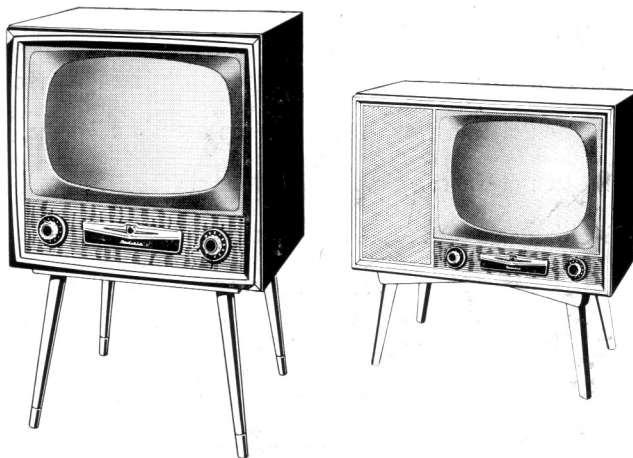


TECHNICAL INFORMATION AND SERVICE DATA



A.W.A. RADIOLA TELEVISION RECEIVER

Models 204-T and 205-C

(21 inch, 24 Valves, A.C. Operated)

Issued by Amalgamated Wireless (Australasia) Ltd.

GENERAL DESCRIPTION

The Models 204-T and 205-C are "21-inch," 24-valve, A.C. operated Television Receivers.

Features of design include: Inter-carrier F.M. system; Ratio Detector, Aluminised Kinescope, Amplified A.G.C., A.F.C. Horizontal Hold, Twin Loudspeakers.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE: Approximately 261 sq. ins. on a 21ALP4A Kinescope.

TELEVISION CHANNELS: All 10 V.H.F. channels.
(Refer Alignment Procedure)

INTERMEDIATE FREQUENCIES

Video I.F. Carrier Frequency 36.0 Mc/s

Sound I.F. Carrier Frequency 30.5 Mc/s

POWER CONSUMPTION: 200 watts max.

UNDISTORTED AUDIO POWER OUTPUT: 5 watts max.

LOUDSPEAKERS—

Model 204-T:

7" x 5" Permanent Magnet No. 21034 and

7" x 5" Permanent Magnet No. 21045.

Model 205-C:

9" x 6" Permanent Magnet No. 21520 and

9" x 6" Permanent Magnet No. 21519.

Transformer No. 21147.

V.C. Impedance of combination.

6—8 ohms at 400 c/s.

VALVE COMPLEMENT:

- (1) Radiotron 6BQ7A R.F. Amplifier
- (2) Radiotron 6U8 R.F. Oscillator and Converter
- (3) Radiotron 6AU6 1st Sound I.F. Amplifier
- (4) Radiotron 6AU6 2nd Sound I.F. Amplifier
- (5) Radiotron 6AL5 Ratio Detector
- (6) Radiotron 6AV6 A.F. Amplifier
- (7) Radiotron 6AQ5 A.F. Output
- (8) Radiotron 6BA6 1st Video I.F. Amplifier
- (9) Radiotron 6CB6 2nd Video I.F. Amplifier
- (10) Radiotron 6CB6 3rd Video I.F. Amplifier
- (11) Radiotron 6CB6 4th Video I.F. Amplifier
- (12) Radiotron 6AL5 . Video Detector and A.G.C. Clamp
- (13) Radiotron 12BY7 Video Amplifier
- (14) Radiotron 6CB6 A.G.C. Amplifier
- (15) Radiotron 6SN7GTA Vertical Sync. Separator
and Horizontal Sync. Separator
- (16) Radiotron 6SN7GTA Sync. Amplifier and
Vertical Oscillator
- (17) Radiotron 6AQ5 Vertical Output
- (18) Radiotron 6SN7GTA Horizontal Control and
Horizontal Oscillator
- (19) Radiotron 6DQ6A Horizontal Output
- (20) Radiotron 6AX4GT Damper
- (21) Radiotron 1B3GT High Voltage Rectifier
- (22) Radiotron 5AS4 Rectifier
- (23) Radiotron 5AS4 Rectifier
- (24) Radiotron 21ALP4A Kinescope

AERIAL INPUT IMPEDANCE

Choice—300 ohms balanced, or 72 ohms unbalanced.

VIDEO RESPONSE To 4.25 Mc/s

FOCUS Electrostatic (Low Voltage)

SWEEP DEFLECTION Magnetic

SCANNING Interlaced, 625 lines

HORIZONTAL SCANNING FREQUENCY 15,625 c/s

VERTICAL SCANNING FREQUENCY 50 c/s

PICTURE REPETITION RATE 25 per second

OPERATING CONTROLS:

Channel Selector	}	Concentric.
Fine Tuning		
Power/Volume	}	Concentric.
Brightness		
Contrast	}	Single Controls under Front Panel.
Horizontal Hold		
Vertical Hold		
Tone		

NON-OPERATING CONTROLS (not including R.F. and I.F. adjustments)

Height screwdriver adjustment under front panel

Vertical Linearity screwdriver adjustment under front panel

Horizontal Drive rear chassis adjustment

Horizontal Sine Wave top chassis adjustment

Horizontal Linearity rear chassis adjustment

Width rear chassis adjustment

A.G.C. Control rear chassis adjustment

Focus rear chassis adjustment

Picture Centring above chassis adjustment

Deflection Yoke above chassis adjustment

Ion Trap Magnet above chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED. MAKE SURE THAT THE EARTH STRAP BETWEEN THE CHASSIS AND THE KINESCOPE ASSEMBLY IS SECURELY FASTENED BEFORE TURNING THE RECEIVER ON.

KINESCOPE HANDLING PRECAUTIONS

DO NOT INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTER-PROOF GOGGLES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

When the receiver has been switched off after operating for a time, the kinescope will retain a certain charge. Therefore it is advisable to discharge it before handling.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. Therefore, kinescopes must be handled with more care than ordinary receiving valves.

The large end of the kinescope bulb, particularly that part at the rim of the viewing surface, must not be struck, scratched or subjected to more than moderate pressure at any time. When installing, if the valve sticks or fails to slip smoothly into its socket or deflecting yoke, do not force it, but investigate and remove the cause of the trouble. All Radiotron replacement kinescopes are packed in special cartons and should be left in the cartons until required for installation.

OPERATING INSTRUCTIONS.

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the POWER/VOLUME control clockwise to switch the receiver "ON" and set the control near the middle of its range. An interval of about one minute is necessary for the valves to heat before satisfactory operation is obtained.
2. Set the CHANNEL SELECTOR to the desired channel.
3. Turn the FINE TUNING control fully anti-clockwise.
4. Adjust the VOLUME control, until the desired volume is obtained.
5. Turn the BRIGHTNESS control to the extreme anti-clockwise position and then clockwise until a pattern appears on the screen.
6. Adjust the VERTICAL hold control until there is no vertical movement of the pattern.
7. Adjust the HORIZONTAL hold control until a picture is obtained.
8. Adjust the FINE TUNING, CONTRAST and BRIGHTNESS controls until the picture contrast and brightness is satisfactory.
9. After switching from one channel to another, it may be necessary to repeat adjustments 3 and 7.

10. When the set is switched on again after an idle period, it should not be necessary to repeat the adjustments unless the positions of the controls have been altered. If any adjustment is necessary, adjustment No. 8 is generally sufficient. However, if the controls have been altered it may be necessary to repeat adjustments 1 to 9.

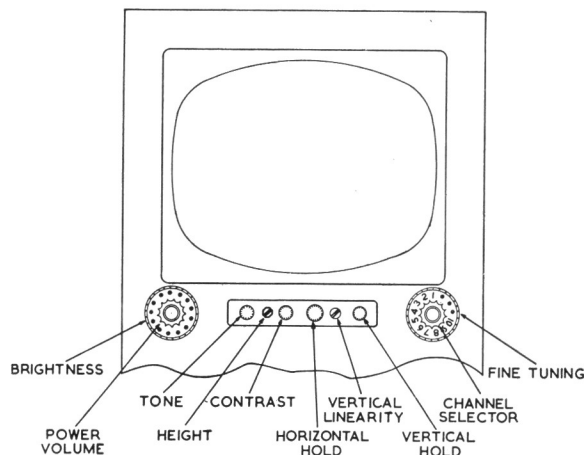


FIG. 1—RECEIVER OPERATING CONTROLS

INSTALLATION INSTRUCTIONS

UNPACKING

These receivers, complete with valves, are packed in cardboard cartons.

Take the receiver from the carton and remove the wooden packing block from the base of the cabinet.

Refer to the label inside the cabinet and make sure that the valves are in their correct sockets and pressed firmly down.

Check to see that the kinescope high voltage lead clip is in place.

Plug the power cable into a 200-240 volts, A.C. Power Point after making sure that the power cable is wired to the correct transformer tap. Refer to the instructions on the cabinet back.

Connect the aerial to be used to the terminals at the rear of the cabinet. The in-built aerial may be used if conditions indicate that satisfactory reception will be obtained.

AERIAL INPUT

A 300 ohm aerial input is provided. However, by rewiring the matching unit input plug, as shown in the circuit diagram, a 72 ohm co-axial cable may be used.

