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2. Select “File – Print” or click on the printer icon. This will bring up the print dialog box.

3. Select the correct printer if necessary.

4. In the area marked “Print Range” click on the radio button marked “Pages from..”, then enter the first and last page numbers worked out in step 1 into the “from” and “to” boxes.

5. In the “Page Handling” area, next to “Page Scaling”, select “Fit to paper”. The press “OK”

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Richard Hankins, VMARS Archivist, Summer 2004
The Receiver is a thirteen valve three band super-
heterodyne. Twelve volt indirectly heated valves are used
in every stage. The crystal calibrator valves are type
12SC7 double triodes; the second detector and AVC stage,
and the noise limiter stage use type 12Y4G double diodes;
all the amplifying stages and the two oscillators use type
ARP3 pentode valves.

When the Receiver is used in the Carrier the input
to the tuned R.F. amplifier is taken from the P.A. tank
circuit in the Sender. When the Sender tank circuit is
tuned to the Receiver frequency its resonance character-
istics contribute to the image frequency attenuation and
slightly to the sensitivity. A gas filled discharge gap is
connected across the input terminals.

The R.F. stage is followed by a pentode mixer which
is suppressor-grid modulated by the conversion oscillator.

The oscillator valve is connected as a triode in a Hartley
circuit. Its frequency is always 420KC higher than the
signal frequency. Parallel capacitive temperature com-
ensation is provided on each band. Part of a small tapped
coil L10A is connected in series with the low potential end
of each oscillator tank coil. The position of an iron core
in L10A can be adjusted by turning the FREQ. ADJ.
knob. This narrow range of control of inductance provides
a vernier control of frequency. The maximum frequency
coverage is not large enough to cause serious mistracking
in the R.F. tuned circuits. Permeability and capacitive
trimming are both used in all ganged circuits.

Both I.F. stages are coupled by two double-tuned I.F.
transformers tuned to 420 k.c. They include small ad-
ditional coupling coils which are connected in the FLAT
position of the Selectivity switch to increase the coupling
and therefore the band width.

The heterodyne oscillator valve is connected as a triode
in a tuned-grid tuned plate circuit. Parallel capacitive
temperature compensation is provided in the plate circuit.
The HET. control varies the effective capacitance across
the grid circuit. The oscillator frequency is 420KC when
the dot on the HET. knob is at the dot on the panel.
Separate diodes of V2A are used for the audio and AVC circuits. Full AVC voltage is applied to the R.F. Mixer and 1st I.F. valves; partial AVC voltage is applied to the 2nd I.F. and 1st AF valves. AVC voltage is applied to these valves when the Mode of Operation switch is at AUTO and is removed when the switch is at MAN. When switching from R.T. to C.W., in the AUTO positions, the time delay is increased so that the AVC voltage does not follow the large signal input changes between key up and key down conditions of the sending station. In the two C.W. positions plate voltage is applied to the Het. oscillator.

The A.F. amplifier comprises two resistance coupled pentode stages; the output valve is transformer coupled to match low resistance phones and the permanent magnet dynamic speaker.

There are two noise limiting devices. One is a combination series and parallel limiter which uses both diodes of V2B. Diode 3 is connected in series with the audio lead from the diode load resistors to the 1st A.F. grid. When a noise pulse occurs, the cathode potential does not change, but the plate potential becomes more negative; the result is that instantaneously the diode does not conduct and does not transmit the pulse. Diode 5 which normally is not conducting is connected through the conducting diode 3, to the audio load resistor. When the pulse occurs the cathode becomes sufficiently negative for the diode to conduct and condenser C3Z is shunted across the audio load. It's really amazing, but it works. This limiter is very useful on short duration pulses of large amplitude such as ignition noise from charging sets or vehicles.

