

E.M.I. SALES & SERVICE LTD.

"HIS MASTER'S VOICE" 904 & 905  
MARCONIPHONE 706 & 707

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# SERVICE MANUAL

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## "HIS MASTER'S VOICE"

### MODELS 904 & 905

#### DIMENSIONS.

	Model 904	Model 905
Height	17 $\frac{3}{4}$ inches.	19 $\frac{1}{8}$ inches.
Width	23 ..	26 ..
Depth	14 $\frac{1}{2}$ ..	14 $\frac{1}{2}$ ..

#### WEIGHT.

Model 904	82 lb. net.	96 lb. gross
Model 905	87 lb. net.	103 lb. gross

#### EXTRA LOUDSPEAKERS.

"His Master's Voice" Models 172 or 184 are recommended. Details of connexions are given on page 3.

#### CONNECTING A PICK-UP.

The "His Master's Voice" Models 119, 120 and 122 Record Players or the No. 11 Pick-up are recommended. Details of connexions are given on page 3.

## MARCONIPHONE MODELS

### 706 & 707

#### DIMENSIONS.

	Model 706	Model 707
Height	17 $\frac{3}{8}$ inches.	18 $\frac{1}{4}$ inches.
Width	23 ..	26 ..
Depth	14 $\frac{1}{2}$ ..	14 $\frac{1}{2}$ ..

#### WEIGHT.

Model 706	82 lbs.	96 lbs.
Model 707	87 lbs.	103 lbs.

#### EXTRA LOUDSPEAKERS.

Marconiphone Models 144 or 196 are recommended. Details are given on page 3.

#### CONNECTING A PICK-UP.

The Marconiphone Model 25 Pick-up is recommended and should have a 7,500 ohm resistance wired across the pick-up plugs for perfect matching. Details of connexions are given on page 3.

## SPECIFICATIONS

### VOLTAGE RANGE.

200 to 250 volts, 50 cycles.  
 At 224 volts    98 volt amps    } Radio,  
                   85 watts                }  
                   225 volt amps    } Television.  
                   200 watts                }

### FUSES.

This Model is fitted with a Heat Coil.  
 Part No. 16705B. Yellow, 1.6 amp.  
 Nevertheless it is recommended that it should not be connected to a supply point fused to carry more than 5 amperes.

### SPEECH OUTPUT.

Approximately 3 watts maximum.

### WAVELENGTH RANGE.

Television, fixed tuned { 6.67 metres Vision,  
                                   7.23 metres Sound.  
 Broadcast { 16.5— 52 metres Short Waves.  
                   200— 550 metres Medium Waves.  
                   750—2,000 metres Long Waves.

### VALVES.

Marconi MSP4	H.F. Amplifier, television and broadcast (V1).
.. X41C	Frequency Changer, television and broadcast (V2).
.. KTZ41	I.F. Amplifier, television and broadcast (V3).
.. MDH4 (Met.)	Sound Detector and A.V.C. (V4).
.. KT41	Sound output (V5).
.. KTZ41	I.F. Amplifier, television only (V7).

Marconi KTZ41	I.F. Amplifier, vision only (V8).
.. MS4B	Vision Detector (V9).
.. D42	Pulse Diode (V16).
.. KTZ63	Limiter (V10).
.. KTZ63	Frame Oscillator (V11).
.. KT63	Frame Output (V12).
.. KTZ63	Line Oscillator (V13).
.. KT63	Line Output (V14).
.. U17	Extra H.T. Rectifier (V15).
.. U52	H.T. Rectifier (V6).

Emiscope Tube type 3/1 (5 inch).  
 3/2 (7 inch).

Pilot Lamps 6 volts  
 Part No. 22704A.

### LOUDSPEAKER.

No. 20277D.  
 A permanent magnet loudspeaker is employed on these models.

D.C. resistance of speech coil, 3.25 ohms.  
 Impedance at 800 cycles, 3.75 ohms.

An extra loudspeaker may be connected to the sockets provided. The extra loudspeakers should be adjusted to a total impedance of approximately 5 ohms.

The internal loudspeaker may be silenced by removing the yellow plug from the third socket on the E.L.S. panel.

### CONNECTING A PICK-UP.

A high resistance pick-up may be permanently connected to the sockets provided. The leads should be connected to the left-hand sockets and the lead screening to the right-hand socket.

## CIRCUIT DESCRIPTION

Owing to the multiple functions of certain of the stages in this receiver the circuit diagram has been drawn to show these various functions. The central string of valves (V1, V2, V3, V7, V8, V9) are those which deal with the television signal from aerial to cathode ray tube. Branched off above are the valves (V4 and V5) used for sound (both television and broadcast), whilst the lower row (V16, V10, V11, V12, V13, V14) are valves employed in the separation and time base circuits and may be regarded as auxiliary to the main circuit. It will be noted that V1, V2 and V3 handle television (vision and sound) and broadcast sound signals; V7 is an I.F. amplifier for television (vision and sound) only, whilst V8 I.F. amplifier is for vision only, having in its cathode circuit a sound rejector (L27, C88, TC19).

### H.F. AMPLIFIER.

A single tuned circuit for each of the wave bands

precedes the H.F. amplifier. In the case of television the tuning of L4 is sufficiently broad to accept both sound and vision signals. The A.V.C. which operates on this valve for broadcast reception is not used for television, and an adjustment of cathode bias is made by contacts D, 20, 23 of the wavechange switch to improve sensitivity on short waves and television. Tuned anode coupling is employed between this valve and the next stage.

### FREQUENCY CHANGER.

The triode-hexode frequency changer has coupled coils (L11, L14, L12, L15, L13, L16) for the production of oscillations on SW, MW and LW, giving an I.F. frequency of 465 kc., whilst on television a stable centre-tapped circuit (L17, C18, TC13) is employed and the resultant mean I.F. frequencies are 8 Mc vision and 4.5 Mc sound.

## I.F. AMPLIFIERS.

For broadcast two normal I.F. transformers (L9, L10 and L20, L21) are employed to couple the single I.F. amplifier stage (V3), but on television the system used is different. There are three I.F. amplifying stages the first two dealing with both sound and vision (bi-channel). The vision circuits (L18, L22, L24, L28) are "staggered" in frequency in order to endure adequate band width, whilst in series with the first three of these are circuits (L19, L23, L25) tuned for the sound signal. A coupling coil L26 coupled to the last sound circuit feeds the voltage to the diode of V4 for sound detection. The bias of V3 is adjustable by means of the potentiometer VR2 in the H.T.-feed. This is the "contrast" or sensitivity control.

## SOUND DETECTOR AND OUTPUT STAGE.

The double diode-triode V4 is the second detector for sound, both broadcast and television. The sound detector diode is fed in the first case from the secondary of IFT2 and in the second case from the coupling coil mentioned above. The A.V.C. diode which is fed from the anode of V3 supplies A.V.C. voltage only in the case of broadcast sound. Resistance capacity (R23, C41) coupling is employed between V4 and the output valve V5 which has a negative feedback tone control circuit VR10, C84.

## VISION DETECTOR AND SEPARATION.

The vision detector V9 is an anode bend detector fed from the tuned circuit L28. An H.F. choke (L29) in the anode circuit is followed by direct coupling (R65, C60) to the modulating electrode of the cathode ray tube which in this case is the cathode itself. The anode load for V9 is divided into two, R34 and R75. The action of the pulse diode V16 is virtually to short circuit R75 during the picture portion of the vision

signal. During the sync. pulses, however, a voltage is applied through C61 to the grid of the limiter V10. The valve limits the pulses to a certain value, and passes them on to trigger the frame and line oscillators from the anode and screen respectively via C66 and C68.

## TIME BASES.

Hard valves operating on the "squegging" oscillator principle are used for both frame and line time bases. These circuits have the usual reaction transformers (T5, T6) and grid leak and condenser (R53, VR7, C71 and R46, VR6, C67). A feed-back condenser is fed from a tapping on the output transformer in the line circuit, and a waveform circuit (C79, R49, VR9) is connected across the secondary. In the frame circuit the output valve (V12) is resistance capacity coupled to the deflecting coils (L30, L31). The amplitude of the frame and line oscillations are controlled by varying the anode voltage by means of VR5 ("height") and VR4 (width).

## THE C.R. TUBE.

The modulator (cathode) has already been described, and the other two electrodes (the tube is a triode) are the "grid" and the anode. A D.C. voltage derived from a potentiometer (VR5, VR3) across the H.T. feed is applied to the grid as bias, and variation of this voltage (by VR3) consequently varies the brightness. The second anode operates at approximately 2,500 volts fed from a half-wave rectifier (V15) with the usual resistance capacity smoothing (R86, R59, C76, C77) and voltage stabilizing drain resistances (R60-R64). The focusing of the beam is done magnetically by means of a coil (L32) round the neck of the tube. This coil is enclosed in an Iron yoke, and adjustment of the current through the coil is done by VR8 (Focus control) and the pre-set adjustment of R85, R88.

## H.F. TESTS AND ADJUSTMENTS

*Do not attempt to make any adjustment to the circuits of this receiver unless you have adequate equipment as outlined below. All necessary oscillators, trimming tools, etc., essential for the correct adjustment of H.F. and I.F. circuits can be obtained from:—*

**E.M.I. Sales & Service Ltd.**

## INSTALLATION ADJUSTMENTS.

Further to the information given in the Service Sheet, an abridged instruction for installation (with recent modifications) is given below.

### Aerial and Cable.

A properly designed aerial with a lead-in of the correct impedance (such as are obtainable from E.M.I. Sales & Service Ltd.) must be used to ensure good reception.

### Pre-set Adjustments.

1. Adjust focus by manual control, and if necessary pre-set adjustment. The focus adjustment screw should be inserted in one or other of the sockets at the back of the chassis until good sharp lines can be obtained with the Focus control.

2. Tune receiver oscillator trimmer (TC13) as detailed on page 5.

**IMPORTANT.**—The first issue of the Service Sheet recommended the adjustment of L8 to obtain improved sound signal. This applies only to models with Serial Numbers prior to Model 904—H/2 1310, Model 905—H/2 3427, Model 706—H/2 282, Model 707—H/2 2512. On these models it may be noted that an improvement to both vision and sound signal can be obtained by fully unscrewing the plunger of L8. As the plunger is unscrewed (from the top of the chassis) a decrease and then an increase of signal should be observed, usually resulting in a final improvement.

To identify with certainty models which may have L8 adjusted remove the bottom cover and examine L8 coil former. If the former has no white spot, the plunger may be adjusted. If the former has a white spot this plunger must not be disturbed, irrespective of the advice in the first issue of the Service Sheet. For vision/sound ratio adjustment, see below.

3. Check that the correct amount of signal is reaching the receiver by noting the best position for the Contrast control. If too much signal is being received (contrast control near minimum), employ attenuation as detailed on page 12.

4. Check sound/vision ratio as detailed below.

5. In cases where it is difficult to make the picture "hold" (for instance, where field strength is weak) it may be possible to improve matters by adjusting the synch. control. Turn this control slightly clockwise, and again carefully adjust the Frame and Line field controls. The synch. control must not be turned so far clockwise that an intensification of the picture contrast is noticed.

#### **Picture shape, size and position.**

Pre-set controls at the back are provided for "Height" and "Width" adjustment.

The "Form" adjustment need be touched only if the detail at the left-hand side of the picture has incorrect proportions.

The picture may be levelled and centred by moving the scanning and focus coils respectively.

Re-fix the coils securely after making any adjustment.

#### **Adjustment of Tuning and Sound/vision Ratio :**

On installation or after re-ganging it is essential to check the setting of TC13 on a television transmission as follows :—

1. Turn Volume control fully up, and Contrast control until sound is just heard.

2. Adjust TC13 for maximum sound. On some models TC13 is accessible from the top of the chassis, and on others from the bottom when the bottom cover is removed. Unclamp the rod and move up or down to trim.