In locations where a very strong signal is likely to cause overloading of the receiver, an attenuator of the type shown in Fig. 10 should be used.

INITIAL OPERATION CHECK

Turn the Power/Volume control clockwise to switch the receiver "ON" and check all operations.

This instrument has been accurately aligned by the manufacturer with precision instruments and should require no further adjustments. However, a check should be made of all the various functions and if further adjustments are found necessary the following should be carried out.

ION TRAP MAGNET ADJUSTMENT

Set the ion trap magnet approximately in the position shown in Fig. 2. Adjust the magnet by moving it backward or forward, at the same time rotating it slightly around the neck of the kinescope, for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Re-adjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control

at the maximum clockwise position with which good line focus can be maintained.

DEFLECTION YOKE ADJUSTMENT (Fig. 2)

If the lines of the raster are not horizontal or squared with the kinescope, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment nuts.

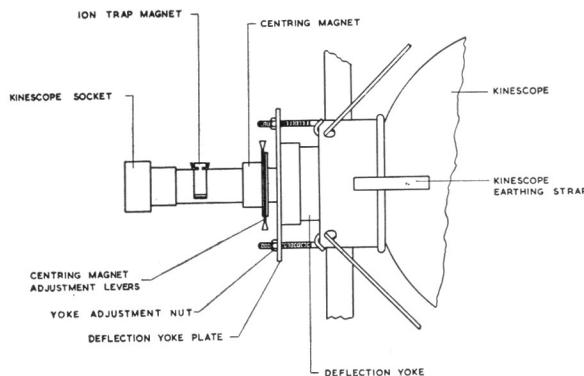


FIG. 2

FOCUS ADJUSTMENT (Fig. 3)

This adjustment has been made at the factory and it should only be necessary to re-adjust if the kinescope is replaced. In this case, adjust the focus control (R231) on the rear of the chassis until maximum definition of the line structure of the raster is obtained.

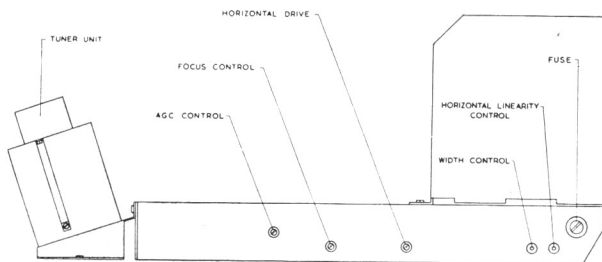


FIG. 3
REAR CHASSIS ADJUSTMENTS

INSTALLATION INSTRUCTIONS

PICTURE ADJUSTMENTS

It will now be necessary to obtain a test pattern or picture in order to make further adjustments.

When the Horizontal Oscillator and A.G.C. system are operating correctly, it should be possible to synchronise the picture at this point. However, if the A.G.C. control is not adjusted correctly and the receiver is overloading, it may be impossible to synchronise the picture.

If the receiver is overloading, turn R311 (on the rear of the chassis, Fig. 3) anti-clockwise until the receiver operates normally and the picture can be synchronised.

CHECK OF HORIZONTAL OSCILLATOR ADJUSTMENT

Turn the horizontal hold control to the extreme clockwise position. The picture will be out of synchronisation with a minimum of 12 bars slanting downwards towards the left. Turn the control slowly anti-clockwise. The number of diagonal black bars will gradually reduce and when only $1\frac{1}{2}$ to 3 bars remain, the picture will synchronise with further slight anti-clockwise rotation of the control. The picture should remain synchronised for approximately two full turns of additional anti-clockwise rotation of the control. Continue to turn the control anti-clockwise until the picture falls out of synchronisation. Turning the control beyond the fall-out position should produce between 2 and 5 bars before motorboating occurs. Motorboating should occur before the extreme anti-clockwise position is reached.

When the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is correctly aligned. Therefore, the "Horizontal Oscillator Adjustment" may be by-passed.

HORIZONTAL OSCILLATOR ADJUSTMENT

If during the above check the receiver failed to hold synchronisation over two full anti-clockwise turns of the control from the pull-in point, the following adjustments are necessary.

Turning the horizontal hold control anti-clockwise will produce a number of bars before motorboating occurs. Adjust the horizontal sine wave coil (L401) until 3 or 4 bars are present before motorboating occurs, when the horizontal hold control is turned anti-clockwise from the fall-out point.

If it is impossible to synchronise the picture and the A.G.C. system is correctly adjusted, it will be necessary to align the Horizontal Oscillator by the method laid down in the Alignment Procedure.

CENTRING ADJUSTMENT

The electrostatic focus kinescope is equipped with special centring magnets. These are in the form of two discs mounted on a non-magnetic tube which is placed around the neck of the kinescope at a distance of about $\frac{1}{4}$ " behind the deflection yoke plate. When the magnets are rotated on the tube so that the levers are opposite, maximum centring effect is produced. To shift the picture, rotate one of the magnets with respect to the other. To shift the picture in the desired direction, rotate the entire centring magnet assembly on the neck of the kinescope. By alternately rotating one magnet with respect to the other, then rotating the entire assembly around the neck of the valve, correct centring of the picture can be obtained.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS

Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage and hence the brightest and best focussed picture, turn the horizontal drive trimmer (C409) anti-clockwise until a bright white line begins to appear in approximately the centre of the raster. Then, turn the control clockwise until the line disappears.

Turn the horizontal linearity control (L402) clockwise until the picture begins to cramp on the right-hand side and then anti-clockwise until the cramping disappears and the best linearity is obtained.

Adjust the width control (L404) to obtain correct picture width. This is with the picture extending approximately $\frac{3}{4}$ " on either side of the kinescope mask and normal picture brightness.

A slight re-adjustment of these three controls may now be necessary to obtain the best linearity.

Adjustments of the horizontal drive control affect the horizontal hold and locking range. Therefore, re-check the oscillator alignment.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS

The height control (R334) has more effect on the bottom of the picture than the top, tending to give bottom stretch or cramp, depending on the setting of the control. The opposite effect is noticeable with variation of the vertical linearity control (R341) in that it tends to give top stretch or cramp depending on its position. Therefore, to adjust for height and linearity, the two controls should be adjusted in conjunction, so that approximately $\frac{1}{2}$ " of the picture extends beyond the top and bottom of the kinescope mask while maintaining the best linearity from top to bottom. The centring may have to be adjusted to obtain the above condition.

A.G.C. THRESHOLD CONTROL

The A.G.C. threshold control (R311) is adjusted at the factory and should not require any further re-adjustment.

To check the adjustment, tune in a strong signal and synchronise the picture. Momentarily remove the signal by switching off the channel and back again. If the picture reappears immediately, the receiver is not overloading, due to incorrect setting of R311. If the picture does not re-appear immediately, or bends excessively, R311 should be re-adjusted.

Turn R311 fully anti-clockwise. The raster may be bent slightly, but this should be disregarded. Now turn R311 clockwise until there is a very slight bend or change of bend in the picture. Then turn R311 anti-clockwise just enough to remove this bend or change of bend.

If the signal is weak, the above method may not work, as it may be impossible to get the picture to bend. In this case, turn R311 clockwise until the snow in the picture becomes more pronounced, then anti-clockwise until the best signal to noise ratio is obtained.

The A.G.C. control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, the receiver may overload when a strong signal is received.

INSTALLATION INSTRUCTIONS

CHASSIS REMOVAL

To remove the chassis from the cabinet, for repair or the installation of a new kinescope, proceed as follows:

Remove the control knobs by pulling them straight off their spindles.

Disconnect the loudspeaker, aerial, yoke, high voltage cables and kinescope cradle earthing strap.

Disconnect the kinescope socket.

The chassis is held in the cabinet by 5 bolts through the base of the cabinet. Removal of these enables the chassis to be withdrawn.

KINESCOPE HANDLING PRECAUTIONS

Do not install, remove or handle the kinescope in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while handling kinescopes.

Keep the kinescope away from the body while handling.

REMOVAL AND INSTALLATION OF KINESCOPE

First disconnect the kinescope socket, yoke and high voltage cables.

Loosen 2 winged nuts in the front roof of the cabinet.

Remove the top glass retainer, safety glass and mask.

Remove 4 hexagon screws from the slide rails of the kinescope assembly.

Gently slide the kinescope and cradle out from the front of the cabinet and place face down on a covered table to avoid scratching.

Slide the centring magnet and ion trap magnet from the neck of the kinescope.

Remove the deflection yoke retaining plate and deflection yoke.

Unscrew two turnbuckles on the rods holding the deflection yoke hood to the kinescope bulb.

Loosen two screws on either side of the straps around the kinescope bulb and ease the cradle and deflection yoke hood from the kinescope.

Replace the kinescope by reversing the removal procedure, making sure that the dust seal is in its correct position.

When viewed from the rear of the cabinet, the high voltage contact on the kinescope should be on the right hand side.

When re-tightening the screws on the straps around the kinescope bulb, tighten them evenly and equally.

SAFETY GLASS REMOVAL

Remove the cabinet back and loosen two winged nuts in the front roof of the cabinet.

