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For Trade Use Only

"HIS MASTER'S VOICE"

SERVICE MANUAL

for

TELEVISION RECEIVER

CHASSIS TYPE M1

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THE GRAMOPHONE COMPANY LIMITED
(Incorporated in England)
2 PARRAMATTA ROAD, HOMEBUSH, N.S.W.

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Part No. 682-7731

TV RECEIVER — CHASSIS TYPE M1

SPECIFICATION

POWER SUPPLY:

200, 230, 240V. A.C., 50 cycles per second.

CARRIER FREQUENCIES:

Channel	*Vision Carrier*	*Sound Carrier*
1.	50.25 mc/s	55.75 mc/s
2.	64.25	69.75
3.	86.25	91.75
4.	133.25	138.75
5.	140.25	145.75
6.	175.25	180.75
7.	182.25	187.75
8.	189.25	194.75
9.	196.25	201.75
10.	210.25	215.75

CONSUMPTION:

180 Watts.

AERIAL INPUT:

Provision for 300 ohm balanced twin feeder.

INTERMEDIATE FREQUENCIES:

Vision I.F. — Carrier ..... 36.0 mc/s.
Sound I.F. — Carrier ..... 30.5 mc/s.

FUSE TYPES:

Mains — 1 amp.
H.T.1 — 1.5 amp.
H.T.2 — 250 mA.

VALVE COMPLEMENT

V1	6ES8	R.F. Amplifier
V2	6BL8	Frequency Changer
V3	6BY7	1st IF Amplifier
V4	6BX6	2nd IF Amplifier
V5	6BX6	3rd IF Amplifier
V6	6DX8	Video Amplifier and Blocking Oscillator
V7	6CS6	Noise Gated Sync. Separator
V8	6U8	Limiter and Gated A.G.C.
V9	6BM8	Audio Amplifier and Audio Output.
V10	6CW5	Vertical Output
V11	12AU7	Horizontal Multivibrator
V12	6CM5	Horizontal Output
V13	6AL3	Damping Diode
V14	1S2	E.H.T. Rectifier
MR1	0A90	Vision Detector
MR2	0A210	Mains Rectifier
MR3	0A210	Mains Rectifier
MR4	0A79	Ratio Detector
MR5	0A79	Ratio Detector
MR6	0A81	Phase Discriminator
MR7	0A81	Phase Discriminator
MR8	M3	Clamping Diode
C.R.T.		AW53-88 Picture Tube or 21DAP4 Picture Tube

CAUTION

The normal B+ voltages in this receiver are dangerous. Use extreme caution when servicing this receiver. The high voltage at the picture tube anode (16,000 volts) will give an unpleasant shock but does not supply enough current to give a fatal burn or shock. However, secondary human reactions to otherwise harmless shocks have been known to cause injury.

Always discharge the picture tube anode to the chassis before handling the tube.

The picture tube is highly evacuated and if broken it will violently expel glass fragments. When handling the picture tube, always wear goggles.

SUMMARY OF FEATURES

Fourteen valves and eight metal rectifiers. 110° aluminised electrostatic focus picture tube. Laminated, tinted safety glass screen for maximum protection against implosion and to reduce reflections.

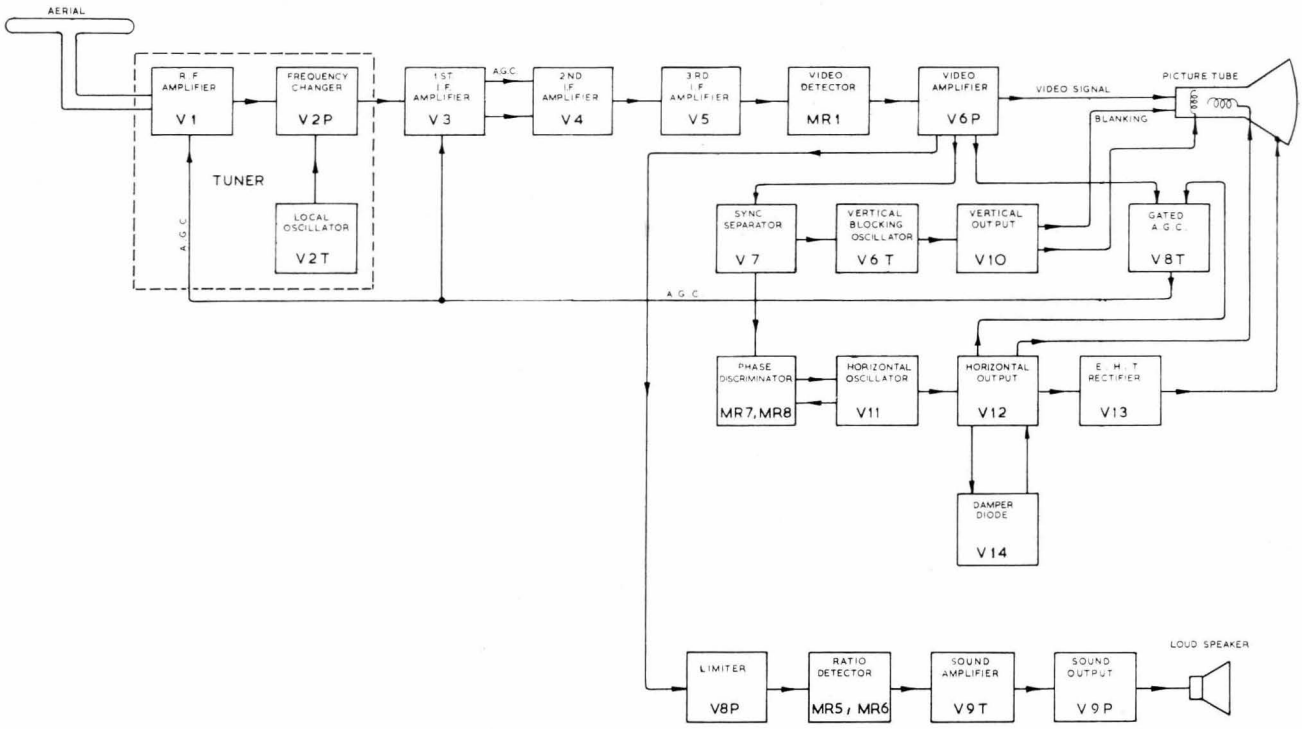


FIG. 1

CIRCUIT FEATURES

1. Turret tuner has facilities for individual exact alignment of oscillator on each channel through the front of the receiver.

2. The three-stage I.F. Amplifier gives high sensitivity consistent with wide bandwidth and good definition.

3. Linear phase treatment of the I.F. response ensures best possible definition with freedom from overshoots or smearing, allowing non-critical fine tuning control.

4. The overall frequency response of the system is within 6 db from DC up to 4.7 megacycles per second.

5. DC coupling from the video detector through to the picture tube ensures that a true black is retained and that all shades retain their true relationship to black. This prevents fading to grey instead of down to black, and gives accurate portrayal of night-time scenes.

6. Time-gated A.G.C. gives immunity from the effects of impulse noise and has fast action to cope with rapid fading from "aircraft flutter." A variable delay on the tuner is provided to maintain full R.F. gain on weak to moderate signals, thus minimising frequency converter noise. This delay can be adjusted for best results when the receiver is first installed.

7. A noise-gated sync. separator is employed, giving protection to synchronising in the presence of impulse interference.

8. A ratio detector, preceded by limiter, is used in the F.M. sound section to ensure that impulse noise and intercarrier "buzz" are eliminated even in low signal areas and during severe interference.

9. The sound amplifier with ample feedback gives excellent quality sound with ample power. A compensated volume control maintains tonal balance at all volume settings.

10. The Vertical Deflection Amplifier has current feedback to maintain consistent deflection current in coils rather than constant voltage across them. As a result, the height does not shrink as the deflection coils warm up and their resistance increases. This transformer method of feedback gives excellent interlace.

11. The Horizontal Hold circuit is a multivibrator employing a stabilising coil in the oscillator anode circuit and this, together with the cathode coupling employed, gives a stable oscillator virtually unaffected by large H.T. variations. This stability, together with a good pull-in range, render a front Horizontal Hold control unnecessary and a preset control is provided on the back of the receiver.

12. The Horizontal Deflection circuit uses a linearity control which can be adjusted for an indication on a multimeter. This has the advantage that it can be adjusted in the absence of a transmitted test pattern.

13. Vertical Flyback Blanking eliminates any vertical retrace lines.

14. A minimum number of controls necessary for operation are provided.

15. Dustproof seal around picture tube to eliminate dust which is otherwise attracted to the picture tube by static charge.

16. THERMISTOR PROTECTION is provided to guard against high tension surge when switching on.

17. Silicon Junction Diodes are used in a voltage doubler full-wave power supply. These diodes are noted for their robustness, economy of wasted heater power and high surge rating. Since they have no heated cathode, they cannot be damaged by operation on low mains input, as is the case with a valve rectifier.

18. Transformer coupled focussing of the picture is employed to give good overall edge-to-edge focus of the raster. A true focus is maintained right into the corners of the C.R.T.

19. A hinged, vertical chassis, giving ease of service to the whole of the receiver, has been incorporated in this model. Any repair or replacement can now be made without removing the chassis from its cabinet, thus saving valuable service time and enabling the serviceman to make almost any repair in the home. It is also possible to withdraw the receiver from the cabinet and it is then still a complete working unit and can be operated as such on the workshop bench.

20. A REMOTE CONTROL facility is provided whereby sound volume and picture contrast can be controlled at distances up to 25 feet from the receiver.

CIRCUIT DESCRIPTION

R.F. INPUT

The input to the turret tuner is to a centre tapped transformer which presents an impedance of 300 ohms.

R.F. amplification is achieved with a type 6ES8, double triode (V1), in a cascode circuit. The two sections of this stage are connected in series for DC. The grounded cathode input section is neutralized and is also controllable by A.G.C. from the mains chassis. Because of the series DC connection of the two portions, A.G.C. voltage to one section also effects control on the other section.

Coupling between the two sections of the cascode is direct and the coil between the two maintains amplification on the high frequency channels.

Inductive coupling is used between the cascode and mixer. V2, a type 6BL8, combined triode-pentode, is used as oscillator and mixer. The oscillator is a Colpitts circuit operating above signal frequency. Injection to the mixer input is by inductive coupling. The fine tuning capacitor is capacitively coupled to the oscillator coil by a contact lug on the coil former. Adjustment on each channel is provided by means of a screwed slug in each oscillator coil, this slug being accessible through a hole in the front plate of the tuner when the fine tuning capacitor is in an approximate mid-position.

