 31.10 | HH3W | Port-au-Prince, Haiti | 1-2 P.M., 7-8:30 P.M. ex. Sunday |
| 9635 | 31.13 | 2RO3 | Rome, Italy | 12:30-6 P.M. daily ex. Sat. Sat., 1:20-5:30 P. M. Mon., Wed., Fri., Amer. Hour 6-7:30 P. M.; Tues., Thurs., Sat., Lat. Amer. 6-7:45 P.M. |
| 9630 | 31.15 | CFA5 | Drummondville, Que. | (P) Phones No. America days |
| 9620 | 31.17 | FZR | Saigon, Indo-China | (P) Phones Paris early A.M. |
| 9616 | 31.20 | HJ1ABP | Cartagena, Colombia | 7-9 A.M., 11 A.M.-1:20 P.M., 6-11 P.M. daily |
| 9600 | 31.25 | RAN | Moscow, U.S.S.R. | 7-9:15 P.M. daily |
| 9600 | 31.25 | XEYU | Mexico D. F. | 7-10 P.M. daily |
| 9600 | 31.25 | CB960 | Santiago, Chile | Daily 11:30 A.M.-2 P.M., 9:30 P.M.-12 A.M. |
| 9595 | 31.27 | HBL | Geneva, Switzerland | 5:30-6 P.M. Saturdays |
| 9595 | 31.27 | YNLF | Managua, Nicaragua | 8-9 A.M., 1-3 P.M., 6:30-10:30 P.M. daily |
| 9590 | 31.28 | VK6ME | Perth, W. Australia | Daily ex. Sun. 6-8 A.M. |
| 9590 | 31.28 | W3XAU | Philadelphia, Pa. | Daily ex. Sun. & Wed. 12-8 P.M. Sun. & Wed. 12-7 P.M. Also Thurs. 10-11 P.M. |
| 9590 | 31.28 | VK2ME | Sydney, Australia | Sunday 12-2 A.M., 4:30-8:30 A.M., 11:30 A.M.-1:30 P.M. |
| 9590 | 31.28 | HP5J | Panama City, Panama | Week days 12-2 P.M., 5-10:30 P.M. Sundays 10:30 A.M.-2 P.M., 8-10 P.M. |
| 9590 | 31.28 | PCJ | Hilversum, Holland | Sun. 2-3 P.M., 7-8 P.M. Tues., 1:30-3 P.M., Wed. 7-10 P.M. |
| 9580 | 31.32 | GSC | Daventry, England | 9-11 P.M. daily |
| 9580 | 31.32 | VK3LR | Melbourne, Australia | Sun. 3:30-7:30 A.M. Mon. to Fri. 9:45 P.M.-8:30 A.M. Sat. 9:45 P.M.-9 A.M. |
| 9575 | 31.33 | HJ2ABC | Cucuta, Colombia | 11 A.M.-12 noon; 6:30-9 P.M. daily |
| 9570 | 31.33 | W1XK | Boston, Mass. | Weekdays 6:30 A.M.-1 A.M. Sundays, 8 A.M.-1 A.M. |
| 9565 | 31.36 | YV3RB | Barquisimeto, Venezuela | Daily 11:30 A.M.-12:30 P.M., 5:30-9:30 P.M. |
| 9562 | 31.38 | OAX4T | Lima, Peru | 7-11 P.M. |
| 9560 | 31.38 | DJA | Zeesen, Germany | 12:05-5:15 A.M., 4:50-10:45 P.M. daily |
| 9560 | 31.38 | HJ1ABB | Barranquilla, Colombia | 7 A.M.-12:30 P.M. daily |
| 9550 | 31.41 | YDB | Soerabaja, Java | Sun. 5:30-10:30 A.M. 7:30 P.M.-2 A.M. Weekdays 5:30-10:30 A.M. or 11 A.M. (Sat. 11:30 A.M.). 6-7:30 P.M., 10:30 P.M.-2 A.M. |
| 9550 | 31.41 | HI5E | Ciudad Trujillo, R. D. | Irregular |
| 9550 | 31.41 | OLR3A | Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 9545 | 31.44 | HH2R | Port-au-Prince, Haiti | Special programs irreg. |
| 9540 | 31.45 | VPD-2 | Suva, Fiji Is. | 5:30-7:30 A.M. daily |
| 9540 | 31.45 | DJN | Zeesen, Germany | 12:05-5:15 A.M., 5:55-11 A.M., 4:50-10:45 P.M. daily |
| 9535 | 31.46 | JZI | Nazaki, Japan | 9-10 A.M., 2:30-3:30 P.M., 4-5 P.M., 12-1 A.M. daily |
| 9530 | 31.48 | W2XAF | Schenectady, N. Y. | 4 P.M.-12 A.M. daily |
| 9530 | 31.48 | LKJ1 | Jeloy, Norway | 5-8 A.M., 11 A.M.-5 P.M. daily |
| 9525 | 31.49 | ZBW-3 | Hong Kong, China | Daily ex. Sat. 11:30 P.M.-1:30 A.M.; Mon. & Thurs. 4-10 A.M.; Tues., Wed., Fri., Sun. 3-10 A.M.; Sat., 3-11 A.M., 9 P.M.-1:30 A.M. |
| 9523 | 31.50 | "Radio Liberte" | Paris, France | 7-8 P.M. daily (see 7380 kc.) |
| 9520 | 31.51 | HJ4ABH | Armenia, Colombia | Weekdays 8-11 A.M., 6-10 P.M. Sundays 7-10 P.M. |
| 9520 | 31.51 | XEDQ | Guadalajara, Mexico | Daily 12-4 P.M., 8 P.M.-12 A.M. Occasional Sunday DX 2-4 A.M. |
| 9510 | 31.55 | GSB | Daventry, England | 12:15-6 P.M., 6:20-8:30 P.M., 11:30 P.M.-1:45 A.M. daily |
| 9510 | 31.55 | VK3ME | Melbourne, Australia | Mon., Sat. 4-7 A.M. |
| 9510 | 31.55 | HJU | Buenaventura, Colombia | 12-2 P.M., 8-11 P.M., Mon., Wed., Fri. |
| 9510 | 31.55 | XEFT | Vera Cruz, Mexico | 10:30 A.M.-4:30 P.M., 7:30 P.M.-12:30 A.M. daily. Sundays begin 9 P.M. (see 6120 kc.) |
| 9504 | 31.57 | OLR3B | Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 9500 | 31.58 | PRF5 | Rio de Janeiro, Brazil | 4:45-5:45 P.M. ex. Sun. |
| 9500 | 31.58 | HI5G | La Vega, R. D. | 6:40-8:40 A.M., 10:40 A.M.-2:40 P.M., 4:40-8:40 P.M. |
| 9500 | 31.58 | HJ1ABE | Cartagena, Colombia | 6:45 A.M.-11 P.M. Sun. 9 A.M.-3 P.M. |
| 9500 | 31.58 | XEWW | Mexico City, Mexico | 7 P.M.-12 A.M. daily |
| 9490 | 31.61 | KEI | Bolinas, Calif. | (P) Phones Indo-China and China A.M. |
| 9480 | 31.65 | EAR | Madrid, Spain | 6:30-8:30 P.M., 10-11 P.M. daily |
| 9480 | 31.65 | PLW | Bandoeng, Java | (P) Phones Australia early A.M. |
| 9480 | 31.65 | KET | Bolinas, Calif. | (P) Phones WEL evenings & nights |
| 9470 | 31.68 | WET | Rocky Point, N. Y. | (E) Tests LSX-PPM-ZFD evenings |
| 9460 | 31.71 | ICK | Tripoli, Africa | (P) Phones Italy A.M. |
| 9450 | 31.75 | "Radio Fort de France" | Fort de France, Martinique | 11:30 A.M.-12:30 P.M., 6:15-7:15 P.M., 8-9 P.M. daily |
| 9450 | 31.75 | TGWA | Guatemala City, Guate. | Daily ex. Sun. 12-2 P.M., 8-9 P.M., 10 P.M.-12 A.M.; Sun., 12 noon-2 P.M., 12 A.M.-6 A.M. |
| 9440 | 31.78 | HCODA | Guayaquil, Ecuador | 8-11 P.M. ex. Sunday |
| 9430 | 31.80 | YVR | Maracay, Venezuela | (P) Tests mornings |
| 9428 | 31.81 | COCH | Havana, Cuba | Daily 8 A.M.-12 A.M. |
| 9415 | 31.86 | PLV | Bandoeng, Java | (P) Phones San Francisco 9:30-10:30 A.M. |
| 9400 | 31.92 | XDR | Mexico City, Mexico | (P) Phones XAM irreg., days |
| 9385 | 31.97 | PGC | Kootwijk, Holland | (P) Phones East Indies nights |
| 9375 | 32.00 | PGC | Kootwijk, Holland | (P) Phones East Indies nights |
| 9370 | 32.02 | PGC | Kootwijk, Holland | (P) Phones East Indies nights |
| 9363 | 32.04 | COBC | Havana, Cuba | 6-10:30 P.M. daily |
| 9355 | 32.07 | WNK | Hialeah, Florida | (P) Phones 8 A.M.-8 P.M. |
| 9350 | 32.09 | HS8PJ | Bangkok, Siam | Thurs., 8-10 A.M. |
| 9345 | 32.10 | HBL | Geneva, Switzerland | (E) Broadcasts and phones irreg. |
| 9340 | 32.12 | OAX4J | Lima, Peru | Daily 12-3 P.M., 5 P.M.-1 A.M. |
| 9330 | 32.15 | CGA4 | Drummondville, Que. | (P) Phones GCB-GDB-GBB afternoons |
| 9300 | 32.27 | YNGU | Managua, Nicaragua | Weekdays 12-2 P.M., 5-6 P.M. Sundays 11 A.M.-12 noon |
| 9280 | 32.33 | GCB | Rugby, England | (P) Phones Canada afternoons |
| 9240 | 32.47 | PDP | Kootwijk, Holland | (P) Phones East Indies nights |
| 9235 | 32.49 | PDP | Kootwijk, Holland | (P) Phones East Indies nights |
| 9180 | 32.68 | ZSR | Klipheuvel, S. Africa | (P) Phones Rugby afternoons seasonally |
| 9170 | 32.72 | WNA | Lawrenceville, N. J. | (P) Phones GBS-GCU-GCS afternoons |
| 9147 | 32.79 | YVR | Maracay, Venezuela | (P) Phones EHY afternoons |
| 9125 | 32.88 | HAT4 | Budapest, Hungary | Sun. 7-8 P.M., Wed. 7-8 P.M., Sat. 6-7 P.M. |
| 9120 | 32.89 | CP6 | La Paz, Bolivia | No regular schedule |
| 9110 | 32.93 | KUW | Manila, P. I. | (P) Tests and phones early A.M. |
| 9091 | 33.00 | CGA-5 | Drummondville, Que. | (P) Phones Europe days |
| 9037 | 33.19 | TYA-2 | Paris, France | (P) Phones Algiers, irreg. |
| 9020 | 33.26 | GCS | Rugby, England | (P) Phones Lawrenceville afternoons |
| 9010 | 33.30 | KEJ | Bolinas, Calif. | (P) Relays programs to Hawaii eve. |
| 8975 | 33.42 | CJA5 | Drummondville, Que. | (P) Phones Australia nights, early A.M. |
| 8975 | 33.43 | VWY | Poona, India | (P) Phones GBC-GBU mornings |
| 8960 | 33.48 | TPZ2 | Alger, Algeria, Africa | (P) Phones Paris 12-1 A.M. daily |
| 8950 | 33.52 | WEL | Rocky Point, N. Y. | (E) Tests with Europe, irreg. |
| 8950 | 33.52 | W2XBJ | Rocky Point, N. Y. | (E) Tests irregularly |
| 8948 | 33.53 | HCJB | Quito, Ecuador | 7:30-8:45 A.M. daily. 11:30 A.M.-2:30 P.M., 5-10 P.M. ex. Mondays (To 7 P.M. on 4107 k.c., after 7 P.M. on 4107 and 8948 k.c.) |
| 8900 | 33.71 | ZLS | Wellington, N. Z. | (P) Phones VLZ early mornings |
| 8840 | 33.94 | ZMBJ | TSS "Awatea," Wellington, N. Z. | B.C. Sundays 6:40 P.M. Daily 1-3 A.M. |
| 8830 | 33.98 | LSD | Buenos Aires, Arg. | (P) Relays to New York early evenings |
| 8795 | 34.13 | HKV | Bogota, Colombia | (E) Tests early evenings and nights; broadcasts news Mon. and Thurs. 7-7:30 P.M. |
| 8790 | 34.13 | TIR | Cartago, Costa Rica | (P) Phones Cent. America daytime |
| 8790 | 34.13 | TIM | San Jose, Costa Rica | (P) Phones 8 A.M.-8 P.M. |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 8775 | 34.19 | PNI | Makasser, D. E. I. | (P) Phones PLV early mornings |
| 8765 | 34.23 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 8760 | 34.35 | GCQ | Rugby, England | (P) Phones ZSR afternoons |
| 8740 | 34.35 | WXV | Fairbanks, Alaska | (P) Phones WXH nights |
| 8730 | 34.36 | GCI | Rugby, England | (P) Phones VWY afternoons |
| 8710 | 34.44 | KBB | Manila, P. I. | (E) 6-8 A.M. special broadcast |
| 8680 | 34.56 | GBC | Rugby, England | (P) Phones ships and New York daily |
| 8665 | 34.62 | COJK | ●Camaguey, Cuba | 7:45-9:00 P.M. weekdays. Sundays irreg. |
| 8650 | 34.68 | YN1PR | ●Managua, Nicaragua | Weekdays 1:15-2:15 P. M., 8:30-10 P.M. |
| 8650 | 34.68 | WVD | Seattle, Wash. | (P) Tests irregularly |
| 8630 | 34.76 | CMA | Havana, Cuba | (P) Phones N. Y. irreg. |
| 8560 | 35.05 | WOO | Ocean Gate, N. J. | (P) Phones ships days |
| 8550 | 35.09 | HPI | Panama City, Panama | (P) Phones 8 A.M.-8 P. M. |
| 8515 | 35.23 | JAC | Pisa, Italy | (P) Phones irreg. |
| 8505 | 35.27 | YNLG | ●Managua, Nicaragua | Daily 1-2:30 P.M., 7:30-9:45 P.M. |
| 8500 | 35.29 | JZF | Nazaki, Japan | (P) Phones ships irreg. |
| 8404 | 35.70 | HC2CW | ●Guayaquil, Ecuador | Weekdays 11:30 A.M.-12:30 P.M., 7-11 P.M. Sundays 3-5 P.M. |
| 8185 | 36.65 | PSK | Rio de Janeiro, Brazil | (P) Phones LSL - WOK evenings. Broadcasts irreg. |
| 8330 | 36.01 | DAS | Rugen, Germany | (P) Phones ships irreg. |
| 8155 | 36.79 | PGB | Kootwijk, Holland | (P) Phones Java irreg. |
| 8140 | 36.86 | LSC | Buenos Aires, Arg. | (P) Tests evenings and nights irreg. |
| 8120 | 36.95 | KTP | Manila, P. I. | (P) Phones KWX-KWV-PLV-JVQ A.M. |
| 8110 | 37.00 | ZP10 | ●Asuncion, Paraguay | 8-10 P.M. |
| 8075 | 37.15 | WEZ | Rocky Point, N. Y. | (E) Program service P. M.; irregular |
| 8075 | 37.15 | TYB-2 | Paris, France | (P) Phones Morocco irreg. |
| 8035 | 37.33 | CNR | Rabat, Morocco | (P) Phones France nights |
| 8035 | 37.33 | CNR | ●Rabat, Morocco | Special broadcasts irreg. |
| 7970 | 37.64 | XGL | Shanghai, China | (P) Tests early mornings |
| 7960 | 37.69 | VLZ | Sydney, Australia | (P) Phones ZLT early A.M. |
| 7955 | 37.71 | HSJ | Bangkok, Siam | (P) Phones Berlin, Manila, Java irregular |
| 7935 | 37.81 | PSL | Rio de Janeiro, Brazil | (P) Phones N. Y. and Madrid irreg. |
| 7920 | 37.88 | GCP | Rugby, England | (P) Phones VLK irreg. |
| 7900 | 37.97 | LSL | Buenos Aires, Arg. | (P) Phones PSK - PSH evenings |
| 7890 | 38.02 | IDU | Asmara, Eritrea, Africa | (P) Irregular |
| 7890 | 38.02 | CJA-2 | Drummondville, Que. | (P) Phones Australia nights |
| 7880 | 38.05 | JYR | Kemikawa-Cho, Japan | (E) Tests and relays irregularly |
| 7860 | 38.17 | SUX | Cairo, Egypt | (P) Phones GCB afternoons |
| 7855 | 38.19 | LQP | Buenos Aires, Arg. | (P) Tests evening irreg. |
| 7854 | 38.19 | HC2JSB | ●Guayaquil, Ecuador | 9 A.M.-2 P.M., 4-11 P. M. daily |
| 7840 | 38.27 | PGA | Kootwijk, Holland | (P) Phones Java irreg. |
| 7835 | 38.29 | PGA | Kootwijk, Holland | (P) Phones Java irreg. |
| 7830 | 38.31 | PGA | Kootwijk, Holland | (P) Phones Java irreg. |
| 7812.5 | 38.40 | DFT | Nauen, Germany | (P) Phones irreg. |
| 7797 | 38.47 | HBP | ●Geneva, Switzerland | 5:30-6 P.M., Saturdays |
| 7790 | 38.49 | YNA | Managua, Nicaragua | (P) Phones Cent. & So. America daytime |
| 7770 | 38.61 | PDM | Kootwijk, Holland | (P) Special relays to E. Indies |
| 7765 | 38.63 | PDM | Kootwijk, Holland | (P) Special relays to Dutch Indies |
| 7760 | 38.66 | PDM | Kootwijk, Holland | (P) Special relays to E. Indies |
| 7740 | 38.76 | CEC | Santiago, Chile | (P) Phones evenings to 8:30 P.M. |
| 7735 | 38.78 | PDL | Kootwijk, Holland | (P) Special relays to E. Indies |
| 7730 | 38.81 | PDL | Kootwijk, Holland | (P) Special relays to E. Indies |
| 7715 | 38.39 | KEE | Bolinas, Calif. | (P) Relays programs to Hawaii seasonally |
| 7700 | 38.96 | TYC-2 | Paris, France | (P) Phones Cairo irreg. |
| 7670 | 39.11 | WDF | San Juan, P. R. | (P) Phones WNC irreg. |
| 7669 | 39.11 | TGF | Guatemala City, Guate. | (P) Phones TIU - HPF daytime |
| 7650 | 39.22 | TYE-4 | Paris, France | (P) Phones U.S.A. irreg. |
| 7626 | 39.31 | RIM | Tashkent, USSR. | (P) Phones RKI early mornings |
| 7620 | 39.37 | IUB | ●Addis Ababa, Ethiopia | Irregular |
| 7610 | 39.42 | KWX | Dixon, Calif. | (P) Phones KKH nights; KAZ - KTP - PLV-JVT-JVM A.M. |
| 7565 | 39.66 | KWY | Dixon, Calif. | (P) Phones Shanghai early mornings |
| 7550 | 39.74 | TI8WS | ●Puntarenas, Costa Rica | Sun., 4-5 P.M. Weekdays, 5-7 P.M., 8:30-10 P.M. |
| 7520 | 39.89 | KKH | Kahuku, Hawaii | (P) KEE-KEI evenings. KWX-KWV nights |
| 7518 | 39.90 | RKI | Moscow, U.S.R.R. | (P) Phones RIM early mornings |
| 7510 | 39.95 | JVP | ●Nazaki, Japan | (P) Phone & B.C. irreg. |
| 7500 | 40.00 | CFA-6 | Drummondville, Que. | (P) Phones N. America days |
| 7470 | 40.16 | JVQ | Nazaki, Japan | (P) Relays and phones early A.M.; broadcasts Mon., Thurs., 2-3, 4-5 P.M. |
| 7470 | 40.16 | HJP | Bogota, Colombia | (P) Phones HJA3-YVQ early evenings |
| 7430 | 40.38 | ZLR | Wellington, N. Z. | (P) Phones VLJ early mornings |
| 7400 | 40.45 | WEM | Rocky Point, N. Y. | (E) Special relays evenings |
| 7390 | 40.60 | ZLT-2 | Wellington, N. Z. | (P) Phones Sydney 3-7 A.M. |
| 7385 | 40.62 | OEK | Wien, Austria | (P) Tests early evenings very irreg. |
| 7380 | 40.65 | "Radio Liberte" | ●Paris, France | 7-8 P.M. daily (see 9523 kc.) |
| 7380 | 40.65 | XECR | ●Mexico City, Mexico | Sundays 6-8 P.M. |
| 7370 | 40.71 | KEQ | Kahuku, Hawaii | (P) Relays programs evenings |
| 7345 | 40.84 | GDL | Rugby, England | (P) Phones Japan irreg. A.M. |
| 7332.5 | 40.92 | DLC | Rehmate, Germany | (P) Phones irreg. |
| 7211 | 41.60 | EA8AB | ●Santa Cruz, Tenerife, C. I. | Mon., Wed., Fri., Sat., 3:15-4:15 P.M. |
| 7203 | 41.64 | EAJ | ●San Sebastian, Gomera, C. I. | 4 P.M.-12 A.M. and later |
| 7200 | 41.67 | YNAM | ●Managua, Nicaragua | Daily 7-10 P.M. |
| 7177 | 41.80 | CR6AA | ●Lobito, West Africa | 2:45-4:30 P.M. Wed. & Sat. |
| 7100 | 42.25 | FO8AA | ●Papeete, Tahiti | Tues. & Fri. 11 P.M.-1 A.M. |
| 7080 | 42.37 | PI1J | ●Dordrecht, Holland | Sat., 10:10-11:10 A.M. |
| 7030 | 42.67 | EA9AH | ●Tetuan, Spanish Morocco, Africa | 4-4:25 P.M. daily; 12-2:30 A.M. irregular |
| 6990 | 42.92 | JVS | Nazaki, Japan | (P) Phones China mornings early |
| 6977 | 43.00 | XBA | Tacubaya, D. F., Mex. | (E) 6-8 P.M. daily |
| 6975 | 43.01 | HCETC | ●Quito, Ecuador | Sat. & Mon. 7:45-9 A.M. |
| 6950 | 43.17 | WKP | Rocky Point, N. Y. | (E) Relays programs evenings |
| 6950 | 43.17 | GBY | Rugby, England | (P) Phones U.S.A. irreg. |
| 6922 | 43.34 | IUF | Addis Ababa, Ethiopia | (E) Irregular |
| 6905 | 43.45 | GDS | Rugby, England | (P) Phones WOA-WNA-WCN evenings |
| 6900 | 43.48 | HI2D | ●Ciudad Trujillo, R. D. | Daily 6:40-8:40 A.M., 10:40 A.M.-2:40 P.M., 4:40-8:40 P.M. |
| 6890 | 43.54 | KEB | Bolinas, Calif. | (P) Tests KAZ - PLV early A.M. |
| 6880 | 43.60 | CGA-7 | Drummondville, Que. | (P) Phones Europe days |
| 6860 | 43.73 | KEL | Bolinas, Calif. | (P) Tests KAZ - PLV early A. M. |
| 6850 | 43.80 | TIOW | ●Port Limon, Costa Rica | Weekdays 10-11:30 P.M. Sun. 2-3 P.M. |
| 6845 | 43.83 | KEN | Bolinas, Calif. | (P) Used irregularly |
| 6830 | 43.92 | CFA | Drummondville, Que. | (P) Phones N. America nights |
| 6820 | 43.99 | XGOX | ●Nanking, China | Weekdays 5:30-8:30 A. M., Sun. 7-9 A.M. |
| 6800 | 44.12 | HI7P | ●Ciudad Trujillo, R. D. | Weekdays 12:40-1:40 P. M., 6:40-8:40 P.M. Sundays 9:40-10:40 A. M. |
| 6795 | 44.15 | GAB | Rugby, England | (P) Phones Canada irreg. |
| 6788 | 44.20 | PZH | ●Paramaribo, D. Guiana | Sunday, 9:45-11:45 A.M. Weekdays 2:45 - 4:45, 5:45-9:45 P.M. |
| 6780 | 44.25 | HIH | ●San Pedro de Macoris, R. D. | Daily 12:10-1:40 P.M., 7:40-9 P.M. Sunday 3:10-6:40 P.M. DX 2:40-3:40 A.M. |
| 6760 | 44.38 | CJA-6 | Drummondville, Que. | (P) Phones Australia early A.M. |
| 6755 | 44.41 | WOA | Lawrenceville, N. J. | (P) Phones GDW-GDS-GCS evenings |
| 6750 | 44.44 | JVT | Nazaki, Japan | (P) Phones JOAK and Pt. Reyes irreg. |
| 6750 | 44.44 | JVT | ●Nazaki, Japan | 4:40-7:40 A.M. daily |
| 6732.5 | 44.56 | KBK | Manila, P.I. | (P) Phones irreg. |
| 6730 | 44.58 | HI3C | ●La Romana, R. D. | Weekdays 12:10-2:10 P. M., 6:10-7:40 P.M. Sun., 12:10-2:40 P.M. |
| 6725 | 44.60 | WQO | Rocky Point, N. Y. | (E) Tests evenings irreg. |
| 6720 | 44.64 | PMH | ●Bandoeng, Java | Phones early A.M., B.C. 5:30-11 A.M. daily |
| 6690 | 44.84 | TIEP | ●San Jose, Costa Rica | 7-11 P.M. daily |
| 6690 | 44.84 | CGA-6 | Drummondville, Que. | (P) Phones Europe irregularly |
| 6675 | 44.94 | HBQ | Geneva, Switzerland | (E) Broadcasts and phones irreg. |
| 6668 | 44.99 | HC2RL | ●Guayaquil, Ecuador | Sun. 5:30 - 7:30 P.M. Tues. 9-11 P.M. |
| 6650 | 45.11 | GBY | Rugby, England | (P) Phones U.S.A. irreg. |
| 6650 | 45.11 | IAC | Pisa, Italy | (P) Phones ships irreg. |
| 6630 | 45.25 | HIT | ●Ciudad Trujillo, R. D. | 12:10-1:40 P.M., 6:10-8:40 P.M. ex. Sun. 1st Sat., DX 11:10 P.M.-1:10 A.M. |
| 6618 | 45.33 | Prado | ●Riobamba, Ecuador | Thursday 9:15-11:15 P. M. |
| 6600 | 45.45 | DAF | Norddeich, Germany | (P) Phones irreg. |
| 6575 | 45.63 | HCIVT | ●Ambato, Ecuador | Mon., Wed., Fri., 8-10:30 P.M. |
| 6550 | 45.81 | TIRCC | ●San Jose, Costa Rica | Daily 12-2 P.M., 6-9:30 P.M. |
| 6548 | 45.82 | XBC | Vera Cruz, Mexico | (E) 7-8 P.M. irreg. |
| 6545 | 45.84 | YV6RB | ●Ciudad Bolivar, Venez. | 7-10 P.M. daily; 3-6 P. M. Sun. |
| 6535 | 45.91 | YN1GG | ●Managua, Nicaragua | 6-10 P.M. daily |
| 6520 | 46.01 | YV4RB | ●Valencia, Venezuela | 11 A.M.-1:30 P.M., 5:30-9:30 P.M. daily |
| 6500 | 46.15 | HIL | ●Ciudad Trujillo, R. D. | 12-2 P.M., 6-8 P.M. |
| 6485 | 46.26 | "Radio Guardia Civil" | ●Tetuan, Sp. Morocco, Africa | 7-8 P.M. ex. Sunday |