Remove the top glass retainer and the safety glass will be free to lift out.

When replacing the glass, carry out the above instructions in reverse.

RECEIVER LOCATION

The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen to agree with the following—

Away from windows so that bright light will not shine directly on the screen or in the viewer's eyes. However, some illumination in the room is desirable.

To give easy access for operation and comfortable viewing.

To permit convenient connection of the external aerial.

Convenient to a power point.

To allow adequate ventilation.

REPLACEMENT OF FUSES

The 1.5A mains fuse is accessible through a hole in the rear cover at the bottom right hand corner. When replacing this fuse, make certain that the receiver is disconnected from the power mains.

The 375 mA B+ fuse is only accessible on removal of the rear cover. Before removing this fuse, ensure that the set is switched off. Even when this is done there is a possibility of shock, if the fuse has blown, due to charge retained by C421. To avoid this, short together the two fuse terminals before attempting to replace this fuse.

ALIGNMENT PROCEDURE

TESTING INSTRUMENTS

To properly service the television receiver, it is recommended that the following testing equipment be available—

(1) A.W.A. Television Sweep Generator, type A56036.

(2) A.W.A. Cathode Ray Oscilloscope (C.R.O.), type A56031.

(3) A.W.A. Television Calibrator, type A56057.

(4) A.W.A. Voltohmyst, type A56010.

(5) A.W.A. Universal Measuring Bridge, type A56048.

AUSTRALIAN TELEVISION CHANNELS

Channel No.	Picture Carrier Freq. Mc/s	Sound Carrier Freq. Mc/s	Receiver R.F. Osc. Freq. Mc/s
1	50.25	55.75	86.25
2	64.25	69.75	100.25
3	86.25	91.75	122.25
4	133.25	138.75	169.25
5	140.25	145.75	176.25
6	175.25	180.75	211.25
7	182.25	187.75	218.25
8	189.25	194.75	225.25
9	196.25	201.75	232.25
10	210.25	215.75	246.25

SOUND I.F. ALIGNMENT

NOTE: When two positions of the core appear to give the correct adjustment, the following apply:—

* coil tuned with core close to chassis.

† coil tuned with core close to can top.

Connect the output of the Television Calibrator to pin 1 of V204 (4th Video I.F.).

Set the Calibrator frequency at 5.5 Mc/s.

Connect the Voltohmyst D.C. probe to pin 1 of V103 and set the range switch at +5 volts D.C.

Adjust the following transformers for a peak output, reducing the input so that the Voltohmyst maintains a reading of +5 volts. T102 secondary (bottom core)*, T102 primary (top core)†, T101 (bottom core)* and T206 (bottom core)*.

Disconnect the Voltohmyst probe from V103 and connect it to the junction of R106 and C110.

Re-adjust T102 secondary core for zero voltage reading on the Voltohmyst. The voltage, before re-adjusting, should lie between +0.5 and -0.5 volts.

VIDEO I.F. ALIGNMENT

Connect a source of -5 volts D.C. bias to the junction of R201 and C204.

Turn the A.G.C. control to the extreme clockwise position.

Connect the Voltohmyst D.C. probe to pin 2 of V206 (Video Amplifier).

Connect the output of the calibrator to the tuner (TP2) through a 1000 pF capacitor using short leads. Set the tuner on Channel 6. Set the fine tuning control to its mechanical centre and check that the oscillator frequency is 211.25 Mc/s. \pm 0.5 Mc/s.

Adjust the calibrator to the frequencies shown and adjust the following transformers for a peak output, reducing the input so that the Voltohmyst maintains a reading of approximately -3 volts.

33.5 Mc/s T204 (bottom core)*

35.3 Mc/s T203 (bottom core)*

31.9 Mc/s T202 (bottom core)*

Adjust the calibrator to the frequencies shown and adjust the following for a minimum output, increasing the input to maintain an output of approximately -1 volt.

28.5 Mc/s L202 (bottom core)*

30.5 Mc/s T201 trap (top core)†

37.5 Mc/s L201 (bottom core)*

Disconnect the Voltohmyst.

Connect the C.R.O. to pin 2 of V206 (Video Amplifier) using the network shown in Fig. 4.

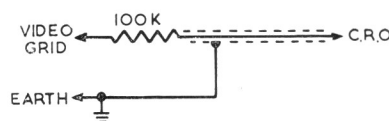


FIG. 4

Connect the sweep generator to pin 1 of V204 (4th Video I.F.). Set the output from the sweep generator at its maximum.

Adjust T205 primary (top core)† and secondary (bottom core)* so that the 36 Mc/s. marker falls at 85% response and the curve is flat topped. The required response is shown in Fig. 5.

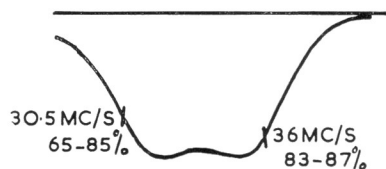


FIG. 5

Connect the sweep generator to the aerial input terminals of the matching unit. Use a 4-pin plug for this purpose and keep the leads to the termination of the sweep output cable very short. It is advisable to have on hand a special cable for connection from tuner to sweep generator with a resistive pad (Fig. 12) having balanced connections, direct to the plug.)

Connect a bias source to the A.G.C. terminal of the tuner and set the bias to -3 volts. The I.F. bias remains at -5 volts. Connect the vertical input of the C.R.O. direct to TP1 on the tuner with a shielded lead. Earth the shield at the tuner.

ALIGNMENT PROCEDURE

Set the sweep generator on channel 6.

Check that the R.F. response as viewed on the C.R.O. conforms with that shown in Figs. 13 and 14.

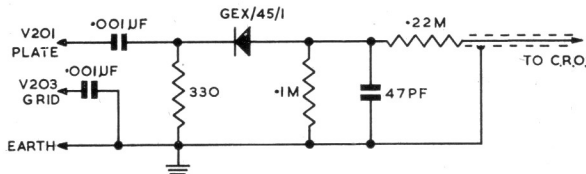


FIG. 6 - LINK CIRCUIT JIG.

Connect the "Link Circuit" jig (Fig. 6) to the chassis next to T203. Connect the crystal lead to pin 5 of V201 (1st Video I.F.) and the "earthy" lead to pin 1 of V203 (3rd Video I.F.). Connect the C.R.O. to the output of the crystal probe.

Loosely couple the calibrator to the plate of V201 making sure that this connection does not change the output waveform.

Set the sweep generator output to give 0.1 volts p/p output on the C.R.O. This corresponds to max. sensitivity on the A.W.A. C.R.O. A56031.

Reduce the capacitance of trimmer C201 to a minimum. Adjust T201 secondary (bottom core)* and T2 core (tuner)* for a round topped response with the 36 Mc/s. marker at 80%. T2 affects the marker position whilst T201 affects the tilt of the response top. Increase the capacitance of C201 to give the 31.75 Mc/s. marker at 70%. Repeat this series of adjustments, if necessary, to give the response curve shown in Fig. 7.

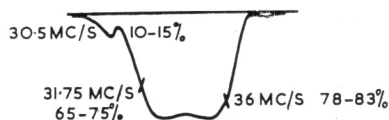


FIG. 7

Remove the "Link Circuit" jig from the chassis and reconnect the C.R.O. to pin 2 of V206 (Video Amplifier).

Loosely couple the calibrator into the I.F. amplifier by connecting it to the I.F. input shield making sure that the output waveform is unchanged by the connection.

View the overall response with 5 volts peak to peak output and re-adjust T204, T203 and T202 if necessary, to give the 36 Mc/s. marker at 45%, the 31.75 Mc/s. marker at 60% and a flat topped response. Increase the C.R.O. gain 10 times and check that the accompanying sound (30.5 Mc/s.) lies between 2% and 4%. The required overall response is shown in Fig. 8.

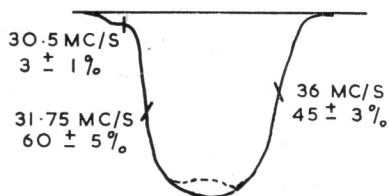


FIG. 8

TUNER ALIGNMENT

A tuner unit which is completely out of alignment, due to most unusual circumstances, should be re-aligned by carrying out the procedure listed below in correct order. In cases where only slight re-adjustment is necessary, due to component or valve failure, the tuned circuits associated with them need only be re-adjusted. In such cases, follow the appropriate procedure.