The fine tuning capacitor takes the form of a specially-shaped ceramic wafer which turns between two fixed metal plates.

The intermediate frequency output of the tuner (vision 36.0 Mc/s, sound 30.5 Mc/s) is coupled to the I.F. channel of the main chassis through a secondary winding on the I.F. coil L7.

The heater circuit is filtered by a Ferroxcube bead through which a heater wire is passed. The bead concentrates the field around the wire, increasing its self-inductance so that it acts as a choke.

I.F. AMPLIFIER

The tuner I.F. output is coupled to the grid of the first I.F. Amplifier V3 and tuned by coil L9 with stray capacities. There are three I.F. amplifying stages, the first two are "stacked" as far as DC is concerned, i.e., they operate in series with V4 above V3. This does not influence their R.F. operation in any way but does save H.T. current. A.G.C. voltage applied to V3 also controls V4, since the same current flows through both valves.

V5 is coupled to the video detector MR1 by inductive coupling.

Trap circuits L11, L12 and L15 are coupled to the I.F. coils L10, IFT1 and IFT2. The first attenuates the sound carrier 30.5 Mc/s., the second attenuates the adjacent vision carrier 29.0 Mc/s., and the third attenuates the adjacent sound carrier 37.5 Mc/s.

V3 and V4 have small unbypassed cathode resistors R15 and R21 to minimise detuning of their grid circuits when A.G.C. bias is applied.

VIDEO AMPLIFIER

The detected video output of the germanium diode MR1 is amplified in the pentode section of V6. L20, L21 and L22 are peaking chokes which maintain the high frequency components of the vision signal fed to the picture tubes. The 5.5 Mc/s component is removed by the combined transformer and trap, IFT4.

INTERCARRIER SOUND

The frequency modulated 5.5 Mc/s component is taken from the Video Amplifier anode via the transformer IFT4 to the Limiter grid. A short time constant in this grid gives improved impulse noise operation of this Limiter.

Output from the limiter is demodulated by the ratio detector, MR5, MR6, to provide the audio signal which passes through the volume control to be amplified in the driver triode and output pentode sections of V9. Feedback is applied via both triode and pentode cathodes.

A margin of sound gain is provided so that the full 2 watts output is obtained from sound signals which are not fully modulated. Moreover, the sound output stage has a controlled overload characteristic which enables that, when overdriven, it does not "paralyse" but merely clips the peaks and so remains comparatively free from audible distortion.

SYNC. SEPARATOR

A combined Horizontal and Vertical sync. separator including noise gating is employed (V7). Video signal with sync. tips positive is applied to the control grid, G3, from the Video Amplifier anode. At the same time, video signal with sync. tips negative is applied at the noise grating grid, G1, from the Video Amplifier grid. Grid leak bias on this valve ensures that it will only conduct on sync. tips and consequently no picture information will appear on its output. The video signal at its noise gating grid is fed via the potentiometer R41, R42, and is so arranged that the negative excursion of the signal will not affect the current through the sync. separator. However, when a noise pulse, which will sit more negative than the sync. tips occurs, then the current through the valve is cut off and the anode voltage will rise to H.T. Suitable time constants in the grid of the sync. separator (G3) prevent blocking of the grid immediately following strong noise pulses so that synchronising signals are restored immediately following the cutting off of the valve by the gating grid.

GATED A.G.C.

Video signals with sync. tips positive are fed from the Video Amplifier anode to the grid of the A.G.C. valve (V8 triode section) and the valve is biased so that it will only conduct on sync. tips. During line flyback, a positive pulse is applied to its anode via C46, and the valve will conduct when this pulse at its anode and a sync. tip at its grid coincide. The valve cannot, therefore, conduct in the period between sync. pulses and is thus immune to noise pulses appearing in the period between sync. pulses.

The current through the valve will depend on the height of the sync. pulses at its grid and the height of these sync. pulses is adjusted by the contrast control. The cathode of the A.G.C. valve is held at about 50 volts and is set by the divider network R58, RV3, RV4, R59. C48 smoothes the voltage at the cathode. Operation of the slider of RV3, the Contrast Control, will vary the bias applied to the grid of the A.G.C. valve and so increase or decrease the height of sync. tips in respect to the fixed cathode volts. Increasing the height of the sync. tips will cause the valve to conduct harder and will produce more A.G.C. volts, reducing the gain of the receiver and decreasing the voltage available to drive the C.R.T. cathode. Decreasing the height of sync. tips will reduce the conduction of the A.G.C. valve, thus producing less A.G.C. volts, increase the gain of the receiver and increase the volts available to drive the C.R.T. cathode. Increasing the height of the sync. tips therefore reduces the contrast, and decreasing the height of the sync. tips will increase the contrast.

The voltage developed at the anode of the A.G.C. valve is applied across the divider R52, RV2, and the divider R49, R50 and R51. The clamping diode, MR3, is connected across R51, R52 and RV2, and then earthed. The ratio of Tuner A.G.C. voltage to I.F. A.G.C. voltage is important and the ratio can be adjusted by means of RV2. If the ratio is too small then, even on large signals, the tuner will be biased back and the I.F. amplifier will be operating at an unnecessarily large gain and converter noise will be evident in the picture. If the ratio is too large, then no controlling bias will be applied to the tuner and it will be held at the clamping voltage and all control will be made in the I.F. amplifiers. This can cause severe overloading of the I.F. amplifier. It is essential that the A.G.C. control be adjusted for optimum operation when the set is initially installed.

VERTICAL DEFLECTION CIRCUITS

Vertical sync. pulses from the sync. separator fed via the integrator are used to synchronise the blocking oscillator comprised of transformer T3 and triode portion of V6. "Height" is varied by adjustment of the D.C. potential fed to the blocking oscillator anode and "Vertical Hold" is adjusted by varying the time constant of the blocking oscillator grid circuit. The Vertical Hold control RV7 is returned to the slider of the Height Control potentiometer RV6 so that the blocking oscillator frequency is unaffected when Height is adjusted. This makes the Vertical Hold almost independent of Height Adjustment.

The pentode V10 is the vertical output stage. The sawtooth waveform from the blocking oscillator is applied to the grid of the output amplifier and a sawtooth current waveform appears in the vertical output transformer, T4.

A feedback voltage is developed across R92, R93 from the current in the deflection coils. This voltage is stepped up to the input grid of the frame output valve. A potentiometer, RV8, is provided for adjustment of linearity.

HORIZONTAL OSCILLATOR AND AUTOMATIC PHASE CONTROL

Automatic frequency and phase control is obtained by means of a DC controlled, cathode coupled, stabilised multivibrator controlled by a germanium diode phase discriminator.

Sync. pulses from the sync. separator are fed into the centre of the discriminator and a sawtooth waveform from the multivibrator output is fed across the diode loads, R94, R95.

Since the negative going sync. pulse is fed to the diode cathodes and the diodes are effectively in parallel, then the discriminator output will be zero volts. The sawtooth is not of sufficient amplitude to cause the diodes to conduct, due to the bias caused by the coupling capacitor C77, so that the DC component of the sawtooth (average AC) is zero volts. Neither the sawtooth nor the sync. pulses can cause a bias voltage to be developed across the discriminator but that part of the sawtooth that occurs at the instant of the sync. pulses will have an affect on the bias voltage produced. If the sync. pulse occurs in the centre of the sawtooth, then the output is zero volts, and if it occurs before the retrace passes through its AC axis then the oscillator is running slow and the output voltage will be negative. The reverse will be the case if the oscillator is running fast.

The frequency of the Horizontal Multivibrator, V11, is controlled by the DC output of the discriminator. If the output voltage of the discriminator is positive it causes the cathode voltage to rise, lengthening the discharge time of the coupling capacitor to the second triode and slows down the firing rate of the multivibrator. A negative output from the discriminator will have the reverse effect. Shaping of the drive waveform to the Horizontal Amplifier is effected by the anode load R102, R103, C85, C86 and the grid leak R104.

HORIZONTAL DEFLECTION CIRCUITS

The horizontal driver valve produces a negative pulse output which is timed to cut off the horizontal output valve V12 at end of a scan. When V12 is cut off sharply, the magnetic field that has been established in the horizontal output transformer during the scan collapses and the oscillatory circuit comprised of the transformer inductance and stray capacitances tends to "ring." However, after one-half cycle of oscillation the damping diode V14 starts to conduct. During the "flyback" time the magnetic energy has established itself in the reverse direction, and the picture tube spot has returned to the left-hand side of the screen.

When the damping diode conducts it permits current to flow at a controlled rate through part of the transformer. This current, passed by the auto-transformer into the deflection coils, forms the initial part of the horizontal scan. As the damper ceases to conduct the line output valve takes over and supplies the necessary current to complete the scan, at which point a further negative pulse on the grid of V12 starts the cycle over again.

During flyback a high voltage pulse is produced at the anode of the E.H.T. rectifier V13, which is peak-rectified and then smoothed by the capacitance between inner and outer bulb coatings of the picture tube, and supplies E.H.T. of approximately 16,000 volts.

Energy recovered by the damping diode produces a boosted H.T. voltage of 650 volts which is divided down to 400 volts for supplying the G2 electrode voltage of the picture tube.

T7 is the focus transformer. The sawtooth scanning current in its primary produces, in the secondary, a large parabolic voltage waveform which is fed direct to the focus electrode of the C.R.T. and the cold end of the secondary is connected to a suitable voltage to give good overall focus.

REMOTE CONTROL

By plugging into socket SKT2 the five-pin socket in the rear of the chassis, volume and contrast can be controlled from the Remote Control Unit.

The remote volume control RV5A adds a variable resistance across the supply voltage of the sound limiter. Since this control can only *reduce* volume, the main volume control should be set for the maximum volume desired.

The remote contrast control RV3A feeds a variable DC voltage into the contrast control chain R53, R54. It varies contrast either side of a middle (normal) value which is set by the main contrast control.

Note that connection of the Remote Control Unit does not affect operation of the normal receiver volume and contrast controls.

A facility is provided on the socket for use of a remote hearing aid.

INSTALLATION

The receiver is shipped from the factory with the picture tube installed and all controls pre-adjusted for normal operation. It should only be necessary to ensure that the mains tapping is correctly adjusted for the mains voltage existing in the particular area and a suitable aerial connected to the aerial input terminals. In very strong signal areas it may be necessary to use an attenuator in the aerial lead to avoid overloading the receiver. The various operating controls should be checked for proper operation, and their use demonstrated to the purchaser as described in the installation manual. It is necessary to remove the back of the cabinet to gain access to the mains adjustment.