**WARNING.**—In those models in which the trimmer is adjustable from the top of the chassis the rod is at HT+ voltage, and must therefore be adjusted with an insulated tool.

If sound is still low although there is now enough picture, unscrew TC16 to obtain a more satisfactory ratio.

If sound value is too high, causing modulation of the picture (bands across the picture, particularly on loud passages) TC16 should be screwed in.

## **GANGING.**

The broadcast side of this receiver may be treated as an ordinary broadcast sound radio insofar as alignment of circuits is concerned. In the event of it being necessary to re-align the I.F. circuits, complete R.F. alignment must follow, but if only an R.F. circuit has been disturbed R.F. alignment in the order, SW, MW, LW, should be all that is required.

On television, if possible, even greater care must be exercised than on broadcast, otherwise picture quality will suffer. Generally speaking, low sensitivity or unsatisfactory picture/sound ratio is the result of mis-tuning in the R.F. circuits, whilst lack of definition in the picture is due to faulty I.F. alignment. As in broadcast, if the I.F. circuits are touched the R.F. circuits must be done.

The following are required for broadcast ganging :—

(a) A modulated oscillator or signal generator with attenuator tuning from 16 to 1,900 metres (18.75 Mc. to 157 kc.).

(b) An output meter or 0-2 A.C. voltmeter.

(c) A trimming screwdriver with a minimum of metal in the blade, a tool for adjusting coil loops, and a tuning wand.

In addition for television ganging the oscillator must tune down to 6.67 metres (45 Mc.) and an 0-10 D.C. milliammeter, and an entirely non-metallic screwdriver are required.

## **BROADCAST RECEIVER.**

The A.C. voltmeter should be connected across the extra loudspeaker sockets, or the anode of the sound output valve V5 and chassis if the E.M.I. Service Output Meter is used. During all ganging operations the input to the receiver from the oscillator should be kept low, and progressively reduced as the circuits are brought into line so that the reading on the output meter does not exceed approximately 500 mW or 1.4 volts.

### I.F. ALIGNMENT.

Set receiver to LW, tone control at maximum top, gang condenser to maximum, and volume control to maximum. The oscillator must be connected via a 0.1 mfd. condenser to the top cap of V2 (X41C), leaving grid connexion made.

1. Tune oscillator exactly to 465 kc. (645.2 metres).
2. Adjust TC6, TC7, TC14 and TC15 in that order for maximum output.
3. Check operation 2 in the same order.

NOTE.—If when the I.F. ganging has been done instability is noted it may be necessary to move the fixed condensers in iFTL. Remove the can from this transformer and move C10 and C11 up as close as possible to the coils they tune (i.e., L9 and L10 respectively). This should cure the instability.

### SHORT WAVES.

Switch receiver to SW, set volume control to maximum, tone control to maximum top, and connect oscillator to aerial and earth sockets, via a suitable dummy aerial.

1. Set receiver gang condenser to minimum and tune oscillator to 16.7 metres (17.96 Mc.).
2. Adjust TC8 for maximum output.
3. Set oscillator and receiver (by scale) to 50 metres (6 Mc.) and adjust inductance loops L1, L5 and L11 for maximum output. These loops will be found inside the coil formers, and may be adjusted by means of a strip of insulating material with a nick in it by bending the loop either towards or away from the chassis. The cans may be removed to identify the loops, but they must be in place when the adjustment is actually done. Check results with a tuning wand (see page 6).
4. Set oscillator to 18 metres (16.66 Mc.), tune-in on receiver and adjust TC1 for maximum output whilst "rocking" the gang condenser.

5. Repeat operations 1, 2, and 4, checking results with a tuning wand.

### MEDIUM AND LONG WAVES.

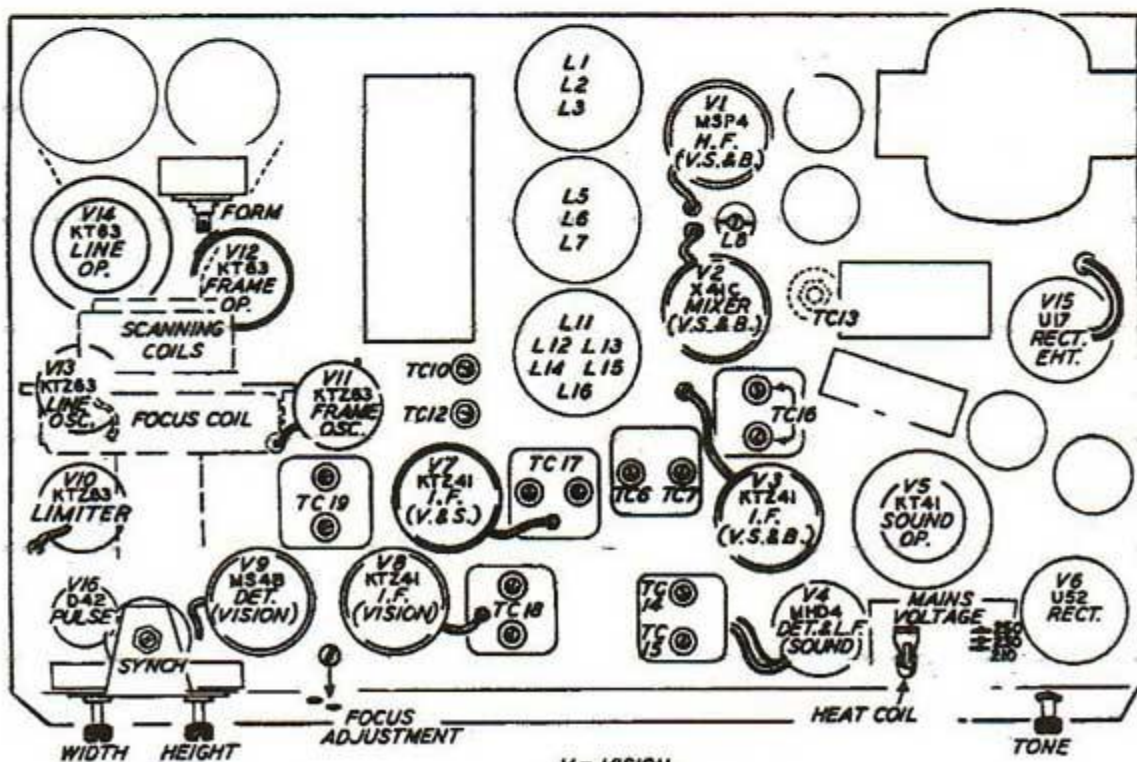
Set receiver to MW and other controls as for SW ganging :

1. Tune oscillator to 195 metres (1,538.5 kc.) set gang condenser to minimum and adjust TC9 for maximum output.
2. Set receiver to 225 metres (1,333.3 kc.) by scale and tune oscillator to this frequency. Adjust TC2 and TC4 for maximum output.
3. Set oscillator to 530 metres (566 kc.) tune-in signal on receiver and adjust TC10 for maximum output, at the same time "rocking" gang condenser.
4. Repeat operation 1, checking all circuits with a tuning wand.
5. Turn wavechange switch to LW and set gang condenser to minimum. Tune oscillator to 725 metres (413.8 kc.) and adjust TC11 for maximum output.
6. Set oscillator and receiver (by scale) to 800 metres (375 kc.) and adjust TC3 and TC5 for maximum output.
7. Set oscillator to 1,900 metres (157.9 kc.) tune-in on receiver and adjust TC12 for maximum output at the same time "rocking" the gang condenser.
8. Repeat operation 5, and check all circuits with a tuning wand.

NOTE.—The tuning wand is used to check circuits as follows :—

(a) Insert ferrocart end of the wand into the can containing the coil of the circuit being aligned. If output reading falls, leave trimmer set, and if reading increases, increase capacity of trimmer until peak reading is obtained.

(b) Insert brass end of wand, and if reading falls leave trimmer set, but if output reading increases decrease trimmer capacity until a peak reading is obtained.



V = VISION  
S = TELEVISION SOUND  
B = BROADCAST SOUND

## TELEVISION

For measurement of output of the vision signal, a D.C. milliammeter must be connected in the anode circuit (top cap lead) of V9. The sound signal is measured on the output meter as for broadcast sound. It is advisable to switch on the receiver and oscillator if mains driven at least 15 minutes before commencing aligning operations to allow a condition of stability to be reached.

### I.F. ALIGNMENT.

Connect output leads of oscillator to grid (top cap) V2 (X41C) and chassis, set waveband switch to TEL, and turn Contrast control fully clockwise.

1. Tune oscillator to 4.5 Mc. (66.67 metres) and adjust TC18, for maximum output on sound output meter.
2. Adjust TC17 and TC16 for maximum output on sound output meter.
3. Adjust TC19 for minimum output on milliammeter (vision output meter).
4. Set oscillator to 8 Mc. (37.5 metres) and tune L28 for maximum vision output (milliammeter).
5. Set oscillator to 8.7 Mc. (34.48 metres) and tune L24 for maximum vision output.
6. Set oscillator to 7.3 Mc. (41.1 metres) and tune L22 for maximum vision output.
7. Set oscillator to 8.0 Mc. and tune L18 for maximum vision output.
8. Leave oscillator set and tune L28 for maximum reading.
9. Alter oscillator to 4.5 Mc. and adjust TC19 for minimum reading on the vision milliammeter.
10. Adjust TC18 for maximum reading on sound output meter.
11. Set oscillator to 8.7 Mc. and tune L24 for maximum vision output.
12. Set oscillator to 4.5 Mc. and adjust TC17 for maximum sound output.
13. Set oscillator to 7.3 Mc. and tune L22 for maximum vision output.
14. Set oscillator to 4.5 Mc. and adjust TC16 for maximum sound output.
15. Set oscillator to 8.0 Mc. and adjust L18 for maximum vision output.
16. Check the band width of the vision I.F. circuits as follows:—

(a) Switch off oscillator and note reading of milliammeter.

(b) Switch on oscillator, tune to 8 Mc. and adjust oscillator attenuator to give a milliammeter reading 3.0 mA more than (a) and note value.

(c) Increase oscillator attenuator to exactly twice the input (microvolts) and reset oscillator to 8.5 Mc. and then 7.5 Mc.

Note that the milliammeter readings are not less than that noted in (b).

If this condition cannot be fulfilled the entire television I.F. ganging should be checked **working always in the order given above.**

### R.F. GANGING.

Connect oscillator to the television aerial and earth sockets. Output meters to be connected as detailed under "I.F. Alignment." Turn Contrast control to maximum.

1. Tune oscillator to 41.5 Mc. (7.23 metres) and trim TC13 for maximum sound output.

2. Tune oscillator to 45 Mc. (6.67 metres) and adjust L4 and L9 for maximum vision output. If L8 is done from the underside of the chassis an entirely non-metallic screwdriver must be used.

**IMPORTANT.**—Check the setting of TC13 and sound/vision ratio on an actual television transmission, see page 5.

### GANGING ON TELEVISION SIGNALS.

Apart from the adjustment of the oscillator circuit (TC13) on television transmission it is very easy, and even desirable, to do the entire R.F. ganging by this means. It must be clearly understood, however, that it is not possible to do the I.F. ganging on a television transmission, and it should on no account be attempted.

Observation of output in the case of vision may be made by means of the milliammeter suggested above, but it is perhaps preferable to use the actual picture on the tube for this purpose. In the case of sound output, the A.C. voltmeter, or output meter, cannot be used, but there is no objection to judging this aurally if done carefully.

Follow the procedure given for "oscillator" ganging, treating the incoming signal as an oscillator input of 41.5 Mc. and 45 Mc. and using the "Contrast" control as an attenuator.