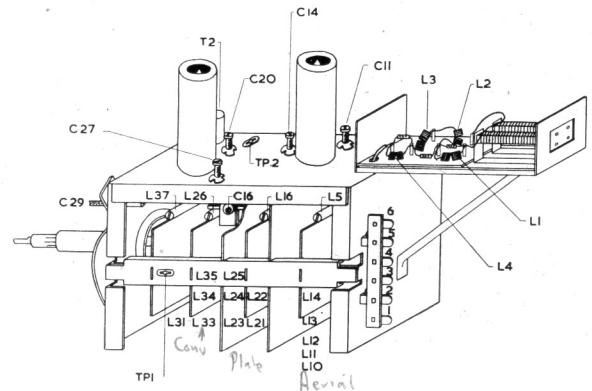


FIG. 9A - TUNER ADJUSTMENTS

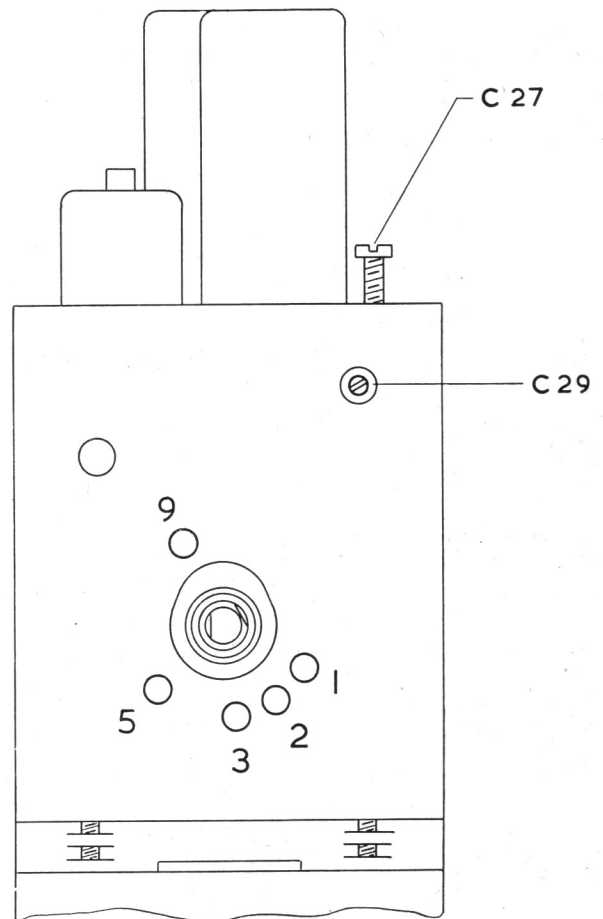


FIG. 9B OSCILLATOR ADJUSTMENTS

ALIGNMENT OF AERIAL MATCHING UNIT

The aerial matching unit is accurately aligned at the factory and no adjustment of the unit should be attempted in the customer's home, since slight mis-adjustment may cause serious attenuation of the signal, especially on channel 1. The R.F. unit is aligned with a particular matching unit in place and if for any reason a new matching unit is installed, the R.F. unit should be re-aligned.

To align the aerial matching unit, disconnect C7 from the junction of C3 and L4. Remove the aerial matching unit from the tuner and clip it to the side of the chassis. Connect the output of the aerial matching unit, via a 1000 pF capacitor, to pin 1 of V202, keeping the leads as short as possible.

ALIGNMENT PROCEDURE

Remove the 1st Video I.F. valve (V201).

Connect a variable bias source to the junction of R201 and C204 and set the bias to approximately -5 volts. Connect the A.W.A. television calibrator to the aerial input socket (with 72 ohms connections) and adjust its output, until a convenient output is measured at the grid of V206. This convenient output may be negative D.C. volts if measured with the A.W.A. Voltomyst, or 400 cycle modulation observed on the C.R.O. if a modulated signal is used. Tune the calibrator to 36.0 Mc/s and adjust the inductance of L1 and L4, by varying the distance between turns, for a minimum output indication.

Remove the 1000 pF capacitor, bias and replace V201.

Connect a 300 ohm $\frac{1}{2}$ watt composition resistor from the junction of C3 and L4 to earth with short leads.

Connect the C.R.O. low capacitance crystal probe across the 300 ohm resistor and turn the C.R.O. gain to maximum.

Connect the sweep generator to the matching unit aerial terminals with the 300 ohm line plug connections. To prevent coupling reactance from the sweep generator into the matching unit, it is advisable to connect a resistance pad (Fig. 10), constructed with short leads, to the input terminals.

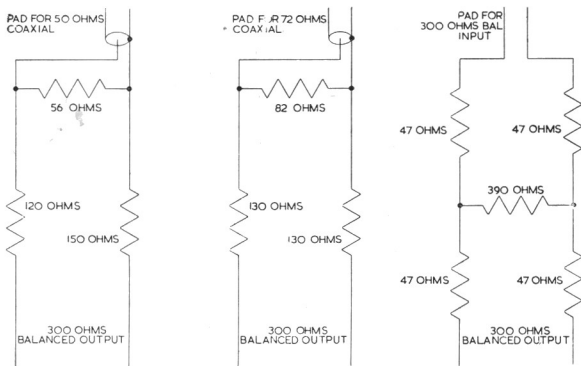


FIG. 10
SWEEP ATTENUATOR PADS

Connect the calibrator loosely to the matching unit terminals. It will be found convenient to use the pad in Fig. 12 for this purpose.

Set the sweep generator to sweep from 42—52 Mc/s. This may be achieved with the A.W.A. Sweep Generator Type A56036 by switching the generator to channel 1 and screwing the core in several turns.

Adjust L2 and L3 to obtain the response shown in Fig. 11. (Note that adjustment to L3 affects the shoulder of the response curve, whilst L2 affects the position of the 46.5 Mc/s point.)

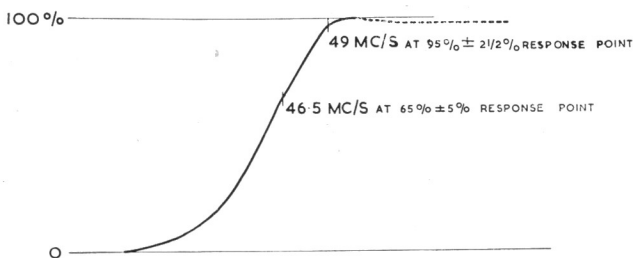


FIG. 11 - AERIAL MATCHING UNIT RESPONSE

Remove the 300 ohm resistor, crystal probe connections, seal L1, L2, L3 and L4 in position and replace covers.

Re-connect C7 to the junction of C3 and L4.

R.F. ALIGNMENT

For complete tuner alignment the tuner must be removed from the receiver. Disconnect the co-axial lead from the I.F. transformer at the junction of C201 and T201. Extension leads for B+, Filament and Earth connections to the tuner will be

required. For final adjustment of oscillator frequencies, the procedure for adjustment of the oscillator with covers in position may be carried out with the tuner mounted in its normal position.

COMPLETE R.F. ALIGNMENT

Remove cover from tuner.

Connect the sweep generator to the aerial input terminals of the matching unit. Use a 4 pin plug for this purpose and keep the leads to the termination of the sweep output cable very short. (It is advisable to have on hand a special cable for connection from tuner to sweep generator with a resistive pad (Fig. 12) having balanced connections, direct to the plug.)

Connect a bias source to the A.G.C. terminal of the tuner and set the bias to -3 volts while making all adjustments for correct responses. Connect the vertical input of the C.R.O. direct to TP1 on the tuner with a shielded lead. Earth the shield at the tuner.

Terminate the inner connector of the I.F. co-axial cable with a 47 ohm composition resistor.

Adjust C29 if necessary such that the end of the core is level with the outer sleeve when the fine tuning control is turned to the extreme clockwise position.

Switch on the receiver or power supply to the tuner and carry out the following adjustments with the correct voltages: 265V H.T., 6.3V Filament and -3 V Bias.

Switch to channel 6 and turn the fine tuning control to the middle of its range.

Loop an insulated wire from the R.F. input terminal of the calibrator around the 6U8 valve with its cover removed.

Switch to channel 10 and adjust L37 to give oscillator frequency of 246.25 Mc/s.

Switch to channel 9 and adjust L38 to give oscillator frequency of 232.25 Mc/s.

Switch to channel 6 and re-adjust C27, if necessary, to 211.25 Mc/s.

Repeat the above procedure until no adjustment is necessary for correct oscillator frequencies on channels 10, 9 and 6 within ± 0.3 Mc/s. Channel 8 and 7 have no separate frequency adjustment, but the frequency will be found to be 225.25 Mc/s and 218.25 Mc/s $\pm .3$ Mc/s respectively, if adjustments of 10, 9 and 6 frequency are carried out correctly. Make sure that the presence of the insulated wire loop from the calibrator does not change the frequencies.

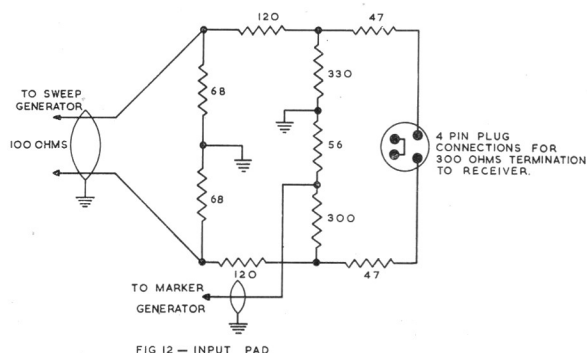


FIG. 12 - INPUT PAD

Connect the calibrator to the input pad from the sweep generator as shown in Fig. 12.