PICTURE SHIFT

Small shifts in position of picture may occur due to the effect of the earth's magnetic field in different locations. The picture may be re-centred by rotating the two shift magnets on the tube neck behind the deflection yoke.

Rotate the centring magnet assembly to shift the picture in the required direction, and move one of the magnets with respect to the other to change the strength of the field and hence the amount of picture shift.

PICTURE TILT

If the picture is not square with the edges of the mask, the deflection coils should be rotated until the picture is squared up. It may be necessary after this operation to centre the picture by means of the shift magnets.

A.G.C.

The A.G.C. control should be adjusted when the receiver is installed. The procedure is to turn the control to the maximum anti-clockwise position, then observing the picture, advance the control until the noise or "snow" in the picture is no longer reduced. The receiver should then be checked on all channels to ensure that no overloading is evident, which may be due to the control being adjusted too far in a clockwise position, and that the minimum noise condition has been achieved for all signals.

FUSES

Three fuses are provided, one in the mains circuit and two in the H.T. circuits. Ensure that they are replaced with similar types.

SERVICING

The vertical chassis of this receiver has been especially designed to make servicing as easy as possible. All valves, test points and major components are accessible to the serviceman when the cabinet back is removed. All other components may be serviced by swinging the chassis out so that all of the receiver is accessible.

To do this, remove the E.H.T. lead from the plastic strap under the top of the cabinet; slacken off the screws on the right-hand side of the chassis and remove the clamp. Note that one of these screws is intended as a factory transit screw only, and need not necessarily be replaced. Remove the screw from under mains transformer. This is also a transit screw and need not necessarily be replaced. The chassis, pivoting about the left-hand side, may be swung out to an angle of approximately forty degrees.

In order to swing it out further than this, disconnect the yoke and E.H.T. anode lead.

To secure the chassis, reconnect any disconnected leads and replace the screw below the power transformer before the retaining clamp and its screws are replaced.

If the repair or replacement cannot be made without removing the chassis from the cabinet, the receiver can be withdrawn as a complete working unit and can be operated as such on the workshop bench.

DISMANTLING

REMOVAL OF CHASSIS ASSEMBLY

Remove the bottom screws securing the back cover of the receiver to the cabinet. Ease the back cover down until the top edge is free of the cabinet groove. Withdraw the cover straight back over the picture tube neck.

WARNING: Be careful not to drop the cover on to the neck of the picture tube when the bottom screws are removed.

Pull off the four small knobs from the front of the receiver. Undo the grub screw and remove the brass collar on the contrast spindle. Set the Channel Selector knob to channel 5. Flex the black plastic cover back with a screwdriver at the channel 7 position. Undo the securing screw at this position and pull off both the Channel Selector and the Fine Tuning knobs.

Remove two bolts that secure the base board to the cabinet shelf.

Remove two bolts that secure the top of the picture tube clamp bracket to the cabinet.

Slacken off two screws on the antenna bracket. Slide the bracket towards the rear of the cabinet in its guide grooves and remove the bracket from the cabinet.

The chassis and picture tube may then be withdrawn from the cabinet.

REMOVAL OF DEFLECTION YOKE

First remove the picture tube socket. Loosen the clamp fixing screw. Remove the yoke plug from the back of the E.H.T. cage and slide the yoke from the picture tube neck.

REPLACEMENT OF DEFLECTION YOKE

Carefully slide the yoke over the neck of the picture tube. Rotate the yoke so that the fixing screw on the band around the yoke assembly is at the top, and push the yoke firmly against the flare of the picture tube. Do not tighten the retaining screw at the back of the yoke assembly until the set is operating and the picture is squared up.

REMOVAL OF PICTURE TUBE

Having removed the chassis and picture tube assembly, remove the spring which rests against the aquadag coating on the rear of the picture tube. Undo the top and bottom screws that secure the clamping ring to the picture tube.

Lift the tube out carefully by supporting it around the mounting ring.

N.B.: The picture tube should be carefully handled and never placed face down on a bench. Always ensure that it is placed on a soft, clean surface, such as felt, so that the face does not become scratched. Whenever possible, keep tubes in the original manufacturer's carton.

REPLACEMENT OF CHASSIS ASSEMBLY

First clean the tube face and the inside surface of the protective screen. Replace the rubber dust sealing ring around the picture tube face. Slide the chassis into the cabinet, ensuring that the spindles of the front controls locate in their holes. Push the chassis forward until the picture tube seats against the mask, replace the two screws securing the picture tube clamp bracket to the front of the cabinet and the two screws that secure the chassis base board to the shelf.

Replace the antenna bracket over its two screws, slide the bracket forward along its slots and tighten the two screws.

Replace the brass collar on the Contrast spindle and tighten the gub screw with the collar sitting free of the cabinet.

Push on the four small control knobs.

Replace the Fine Tuning knob. Set the Channel Selector knob to channel five. Flex the black plastic cover back with a screwdriver and tighten the securing screw at the channel seven position.

Replace the cabinet back panel and secure the two bottom screws.

ADJUSTMENTS

HORIZONTAL LINEARITY

A typical multimeter employing a 100 ohm 1 mA full scale deflection meter, when on 100 mA range, has a total resistance of 1 ohm. If such a meter is connected between V12 pin 8 and earth it will indicate half the current flowing in the cathode of V12.

The Horizontal Linearity control should be adjusted to reduce the current in V12 to a minimum.

HORIZONTAL HOLD

Disconnect sync. pulses by removing V7, the sync. separator valve, and adjust the "Horizontal" Hold Control until the picture just "floats" or locks weakly, then replace V7.

If any adjustment has been made to L23 or if C81 or R97 has been replaced, remove V7 as above, shortcircuit L23 and adjust the Horizontal Hold control for a weak, or floating, lock. Remove short across L23 and adjust core of L23 for a weak or floating lock. Replace V7.

CONTRAST RANGE

Turn Contrast control to its maximum clockwise position and adjust RV4 to give sync. tips at the video amplifier anode at + 190 volts read on a DC coupled oscilloscope.

VISION I.F. ALIGNMENT

GENERAL NOTES

To align the vision I.F., a sweep generator and a marker generator, both covering the range 28.5 to 38.5 Mc/s are required, together with a display unit. The marker generator may be a signal generator and the display unit a C.R.O. These instruments should be inter-connected as described in the instructions supplied with the sweep generator. The sweep generator should be terminated with a resistor equal to its output impedance and connected to the receiver as suggested in Fig. 2.

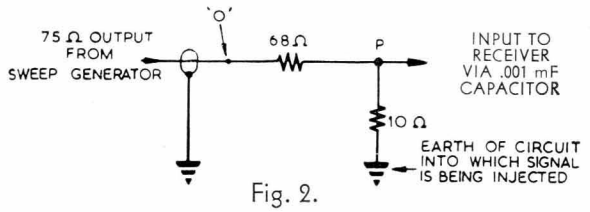


Fig. 2.

If there is inadequate output from this arrangement, the point "O" may be connected to the receiver instead of the point "P."

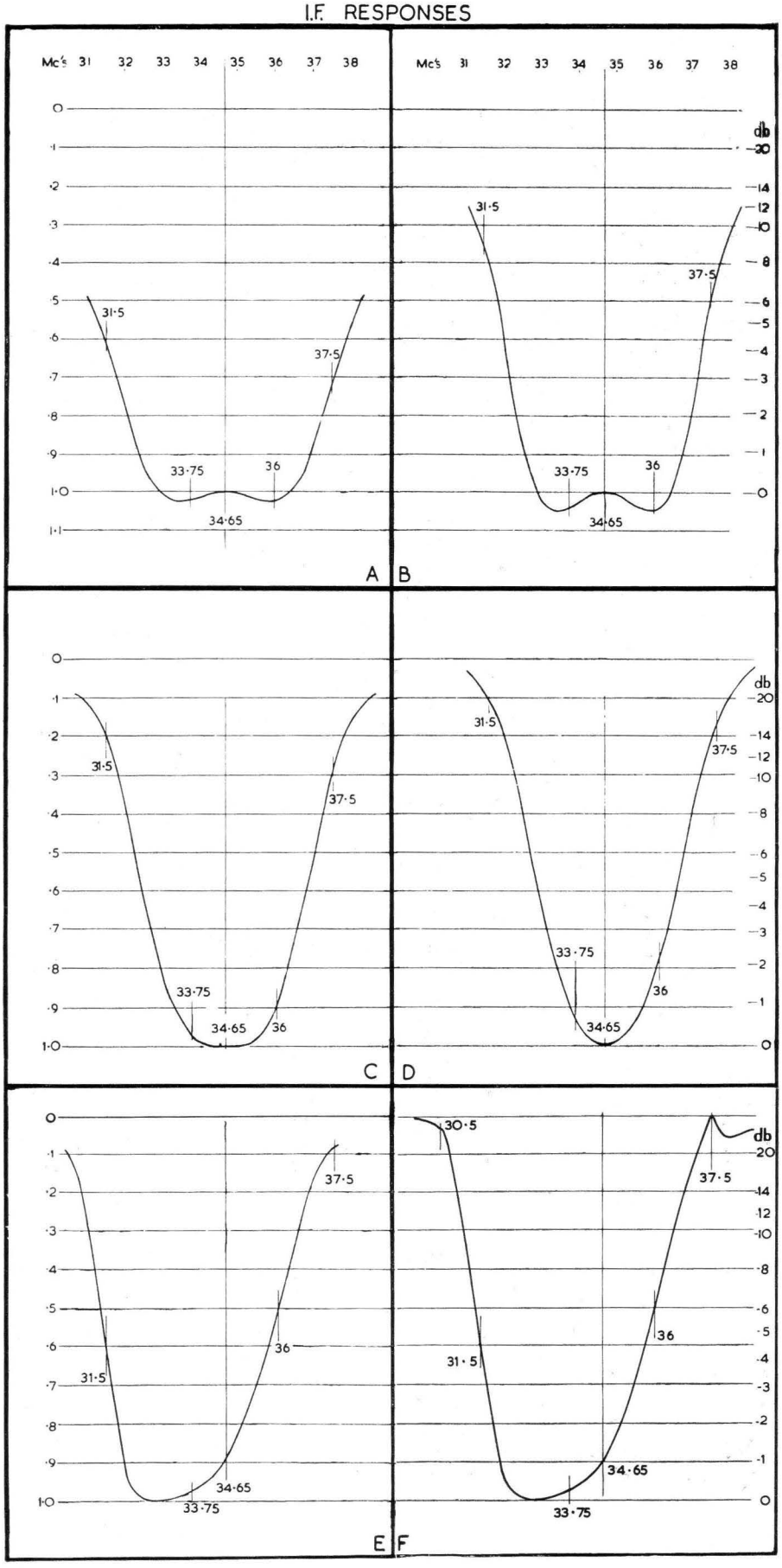
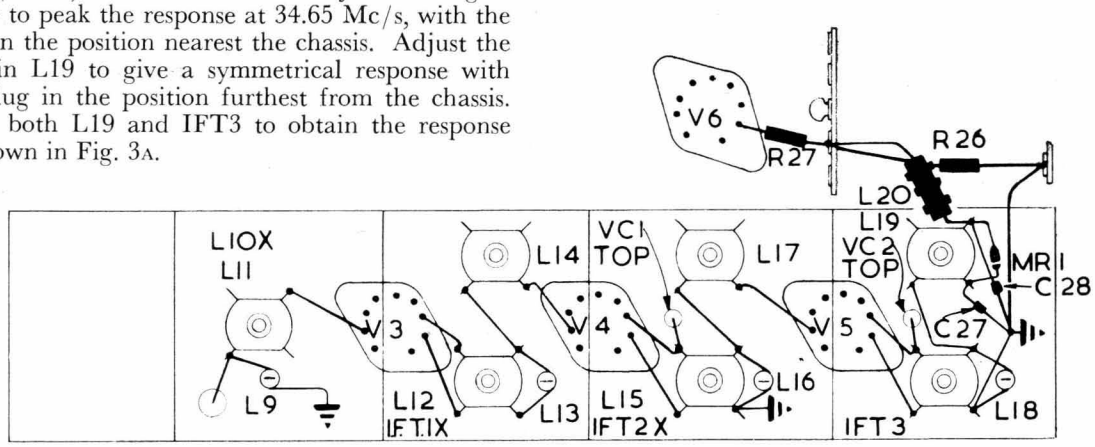