The best way to "measure output" by the picture is to reduce the Contrast control until the synch. just breaks (be sure the Frame and Line Hold controls are correctly set) and make the trimming adjustments with the object of re-establishing "hold."

## VALVE TABLE

Values  $\pm 15$  per cent. Voltages measured on meter having a resistance of approx. 1,000 ohms per volt. The following values were taken on a model operating on 220 volt mains (230 volt tapping). All resistance readings taken with the wave-change switch in the TEL position, values approximate. Absence of a voltage reading does not necessarily mean that no voltage will be found, but merely that the value is regarded as of little interest.

	V1 (MSP4)	V2 (X41C)	V3 (KTZ41)	V4 (MHD4)	V5 (KT41)	V6 (U52)	V7 (KTZ41)	V8 (KT41)	V9 (MS4B)	V10 (KTZ63)	V11 (KTZ63)	V12 (KT63)	V13 (KTZ63)	V14 (KT63)	V15 (U17)	V16 (D42)
<b>Anode Volts</b> —																
Television	90	* 95*	* 103	103	275	350 A.C.	155*	*	235	30	45*	150	30*	295	1,800	270
Broadcast	155	180 100	155	95	245										A.C.	
Resistance to chassis	32,000	42,000 62,000	22,000	67,000	7,300	82	22,000	22,000	22,000	27,000	1M	17,000	0.5M	7,500	5,000	9,000
<b>Screen Volts</b> —																
Television	105	90	105	—	210	—	90	150	105	40	See anode	See anode	125	305	—	—
Broadcast	105	90	105	—	190	—	—	—	—	5,000	—	—	13,000	8,000	—	—
Resistance to chassis	17,000	21,000	16,000	—	17,000	—	26,000	107,000	22,000	22,000	—	—	—	—	—	—
<b>Cathode Volts</b> —																
Television	1.0	2.5	0.8	1.3	4.0	335	1.0	1.5	5.0	—	—	10.5	—	18.0	2,570	270
Broadcast	2.5	2.0	0.8	1.3	3.2	295	—	—	—	—	—	—	—	—	—	—
Resistance to chassis	negligible	negligible	5,000	25 ohms to 2M (VR1)	0.15M	—	0.1M	0.1M	1.5 ohms	0.23M	75,000 ohms to 0.25M (VR7)	1M	35,000 to 85,000 VR6	0.5M	—	—
<b>Grid</b> —																
Resistance to chassis	negligible	negligible	5,000	25 ohms to 2M (VR1)	0.15M	—	0.1M	0.1M	1.5 ohms	0.23M	75,000 ohms to 0.25M (VR7)	1M	35,000 to 85,000 VR6	0.5M	—	—

\* In these cases the connexion of a meter to the test point either entirely upset the operation of the receiver (where no value is given) or affected it in some way. For instance, the anode values on V2 and V7 had to be taken on the H.T. side of the anode impedance, whilst the connexion of a meter to the anodes of V11 and V3 affected the amplitude or frequency of the frame or line oscillators.

C.R. Tube Voltages—Anode, 2,420 V.

Grid—0 to 40 V (depending on VR3).

Cathode—Approximately 45 volts.

Heater—4.0 V 1.3 A.

H.T. Voltages—Junction CK1, CK2 and CK3—

325 Television

285 Broadcast

H.T. Voltages, CK1—

305 Television

280 Broadcast

H.T. Voltages, CK3—

285 Television

257 Broadcast

H.T. feed to focus coil (L32), 24mA.

H.T. drain in potentiometer R33, R2, etc., 3 mA.

H.T. drain in potentiometer VR11, R76, R77, R78, etc., 13 mA.

Total H.T. Feed—television 190 mA.

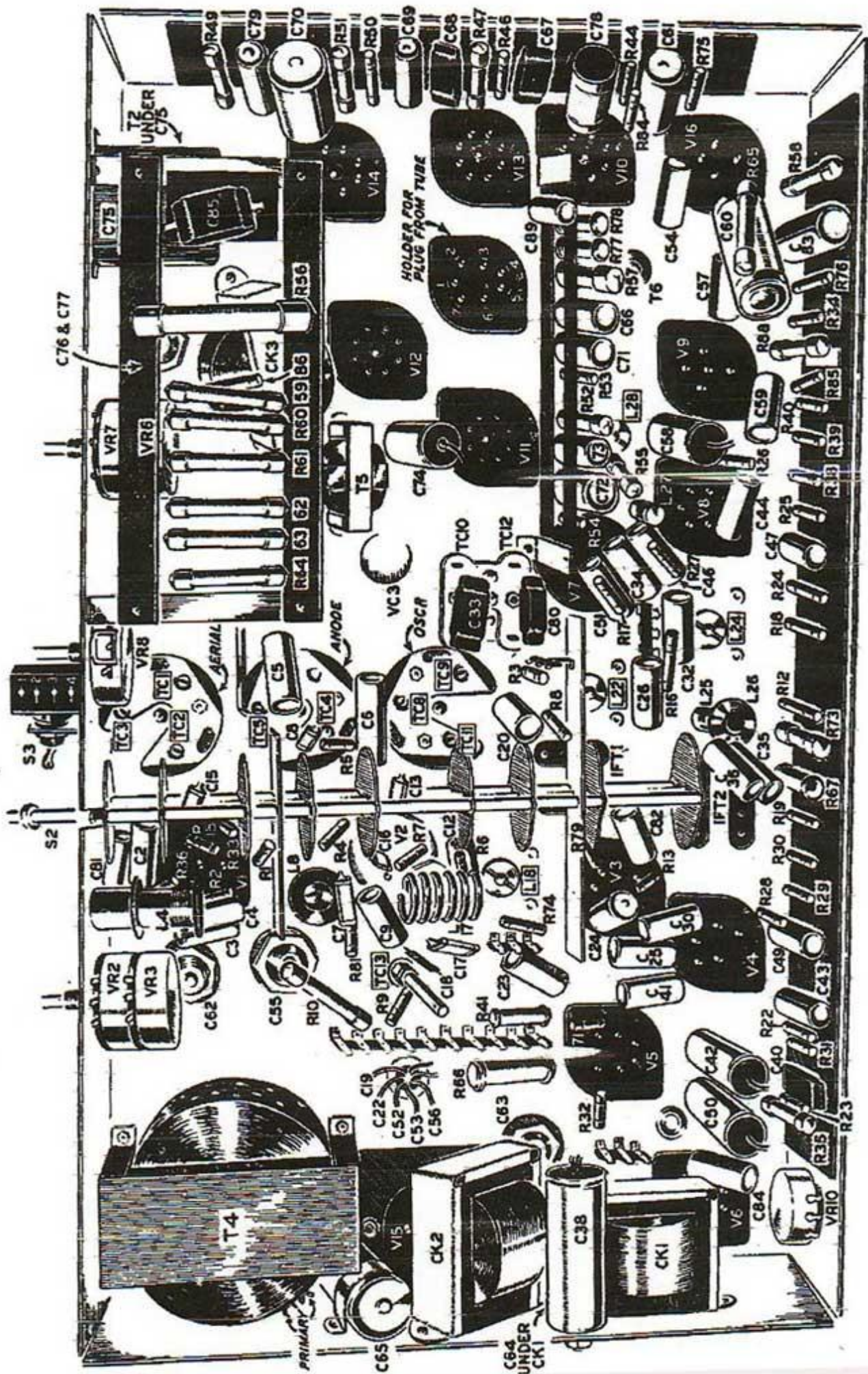
broadcast, 76 mA.



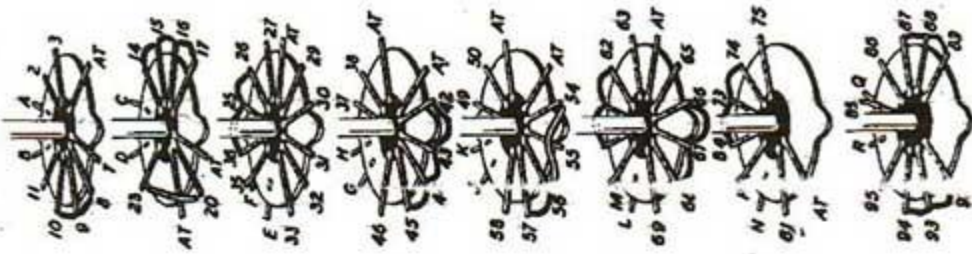
## CONTINUITY CHECKS

Values  $\pm 15$  per cent.

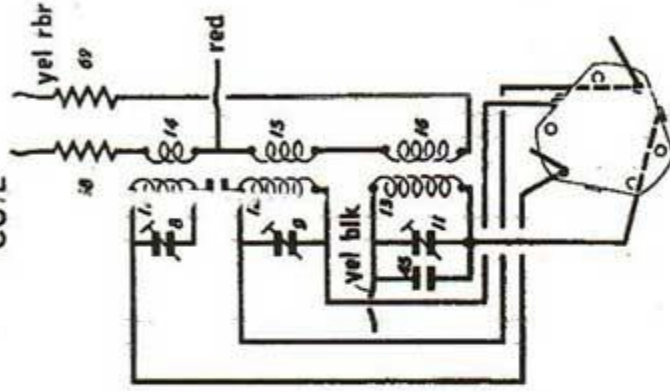
Component.	Measured.	Switch.	Resistance.
L1, L2, L3 ... ..	Fixed vanes VC1 and contact A S2 ... ..	SW MW LW	0.1 ohms. 5.5 " 21.0 "
L4 ... ..	Grid socket V1 or Television aerial socket and chassis	TEL	Negligible.
L5, L6, L7, R4 ... ..	Anode (top clip), V1 and contact H S2 ... ..	TEL SW MW LW	5,000 ohms (R4). 0.1 " 0.9 " 1.6 "
	Whole coils across ends ... ..	---	L6, 6.0 ohms. L7, 15.0 ohms.
L8 ... ..	Top grid V2 and chassis ... ..	TEL	Negligible.
L9, L20, R12, R77 ... ..	Anode V2 to anode V3 ... ..	MW	5,056 ohms (L9, 2.0 ohms). (L20, 4.0 ohms).
L10, R30 ... ..	Grid V3 (KTZ41) and chassis ... ..	MW	0.5 megohm (L10, 2.0 ohms).
L11 ... ..	Across ends ... ..	---	0.1 ohms.
L12 ... ..	Across ends ... ..	---	5.6 ohms.
L13 ... ..	Across ends ... ..	---	4.5 ohms.
L14 ... ..	Across ends ... ..	---	1.0 ohms.
L15 ... ..	Across ends ... ..	---	2.0 ohms.
L16 ... ..	Across ends ... ..	---	3.25 ohms.
L17 ... ..	Across ends ... ..	---	Negligible.
L18, L19, R11, R74, VR2 ... ..	Grid V3 and chassis ... ..	TEL	5,000 ohms (L19, 0.1 ohms). (L18, 0.7 ohms).
L21, R21 ... ..	Diode to cathode V4 ... ..	MW	0.5 megohm (L21, 4.0 ohms).
L22, L23, L24, L25, R14, R20, R12, R18, R79, R80	Anode socket V3 to anode socket V7 ... ..	TEL	10,100 ohms. L22, 1.6 ohms. L23, 0.1 " L24, 0.8 " L25, 0.2 "
L26 ... ..	Across ends ... ..	---	1.5 ohms.
L27, R27 ... ..	Cathode V8 to chassis ... ..	---	230 ohms (whole L27, 0.2 ohms).
L28, R37 ... ..	Grid V9 to chassis ... ..	---	1.5 ohms.
For transformers, chokes, scanning and focus coils	See circuit diagram		
For grid circuit resistances	See Valve Table		