Switch the tuner and sweep generator to channel 6 and adjust the output to give a response pattern on the C.R.O. Detune the core of T2 (Converter I.F. transformer) when adjusting response curves until no variation of curve is observed on the C.R.O. Adjust C11, C14, C16 and C20 for correct response shape, with markers, from calibrator at Video and sound carrier frequencies, correctly placed on the response curve. Be sure that the pattern shown on the C.R.O. is not disturbed by a 50 c/s pick-up. A direct earth strap between tuner, C.R.O. and power supply will eliminate this interference.

ALIGNMENT PROCEDURE

The correct adjustment of C11 is indicated by maximum amplitude at a frequency midway between video and sound markers. C16 is adjusted for the required band-width on top of the response curve. C20 affects the frequency of the response mainly and C14 the symmetry. C11 also affects symmetry and tilt but should always be adjusted for the maximum output in the centre.

Switch the tuner and sweep generator to channel 10 and adjust the calibrator to give video and sound markers. Adjust L5 for maximum output between video and sound markers and L26, L16 for correct curve. L16 affects mainly the frequency of the response and L26 the symmetry.

Return to channel 6 and observe the response curve. If re-adjustment is necessary, repeat the procedure contained in the previous three paragraphs, until correct response is obtained on channels 6 and 10 without re-course to adjustment. Observe the responses on channels 9, 8 and 7 which should be within the tolerances shown in Fig. 13.

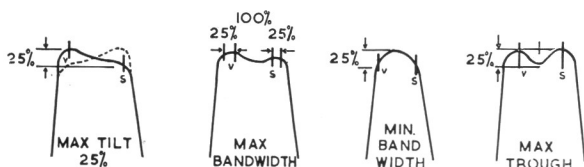


FIG. 13—RESPONSE CURVE TOLERANCES ALL CHANNELS

Re-check the oscillator frequency adjustment as in the first paragraph of this section. If re-adjustment is necessary, check the response curves of channels 10 and 6. Re-adjust if necessary.

Then proceed as follows:

Switch to channel 5 and adjust screw in L42 to give oscillator frequency of 176.25 Mc/s.

Switch to channel 3 and adjust screw in L44 to give oscillator frequency of 122.25 Mc/s.

Switch to channel 2 and adjust screw in L45 to give oscillator frequency of 100.25 Mc/s.

Switch to channel 1 and adjust screw in L46 to give oscillator frequency of 86.25 Mc/s.

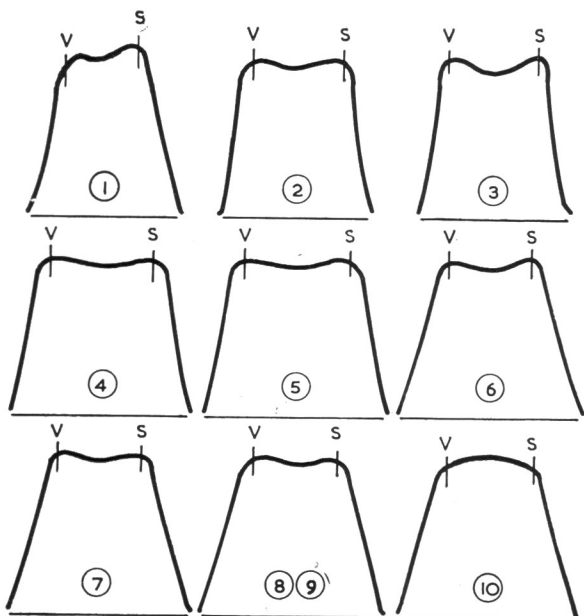


FIG. 14
TUNER RESPONSE CURVES

Switch tuner and sweep generator to channel 5 and spread or close turns of L21 and L31 to give correct curve as shown in Fig. 14. Adjust L10, in the R.F. amplifier grid circuit for maximum response in the centre of the channel. L21 affects the frequency of the response mainly and L31 the symmetry.

Switch to channel 4 and if necessary adjust L22 and L11 for correct response.

Switch to channel 3 and spread or close the turns of L23 and L33 to give approximately the correct response. Spread or close the turns of L12, in grid circuit, for maximum response at the centre frequency which corresponds to the minimum hollow in the top of the curve.

Switch to channels 2 and 1 in turn and adjust—
L24, L34, L13 on channel 2
L25, L35, L12 on channel 1
for correct response curve.

Re-check response curves of channels 10 and 6, and re-adjust C14, C20, L16, L26 if necessary. Then re-check response curves of channels 5, 4, 3, 2 and 1.

FINAL OSCILLATOR ADJUSTMENT

Replace the cover on the tuner unit and with the calibrator R.F. input lead looped around the 6U8 valve, re-adjust C27 on channel 6, L37 on channel 10, L38 on channel 9 for the correct frequency when the fine tuning control is in its central position. Then readjust screws through the front of the tuner for correct frequencies on channels 5, 3, 2 and 1.

Check that the correct frequency on all channels is obtained without adjustments when the fine tuning control is rotated $\pm 45^\circ$ from its centre position. Check that the oscillator injection voltage, measured with the Voltomyst D.C. probe at TP2, is between 2.0 and 5.0 volts.

Make sure that the screws retaining the covers are firmly in position and that the covers are well fitted to maintain a low oscillator radiation.

SPECIAL NOTES

1. Always align with the correct bias of -3 volts which is an average figure of the A.G.C. potential.
2. The cover on the aerial matching unit must be in position whilst adjusting the tuner R.F. responses.
3. The cover of the tuner must be in position when making final adjustment to frequency of local oscillator.
4. Detune the core of T2 (converter I.F. transformer) when adjusting response curves until no variation of the curve is observed on the C.R.O.

HORIZONTAL OSCILLATOR ALIGNMENT

Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment may require the use of an oscilloscope, it usually can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require re-adjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is incorrect.

When no C.R.O. is available the horizontal oscillator may be aligned and checked as follows:

Tune in a station, if available, or, using a generator to provide the appropriate synchronising signals, synchronise the picture by adjusting the horizontal and vertical hold controls respectively. If the picture cannot be synchronised, short circuit the sine wave stabilising coil (L401) and then adjust

ALIGNMENT PROCEDURE

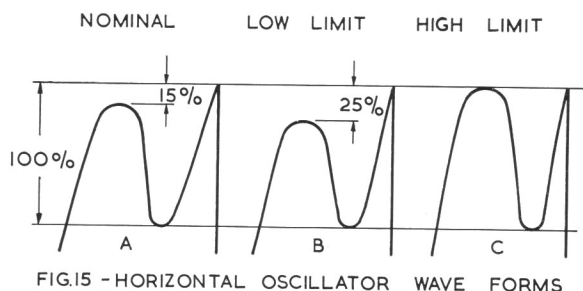
the horizontal hold control until synchronisation is obtained. Remove the short circuit and adjust the core in L401 until the picture is again synchronised. If synchronisation is still unobtainable, adjust the horizontal hold control slowly, in conjunction with the core in L401, until the picture is synchronised.

Check for over-drive and make any necessary re-adjustments to the horizontal hold control or to the core in the sine wave stabilising coil.

To check if the correct adjustment has been made, turn the horizontal hold control to the extreme clockwise position. The picture should be out of synchronisation, with a minimum of twelve bars slanting downwards to the left. Turn the control slowly anti-clockwise. The number of diagonal black bars will be gradually reduced and when only $1\frac{1}{2}$ to 3 bars sloping downward to the left are obtained, the picture will synchronise upon slight additional anti-clockwise rotation of the control. The picture should remain in synchronisation for approximately two full turns of additional anti-clockwise rotation of the control. Continue turning the control anti-clockwise until the picture falls out of synchronisation. Rotation beyond the "fall-out" position should produce between 2 and 5 bars before motorboating occurs. Motorboating should be reached before the control reaches the extreme anti-clockwise position.

If an oscilloscope is available, the procedure is as follows:

Connect the low capacity probe of the C.R.O. to the terminal of L401 which is connected to C406 and R408. Dress the probe at least one inch away from the sine wave coil (L401). Turn the horizontal hold control so that the picture is in synchronisation. The pattern on the C.R.O. should be as shown in Fig.



CRITICAL LEAD-DRESS

1. All leads in the video I.F., sound I.F. and video circuits to be as short as possible.
2. Any non-insulated carbon resistors to be dressed so as to avoid possible contact with the chassis or other components.
3. Bypass capacitor (C105) under sound I.F. shield to be laid in such a way as to avoid a short to shield.
4. The following components in the video amplifier stage to be kept clear of the chassis and other metal parts in order to avoid excessive stray capacitances: C228, C229, C232, L206, L207, L208, R224, R229.
5. High voltage capacitors C416, C417, C418 and C419 to be dressed so as to avoid possible breakdown to chassis or other components.

15A. If not, adjust the sine wave coil until nominal waveform, as shown, is obtained. Remove the C.R.O. on completion of this adjustment.

When the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned.

SENSITIVITY CHECK

A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the service department aerial to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the aerial. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the contrast control is in the extreme clockwise position. Only carbon type resistors should be used to construct the pad.

A.G.C. CONTROL ADJUSTMENT

Disconnect all test instruments except the oscilloscope which should be connected to pin 7 of V206.