Fig. 3 — Oscilloscope Patterns obtained with Sweep Oscillator Input.

Before commencing alignment, remove the slugs from L11, L12 and L15 and wind the slugs in IFT1 and IFT2 so that they are set flush with the chassis. Turn the two trimmers VC1 and VC2 so they are at their minimum capacity position (i.e., $\frac{1}{16}''$ of the thread should be visible above the chassis). Connect a —6V. bias across C44. Connect the input to the display unit between the junction of L20 and R26, and earth. Throughout the alignment, the display unit should be adjusted to present a reasonable amplitude display from a signal 2.5V. peak to peak, and the output from the I.F. strip should be maintained at that level by varying the output from the sweep generator.

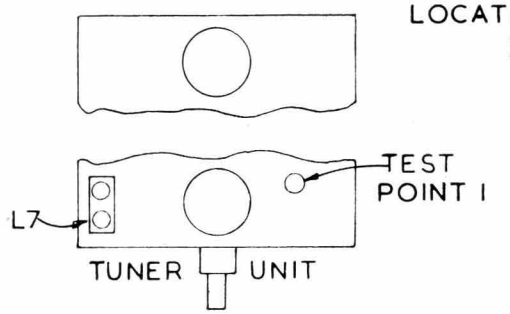
ALIGNMENT

(1) Connect the sweep output between the grid (Pin 2) of V5 and earth. Adjust the slug of IFT3 to peak the response at 34.65 Mc/s, with the slug in the position nearest the chassis. Adjust the slug in L19 to give a symmetrical response with the slug in the position furthest from the chassis. Vary both L19 and IFT3 to obtain the response as shown in Fig. 3A.



LOCATION OF COILS FROM UNDERSIDE OF CHASSIS
X INDICATES COIL NEAREST CHASSIS

Fig. 4.



(2) Remove the sweep generator from V5 and connect it to the grid of V4 (Pin 2). Peak the response at 34.65 Mc/s with the slug of IFT2 in the position nearest the chassis. Adjust the slug of L17 to give a symmetrical response with the slug in the position furthest from the chassis. Using both L17 and IFT2, obtain the response as shown in Fig. 3B.

(3) Remove the sweep generator from V4 and connect it to the grid of V3 (Pin 2). With IFT1 peak the response at 34.65 Mc/s making sure that the slug is in the position closest to the chassis. Adjust L14 for a symmetrical response with the slug in the position furthest from the chassis. Use both IFT1 and L14 to obtain the response as shown in Fig. 3C.

(4) Remove the sweep generator from V3 and connect it to test point *1* on the tuner (adjacent to V2). Switch the tuner to position 12. Adjust the slug in L7 to give the maximum response at 34.65 Mc/s. Adjust the slug in L10 to the position nearest the chassis which peaks the response at 34.65 Mc/s, and then using L7 and L10, obtain the response as shown in Fig. 3D.

(5) Increase the capacity of VC1 so that the peak of the response (34.65 Mc/s marker) falls through 1.5 db on the display unit, and then increase the capacity of VC2 so that the peak of the response (34.65 Mc/s marker) falls through another 1.5 db. Vary both VC1 and VC2 to obtain 3E as closely as possible. It may also be necessary to make an alteration to the setting of L17 and L19.

(6) Insert a slug in L15 and adjust for a minimum response at 37.5 Mc/s. Insert a slug into L11 and adjust to set the 30.5 Mc/s marker in the middle of the step created by this coil. Insert a slug in L12 and adjust for minimum response at 29 Mc/s.

(7) Make any final adjustment that may be necessary to obtain the final response as shown in Fig. 3F.

Note: L9, L13, L16 and L18 are coupling coils for factory adjustment, and should not be disturbed.

SOUND I.F. ALIGNMENT

The following equipment is necessary to carry out this procedure:

(i) A C.W. Oscillator accurately tuned to 5.5 Mc/s by a crystal controlled reference.

(ii) A 20,000 ohm / volt meter (Model 8AVO or similar type).

(iii) A D.C. V.T.V.M.

(iv) A peak-to-peak detector as shown.

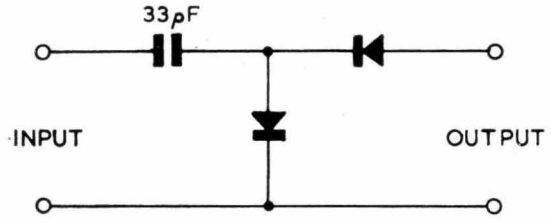


Fig. 5 — Peak-to-Peak Detector.

5.5 MC/S NULL TRAP (IFT4)

IFT4 is a combined null trap and transformer, working at 5.5 Mc/s. When tuned in the factory, both primary and secondary cores are tuned together to give a zero output at 5.5 Mc/s at the video grid, and a maximum transfer to the intercarrier amplifier. This can only be done accurately with a sweep oscillator and a suitable display having a high gain at 5.5 Mc/s. Once set, however, it should not need retuning unless quite large circuit alterations have been made.

Should it be necessary to retune IFT4, the following procedure should be adopted:

(1) Inject 5.5 Mc/s at approximately 100 mV between the junction R26 and R27 and earth (disconnecting the grid peaking choke, L20).

(2) Connect the input of the peak-to-peak detector illustrated to C.R.T. cathode, pin 7. Connect the output of the peak-to-peak detector to a 20,000 ohm/volt meter on the 50 micro-amp range.

(3) Adjust primary core of IFT4 (nearest chassis to give zero reading on meter.

If IFT4 is replaced, it is necessary to adjust both cores to give a zero reading at 5.5 Mc/s.

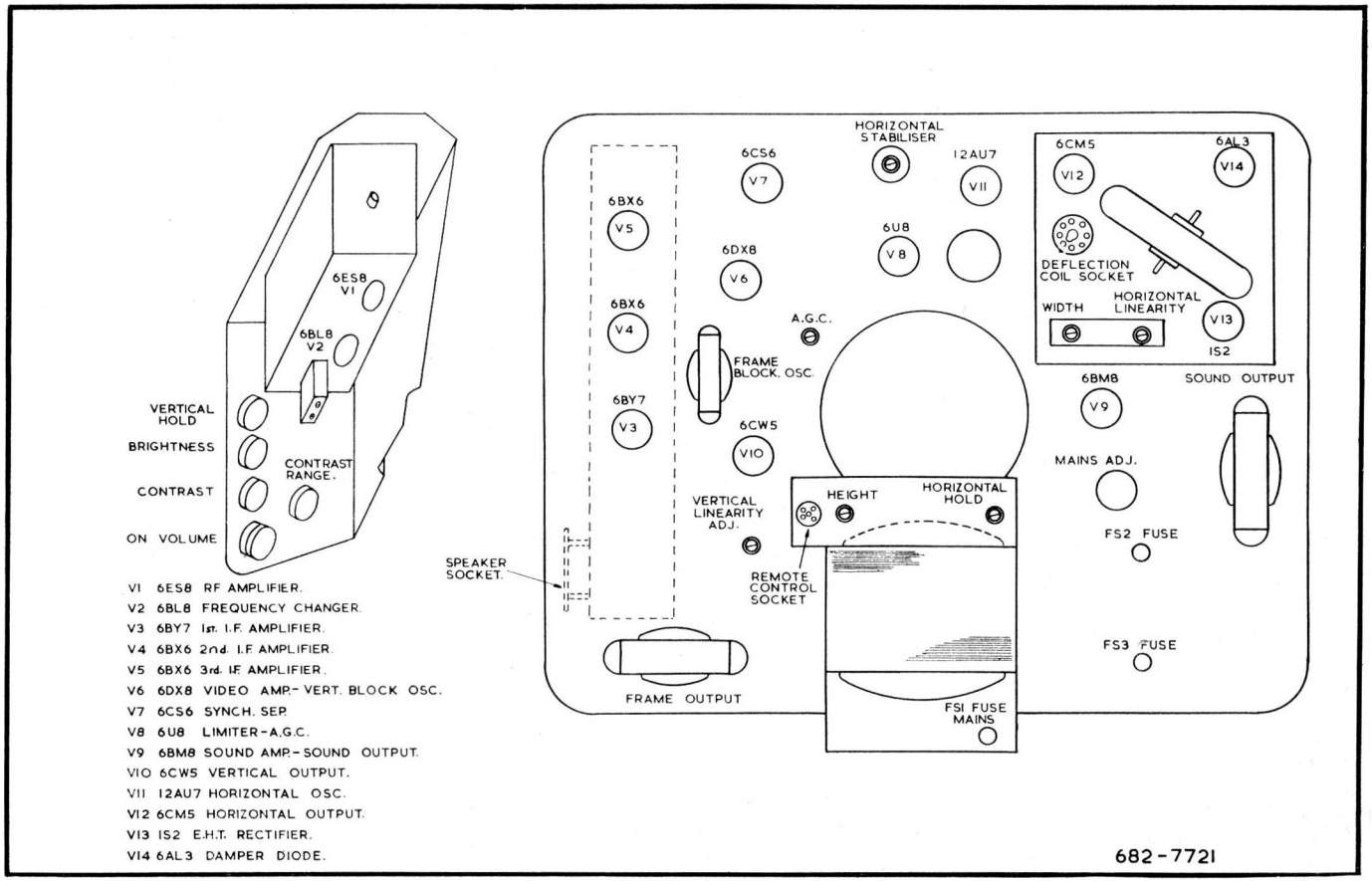
(4) Withdraw both cores from former. Screw in primary core (nearest chassis) to give a minimum reading.

