

Private and Confidential



For Trade Use Only

"HIS MASTER'S VOICE"

SERVICE MANUAL

for

TELEVISION RECEIVER
CHASSIS TYPE F3



THE GRAMOPHONE COMPANY LIMITED
(Incorporated in England)
HOMEBUSH - - - N.S.W.

Part No. 682-6281

TV Receiver — Chassis Type F3

SPECIFICATION

POWER SUPPLY:

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

CONSUMPTION:

195 watts.

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

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:

2 amp. — Mains.

250 mA — H.T.

500 mA — H.T.

VALVE COMPLEMENT

V1	6CW7	R.F. Amplifier	V15	6BM8	} Audio Amplifiers & Audio Output
V2	6BL8	Frequency Changer	V16	6BM8	
V3	6BY7	1st I.F. Amplifier	V17	6BM8	Blocking Oscillator & Vertical Output
V4	6BX6	2nd I.F. Amplifier	V18	6BX6	Reactance Valve
V5	6BX6	3rd I.F. Amplifier	V19	6AL5	Phase Discriminator
V6	6BX6	4th I.F. Amplifier	V20	6BL8	Horizontal Osc. and Horizontal Drive
V7	6CK6	Video Amplifier	V21	6CM5	Horizontal Output
V8	6N3	Power Rectifier	V22	1S2	E.H.T. Rectifier
V9	6N3	Power Rectifier	V23	6R3	Damping Diode
V10	6BL8	Gated A.G.C. and Noise Inverter	MR1	0A70	Vision Detector
V11	6BL8	Vertical Sync. Separ- ator and Horizontal Sync. Separator	MR2	0A81	Clamping Diode
V12	6BX6	Intercarrier Amp.	MR3	M3	Clamping Diode
V13	6BX6	Limiter	C.R.T.	21ALP4-A	Picture Tube
V14	6AL5	Ratio Detector	or	AW53-80	

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 other-wise 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

23 valves and three metal rectifiers.

90° aluminised, electrostatic focus picture tube, type 21ALP4-A or AW53-80.

Exact 4 : 3 aspect ratio to avoid cutting off picture information by overscanning—important with film titles.

Laminated, tinted safety glass screen for maximum protection against implosion and to reduce reflections.

Metal-foil screening of some cabinets to minimise interference with nearby radio receivers.

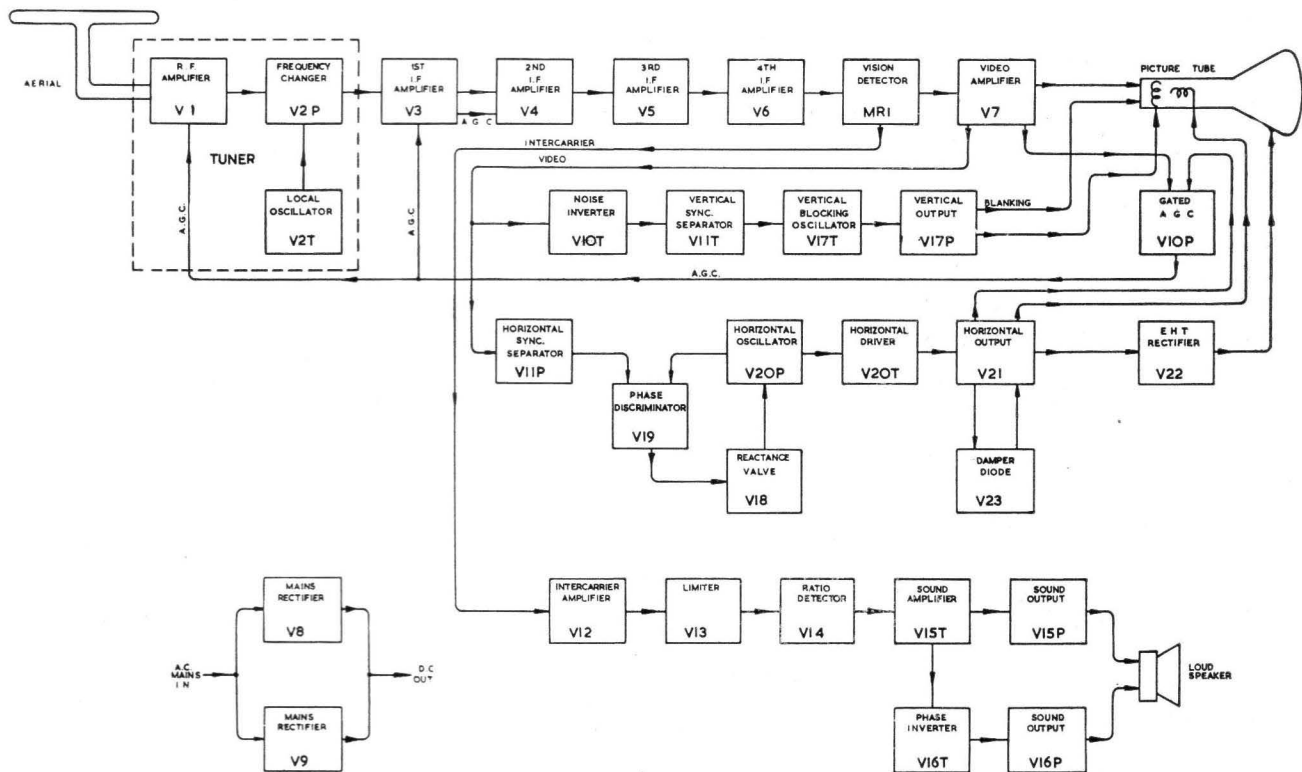


FIG 1

CIRCUIT FEATURES

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

(2) A four-stage I.F. Amplifier gives high sensitivity consistent with wide bandwidth and good definition.

(3) Phase-linear treatment of the I.F. phase response ensures best possible definition with freedom from overshoots or smear and is entirely non-critical with respect to fine tuning. No critical tuning adjustment is needed to obtain a picture free of smear or overshoots.

(4) Overall frequency response of the system is within 3 db. from D.C. up to 4.7 megacycles per second.

(5) D.C. coupling from the video detector through the video amplifier to the picture tube ensures that true scene black is retained and all shades have their true relationship to black. This ensures correct reproduction of special effects

such as night-time scenes and shots against a dark background.

(6) Gated A.G.C. gives immunity from effects of impulse noise and has fast action to cope with rapid fading from "aircraft flutter." Variable delay on the tuner A.G.C. maintains full R.F. stage gain on weak to moderate signals to minimise frequency converter noise, and can be adjusted for best results when the receiver is installed.

(7) A noise inverter protects the synchronising circuits from impulse interference. The receiver "holds" well in conditions of severe interference.

(8) Separate vertical and horizontal sync. separators ensure maximum efficiency of separation and positive synchronisation of horizontal and vertical oscillators.

(9) Both amplitude limiter and ratio detector are used to ensure that impulse noise and "sync. buzz" on the 5.5 mc/s intercarrier are effectively eliminated even in areas of low signal strength and severe interference.

(10) The push-pull sound amplifier with ample feedback gives excellent quality and a reserve power for handling the "hi-fi" F.M. sound that can be transmitted. A compensated volume control maintains tonal balance at all volume settings.

(11) 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 also eliminates the need for a vertical linearity control since it is practically independent of wide component tolerances. It also gives excellent interlace.

(12) The Horizontal Hold circuit is a balanced diode discriminator type of phase comparator with a sine-wave oscillator and has sufficient pull-in range to render unnecessary a hold control on the front of the receiver.

(13) Horizontal Deflection circuit uses a unique form of linearity correction which is non-

critical, and requires no adjustment. The linearity correction is in the form of a metal foil around the picture tube neck under the deflection coils. It also has the advantage that it cannot produce "ringing" or "striations" on the left-hand edge of the picture as other forms of linearity control can do.

(14) Vertical Flyback Blanking eliminates any vertical retrace lines.

(15) Minimum number of controls necessary for operation.

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

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

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

CIRCUIT DESCRIPTION

R.F. INPUT

The input to the turret tuner is to a centre tapped transformer which presents an impedance of 300 ohms. In series with each leg of the input is a fixed-tuned video I.F. trap circuit tuned to 36.0 Mc/s. Shunted across the input is a variable sound I.F. trap circuit tuned to 30.5 Mc/s.

R.F. amplification is achieved with a type 6CW7, double triode (V1), in a cascode circuit. The two sections of this stage are connected in series for D.C. The grounded cathode input section is neutralized and is also controllable by A.G.C. from the main chassis. Because of the series D.C. 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 6FL8, 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 L9 on the I.F. coil L8.

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 L16 with stray capacities. There are four I.F. amplifying stages, the first two are "stacked" as far as D.C. is concerned, i.e., they operate in series with V4 above V3. Similarly, V12 is "stacked" above V5. 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 V6 and V6 to the video detector MR1 by inductive coupling.

Trap circuits L15 and L17 are coupled to I.F. coils L16 and L18. The former attenuates the sound carrier 30.5 Mc/s; the latter attenuates the adjacent-channel sound carrier 37.5 Mc/s.