Connect an aerial to the receiver aerial terminals.

Turn the A.G.C. control to the extreme anti-clockwise position.

Tune in a strong signal and adjust the oscilloscope to see the video waveform.

Turn the A.G.C. control clockwise until the tips of sync. begin to be compressed and then anti-clockwise until no compression is obtained.

RESPONSE CURVES

The response curves referred to throughout the alignment procedure were taken from a production set, but some variations can be expected.

6. High voltage leads to the plate of V402 and the side connection of the kinescope to be dressed as far from adjacent metal parts as possible.
7. All high voltage (16KV) wiring and connections to be kept free of sharp spikes and discontinuities likely to cause corona.
8. Any high wattage resistors (wire wound) to be dressed clear of other components which may be damaged because of fairly high body temperature.
9. Dress power leads away from the volume control and 6AV6 input circuit.
10. When the chassis is mounted in the cabinet, keep the lead to the cathode of the kinescope dressed clear of the metal parts of the chassis and the high voltage yoke leads.

FAULT FINDING

The following is a list of symptoms and some suggestions for their possible cause:

NO RASTER ON KINESCOPE

1. Incorrect adjustment of ion trap magnet. Magnet reversed either front to back or top to bottom.
2. V401 or V402 not operating. Check waveforms on grids.
3. No high voltage. If horizontal deflection is operating as shown by the correct voltage at terminal (1) of the high voltage transformer, the trouble can be isolated to the 1B3GT circuit. Either the T402 high voltage winding is open circuit, the 1B3GT valve is defective or its filament circuit is open.
4. V206 circuit defective. Refer to the circuit diagram and waveforms.
5. Damper valve (V403) defective.
6. Kinescope defective.
7. Brightness control open circuit.
8. No receiver anode voltage (B+). Filter capacitor short-circuited, or filter choke open circuit.

NO VERTICAL DEFLECTION

1. V303B or V304 defective. Check voltage and waveforms on grids and plates.
2. T302 open circuit.
3. Vertical deflection coils open circuit.

SMALL RASTER

1. Low B+ or mains voltage.
2. V402, V405 or V406 defective.

POOR VERTICAL LINEARITY

1. If adjustments cannot correct, change V304.
2. Vertical output transformer (T302) defective.
3. V303B defective. Check voltage and waveforms on grid and plate.
4. C317, C318, C319, C320 or C322 defective.
5. Low anode voltage. Check rectifiers and capacitors in supply circuits.
6. If height is insufficient, try changing V303.

POOR HORIZONTAL LINEARITY

1. If adjustments do not correct, change V402 or V403.
2. T402 or L402 defective.
3. C414 or C415 defective.

CRAMPING ON SIDE OF RASTER

1. C420 defective.
2. Yoke defective.

PICTURE OUT OF SYNCHRONISATION HORIZONTALLY

1. T401 incorrectly tuned.
2. L401 incorrectly tuned.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER

1. Incorrect adjustment of centring or ion trap magnets.
2. Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND

1. T206 defective.
2. Sound I.F. ratio detector or audio amplifier inoperative. Check V101, V102, V103 and their socket voltages.
3. Audio system defective.
4. Loudspeaker defective.

SIGNAL AT KINESCOPE BUT NO SYNCHRONISATION

1. A.G.C. control (R311) incorrectly adjusted.
2. V301 inoperative. Check voltage and waveforms at its anode and grid.

SIGNAL ON KINESCOPE CATHODE BUT NO VERTICAL SYNCHRONISATION

1. Check V303B and its associated circuit.
2. Integrating network inoperative—check.
3. V302A, V303A or associated circuit defective.
4. Gas current, grid emission or grid cathode leakage in V302, V303. Replace.

SIGNAL ON KINESCOPE CATHODE BUT NO HORIZONTAL SYNCHRONISATION

1. T401 or L401 incorrectly adjusted.
2. V302B or V303A inoperative. Check socket voltage and waveforms.
3. T401 or L401 defective.
4. C401, C402, C403, C404, C405, C406, C312 or C313 defective.
5. If horizontal speed is completely off and cannot be adjusted, check R407, R408, R412, R413 and R414.

PICTURE STABLE BUT POOR RESOLUTION

1. V205 or V206 defective.
2. Peaking coils defective. Check resistance.
3. R.F. and I.F. circuits incorrectly aligned.

PICTURE SMEAR

1. R.F. or I.F. circuits incorrectly aligned.
2. Open circuit peaking coil.
3. This trouble can originate at the transmitter. Check on another station.

PICTURE JITTER

1. A.G.C. control (R311) incorrectly adjusted.
2. If regular sections at the left of the picture are displaced, change V402.
3. Vertical instability may be due to loose connections or noise.
4. Horizontal instability may be due to unstable transmitted signal.

RASTER BUT NO SOUND, PICTURE OR SYNCHRONISATION

1. Defective aerial or transmission line.
2. R.F. oscillator off frequency.
3. R.F. unit inoperative. Check V1 and V2.
4. One of video I.F. stages or video detector defective.

D.C. RESISTANCE OF WINDINGS

WINDING	D.C. RESISTANCE IN OHMS	WINDING	D.C. RESISTANCE IN OHMS
Tuner Windings	*	T202 1st Video I.F. Transformer	
L201 37.5 Mc/s Trap	*	Primary	*
L202 28.5 Mc/s Trap	*	Secondary	*
L203 I.F. Filter Choke	*	T203 2nd Video I.F. Transformer	
L204 Video Detector Filter Choke	3	Primary	*
L205 Video Detector Peaking Coil	7.5	Secondary	*
L206 5.5 Mc/s Trap	1.5	T204 3rd Video I.F. Transformer	
L207 Video Amplifier Shunt Peaking Coil	12	Primary	*
L208 Video Amplifier Series Peaking Coil	6	Secondary	*
L401 Horizontal Sine Wave Coil	45	T205 4th Video I.F. Transformer	
L402 Horizontal Linearity Coil	19	Primary	*
L403 H.T. Choke	*	Secondary	*
L404 Width Coil		T206 Sound Take Off Transformer	
Red—T402	12	2—3	1.6
Red—R417	3.3	1—3	4.7
L405 Deflection Yoke	22	T301 Vertical Oscillator Transformer	
L406 Deflection Yoke	22	Primary (Grid)	450
L407 Deflection Yoke	15	Secondary (Cathode)	130
L408 Deflection Yoke	15	T302 Vertical Output Transformer	
L409 Filter Choke	40	Primary	550
T101 Sound I.F. Transformer	1	Secondary	14
102 Ratio Detector Transformer		T401 Horizontal Blocking Oscillator Transformer	
Primary	8	YE—Anode	23
Secondary	*	YE—C405	60
T103 Audio Output Transformer		T402 Horizontal Output Transformer	
Primary	380	1—2	4
Secondary	*	2—3	20
T201 I.F. Link Transformer		3—4	9.5
Primary	*	4—5	12
Secondary	*	5—Anode	300
		T403 Power Transformer	
		Primary	7
		Secondary	45

* Less than 1 ohm.

The above readings were taken on a standard chassis, but substitution of materials during manufacture may cause variations and it should not be assumed that a component is faulty if a slightly different reading is obtained.

MECHANICAL REPLACEMENT PARTS

Description.	Part No.	Code No.	Description.	Part No.	Code No.
MAIN CHASSIS:—			FINE TUNING ASSEMBLY:—		
Anode Cap. H.V. Rectifier		188011	Detent Mech. Assembly		40144
Anode Cap. and Lead. Horizontal Output	40044		Guide, Fine Tuning Spring		40140
Base, Tuner Mounting	40727		Lever Assembly		40165
Bracket, Chassis. Rear Mounting	40201		Retainer, Spring. Fine Tuning		40141
Bracket, Chassis. Side Mounting	40214		Spring, Fine Tuning		40502
Bracket, Width and Linearity Coils	40213		Spring, Lever		40500
Cable, Volume Control	49711		Spring, Wiper		40507
Clip, Bakelite Mounting		211019			
Clip, Chassis Mounting		211022			
Connector, Kinescope Ultor	40018				
Coupling, Contrast Control	40206				
Cover, Power Transformer	40025				
Dial Lamp Holder	4195				
Dial Lamp Holder Spring	25773				
Fuse Holder (B+)	40209				
Fuse Holder (Mains)		400024			
Insulator, Contrast Control Mounting	40725				
Insulator, H.V. Rectifier Socket Mounting	40030				
Magnet, Centring	40405				
Magnet, Ion Trap	40247				
Plate, ON/OFF—Vol. Brightness	40200				
Plate, Preset Control Mounting	40196				
Plug, Speaker		481215			
Retainer, Yoke	40243				
Screen, I.F. Input	40215				
Screen, Sound I.F.	40012				
Shield, H.V. Rectifier	40034				
Shield, Horizontal Output Transformer	40036				
Shield Cover, Horizontal Output Transformer	40037				
Socket, Kinescope		794598			
Socket, 8 Pin Wafer		793036			
Socket 7 Pin Less Register		794576			
Socket, 7 Pin Less Register Mica Filled		794578			
Socket, 7 Pin with Register		794574			
Socket, 8 Pin Mica Filled		794582			
Socket, 9 Pin Mica Filled		794591			
Spindle, Contrast Control Extension	40205				
Spring, Earthing Deflection Yoke	40564				
Spring, Contact. Chassis to Base Shield	40509				
Terminal Panel, Aerial	40411				
TUNER UNIT:—			MISCELLANEOUS:—		
Tuner	40129		Bracket, Control Box Mounting		40292
Bracket, Support	40724		Cabinet, Console		28146
Cable, Tuner to I.F.	49714		Cabinet, Table		28141
Cover, Main Body	40152		Cabinet Trim, Horizontal		40739
Cover, Front	40153		Cabinet Trim, Vertical		40738
Pin Jack Assembly	27685		Clamp, Baffle (204-T)		40728
Terminal Panel Assembly	40612		Control Box Assembly		40289
			Cover, Kinescope Base		40732
			Cradle, Strap Assembly L.H.		40745
			Cradle, Strap Assembly R.H.		40746
			Dust Seal, Kinescope		40731
			Glass Retainer. Top		40715
			Glass Retainer. Bottom		40717
			Hood Assembly		40712
			Hood Cushion		40714
			Hood Support		40707
			Hood Support Stud		40238
			Knob Assembly, Brightness		40229
			Knob Assembly, Channel Selector		40733
			Knob Assembly, Fine Tuning		40226
			Knob Assembly, ON/OFF Volume		40228
			Knob, Horizontal Hold		40197
			Plate, Speaker Mounting (204-T)		40264
			Mask, Kinescope		40713
			Retainer, Horizontal Hold Knob		40198
			Safety Glass		40701
			Strap, Earthing. Kinescope Mount to Chassis		40710
			Washer, Horizontal Hold Knob		40199