(5) Screw in secondary core until meter reading rises slightly and then adjust primary core until a new minimum is obtained.

(6) Repeat adjustment of primary and secondary cores until meter reads zero.

RATIO TRANSFORMER (IFT5)

Connect oscillator as in (1) above. Adjust secondary core (nearest chassis) so that a positive or negative reading is obtained on a DC V.T.V.M. between the junction of R64 and R65 and earth. Adjust primary core (top of coil) so that this reading shows a maximum. Then adjust secondary core so that this reading is zero volts. This procedure may be used on a signal from a transmission.


6ES8
V1
6BL8
V2
VERTICAL HOLD
BRIGHTNESS
CONTRAST
CONTRAST RANGE.
ON VOLUME
HORIZONTAL STABILISER
6CS6
V7
12AU7
V11
6CM5
V12
6AL3
V14
6BX6
V5
6U8
V8
6DX8
V6
DEFLECTION COIL SOCKET
WIDTH
HORIZONTAL LINEARITY
V13
IS2
6BX6
V4
A.G.C.
FRAME BLOCK. OSC.
6BM8
V9
SOUND OUTPUT
6BY7
V3
6CW5
V10
MAINS ADJ.
HEIGHT
HORIZONTAL HOLD
VERTICAL LINEARITY ADJ.
FS2 FUSE
SPEAKER SOCKET.
REMOTE CONTROL SOCKET
FS3 FUSE
FRAME OUTPUT
FS1 FUSE MAINS
V1 6ES8 RF AMPLIFIER.
V2 6BL8 FREQUENCY CHANGER.
V3 6BY7 1st. I.F. AMPLIFIER.
V4 6BX6 2nd. I.F AMPLIFIER.
V5 6BX6 3rd. I.F. AMPLIFIER.
V6 6DX8 VIDEO AMP.- VERT. BLOCK OSC.
V7 6CS6 SYNCH. SEP.
V8 6U8 LIMITER-A.G.C.
V9 6BM8 SOUND AMP.- SOUND OUTPUT.
V10 6CW5 VERTICAL OUTPUT.
V11 12AU7 HORIZONTAL OSC.
V12 6CM5 HORIZONTAL OUTPUT.
V13 IS2 E.H.T. RECTIFIER.
V14 6AL3 DAMPER DIODE.
682-7721

PARTS LIST — CHASSIS M1

RESISTORS

Ref.	Part No.	Position	Description
R13	740-0032	V10	2.2K ohms ± 10% BTS
R14	740-0612	V11	10K ohms ± 20% BTS
R15	740-0483	V9	56 ohms ± 10% ½ Watt Morg.
R16	740-0653	W9	100 ohms ± 10% ½ Watt Morg.
R17	740-0112	W8	27K ohms ± 10% BTS
R18	740-0252	V7	1.5K ohms ± 10% BTS
R19	742-0142	W7	270K ohms ± 10% BTA
R20	742-0142	W8	270K ohms ± 10% BTA
R21	740-0483	V7	56 ohms ± 10% ½ Watt Morg.
R22	740-0273	W6	150 ohms ± 10% ½ Watt Morg.
R23	740-0052	V4	3.3K ohms ± 10% BTS
R24		W4	150 ohms—Part of CR1
R25	742-0712	W3	2.2K ohms ± 20% BTA
R26	740-0043	T2	2.7K ohms ± 10% ½ Watt Morganite
R27	740-0322	T4	1.2K ohms ± 10% BTS
R28	749-0242	T5	1.8K ohms ± 10% BTB
R29	749-0242	S5	1.8K ohms ± 10% BTB
R30	740-0773	S4	39 ohms ± 10% ½ Watt Morg.
R32	742-0162	F12	390K ohms ± 10% BTA
R33	740-0782	TB	120K ohms ± 10% BTS
R34	740-0622	R14	470K ohms ± 20% BTS
R35	740-0732	N13	12K ohms ± 10% BTS
R36	740-0272	YK	150 ohms ± 10% BTS
R37	740-0272	YK	150 ohms ± 10% BTS
R38	750-0291	D13	250 ohms ± 5% 5 Watt Wire Wound
R39	749-0141	F12	1K ohms ± 20% BTB
R40	749-0252	C11	12K ohms ± 10% BTB
R41	740-0122	S3	47K ohms ± 10% BTS
R42	740-0112	S3	27K ohms ± 10% BTS
R43	742-0772	T3	3.9 Megohm ± 10% BTA
R44	740-0862	R3	18K ohms ± 10% BTS
R45	740-0162	S2	220K ohms ± 10% BTS
R46	740-0202	S2	2.2 Megohm ± 10% BTS
R47	742-0122	P2	150K ohms ± 10% BTA
R48	749-0232	P2	27K ohms ± 10% BTB
R49	742-0772	M3	3.9 Megohm ± 10% BTA
R50	742-0772	L4	3.9 Megohm ± 10% BTA
R51	740-0312	L5	1.2 Megohm ± 10% BTS
R52	740-0722	N5	1.5 Megohm ± 10% BTS
R53	740-0782	N4	120K ohms ± 10% BTS
R54	740-0702	N4	56K ohms ± 10% BTS
R55	740-0162	M12	220K ohms ± 10% BTS
R56	742-0982	M3	1.2 Megohm ± 10% BTA
R57	740-0782	N3	120K ohms ± 10% BTS
R58	742-0082	N3	39K ohms ± 10% BTA
R59	740-0082	TB	10K ohms ± 10% BTS
R60	740-0122	N4	47K ohms ± 10% BTS
R61	749-0052	L12	47K ohms ± 20% BTB
R62	740-0032	L3	2.2K ohms ± 10% BTS
R63	740-0102	J4	22K ohms ± 10% BTS
R64	740-0112	J4	27K ohms ± 10% BTS
R65	740-0112	J4	27K ohms ± 10% BTS
R66	740-0122	J4	47K ohms ± 10% BTS
R67	740-0702	TB	56K ohms ± 10% BTS
R68	742-0492	N11	68K ohms ± 10% BTA
R69	742-0132	E9	220K ohms ± 10% BTA
R70	740-0062	F9	3.9K ohms ± 10% BTS
R71	740-1052	F8	330K ohms ± 20% BTS
R72	740-1062	F8	680K ohms ± 20% BTS
R73	749-0261	F13	680 ohms ± 20% BTB
R74	742-0823	E8	270 ohms ± 10% 1 Watt Morg.
R75	749-0272	F5	270K ohms ± 10% BTB
R76	742-0092	S9	47K ohms ± 10% BTA
R77	740-0122	R2	47K ohms ± 10% BTS
R78	740-0082	R7	10K ohms ± 10% BTS
R79	740-0082	R7	10K ohms ± 10% BTS
R80	740-0082	S6	10K ohms ± 10% BTS
R81	742-0172	T10	470K ohms ± 10% BTA
R82	740-0082	T11	10K ohms ± 10% BTS
R83	740-0232	S11	39K ohms ± 10% BTS
R84	742-0512	M14	2.2K ohms ± 10% BTA
R85	740-0202	S10	2.2 Megohm ± 10% BTS
R86	740-0582	R9	47K ohms ± 20% BTS
R87	740-0302	R12	1.8K ohms ± 10% BTS
R88	742-0972	M14	560 ohms ± 10% BTA
R89	742-0972	M14	560 ohms ± 10% BTA
R90	742-0972	S8	560 ohms ± 10% BTA
R91	742-0972	S8	560 ohms ± 10% BTA
R92	740-1033	N14	10 ohms ± 10% ½ Watt Morg.
R93	740-1033	P14	10 ohms ± 10% ½ Watt Morg.
R94	740-0172	M1	270K ohms ± 10% BTS
R95	740-0392	M2	330K ohms ± 10% BTS
R96	740-0182	K2	470K ohms ± 10% BTS
R97	740-0112	N1	27K ohms ± 10% BTS
R98	740-0102	K2	22K ohms ± 10% BTS
R99	742-0042	J1	15K ohms ± 10% BTA
R100	740-0302	J2	1.8K ohms ± 10% BTS
R101	740-0702	J2	56K ohms ± 10% BTS
R102	740-0112	M2	27K ohms ± 10% BTS
R103	740-0122	K3	47K ohms ± 10% BTS
R104	740-0182	G1	470K ohms ± 10% BTS
R105	750-0301	E2	3.3K ohms ± 10% 5 Watt Wire Wound
R106	740-0571	G1	1K ohm ± 20% BTS
R107	745-0242	G2	1 ohm ± 10% BW½
R108	742-0982	D2	1.2 Megohm ± 10% BTA
R109	742-0982	E5	1.2 Megohm ± 10% BTA
R110	740-0492	E2	1.5 Megohm ± 20% BTS
R112	742-0022	LSA	4.7K ohms ± 10% BTA
RT1	752-0621	B11	Brimistor CZ4
VDR1	750-0281	N14	Voltage Depedent Resistor — Type E298GD/A260—Blue Spot.
CR1	753-0001	W4	150 ohm/1500 pF R.C. Unit