The other gadget is an audio resonant network which is connected as a feed-back path between plate and grid of the 1st A.F. valve V1G. The network peaks symmetrically the response of the audio amplifier at about 1000 cycles and sharply attenuates all audio notes above and below that frequency. It provides a great gain in signal-to-noise ratio on C.W. with all types of noise. Since it cannot be used on R.T. an IN-OUT switch is provided on the panel.
The Crystal Calibrator is a miniature sender which includes three separate oscillators. The frequencies of these are 1000 kc., 100 kc., and 10 kc. Each oscillator generates harmonics which are heard in the Wireless Set. For example when the 1000 kc. oscillator is used, although 1000 kc. is not within the range of the Set, signals can be heard at 2000 kc., 3000 kc., 4000 kc. and so forth, up to 16000 kc.

Similarly when the 100 kc. oscillator is switched on harmonics of 100 kc. are heard in the Set. When the 10 kc. oscillator is turned on harmonics of 10 kc. can be heard from 1.75 mc to 16000 kc. The lowest in frequency is the 175th harmonic and the highest is the 1,600th harmonic.

The three valves of the crystal calibrator are double triodes.

Separate triodes of V3A are used for the 1000 kc. and 100 kc. oscillators. The frequencies are controlled by a dual frequency crystal which vibrates at 1000 kc. in one direction and 100 kc. in another direction. The 100 kc. is more accurate in frequency than the 1000 kc. signal. It is provided with a frequency adjustment C49A which is set at the factory. Do not touch this adjustment.

The 10 kc. oscillator uses both triodes of V3B in a multivibrator circuit. The output voltage of the 100 kc. oscillator is applied to one multivibrator plate and controls the frequency of the multivibrator circuit so that its frequency and the frequency of all its harmonics are as accurate as the frequency of the 100 kc. oscillator.

The frequency at which the multivibrator is controlled depends upon the magnitude of the 100 kc. voltage which is applied to it. At low voltages the multivibrator oscillates at 9.09 kc. As the control voltage (100 kc.) is increased, a value is attained at which the multivibrator frequency suddenly alters to 10 kc. As the control voltage is further increased, a value is attained at which the frequency suddenly changes to 11.1 kc. This control voltage can be adjusted by a potentiometer, R29A. The potenti-
meter is properly set at the factory so that the frequency of the multivibrator is 10 kc. This adjustment must not be altered unless the frequency of the multivibrator has changed on page 11. This is not likely to occur. It is possible however, to find that the multivibrator has changed frequency after a valve has been changed or after an extreme change of temperature. The potentiometer must then be reset as described on page 12.

V3C is an output valve which separates the 1000 kc. and 100 kc. oscillator from their load and, because it is connected as a diode rectifier, exaggerates the harmonic content of the signals.

When the calibrator is switched OFF it is severed from all voltage supply so that it does not draw power when idle.

<table>
<thead>
<tr>
<th>Band</th>
<th>Freq. Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.75 - 4 M.C.</td>
</tr>
<tr>
<td>2</td>
<td>3.5 - 8 M.C.</td>
</tr>
<tr>
<td>3</td>
<td>7 - 16 M.C.</td>
</tr>
</tbody>
</table>

**RECEIVER VALVE LIST**

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.F. Amplifier</td>
<td>V1A</td>
<td>ARP3</td>
</tr>
<tr>
<td>Mixer</td>
<td>V1C</td>
<td>ARP3</td>
</tr>
<tr>
<td>Conversion Oscillator</td>
<td>V1B</td>
<td>ARP3</td>
</tr>
<tr>
<td>1st I.F. Amplifier</td>
<td>V1D</td>
<td>ARP3</td>
</tr>
<tr>
<td>2nd I.F. Amplifier</td>
<td>V1E</td>
<td>ARP3</td>
</tr>
<tr>
<td>Detector and A.V.C.</td>
<td>V2A</td>
<td>12Y4G(ARDD1)</td>
</tr>
<tr>
<td>Noise Limiter</td>
<td>V2B</td>
<td>12Y4G(ARDD1)</td>
</tr>
<tr>
<td>Heterodyne Oscillator</td>
<td>V1F</td>
<td>ARP3</td>
</tr>
<tr>
<td>1st A.F. Amplifier</td>
<td>V1G</td>
<td>ARP3</td>
</tr>
<tr>
<td>2nd A.F. Amplifier</td>
<td>V1H</td>
<td>ARP3</td>
</tr>
<tr>
<td>Crystal Calibrator: Oscillator</td>
<td>V3A</td>
<td>12SC7</td>
</tr>
<tr>
<td>Multivibrator</td>
<td>V3B</td>
<td>12SC7</td>
</tr>
<tr>
<td>Harmonic</td>
<td>V3C</td>
<td>12SC7</td>
</tr>
<tr>
<td>Exaggerator</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Receiver Sensitivity:** About 2.5 UV on R.T.