V3 and V4 have small unbypassed cathode resistors R17 and R22 to minimise detuning of their grid circuits when A.G.C. bias is applied.

VIDEO AMPLIFIER

The detected video output from the germanium diode MR1 is fed through IFT5 which, in conjunction with R30 and C37A forms a 5.5 Mc/s null trap, and is amplified by V7. L22, L23 and L24 are peaking chokes which maintain the high frequency components of the vision signal fed to the cathode of the picture tube.

INTERCARRIER AMPLIFIER AND SOUND OUTPUT

The frequency modulated 5.5 Mc/s component from the video detector is applied via the transformer IFT5 to the intercarrier amplifier V12. A single tuned circuit couples V12 to the limiter V13.

Output from the limiter is demodulated by ratio-detector V14 to provide the audio signal which passes through the tone control network and volume control and is amplified by the triode section V15, phase inverter (V16 triode) and the push-pull power output pair (V15 and V16 pentodes). Feedback is applied via the pentode cathodes and also via V15 triode cathode.

The tone control provides normal flat response at mid position. Full anti-clockwise rotation cuts high frequencies, as may be needed when excessive sibilance or high frequency noise is transmitted. Full clockwise rotation cuts low frequencies. This facility may be needed in "live" reverberant locations such as halls, or schools, or when low frequency noise such as hum is transmitted.

A margin of sound gain is provided so that the full 6 watts output is obtained from sound signals which are not fully modulated. Moreover, the sound output stage has a controlled overload characteristic which ensures that, when overdriven, it does not "paralyse" but merely clips the peaks and so remains comparatively free from audible distortion.

SYNC SEPARATORS

Separate vertical and horizontal sync. separators are employed (V11 triode and pentode sections). Video signal with sync. tips positive is taken from the video amplifier anode and applied to the grids of both sections of V11. Differentiation in C51 and R66 occurs in the pentode grid. Grid leak bias on these valves ensures that they conduct only on sync tips and hence the sync output at their anodes is free of picture information. Since differentiation has occurred at the grid of the pentode section, its output is essentially horizontal sync pulses only. The triode section output is followed by a three-stage integrator and only vertical sync pulses pass out of this circuit.

NOISE INVERTER

Anode current in the triode section of V10 is normally cut off by the steady bias between its grid and cathode. Video signal with sync tips positive is fed to the grid of this valve from the video amplifier and the valve is biased so that

under normal conditions this signal will not drive it into conduction. However, if impulse interference with amplitude greater than sync pulse height is present, the valve will conduct during the interfering pulse and amplified, inverted interference pulses will appear at the valve anode. Since the anode load of this valve (R62) is also in the path through which video signal is fed to the vertical sync separator then the interfering pulses cancel out across this resistor and the vertical sync separator thereby has good immunity to the effects of impulse noise.

GATED A.G.C.

The same video waveform that feeds the noise inverter is fed to the grid of the A.G.C. amplifier (Pentode section V10). The polarity of this waveform is with sync tips positive, and the valve is biased so that it can conduct during sync pulses. However, it can only do this if there is a positive pulse applied to its anode via C46 from the line output transformer during line flyback. This overcomes the possibility of the valve conducting on impulse interference occurring during the period between line sync pulses, and makes the A.G.C. operation immune to impulse interference.

The current through the valve depends upon the height of the sync pulses and the setting of the contrast control. The current pulses flow from the chassis via R48, VR2 and R51A to the anode of the valve. C44 smoothes the voltage developed across R50 and VR2, which is the A.G.C. bias for the I.F. valve, V3. VR2 controls the ratio of I.F. and R.F. A.G.C. The cathode of the A.G.C. valve is returned to +50V. This voltage is set by a divider network consisting of R52, R53, R54, R61, VR3 and VR5.

The grid voltage is obtained from the CONTRAST control tap on the cathode chain and is applied to the A.G.C. valve grid via R56 and R60. Because the A.G.C. valve has a small grid base (about -2V.) compared with the voltage from its cathode to earth (+50V.), the voltage from its grid to earth during conduction remains substantially constant (+48 to 49 volts) as long as any A.G.C. voltage is produced. Thus an increase of voltage at its grid due to the CONTRAST control produces an equal *decrease* of grid voltage due to sync tips from the video output. In this way the CONTRAST control voltage sets the video output voltage, by automatic control of the A.G.C. voltage and hence I.F. gain. At the same time, the CONTRAST control varies the bias of the noise inverter grid so that sync tips are always held just below cut-off independent of the height of the video signal. VR4 is a pre-set adjustment of the range of the contrast control.

With a normal picture displayed on the screen, VR3 is adjusted to set the A.G.C. cathode bias at +50V.

A.G.C. voltage is also applied to the R.F. amplifier from the junction of R50 and R51. This latter resistor, together with C45, form a smoothing filter for the pulses appearing at V10 anode. The junction of these two resistors is clamped to earth potential by the clamping diode, MR3, and not until the anode of V10 falls to a value fixed by the H.T. voltage divided by the ratio of R49 and R50 to R51 does this point become unclamped. A "delayed" bias is therefore provided to the R.F. stage, ensuring that maximum R.F. stage gain is available with low signal levels to minimise noise from the frequency converter.

The division ratio of the voltage divider supplying I.F. bias is important. If the ratio is too small, the tuner will start to receive bias before converter noise has disappeared from the picture. As a result, noise will be visible even at high signal levels. If the ratio is too large, an excessive degree of control will be demanded of the I.F. amplifier before the tuner starts to receive bias. This can cause overloading of the I.F. amplifier. Therefore, the ratio should be adjusted for optimum when the receiver is installed, using VR2.

VERTICAL DEFLECTION CIRCUITS

Vertical sync pulses from the sync separator via the integrator are used to synchronise the blocking oscillator comprised of transformer TR3 and triode portion of V17. "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 anode and "Vertical Hold" is adjusted by varying the time constant of the blocking oscillator grid circuit. The Vertical Hold control VR9 is returned to the slider of the Height Control potentiometer VR8 so that the blocking oscillator frequency is unaffected when Height is adjusted. This makes the Vertical Hold almost independent of Height Adjustment.

The pentode section of V17 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 TR4.

A feedback voltage is developed across R115, A and B, from the current in the deflection coils. This voltage is stepped up to the input grid of the frame output valve. A tapped resistor, R116, A, B and C, is provided in series with the feedback transformer primary for factory adjustment of linearity.

HORIZONTAL OSCILLATOR AND AUTOMATIC PHASE CONTROL

Automatic frequency and phase control is obtained by means of a sine wave type of "fly-wheel" circuit. Incoming horizontal sync pulses from the horizontal sync separator are fed via transformer TR6 (damped by diode MR2) into the discriminator V19 where they are compared

in phase with a sine waveform taken from the horizontal oscillator transformer TR7. In this circuit the sync pulse is applied in the same phase to both diodes of the discriminator. From the oscillator a balanced winding on the transformer feeds equal and opposite sine-wave voltages to the cathodes of the diodes. These pulse and sine waveforms are added together and detected by the diodes so that the voltage developed across R119 is equal to the peak negative voltage applied to the top diode and is negative with respect to the centre tap of the sine wave winding. Similarly, the voltage across R120 is equal to the peak negative voltage applied to the bottom diode and is negative with respect to the centre tap of the winding.

Since the two peak rectified voltages are in the same sense, negative with respect to the transformer centre tap, the discriminator output voltage, taken across the two load resistors R119 and R120, will be their difference.

Fig. 2 shows how the sine wave applied to the diodes in opposite sense and the pulse applied in the same sense are added together.

In Fig. 2 (a) there is a phase error between the incoming sync pulse and the receiver horizontal oscillator, the sync pulse arriving before the sine-wave crosses the zero axis. Then the voltage across R119 is greater than the voltage across R120, and the discriminator output (the difference between the above two voltages) is negative with respect to the bottom of the discriminator. If the phase error had been in the opposite sense, i.e., the sync pulse arriving *after* the sine-wave had crossed the zero axis, the discriminator output would be in the opposite direction, i.e., positive with respect to the bottom of the discriminator. When the phase error is zero, as in Fig. 2 (b), the voltages across R119 and R120 are equal and the resulting output is zero.

The discriminator output is connected in series with a fixed negative bias voltage of approximately -3.4 volts derived from the Horizontal Hold potentiometer which taps off part of the grid leak bias developed in the horizontal driver grid circuit. Thus the D.C. voltage on the reactance valve (V18) grid is approximately -3.4 volts when there is zero phase error, more negative when the sync pulse leads in phase and less negative when the sync pulse lags.

The reactance valve V18 is essentially a capacitance shunted across the oscillator tank circuit and the effective value of its capacitance is varied by the control bias on its grid, developed by the discriminator, and is varied in such a direction as to correct for any change of phase which develops a correcting voltage.