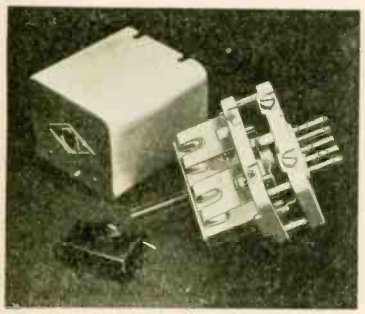
| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 6482 | 46.28 | HI4D | ●Ciudad Trujillo, R. D. | Mon. & Sat., 11:55 A. M.-1:40 P.M., 4:40-7:40 P.M. |
| 6480 | 46.30 | EDR-4 | ●Palma de Mallorca, Balearic Is. | 4:30-5:15 P.M. daily |
| 6479 | 46.30 | HI8A | ●Ciudad Trujillo, R. D. | Daily 8:40-10:40 A.M., 2:40-4:40 P.M. Sat., 9:10-10:40 P.M. |
| 6450 | 46.51 | HI4V | ●San Francisco de Macoris, R. D. | 11:40 A.M.-1:40 P.M., 6:40-9:15 P.M. daily |
| 6445 | 46.55 | YVQ | ●Maracay, Venezuela | 8-9 P.M. Saturdays |
| 6445 | 46.55 | YVQ | Maracay, Venezuela | (P) Phones LSL irreg. |
| 6420 | 46.73 | HI1S | ●Santiago de los Caballeros, R. D. | 11:40 A.M.-1:40 P.M., 5:40-7:40 P.M. |
| 6420 | 46.73 | YV6RC | ●Ciudad Bolivar, Venez. | Daily 10:30 A.M.-1:30 P.M., 4:30-9:30 P.M. |
| 6415 | 46.77 | HJA3 | Barranquilla, Colombia | (P) Phones HJA2 evenings |
| 6410 | 46.80 | TIPG | ●San Jose, Costa Rica | 7:30-9:30 A.M., 12-2 P. M., 6-11:30 P.M. daily |
| 6400 | 46.88 | YV5RH | ●Caracas, Venezuela | Weekdays 11 A.M.-1:30 P.M., 4:30-9:30 P.M. Sun. 9:30 A.M.-1:30 P.M., 5-7:30 P.M. |
| 6375 | 47.10 | YV5RF | ●Caracas, Venezuela | 6:30-7:30 A.M., 10:30 A. M.-1:30 P.M., 4:30-10:30 P.M. daily |
| 6360 | 47.17 | YV1RH | ●Maracaibo, Venezuela | 6-11 P.M. daily |
| 6351 | 47.24 | HRP1 | ●San Pedro de Sula, Honduras | 12-2 P.M., 7:45-10 P.M. daily ex. Sunday |
| 6340 | 47.32 | HI1X | ●Ciudad Trujillo, R. D. | Sun. 7:40-10:40 A.M. Weekdays 12:10-1:10 P.M. Tues. & Fri. 8:10-10:10 P.M. |
| 6330 | 47.39 | JZG | ●Nazaki, Japan | 5-7 A.M. irregular |
| 6325 | 47.43 | HH3NW | ●Port-au-Prince, Haiti | 1-2 P.M., 7-8:30 P.M. ex. Sunday |
| 6316 | 47.50 | HIZ | ●Ciudad Trujillo, R. D. | Daily 11:30 A.M.-2:45 P.M., 5:30 P.M.-9 P.M. Sat. to 10 & 11 P.M. |
| 6310 | 47.54 | TG2 | ●Guatemale City, Guatemala | 11 P.M.-2 A.M. |
| 6300 | 47.62 | YV4RD | ●Maracay, Venezuela | 6:30-9:30 P.M. ex. Sun. |
| 6280 | 47.77 | COHB | ●Sancti-Spiritus, Cuba | 9-10 A.M., 12-1 P.M., 4-6 P.M., 9-11 P.M. daily |
| 6280 | 47.77 | HIG | ●Ciudad Trujillo, R. D. | 7:10-8:40 A.M., 12:40-2:10 P.M., 8:10-9:40 P.M. |
| 6270 | 47.85 | YV5RP | ●Caracas, Venezuela | 6-11:45 P.M. daily |
| 6275 | 47.81 | OAX4G | ●Lima, Peru | 7-11:30 P.M. daily |
| 6250 | 48.00 | YV5RJ | ●Caracas, Venezuela | 5:30-9:30 P.M. daily |
| 6243 | 48.05 | HIN | ●Ciudad Trujillo, R. D. | (See 12500 kc.) Weekdays 11:40 A.M.-2:40 P.M., 7:10-9:10 P.M. Sun. 11:10 A.M.-3:40 P.M. |
| 6240 | 48.08 | HI8Q | ●Ciudad Trujillo, R. D. | Daily 10:40 A.M.-1:40 P.M, 4:40-8:40 PM |
| 6235 | 48.11 | OCM | Lima, Peru | (P) Phones afternoons |
| 6235 | 48.11 | HRD | ●La Ceiba, Honduras | Week days 8-11 P.M. |
| 6230 | 48.15 | YV1RG | ●Valera, Venezuela | 11 A.M.-12:30 P.M., 5:30 8:30 P.M. daily |
| 6210 | 48.31 | YV1RI | ●Coro, Venezuela | 7:30-9:30 P.M. daily |
| 6200 | 48.39 | COKG | ●Santiago, Cuba | Sundays 12:01-1 A.M., 5-6 P.M., 9:30-10:30 P. M. daily |
| 6200 | 48.39 | XEXS | ●Mexico City, Mexico | 7-11 P.M. |
| 6190 | 48.47 | HI1A | ●Santiago de Caballeros, R. D. | Daily 11:40 A.M.-1:40 P.M., 7:40-9:40 P.M. |
| 6170 | 48.62 | HJ3ABF | ●Bogota, Colombia | 11 A.M.-2 P.M. 6-11 P.M. |
| 6160 | 48.70 | VPB | ●Colombo, Ceylon | Daily 7-11:30 A.M. To 12:30 P.M. Saturdays |
| 6156 | 48.73 | YV5RD | ●Caracas, Venezuela | Weekdays 10:30 A.M.-1:30 P.M., 4:30-10 P.M.; Sundays 8:30 A.M.-12:30 P.M., 2:30-10:30 P.M. |
| 6150 | 48.78 | HJ4ABU | ●Pereira, Colombia | Daily 9:30 A.M.-12 Noon, 6:15-10 P.M. |
| 6150 | 48.78 | CJRO | ●Winnipeg, Manitoba | Weekdays 6 P.M.-12 A. M., Sundays 5-10 P.M. |
| 6150 | 48.78 | GBT | Rugby, England | (P) Phones U.S.A. days |
| 6150 | 48.78 | HI5N | ●Moca, R. D. | Daily 6:40-8:40 A.M., 10:40 A.M.-2:40 P.M., 4:40-8:40 P.M. |
| 6150 | 48.78 | OAX1A | ●Chiclayo, Peru | 7-10:30 P.M. daily |
| 6150 | 48.78 | CB615 | ●Santiago, Chile | 4-7 P.M. daily |
| 6140 | 48.86 | W8XK | ●Pittsburgh, Pa. | 9 P.M.-1 A.M. daily |
| 6140 | 48.86 | ZEB | ●Bulawayo, Rhodesia, Africa | Sun. 3-5 A.M.; Tues. & Thurs. 1:15-3:15 P.M. |
| 6138 | 48.88 | HJ4ABD | ●Medellin, Colombia | Weekdays 10 A.M.-2 P. M., 4-11 P.M. Sun., 11 A.M.-3 P.M., 7-11 P.M. (see 5900 and 5780 kc.) |
| 6137 | 48.88 | CR7AA | ●Lourenco Marques, Africa | Sundays 6-8 A.M., 10 A. M.-12:30 P.M., 1:30-3:30 P.M. Mon. to Sat., 11:45 P.M. (Sunday)-12:30 A.M., 4:30-6:30 A.M., 9:30-11 A.M., 12:30-4 P.M. |
| 6133 | 48.91 | XEXA | ●Mexico City, Mexico | 8-11:30 A.M., 3-5 P.M., 7-11 P.M. ex. Sunday |
| 6132 | 48.92 | VP3BG | ●Georgetown, Br. Guiana | 6-8:45 P.M. daily |
| 6130 | 48.94 | ZGE | ●Kuala Lumpur, S.S. | Sun., Tues., Fri., 6:40-8:40 A.M. |
| 6130 | 48.94 | LKJ1 | ●Jeloy, Norway | 11 A.M.-5 P.M. daily |
| 6130 | 48.94 | COCD | ●Havana, Cuba | Weekdays 9 A.M.-1 A.M. Sundays 1-3 A.M., 10 A.M.-8 P.M. |
| 6130 | 48.94 | VE9HX | ●Halifax, Nova Scotia | Sun. 3:55-9:45 P.M. Mon. to Fri. 5:30 A.M.-9:45 P.M. Sat. 10 A. M.-9:45 P.M. |
| 6128 | 48.96 | HJ1ABB | ●Barranquilla, Colombia | 11:45 A.M.-1 P.M., 5:30-10 P.M. daily |
| 6125 | 48.98 | CXA4 | ●Montevideo, Uruguay | 8 A.M.-12 noon, 2-10 P. M. daily |
| 6122 | 49.00 | HP5H | ●Panama City, Panama | 7-10 P.M. daily |
| 6122 | 49.00 | HJ3ABX | ●Bogota, Colombia | Weekdays 10:30 A.M.-2 P.M., 5:30-11:30 P. M.; Sundays 12-1:30 P.M., 6-11 P.M. |
| 6120 | 49.02 | XEFT | ●Vera Cruz, Mexico | Not in use (see 9510 kc.) |
| 6120 | 49.02 | W2XE | ●Wayne, N. J. | Not in use |
| 6120 | 49.02 | XEUZ | ●Mexico City, Mexico | 8-11 A.M., 5 P.M.-12 A. M. daily. English-Spanish DX 11 P.M.-12 A. M. nightly |
| 6115 | 49.06 | OLR2C | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 6110 | 49.10 | HJ4ABB | ●Manizales, Colombia | 11 A.M.-1 P.M., 5-8 P.M. |
| 6110 | 49.10 | GSL | ●Daventry, England | Not in use |
| 6110 | 49.10 | VUC | ●Calcutta, India | Mon., 8-9 A.M. Wed., 10:30-11:30 A.M. |
| 6110 | 49.10 | XEPW | ●Mexico City, Mexico | Daily ex. Mon. 11 A.M.-4 P.M., 7 P.M.-12 A. M. Mondays 9 A.M.-4 P.M. |
| 6109 | 49.10 | VUC | ●Calcutta, India | Daily 8 A.M.-12:30 P.M., 11 P.M.-12:30 A.M. |
| 6100 | 49.18 | YUA | ●Belgrade, Yugoslavia | 1245 A.M.-6 P.M. |
| 6100 | 49.18 | W9XF | ●Chicago, Illinois | Mon. to Fri. 11:05 P. M.-2 A.M. Sat. 12-2 A.M. Sun. 11:05-12 A.M., 1:05-2 A.M. |
| 6100 | 49.18 | W3XAL | ●Bound Brook, N. J. | Sun. to Fri. 7-10 P.M., Sat. 7 P.M.-12 A.M. |
| 6097.5 | 49.20 | ZTJ | ●Johannesburg, S. Africa | Sunday 4-5 A.M., 12:15-3:15 P.M. Weekdays 12-12:45 A.M., 3:15-5 A.M., 9 A.M.-4 P.M. |
| 6097 | 49.20 | HJ4ABE | ●Medellin, Colombia | 9:30 A.M.-1 P.M., 5-11:30 P.M. daily |
| 6095 | 49.22 | JZH | ●Nazaki, Japan | Irregular |
| 6092 | 49.24 | OAX4Z | ●Lima, Peru | 7-11:30 P.M. daily |
| 6090 | 49.26 | CRCX | ●Bowmansville, Ont. | Weekdays 12 noon-8 P. M. Sunday 11 A.M.-8 P.M. Sat. "Northern Messenger," 11 P.M.-12 A.M. |
| 6090 | 49.26 | ZBW-2 | ●Hong Kong, China | Daily ex. Sat. 11:30 P. M.-1:30 A.M.; Mon. & Thurs., 4-10 A.M.; Tues., Wed., Fri., Sun., 3-10 A.M.; Sat., 3-11 A.M., 9 P.M.-1:30 A. M. |
| 6090 | 49.26 | HJ4ABC | ●Ibague, Colombia | 6-11 P.M. |
| 6085 | 49.30 | HJ5ABD | ●Cali, Colombia | 11 A.M.-2 P.M., 6-11 P. M. daily |
| 6080 | 49.34 | W9XAA | ●Chicago, Ill. | Not in use |
| 6080 | 49.34 | ZHJ | ●Penang, S. S. | 6:40-8:40 A.M. |
| 6080 | 49.34 | CP5 | ●LaPaz, Bolivia | No regular schedule |
| 6080 | 49.34 | VE9CS | ●Vancouver, B. C. | Sun. 12 noon-1:30 A.M.; Mon., Thurs., Sat., 9:30 A.M.-8:30 P.M.; Tues., Wed., Fri., 9:30 A.M.-2:30 A.M. |
| 6080 | 49.34 | HP5F | ●Colon, Panama | Daily ex. Sunday, 11 A. M.-1 P.M., 7-10 P.M.; Sun. 10:45-11:30 A.M., 7-10 P.M. |
| 6079 | 49.35 | DJM | ●Zeesen, Germany | Irregular |
| 6075 | 49.38 | XECU | ●Guadalajara, Mexico | 9-11 A.M., 1-4 P.M., 8-11:30 P.M. or 12 A.M. |
| 6070 | 49.42 | CFRX | ●Toronto, Ont. | Week days 6:30 A.M.-11:05 P.M. Sundays 9:30 A.M.-11 P.M. |
| 6070 | 49.42 | YV1RD | ●Maracaibo, Venezuela | Daily 8 P.M.-12 A.M. Sun. 8 A.M.-8 P.M. |
| 6065 | 49.46 | XEXR | ●Mexico City, Mexico | 6-11:30 P.M. |
| 6063 | 49.46 | SBG | ●Motala, Sweden | Daily 1:30-5 P.M. |
| 6060 | 49.50 | W8XAL | ●Cincinnati, Ohio | 6:30 A.M.-8 P.M., 11 P. M.-2 A.M. Weekdays |
| 6060 | 49.50 | W3XAU | ●Philadelphia, Pa. | 8-11 P.M. daily ex. Thurs. (8-10 P.M.) |
| 6060 | 49.50 | VQ7LO | ●Nairobi, Kenya Colony, Africa | Mon. to Fri. 5:45-6:15 A.M., 11:30 A.M.-2:30 P.M. Tues. and Thurs., 8:30-9:30 A.M. Sat., 11 A.M.-3 P.M. Sun., 11:30 A.M.-2:30 P.M. |
| 6060 | 49.50 | OXY | ●Skamleback, Denmark | 1-6:30 P.M. Sunday 11 A.M.-6:30 P.M. |
| 6050 | 49.59 | GSA | ●Daventry, England | Not in use |
| 6050 | 49.59 | HJ3ABD | ●Bogota, Colombia | Weekdays 9 A.M.-2 P. M., 6 P.M.-12 A.M. Tues. & Thurs. to 3 P. M. Wed. & Fri. begin 5:30 P.M. |
| 6050 | 49.59 | XEXF | ●Mexico City, Mexico | 8 P.M.-12 A.M. |
| 6045 | 49.62 | XETW | ●Tampico, Mexico | 7 P.M.-12 A.M. daily |
| 6043 | 49.62 | HJ1ABG | ●Barranquilla, Colombia | Daily 11 A.M.-11 P.M. Sun., 11 A.M.-8 P.M. |
| 6040 | 49.67 | YDA | ●Tandjong Priok, Java | 10:30 P.M.-2 A.M. daily |
| 6040 | 49.67 | W4XB | ●Miami, Florida | Temporarily off the air. Undergoing repairs. |
| 6040 | 49.67 | W1XAL | ●Boston, Mass. | Not in use |
| 6030 | 49.75 | OLR2B | ●Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |

| KC | Meters | Call | Location | Time |
|---|---|---|---|---|
| 6030 | 49.75 | HP5B | ● Panama City, Panama | 12-1 P.M., 5-10 P.M. |
| 6030 | 49.75 | HJ4ABP | ● Medellin, Colombia | 8 A.M.-11 P.M. daily |
| 6030 | 49.75 | PGD | Kootwijk, Holland | (P) Phones Java and E. Indies irreg. |
| 6030 | 49.75 | VE9CA | ● Calgary, Alberta, Can. | Weekdays 9 A.M.-1 A. M.; Thursdays to 2 A. M.; Sundays 12 noon-12:30 A.M. |
| 6030 | 49.75 | XEBQ | ● Mazatlan, Mexico | 8-11:30 P.M. |
| 6025 | 49.79 | PGD | Kootwijk, Holland | (P) Phones Java and E. Indies irreg. |
| 6025 | 49.79 | HJ1ABJ | ● Santa Marta, Colombia | 11:30 A.M.-2 P.M., 5:30-10:30 P.M. daily |
| 6020 | 49.83 | PGD | Kootwijk, Holland | (P) Phones Java and E. Indies irreg. |
| 6020 | 49.83 | DJC | ● Zeesen, Germany | 11:35 A.M.-4:30 P.M. |
| 6020 | 49.83 | XEUW | ● Vera Cruz, Mexico | 7 A.M.-11 P.M. daily |
| 6018 | 49.85 | ZHI | ● Singapore, S. S. | Mon., Wed., Thurs. 5:40-8:10 A.M.; Sat. 10:40 P.M.-1:10 A.M.; 2nd & 4th Sundays, 5:10-6:40 A.M.—organ |
| 6015 | 49.88 | HI3U | ● Santiago de los Caballeros, R. D. | Weekdays 7:10-8:40 A. M., 10:40 A.M.-1:40 P.M., 4:40-9:40 P.M. Sundays, 10:40 A.M.-1:40 P.M. only |
| 6015 | 49.88 | XEWI | ● Mexico City, Mexico | Irregular (see 11900 kc.) |
| 6012 | 49.90 | HJ3ABH | ● Bogota, Colombia | 11:30 A.M.-2 P.M., 6-11 P.M.; Sun. 12-2 P.M., 4-11 P.M. |
| 6010 | 49.92 | VP3MR | ● Georgetown, Br. Guiana | Weekdays, 4:45-8:45 P. M. Mon., Wed., Fri. 10:15-11:15 A.M. Sun. 8:45-11:15 A.M. |
| 6010 | 49.92 | VK9MI | ● Sydney, Australia "S.S. Kanimbla" | 11 P.M.-8 A.M. & later. Irregular |
| 6010 | 49.92 | COCO | ● Havana, Cuba | 8 A.M.-10 P.M. daily |
| 6010 | 49.92 | OLR2A | ● Prague, Czechoslovakia | Irregular (see 15230-11840 kc.) |
| 6005 | 49.96 | HP5K | ● Colon, Panama | 7:30-9 A.M., 11:30 A.M.-1 P.M., 6-11 P.M. |
| 6005 | 49.96 | CFCX | ● Montreal, Que. | Weekdays 7:44 A.M.-1 A.M. Sundays, 9 A. M.-11:15 P.M. |
| 6005 | 49.96 | VE9DN | ● Montreal, Que. | Sat. 11 P.M.-12 A.M., Fall, Winter & Spring |
| 6000 | 50.00 | HJ1ABC | ● Quibdo, Colombia | Sun., 3-5 P.M.; Wed., Sat., 5-6 P.M.; daily 6-9 P.M. |
| 6000 | 50.00 | XEBT | ● Mexico City, Mexico | 10 A.M.-1 A.M. daily |
| 6000 | 50.00 | FIQA | ● Tananarive, Madagascar | 3:30-4:45 A.M., 7 A.M.-1 P.M. daily |
| 6000 | 50.00 | RV59 | ● Moscow, U.S.S.R. | Not in use. |
| 5980 | 50.17 | HJ2ABD | ● Bucaramanga, Colombia | Daily 11:30 A.M.-12:30 P.M., 6-10 P.M. |
| 5969 | 50.26 | HVJ | ● Vatican City, Vatican | 2-2:15 P.M., Sunday 5-5:30 A.M. |
| 5955 | 50.35 | HJN | ● Bogota, Colombia | Daily 11 A.M.-2 P.M., 5-10:30 P.M. |
| 5940 | 50.51 | TG2X | ● Guatemala City, Guat. | Daily 4-6 P.M.; Mon., Thurs., Sat., 10 P.M.-11:30 P.M.; Sundays, 1-2 P.M. |
| 5930 | 50.59 | PJC1 | ● Willemstad, Curacao | Weekdays 6:36-8:36 P.M. Sun. 10:36 A.M.-12:36 P.M. |
| 5930 | 50.59 | YV1RL | ● Maracaibo, Venezuela | Weekdays, 11 A.M.-1 P. M., 4:30-9:30 P.M. Sun., 8:30 A.M.-2:30 P.M. |
| 5910 | 50.76 | YV4RH | ● Valencia, Venezuela | 8-11:30 P.M. daily |
| 5910 | 50.76 | HH2S | ● Port-au-Prince, Haiti | 7-10 P.M. |
| 5905 | 50.80 | TIIS | ● San Jose, Costa Rica | Week days 12-3 P.M., 6-11 P.M. Sundays irreg. |
| 5900 | 50.84 | ZNB | ● Mafeking, South Africa | Sun., 1:30 - 2:30 P.M. Mon. to Sat., 1-2:30 P.M. |
| 5900 | 50.85 | HJ4ABD | ● Medellin, Colombia | Weekdays 10 A.M.-2 P. M., 4-11 P.M. Sundays 11 A.M.-3 P.M., 7-11 P.M. (see 6138 & 5780 kc.) |
| 5885 | 50.98 | HI9B | ● Santiago de los Caballeros, R. D. | Weekdays, 7:30 - 8:45 A.M., 12-2 P.M., 5-7:45 P.M. Sunday, 11:45 A.M.-2:45 P.M. |
| 5880 | 51.02 | YV3RA | ● Barquisimeto, Venezuela | Daily 11:30 A.M.-12:30 P.M., 5:30-9:30 P.M. |
| 5880 | 51.02 | IUA | ● Addis Ababa, Ethiopia | Used irregularly |
| 5875 | 51.11 | HRN | ● Tegucigalpa, Honduras | 7-10 P.M. daily |
| 5865 | 51.15 | HI1J | ● San Pedro de Macoris, R. D. | 11:40 A.M.-1:40 P.M., 5:40-9:40 P.M. daily |
| 5853 | 51.20 | WOB | Lawrenceville, N. J. | (P) Phones ZFA P.M. |
| 5850 | 51.28 | YV1RB | ● Maracaibo, Venezuela | Daily ex. Sun. 10:45 A. M.-12:45 P.M., 4:45-9:45 P.M. Sun. 8:45 A.M.-9:45 P.M. Mon., Wed., Fri., 5:45-8:15 A. M. Tues., Thurs., Sat., 5:45-9:45 A.M. |
| 5830 | 51.28 | GBT | Rugby, England | (P) Phones U.S.A. irreg. |
| 5845 | 51.33 | KRO | Kahuku, Hawaii | (P) Tests early mornings |
| 5830 | 51.46 | TIGPH | ● San Jose, Costa Rica | 8-11 P.M. daily ex. Sun. |
| 5825 | 51.50 | HJA2 | Bogota, Colombia | (P) Phones HJA3 afternoons irreg. |
| 5800 | 51.72 | KZGF | Manila, P. I. | (P) Tests A.M. irreg. |
| 5800 | 51.72 | YV5RC | ● Caracas, Venezuela | Sun. 8:30 A.M.-10:30 P. M. Mon.-Fri., 7-8 A. M., 10:45 A.M.-1:45 P.M., 4-9:30 P.M. Ex. Wed.—off 9:15 P.M. Thurs. off 10 P.M. Sat. 7-8 A.M., 10:45 A.M.-3:30 P.M., 4-9:30 P.M. |
| 5800 | 51.72 | ZEC | ● Salisbury, Rhodesia, Africa | Sun. 3-5 A.M.; Tues. & Fri. 1:15-3:15 P.M. |
| 5790 | 51.81 | JVU | Nazaki, Japan | (P) Phones JZC early mornings |
| 5780 | 51.90 | CMB-2 | Havana, Cuba | (P) Phones and tests irregularly |
| 5780 | 51.90 | OAX4D | ● Lima, Peru | 9-11:30 P.M. Wed., Sat. |
| 5780 | 51.90 | HJ4ABD | ● Medellin, Colombia | Weekdays 10 A.M.-2 P. M., 4-11 P.M. Sunday 11 A.M.-3 P.M., 7-11 P.M. (see 6138 & 5900 kc.) |
| 5758 | 52.10 | YNOP | ● Managua, Nicaragua | 8:30-10:30 P.M. daily ex. Sunday |
| 5755 | 52.13 | YV2RA | ● San Cristobal, Venez. | Sundays 5:30-10 P.M. Weekdays 11:30 A.M.-12:30 P.M., 5:30-9 P.M. |
| 5750 | 52.17 | XAM | Merida, Mexico | (P) Phones XDR-XDF early evenings |
| 5730 | 52.36 | JVV | Nazaki, Japan | (P) Phones JZC early A.M. |
| 5725 | 52.40 | HC1PM | ● Quito, Ecuador | Saturdays 9-11 P.M. |
| 5713 | 52.51 | TGS | ● Guatemala City, Guat. | Sun., Wed., Fri., 6-8 P.M. |
| 5705 | 52.59 | CFU | Rossland, Canada | (P) Phones CFO and CFN eves.; news, 8:30-8:45 P.M. |
| 5670 | 52.91 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 5635 | 53.24 | DAS | Rugen, Germany | (P) Phones ships irreg. |
| 5445 | 55.10 | CJA7 | Drummondville, Que. | (P) Phones Australia early A.M. |
| 5435 | 55.20 | LSH | Buenos Aires, Arg. | (P) Relays LR4 and tests evenings |
| 5395 | 55.61 | CFA7 | Drummondville, Que. | (P) Phones No. America irregular |
| 5355 | 52.63 | DOG | Konigs W'n., Germany | (P) Phones irreg. |
| 5255 | 57.09 | DOF | Konigs W'n., Germany | (P) Phones irreg. |
| 5140 | 58.37 | PMY | ● Bandoeng, Java | Daily 4:45-10:45 A.M., 5:45 P.M.-2:15 A.M. |
| 5110 | 58.71 | KEG | Bolinas, Calif. | (P) Phones irregularly evenings |
| 5080 | 59.08 | WCN | Lawrenceville, N. J. | (P) Phones GDW evenings seasonally |
| 5025 | 59.76 | ZFA | Hamilton, Bermuda | (P) Phones WOB evenings |
| 5040 | 59.25 | RIR | Tiflis, U.S.S.R. | (P) Phones afternoons irregular |
| 5015 | 59.82 | KUF | Manila, P. I. | (P) Phones Bolinas; irregular |
| 4975 | 60.30 | GBC | Rugby, England | (P) Phones ships afternoon and nights |
| 4905 | 61.16 | CGA8 | Drummondville, Que. | (P) Phones GDB - GCB afternoons |
| 4820 | 62.20 | GDW | Rugby, England | (P) Phones WCN-WOA evenings |
| 4810 | 62.37 | YDE2 | ● Solo, D. E. I. | 5:30-11 A.M., 5:45-6:45 P.M., 10:30 P.M.-2 A. M. daily |
| 4752 | 63.13 | WOY | Lawrenceville, N. J. | (P) Tests irregularly |
| 4752 | 63.13 | WOO | Ocean Gate, N. J. | (P) Phones ships irreg. |
| 4752 | 63.13 | WOG | Lawrenceville, N. J. | (P) Phones Rugby irreg. |
| 4600 | 65.22 | HC2ET | ● Guayaquil, Ecuador | 9:15-10:45 P.M., Wed. & Sat. |
| 4555 | 65.86 | WDN | Rocky Point, N. Y. | (P) Tests Rome and Berlin evenings |
| 4550 | 65.93 | KEH | Bolinas, Calif. | (P) Phone; irreg. |
| 4512 | 66.49 | ZFS | Nassau, Bahamas | (P) Phones WND daily; tests GYD - ZSV irregular |
| 4500 | 66.67 | DAS | Rugen, Germany | (P) Phones ships irreg. |
| 4465 | 67.19 | CFA2 | Drummondville, Que. | (P) Phones No. America; irregular days |
| 4420 | 67.87 | ZMBJ | ● TSS "Awatea," Wellington, N. Z. | (See 8840 kc.) |
| 4400 | 68.18 | DAF | Norddeich, Germany | (P) Phones ships irreg. |
| 4355 | 68.88 | IAC | Pisa, Italy | (P) Phones and tests irreg. |
| 4348 | 69.00 | CGA9 | Drummondville, Que. | (P) Phones ships and Rugby evenings |
| 4320 | 69.40 | GDB | Rugby, England | (P) Phones CGA8 and tests evenings |
| 4273 | 70.21 | RV15 | ● Khabarovsk, U.S.S.R. | Daily ex. 6, 12, 18, 24, 30th, 3 P.M.-8 A.M. On 6, 12, 18, 24, 30th, 7:10 P.M.-8 A.M. English programs start at 2 A.M. |
| 4287 | 69.97 | WOM | Hialeah, Florida | (P) Phones 8 A.M.-8 P.M. |
| 4272 | 70.22 | WOO | Ocean Gate, N. J. | (P) Phones ships afternoons and eve. |
| 4272 | 70.22 | WOY | Lawrenceville, N. J. | (P) Tests evenings |
| 4107 | 73.05 | HC1B | ● Quito, Ecuador | (See 8948 kc.) |
| 4097 | 73.20 | WND | Hialeah, Florida | (P) Phones 8 A.M.-8 P.M. |
| 4002 | 75.00 | CT2AJ | ● Ponta Delgada, Azores | Wed. and Sat., 5-7 P.M. |
| 3750 | 80.00 | HCK | ● Quito, Ecuador | Mondays 8:30-10:30 P.M. and occasional specials |
| 3310 | 90.63 | CJA8 | Drummondville, Que. | (P) Phones Australia A.M. |
| 3040 | 98.68 | YDA | ● Batavia, Java | Sunday 5:30-10:30 A.M., 7:30 P.M.-2 A.M. Weekdays 5:30-10:30 or 11 A.M. (Sat. 11:30 A.M.), 6-7:30 P.M., 10:30 P.M.-2 A.M. |