**Signal to Noise Ratio** 10:1
THE RECEIVER CONTROLS

BAND: This switch selects the frequency band on which the Receiver will operate. The range at each position is marked on the panel.

MODE OF OPER: This switch provides the choice of reception of R.T., M.C.W., or C.W. Signals.

There are two R.T. and two C.W. positions. The former are used for both R.T. and M.C.W. reception. The latter only for C.W. All types of signal can often be located more easily on C.W. than on R.T.

The AUTO position will normally be used on R.T. There is little fading of signals and most stations appear to have about the same strength. It is particularly useful when communicating with several stations, (either on R.T. or C.W.) because the GAIN controls will not require much readjustment. Set the R.F. GAIN at maximum and use the A.F. GAIN for volume control whenever the AUTO position is used.

The MAN. position provides greater volume and slightly more sensitivity than the AUTO position. Signals from various stations will have widely different strengths and some will fade. However C.W. signals may be more stable. The MAN. position must be used for break-in operation. Whenever the MAN. position is used, set the A.F. GAIN control at maximum and use the R.F. GAIN for volume control. You must be careful when using the MAN. position not to set the R.F. GAIN too high, or the signal will be distorted. You are least likely to do so when the A.F. GAIN is at maximum.
FREQUENCY: This is the tuning dial on which all three bands are calibrated. It is equipped with a two speed slow motion drive. There are two knobs, the larger for coarse movements, the smaller for accurate tuning. They provide tuning at two speeds, slow and very slow.

FREQUENCY ADJ.: This knob is also a tuning control. It has a range of only a few Kc above and below whatever frequency the main tuning dial has selected. The ± signs show the directions of rotation to raise or lower the frequency. If any drift of carrier frequency or of the Receiver occurs, it can be corrected with the FREQ. ADJ. knob without altering the flick position. It is particularly useful when several stations on a net differ slightly in frequency. Each can be tuned in accurately by a twist of the FREQ. ADJ. knob. It is also useful when searching near the Receiver frequency at high frequencies, because it provides finer tuning than the main dial. The range of the FREQ. ADJ. increases with frequency. There is a detent at the zero position and the knob should be at this position when the FREQUENCY dial is being used—particularly when netting, or when on SHARP selectivity.

HET. TONE: This control is used to vary the pitch of the audio note which is heard when listening to C.W. signals. When a signal has been tuned in properly the dot (●) on the panel indicates approximately the zero beat position. The same note can be obtained by turning the control in either direction from the centre position, but an interfering signal may be much weaker on one side than on the other. Often the pitch of the
desired signal can be adjusted to a value at which the note of an interfering signal is either very low or very high and therefore less objectionable.

When netting or when tuning to a C.W. signal this control must be at the centre position.

A.F. GAIN: This Control is used to adjust the volume of the Receiver when operating on AUTO. For MAN. operation it should be left at maximum.

H.F. GAIN: This control is used to adjust the gain of the Receiver. For AUTO operation it should be left at maximum unless the distance between stations is so small that the quality is poor. For MAN. operation it should be used as a volume control with the A.F. GAIN at maximum.

SELECTIVITY: This switch will normally be used at FLAT on R.T. and SHARP on C.W. An interfering signal a few Kc away from the desired signal will be much weaker when the switch is at SHARP than at FLAT, and the background noise is lower. However on R.T. the reduction in quality offsets most of this gain, so that it will be used mostly on C.W. The sensitivity is slightly higher on FLAT. Always use the SHARP position when operating the Calibrator, using the tuning meter, or netting; use the FLAT position when searching for signals, or listening to R.T. Signals.