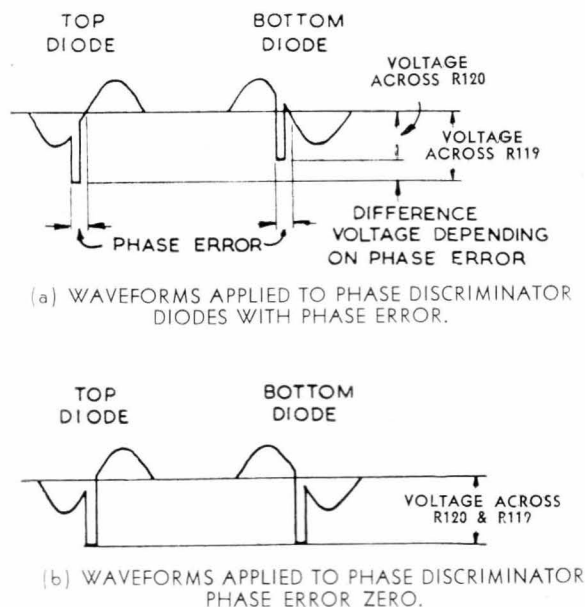


Fig. 2

HORIZONTAL DEFLECTION CIRCUITS

Negative voltage pulses from the anode of the horizontal oscillator (V20 pentode) are applied via a differentiating circuit of which VR7, the Horizontal Drive control, is a variable element, to the Horizontal Driver valve (V20 triode). VR7 serves to adjust the amount of differentiation and hence the time at which the Horizontal Output valve is driven "on" as required below.

The horizontal driver valve (V20 triode) produces a negative pulse output which is timed to cut off the horizontal output valve V21 at end of a scan. When V21 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 V23 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 V21 starts the cycle over again.

During flyback a high voltage pulse is produced at the anode of the E.H.T. rectifier V22, 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 530 volts which is used, if required, for focus voltage and also is divided down to 400 volts for supplying the G2 electrode voltage of the picture tube.

REMOTE CONTROL

By plugging into socket SK4, the octal socket in the rear of the chassis, volume and contrast can be controlled from the Remote Control Unit.

The remote volume control VR7A 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 VR5A feeds a variable D.C. voltage into the contrast control chain R59, R60 and R56. 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.

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 panel.

PICTURE SHIFT

Small shifts in position of picture may occur due to the effects 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

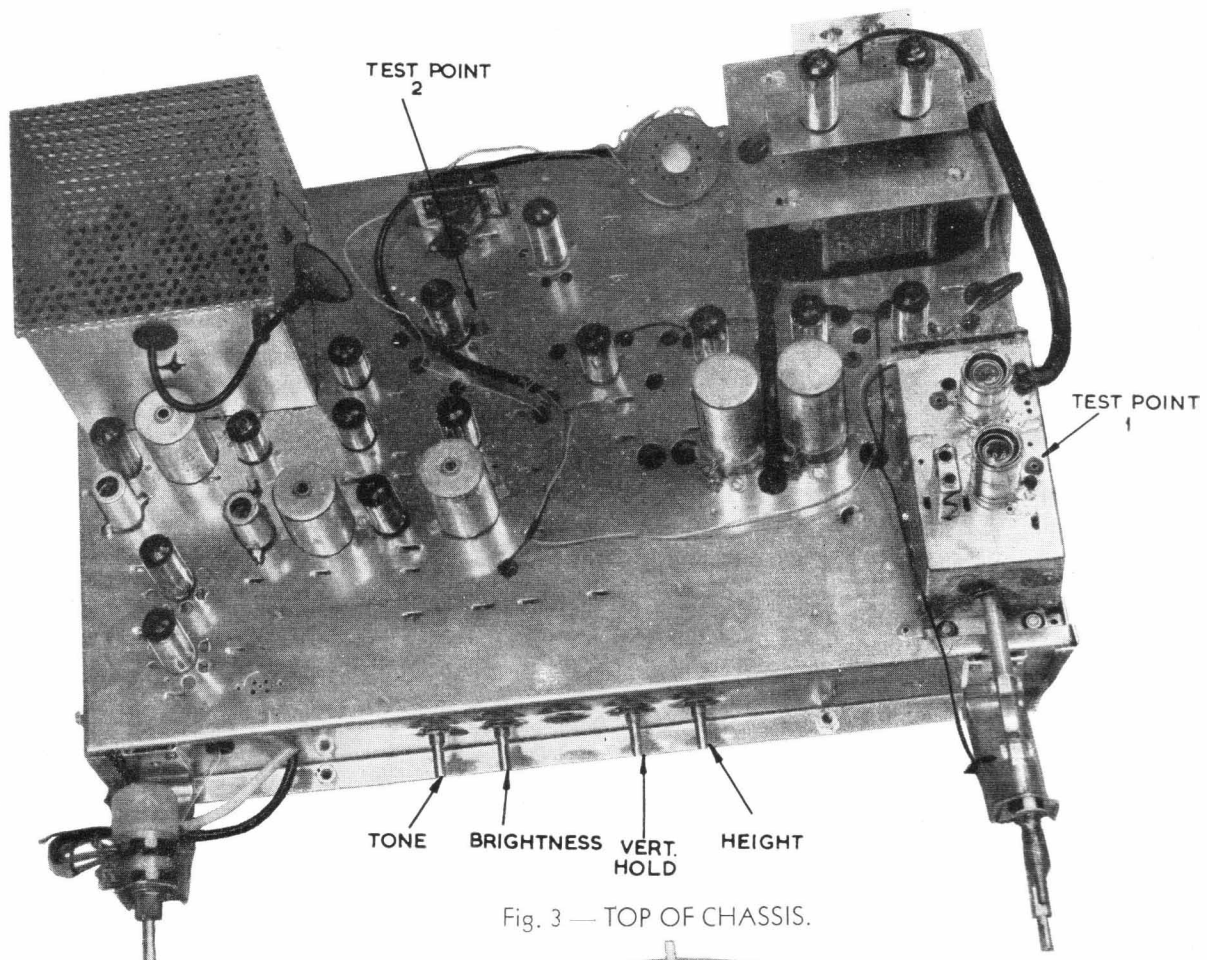


Fig. 3 — TOP OF CHASSIS.

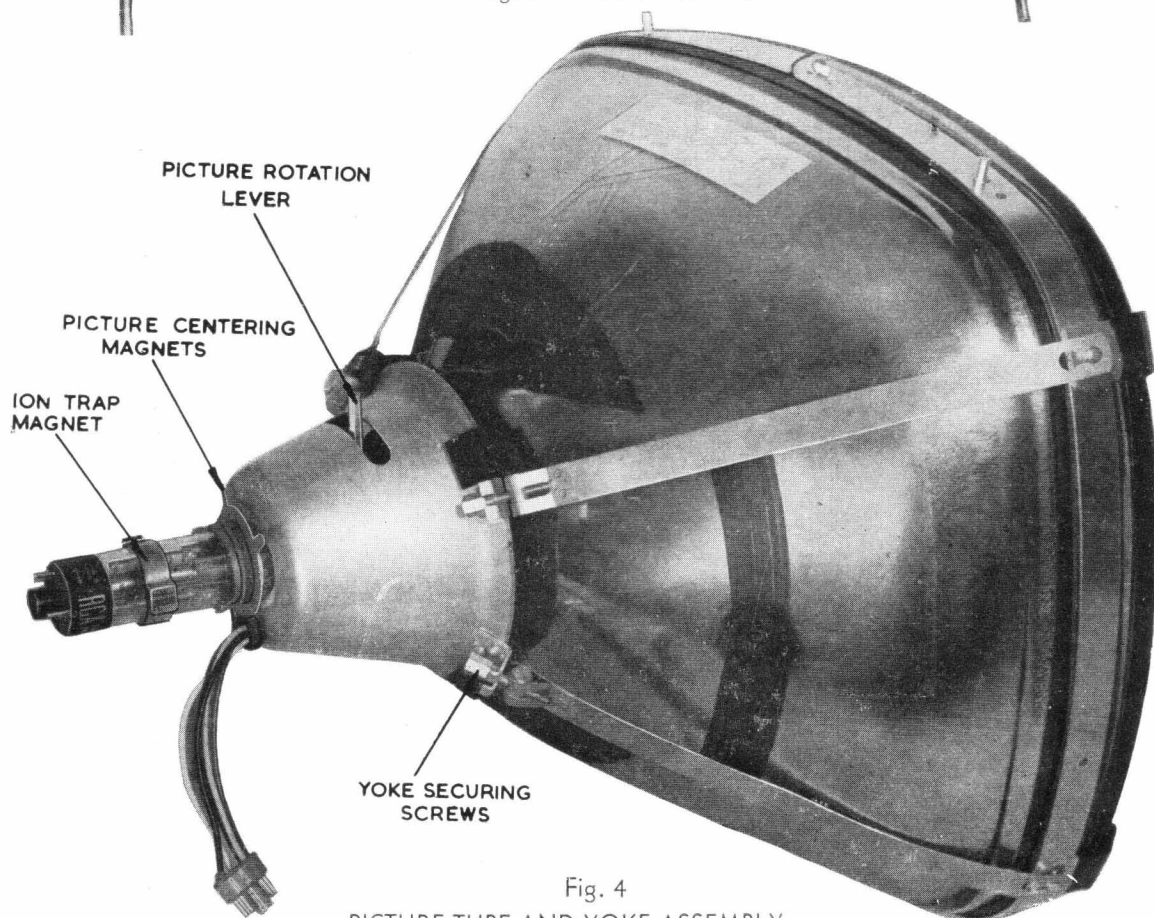


Fig. 4
PICTURE TUBE AND YOKE ASSEMBLY.

by pushing the lever which emerges from the slot in the top of the yoke assembly until the picture is squared up. It may be necessary after this operation to centre the picture by means of the shift magnets.