CAPACITORS

Ref.	Part No.	Position	Description
C14	273-0591	V11	68 pF ± 2½% Silver Mica M.S.
C15	271-0031	V10	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C16	271-0031	W10	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C17	271-0031	U10	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C18	271-0031	W9	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C19	273-0591	W8	68 pF ± 2½% Silver Mica M.S.
C20	271-0031	W8	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C21	271-0321	W8	.001 Mfd. +80% —20% Ceramic Disc 500V. Wkg.
C22	271-0321	W6	.001 Mfd. +80% —20% Ceramic Disc 500V. Wkg.
C23	273-0591	W5	68 pF ± 2½% Silver Mica M.S.
C24	271-0031	V4	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C25		W4	.0015 Mfd.—Part of CR1
C26	271-0321	W3	.001 Mfd. +80% —20% Ceramic Disc 500V. Wkg.
C27	271-0151	V1	6.8 pF ± ¾ pF Ceramic Tube NPO
C28	271-0131	U1	8.2 pF ± ¾ pF Ceramic Tube NPO
C29	271-0221	P5	2.2 pF ± ¼ pF Ceramic Bead
C30	271-0311	P4	27 pF ± 5% Ceramic Tube NPO
C31	269-0211	J13	8 Mfd. Electrolytic Pigtail ET2D 300V. Wkg.
C32	279-4541	P14	.0022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C33	279-4581	P14	.0047 Mfd. ± 10% Paper Tubular 400V. Wkg.
C34	271-0371	YK	120 pF ± 5% Ceramic Tube 1KV NPO
C35	271-0361	YK	91 pF ± 2% Ceramic Tube 3KV NPO
C36	271-0371	YK	120 pF ± 5% Ceramic Tube 1KV NPO
C37	269-0521	F13	100 Mfd. Electrolytic (Insulated) 150V. Wkg.
C38	269-0531	F15	100 Mfd. Electrolytic (Uninsulated) 150V. Wkg.
C39	269-0511	D12	80 Mfd. Electrolytic 300V. Wkg. (With C40)
C40	269-0511	D12	40 Mfd. Electrolytic 300V. Wkg. (With C39)
C41	279-4661	S2	.022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C42	280-1791	S3	220 pF ± 10% Plastic Tubular 600V. Wkg.
C43	279-1741	R1	.1 Mfd. ± 20% Paper Tubular 400V. Wkg.
C44	279-1161	R8	.22 Mfd. ± 20% Paper Tubular 200V. Wkg.
C45	279-1161	TB	.22 Mfd. ± 20% Paper Tubular 200V. Wkg.
C46	271-0231	LSA	68 pF ± 10% Ceramic Disc 3KV N750
C47	271-0031	M3	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.

PARTS LIST — CHASSIS M1

CAPACITORS — *continued*

Ref.	Part No.	Position	Description
C48	279-1161	M2	.22 Mfd. ± 20% Paper Tubular 200V. Wkg.
C49	271-0351	N5	33 pF ± 1 pF Ceramic Tubular NPO
C50	271-0031	L4	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C51	273-0561		10 pF ± 10% Type I.F.
C52	271-0031	L3	.0033 Mfd. +100% —0% Ceramic Disc 500V. Wkg.
C53	273-0331		100 pF ± 5% Type I.F.
C54	280-1501	J5	100 pF ± 5% Plastic Tubular 600V. Wkg.
C55	280-1501	K5	100 pF ± 5% Plastic Tubular 600V. Wkg.
C56	269-0371	J4	10 Mfd. Electrolytic ET1B 25V. Wkg.
C57	280-1851	J5	680 pF ± 10% Plastic Tubular 600V. Wkg.
C58	279-4001	H4	.01 Mfd. ± 10% Paper Tubular 200V. Wkg.
C59	279-4001	TB	.01 Mfd. ± 10% Paper Tubular 200V. Wkg.
C60	269-0371	E9	10 Mfd. Electrolytic ET1B 25V. Wkg.
C61	279-1641	F8	.015 Mfd. ± 20% Paper Tubular 400V. Wkg.
C62	269-0061	J14	16 Mfd. Eelectrolytic ET4D 300V. Wkg.
C63	269-0221	E8	25 Mfd. Electrolytic ET1B 25V. Wkg.
C64	279-4661	E3	.022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C65	279-0281	S8	1 Mfd. ± 25% Metallised Paper 200V. Wkg.
C66	279-1701	R5	.047 Mfd. ± 20% Paper Tubular 400V. Wkg.
C67	279-4541	R6	.0022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C68	279-4541	S9	.0022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C69	279-4541	S6	.0022 Mfd. ± 10% Paper Tubular 400V. Wkg.
C70	279-4721	T10	.068 Mfd. ± 10% Paper Tubular 400V. Wkg. (U.C.C.)
C71	279-4621	R10	.01 Mfd. ± 10% Paper Tubular 400V. Wkg.
C72	269-0481	K15	24 Mfd. Electrolytic EDT6 300V. Wkg. With C74)
C73	279-4161	S12	.22 Mfd. ± 10% Paper Tubular 200V. Wkg.
C74	269-0481	K15	24 Mfd. Electrolytic EDT6 300V. Wkg. (With C72)
C75	269-0221	S8	25 Mfd. Electrolytic ET1B 25V. Wkg.
C76	273-0921	M1	68 pF ± 10% Silver Mica M.S.
C77	273-1031	P1	47 pF ± 1 pF Silver Mica M.S.
C78	280-1891	K2	.0015 Mfd. ± 10% Plastic Tubular 600V. Wkg.
C79	280-1001	M2	.001 Mfd. ± 10% Plastic Tubular 400V. Wkg.
C80	279-1581	L2	.0047 Mfd. ± 20% Paper Tubular 400V. Wkg.
C81	280-0061	J1	.0033 Mfd. ± 5% Plastic Tubular 200V. Wkg.
C82	280-1751	K2	100 pF ± 10% Plastic Tubular 600V. Wkg.
C83	279-0561	K2	.5 Mfd. ± 25% Metallised Paper 200V. Wkg.
C84	280-1861	J2	820 pF ± 10% Plastic Tubular 600V. Wkg.
C85	271-0311	K3	27 pF ± 5% Ceramic Tubular
C86	280-1781	J2	180 pF ± 10% Plastic Tubular 600V. Wkg.
C87	279-4581	H2	.0047 Mfd. ± 10% Paper Tubular 400V. Wkg.
C88	271-0341	LSA	150 pF ± 10% Ceramic Disc 5KV N750
C89	279-1781	D3	.22 Mfd. ± 10% Paper Tubular 400V. Wkg.
C90	279-5201	E5	.047 Mfd. ± 10% Paper Tubular 600V. Wkg.
C91	279-5201	D5	.047 Mfd. ± 10% Paper Tubular 600V. Wkg.
C92	279-4081	LSA	.047 Mfd. ± 10% Paper Tubular 200V. Wkg.

COILS

Ref.	Part No.	Position	Description
L9	259-0981	W10	Tuner Coupling Trimmer
L10)	259-0941	V10	1st I.F. Grid and Sound Trap
L11)			
L12		W8	29 mc/s Trap (on IFT1)— Part of 906-0231
L13	259-0671	W7	1st I.F. Coupling
L14	259-0931	U7	2nd I.F. Grid
L15		W5	37.5 mc/s Trap—Part of 906-0241
L16	259-0671	W4	2nd I.F. Coupling
L17	259-0931	U5	3rd I.F. Grid
L18	259-0671	W2	3rd I.F. Coupling
L19	259-0931	U2	Detector Input
L20	259-0951	U2	Peaking Choke (Grid)
L21	259-0961	R4	Peaking Choke (Shunt)
L22	259-0971	N4	Peaking Choke (Series)
L23	259-0991	M2R	Stabilising Coil
L24	259-0042	LSA	Coil—Anti-Parasitic
L25	259-0921	G6R	Width Coil
L26	259-0042	LSA	Coil—Anti-Parasitic
L27	259-0921	F6	Linearity Coil
L28	259-0042	C3	Coil—Anti-Parasitic

MISCELLANEOUS

Ref.	Part No.	Position	Description
RV1	677-0641	TB	500K Curve A Type Q (Brightness)
RV2	677-0671	P6	500K Curve A Type PTU (A.G.C.)
RV3	677-0601	TB	25K Curve A Type Q (Contrast)
RV4	677-0611	TB	50K Curve C Type EC (Contrast Range)
RV5	677-0621	TB	1 Megohm Tapped 500K Curve A with PPD.P. Switch (Volume)
RV6	677-0631	N10	50K Curve A Type PTU (Height)
RV7	677-0641	TB	500K Curve A Type Q (Vert. Hold)
RV8	677-0511	S11	10K Curve A Type EC (Vert. Linearity)
RV9	677-0631	J10	50K Curve A Type PTU (Horizontal Hold)
VC1	281-0131	V5	Capacitor Trimmer
VC2	281-0131	V3	Capacitor Trimmer
IFT1	906-0231	W8	Transformer—I.F. Vision
IFT2	906-0241	W5	Transformer—I.F. Vision
IFT3	906-0251	W2	Transformer—I.F. Vision
IFT4	906-0261	P4	Transformer—Sound Take-off and 5.5 mc/s Trap
IFT5	906-0101	K4	Transformer—Ratio
T1	904-0251	L14R	Transformer—Power
T2	905-0301	B10R	Transformer—Audio Output
T3	908-0321	T8R	Transformer—Blocking Osc.
T4	905-0291	U15R	Transformer—Vertical Output
T5	908-0183	S14	Transformer—Vert. Feedback
T6	908-0341	D4R	Transformer—Horiz. Output
T7	908-0331	A4	Transformer—Focus

PARTS LIST — CHASSIS M1

MISCELLANEOUS — *continued*

Ref.	Part No.	Position	Description
CH1	232-0122	C15	Choke 1.5H 300 mA
MR1	932-0971	U1	Diode 0A90
MR2	932-1071	F14	Diode 0A210
MR3	932-1071	F15	Diode 0A210
MR4	932-0991	K5	Selenium Diode M3
MR5	932-0601	J5	Diode 20A79
MR6	932-0601	K5	Diode 20A79
MR7	932-0791	M1	Diode 0A81
MR8	932-0791	M2	Diode 0A81
CRT	932-1121		AW53-88 or AWV21DAP4 21in. Picture Tube
FS1	431-0071		Fuse, 1 Amp.
FS2	431-0081	E10	Fuse, 1.5 Amp.
FS3	431-0031	B16	Fuse, 250 mA