METER SW.: By means of this switch the Receiver meter is used for several purposes.

At L.T. and H.T. it measures the Receiver Supply voltages; at the eight positions from V1A to V1H it tests Receiver valves page 14; and at the TUNE position it is used as a tuning meter. In the latter position correct tuning is indicated by a dip of the needle to a low value. This must be done with the R.F. GAIN turned well up, with the SELECTIVITY switch at SHARP, and with
the Mode of Operation Switch at AUTO. It is required principally on very strong signals, and will be used to tune the Receiver accurately when the sets are close. When the Remote Receiver is operated from an A.C. power source, the LT position is inoperative.

When the switch is at SENDER the meter indicates that function which is chosen by the Sender meter switch.

**C.W. NOTE FILTER:** This filter is used on C.W. only, to reduce noise and interference. It is very effective and the operating skill that it requires is abundantly repaid. When it is switched in, all audio notes above and below 1000 cycles are greatly reduced in volume. To use it turn the HET. TONE to the dot, tune to the zero beat of the desired signal, and switch the C.W. NOTE FILTER to IN. The noise will become much weaker. Now turn the HET. TONE slowly in either direction until a pitch is reached at which the signal can be heard clearly above the noise or interference. With a little practice the pitch at which this occurs can be recognized by its rather unusual note. When two stations interfere badly, often the desired signal can be received fairly clearly with the filter in by carefully adjusting the HET. TONE Control until the one signal is loud and the other is faint. The signal will probably be better on one side of the HET. TONE dot than on the other.

**NOISE LIMITER:** This is a simple in and out device which reduces the interference caused by some types of noise. When there is noise of the “click” type, such as interference from gasoline engines or Charging Sets, the signal will be much clearer with the switch at IN. Since the gain of the set is lower when the switch is IN, it will be most
effective on fairly strong signals. It can be used on R.T. and C.W. but, unlike the C.W. NOTE FILTER, is effective only on certain types of noise.

SPEAKER-PHONES: This switch feeds the Receiver output to either the phones jacks or to the loudspeaker.

To use the Crystal Calibrator (Black gadget upper left hand corner)

You can tune the Receiver accurately to any frequency by using the Calibrator. It is a very clever device so you should practice using it until you are expert. When properly used it will give you the correct frequency, speedily and absolutely reliably.

The operation is described by giving an example at 4.43 mc. It is assumed that you want to set the flick. If not, just leave the lever at TUNE.

How to do it at 4.43 Mc.
(a) Remove the lead from the Receiver AERIAL terminal.
(b) Turn the FREQ. CHECK to 1000. (The light should come on) Allow about one minute for the valves to become warm.
   MODE OF OPER. to C.W. AUTO
   FREQ. ADJ. to ZERO
   HET. TONE to DOT
   A.F. GAIN to maximum
   SELECTIVITY to SHARP
   BAND switch to proper frequency band.
   (Band 2, 3.5-8 M.C. in this example)
   NOISE LIMITER and NOTE FILTER
   switches OUT
   SPEAKER-PHONES to PHONES
(c) Engage the flick; turn the lever to SET; loosen the corresponding two screws 1/2 turn.
(d) Turn the FREQUENCY dial (hereafter called "the dial") across the band; pips will be heard at the 4, 5, 6 marks etc. Tune to zero beat at the 4 Mc. pip.

page 9
(e) Turn the FREQ. CHECK switch to 100. The pip will still be heard but will not be at zero beat. Tune to zero beat.

(f) Turn the dial slowly toward the 4.4 mc. mark. A pip will be heard near every dial mark. (Also between marks on band 3). Count the zero beat points omitting the one at 4.00 Mc. They occur exactly at 4.10, 4.20, 4.30 Mc. etc. Tune to the 4th one.