ION TRAP

If ion trap adjustment is necessary, set brightness control at normal brightness or if no raster is evident at all set brightness control at the centre of its range. Check that ion trap magnet is placed on the neck of the tube in the region of the bend in the gun. (This position is shown in Fig. 4). Rotate magnet around the tube neck and move it backwards or forwards along the neck until the position for maximum brightness of raster is obtained. Readjust brightness setting if necessary to keep raster brightness at that of a reasonably bright picture, but not excessively so.

Check also that the position found for the magnet by the above procedure produces good overall focus.

It is most important that the ion trap be accurately set because misadjustment not only produces astigmatism, but can damage the picture tube.

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.

DISMANTLING

REMOVAL OF CHASSIS

Disconnect the receiver from the mains supply and remove the aerial connection.

Remove the two screws securing the back cover of the receiver to the cross rail on which the chassis sits. Ease back the mains interlock socket so that it comes free of the chassis and, while holding the socket free, slide the cover downwards in its guide grooves until the top edge is free of its cabinet groove. The cover may then be eased out by bowing it down the centre until the edges are free of the cabinet grooves.

Disconnect the picture tube socket, E.H.T. connector, deflection yoke plug and speaker plug.

Remove all knobs from the front of the set.

Remove four bolts securing chassis to the cabinet shelf.

The chassis may then be withdrawn from the cabinet.

REMOVAL OF DEFLECTION YOKE

First slide the ion trap and picture shift magnets from the picture tube neck.

The deflection yoke may be removed by loosening the four yoke securing screws shown in Fig. 4, lifting them out of the slots in the brackets and then pulling the yoke assembly back off the picture tube.

REMOVAL OF PICTURE TUBE

Having removed the chassis and yoke assembly, lay the cabinet on its face and undo four screws securing the picture tube clamping ring to the cabinet and the mounting brackets.

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 PICTURE TUBE

First, clean the tube face and the inside surface of the protective glass screen. Stretch the rubber dust-sealing ring around the four spigots moulded into the mask.

Place the tube in position on the mask, and secure with two bottom screws and then two top screws. The top screws should be tightened only until face of tube seats against mask. Prise dust-sealing ring off the spigots until it flicks into position around the mask.

REPLACEMENT OF DEFLECTION YOKE

First, check that the linearity foil insulation on the neck of the picture tube is in its correct position and in good condition. If a replacement picture tube is being fitted it will be necessary to fit a new piece of foil and three layers of insulation (Part No. 892-0251). (Note that this tape is special high voltage insulation material and not cellulose tape). Slide yoke assembly along tube neck and ensure that it slides over the linearity foil without being forced. Replace four securing straps and screw up tight. Replace shift magnets and ion trap magnet.

REPLACEMENT OF CHASSIS

Slide chassis into cabinet, ensuring that the extension spindles on the pre-set controls locate in their guides. Push chassis forward until it comes against a stop, and replace the four screws securing the chassis to the shelf.

Replace loudspeaker plug, deflection yoke connector, picture tube socket and E.H.T. Lead. Replace knobs.

Replace the cabinet back panel and ease home the mains interlock plug. Ensure that this is properly aligned with the pins on the chassis before pushing it home. Do not force it on.

Replace two screws securing the back panel.

ADJUSTMENTS

PICTURE TUBE FOCUS

The voltage on the focus electrode G4 of the picture tube is set in the factory for best overall focus by connecting the focus lead to either pin 8 (0 volts), pin 2 (225 volts) or pin 6 (530 volts) on SK1. This should be checked and reset, if necessary, when a picture tube is changed.

HORIZONTAL DRIVE

Tune to a channel which is operating and, with the picture in lock, adjust VR7 (Horizontal Drive) until a white vertical stripe appears about one-third of the way across from the left-hand edge of the screen. Then adjust this control again until the white strip just disappears. After this adjustment, check the setting of the "Horizontal Hold" control.

HORIZONTAL HOLD

Disconnect sync pulses by removing V11, the sync separator valve, and adjust the "Horizontal

IMPORTANT: Before replacing back on receiver, the ion trap must be adjusted in accordance with instructions. Do not operate the receiver for any length of time with the ion trap misadjusted.

Hold" control until the picture just "floats" or locks weakly, then replace V11.

Should the reactance valve, V18, or the oscillator valve, V20, be replaced, the horizontal hold control should be reset. The voltage on the test point IV should be found to be within the range of -3 to -3.6 volts. If this is not so, it should be set at -3.4 volts, using the horizontal hold control, V11 removed, and the core of the oscillator transformer TR7 adjusted for the weak or floating lock. V11 should then be replaced.

50V. ADJUST.

Connect a multimeter switch to 300V. range between pin 8, V10 and earth. With a normal picture displayed, adjust VR3 to give a reading of $+50$ volts.

CONTRAST RANGE

Check the setting of "50V. Adjust." control. Turn the contrast control to its maximum anticlockwise position and adjust VR4 to give a light under-contrasted picture.

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 below.

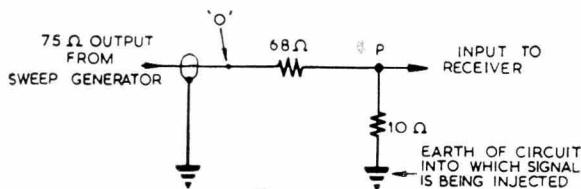


Fig. 5

If there is inadequate output from this arrangement for alignment of the final I.F. stage, the point O may be connected to the receiver instead of the point P shown.

Before commencing alignment, remove the cores from L15, L17 and L18. Turn the two trimmers, VC1 and VC2 to their minimum capacitance position, i.e., $\frac{7}{16}$ " of thread on the

screw should be visible above the chassis. Connect $-6V.$ bias across C44. Connect the input to the display unit between the grid of V7 and earth. Throughout 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 of V6 and earth. Adjust the core of L20 to peak the response at 34.65 Mc/s, with the core in the position closest to the chassis. Adjust the core in IFT4 to give a symmetrical response with the core in the position furthest from the chassis, and then vary both to obtain the response shown in A (Fig. 8).

(2) Remove the sweep generator output from the grid of V6 and re-connect it to the grid of V5. Insert a core in L18 and peak the response at 34.65 Mc/s with the core in the position closest to the chassis. Adjust the core of IFT3 to give a symmetrical response with the core in the position furthest from the chassis, and then vary both to obtain the response shown in B.

(3) Remove the sweep generator output from the grid of V6 and re-connect it to the junction of C25 and L16. Adjust the core of IFT2 to make

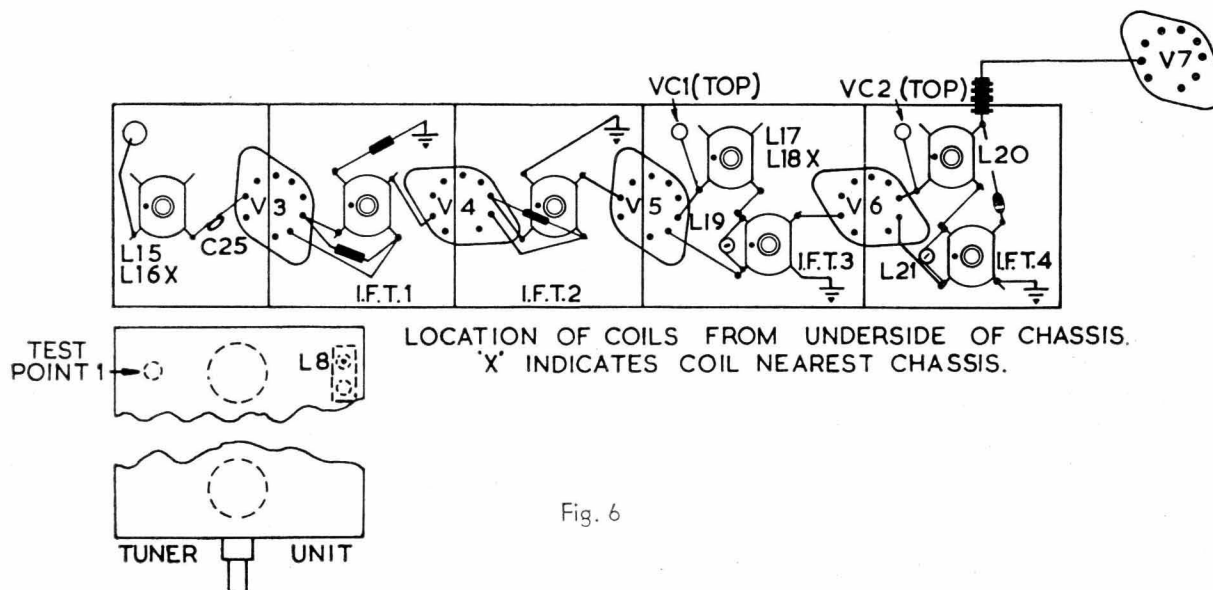


Fig. 6

the output maximum possible at 33.5 Mc/s with the core in the position closest to the chassis, adjust the core in IFT1 to give the maximum possible output at 36.0 mc/s with the core in the position closest to the chassis, and then using both cores, obtain the response shown in C.