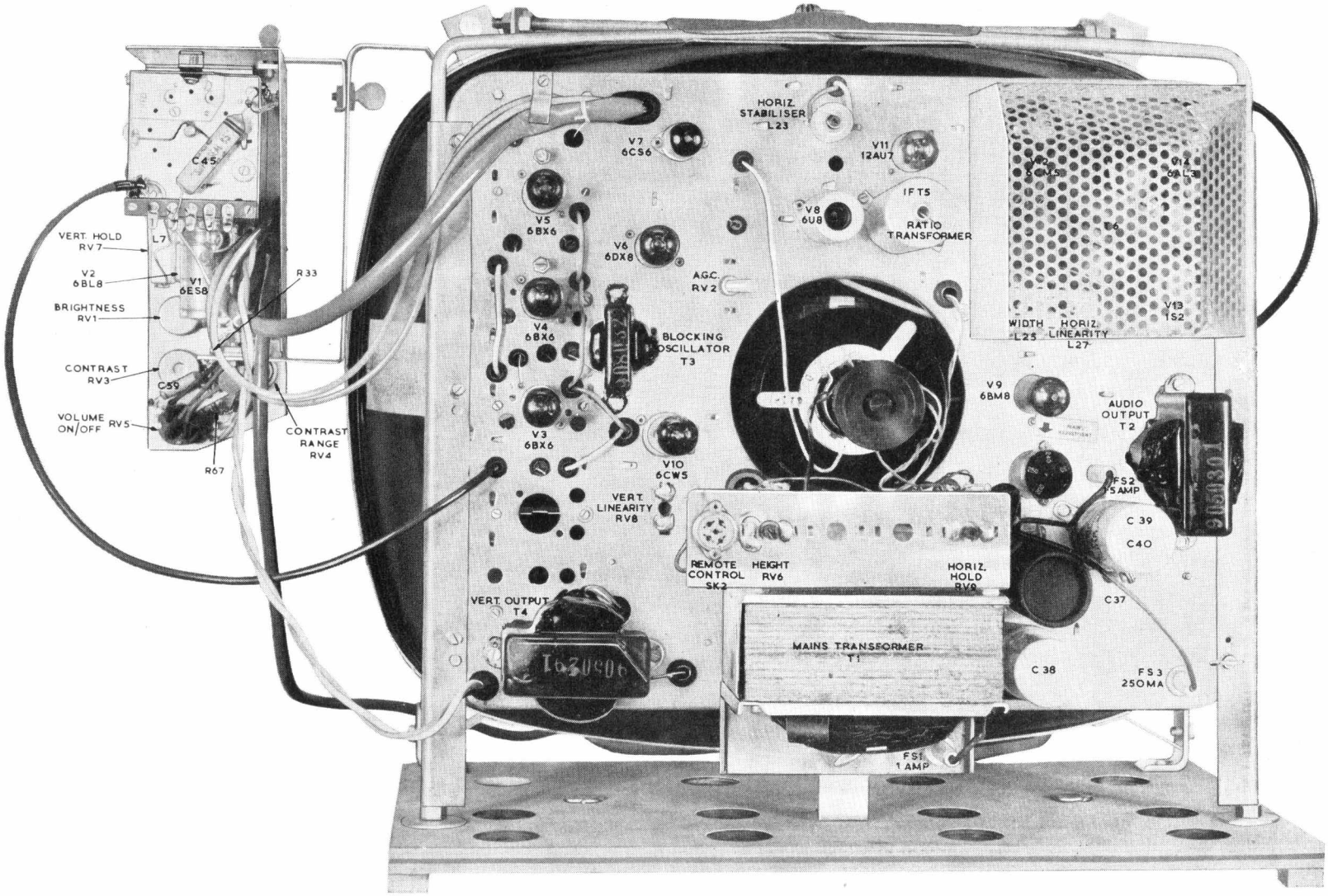
Ref.	Part No.	Position	Description
V1	932-1161	TB	6ES8 Valve
V2	932-0501	TB	6BL8 Valve
V3	932-0881	V9	6BY7 Valve
V4	932-0521	V6	6BX6 Valve
V5	932-0521	V4	6BX6 Valve
V6	932-1081	S5	6DX8 Valve
V7	932-1091	R2	6CS6 Valve
V8	932-1101	M4	6U8 Valve
V9	932-0511	F8	6BM8 Valve
V10	932-1111	S10	6CW5 Valve
V11	932-0481	J2	12AU7 Valve
V12	932-0531	G2	6CM5 Valve
V13	932-0771	B6	1S2 Valve
V14	932-1151	B2	6AL3 Valve.

ABBREVIATIONS:

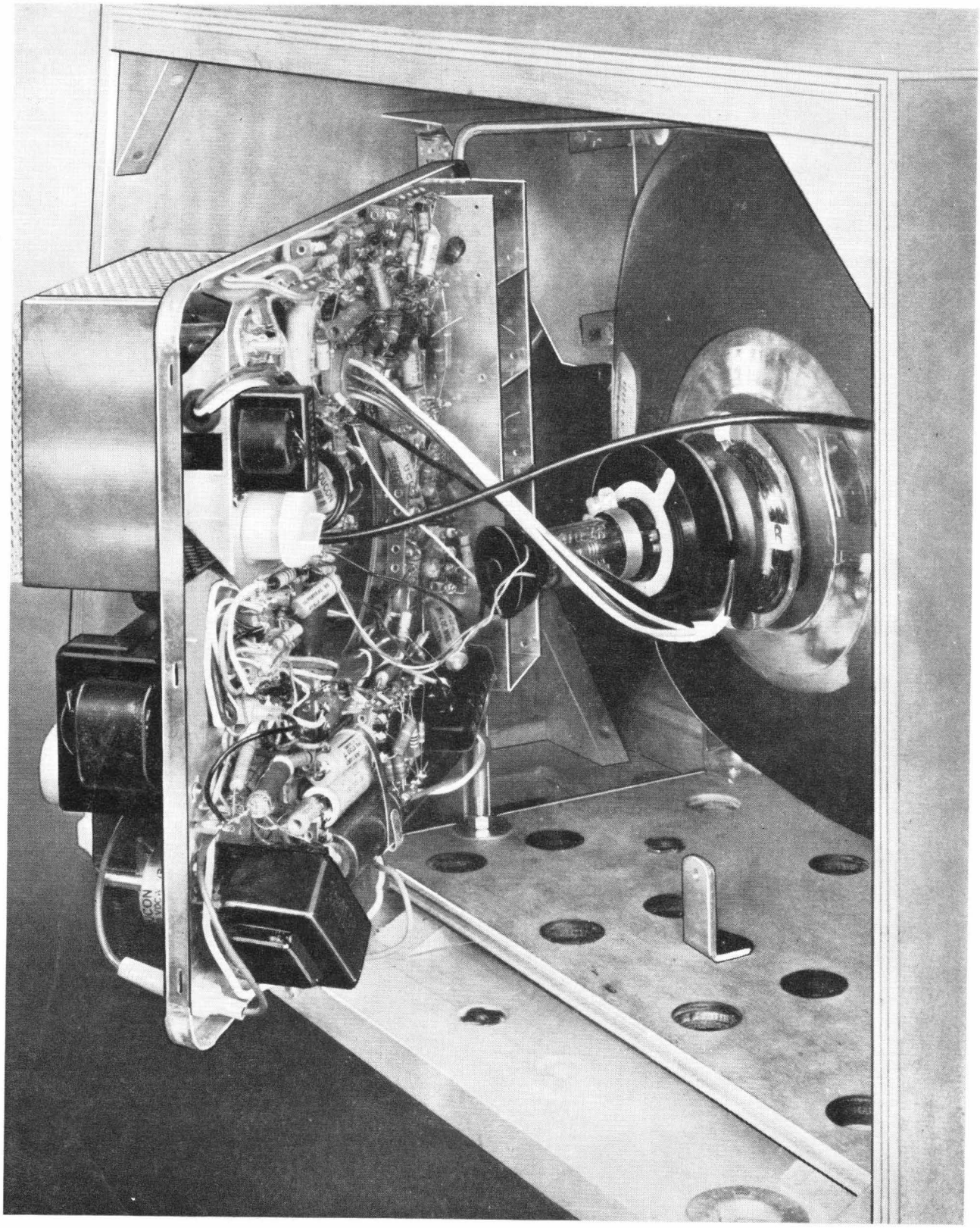
LSA: indicates component in Line Output Assembly.
TB: indicates component on Tuner Bracket.
YK: indicates component on Yoke Assembly
Suffix R: indicates component on reverse side of chassis.

THE GRAMOPHONE COMPANY LIMITED
(Incorporated in England)
2 PARRAMATTA ROAD, HOMEBUSH

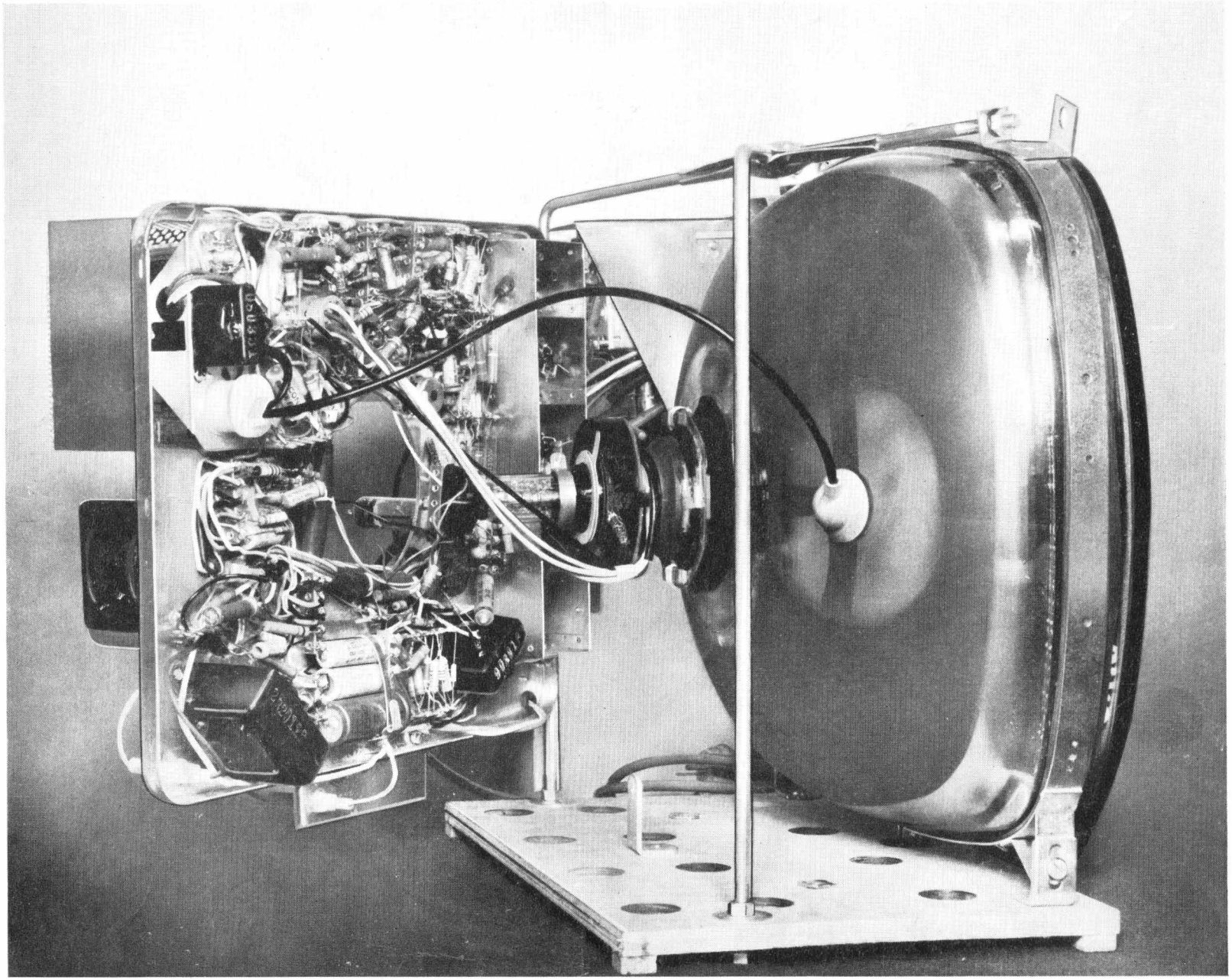
H. CLARK PTY. LTD.
Printers
CAMPERDOWN - N.S.W.