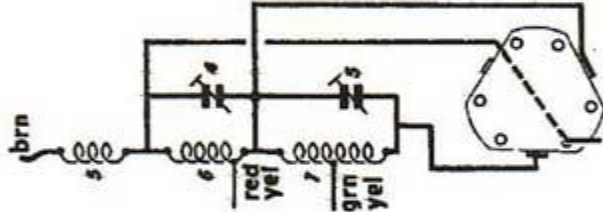
**S2 DETAILS**  
AT = ANCHOR TAG



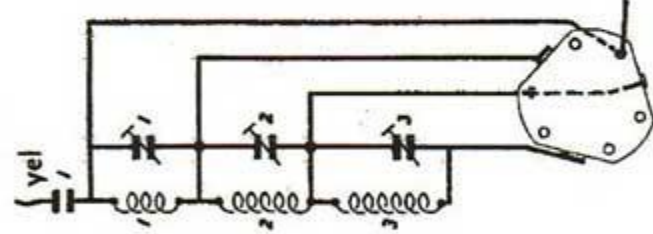
**OSCILLATOR COIL**



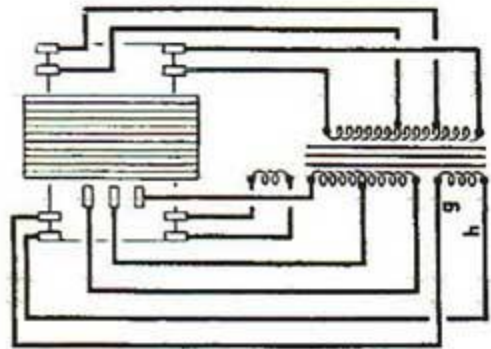
**ANODE COIL**



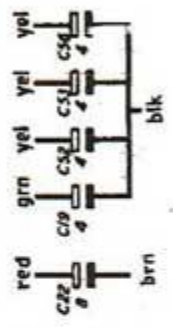
**AERIAL COIL**



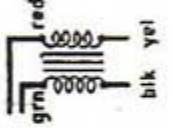
**T3**



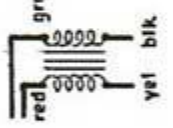
**BLOCK CONDENSER**



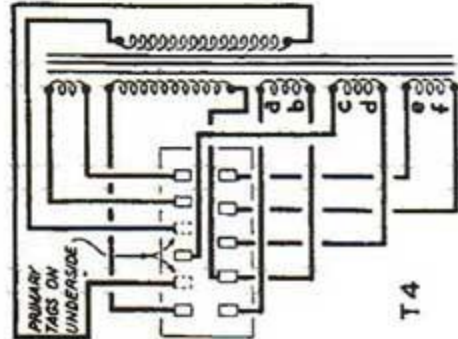
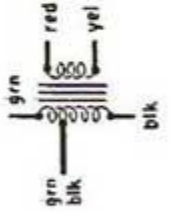
**T6**

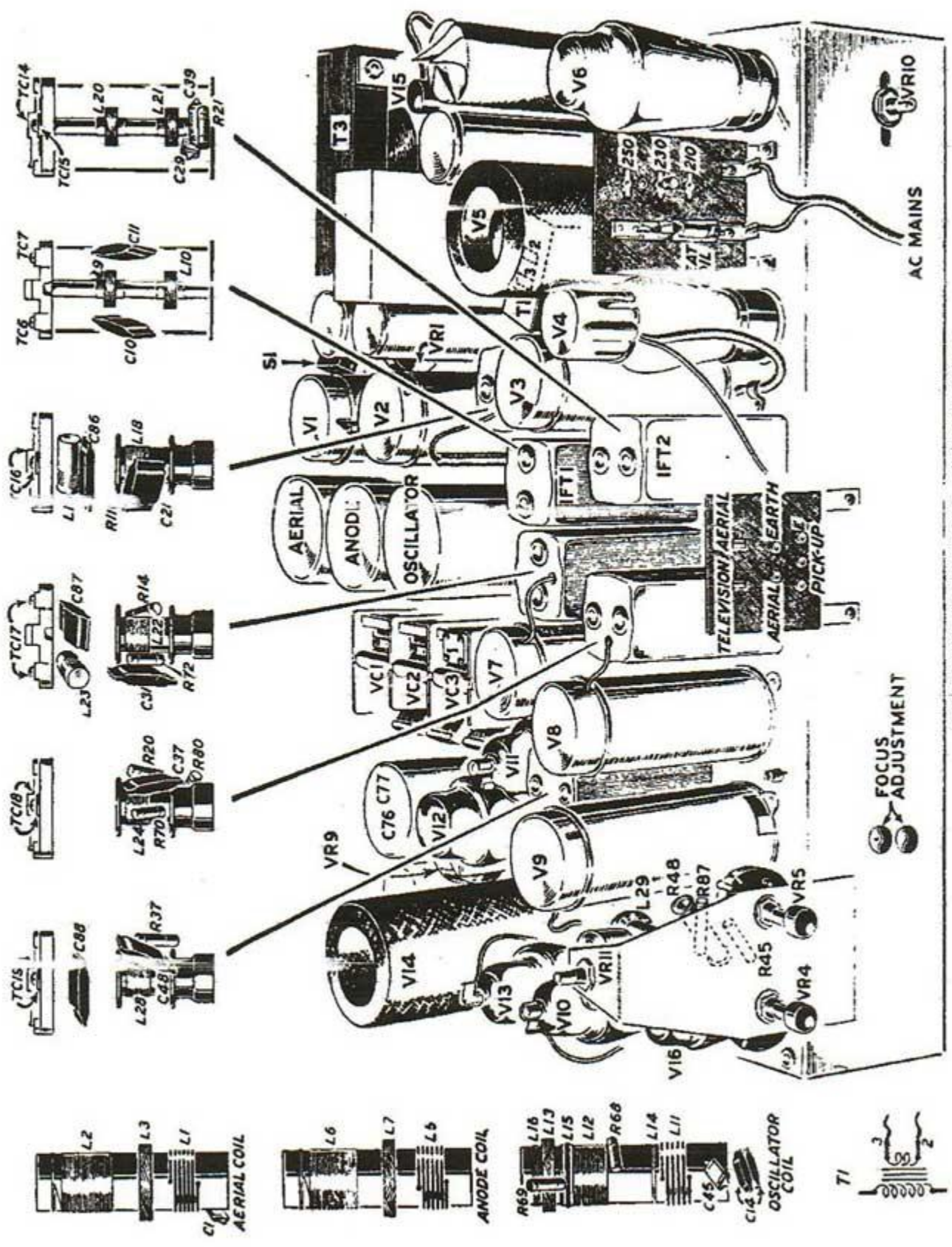


**T5**

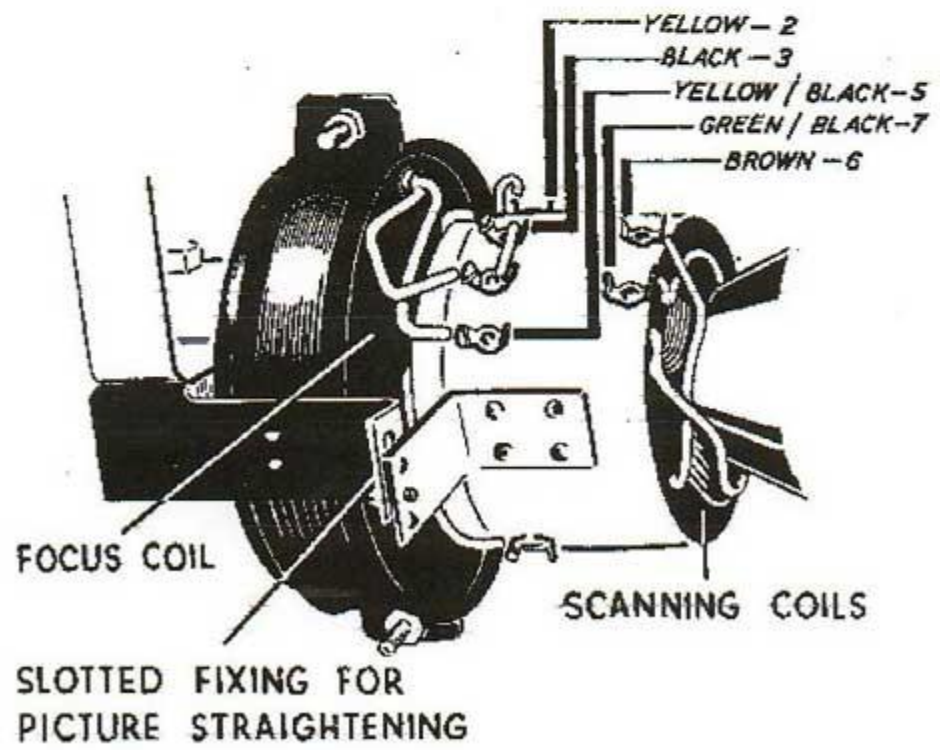
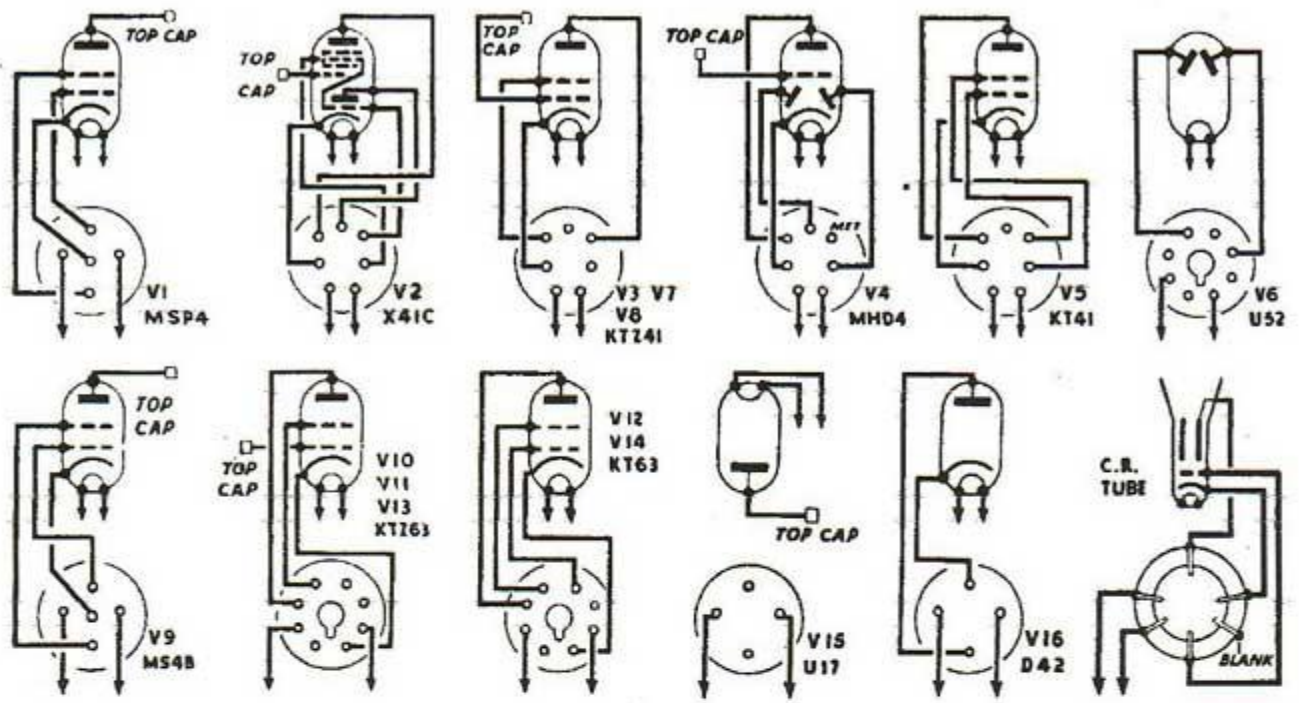