(4) Remove the sweep generator output from the junction of C25 and L16 and connect it to the test point 1 on the turret. Switch the turret to position 12. Adjust the core in L8 to give the maximum response at 34.65 Mc/s. Adjust the core in L16 to the position nearest the chassis which peaks at 34.65 Mc/s, and then using both L8 and L16 cores, obtain the response shown in D.

(5) Increase capacity of VC1 so that the

peak response falls about $1\frac{1}{2}$ db. and then adjust VC2 to make the peak response fall a further $1\frac{1}{2}$ db. Vary both to obtain E as closely as possible and, if necessary, make an alteration to the setting of IFT4.

(6) Insert a core into L17 and adjust for minimum response at 37.5 Mc/s. Insert a core into L15 and adjust to set the 30.5 Mc/s marker in the middle of the step created by this coil.

(7) Make any small, final adjustments that may prove necessary to obtain the end result shown in F.

Note that L19 and L21 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 8 A.V.O. or similar type).
- (iii) A D.C. V.T.V.M.
- (iv) A peak-to-peak detector as shown.

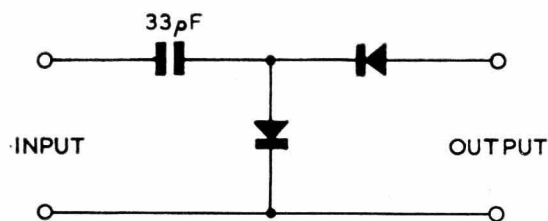


Fig. 7 — Peak-to-peak Detector

5.5 MC/S. NULL TRAP (IFT4)

IFT5 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 swept 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. Only the primary core should be retuned as the secondary core (nearest chassis) is sealed in the factory.

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

I.F. RESPONSES

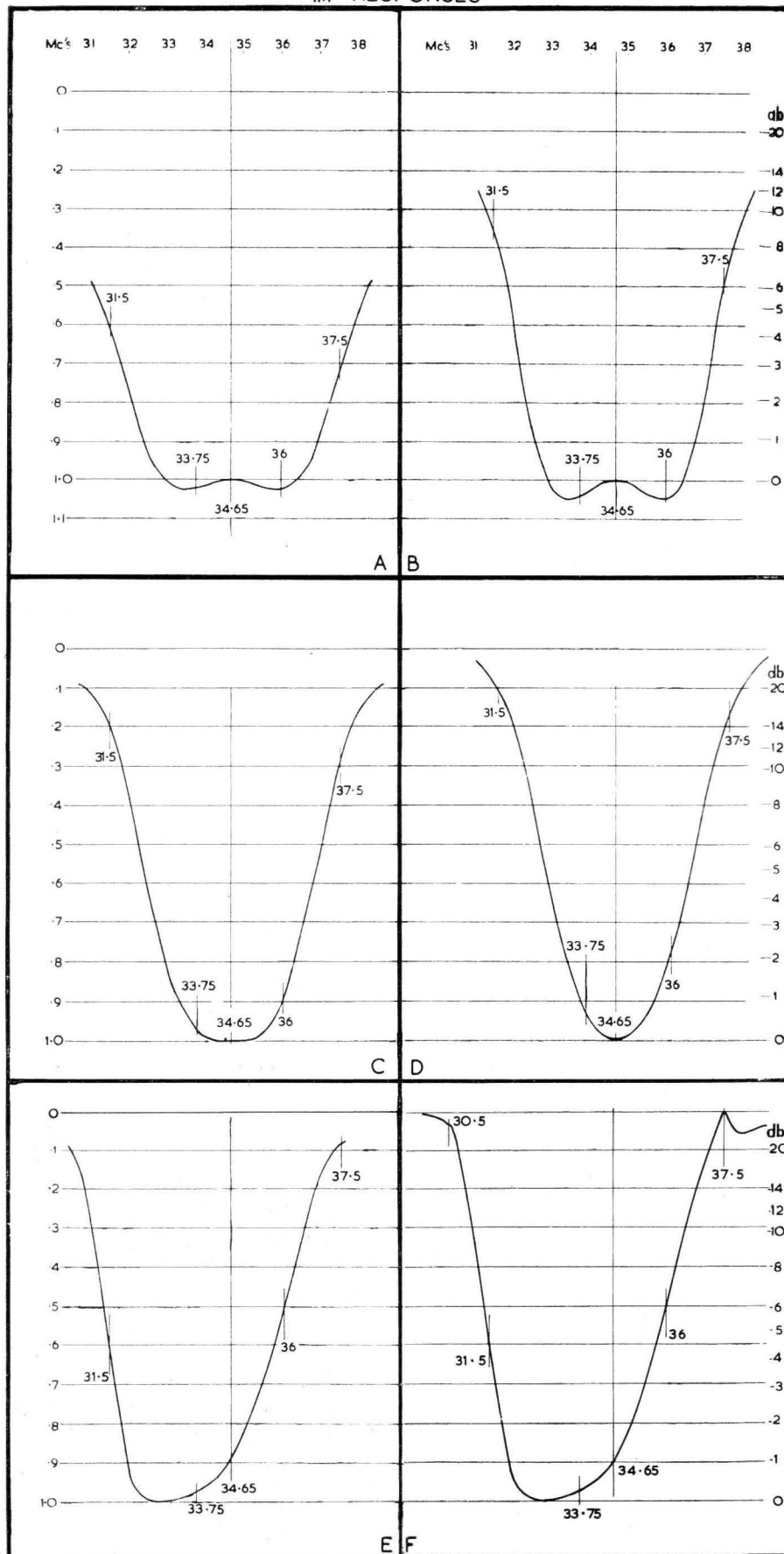


Fig. 8 — Oscilloscope Patterns Obtained with Sweep Oscillator Input.

- (1) Inject 5.5 Mc/s C.W. at approximately 100 mV between L22 and earth (disconnecting L22 from C36 and MR1).
- (2) Connect the input of the peak-to-peak detector illustrated to C.R.T. Pin 11. Connect output of peak - to - peak detector to 20,000 ohm/volt meter on 50 micro-amps. range.
- (3) Adjust primary core of IFT5 to give zero reading on meter. NOTE: Do not move secondary core.

If IFT5 is replaced, a similar method is used, but adjustment of both primary and secondary cores is necessary. Set up as in (1) and (2) above, and proceed as follows:

- (3) Withdraw both cores to end of former, and then screw in primary core until a minimum reading is obtained on meter.
- (4) Screw in secondary core until meter reading increases slightly.
- (5) Screw out primary core until meter reading reaches new minimum.

- (6) Repeat (3) and (4) until a ZERO reading is obtained.
- (7) Seal secondary coil.

SOUND I.F.

- (1) Connect the output of the C.W. Oscillator between grid (Pin 2) of V12 and earth and tune the core of L29 amplifier anode coil to obtain maximum negative reading across the 10K. metering resistor, R75, measured with a D.C. V.T.V.M.
- (2) Using the same input, connect V.T.V.M. between junction of R80 and R81, and earth. Set the cores of IFT6, ratio transformer, until they are $\frac{3}{8}$ " from ends of former. Rotate top (primary) core of IFT6 one turn in either direction. Continue tuning core in the direction that increases the positive reading, until a maximum is obtained. Screw in bottom (secondary) core of IFT6 so that the reading becomes more positive and then falls rapidly through zero to a negative potential. Carefully adjust core so that the meter reads exactly zero volts.