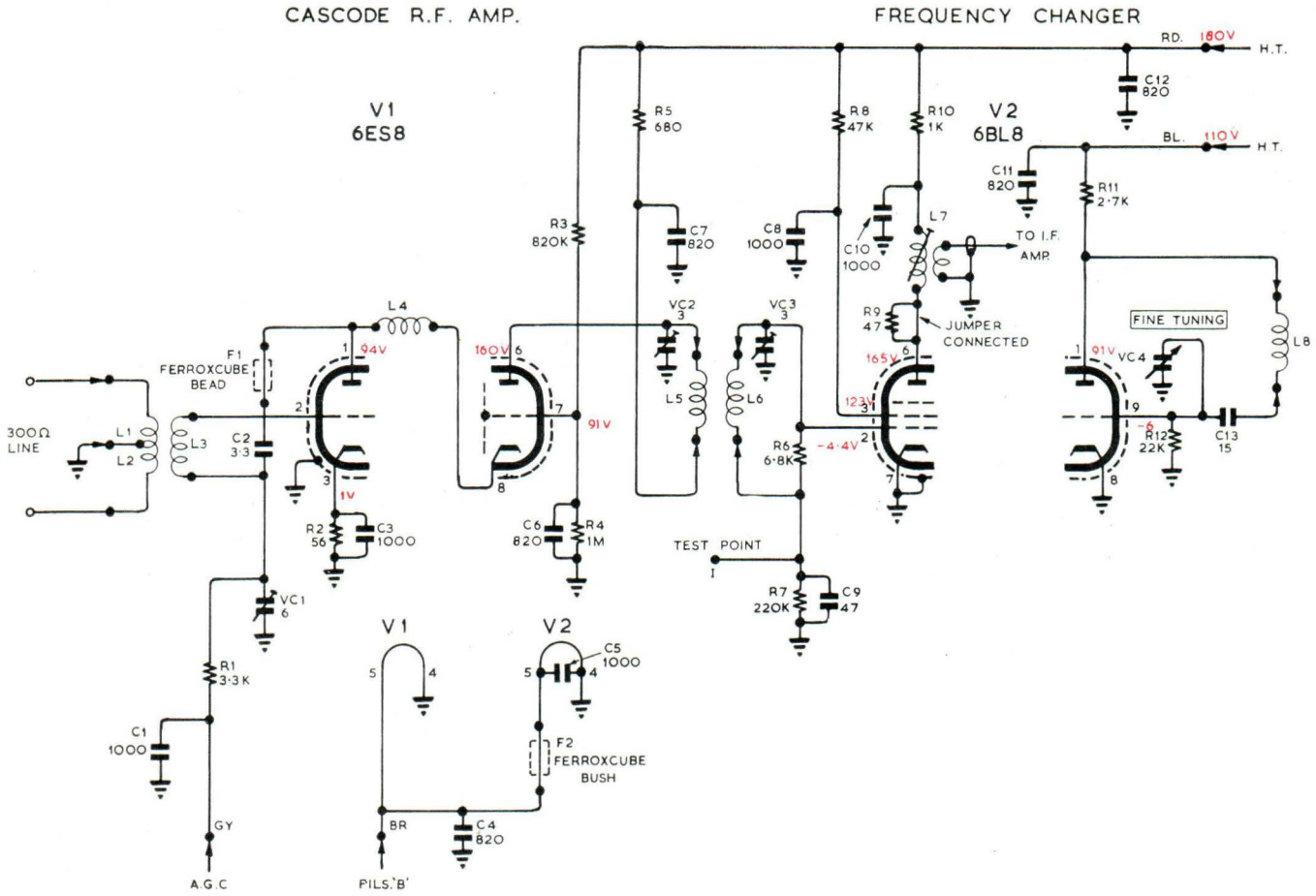
REAR VIEW OF CHASSIS.

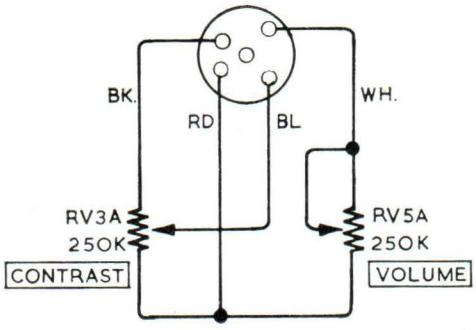


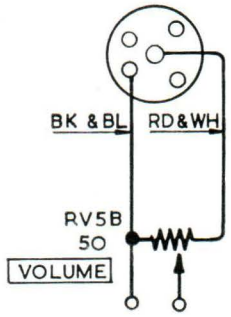
CHASSIS SWUNG OPEN FOR SERVICING IN CABINET.

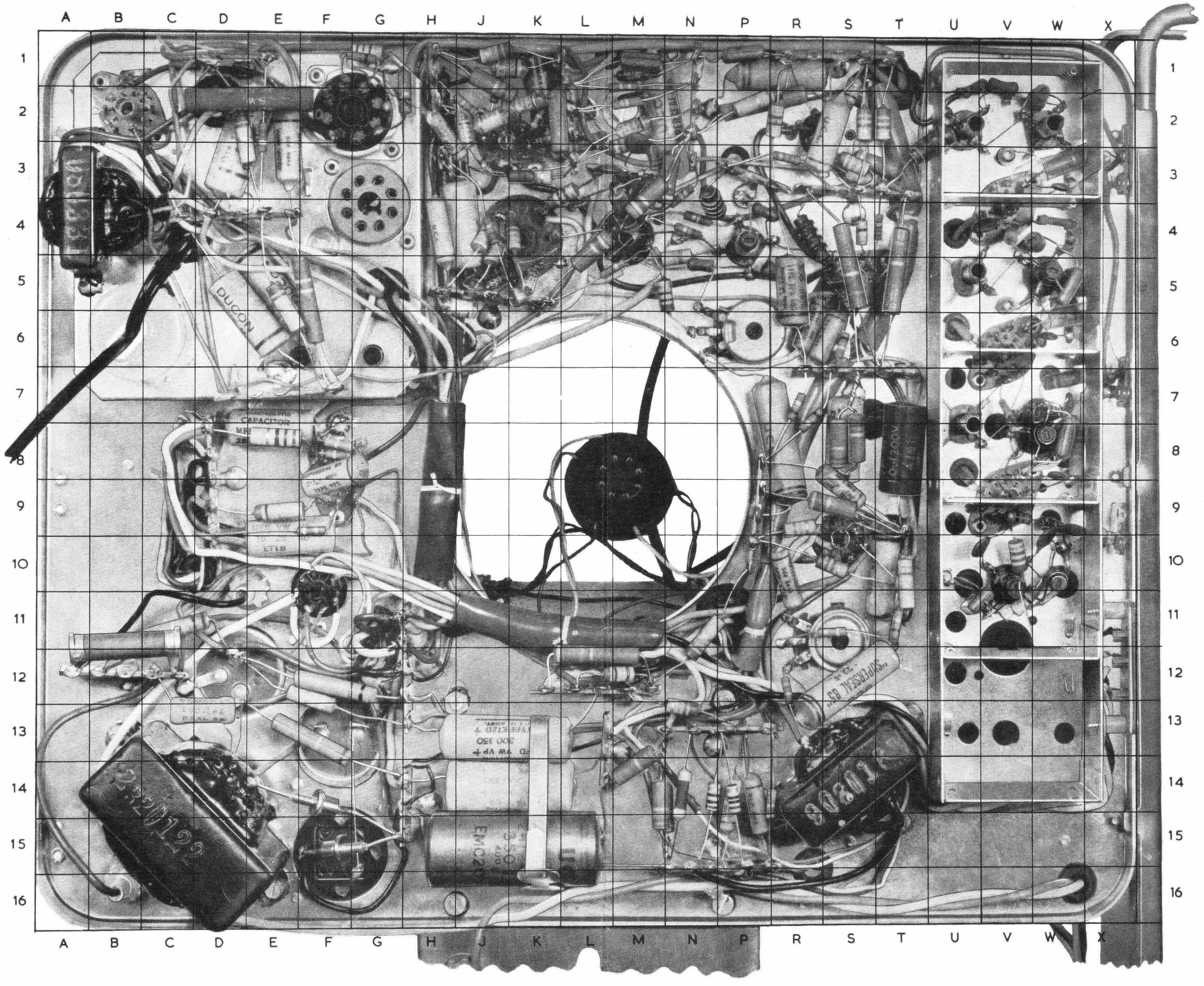


CHASSIS ASSEMBLY REMOVED FROM CABINET.


CASCODE R.F. AMP.
FREQUENCY CHANGER
V1
6ES8
V2
6BL8
RD. 180V H.T.
BL. 110V H.T.
C12 820
R5 680
R8 47K
R10 1K
C11 820
R11 2·7K
R3 820K
C7 820
C8 1000
C10 1000
L7
TO I.F. AMP.
JUMPER CONNECTED
R9 47
VC2 3
VC3 3
L4
F1 FERROXCUBE BEAD
94V
160V
165V
123V
91V
FINE TUNING
VC4
L8
300Ω LINE
L1
L2
L3
C2 3·3
L5
L6
R6 6·8K
-4·4V
R12 22K
C13 15
1V
R2 56
C3 1000
C6 820
R4 1M
TEST POINT
R7 220K
C9 47
VC1 6
R1 3·3K
C1 1000
V1
V2
C5 1000
F2 FERROXCUBE BUSH
GY
A.G.C
BR
C4 820
PILS.'B'


REMOTE CONTROL
BK.
RD
BL
WH.
RV3A 250K
CONTRAST
RV5A 250K
VOLUME


HEARING AID CONTROL
BK & BL
RD & WH
RV5B 50
VOLUME



COMPONENT LOCATION.

"H·M·V" CHASSIS TYPE M1