(g) Turn the FREQ. CHECK to 10. You will still be at zero beat of the 4.40 mc. pip. Turn the dial by the smaller knob toward the 4.45 mc. mark. As it is turned, pips will be heard at 4.41; 4.42 mc. etc. Count the zero beat positions omitting the one at 4.40 mc. and tune the third one. Turn the R.F. GAIN until the volume is low and readjust the dial if necessary.

(h) The Receiver is now tuned to 4.43 mc. and the flick screws may be tightened. (By Hand)

(i) Rotate the dial out of the flick and then back. The signal should be near zero beat. If necessary a small correction can be made with the FREQ. ADJ. knob. Correction should not usually be necessary except at the highest frequencies.

If the frequency had been 4.46, you would have tuned to the 5th zero beat, 4.50 mc. at step (f), and then would have counted back four zero beat points to 4.46 mc. in step (g).

(j) Turn the Calibrator OFF, replace the aerial lead, and adjust the controls for Receiver operation.

NOTES:

(i) When counting pips you actually count the zero beat positions.

(ii) The pip from which you start is always the "zero" pip and is not counted; the next pip is the first. e.g. start at 2.30, the next is 2.31; or start at 14.00 the next is 14.10 or start at 14.30 the next is 14.31 etc.
(iii) The pips are close together and are sharp on band 3. Tune carefully.
(iv) It is very unlikely that any interfering signal will be heard and be mistaken for a pip unless the aerial lead is left connected to the Receiver. However by switching the Calibrator OFF momentarily you can identify a note as a calibratop pip or a signal.

4.5.2 Calibrator Test for Proper Operation

The following test should be performed before operations, during weekly maintenance, and after a Calibrator valve has been changed. It will show definitely whether the frequency interval between 10 Kc. pips is exactly 10 Kc. The intervals between 100 Kc. or 1000 kc. pips will always be correct and need not be checked.

Proceed as follows:

(a) See (a) and (b) page 9
(b) See (a) and (b) page 9
(c) Tune the dial to the zero beat at the 2 mc. pip. It will be found near the 2 mc. mark on the dial.
(d) Turn the FREQ. CHECK switch to 100. The pip will still be heard although not at zero beat. Tune to zero beat.
(e) Turn the switch to 10. You will still be tuned to the zero beat of the 2.00 mc. pip.
(f) Turn the dial slowly toward 2.1 mc. counting the zero beat points. The one at 2.00 mc. is not counted of course. Stop at the tenth pip, just off the zero beat point so that a note can be heard.
(f) Turn the switch to 100. If the pip is still heard the Calibrator is operating properly and the frequency interval between any two adjacent 10 kc pips is exactly 10 kc. If the 100 kc. pip can be heard only when the dial is stopped at the ninth or eleventh pip, an adjustment must be made.
Calibrator Adjustment

After changing any of the valves in the crystal calibrator it is important to check the number of calibrator pips as described on page 11.

If in that test nine or eleven pips are heard between 2.00 mc. and 2.10 mc. the following adjustment must be made:

(a) Remove the upper Receiver panel just as you would to change a valve.

(b) On the Calibrator chassis is a small control which can be turned with a screwdriver. It has been properly adjusted by the manufacturer and is sealed with wax. DO NOT TURN THIS CONTROL UNLESS THE NUMBER OF "PIPS" HEARD IN THE TEST page 11 IS INCORRECT.

(c) Turn the Wireless Set ON. Turn the Calibrator to 10. Allow the valves to become warm for a minute or two. Tune in one of the pips. Choose one which lies between two dial marks, so that no signal is heard when the switch is at 100.

(d) If nine pips were counted in the test, turn the control slowly counter-clockwise while listening to the note in the receiver. If the number of pips was eleven, turn the control slowly clockwise. As the control is turned a place will be reached where the note changes pitch. Notice the position at which this occurs, (position A) and continue turning. When the pitch of the note changes again, stop turning. This is position B. Turn the control back until it is half way between positions A and B.