PARTS LIST

RESISTORS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
R15	740-0252	1.5K ohms \pm 10% BTS	R79	740-0102	22K ohms \pm 10% BTS
R16	740-0612	10K ohms \pm 20% BTS	R80	740-0092	15K ohms \pm 10% BTS
R17	740-0483	56 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R81	740-0092	15K ohms \pm 10% BTS
R18	740-0032	2.2K ohms \pm 10% BTS	R82	740-0122	47K ohms \pm 10% BTS
R19	742-0142	270K ohms \pm 10% BTA	R83	740-0102	22K ohms \pm 10% BTS
R20	742-0142	270K ohms \pm 10% BTA	R84	740-0122	47K ohms \pm 10% BTS
R21	740-0112	27K ohms \pm 10% BTS	R85	740-0702	56K ohms \pm 10% BTS
R22	740-0483	56 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R86	742-0122	150K ohms \pm 10% BTA
R23	740-0693	150 ohms \pm 20% $\frac{1}{2}$ W. Morganite	R87	742-0122	150K ohms \pm 10% BTA
R24	740-0302	1.8K ohms \pm 10% BTS	R88	740-0252	1.5K ohms \pm 10% BTS
R25	740-0653	100 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R89	740-0242	33K ohms \pm 10% BTS
R26	740-0693	150 ohms \pm 20% $\frac{1}{2}$ W. Morganite	R90	740-0112	27K ohms \pm 10% BTS
R27	740-0052	3.3K ohms \pm 10% BTS	R91	740-0362	390K ohms \pm 10% BTS
R27a	740-0273	150 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R92	740-0182	470K ohms \pm 10% BTS
R28	740-0572	1K ohm \pm 20% BTS	R93	740-0182	470K ohms \pm 10% BTS
R29	740-0572	1K ohm \pm 20% BTS	R94	740-0182	470K ohms \pm 10% BTS
R30	740-0043	2.7K ohms \pm 10% $\frac{1}{2}$ W. Morganite	R95	742-0502	390 ohms \pm 10% BTA
R31	740-0322	1.2K ohms \pm 10% BTS	R96	742-0502	390 ohms \pm 10% BTA
R32	740-0382	6.8K ohms \pm 10% BTS	R97	748-0102	470 ohms \pm 10% BW1
R33	749-0191	680 ohms \pm 10% BTB	R98	748-0102	470 ohms \pm 10% BW1
R34	749-0191	680 ohms \pm 10% BTB	R99	742-0252	10K ohms \pm 10% BTA
R35	749-0191	680 ohms \pm 10% BTB	R100	742-0392	47K ohms \pm 20% BTA
R36	749-0191	680 ohms \pm 10% BTB	R101	740-0082	10K ohms \pm 10% BTS
R37	740-0713	47 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R102	740-0082	10K ohms \pm 10% BTS
R38	740-0392	330K ohms \pm 10% BTS	R103	740-0082	10K ohms \pm 10% BTS
R39	740-0622	470K ohms \pm 20% BTS	R104	742-0172	470K ohms \pm 10% BTA
R40	740-0732	12K ohms \pm 10% BTS	R105	740-0142	100K ohms \pm 10% BTS
R41	740-0262	560 ohms \pm 10% BTS	R106	740-0072	4.7K ohms \pm 10% BTS
R42	740-0262	560 ohms \pm 10% BTS	R107	740-0122	47K ohms \pm 10% BTS
R43	746-0222	3.9 ohms \pm 5% BW $\frac{1}{2}$	R108	740-0202	2.2 Megohms \pm 10% BTS
R44	750-0141	22 ohms \pm 5% Reco.	R109	740-0522	220K ohms \pm 20% BTS
R45	742-0752	10K ohms \pm 20% BTA	R110	742-0752	10K ohms \pm 20% BTA
R46	742-0712	2.2K ohms \pm 20% BTA	R111	742-0752	10K ohms \pm 20% BTA
R47	742-0712	2.2K ohms \pm 20% BTA	R112	742-0322	1K ohm \pm 20% BTA
R48	740-0583	47K ohms \pm 20% $\frac{1}{2}$ W. Morganite	R113	742-0322	1K ohm \pm 20% BTA
R49	742-0772	3.9 Megohms \pm 10% BTA	R114	742-0312	330 ohms \pm 10% BTA
R50	742-0222	4.7 Megohms \pm 10% BTA	R115a	750-0201	2.0 ohms)
R51	742-0352	1 Megohm \pm 20% BTA	R115b	750-0201	2.0 ohms)
R51a	742-0172	470K ohms \pm 10% BTA	R116a	750-0201	1.2 ohms) Resistor Strip
R52	742-0432	18K ohms \pm 10% BTA	R116b	750-0201	2.4 ohms)
R53	742-0762	12K ohms \pm 10% BTA	R116c	750-0201	4.8 ohms)
R54	740-0862	18K ohms \pm 10% BTS	R117	740-0732	12K ohms \pm 10% BTS
R55	742-0902	82K ohms \pm 20% BTA	R118	740-0192	1 Megohm \pm 10% BTS
R56	740-0112	27K ohms \pm 10% BTS	R119	742-0582	120K ohms \pm 10% BTA
R57	742-0522	820K ohms \pm 10% BTA	R120	742-0582	120K ohms \pm 10% BTA
R58	742-0132	220K ohms \pm 10% BTA	R121	749-0181	22K ohms \pm 10% BTB
R59	740-0782	120K ohms \pm 10% BTS	R122	740-0612	10K ohms \pm 20% BTS
R60	740-0082	10K ohms \pm 10% BTS	R123	740-0182	470K ohms \pm 10% BTS
R61	740-0082	10K ohms \pm 10% BTS	R124	740-0142	100K ohms \pm 10% BTS
R62	740-0822	33K ohms \pm 20% BTS	R125	742-0492	68K ohms \pm 10% BTA
R63	740-0202	2.2 Megohms \pm 10% BTS	R126	740-0122	47K ohms \pm 10% BTS
R64	742-0762	12K ohms \pm 10% BTA	R127	740-0392	330K ohms \pm 10% BTS
R65	740-0242	33K ohms \pm 10% BTS	R128	740-0512	100K ohms \pm 20% BTS
R66	740-0202	2.2 Megohms \pm 10% BTS	R129	740-0152	150K ohms \pm 10% BTS
R67	742-0162	390K ohms \pm 10% BTA	R130	740-0142	100K ohms \pm 10% BTS
R68	742-0092	47K ohms \pm 10% BTA	R131	740-0242	33K ohms \pm 10% BTS
R69	740-0092	15K ohms \pm 10% BTS	R132	742-0392	47K ohms \pm 20% BTA
R70	742-0142	270K ohms \pm 10% BTA	R133	742-0562	470K ohms \pm 20% BTA
R71	742-0142	270K ohms \pm 10% BTA	R134	742-0432	18K ohms \pm 10% BTA
R72	740-0273	150 ohms \pm 10% $\frac{1}{2}$ W. Morganite	R135	740-0572	1K ohm \pm 20% BTS
R73	740-0142	100K ohms \pm 10% BTS	R136	750-0161	3.3K ohms Reco \pm 5% 5 Watts
R74	740-0122	47K ohms \pm 10% BTS	R137	746-0242	1.0 ohm \pm 10% BW $\frac{1}{2}$
R75	740-0082	10K ohms \pm 10% BTS	R138	740-0152	150K ohms \pm 10% BTS
R76	740-0612	10K ohms \pm 20% BTS	R139	742-0132	220K ohms \pm 10% BTA
R77	749-0051	47K ohms \pm 20% BTB	R140	740-0492	1.5 Megohms \pm 20% BTS
R78	740-0742	2.2K ohms \pm 20% BTS	R141	742-0492	68K ohms \pm 10% BTA

CAPACITORS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
C24	273-0591	68 pF. \pm 1 pF. Silver Mica M.S.	C34	280-1311	.0033 Mfd. Plastic Tubular 20% DFB 418
C25	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C35	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.
C26	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C36	271-0151	6.8 pF. \pm $\frac{1}{2}$ pF. Tubular Ceramic NPO
C27	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C37	271-0131	8.2 pF. \pm $\frac{1}{2}$ pF. Tubular Ceramic NPO
C28	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C37a	271-0131	8.2 pF. \pm $\frac{1}{2}$ pF. Tubular Ceramic NPO
C29	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C38	280-0251	.001 Plastic Tube 10% DFB 212
C30	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C39	279-4581	.0047 Mfd. \pm 10% Paper Tubular 400V.
C31	273-0591	68 pF. \pm 1 pF. Silver Mica M.S.	C40	269-0401	40 Mfd. Electrolytic 250 V.W. (With C42)
C32	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C41	269-0441	200 Mfd. Electrolytic 250 V.W. (With C43)
C33	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C42	269-0401	80 Mfd. Electrolytic 250 V.W. (With C40)