# On the Market

## National Multiple Crystal Holder

THE NATIONAL CO., INC., Malden, Mass., has introduced for amateur and experimental use a new crystal holder in which four holders with selector switch have been combined into a single unit. While provided with a plug-in base for mounting in a standard 5-prong tube socket, the unit may be single hole panel mounted. In many ways the latter is the most preferable arrangement in that the selection switch is easily accessible. When so mounted, connections are made directly to the ends of the plug prongs.



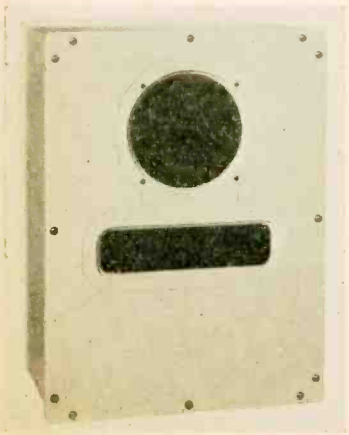
The illustration shows the thermal bar against which all four crystals are mounted, as well as the low-capacity switch which makes the action of any one crystal completely independent of the others. ALL-WAVE RADIO.

✦

## Jensen Peri-Dynamic Reproducer Kits

JENSEN HAS JUST announced a line of Peri-Dynamic Reproducers available in kits.

Kits consist of speaker and knock-down enclosure. All necessary screws, bolts, grilles, brackets, etc., are furnished for assembling.



Enclosures in all cases are cut to size, drilled and all necessary parts for assembling are enclosed. Hardwood is used throughout and outside surfaces are finished with two coats of French gray, sanded and smoothed.

There are two models, Model KM and Model KV. Model KM (illustrated) uses both Peri-dynamic and Bass Reflex Principles and is recommended for general uses and where the finest in the reproduction of music is desired.