**T2**





L8 TRIMMER IS ON CHASSIS BETWEEN V1 & V2



## FAULT TABLE

Symptom.	Probable Cause.	Analysis.
Picture unsteady ... ..	Synch. pulses not reaching time bases ...	Check V16, V10, and setting VR11 (synch. control).
Picture lacking contrast... ..	Insufficient input, or gain ... ..	Check aerial, V1, V3, V7, V8. Contact aerial between top cap V1 and chassis and then V2 and chassis. If results do not progressively deteriorate suspect V1.
Picture low brightness ... ..	Low E.H.T. volts or incorrect bias. Low H.T. volts	Check V15, check voltage at C.R. tube grid (see valve table). Check H.T. voltage and V6, or change C.R. tube.
Picture too bright ... ..	Cathode D.C. voltage low ... ..	Check V9 emission.
Picture with pattern on ... ..	Diathermy interference, or spurious oscillation	For latter, examine all screening or re-gang, check decoupling condensers for open circuit.
Poor definition ... ..	Focus out of adjustment or I.Fs. out of alignment Mains voltage adjustment incorrectly set.	If it is possible to get sharp clear lines on a plain raster (aerial disconnected), I.F. ganging must be done. Also see note under circuit diagram, p. 11.
Horizontal line ... ..	No frame deflection ... ..	Check V11, V12, L30, L31.
Vertical line ... ..	No line deflection ... ..	Check V13, V14, L33, L34.
Small light spot in centre of tube ...	No frame or line deflection ... ..	Check all items in two lines above.
Large diffuse spot in centre of tube ...	No focus, faulty H.T. rectifier ... ..	Check L32, V6.
Large dark spot in centre of tube ...	Ionic bombardment ... ..	Change C.R. tube.
Insufficient width or height ... ..	Faulty line or frame output valves ... ..	Check V12 and V14 cathode voltages or change valves.
Interference crackles and splashes on half of picture, similar to car interference	Faulty insulation in pinch of V12 or V14 ...	Turn down volume, and the arcing in the base should be audible and/or visible if present. Change valve.
Poor line definition ... ..	Incorrect focusing field, or soft C.R. tube ...	Try changing R57 (see note on p. 11). Examination of the tube "gun" will reveal faint blue glow if the tube is soft.
Sound on picture ... ..	Incorrect adjustment of TC16 or sound projector circuit (TC19)	Check these adjustments referring to H.F. Tests and Adjustments.
Synch. on sound ... ..	Faulty decoupling of H.T. feed, faulty V9, 10, or 16. Screened lead passing through field of T5.	Check CK1 and condensers; if "contrast" has to be turned right up, try changing V9, 10, or 11. Move lead.
"Ringing" or images ... ..	Incorrect aerial feeder impedance, faulty I.F. alignment (I.F. stages verging on instability), or "reflections" reaching aerial	The difference between "ringing" and an image may be established by turning up the "Contrast" control. Rings increase in number as the control is turned up, whereas a true image is unaffected; it is usually more distant from the true picture than "rings." See E.M.I. Service "Aerial Brochure."
No television or radio ... ..	X41c not oscillating ... .. Note.—It is possible that a faint programme from Luxembourg may be heard. This is due to direct reception through the I.F. amplifier of a harmonic	Connect voltmeter across R10, and short L17. If valve is oscillating a marked increase in voltage should be noted. Repeat with R8 and short VC3 for broadcast check.

## ATTENUATION

Attenuators comprising a network of resistances, so designed that the impedance and frequency characteristics of the cable are unaffected, are obtainable from E.M.I. Sales & Service Ltd.

**SPARE PARTS LIST**

**MODELS 706, 707, 904 & 905**

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>PARTS OF RADIOVISION UNIT</b>					
23921T	L1, L2 and L3—Aerial coil (broadcast) ...	1	—	—	—
23675K	L4—Aerial coil (television)...	1	—	—	—
23674B	Adjusting screw } securing L4 ...	1	AcD	—	—
23671	Nut				
23921U	L5, L6 and L7—Anode coil (broadcast) ...	1	—	—	—
23675L	L8—Anode coil (television) ...	1	—	—	—
23674A	Adjusting screw } securing L8 ...	1	AcD	—	—
23671	Nut				
	L9 and L10—in I.F.T. 1				
23921S	L11, L12, L13, L14, L15 and L16—Oscillator coil (broadcast) ...	1	—	—	—
26652D	L17—Oscillator coil (television) ...	1	WN	—	—
28401	Stud	2	WN	—	—
11629	Nut				
3165	Washer, S.P.				
26746H	L18—1st vision I.F. coil—White spot	1	—	—	—
23674A	Adjusting screw } securing L18 ...	1	AcD	—	—
23671	Nut				
26804C	L19—1st Television sound I.F. ...	1	—	—	—
	L20 and L21—in I.F.T. 2				
26746F	L22—2nd vision I.F.—Black Spot ...	1	—	—	—
23674A	Adjusting screw } securing L22 ...	1	AcD	—	—
23671	Nut				
26804C	L23—2nd television sound I.F. ...	1	—	—	—
26746C	L24—3rd vision I.F.—Green Spot	1	—	—	—
23674A	Adjusting screw } securing L24 ...	1	AcD	—	—
23671	Nut				
26748D	L25 and L26—3rd television sound I.F. ...	1	WN	—	—
11228	Screw	1	—	—	—
3165	Washer, S.P.				
28411A	L27—television sound rejector ...	1	WN	—	—
11228	Screw	1	—	—	—
3165	Washer, S.P.				
26746G	L28—4th vision I.F. coil—Orange spot	1	—	—	—
23679A	Adjusting screw } securing L28 ...	1	AcD	—	—
23671	Nut				
26748E	L29—H.F. choke ...	1	WN	—	—
11228	Screw	1	—	—	—
3165	Washer, S.P.				
28460B	L30 and L31—Frame coils ...	1	—	—	—
	L33 and L34—Line coils ...				
*29432A	L32—Focus coil ...	1	—	—	—
<p>On those models with early type of focus coil R57, R85, &amp; R88 will have the following values instead of those given later in this list.</p>					
10451AL	R57—2,300 ohms ...	1	—	—	—
17541BZ	R85—750 ohms ...	1	—	—	—
17541BZ	R88—750 ohms ...	1	—	—	—
28452A	Clamp and bracket assembly ...	1	BEn	—	—
28452B	Clamp and bracket assembly ...	1	BEn	—	—
11219	Screw	2	BEn	—	—
1088	Washer				
<p>* To fit this coil to those early models which had a different focus coil the following parts are required :—</p>					
28537	Plate ...	1	SynBEn	—	—
23201	Screw (5" models) ...	2	WN	—	—
or 11211	Screw (7" models) ...	2	WN	—	—
3167	Washer, SP ...	2	—	—	—
11627	Nut ...	2	WN	—	—

**SPARE PARTS LIST—continued**

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
17423	Screw	2	BEn		
24055	Spring	2	—		
1021	Washer	2	BEn		
11627	Nut	2	BEn		
28455A	Support bracket assembly ...	1	BEn		
28456A	Support clamp, with felt ...	1	BEn		
28500	Bolt	4	BEn		
1021	Washer	4	BEn		
3167	Washer, S.P.	4	—		
11627	Nut	4	BEn		
Please Note. The above items from 28460B (L30, etc.) onwards are not part of radiovision unit.					
22624W	CK1—Choke ...	1	—		
19050	Screw	2	WN		
3166	Washer, S.P.	2	—		
28024E	CK2—Choke ...	1	—		
19050	Screw	2	WN		
3166	Washer, S.P.	2	—		
24355P	CK3—Choke ...	1	—		
10606	Screw, P.K., securing CK3 ...	2	—		
26330AU	I.F.T.1—1st I.F. transformer, complete with L9, L10, TC6, TC7, C10 and C11	1	—		
26330AV	I.F.T.2—2nd I.F. transformer, complete with L20, L21, TC14, TC15, R21, C29 and C39 ...	1	—		
12619	Screw, P.K., securing I.F. transformers ...	4	—		
22624U	T1—Sound output transformer ...	1	—		
16328B	Panel, with two tags and terminal screws ...	1	—		
14512	Tag ...	2	—		
14511	Nut ...	2	WN		
11228	Terminal Screw ...	2	WN		
211	Screw, P.K., securing panel ...	2	—		
10606	Screw, P.K., securing T1 ...	2	—		
28418B	T2—Line output transformer ...	1	—		
10606	Screw, P.K., securing T2 ...	2	—		
28410A	T3—Mains transformer ...	1	—		
11211	Screw	4	WN		
6305	Washer	4	WN		
3167	Washer, S.P.	4	—		
11627	Nut	3	WN		
28412A	T4—Television mains transformer ...	1	—		
11210	Screw	4	WN		
3167	Washer, S.P.	4	—		
19255H	T5—Frame osc. transformer ...	1	—		
8777	Screw, P.K., securing T5 ...	2	—		
18964G	T6—Line osc. transformer ...	1	—		
10606	Screw, P.K., securing T6 ...	2	—		
<b>RESISTANCES.</b>					
19202B	R1—1,000 ohms ...	1	—		
19202A	R2—500 ohms ...	1	—		
17541B	R3—10,000 ohms ...	1	—		
17541F	R4—5,000 ohms ...	1	—		
19202N	R5—500,000 ohms ...	1	—		
19202AV	R6—230 ohms, S.L. ...	1	—		
19202J	R7—50,000 ohms ...	1	—		
17541AT	R8—35,000 ohms, S.L. ...	1	—		
19202E	R9—5,000 ohms ...	1	—		
5786A	R10—50,000 ohms ...	1	—		
19202BE	R11—5,000 ohms, S.L. ...	1	—		
17541F	R12—5,000 ohms ...	1	—		
19202AV	R13—150 ohms, S.L. ...	1	—		
19202BF	R14—7,500 ohms, S.L. ...	1	—		
19202M	R15—230,000 ohms ...	1	—		
17541B	R16—10,000 ohms ...	1	—		
19202AV	R17—230 ohms, S.L. ...	1	—		
17541F	R18—5,000 ohms ...	1	—		
19202L	R19—100,000 ohms ...	1	—		
19202BE	R20—5,000 ohms, S.L. ...	1	—		
19202N	R21—500,000 ohms ...	1	—		



SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>RESISTANCES—continued</b>					
19202B	R22—1,000 ohms ...	...	...	...	...
17541P	R23—50,000 ohms ...	...	...	...	...
17541Q	R24—100,000 ohms ...	...	...	...	...
17541F	R25—5,000 ohms ...	...	...	...	...
17541B	R26—10,000 ohms ...	...	...	...	...
19202AV	R27—230 ohms, S.L.	...	...	...	...
19202N	R28—500,000 ohms ...	...	...	...	...
19202N	R29—500,000 ohms ...	...	...	...	...
19202N	R30—500,000 ohms ...	...	...	...	...
19202AU	R31—100 ohms ...	...	...	...	...
19202X	R32—50 ohms ...	...	...	...	...
17541E	R33—35,000 ohms ...	...	...	...	...
17541F	R34—5,000 ohms ...	...	...	...	...
5786B	R35—10,000 ohms ...	...	...	...	...
19202AB	R36—150 ohms ...	...	...	...	...
19202BE	R37—5,000 ohms, S.L.	...	...	...	...
17541P	R38—50,000 ohms ...	...	...	...	...
17541E	R39—35,000 ohms ...	...	...	...	...
19202A	R40—500 ohms ...	...	...	...	...
19104CS	R41—25 ohms ...	...	...	...	...
17541Z	R44—230,000 ohms ...	...	...	...	...
17541AA	R45—23,000 ohms ...	...	...	...	...
17541AT	R46—35,000 ohms, S.L.	...	...	...	...
5786BY	R47—500,000 ohms, S.L.	...	...	...	...
19105R	R48—35,000 ohms, S.L.	...	...	...	...
5786CH	R49—600 ohms ...	...	...	...	...
19202N	R50—500,000 ohms ...	...	...	...	...
5786BE	R51—350 ohms, S.L.	...	...	...	...
5786AS	R52—1 megohm ...	...	...	...	...
17541CF	R53—75,000 ohms, S.L.	...	...	...	...
19202P	R54—1 megohm ...	...	...	...	...
19105AG	R55—750 ohms ...	...	...	...	...
21405F	R56—10,000 ohms ...	...	...	...	...
10451Q	R57—3,000 ohms ...	...	...	...	...
5786U	R58—50,000 ohms, S.L.	...	...	...	...
5786BX	R59—350,000 ohms ...	...	...	...	...
5786AS	R60—1 megohm ...	...	...	...	...
5786AS	R61—1 megohm ...	...	...	...	...
5786AS	R62—1 megohm ...	...	...	...	...
5786AS	R63—1 megohm ...	...	...	...	...
5786AS	R64—1 megohm ...	...	...	...	...
5786BV	R65—230,000 ohms, S.L.	...	...	...	...
19105AX	R66—15,000 ohms ...	...	...	...	...
19105AY	R67—23,000 ohms ...	...	...	...	...
19202AA	R68—100 ohms ...	...	...	...	...
19202AA	R69—100 ohms ...	...	...	...	...
19202L	R70—100,000 ohms ...	...	...	...	...
19202AJ	R71—150,000 ohms ...	...	...	...	...
19202L	R72—100,000 ohms ...	...	...	...	...
5786B	R73—10,000 ohms ...	...	...	...	...
19202E	R74—5,000 ohms ...	...	...	...	...
17541B	R75—10,000 ohms ...	...	...	...	...
17541CA	R76—1,500 ohms, S.L.	...	...	...	...
19104BR	R77—23,000 ohms, S.L.	...	...	...	...
19104BR	R78—23,000 ohms, S.L.	...	...	...	...
19202X	R79—50 ohms ...	...	...	...	...
19202X	R80—50 ohms ...	...	...	...	...
17541F	R81—5,000 ohms ...	...	...	...	...
17541K	R84—1,000 ohms ...	...	...	...	...
19104BJ	R85—1,500 ohms S.L.	...	...	...	...
17541AN	R86—150,000 ohms ...	...	...	...	...
17541P	R87—50,000 ohms ...	...	...	...	...
19104BJ	R88—1,500 ohms S.L.	...	...	...	...
18300DN	VR1—2 megohm volume control with rut	...	...	...	...
29121	Bracket for VR1 ...	...	...	...	...
8777	Screw, securing bracket ...	...	...	...	...

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>RESISTANCES—continued</b>					
28403A	VR2—1,000 ohms—Contrast ... ..	1	—		
	VR3—5,000 ohms—Brightness ... ..				
28407	Sleeve ... ..	1	CdP		
20938	Screw, securing sleeve to "contract" spindle ... ..	2	WN		
23651EC	VR4—250,000 ohms—Width ... ..	1	—		
23651EC	VR5—250,000 ohms—Height ... ..	1	—		
28404	Plate, supporting VR4, VR5 and VR9 ... ..	1	CdP		
8777	Screw, P.K., securing plate ... ..	4	—		
28403B	VR6—50,000 ohms—Line ... ..	1	—		
	VR7—250,000 ohms—Frame ... ..				
28407	Sleeve ... ..	1	CdP		
20938	Screw, securing sleeve to "framehold" spindle ... ..	2	WN		
23690AJ	VR8—3,000 ohms—Focus ... ..	1	—		
23690A	VR9—750 ohms—Form ... ..	1	—		
18300DK	VR10—2 megohm tone control ... ..	1	—		
2992	Pin, for spindle ... ..	1	WN		
23690A	VR11—750 ohms—Sync. hold ... ..	1	—		
27778	Bracket, for VR11 ... ..	1	CdP		
8777	Screw, P.K., securing bracket ... ..	2	—		
1061	Washer ... ..	9	WN		
5673	Washer, S.P. } for variable resistances. Nut is supplied with each ...	9	—		
<b>CONDENSERS.</b>					
22164B	C1—7.5 mfd. ... ..	1	—		
24900W	C2—0.05 mfd. ... ..	1	—		
24900W	C3—0.05 mfd. ... ..	1	—		
24900W	C4—0.05 mfd. ... ..	1	—		
24900AA	C5—0.1 mfd. ... ..	1	—		
24900AA	C6—0.1 mfd. ... ..	1	—		
22170AE	C7—0.00035 mfd. ... ..	1	—		
22164F	C8—35 mmfd. ... ..	1	—		
24900W	C9—0.05 mfd. ... ..	1	—		
22330BN	C10—0.0005 mfd. ± 2 per cent. ... ..	1	—		
22330BN	C11—0.0005 mfd. ± 2 per cent. ... ..	1	—		
24900W	C12—0.05 mfd. ... ..	1	—		
22164J	C13—50 mmfd. ... ..	1	—		
22330CP	C14—0.0035 mfd., ± 2 per cent. ... ..	1	—		
22164F	C15—35 mmfd. ... ..	1	—		
22164J	C16—50 mmfd. ... ..	1	—		
22001AG	C17—0.0023 mfd. ... ..	1	—		
28444B	C18—65 mmfd. ... ..	1	—		
26174A	C19—4 mfd. (with C22, C52, C53 and C56) ... ..	1	—		
8777	Screw, P.K. ... ..	3	WN		
11229	Screw ... ..				
3165	Washer, S.P. } securing condenser block ... ..				
11629	Nut ... ..				
24900W	C20—0.05 mfd. ... ..	1	—		
22330BX	C21—0.0023 mfd. ... ..	1	—		
—	C22—8 mfd., with C19 ... ..	1	—		
24900W	C23—0.05 mfd. ... ..	1	—		
24900AE	C24—0.23 mfd. ... ..	1	—		
24900W	C25—0.05 mfd. ... ..	1	—		
24900W	C26—0.05 mfd. ... ..	1	—		
22164K	C29—75 mmfd. ... ..	1	—		
24900AA	C30—0.1 mfd. ... ..	1	—		
22330BX	C31—0.0023 mfd. ... ..	1	—		
24900W	C32—0.05 mfd. ... ..	1	—		
22330AL	C33—0.00035 mfd. ... ..	1	—		
24900W	C34—0.05 mfd. ... ..	1	—		
24900A	C35—0.001 mfd. ... ..	1	—		
24900N	C36—0.01 mfd. ... ..	1	—		
22330BX	C37—0.0023 mfd. ... ..	1	—		
21553C	C38—50 mfd., electrolytic ... ..	1	—		
22170B	C39—0.0001 mfd. ... ..	1	—		
22330AL	C40—0.00035 mfd. ... ..	1	—		
24900N	C41—0.01 mfd. ... ..	1	—		
21553F	C42—50 mfd., electrolytic ... ..	1	—		
24900W	C43—0.05 mfd. ... ..	1	—		

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price	Per
<b>CONDENSERS—continued</b>					
24900W	C44—0.05 mfd. ...	1	—	—	—
22164E	C45—23 mmfd. ...	1	—	—	—
24900W	C46—0.05 mfd. ...	1	—	—	—
24900W	C47—0.05 mfd. ...	1	—	—	—
22330BX	C48—0.0023 mfd. ...	1	—	—	—
24900W	C49—0.05 mfd. ...	1	—	—	—
21553F	C50—50 mfd., electrolytic ...	1	—	—	—
24900W	C51—0.05 mfd. ...	1	—	—	—
	C52—4 mfd., with C19				
	C53—4 mfd., with C19				
24900G	C54—0.0035 mfd. ...	1	—	—	—
22675E	C55—32 mfd., electrolytic ...	1	—	—	—
	C56—4 mfd., with C19				
24900W	C57—0.05 mfd. ...	1	—	—	—
21553F	C58—50 mfd., electrolytic ...	1	—	—	—
24900W	C59—0.05 mfd. ...	1	—	—	—
26758A	C60—2 mfd., electrolytic ...	1	—	—	—
24900AE	C61—0.23 mfd. ...	1	—	—	—
22675E	C62—32 mfd., electrolytic ...	1	—	—	—
22675D	C63—16 mfd., electrolytic ...	1	—	—	—
28495	Insulation ...	1	—	—	—
22675F	C64—16 mfd., electrolytic ...	1	—	—	—
24900AN	C65—1 mfd. ...	1	—	—	—
28498	Clip, for C65 ...	1	—	—	WN
11228	Screw				WN
3165	Washer, S.P. } securing clip				WN
11629	Nut				WN
24900J	C66—0.005 mfd. ...	1	—	—	—
22330AK	C67—0.00023 mfd. ...	1	—	—	—
22330AM	C68—750 mmfd., ± 5 per cent. ...	1	—	—	—
24900J	C69—0.005 mfd. ...	1	—	—	—
24900AN	C70—1 mfd. ...	1	—	—	—
24900X	C71—0.05 mfd. ...	1	—	—	—
24900AE	C72—0.23 mfd. ...	1	—	—	—
24900AA	C73—0.1 mfd. ...	1	—	—	—
21553G	C74—0.25 mfd., electrolytic ...	1	—	—	—
28409A	C75—8 mfd., electrolytic ...	1	—	—	—
28487	Strap				CdP
8777	Screw, P.K. } securing C75				2
28408A	{ C76—0.1 mfd. } with fixing nut ...				1
	{ C77—0.1 mfd. }				
17250K	C78—8 mfd., electrolytic ...	1	—	—	—
24900S	C79—0.023 mfd. ...	1	—	—	—
22303BJ	C80—0.00023 mfd., ± 2 per cent. ...	1	—	—	—
24900W	C81—0.05 mfd. ...	1	—	—	—
24900W	C82—0.05 mfd. ...	1	—	—	—
17250C	C83—10 mfd., electrolytic ...	1	—	—	—
24900A	C84—0.001 mfd. ...	1	—	—	—
20387AB	C85—0.00023 mfd., ± 5 per cent. ...	1	—	—	—
8777	Screw, P.K., securing C85 ...				1
22330BQ	C86—0.00075 mfd., ± 2 per cent. ...	1	—	—	—
22330BQ	C87—0.00075 mfd., ± 2 per cent. ...	1	—	—	—
22330AK	C88—0.00023 mfd., ± 5 per cent. ...	1	—	—	—
24900AA	C89—0.1 mfd. ...	1	—	—	—
22330AN	C90—0.0015 mfd., ± 5 per cent. ...	1	—	—	—
23922R	TC1, TC2 and TC3—Triple pre-set condenser ...	1	—	—	—
23922N	TC4 and TC5—Twin pre-set condenser ...	1	—	—	—
	TC5 and TC6—with 1FT!				
23922B	TC8, TC9 and T311—Triple pre-set condenser ...	1	—	—	—
24027	Adjusting screw (for 23922 series) ...	8	—	—	AcD
19050	Screw				3
3166	Washer, S.P. } securing 23922 series, pre-set condensers				3
25350AR	TC10 and TC12—Twin pre-set condenser ...	1	—	—	—