PARTS LIST

CAPACITORS — continued

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
C43	269-0441	100 Mfd. Electrolytic 250 V.W. (With C41)	C77	269-0221	25 Mfd. Electrolytic 40 P.V.
C44	279-1161	.22 Mfd. \pm 20% Paper Tube 200 V.W.	C78	269-0401	40 Mfd. Electrolytic 250 V.W. (With C86)
C45	279-1161	.22 Mfd. \pm 20% Paper Tube 200 V.W.	C79	269-0211	8 Mfd. Electrolytic 350 P.V.
C46	271-0231	68 pF. \pm 10% Ceramic 3KV N750	C80	279-1541	.0022 Mfd. \pm 20% Paper Tube 400 V.W.
C47	279-1161	.22 Mfd. \pm 20% Paper Tube 200 V.W.	C81	279-0281	1 Mfd. \pm 25% Metallised Paper 200 V.W.
C48	271-0221	2.2 pF. \pm $\frac{1}{2}$ pF. Bead NPO	C82	279-1541	.0022 Mfd. \pm 10% Paper Tube 400 V.W.
C49	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C83	279-1541	.0022 Mfd. \pm 20% Paper Tube 400 V.W.
C50	279-4661	.022 Mfd. \pm 10% Paper Tube 400 V.W.	C84	279-4721	.068 Mfd. \pm 10% Paper Tube 400 V.W.
C51	280-1791	220 pF. Plastic Tubular 10% DFB 604	C85	279-1161	.22 Mfd. \pm 20% Paper Tube 200 V.W.
C52	271-0221	2.2 pF. \pm $\frac{1}{2}$ pF. Bead NPO	C86	269-0401	80 Mfd. Electrolytic 250 P.V. (With C78)
C53	279-1121	.1 Mfd. \pm 20% Paper Tube 200 V.W.	C87	279-4741	.1 Mfd. \pm 10% Paper Tube 400 V.W.
C55	526-2701	.8 pF. Lead Capacitor	C88	279-1661	.047 Mfd. \pm 20% Paper Tube 400 V.W.
C56	280-0041	.0022 Mfd. \pm 5% Plastic Tubular DFB 216	C89	269-0361	100 Mfd. Electrolytic 40 P.V. 25 V.W.
C57	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C90	280-1791	220 Mfd. \pm 10% Plastic Tubular D.F.B. 604 600V.
C58	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C91	279-0281	1.0 Mfd. \pm 25% Metallised Paper 200 V.W.
C59	273-0561	10 pF. \pm 10% I.F. Type	C92	273-0821	33 pF. \pm 5% Silver Mica M.S.
C60	271-0151	6.8 pF. \pm $\frac{1}{2}$ pF. Ceramic Tube NPO	C93	280-0331	.0047 Mfd. \pm 10% Plastic Tubular DFB 220
C61	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C94	280-0331	.0047 Mfd. \pm 10% Plastic Tubular DFB 220
C62	273-0631	330 pF. \pm 10% Mica M.S.	C95	280-0821	.0039 Mfd. \pm 5% Plastic Tubular DFB 419 400V.
C63	273-0561	10 pF. \pm 10% I.F. Type	C96	279-1121	.1 Mfd. \pm 20% Paper Tube 200 V.W.
C64	271-0031	.0033 Mfd. \pm 100% — 0% Ceramic Disc 500V Wkg.	C97	280-1851	680 pF. \pm 10% Plastic Tubular DFB 610 600V.
C65	273-0331	100 pF. \pm 10% I.F. Type	C98	279-1121	.1 Mfd. \pm 20% Paper Tube 200 V.W.
C66	280-1501	100 pF. \pm 5% Plastic Tubular DFB 600	C99	273-0541	47 pF. \pm 10% Silver Mica M.S.
C67	280-1501	100 pF. \pm 5% Plastic Tubular DFB 600	C100	279-1661	.022 Mfd. \pm 20% Paper Tube 400 V.W.
C68	269-0371	10 Mfd. Electrolytic 40 P.V. 25 V.W.	C101	279-1581	.0047 Mfd. \pm 20% Paper Tubular 400 V.W.
C69	279-4021	.015 Mfd. \pm 10% Paper Tube 200 V.W.	C102	279-1661	.022 Mfd. \pm 20% Paper Tubular 400 V.W.
C70	280-0311	.0033 Mfd. \pm 10% Plastic Tubular DFB218 200V.	C103	279-1121	.1 Mfd. \pm 20% Paper Tube 200 V.W.
C71	280-1851	680 pF. \pm 10% Plastic Tubular DFB610 600V.	C104	279-5161	.022 Mfd. \pm 10% Paper Tube 600 V.W.
C72	279-4001	.01 Mfd. \pm 10% Paper Tube 200 V.W.	C105	279-2241	.1 Mfd. \pm 20% Paper Tube 600 V.W.
C73	280-1751	100 pF. \pm 10% Plastic Tubular DFB 600	C106	279-1781	.22 Mfd. \pm 20% Paper Tube 400 V.W.
C74	279-1621	.01 Mfd. \pm 20% Paper Tube 400 V.W.			
C75	279-1621	.01 Mfd. \pm 20% Paper Tube 400 V.W.			
C76	269-0221	25 Mfd. Electrolytic 40 P.V.			

COILS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
L15 }	259-0811	1st I.F. Grid and Trap	L23	259-0771	Video Peaking (Series)
L16 }			L24	259-0022	Video Peaking (Shunt)
L17 }			L25	259-0031	I.F. Sound Coupling
L18 }			L26	232-0151	Filament Choke
L19	259-0671	Coupling Trimmer	L27	232-0151	Filament Choke
L20	259-0611	4th I.F. Anode	L28	259-0623	Width Coil
L21	259-0671	Coupling Trimmer	L29	259-0042	Coil — Anti-Parasitic
L22	259-0741	Video Peaking (Grid)	L30	259-0042	Coil — Anti-Parasitic

MISCELLANEOUS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
VR1	677-0351	500K Curve A (Brightness)	VR8	677-0362	50K Curve A (Height)
VR2	677-0421	500K E.C. Curve A (A.G.C.)	VR9	677-0351	500K Curve A (Vert. Hold)
VR3	677-0171	25K E.C. Curve A (50V. Adjustment)	VR10	677-0341	250K E.C. Curve A (Hor. Drive)
VR4	677-0341	250K E.C. Curve A (Contrast Range)	VR11	677-0471	25K E.C. Curve A (Hor. Hold)
VR5	677-0331	10K Curve A (Contrast)	VC1	281-0131	Capacitor Trimmer
VR6	677-0372	500K Curve C (Tone)	VC2	281-0131	Capacitor Trimmer
VR7	677-0331	1 Megohm Tap 500K Curve A (Volume)	IFT1	906-0151	Transformer I.F.
			IFT2	906-0151	Transformer I.F.
			IFT3	906-0162	Transformer I.F.
			IFT4	906-0171	Transformer I.F.

PARTS LIST

MISCELLANEOUS — *continued*

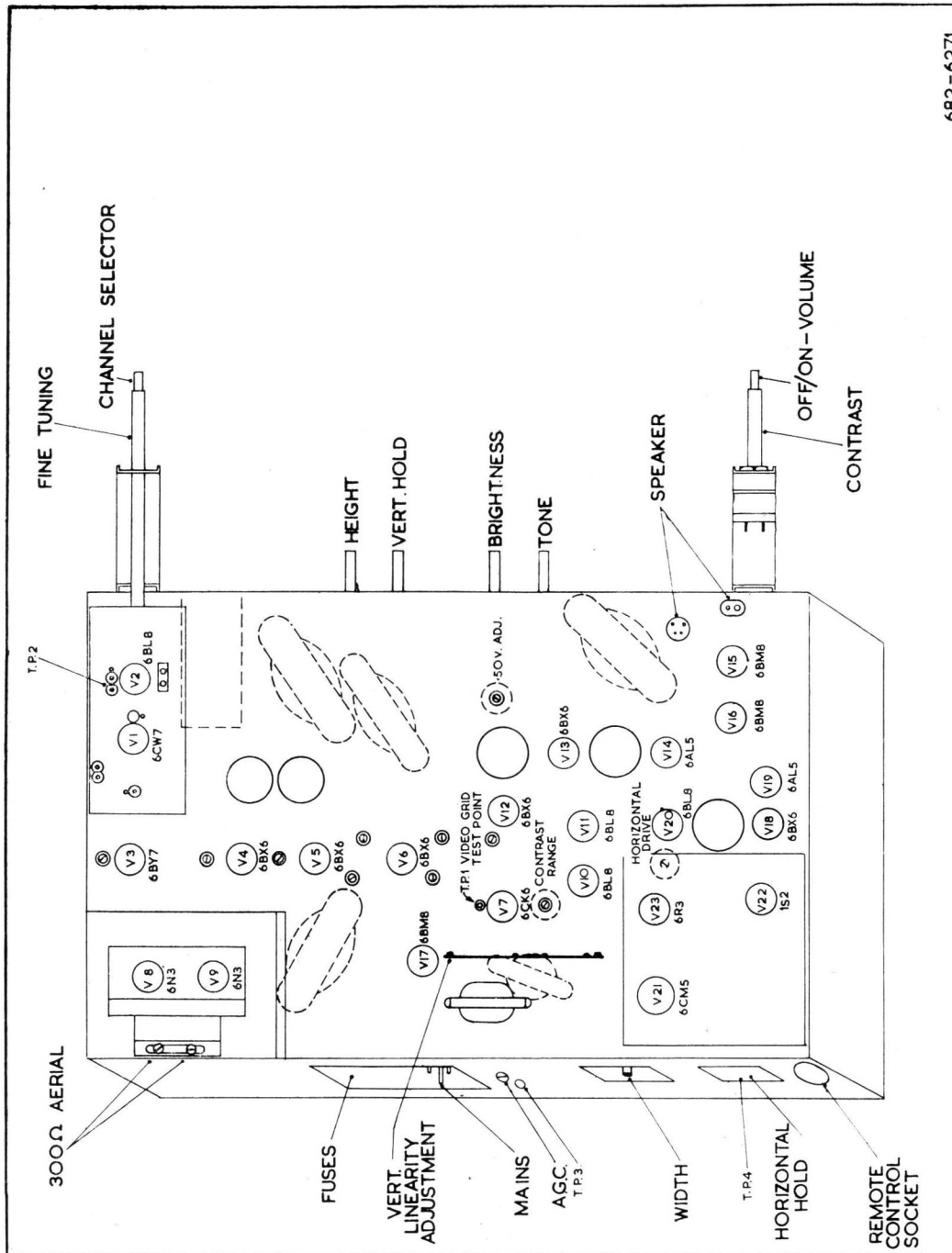
REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
IFT5	906-0181	Transformer I.F. and Trap	V4	932-0521	6BX6 Valve
IFT6	906-0101	Transformer I.F. (Ratio Det.)	V5	932-0521	6BX6 Valve
TR1	904-0182	Transformer Power	V6	932-0521	6BX6 Valve
TR2	905-0201	Transformer Audio	V7	932-0661	6CK6 Valve
TR3	908-0052	Transformer Blocking Oscillator	V8	932-0551	6N3 Valve
TR4	905-0221	Transformer Frame Output	V9	932-0551	6N3 Valve
TR5	908-0181	Transformer Vertical Feedback	V10	932-0501	6BL8 Valve
TR6	908-0111	Transformer Sync. Coupling	V11	932-0501	6BL8 Valve
TR7	908-0191	Transformer Horizontal Osc.	V12	932-0521	6BX6 Valve
TR8	908-0173	Transformer Horizontal Output	V13	932-0521	6BX6 Valve
CH1	232-0122	Choke 1.5H 300 mA.	V14	932-0491	6AL5 Valve
CH2	232-0112	Choke 2.9H 150 mA.	V15	932-0511	6BM8 Valve
MR1	932-0971	Diode 0A90	V16	932-0511	6BM8 Valve
MR2	932-0791	Diode 0A81	V17	932-0511	6BM8 Valve
MR3	932-0991	Diode M3	V18	932-0521	6BX6 Valve
C.R.T.	932-0671	21ALP4-A 21in. Picture Tube	V19	932-0491	6AL5 Valve
	or	with ion trap	V20	932-0501	6BL8 Valve
	932-0871	AW53-80 21in. Picture Tube	V21	932-0531	6CM5 Valve
		with ion trap	V22	932-0771	1S2 Valve
V3	932-0881	6BY7 Valve ±	V23	932-0561	6R3 Valve
				224-0721	Tuner Assembly