SOCKET VOLTAGES

No signal input. A.G.C. maximum clockwise. All D.C. voltages measured with Voltomyst. All voltages in Tuner (V1, V2) measured with Voltomyst with 0.1 megohm resistor in series with the D.C. probe.

* Do not measure.

† Measured with Voltomyst fitted with high voltage probe.

NOTE: These voltages were taken on a typical chassis, but some variations should be expected on individual chassis.

Valve No.	Type and Function	Anode to Chassis		Screen Grid to Chassis		Cathode to Chassis		Control Grid to Chassis		Remarks
		Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V1	6BQ7A R.F. Amplifier	6	250	—	—	8	130	7	128	
	R.F. Amplifier	1	130	—	—	3	1.2	2	0	
V2	6U8 Converter	6	120	3	120	7	0	2	—2 to —5	
	R.F. Oscillator	1	230	—	—	8	120	9	115	
V101	6AU6 1st Sound I.F.	5	132	6	132	7	0.75	1	—0.25	
V102	6AU6 2nd Sound I.F.	5	132	6	132	7	0	1	—2.4	
V103	6AL5 Ratio Detector	2	—8.5	—	—	5	2.2	—	—	
		7	2.3	—	—	1	8.6	—	—	
V104	6AV6 A.F. Amplifier	7	96	—	—	2	.03	1	—0.91	
V105	6AQ5 A.F. Output	5	253	6	268	2	11.9	7	0	
V201	6BA6 1st Video I.F. Amplifier	5	131	6	131	7	1.6	1	0	
V202	6CB6 2nd Video I.F. Amplifier	5	255	6	255	2	144	1	144	
V203	6CB6 3rd Video I.F. Amplifier	5	126	6	126	2	0.94	1	0	
V204	6CB6 4th Video I.F. Amplifier	5	205	6	137	2	1.6	1	0	
V205	6AL5 Video Detector	7	—0.91	—	—	1	0	—	—	
	A.G.C. Clamp	2	—0.1 to +0.4	—	—	5	0	—	—	
V206	12BY7 Video Amplifier	7	158	8	144	1	0.70	2	—0.86	
V207	21ALP4A Kinescope	Side Contact	15.5KV†	10	420	11	80	2	0 to 135	Pin 2—With variation of brightness control. Side contact—Zero Beam Current. NOTE: Pin 6 = 550V Focus Control maximum clockwise.
V301	6CB6 A.G.C. Amplifier	5	2 to 8	6	280	2.7	135	1	35 to 50	
V302A	½6SN7GTA Vertical Sync. Separator	2	70	—	—	3	0	1	—6 to —12	
V302B	½6SN7GTA Horizontal Sync. Separator	5	280	—	—	6	140	4	125	
V303A	½6SN7GTA Sync. Amplifier	5	50	—	—	6	0	4	—1 to +1	
V303B	½6SN7GTA Vertical Oscillator	2	140	—	—	3	0	1	—34	With height and linearity controls adjusted for correct raster.
V304	6AQ5 Vertical Output	5	250	6	260	2	22	1	0	
V401	6SN7GTA Horizontal Control	2	280	—	—	3	1 to 10	1	—17	Oscillator frequency approx. 15,625 c/s.
	6SN7GTA Horizontal Oscillator	5	200	—	—	6	0	4	—90	
V402	6DQ6A Horizontal Output	Top Cap	5.6KV Peak*	4	160	8	9.5	5	—25	
V403	1B3GT High Voltage Rectifier	Top Cap	15.5KV Peak*	—	—	7.2	15.5KV†	—	—	
V404	6AX4GT Damper	5	280	—	—	3	4.2KV Peak*	—	—	
V405	5AS4 Rectifier	4, 6	270 A.C.	—	—	2.8	290	—	—	
V406	5AS4 Rectifier	4, 6	270 A.C.	—	—	2.8	290	—	—	

Junction of C413 and C415, 680V D.C.

In some chassis, R415 was a 20K ohms 2 watt resistor
 In some chassis, C111 was an 0.047 uf \pm 10% 200V paper capacitor
 In some chassis, C210 was a 470 pf \pm 100% — Hi-K ceramic disc
 In some chassis, C210 was a 470 pf \pm 100% —0% Hi-K ceramic disc
 In some chassis, C407 was an 0.001 uf \pm 10% 1,000V paper capacitor
 In some chassis, R408 was a 68K ohms \pm 10% 1/2 watt resistor
 In some chassis, C420 was a 150 pf 2,500V tubular capacitor
 In some chassis, R421 was a 4.7K ohms \pm 10% 1/2 watt resistor
 In some chassis, T103 was No. 21147