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>CONDENSERS—continued</b>					
10710	Screw	}	WN		
3166	Washer, S.P.		WN		
11628	Nut		WN		
11231	Screw		WN		
3165	Washer, S.P.		—		
20250B	TC13—Tubular trimmer condenser	1	—		
20257	Nut	}	WN		
20258	Nut, thin		WN		
28530	Bracket, for TC13	1	CdP		
8777	Screw, P.K., securing bracket TC14 and TC15—In IFT2	2	—		
26350AC	TC16—Twin pre-set condenser	1	—		
26350AC	TC17—Twin pre-set condenser	1	—		
26350AC	TC18—Twin pre-set condenser	1	—		
23650AC	TC19—Twin pre-set condenser	1	—		
25067	Adjusting screw (for 26350 series)	6	AcD		
26130S	VC1, VC2 and VC3—Three-gang condenser	1	—		
28501A	Slow motion drive assembly	1	—		
28501	Drive spindle	1	—		
25615A	Sleeve and pinion	1	BzP		
24053B	Barrel and flange	1	—		
20851	Spring	1	—		
5183	Circlip	1	WN		
3540	Ball	7	—		
3522	Ball	3	—		
24057	Washer	1	CP		
28440	Spacer	2	WN		
11273	Screw, 4 BA	}	WN		
3166	Washer, S.P.		WN		
15938	Nut		WN		
11283	Screw, 6 BA		WN		
11629	Nut		WN		
3165	Washer, S.P.	—			
28441B	Spring gear and cord drive assembly	1	—		
24045	Spring	2	—		
20938	Screw, securing spring gear and drive assembly	2	WN		
28439	Bracket, for vernier indicator	1	CdP		
10606	Screw, P.K., securing bracket	2	WN		
26113	Condenser support bracket, front	1	CdP		
18310	Screw	}	WN		
3166	Washer, S.P.		2	—	
28021D	Condenser support bracket and stud, rear	1	AlSp		
10606	Screw, P.K., securing bracket	2	—		
21236	Rubber bush	3	—		
6305	Washer	3	WN		
3167	Washer, S.P.	3	—		
11627	Nut	3	WN		
<b>SWITCHES.</b>					
22056A	S1—Mains on/off switch, with two nuts	1	—		
26352B	Switch operating lever and bush	1	—		
13387	Screw, securing operating lever and bush to spindle of volume control	2	WN		
28402A	S2—Change-over switch, with nut and S.P. washer	1	—		
12619	Screw, P.K., securing screen of S2	3	—		
22056A	S3—Television on/off switch with two nuts	1	—		
21668	Bracket, for S3	1	CdP		
28524	Insulation	1	—		
11805	Screw, P.K., securing bracket and insulation	2	—		
28431A	Cam, with pin, operating S3	1	CdP		
20938	Screw, securing cam to spindle of S2	1	WN		
<b>CONDENSER DRIVE AND TUNING DETAILS.</b>					
28421B	Scale frame assembly with four pulleys	1	CdP		
8777	Screw, P.K.	}	—		
2855	Washer		4	—	
20963A	Vernier indicator	1	SynCrmEn		
20810A	Pulley	1	—		

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>CONDENSER DRIVE AND TUNING DETAILS—continued</b>					
11237	Screw, securing vernier indicator to pulley	2	CrEnHd		
20944A	Vernier pointer and pin	1	BEn		
15938	Nut	1	WN		
3166	Washer, S.P. } securing pointer and pin to bracket (28 and 39)	1			
20844DB	Chain	1			
20925B	Pulley	1			
20938	Screw, securing pulley to drive mechanism on condenser	2	WN		
	Tuning scale—see pages 22 & 23.				
28437	Scale backing	1			
27869	Scale clamp, upper	1	CdP		
26168	Scale clamp, lower	2	CdP		
25157	Rubber sleeve	3			
8777	Screw, P.K., securing scale clamps	3			
28433A	Cursor and pointer	1	WEEn		
	Cord, for pointer. S.515, 222/00015	4 ft.			
12749	Cord eye	1			
24112	Spring, for cord	1			
28428A	Wave band pointer	1	WEEn		
28503	Strap	1	CdP		
28464	Hexagonal stud	1	CdP		
11628	Nut	1	WN		
3166	Washer, S.P. } securing stud and strap	1			
20936	Felt washer	1			
5693	Washer } securing wave-band pointer to hexagonal stud	1	WN		
21233B	Split pin	1			
17470	Spring, for wave-band pointer	1			
	(For cam operating pointer, see under 53)				
28494	Spring post	1	WN		
3165	Washer, S.P. } securing post to scale frame	1			
11629	Nut	1	WN		
27730A	Lamp holder	2			
27735A	Insulating washer and eyelet	2			
27734	Spring	2			
22704A	Lamp	2			
<b>VALVE HOLDERS, SCREENS, PANELS.</b>					
26651	Valve holder, ceramic, for V2	1			
26719	Valve screen base	1			
26720	Collar	2	WN		
11231	Screw	1	WN		
3165	Washer, S.P. } securing one side of valve-holder. (For stud, see under	1			
11629	Nut	1	WN		
26000B	Valve holder, 5-pin, for V1, V9 and V16	3			
26003A	Valve holder, 7-pin, for V3, V4, V5, V7, V8 and for plug for tube	6			
26005A	Valve holder, octal, for V6, V10, V11, V12, V13 and V14	6			
28303	Valve screen base	6	CdP		
16358	Rivet	10			
16353	Rivet (shorter) } securing valve-holders and screen bases	20			
24501B	Valve-holder, for V15	1			
11220	Screw	4	WN		
3166	Washer, S.P. } securing valve holder	4			
11628	Nut	4	WN		
26672B	Valve screen, for V1, V2 and V9	3			
24982B	Valve screen, 1 (shorter), for V3, V7 and V8	3			
26112	Valve screen, top, for V1, V3, V7, V8 and V9	5			
26562A	Valve screen, for V5 and V14	2	BEn		
10606	Screw, P.K., securing the two latter screens	4			
19835B	Valve top screen, for V4	1			
24038	Valve top clip, small, for V10, V11 and V13	3			
19897	Valve top clip, large	7			
21404A	Valve top clip, insulated, for V15	1			
23694	Tube, for lead to valve top, V1, V2 and V3	3			
21357A	Coil screen, large, for L1-3, L5-7 and L11-16	3			
24013	Spacer, for coils	3			
12619	Screw, P.K., securing coil screens	6			
26339C	Coil screen, square	4			
25593	Rubber bush	8			

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>VALVE-HOLDERS, SCREENS, PANELS—continued</b>					
12619	Screw, P.K., securing coil screens	8	—		
11281	Screw	4	WN		
3165	Washer, S.P. } securing trimmer condensers to screens	4	—		
28414A	Mains connection panel	1	—		
16745	Heat coil clip	1	WN		
16746	Heat coil clip, small	1	WN		
16747	Spring holder, for clip	1	WN		
16748	Plate	2	WN		
11366	Screw	4	WN		
8812	Tag	2	—		
3166	Washer, S.P. } securing clip and holder	2	—		
11228	Terminal screw, for mains connection	2	WN		
28415	Bracket, for panel	2	CdP		
8777	Screw, securing panel to brackets and brackets to chassis	6	—		
12179	Voltage adjustment screw	1	WN		
28612B	Aerial, earth and P.U. connection panel, with brackets	1	—		
8777	Screw, P.K., securing brackets to chassis	4	—		
28468A	Long panel, with 49 tags	1	—		
28469	Backing panel	1	—		
11220	Screw	6	WN		
3166	Washer, S.P. } securing panels	6	—		
11628	Nut	6	WN		
28566A	Panel, with 28 tags	1	—		
28467	Backing panel	1	—		
14384	Spacer	4	WN		
11221	Screw	4	WN		
3166	Washer, S.P. } securing panels	4	—		
11628	Nut	4	WN		
28465B	Resistance panel and bracket assembly, with 20 tags (brackets facing opposite sides)	1	—		
10606	Screw, P.K., securing panels to brackets	4	—		
11187	Screw, P.K., securing brackets to chassis	2	—		
28465C	Resistance panel and bracket assembly, with 20 tags (brackets facing same way)	1	—		
8777	Screw, P.K., securing brackets to chassis	2	—		
25513B	Tag panel, with ten tags	1	—		
24017A	Tag panel, with five tags	1	—		
24020A	Tag panel, with three tags	3	—		
12619	Screw, P.K., securing tag panels	7	—		
24020B	Tag Panel, with tags	1	—		
11228	Screw	1	WN		
3165	Washer, S.P. } securing tag panel...	1	—		
11629	Nut	1	WN		
20334A	Insulated tag and bracket	2	—		
12619	Screw, P.K., securing tag and bracket	2	—		
16757	Insulating bush	8	—		
16755	Insulating bush, small	25	—		
16576	Long tag	4	—		
15140	Tag	3	—		
28516A	Aerial and earth lead	1	—		
<b>LOUDSPEAKER.</b>					
20277D	Loudspeaker	1	—		
20277C	Cone chassis, complete with speech coil and cone...	1	—		
12568A	Panel, with two tags	1	—		
11806	Tag	2	—		
16352	Rivet, securing panel to chassis	2	—		
25222B	Magnet	1	—		
20446	Stud	4	AcD		
19687	Nut	4	AcD		
26515D	Stop	1	BMEn		
20289	Sleeve	1	AcD		
11263	Screw	1	WN		
20287	Felt strip	1	—		
25457A	Dust bag	1	—		
11213	Screw	3	WN		
1021	Washer	3	WN		

SPARE PARTS LIST—continued

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>CABINET PARTS AND FITTINGS.</b>					
706/1B	Cabinet ... ..	1	Pol		
8195	Rubber foot ... ..	4	—		
18709	Pin, securing rubber feet ... ..	4	—		
—	Baffle board, with insert nuts... ..	1	Std		
14922	Insert nut, for loudspeaker ... ..	3	CB		
9553	Screw, securing baffle board ... ..	7	—		
28512	Wire mesh ... ..	1	AnBr		
19273	Pin, securing wire mesh to baffle ... ..	4	—		
—	Felt for wire mesh and safety glass, $\frac{1}{4}$ -in., S1429, 225/82316 ... ..	—	—		
—	Felt for wire mesh and safety glass, $\frac{1}{4}$ -in., S1459, 225/84316 ... ..	—	—		
28478	Safety glass, for tube ... ..	1	—		
28477	Rubber packing for tube ... ..	1	—		
14922	Insert nut, for tube support ... ..	2	CB		
24873	Bracket, for cabinet back ... ..	5	CdP		
8602	Screw, securing brackets ... ..	10	—		
28479A	Cabinet back ... ..	1	—		
25836	Warning transfer ... ..	1	—		
19896	Screw } securing cabinet back ... ..	5	ParB		
19895	Spring washer } ... ..	5	ParB		
28523	Cowl, for tube ... ..	1	CdP		
11946	Bolt, $\frac{1}{2}$ -in. } ... ..	2	WN		
or					
29026	Bolt, 1-in. } securing cowl and tube ... ..	2	WN		
3167	Washer, S.P. } ... ..	2	—		
<b>CONTROLS.</b>					
20967H	Knob—" VOLUME " ... ..	1	ChF		
20967A	Knob—" TUNER " ... ..	1	ChF		
26633C	Knob—" CONTRAST " ... ..	1	ChF		
26634D	Knob—" BRIGHTNESS " ... ..	1	ChF		
27804S	Knob—" WAVE BAND " ... ..	1	ChF		
27804U	Knob—" FOCUS " ... ..	1	ChF		
26633D	Knob—" FRAMEHOLD " ... ..	1	ChF		
26634C	Knob—" LINEHOLD " ... ..	1	ChF		
24577A	Knob, for pre-set controls Height, Width and Tone ... ..	3	—		
11805	Screw, P.K., securing wave-band and focus knobs ... ..	2	—		
19157	Screw, securing volume knob ... ..	1	WN		
11773	Screw, securing tuner, brightness and linehold knobs ... ..	3	WN		
<b>RADIOVISION UNIT.</b>					
28400D	Radiovision unit ... ..	1	—		
28436B	Tuning scale ... ..	1	—		

**MODEL 707**

Instructions, controls and radiovision unit as on Model 706.