THE GRAMOPHONE COMPANY LIMITED

(Incorporated in England)

HOME BUSH : : N.S.W.

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



VOLTAGE TABLE

All measurements are taken with a vacuum-tube voltmeter and with nominal mains voltage.

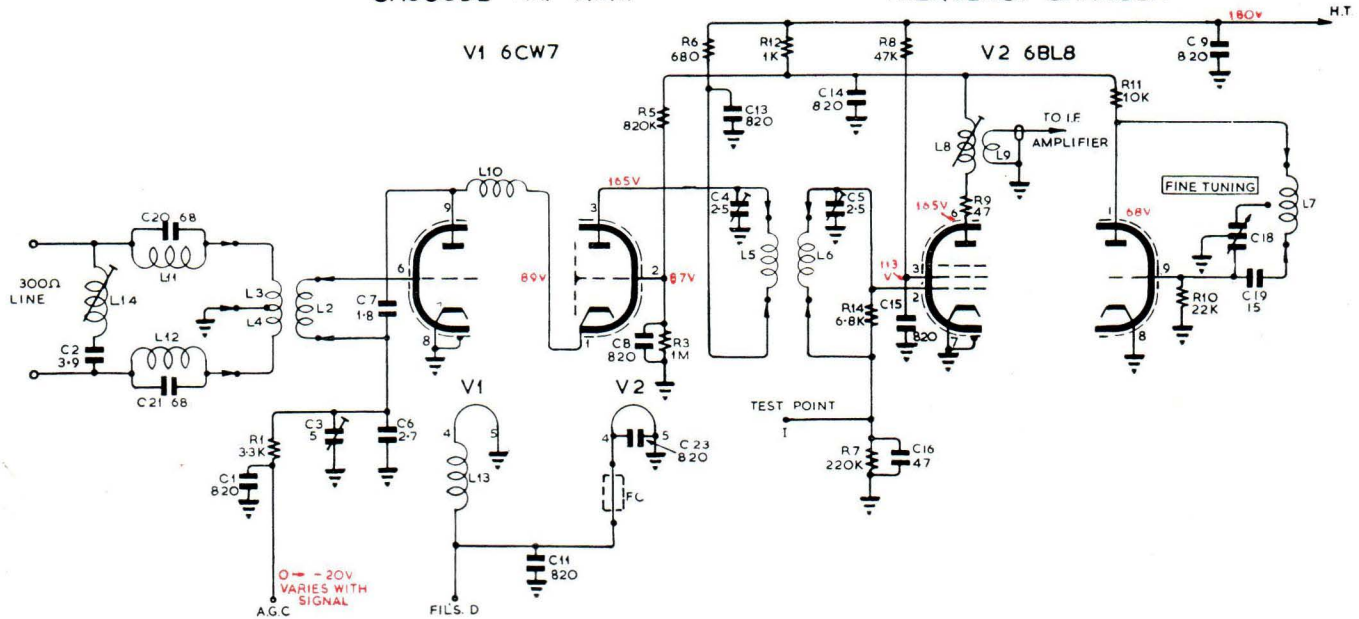
VALVE No.	FUNCTION	TYPE	PENTODE SECTION				TRIODE SECTION			COMMENTS
			ANODE	G2	K	G1	ANODE	K	G1	
1	R.F. Amplifier	6CW7	165	—	89	87	89	0	0	Both sections are Triodes. *This is Min. Negative Voltage.
2	Frequency Changer	6BL8	165	113	0	-2.5*	68	0	-4*	
3	1st I.F. Amplifier	6BY7	105	105	0.3	-1.9	—	—	—	*G1 earthed when readings taken.
4	2nd I.F. Amplifier	6BX6	210	210	105	104	—	—	—	
5	3rd I.F. Amplifier	6BX6	105	105	0.9	0	—	—	—	
6	4th I.F. Amplifier	6BX6	180*	180*	2.2	0	—	—	—	
7	Video Amplifier	6CK6	100	210	1.8	-2.2	—	—	—	Diode. Diode.
8	Power Rectifier	6N3	245AC	—	245	—	—	—	—	
9	Power Rectifier	6N3	245AC	—	245	—	—	—	—	Pentode Anode fed with Line Pulse
10	A.G.C. and Noise Inverter	6BL8	—	115	55	33	100	55	27	
11	Horiz. & Vert. Sync. Separators	6BL8	150	50	0	-5	45	0	-5	Both sections are Diodes. Voltages subject to considerable variation with no signal input.
12	Intercarrier Amplifier	6BX6	210	210	105	104	—	—	—	
13	Limiter	6BX6	60	58	0	-0.6	—	—	—	
14	Ratio Detector	6AL5	0	—	4.5	—	-4.5	0	—	
15	Sound Output and Amplifier	6BM8	205	210	16	0	110	1.4	0	Both sections are Diodes. Voltages subject to considerable variation with no signal input.
16	Sound Output and Amplifier	6BM8	205	210	16	0	110	1.4	0	
17	Vert. Output and Oscillator	6BM8	190	200	15	0	90	0	-25	
18	Reactance Valve	6BX6	210	180	0	-3.2	—	—	—	
19	Phase Discriminator	6AL5	-3.4	—	—	—	-3.5	—	—	*High Voltage. Do not measure. *High Voltage. Do not measure. *High Voltage. Do not measure.
20	Horizontal Osc. and Drive	6BL8	100	120	0	-6	150	0	-20	
21	Horizontal Output	6CM5	*	140	0	-50	—	—	—	
22	E.H.T. Rectifier	1S2	*	—	16KV	—	—	—	—	
23	Damping Diode	6R3	225	—	*	—	—	—	—	G1 Voltage adjusted on Test at Factory.
	TYPE		ANODE	G2	K	G1	G4			
G.R.T.	Picture Tube	21ALP4	16KV	530	100	0-80V.	0,225 or 530 V.			

Condition of Measurement:

Brightness — Normal.
Width and Height — Normal.
Contrast — Maximum.
Tuner — No Signal. Aerial Short Circuited.
No Remote Control Unit.

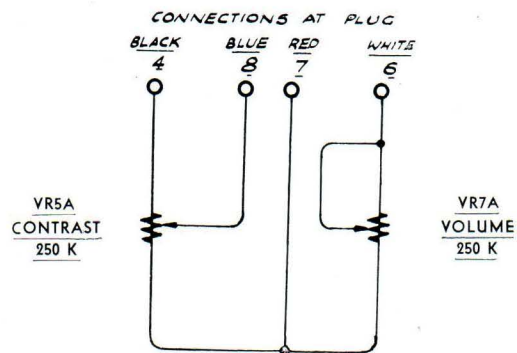
HT1: 225V.
HT2: 210V.
HT3: 180V.
Boost HT: 530V.
Reactance Bias: -3.4 on Wiper of Control.
Filaments: 6.3V. A.C.
Current Fuse 2 (250 mA Anti-Surge): 220 mA.
Current Fuse 3 (250 mA): 140 mA.

FREQUENCY CHANGER



CIRCUIT DIAGRAM — TUNER

REMOTE CONTROL



CIRCUIT DIAGRAM.

"H·M·V" CHASSIS TYPE F3