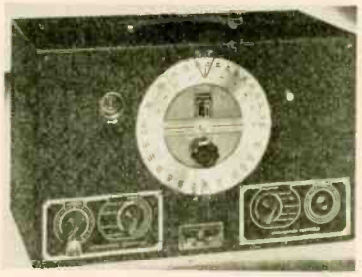
Model KV employs the Peri-dynamic Principle and is recommended where reproduction of speech is of paramount importance and music reproduction is secondary. Jensen Peri-dynamic Reproducers are complete loudspeakers. No baffle is required.

Complete information on models, prices and sizes available on request. ALL-WAVE RADIO.

✦

## New C-B. R-F. Signal Generator

A NEW PRECISION signal generator with an accuracy of ½ of 1% and a frequency range from 100 kc. to 31 mc. in five bands is announced by The Clough-Brengle Company, 2815 West 19th Street, Chicago. The direct reading etched silver finish dial of the Model 110 Signal Generator may be



estimated to ¼ of 1%, it is said. The dials are connected direct to condenser rotor with insulated shaft and 10-to-1 vernier which prevents slippage, removes backlash, and assures a smooth drive without errors. Permanence of calibration is assured by the use of type 2020 molded coil forms and r.f. iron cores. An air trimmer is provided for each band.

The radio-frequency output is continuously variable through vernier control and a 4-step ladder attenuation from minimum to 100,000 microvolts on all bands. There is no uncontrollable high output tap. A uni-selector switch provides 400-cycle internally modulated r.f., unmodulated r.f., externally modulated r.f., and 400-cycle push-pull sinusoidal audio voltage for amplifier tests that is adjustable 0-1.2 volts. The rotor-inductor switching is done by making all coil contacts direct to oscillating circuit. There are no band switch losses.

To exclude strays, the entire r.f. circuit is enclosed in separate copper shielded box. Power supply and modulator circuits are independently shielded, and the power chassis, power supply cord, and r.f. units are completely isolated by shielded, multi-section filters. The outer interlocking case is uni-welded and finished in a rich, dark green baked crystalac trimmed with etched silver designation plates. The tube complement is one 76 oscillator, one 6X5 rectifier, and one 6N7 modulator. ALL-WAVE RADIO.

✦

## New Shure Crystal Mike

A NEW TYPE OF crystal which appreciably increases output level is used in two new "Communication-Type" microphones just announced by Shure Brothers, 225 W. Huron Street, Chicago, U. S. A. The microphones are specially designed for effective communication in Airways, Police Radio, Commercial and Amateur Radiophone systems.

It has been definitely proved experimentally that a uniform or flat response characteristic is not desirable for most effective utilization of a given amount of power in voice communications work. Most of the energy of speech is carried by low-frequency components which contribute *very little* to "intelligibility" or "articulation." This means that, with "flat microphones and associated equipment, the maximum output of amplifiers and modulators is produced by voice components which are relatively unimportant in transmitting intelligible speech. The properly proportioned rising response characteristic overcomes this limiting factor in voice communication by discriminating against the lower audio frequencies, thus resulting in clear, crisp speech in which higher "intelligibility" frequencies are favored. At the same time the

output signal quality from highly-selective receivers is greatly improved since the rising characteristic of the microphone tends to compensate for receiver side-band cutting.

The new Model 70SW is similar to its predecessor, the well known Shure 70S, but the output level has been increased by 5 db, thus requiring only 56% of the voltage amplification previously necessary. The increased level is due to the use of a special Rochelle Salt crystal. Model 70SW is furnished complete with integral desk mount and 7 feet of shielded single-conductor cable.

Model 703S is smaller and lighter and has a new convenient swivel which head furnished with integral desk mount and cable. ALL-WAVE RADIO.

◆

## Automatic Dialing

AMONG THE NEW Knight Radios featured by Allied Radio Corporation, Chicago, is the Knight 11 with Automatic Dialing,

shown in the accompanying illustration. Favorite domestic stations are tuned "quick as a flash" by means of this unique device. The Knight 11 tunes three full bands: 16 to 54 and 52 to 178 meters for short wave domestic and overseas programs, as well as Amateur and Police signals; and 174 to 560 meters for American and Canadian standard broadcast programs.

Other advanced features claimed are: giant Color-Band Dial; metal tubes; 9 watts power output; 12-inch electro-dynamic speaker; Automatic Frequency Control; Automatic Tone Control; Automatic Volume Control; Interstation Noise Silencer; 3-gang tuning condenser; r.f. preselection; and double push-pull audio. The console cabinet measures 41" high, 26½" wide and 14½" deep.

The Knight 11 is one of the 53 Knight radios featured in the 156-page Allied Catalog. ALL-WAVE RADIO.

## Porcelain-Case High-Voltage Mica Capacitors

APPRECIATIVE OF THE high voltages and high frequencies to which mica capacitors are subjected in radio transmitters and certain


electronic applications, a line of porcelain-case mica capacitors is announced by Aerovox Corporation, 70 Washington St., Brooklyn, N. Y.

Each new unit is housed in a glazed porcelain case and provided with heavy brass terminal studs and lock nuts. There is the widest choice of capacities from .00005 to .1 mfd., as well as d.c. test voltages from 2000 to 12,500. The maximum r.f. current that can be handled is indicated on the label of each unit. ALL-WAVE RADIO.

◆

## Round-Can Oil-Filled Capacitors

HANDY HIGH-VOLTAGE oil-filled capacitors in compact round cans, arranged for inverted mounting in limited space, are now offered by Aerovox Corporation, 70 Washington St., Brooklyn, N. Y. These units are similar in general appearance and size to the usual electrolytic condensers. The section of selected linen paper and foil, oil impregnated and bathed in oil, is hermetically sealed in the aluminum can. There is an insulated center terminal and grounded can. Fittings supplied with each unit per-


mit insulating the can from the chassis and providing a second insulated terminal. Units are available in 600, 1000 and 1500 volts d.c. working, and in capacities of from 0.5 to 4 mfd. ALL-WAVE RADIO.

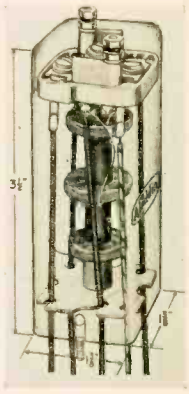
## Sylvania Type 25L6G Tube

HYGRADE SYLVANIA Corporation announces the 25L6G, a new double-grid power output tube designed for use in a.c.-d.c. and d.c. receivers. This new tube is a glass counterpart of the metal type 25L6 and is similar to this type in characteristics, providing a high power output at comparatively low plate and screen voltages. The interelectrode potential fields are such that with normal electrode spacings the electron stream is sectionalized in its flow to the plate, rendering it possible to secure high efficiency with resultant increased power output and power sensitivity. ALL-WAVE RADIO.

◆

## New Aladdin I.F. Transformer

A NEW TRIPLE-TUNED i.f. transformer, type N-200, has been introduced by Aladdin Radio Industries, Inc., 466 West Superior St., Chicago, Ill. This transformer, with all condenser adjustment screws at the top, is said to have a flat-top resonance curve



8 kc. wide at the top, and an adjacent channel rejection about 30 kc. wide at 20 times down.

The transformer measures only 1⅜" x 1⅜" square and 3½" long. No oscilloscope necessary for aligning. ALL-WAVE RADIO.

◆

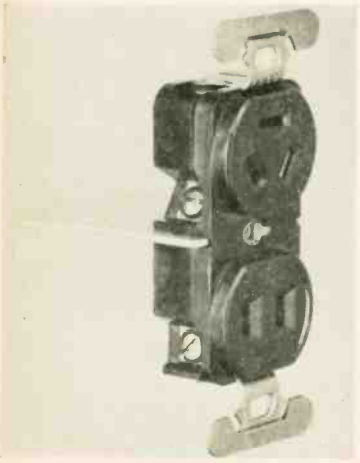
## New G.E. Radio Outlet

A CONVENIENT AND attractive outlet for noise-reducing or "doublet" antennas, which eliminates the usually unsightly wiring connections characteristic of most radio receivers installed in the home, has been announced by the Appliance and Merchandise Department of the General Electric Company, Bridgeport, Conn. The outlet affords a compact means of separable attachment for ground, antenna (two-wire), and power leads for a radio set. Lead-in wires are thereby eliminated and replaced by neat, short lengths of cord.

The new outlet has three slots in the upper portion for ground and antenna connections, and the conventional two in the lower portion for the power plug. A metal divider is attached securely to the

*(Continued on page 438)*

body of the outlet to separate the low and high tension circuits in the switch or outlet box. A special cap is also available, with polarity prongs arranged so as to prevent antenna and ground circuit from connecting with the power side of the outlet. The circuit connections are clearly indicated on the face of the outlet.



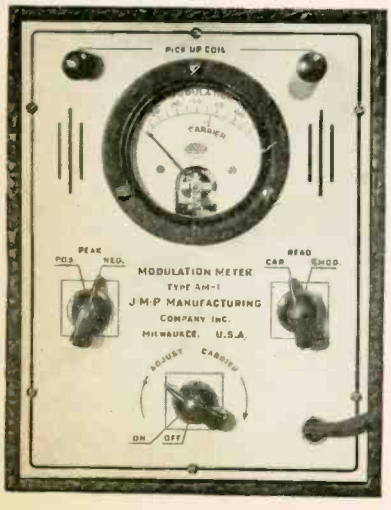
The slots in the radio side of the outlet for the ground and antenna circuit, and the prongs of the special cap are set at an angle not found in any other type of convenience outlet. The special cap cannot be used with any other outlet. ALL-WAVE RADIO.

◆

## J-M-P Modulation Meter

THE J-M-P MFG. CO., INC., Milwaukee, Wis., has placed on the market a compact Modulation Meter, Type AM-1, specifically designed for use in conjunction with amateur phone transmitters. The device will indicate the degree of modulation and also any carrier amplitude shift.

The unit employs a high-speed indicating meter with percentage modulation readings from 0 to 120 percent. Switches are provided for positive or negative peak readings and for percentage modulation or carrier shift. It is designed to operate from a 115-volt a.c. or d.c. line.




The device has a double linear electronic rectifier, one section for rectification of carrier voltage and the other for a.f. voltage.

According to the manufacturer the combination of a high-speed indicating meter and a mathematically correct timing circuit keeps the accuracy at plus or minus 2% at the 100% mark.

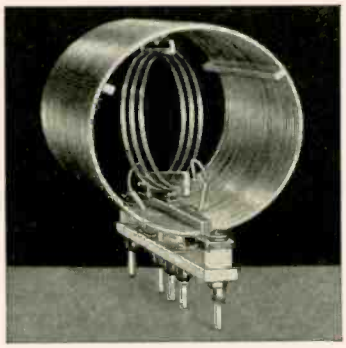
The panel of the Type AM-1 Modulation Meter is of 16 gauge "sunburst" aluminum with letters lithographed in black. The leatherette-covered case measures 6" x 8" x 4". ALL-WAVE RADIO.

◆

## Coto Variable Link Inductors

COTO NOW OFFERS a group of variable link transmitting inductors in addition to an already comprehensive line of regular and fixed link types.

The amateur and engineer will recognize the advantages of variable coupling over that of fixed coupling. Now optimum coupling in each stage can be accomplished with a minimum of work. Once adjusted the rotatable link coil will remain fixed.



Variable link coupling is effected by pivoting a three-turn coil in the electrical center of the inductor, flexible pigtails permitting rotation through 90 degrees. The pivot springs maintain a constant pressure on the link bearings, so that coupling adjustment will not be disturbed when changing bands. Fitted with steatite bar and five-contact plugs with phosphor bronze springs. ALL-WAVE RADIO.

◆

## New Oscillograph Kit

TRANSFORMER CORPORATION of America has just announced a kit which uses the new 1-inch type 913 cathode-ray tube. It includes a modernistic looking steel cabinet, sockets, transformers, condensers—everything necessary to build a complete oscillograph. Complete simplified instructions and diagrams make construction a matter of only a few hours, it is said.

It has an efficient "saw tooth" sweep circuit built in as well as a wide-range vertical amplifier, with provisions for cutting the amplifier in or out. Other features include a linear sweep with 5-position switch for selection of sweep frequencies; vertical beam centering control; linear sweep amplitude control; fine frequency control and a self-locking synchronization circuit which keeps the image locked at any frequency.

Drop a line to Transformer Corporation of America at 69 Wooster Street, New York, N. Y., and they'll be glad to send you all the dope on it. ALL-WAVE RADIO.

◆

## Supreme Oscilloscopes With 2" Tubes

SUPREME ENGINEERS have developed cathode-ray oscilloscopes using a tube with a two-inch screen. This tube allows four times the screen area of a one-inch screen tube, it is said, yet is only 7 inches long. It requires no more operating voltage than the one-inch screen tube and the complete instruments are no larger.

Two models are available. Model 535, the larger of the two, includes more exclusive features than ever before offered. Can be used as a complete visual servicer in conjunction with a frequency-modulated signal generator. Employs return sweep eliminator for completely removing high frequency linear sweep return. Also provides selective return sweep eliminator for inclusion or rejection of power supply frequency return sweep. Includes positive interlocking circuit between linear time base and incoming signal. Special Uni-control allows both horizontal and vertical spot centering knobs on panel from but one shaft protrusion. Horizontal and vertical amplifiers. Means for controlling gain in two amplifiers. Linear time base (saw tooth) oscillator from 15 to over 30,000 cycles. Special switching systems for routing incoming signals direct to cathode-ray tube or through amplifiers. Intensity and focus controls. Mounted on antique bronze panel and in golden oak carrying case with handle. Small size and light weight.

Model 530 has selective return eliminator for inclusion or rejection of power supply frequency return sweep. Can be used for visual alignment with frequency-modulated signal generator. Particularly adapted to use by amateurs for transmitter adjustment. Employs vertical amplifier, graduated gain control, Uni-control potentiometers, intensity and focus controls. Special switching circuits. Mounted in antique bronze panel

(*Continued on page 446*)

## 5-AND-10 SUPERHET

(*Continued from page 404*)

as should all the grounds of the detector. It is generally best to return the detector grounds to No. 1 pin of the socket and return all the r.f. stage grounds to the rotor of its tuning condenser.

### *Variable Selectivity Control*

The selectivity switch uses a very simple method of broadening the acceptance of the i.f. stages. Having tried several systems of selectivity control, the final decision was in favor of the simplest. Variable selectivity is obtained by "switching in" various resisters shunted across the transformer windings to broaden out the frequency response. Since every other system that was tried also decreased the gain to about the same degree, and since some of the commercially-built receivers are guilty of the same thing, this system was thought to be about the best available.

The tuning or "R" meter is an 0-10 milliammeter of the square type. It has been mounted upside-down so that the needle swings to the right when a signal is tuned in. This meter reads the cathode current of the two i.f. stages and is high (to the left) when no signal is received. With a signal in the i.f. amplifier this current drops in proportion to the strength of the signal. It should be easy for local signals to push the meter needle almost to the end. With a lower voltage power supply it would seem advisable to short out R13. In any case this meter should read about 9.5 to 10 ma. with no signal or noise pickup.

Aside from indicating signal strength, this meter also provides an excellent check on frequency modulation of any carrier. Some very startling results were had in this respect. For instance, a great many signals listened to were fine with no modulation, but with modulation the carrier would almost completely disappear.