(e) The Calibrator should now operate properly. Repeat carefully the test described on page 11 to be sure that the adjustment has been successful.
The Calibrator Valves

These are tested by using the Receiver to listen to the calibrator output—which can only be done of course if the rest of the Receiver is operating properly.

(a) No signal when the calibrator switch is at 1000 or 100, and a jumble of signals when the switch is at 10:—Probably V3A, possibly V3C.

(b) No signal when the calibrator switch is at 1000, but normal signals when the switch is at 100 or 10:—V3A.

(c) Normal signal when the Calibrator switch is at 1000, no signal when the switch is at 100 and a jumble of signals when the switch is at 10:—V3A, or the crystal is faulty, see below.

(d) Normal signals when the Calibrator switch is at 1000 and 100, but no signals when the switch is at 10:—V3B.

(e) No signal when the Calibrator switch is at 1000, or 100 but normal signals at 10:—V3C.

NOTE:—When V3B or V3A have been changed, the test described on page 11 must be made. In some cases it will be necessary to make the adjustment described on page 12 after either of these valves has been changed.

(f) Symptom (c) can be caused by a broken or dirty crystal. A temporary repair can often be made by opening the crystal holder and cleaning the quartz plate and the electrodes carefully with carbon tetrachloride or with soap and water. When you are through, the crystal should be really clean—hold it by the edges so that your fingers will not contaminate the surface. After cleaning the crystal replace it so that the arrows on both sides of the case are parallel to the short sides of the crystal. When the crystal assembly is replaced, these arrows must point vertically upwards when the Calibrator and Receiver are
mounted normally. Since the holder was originally sealed with wax and the seal has now been broken, this repair should only be done in an emergency and must be considered as a temporary repair.

**Important**

All essential and maintenance spare valves for the 52 Set crystal calibrator have been aged and are ready for use. They are identified by a blue paint mark on the locating pin. If any Type 12SC7 valves which have not this mark are used, turn the calibrator to 10 and operate the valves for 12 hours before performing test p 11 and adjustment on page 12.

**The Receiver Diodes (V2A, V2B)**

V2A can be tested satisfactorily only by substitution or in a valve tester. If the Receiver has very low output, (distorted) or none at all and shows no meter change on TUNE, the valve may be faulty.

V2B is probably defective if the noise limiter does not work and if the output level does not change when the switch is operated.

**THE METER**

A single D.C. Meter mounted on the Receiver panel is used for Receiver Valve and Voltage Test and Tuning.

**TYPICAL RECEIVER METER READINGS**

Mode of Operation Switch at R.T. MAN.

R.F. GAIN at Maximum—Input 12.5V

<table>
<thead>
<tr>
<th>H.T.</th>
<th>L.T.</th>
<th>TUNE</th>
<th>V1A</th>
<th>V1B</th>
<th>V1C</th>
<th>V1D</th>
<th>V1E</th>
<th>V1F</th>
<th>V1G</th>
<th>V1H</th>
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<tr>
<td>150</td>
<td>12.5</td>
<td>11</td>
<td>2.3</td>
<td>*</td>
<td>3.0</td>
<td>11</td>
<td>11</td>
<td>3.2</td>
<td>2.3</td>
<td>9.6</td>
</tr>
</tbody>
</table>

* Band 1 7.0
** Band 2 6.5
Band 3 3.3

** Mode of operation, at C.W. MAN.

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THE SUPPLY UNIT ZE12

Power for the Receiver is obtained from a vibrator Supply Unit ZE12 which operates from 12 v.d.c. or from 115 V. A.C. 25-60 cycles or from 230 V. A.C. 25-60 cycles.

(a) 12 V.D.C. Operation.

(i) Remove the ZE12 Cover. Put the removable plug into the socket marked D.C. Wind the A.C. line cord around the clips and insert the plug into the socket on the chassis which is marked with a circle. Make sure that the vibrator and valve are securely seated, and replace the cover.

(b) A.C. Operation.

(i) Remove the ZE12 cover. Turn the main switch OFF. Put the removable plug in the A.C. socket.