**CABINET PARTS AND FITTINGS.**

707/1B	Cabinet ... ..	1	Pol		
8195	Rubber foot ... ..	4	—		
18709	Pin, securing rubber feet ... ..	4	—		
—	Baffle board, with insert nuts... ..	1	Std		
14922	Insert nuts, for loudspeaker ... ..	3	CB		
9553	Screw, securing baffle board ... ..	7	—		
28514	Wire mesh ... ..	1	AnBr		
19273	Pin, securing wire mesh to baffle ... ..	6	—		
—	Felt, for wire mesh and safety glass, $\frac{1}{4}$ -in., S1429, 225/82316 ... ..	—	—		
—	Felt, for wire mesh and safety glass, $\frac{1}{4}$ -in., S1459, 225/84316 ... ..	—	—		
28485	Safety glass, for tube ... ..	1	—		
28484	Rubber packing, for tube ... ..	1	—		
14922	Insert nut, for tube support ... ..	2	CB		

**SPARE PARTS LIST—continued**

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>CABINET PARTS AND FITTINGS—continued</b>					
24873	Bracket, for cabinet back	5	CdP		
8602	Screw, securing bracket	10	WN		
28486B	Cabinet back	1	—		
25836	Warning transfer	1	—		
19896	Screw	5	ParB		
19895	Spring washer		ParB		
28528	Cowl, for tube	1	CdP		
11946	Bolt	2	WN		
3167	Washer, S.P.		2	—	

**MODEL 904**

Instructions.					
28492	Warning and valve label	1	—		
28493	Instruction card	1	—		
26111	Voltage adjustment label	1	—		
25821	Transit label	1	—		

**CABINET PARTS AND FITTINGS.**

904/8B	Cabinet	1	Pol		
8195	Rubber foot	4	—		
18709	Pin, securing rubber feet	4	—		
—	Baffle board, with insert nuts...	1	Std		
14922	Insert nut, for loudspeaker	3	CB		
23202	Screw, securing baffle board	6	—		
28513	Wire mesh	1	AnBz		
19273	Pin, securing wire mesh to baffle	4	—		
—	Felt for wire mesh and safety glass, 1/4-in., S1429, 225/82316	—	—		
—	Felt for wire mesh and safety glass, 1/4-in., S1459, 225/84316	—	—		
28478	Safety glass, for tube	1	—		
28477	Rubber packing, for tube	1	—		
14922	Insert nut, for tube support	2	CB		
24873	Bracket, for cabinet back	5	CdP		
8602	Screw, securing brackets	10	—		
28479A	Cabinet back	1	—		
25836	Warning transfer	1	—		
19896	Screw	4	ParB		
19895	Spring washer		ParB		
28523	Cowl, for tube	1	CdP		
8651	Screw, securing cowl	2	WN		
29026	Bolt	2	WN		
3167	Washer, S.P.		2	—	

**CONTROLS.**

20967G	Knob—" VOLUME "	1	ChF		
20967B	Knob—" TUNER "	1	ChF		
26633B	Knob—" CONTRAST "	1	ChF		
26634B	Knob—" BRIGHTNESS "	1	ChF		
27804B	Knob—" WAVE BAND "	1	ChF		
27804V	Knob—" FOCUS "	1	ChF		
26633A	Knob—" FRAMEHOLD "	1	ChF		
26634A	Knob—" LINEHOLD "	1	ChF		
24577A	Knob, for pre-set controls—Height, Width and Tone	3	—		
11805	Screw, P.K., securing wave-band and focus knobs	2	—		
19157	Screw, securing volume knob	1	WN		
11773	Screw, securing tuner, brightness and linehold knobs	3	WN		

**RADIOVISION UNIT.**

28400C	Radiovision unit	1	—		
28436A	Tuning scale	1	—		



**SPARE PARTS LIST—continued**

Part No.	Description.	Parts per Inst.	Finish	Retail List Price	Per
<b>MODEL 905</b>					
Instructions, control and radiovision unit as on Model 904.					
<b>CABINET PARTS AND FITTINGS.</b>					
905/5B	Cabinet	1	Pol		
8195	Rubber foot	4	—		
18709	Pin, securing rubber feet	4	—		
—	Baffle board, with insert nuts...	1	Std		
14922	Insert nut for loudspeaker	3	CB		
23202	Screw, securing baffle board	6	—		
28515	Wire mesh	1	AnBz		
19273	Pin, securing wire mesh to baffle	4	—		
—	Felt, for wire mesh and safety glass, 1/4-in., S1429, 225/82316	—	—		
—	Felt, for wire mesh and safety glass, 1/4-in., S1459, 225/84316	—	—		
28485	Safety glass for tube	1	—		
28484	Rubber packing, for tube	1	—		
14922	Insert nut, for tube support	2	CB		
24873	Bracket, for cabinet back	5	CdP		
8602	Screw, securing brackets	10	—		
28486B	Cabinet back	1	—		
25836	Warning transfer	1	—		
19896	Screw } securing cabinet back	5	ParB		
19895	Spring washer }	5	—		
28528	Cowl, for tube	1	CdP		
14725	Screw } securing cowl and tube	2	WN		
3167	Washer, S.P. }	2	—		

**" FINISH " CODE.**

AcD	...	...	Acid Dip.	ParB	...	...	Parkerised Black.
AlSp	...	...	Aluminium Spray.	Pol	...	...	Polished.
AnBr	...	...	Antique Brass.	SP...	...	...	Silver Plate.
AnBz	...	...	Antique Bronze.	Std	...	...	Standard.
BEn	...	...	Black Enamel.	SynBEn	...	...	Synthetic Black Enamel.
BME	...	...	Black Matt Enamel.	SynCrmEn	...	...	Synthetic Cream Enamel.
BzP	...	...	Bronze Polished.	WEn	...	...	White Enamel.
CB	...	...	Camera Black.	WN	...	...	White Nickel.
CdP	...	...	Cadmium Plated.	WSp	...	...	White Spray.
ChF	...	...	Chrome Filled.				

In order to expedite delivery of spare part orders, please quote:—

1. Model number and serial number.
2. Spare part number and description, as given above.
3. Quantity required.

Unless full particulars are quoted delay in execution of orders must inevitably result.

Order spare parts from:—

E.M.I. SALES AND SERVICE, LTD.,  
 SPARE PARTS DIVISION,  
 SHERATON WORKS,  
 WADSWORTH ROAD,  
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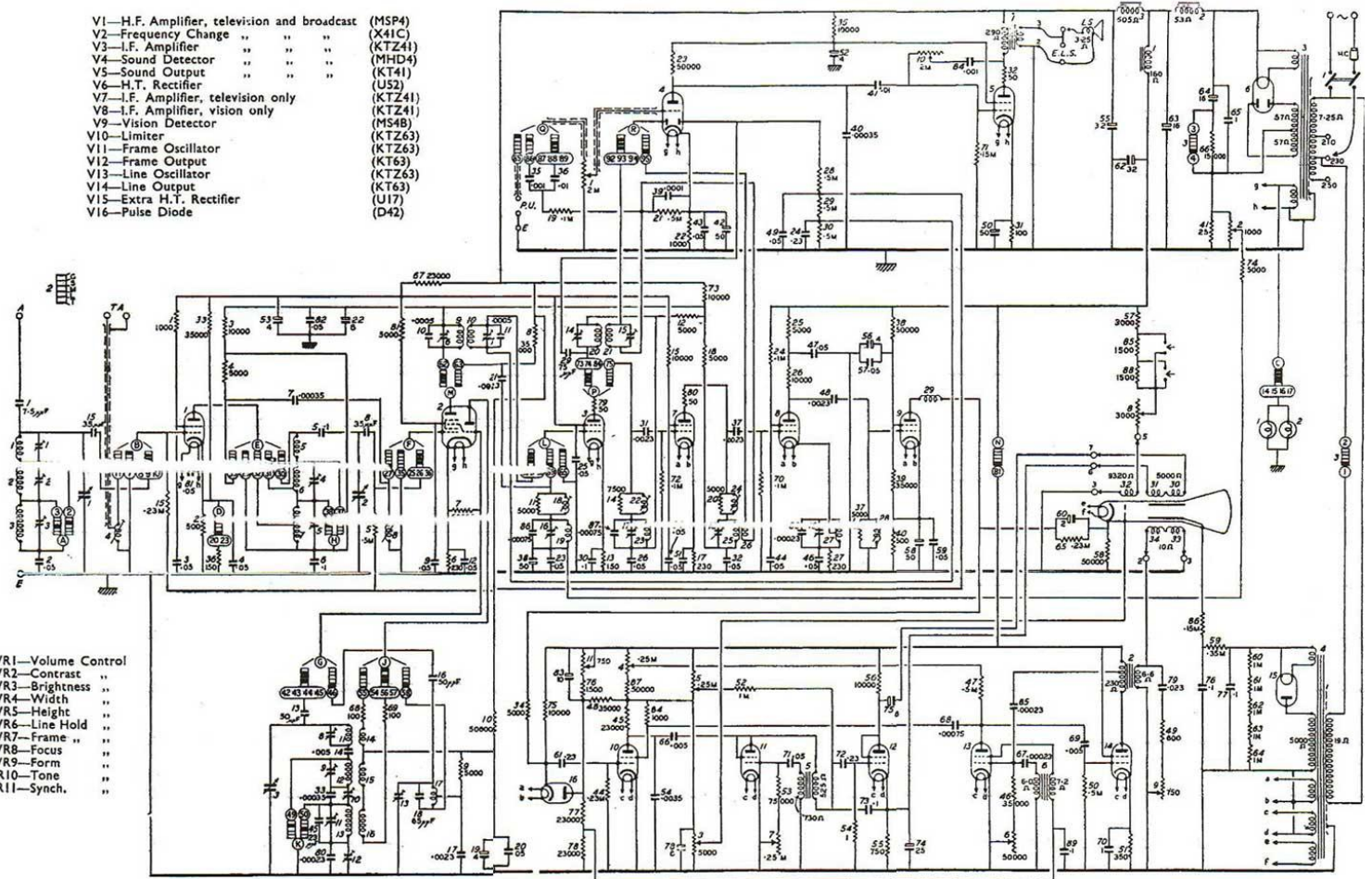
Telegraphic Address : Emiservice, Greenford, Middlesex.

The Company reserves the right to make any modification without notice.

NOTE: To accommodate variations in the magnetic flux of the focus coil it may be necessary to vary the value of R57. Values of 2,500, 3,500, or 5,000 ohms (2 watt) may be used. Do not alter resistance until both positions of the focus adjustment have been tried. It is important that correct focus can be obtained in the first third of the rotation of the "Focus" control (from minimum).

- V1—H.F. Amplifier, television and broadcast (MSP4)
- V2—Frequency Change " " " (X41C)
- V3—I.F. Amplifier " " " (KTZ41)
- V4—Sound Detector " " " (MHD4)
- V5—Sound Output " " " (KT41)
- V6—H.T. Rectifier (U52)
- V7—I.F. Amplifier, television only (KTZ41)
- V8—I.F. Amplifier, vision only (KTZ41)
- V9—Vision Detector (MS4B)
- V10—Limiter (KTZ63)
- V11—Frame Oscillator (KTZ63)
- V12—Frame Output (KT63)
- V13—Line Oscillator (KT63)
- V14—Line Output (KT63)
- V15—Extra H.T. Rectifier (U17)
- V16—Pulse Diode (D42)

- VR1—Volume Control
- VR2—Contrast " "
- VR3—Brightness " "
- VR4—Width " "
- VR5—Height " "
- VR6—Line Hold " "
- VR7—Frame " "
- VR8—Focus " "
- VR9—Form " "
- VR10—Tone " "
- VR11—Synch. " "



NOTE: C14 may be made up of two condensers.