### *Small Parts Used*

Some comment on parts may well be made. It is wise in the r.f. circuit to use parts of small physical size. This results in a much better arrangement of parts and much greater gain. The National dial was chosen because there were no airplane dials available that were in any way practical and at the same time not taking up too much space and being too expensive. The Type A dial is excellent because of its smooth performance

### LEGEND

**AMPHENOL**
5—octal sockets
1—6-prong wafer socket
1—4-prong wafer socket

**CARDWELL**
C2, C8—type ZR15AS variable

**HAMMARLUND**
C1, C7, C13—3-30 mmfd. trimmers
2—insulated shaft couplings
1—acorn tube socket

**LEEDS**
1—chassis 8" x 3" x 17"
1—panel 8¾" x 19" x ⅛"
1—set angle brackets
T, T1—General Radio 30-kc. i.f. transformers
2—aluminum sheets for baffle shields

**MICAMOLD**
C3, C4, C5, C6—.006 mfd. mica
C9, C12—.0001 mfd. mica
C11, C18, C20—.01 mfd., 400 v.
C10, C14—0.1 mfd., 400 v.
C22, C23, 24—0.25 mfd., 400 v.
C19, C21, C25—10 mfd., 30 v. electrolytic
C16, C17, C26, C27—.002 mfd. mica

**NATIONAL**
1—type A dial

**OHMITE**
R1—1500 ohms, 1 watt
R2—70,000 ohms, 1 watt
R3, R20—500,000 ohms, ½ watt
R5—15,000 ohms, 1 watt
R6, R7, R8—500,000 ohms, 1 watt
R9, R10, R12(2), R14—50,000 ohms, 1 watt
R11—250,000 ohms, 1 watt
R13—50 to 100 ohms, 1 watt
R15—1 to 5 megs, ½ watt
R16—1 meg., 1 watt
R18—2000 ohms, 1 watt
R19—100,000 ohms, 1 watt
R21—600 ohms, 2 watts
R23—500 ohms, 10 watts
R24—25,000 ohms, 2 watts
R25—6000 ohms, 2 watts
R26—1000 ohms, 2 watts

**RCA**
1—type 956
1—type 6J7
2—type 6K7
1—type 6H6
1—type 6C5
1—type 41

**TRIPLETT**
M—square type 0-10 ma. milliameter

**YAXLEY-MALLORY**
R4—500,000-ohm potentiometer
R22—10,000-ohm potentiometer with switch
1—jewel pilot light
SW1—No. 151L "Hamswitch"
SW2—s.p.s.t. switch
J1—switch jack
J2—insulated closed-circuit jack

**MISCELLANEOUS**
L1—For 5 meters:—10 turns No. 15 bare wire ½" inside diameter.
For 10 meters:—15 turns No. 15 bare wire ¾" inside diameter.
L2—For 5 meters—8 turns No. 15 bare wire ½" inside diameter.
For 10 meters:—12 turns No. 15 bare wire ¾" inside diameter.
RFC—Single layer No. 28 enamelled 1¼" long on ¼" form.

and its ability to handle a large mechanical load without backlash.

Jacks have been provided for headphones and speaker. Being interconnected, the headphone jack automatically shorts out the speaker when phones are used.

Lock washers should be used wherever possible because it is far from encouraging to have the outfit fall apart after a few months of use. They are useful in keeping tension on the ground connections and are recommended especially for the shield anchors. Self-tapping screws have also been put to use in this rig, and though not the best thing to use, they do save considerable time.

Needless to say a dust cover would aid greatly in preserving the operation of the unit once it has been adjusted, and eliminates some very peculiar and annoying results experienced when ultra-high-frequency circuits become covered with dust.

## HAMFEST

(*Continued from page 405*)

WHAT'S HAPPENED TO—The old navy code? (There used to be three codes back in those dim days before 1912—the Navy, Continental and Morse.)

dah-dah-dah-dah for "ch" (from the German)?

MIM, meaning "warning, high power?"

QSS—the old ARRL abbreviation for fading signals?

♦

IF THE LADS PERSIST in using single-stage super-regenerative receivers on 56 megacycles, conditions on that band are going to be as bad as on the old ham bands before the superhet pushed the single circuit tuner on to the shelf. Parked with Arthur H. Lynch, W2DKJ, in his mobile radio equipped car in Thatcher Park, N. Y., we worked stations in the neighborhood of Troy, Schenectady and Albany, N. Y. In many instances the radiations from their receivers was about as QSA as their transmitting carriers!

And by the way, we picked up several 20-meter fones on their 4th harmonics. Just because we get up pretty high in frequency doesn't mean that we don't have to watch out for harmonics still higher up!

♦

THERE IS SOME talk going the rounds complaining of unfairness in the government tests for ham licenses. As the story goes, the examination papers are turned over to a bevy of YLs in Washington the interiors of whose pretty heads would make an RK-21 look gaseous. Obviously the gals know nothing about radio and all answers are marked down unless they conform to a parrot-like formula. No variations on the theme are permitted. In other words, if the applicant knows his stuff and gives perhaps a better answer than required by the FCC, the chances are he will be flunked on the question. At least that's the story—and something obviously should be done about it, either in the way of denial or a correction of these conditions if they exist.

The idea seems to be that the questions must be answered precisely, word for word, diagram for diagram, as given in the ARRL License Manual. There is no doubt that such answers will get you through. (Don't depend on all manuals, though. We know of one with a flock of answers that we wouldn't pass were we on the FCC side of the examination table.)

All we can say, personally, is that when we took the test last fall, we answered the questions in our own way, and the diagrams we drew varied (though not fundamentally, of course) from the ARRL recommendations. And we got the license. (Though if the call letters mean anything, we just skinned through!)

♦

WE WANT TO acknowledge darned interesting QSOs with—W3GNY, W1KIE, W1KJU, W9ZNM, W1BCF, W1DGN, W1BHM, W1HOW, W1BOE, W1IXB, W1AMF, W3GKP, W2INF, W1JGK, W1KOQ, W3ARV, W1EZ, VE3AFW (fone), W2BKQ, W2COI, W4CZN and W3GIX—with W8QMR, working c.w. on 80-meters.

♦

DEAR W8QMR: So you don't think code tests necessary for fone ops? Well—mebbe not. How about substituting a test in good English—English as she ain't spoken on the air? That would sure clear up the fone QRM situation fb!—yrs, HI.

## CHANNEL ECHOES

(*Continued from page 415*)

BOAKE CARTER has eliminated the commercials from his part of the Philco program—which is a definite improvement. If we must have advertising, let it be frank and above-board, rather than insinuated into the entertainment portion of the program by some form of *leger-demain*-force. It always gave us the heebeejeebees waiting for Carter to tie up a Mississippi flood or the Duke of Windsor's family troubles with a Philco auto radio.

Which is our main objection to the way Buick handled the Louis-Braddock

fracas (in typical Buick style). The plugs were bad enough—being largely of the *insinuated* variety—but to add insult to injury, Buick patted itself on the back for about two minutes (it seemed longer than that) explaining that Buick wasn't going to waste the audience's time patting Buick on the back (Buick's back).

✦

WE HAVE NEVER been particularly enthusiastic concerning Asiatic programs. When the music has been of far east character, we find it most discordant—aside from reminding us of a certain Chinese New Year's Eve celebration down in Mott Street, New York City, dimly associated with a police station. When occasionally the music is of occidental character, it would be better termed accidental. Probably the finest music we ever heard over an oriental station was a chorus of snake charmers—from Bombay if we recall correctly. It was ended abruptly—and one assumed that the snakes, with ample justification, took offense.

To our mind the ideal, in the way of a program from somewhere west of the International Date Line, was transmitted from Tokyo, at 4:15 P. M., Eastern Standard Time, June 26th. It was entitled "Entertainment by Japanese Jugglers."

## THE RME-69

(*Continued from page 423*)

excellent shape. Sensitivity was outstanding due to the trimming effects of the resonator and crystal-control condenser. The r-f. stage was adequate in coping with all ordinary image-frequency interference, both in lab. and air tests—though a pre-selector is available where extreme selectivity and sensitivity are required. The receiver requires about thirty minutes to warm up thoroughly, though satisfactorily stable operation on c.w. may be had about one minute after the switch is turned on. The frequency drift during the entire half hour warm-up at 14 megacycles is only approximately 8,000 cycles.

The tuning controls are super velvet in action and can be spun with a light touch of the finger. This ease of control brings up the present reviewer's minor objection to the receiver. The proximity of three other controls to the two tuning controls—main and bandspread—is such that often one of these two knobs is touched, and the slightest contact is sufficient to detune the receiver.

While the receiver submitted to AWR was equipped with a noise silencer, tests made to date on this particular feature have not been sufficient to justify a report on its functioning, but the system employed is a proven one and can be relied upon to do the job.

## BUG POISON

(*Continued from page 401*)

course, is good advice for the beginner, too, after he progresses past the point where he stumbles over about every letter.)

Code practice is one thing—and getting on the air is another! On the air you're more nervous—pull a few boners—and you immediately reach over for the straight key! Our advice is this: When you get so that you can send 25 perfect words in one minute, for two minutes straight without error, practice for a week or so on imaginary, ad lib, conversations. (There is a lot of difference, too, between sending from printed copy and from your head!) By this time you're fit for the air. Take your straight key—give it to some member of the family with instructions not to return it to you under one week no matter how much you may beg or bribe for it! That's like teaching a dog to swim by tossing him in the water—but it almost always works! Forced to rely on the bug, you'll get over your nervousness in no time at all, and your real ability will quickly come to the fore.

After a week, you can screw the straight key back on the table. Though you won't use it very often, it belongs there. It comes in handy for figures some times (though they are usually just as easy if not easier on the bug to the good operator), for slow transmission (though the experienced operator can go as slow as 15 words per minute on a bug adjusted for 35), for the use of other operators who may not be bug men—and for an occasional change, like razors, pipes, and other good things one changes for luck.

One thing more—there are plenty of semi-automatic keys on the market. Some good, some bad, and some indifferent. And you can't go by price. If possible secure the advice of an experienced op. Get one with plenty of heft—weight in the base—and of the proper height. Then go ahead, but, as the cop told us the other day—take it easy—take it easy!

## 10-20 SUPERHET

(*Continued from page 399*)

plus switch. In the center position this switch cuts off the high voltage, this position being used while transmitting. On either side of the center position the high voltage is on. In the left position the phone circuit is closed, the phones being plugged into a jack on the back of the chassis, while in the right position the 500-ohm line to the output stage is closed.

The small knob just to the right of the dial controls the a.v.c. and b.f.o. circuits. This is also a three-position switch, giving the three switching combinations shown on the diagram. The ground contact of this switch is bent slightly so that it also makes contact when the switch is in the center position. This provides an "a.v.c.-off—b.f.o.-off" position which is useful at times.

The next three controls, in order, are the noise silencer potentiometer, Transfilter switch and selectivity control. The noise silencer has a built-in switch to throw it out of circuit, while the filter switch is of the two-position type.

The signal strength meter is of the balanced bridge type. This is of value in determining the comparative strength of incoming signals, also in providing a check in the variations in strength of any particular station. In order to secure the most easily readable scale a standard meter from an RME receiver is used. This is calibrated in both an R scale and in decibel variations. These meters can be secured direct from the Radio Mfg. Engineers in Peoria, Ill. A 500-ohm variable resistor is mounted on the chassis for adjustment of the meter calibration. This should be adjusted so that the meter needle reads zero with the i.f. gain control set at maximum, a.v.c. switch in the "a.v.c.-on" position and the antenna disconnected.

### *Adjustment and Operation*

The i.f. circuits should be first lined up on completion of the receiver. The coupling condenser, C7, feeding the tap on the Transfilter output transformer, T1, should be set at or near maximum capacity. The other balancing trimmer condenser, also labelled C7, should be set at or near minimum. Neither setting is critical. With the Transfilter switched in and the a.v.c. turned on, a test signal should be tuned in to a peak reading on the R meter. All the i.f. circuits should be then trimmed for maximum meter swing.

With the crystal switched out the secondary trimmer in transformer, T, should be adjusted so that the selectivity condenser, C10, tunes to resonance in its center position. This will give a proper range of control for this latter condenser with the Transfilter both in and out of circuit.

If the secondary windings on the high-frequency coils are made identical as to number of turns and spacing, little difficulty should be had in tracking these circuits. A slight change in the spacing will bring the stages into perfect track.

No tendency toward oscillation is had anywhere in the receiver. This is due to the care taken in both mechanical and electrical isolation of the various stages.

The bypass condensers in the high-frequency section ground to the nearest point on the shelf. The value of the construction procedure followed in this section is attested to by the fact that, with the coupling to the oscillator condenser loosened, the other three stages may be tuned through resonance, with the dial, without the slightest effect on the frequency of a c.w. signal. This is a bit unusual in 10-meter supers. A ground bus is used to support the bypass condensers in the i.f. section in a convenient position. The shield lug of each tube socket in the receiver should be soldered to a lug on its adjacent socket mounting bolt. In the i.f. section each lug should again connect directly to the nearest point on the ground bus.

The operation of the Transfilter has proven its installation to be worthwhile. With the filter in circuit it is found that, while the signal drops only slightly as compared to the no-filter position, the background noise is either greatly reduced or eliminated. The setting of the selectivity control determines the effectiveness of the Transfilter. In its most selective position it is possible to bring through, with little or no QRM, a weak phone signal that is blotted out without the filter by a strong adjacent signal.

The limited air tests made during adjustment of the receiver show that the r.f. stages are performing somewhere near previous expectations. On rough checks the signal-to-noise ratio seems comparable to that of several other specially built 10-meter receivers available for comparison tests. These latter include one receiver using a single regenerative r.f. stage and two receivers using two r.f. stages with the first stage, in each case, being regenerative. A two-weeks' comparison check is next in order. The new receiver is to be set side-by-side on the operating desk at W2TP with a switch to throw the beam antenna to either receiver. In this way an almost simultaneous check may be had on the same signal and antenna. Only in this way can the true worth of the new receiver over the old be shown.

## BIAS SUPPLIES

(*Continued from page 411*)

The total resistance across the output is, then,

$$R\ (\text{total}) = \frac{250\ \text{v.}}{200\ \text{ma.}} \times 1000 = 1250\ \text{ohms}$$

(75 watts rating)

The bias resistance, R', is

$$R' = \frac{180\ \text{v.}}{200\ \text{ma.}} \times 1000 = 900\ \text{ohms,}$$

which is seen to be even less than that found in the first supply and which will result in even better regulation. The greater the grid current through the resistor, however, the more the voltage will vary from that desired. In c.w. transmitters, a not-too-large jump in bias will affect its operation to no serious extent. However, it is desirable to keep the variation as low as possible.

It is not recommended that more than two stages be biased from a supply of this type. The result of trying to handle more than two sources of grid current in the resistor will result, in case of widely different bias voltages required and different values of grid currents flowing, in rather poor regulation as well as a lot of bugs and headaches.

Two stages, if the difference between their bias voltages is 90 volts or less and if the difference between their respective grid currents is not too great, can be

biased. Careful attention must be given to the calculations of the resistances required. If you have good r.f. chokes in the grid circuits of the two stages to be thus biased, it is expected that you will not encounter serious trouble in getting good results. Keep in mind, however, the paths of the two different currents when you figure your values of resistance; it's easy to become confused if you try to rush matters.