Do not connect the line cord unless you are certain that:

(a) The Supply current is a.c. NOT d.c.

(b) The toggle switch is in the correct position for the existing line voltage.

There is a toggle switch just behind the A.C.—D.C. sockets. If the switch handle is not already pointing to the correct line voltage (115 or 230V) remove the clamp; put the switch to the correct voltage, and replace the clamp.

If the line voltage is 230V the toggle switch must be in the position marked “230V”; if it is 115V the switch must be in the position marked 115V.

If this switch is in the wrong position the Supply Unit ZE12 and the Remote Receiver may be burned out almost instantly.

If you do not know the line voltage, either measure it or ask.

(ii) Unwind the line cord and replace the cover. There is a small cut-out in the cover to clear the cord. Attach the line plug to the A.C. line socket.
Diagram of connections Receiver №52 Wireless set (CM) 108 - 953

S2. Receiver Circuit Diagram.
NOTES
1. PL-18A CONNECTIONS
   TERM. #1: +12 V. D.C. OR A.C.
   TERM. #2: EARTH
   TERM. #3: -150 V. D.C.
2. LETTERS ON INDUCTANCES INDICATE START AND FINISH OF WINDINGS.
3. S-14A SHOWN IN NORMAL OR 'A.C.' POSITION.
4. PL-16A PLUGS INTO SOCKET MARKED "D.C." FOR 12 V. D.C. OPERATION OR IN SOCKET MARKED "A.C." FOR A.C. OPERATION.
5. S-4G SHOWN IN 115 VOLT POSITION.

<table>
<thead>
<tr>
<th>PLUGS</th>
<th>FUSES</th>
<th>TRANSFORMER</th>
<th>VIBRATOR</th>
<th>VALVES</th>
<th>RESISTORS</th>
<th>INDUCTANCES</th>
<th>CAPACITORS</th>
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<tr>
<td>PL-15A D.C. INPUT</td>
<td>F-1A 10 AMPS</td>
<td>T-6A POWER</td>
<td>VIBR-1A 4 AMP NON-SYNC.</td>
<td>V-4B 024 OR 024A</td>
<td>R-36A 100,000 OHMS 10 WATTS</td>
<td>L-15A 13 H</td>
<td>C-26A 0.002 MFD</td>
</tr>
<tr>
<td>PL-16A A.C. INPUT</td>
<td>S-4G 115/230 VOLTS</td>
<td>S-14A T.P.R.T. SAFETY</td>
<td>S-4F OFF-ON</td>
<td>C-25B 20.0 MFD</td>
<td>R-35B 300 OHMS ½ WATT</td>
<td>L-14A 1000 µH</td>
<td>C-25A 20.0 MFD</td>
</tr>
<tr>
<td>PL-17A A.C. LINE</td>
<td>S-4G 115/230 VOLTS</td>
<td>S-4F OFF-ON</td>
<td>C-24A 0.0075 MFD</td>
<td>R-35A 300 OHMS ½ WATT</td>
<td>R-35A 300 OHMS ½ WATT</td>
<td>L-13A 850 µH</td>
<td>C-23A 0.004 MFD</td>
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<tr>
<td>PL-18A OUTPUT</td>
<td>S-4G 115/230 VOLTS</td>
<td>S-4F OFF-ON</td>
<td>C-22A 0.02 MFD</td>
<td>L-13B 850 µH</td>
<td>L-11A 50 µH</td>
<td>L-13B 850 µH</td>
<td>C-21A 0.1 MFD</td>
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<tr>
<td>PL-17A A.C. LINE</td>
<td>S-4G 115/230 VOLTS</td>
<td>S-4F OFF-ON</td>
<td>C-19A 1000.0 MFD</td>
<td>L-12A 13 H</td>
<td>L-14A 1000 µH</td>
<td>L-13B 850 µH</td>
<td>C-19A 100.0 MFD</td>
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Fig. 55—Supply Unit ZE-12 Circuit Diagram.
WIRELESS SET,
CANADIAN,
No 52