## QUERIES

*(Continued from page 418)*

9.5 meters long. The following formula takes into consideration the 95% factor:

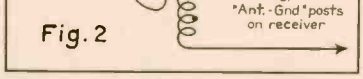
$$L = 468{,}000/F$$

— where L is the length of a half wave on the wire *in feet* and F is the frequency in kilocycles—usually chosen for the exact frequency or the frequency in the middle of the band.

Pontoise, at 15243 kc., is just about in the center of the 20-meter band. Taking this frequency for F, the total length of L1 plus L2 will be 33 feet, 6 inches.

The ordinary twisted pair—or better yet a twisted pair designed for radio transmission line purposes—makes an excellent noise reduction lead-in, and its impedance, about 75 ohms (length has nothing to do with this, and the twisted pair can be any length) matches that of the center of a half-wave doublet—particularly if "fanned" slightly at the antenna end as suggested in Fig. 1.

The chances are the low impedance of this line will not match the input impedance of the receiver. Connect according to whatever directions accompanied the receiver. Try it across doublet posts, if any, with ground connected—and across antenna and ground posts with ground disconnected. If excellent results are not secured, try link coupling as shown in Fig. 2. Coil L1 is wound on a standard 1½-inch coil form with 21 turns, close wound, of any convenient wire tapped every third turn. L2 consists of 3 turns wound over L1. When L1 is connected to the antenna and ground posts of a receiver, try it both with and without ground.




*Link coupling to the receiver when the receiver input does not match the impedance of the twisted transmission line.*

## GLOBE GIRDLING

*(Continued from page 409)*

station in South America. The station will use Telefunken equipment with special antennas and directed beams; one for Japan, Europe and Asia and one for Central America, being first installed.

### *Tuning-In to Daventry*

For the information of listeners in all parts of the world, the following is printed as taken from "B.B.C. Empire Broadcasting" the official organ of that corporation:

"OWING to the recent re-arrangement of aerial arrays at the BBC Empire Broadcasting station at Daventry, overseas listeners my not be quite certain as to the frequencies on which they will experience the best reception. The following advice is therefore given:—

*Transmission I*

Listeners in New Zealand should experience good reception from GSG, GSO, or GSB. Those in Australia are advised to tune-in to GSB or GSD, and those in the Far East to GSG.

*Transmissions II and III*

In these transmissions listeners in India, Malaya, and Ceylon should receive either GSJ or GSG, those in the Far East GSO, and those in the West Indies GSJ. During this day-time period listeners throughout the African Continent should obtain good reception from GSH.

*Transmission IVa*

It is expected that listeners in East Africa should obtain best reception of this transmission from GSD, but it is possible that good signals may also be received from GSG and GSI. Listeners in South Africa are advised primarily to listen to GSB; but during the hours of daylight and dusk better signals may be expected from either GSG or GSI. In Central and West Africa good reception will be experienced from either GSG or GSI, but GSB may also be well heard on certain days.

*Transmission IVb*

In this transmission listeners throughout the whole of Africa are expected to obtain good reception from GSB only. Those in South America should tune-in to GSO, those in the West Indies to GSF, and those in Canada, Newfoundland, and North America to GSG.

*Transmission V*

Listeners in Canada, Newfoundland, and North America should tune-in to GSP or GSD, those in the West Indies, Ceylon, and Malaya to GSB, and those in South America to GSO.

*Transmission VI*

Listeners in Western Canada should tune-in to GSD or GSI, those in other parts of North America to GSC, and those in the West Indies to GSF."

### *Amateur Phones*

The following is a list of 20-meter amateur phone stations reported in late

"CUROM" KORTE GOLF ZENDER

P. J. C. I.

50.6 M. — 5960 K.G.

WILLEMSTAD, CURAÇAO - N.W.I.

Hierdoor bevestigen wij Uw luisterrapport van onze uitzending d.d. en betuigen wij onze dank voor Uwe waardevolle mededeeling.

Nos ta confirma bo reporte di nos trasmision di fecha i nos ta keda agradecido pa e valiosa informacion.

Le confirmamos su reporte de nuestra trasmisión del de de 193 y le agradecemos su valiosa información.

We acknowledge receipt of your radio-report relative to our broadcast of the March 27th 37 and thank you for your valuable information.

CURAÇAOSCHE RADIO VEREENIGING.

Uitzendingen - werkdagen
Trasmisionnan- dia di trabajo
Trasmisiones - dias de trabajo
Broadcasts - working days

7 - 9 p.m.

*Conservative verification card from PCJ-1, and well worth having.*

lists and which have not been shown previously in this section:

| Country | Frequency | Calls | Time Heard |
|---|---|---|---|
| Australia | L.F. | VK3AL | 6:30 A.M. |
| Africa (South) | H.F. | ZS6AM | 8:30 A.M. |
| Africa (South) | L.F. | ZS1B | 10:09 A.M. |
| Africa (Egypt) | L.F. | SU1SG | 11:00 P.M. |
| Africa (Belg. Congo) | L.F. | OQ5AA | 5:30 P.M. |
| Argentina | L.F. | LU4AC | 7:19 P.M. |
| Argentina | H.F. | LU7AC | 7:25 P.M. |
| Antigua | L.F. | VP2AT | 5:26 P.M. |
| Alaska | A.B. | K7FBE | 7:30 A.M. |
| Brazil | L.F. | PY2LJ | 8:54 P.M. |
| Cuba | L.F. | CO2OY-2EG-7VP-2WZ | 5:50-10:15 P.M. |
| England | L.F. | G5SB-G6WX | 6:33 & 7:55 P.M. |
| England | H.F. | G6BY-6VL | 6:47 & 7:18 P.M. |
| France | L.F. | F3NF | 4:48 P.M. |
| France | H.F. | F8AM-8AG | 4:31 & 5:52 P.M. |
| Hawaii | A.B. | K6JZV | 6:38 A.M. |
| Japan | L.F. | J2MI | 9-10 A.M. |
| Japan | H.F. | J2KJ-4MI-2CR | 3:30-10:00 A.M. |
| Malaya States | L.F. | VS2AK | 9-10 A.M. |
| Malta | H.F. | ZB1H | 8:01 P.M. |
| Mexico | L.F. | XE1GK-1BT-1CC | 2:30-9:50 P.M. |
| Paraguay | L.F. | ZP4AB | 3:30 A.M. |
| Philippine Islands | H.F. | KA1KY | 10:13 A.M. |
| Philippine Islands | L.F. | KA1AB-1HS-1ME-1MD-1MM | 10:00-10:30 A.M. |
| Scotland | L.F. | G6XW | 7:00 A.M. |
| Scotland | H.F. | GM5NW | 4:53 P.M. |

### Acknowledgment

It is with pleasure that we acknowledge letters and reports from Mr. Louis P. Ambrosius, Louisville, Ky.; Robert K. Betz, Ocean Park, Calif.; Miss Rita Bernell, San Francisco, Calif.; Messrs. Wm. Fearnley, Ossining, N. Y.; David R. Gray, Duncan, Okla.; Robert Jones, Coshocton, Ohio; J. E. Owens, Tacoma, Wash.; H. Orlaw, Edmonton, Alta., Canada; Dr. J. S. Pugh, Dallas, Texas; J. F. Pichler, Santa Fe, New Mexico; F. M. Pow, South Edmonton, Alta., Canada; Robert F. Rowser, Mare Island, Calif.; Frank W. Stockbridge, Wellsboro, Mass.; George W. Weaver, Saxton, Pa.; V. Nicholas Yagar, New Rochelle, N. Y.; and extend to them and the many others who regularly give assistance to this department the thanks of ALL-WAVE RADIO and the writer.

We appreciate greatly your loyalty and support, It is always a great pleasure to reciprocate by making prompt replies to your questions and giving such information as is possible as to unknown stations, reception, and station matters in general.

Address your letters to me at 85 Saint Andrews Place, Yonkers, New York, enclosing self-addressed stamped envelope if you desire a reply.

All questions of a technical nature should be sent to Queries Editor, ALL-WAVE RADIO, 16 East 43rd Street, New York, N. Y.

## BACKWASH

*(Continued from page 420)*

had closed and slightly overlapped. Being just as contrary, I jerked out all of the tubes and took them to the nearest tester for a test. Nothing much wrong here except a shorted 6F5 and three 6K7's that would give better service in the ash can than in the set, plus one or two more that didn't behave just right on the tester although nothing apparently wrong. Nothing to do in this case other than replace the 6F5 and put the rest back in the set. This, however, had no effect on the 6E5's contrariness since that bird still persisted in opening up shortly after heating up or else varying between closed to 1/8" open at infrequent intervals.

Not overlooking this golden opportunity to pass out a few sarcastic remarks to my

former assistants, I strolled around to their usual hangout and casually drop the bait, which they gobble up and were off. It ended up with the asinine reply on their part that there couldn't be anything wrong with this set or the tubes, as they had checked up with other dealers on this model set and not one of them had been even looked at since installation, and anyway, the guy who tested the tubes probably wouldn't know a good tube if he saw one, and all that was needed on this set was an RCA R.K.40 antenna instead of the clothes-line I was trying to use. Boy, was this inductive to a first-class case of apoplexy since over a month had passed with the receiver hooked to an R.K.40 unbeknown to them and with no appreciable results other than slightly less wrist movement needed on the volume control knob. Disdaining to stand for further insults on the matter, I gracefully proceed to fall out the door on my way out.

I am greeted by one of these self-same gentlemen about a week later who states that he has been in touch with someone or other and if I would bring the tubes around he would send them in for testing and replacement of those that were bad. I, still being in a very congenial humor, very forcibly stated that judging from some of the finished products, all I need to be equally as good a service man, is a trip through the factories and this only being necessary in case your clients should get inquisitive as to your experience and such being the case, if any tubes went anywhere they would do so after I personally put the replacements in first and not before, and if this was not satisfactory, he and his friend both could go jump in the Ohio River. Anyway, I had no intention of doing away with something whose characteristics I was entirely familiar with for something that would probably turn out to be worse.

Now, in summing up, I am sorry to say that I am at a complete loss to explain why various stations on all bands, that previously behaved very nicely, now wander around with the AVC at all hours of the day or night, thus introducing a very serious moral problem. Or why one of our locals that formerly, being very shy, could be picked up and lost within seven kilocycles either side of perfect tuning, now so boldly dares to take nearer twenty before he is satisfied. Or why stations which were obtainable on the 125, such as the West coast and Canada, are noticeably absent for some time on the 10T. Or why the 5Y3 is still good for about another month, judging this from the leopard-like appearance and the beautiful half-moon curve displayed on the screen of the 6E5 at the present time. Or why the speaker persists in emitting a sound similar to a leaky high-voltage wire on a wet day, between stations and on weak stations.

Having reached the end of the great experiment, I am forced to conclude that perhaps it would be better if you just glance through the foregoing notes and draw your final analysis on the basis of your findings rather than for me to compile them and advance the answers, for being close on the verge of a nervous breakdown —not to mention financial embarrassment —as a result of my exhaustive research in this matter, it might tend to sway my judgment to such a point where a serious error would be introduced. Then, too, I am beginning to suspect that I had entirely underestimated the powers of the 125, thus putting the 10T under a decided handicap from the start on all counts except tone quality.

I might state in closing that a fine time was had by all.

I trust that the foregoing will be of invaluable assistance to you in future research along these lines and reminding you that I shall be glad to render any assistance in an advisory capacity at any time you feel in need of such assistance.

W. F. SIMMONS,
*Radio Tester DeLuxe,*
HAMILTON, OHIO.

*(One might gather that Mr. Victor, the dealer, and the servicemen are pixillated—to say nothing of the Model 10T. What happened is evident—the failure of the first 5Z4 did more damage to an otherwise excellent receiver than was realized at the outset. The condition can be compared to the sprung frame of an auto after what might seem to have been a minor accident. We are publicizing this with the hope that it will become clear that this, or a similar chain of tragic events, that are the exception rather than the rule, cast no reflection on the manufacturer or the excellence of the receiver. But we sympathize with Mr. Simmons and wish him a bright future, free of tube failures.—Editor)*



## ON THE MARKET

*(Continued from page 438)*

and in golden oak carrying case with handle. Said to be smallest and lightest oscilloscope having equal functions and ranges on the market. ALL-WAVE RADIO.

◆

### Filter for Electric Razors

TO OVERCOME the interference caused by the electric type of razor in radio receivers, type AE Elim-O-Stat has been developed by the Solar Manufacturing Corp. of 599 Broadway, New York City.

The AE Elim-O-Stat is an exceedingly efficient filter of the capacitive-inductive type containing not only the conventional condensers usually used in devices of this kind, but also induction coils for maximum filtering effect.


Installation of the Elim-O-Stat is easily made by means of built-in plugs. It is attractively finished in black crackle to match the usual type of electric razor. Available through radio jobbing channels or direct from the manufacturer where jobber does not stock. ALL WAVE RADIO.

◆

### IRC Exact Duplicate Replacement Controls

A COMPLETE LINE of IRC Metallized Volume Controls in exact duplicate replacement types, including dual and other special units, is now in production and will be available for trade distribution from stock by September 1, according to an announcement just made by International Resistance Company, 401 North Broad St., Philadelphia, to its jobbers.

Previously IRC Metallized Controls have been made in thirty-five standard types. The present expansion comes as a result of the demand for a complete line of exact duplicate types for all the wide variety of

receivers on which servicemen are called upon to make control replacements.

In addition to this expansion of the IRC jobbing control line, new dual and triple controls as well as a new development of the IRC Type C Control capable of carrying up to 2 watts, are being introduced in the radio manufacturing and industrial fields. ALL-WAVE RADIO.

◆

## New Sprague "Cased" Condensers

AN IMPROVEMENT in the design of Uncased Paper Section Cardboard Dry Electrolytic Condensers which makes them unexcelled as compact, low cost transmitting units as well as for a wide variety of service replacement purposes has been announced by Sprague Products Company, makers of Sprague Condensers, North Adams, Mass.


Instead of the rough, unfinished cases in which Uncased Paper Sections have previously been supplied, these new Type UC Sprague Condensers are fully cased. In addition to being sealed to prevent melting of wax, they are constructed with the recently developed Sprague moisture-proofing process which is said to eliminate one of the most common causes of condenser failure. Handy mounting flanges are a part of the case, and may be cut off if desired.

Despite the many structural improvements in the UC units, there has been no increase in price. Units are also the same compact size as heretofore. They are available in 1 and 2 mfd. capacities with d.c. voltages of 400, 600, 800 and 1,000 volts, and fully guaranteed up to these voltages.

Sprague Products Company, North Adams, Mass., will be glad to send its new 1937 Condenser Catalog—just off the press—to all who request it. Many important new developments will be found here including the exceptionally small Sprague "Pinhead" Tiny-Mike Cardboard Dry Electrolytics and the Tiny-Mike Aluminum Can Type Dry Electrolytics and numerous others. ALL-WAVE RADIO.

◆

## Sprague "Pinhead" Dry Electrolytics

"PINHEAD" TINY-MIKES is an appropriate name for the new Sprague cardboard dry electrolytic condensers just announced by the Sprague Products Company of North Adams, Mass.

These new "Pinhead" units, known as Sprague Type PTM, are made in answer to the growing demand for extremely small, fully reliable units at lowest possible cost. In size they are even smaller than the original Sprague Tiny-Mikes, the 8 mfd. unit, for instance, being only 2 1/2" long by 11/16" wide and 1 1/16" high. Other units are 4 mfd. and an 8-8 mfd. condenser with four leads.

"Pinhead" Tiny-Mikes are conservatively rated at 525 volts.

A new 1937 catalog listing this and many other equally important Sprague Condenser developments will be sent upon request to Sprague Products Company, North Adams,

◆

## ICA Self-Aligning Punch

AN IMPROVED TYPE of self-aligning punch for making large holes in chassis for tube sockets, filter condensers, etc., has been brought out by the Insuline Corporation of America, 25 Park Place, New York, N. Y.

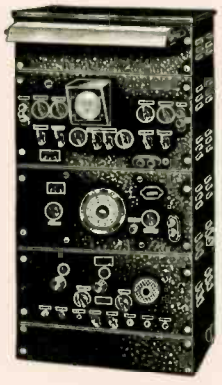
This new tool produces perfectly clean, round holes in a few seconds. Because of a spring-supported inner member, the cutting edges center themselves automatically when the head of the punch is struck by the hammer, and shearing is entirely impossible. No drilling of center hole is required. Hardened and tempered steel is used throughout, and hundreds of holes of uniform size can be made in succession.

Designed for amateurs, experimenters, servicemen, machinists and other workers in sheet metal, the new ICA punch is available in five sizes, to make holes of the following diameters: 3/4, 7/8, 1-3/16, 1-3/8 and 1-1/4 inches.—ALL-WAVE RADIO.

◆

## Complete Service Laboratories

EVIDENCE THAT the radio service industry is soon to follow the path of the automotive industry and adopt modern display methods is found in the wide interest aroused by the line of Complete Service Laboratories recently announced by the Clough-Brengle Company of 2815 W. 19th Street, Chicago, Ill.




The cabinets are finished in C-B emerald green and hold any standard 19 in. panel, in which form all C-B instruments are now available.

A crystal silver lumaline floodlight illuminates the black and silver front panels.

The C-B laboratory cabinet may be purchased with one or more panel instruments, such as oscillator, oscillograph, or analyzer, and will then be supplied complete with blank filler panels. As additional instruments are desired, these panels may be removed to make the needed room, thus eliminating obsolescence and allowing the service laboratory to be kept up-to-date at all times.

A new bulletin describing these laboratories in detail will be mailed upon request to manufacturer. ALL-WAVE RADIO.

◆

## CATALOGS AND BULLETINS

### *New Shure 1938 Catalog*

A NEW, COMPLETELY revised six-page catalog of Microphones and Acoustic Devices has just been published by Shure Brothers, 225 W. Huron Street, Chicago.

Among the new items described in the catalog are the "Tri-Polar" Controlled-Direction Crystal Microphone, providing switch-controlled uni-directional, bi-directional and non-directional response in one unit, "Military-Type" Hand microphones, designed to fit in the hand, improved "Com-

munications-Type" microphones, "Transcription" Record Reproducers, and Vibration Pickups.

Copies of the catalog are available on request. ALL-WAVE RADIO.

◆

### New Clough-Brengle Catalog

THE CLOUGH-BRENGLE CO., 2815 West 19th St., Chicago, Ill. have issued a new catalog covering their complete line of electrical and radio equipment. Complete specifications are given on their a.f., r.f. and beat-frequency oscillators, frequency modulator, large and small oscillographs, vacuum-tube voltmeter, decibel meter, set analyzer, unimeter, and the new line of matching transformers.

A free copy of the catalog can be had by addressing the manufacturer. ALL-WAVE RADIO.

◆

### New Cardwell Catalog

CATALOG NO. 40, giving specifications, etc., on the complete line of Cardwell Condensers, Parts and Accessories is now ready for distribution. Items covered are the Cardwell single, dual and balanced midget Trim-Air Condensers, low- and high-power transmitting condensers, high-frequency neutralizers, tuning condensers for u.h.f. work, the "X" type receiving condensers, and accessories such as flexible couplings, mounting pillars, etc.

The catalog also includes handy charts for determining condenser capacities, peak voltages and breakdown voltages. A free copy can be obtained by writing to The Allen D. Cardwell Mfg. Corp., 81 Prospect St., Brooklyn, N. Y. ALL-WAVE RADIO.

◆

### E. F. Johnson Catalog

NEW CATALOG SHEETS are now available on request to the E. F. Johnson Company, Waseca, Minn. A supplement to the original catalog covers the latest Johnson Plug-In "Hi-Q" Inductors, Flexible Coupling and Drive Shafts, Types E and F Variable condensers, and the new cylindrical type neutralizing Condensers for low C, high-voltage tubes. ALL-WAVE RADIO.

### Brochure On Super Sky Rider

AN ATTRACTIVE AND profusely illustrated brochure which "tells the story" behind the new Hallicrafters Super Sky Rider Receiver is now available for free distribution.

The forepart of the brochure explains the difference between the average and "communications type" receiver, and this is followed by a complete and precise outline of the mechanical and electrical features of the 1938 Super Sky Rider, including schematic diagram, selectivity and audio response curves, etc.

Brief data on the Hallicrafters' Sky Challenger, the Ultra Sky Rider, the Commercial Sky Rider, the Sky Chief, and the Sky Buddy, is included in the rear of the brochure.

Write to The Hallicrafters, Inc., 2611 Indiana Ave., Chicago, Ill., for your free copy. ALL-WAVE RADIO.

◆

### Radio Equipment Protection

HOW TUBES, transformers, condensers and other equipment may be safeguarded is the subject of an interesting folder just issued by Heinemann Electric Co., Trenton, N. J. "Radio Equipment Protection" describes the Re-Cirk-It combination switch and circuit breaker, available in ratings from 50 milliamperes up to 35 amperes, and in instantaneous trip and time-delay action for various kinds of loads. A copy will be sent on request. ALL-WAVE RADIO.

◆

### New Ham Catalog

A CATALOG COMPILED exclusively for the radio amateur and short-wave broadcast fan has just been released for free distribution by Wholesale Radio Service Company, Inc., of 100 Sixth Avenue, New York City. Copies are obtainable at the New York office and sales rooms and at their branches: 901 W. Jackson Blvd., Chicago, Illinois, 430 W. Peachtree St., N.W., Atlanta, Ga., 219 Central Avenue, Newark, N. J., 542 E. Fordham Rd., Bronx, N. Y., and 90-08 166th Street, Jamaica, Long Island.

A post-card with your name and address on it or a phone call will bring you a copy free of charge.

It lists complete lines of short-wave receiving and transmitting accessories as well as factory-built receivers and transmitters. Every nationally-known manufacturer is represented: Hammarlund, R.C.A., Bliley, Speed-X, Mac, National, UTC, Lafayette, Thordarson, Littlefuse, Weston, Triplett Trutest, G. E., Cardwell, Hallicrafter and numerous others. ALL-WAVE RADIO.

◆

### "Wholesale" Summer Bargain Flyer

WHOLESALE RADIO SERVICE Company, Inc., of 100 Sixth Avenue, New York, N. Y., have just released their Summer Bargain Flyer for 1937. This handsomely prepared 12-page circular carries a complete listing of replacement parts, test instruments, auto receivers and parts, electrical appliances, radio receivers for the home and public address and amplifier equipment. All items are priced for summer clearance.

A free copy may be obtained by personally visiting, phoning or writing any of their branches at 100 Sixth Avenue, New York, N. Y., 542 East Fordham Road, Bronx, New York City, 90-08 166th Street, Jamaica, Long Island, 901 West Jackson Blvd., Chicago, Illinois, 430 West Peachtree Street, N. W., Atlanta, Ga., or 219 Central Avenue, Newark, New Jersey. ALL-WAVE RADIO.

◆

### Interference Elimination Booklet

A CONDENSED summary of the subject of eliminating man-made interference in domestic and auto radio installations is contained in a handy little booklet just released by Continental Carbon, Inc., of Cleveland, Ohio. Each form of interference is discussed briefly and methods of attacking it are disclosed. The booklet is of vest pocket size, 24 pages, and well illustrated. It may be obtained from Continental Carbon distributors or direct from the factory, 13900 Lorain Ave., Cleveland, Ohio, price 10c, postpaid. ALL-WAVE RADIO.

◆

### Tube Base Connection Folder

A NEWLY REVISED folder which classifies more than 400 makes and types of vacuum tubes according to their base connections has just been issued by the Weston Electrical Instrument Corporation, Newark, N. J. Seventy-three octal tubes and twenty-two of the 4, 5, 6, or 7-prong types have been added since the previous edition.

The tube base connection diagrams in the folder now show 85 different prong arrangements and base connections. This covers all tubes, old and new, likely to be encountered in radio servicing, and many other special designs used in sound equipment, public-address systems, amateur radio and other electronic circuits.

The diagrams have been specially prepared to facilitate the Weston methods of selective analysis, which remains applicable to the latest tube and circuit developments as well as the older receivers. The leaflet is available to servicemen without charge from the Weston organization. ALL-WAVE RADIO.

These transformers are illustrated and further described in the new Hammarlund catalog available free of charge. ALL-WAVE RADIO.

◆

### Solar Exact Replacement Catalog

LISTING A COMPLETE line of dry electrolytic, wet electrolytic and paper exact replacement condensers, the new Solar 1-R catalog also carries a.c. motor-starting replacements.

The increased use of voltage-regulating wet electrolytics has made this section of the 1-R catalog especially valuable in ordering wet replacements.

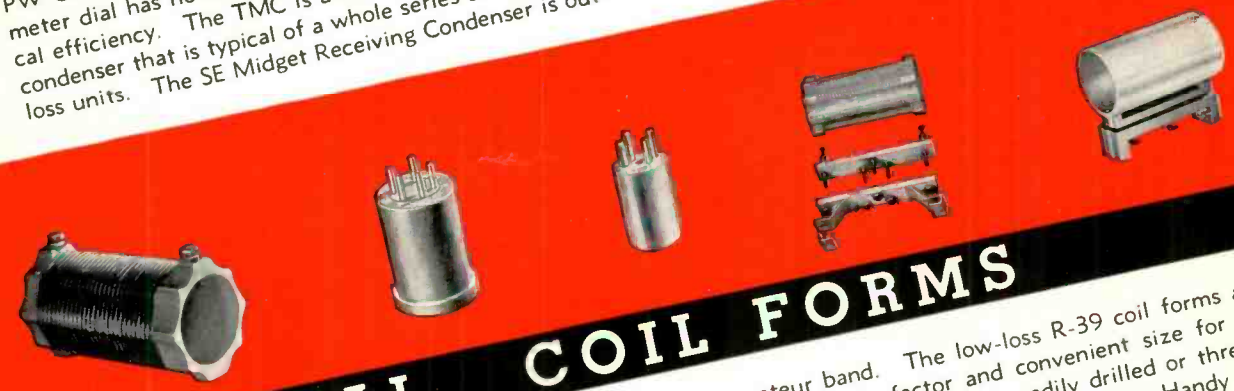
This catalog is companion to and supplements Solar catalog 8-S, general condenser catalog recently announced, and is available on request either from the jobber or the Solar Manufacturing Corporation, 599 Broadway, New York City. ALL-WAVE RADIO.

# NATIONAL DIALS

The fine finish of a National Dial adds distinction to the appearance of your equipment, and its accuracy insures precision. For years National Dials have been preferred on the best of quality apparatus. The four-inch Type N Dial, with its solid nickel-silver scale and flush vernier, is a favorite wherever smooth accuracy is needed. The plain Type O Dial permits thrift without sacrifice of appearance when vernier tuning is not required. For years a favorite, the Type B combines adjustable ratio with a concealed built-in illuminator. The small HRO Dial is an ideal position indicator for controls such as volume or regeneration. There is a National Dial for every purpose. They are listed in the National Catalogue. The coupon below will bring a copy.

# NATIONAL CONDENSERS

National Condensers are the result of years of specialized design. Every detail from material to mounting has been studied to achieve high performance. The PW Condenser with preloaded worm drive and micrometer dial has no competitor for precision and electrical efficiency. The TMC is a husky little transmitting condenser that is typical of a whole series of rigid, low-loss units. The SE Midget Receiving Condenser is outstanding for such refinements as non-inductive pigtail and insulated main bearing. Type UM is an extremely versatile little unit that fits easily in awkward places. NC500 is the largest of a series of low-loss, high-voltage neutralizing condensers. There is a National Condenser for every purpose. Most are listed in the National Catalogue. The coupon below will bring a copy.



# NATIONAL COIL FORMS

The design of National Coil Forms is based on actual experience in constructing receivers and other equipment. They are *right*. The XR-10A, XR-12A and XR-13 transmitter coil forms are of low-loss ceramic and are far superior to ordinary porcelain forms. A data sheet, supplied with each form, makes it easy to determine the proper number of turns to use for any amateur band. The low-loss R-39 coil forms are of excellent form factor and convenient size for receiver circuits. They can be readily drilled or threaded. National Coils are convenient, too. Handy and versatile plug-in mounts are supplied for popular sizes. They are described in the National Catalogue. The coupon below will bring a copy.

National Company, Inc., 61 Sherman Street, Malden, Mass.
Gentlemen: Please send me a free copy of your general catalogue.
Name .....
Address .....

# MAXIMUM USABLE BAND SPREAD


*the 1938*
**SUPER SKY RIDER**

## PLUS A NEW HIGH ORDER OF SELECTIVITY* FOR GREATER STATION SEPARATION . . .

The New 1938 Super Sky Rider exceeds by as much as 500% the most exacting standards for Band Spread on communications receivers. Here's an entirely new approach to Band Spread design, electrically and mechanically, with an ingenious new spiral dial.

Imagine the sheer pleasure of working the crowded bands of today with this revolutionary new band spread, which with the outstanding new selectivity of the Super Sky Rider permits a degree of station separation on short waves that has never been available before.

This is but one of the new and exclusive features of the New 1938 Super Sky Rider that makes it the perfect receiver for amateur and professional operators and short wave listeners as well.

**Two Stages of Specially Designed Iron Core I. F.*

**FEATURES**

- ★ 5 to 550 Meters Coverage
- ★ 6 Bands
- ★ 11 Tubes
- ★ Wide Range Variable Selectivity
- ★ Better Than One Microvolt Average Sensitivity on All Bands
- ★ Improved Crystal Filter Control
- ★ 1000° Electrical Band Spread
- ★ "S" Meter
- ★ 13 Watt Undistorted Output
- ★ Air-Trimmed R.F. Circuit
- ★ Improved Expanding I.F. Transformers

Send for illustrated booklet completely describing the New 1938 Super Sky Rider.

Ask your dealer about the Hallicrafters' Time Payment Plan.

**the hallicrafters inc.**
2605 INDIANA AVE., CHICAGO, U. S. A.
Cable Address, "Hallicraft"—Chicago

"America's Leading Manufacturers of Communications Receivers"