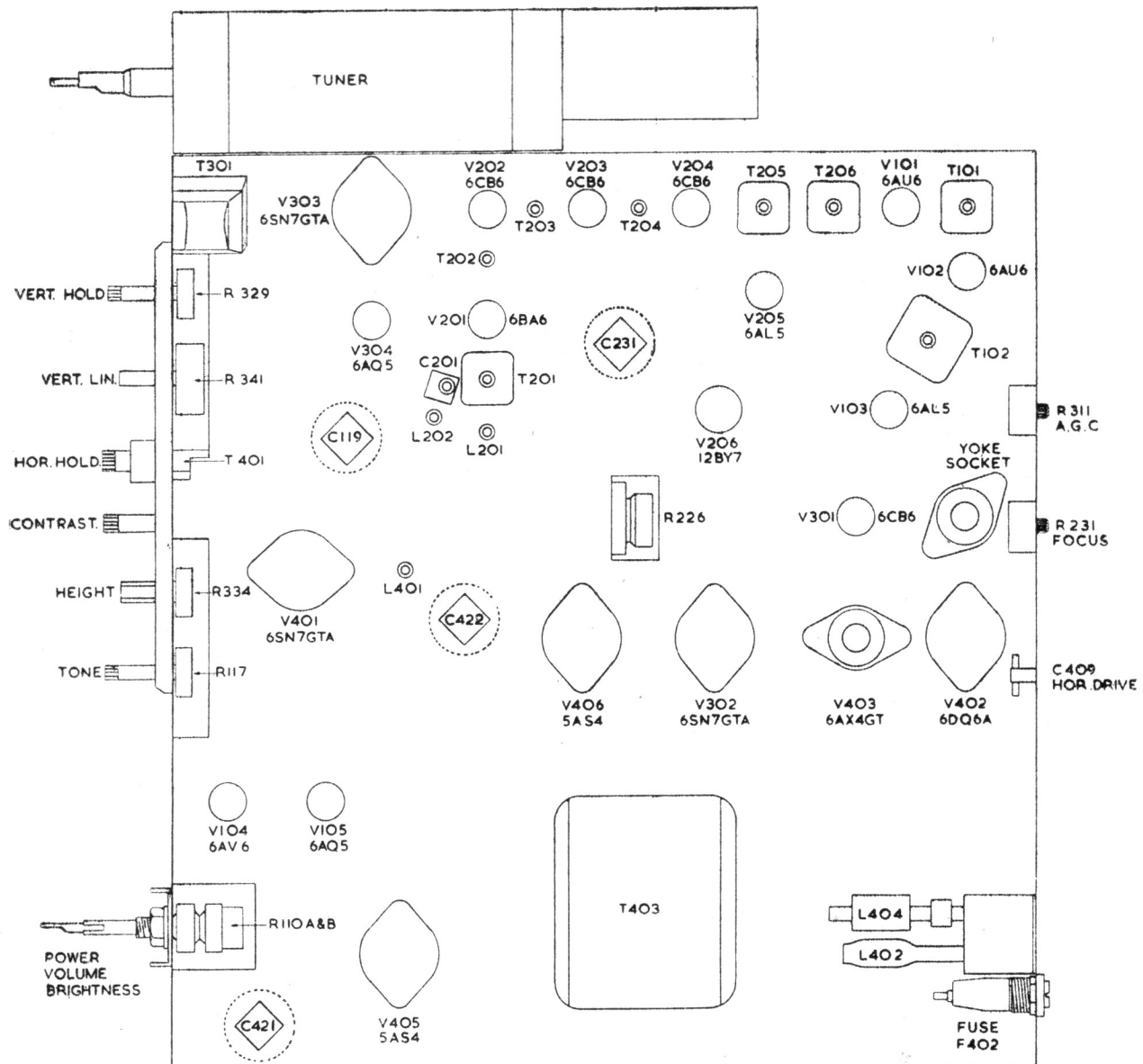
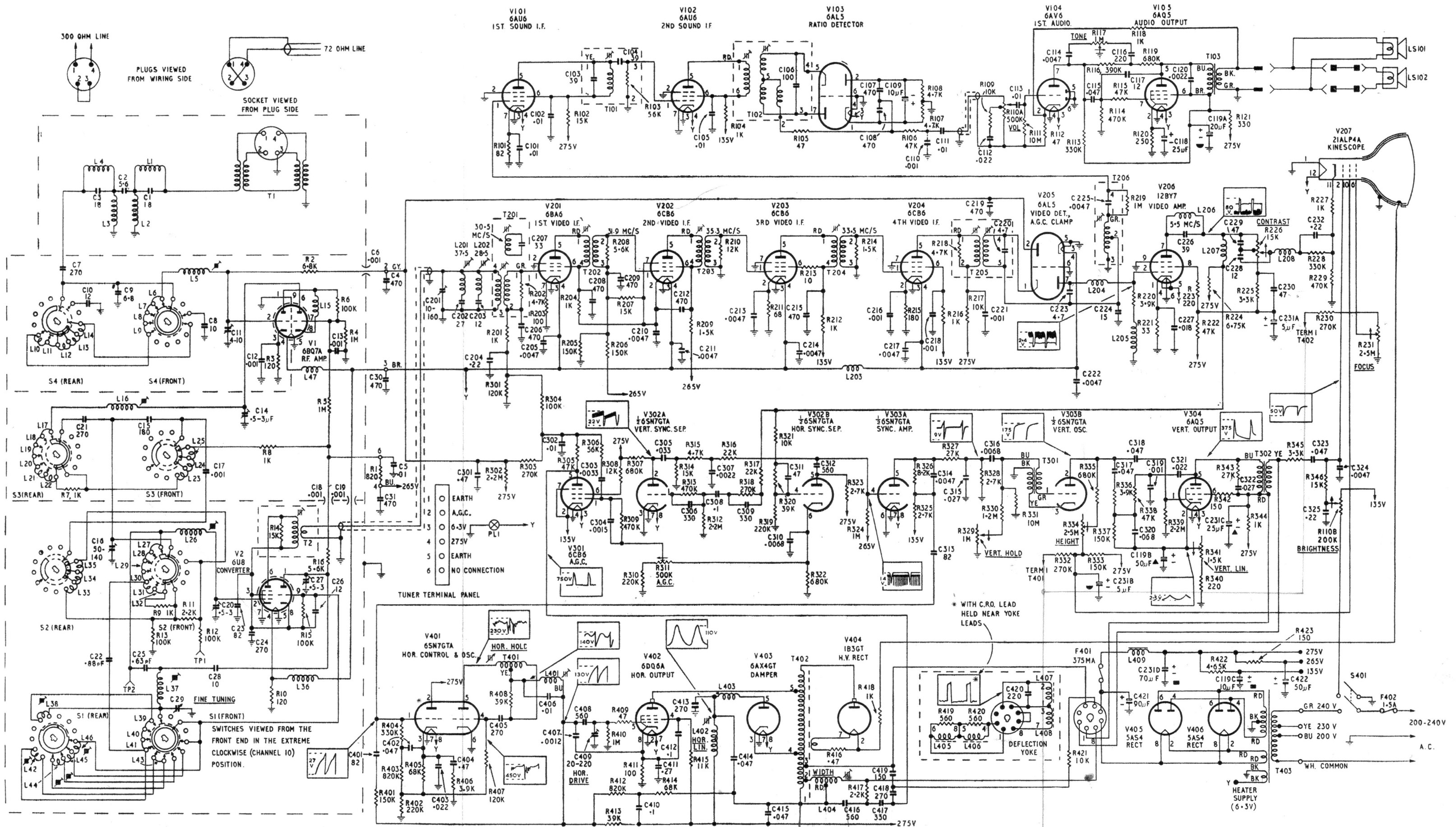


FIG. 17. UNDER CHASSIS ALIGNMENT ADJUSTMENTS

CIRCUIT A.W.A. TELEVISION RECEIVER MODELS 204-T & 205-C



All voltages shown on waveforms measured with a VoltOhmyst.

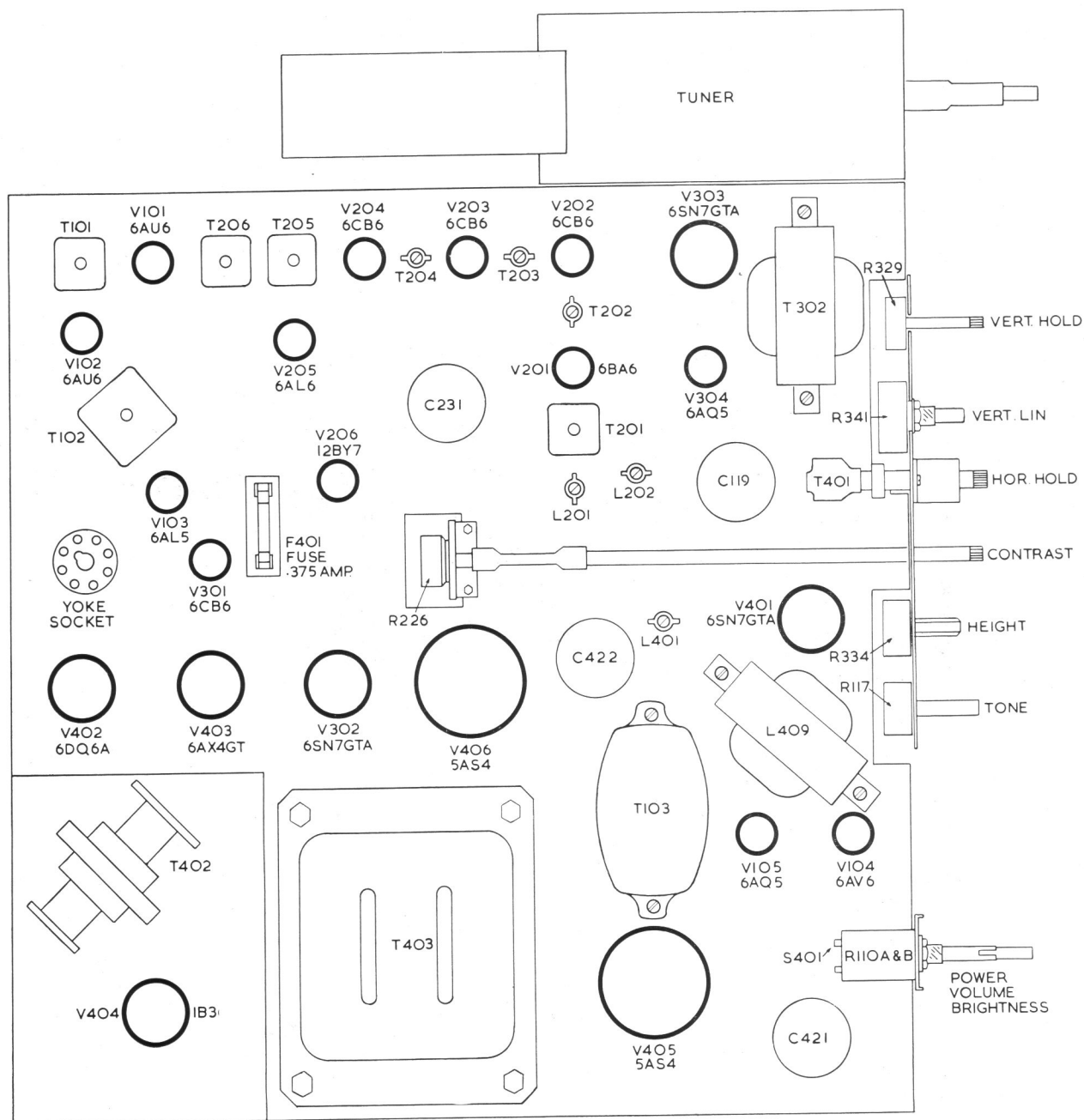


FIG. 18. TOP CHASSIS ALIGNMENT ADJUSTMENTS

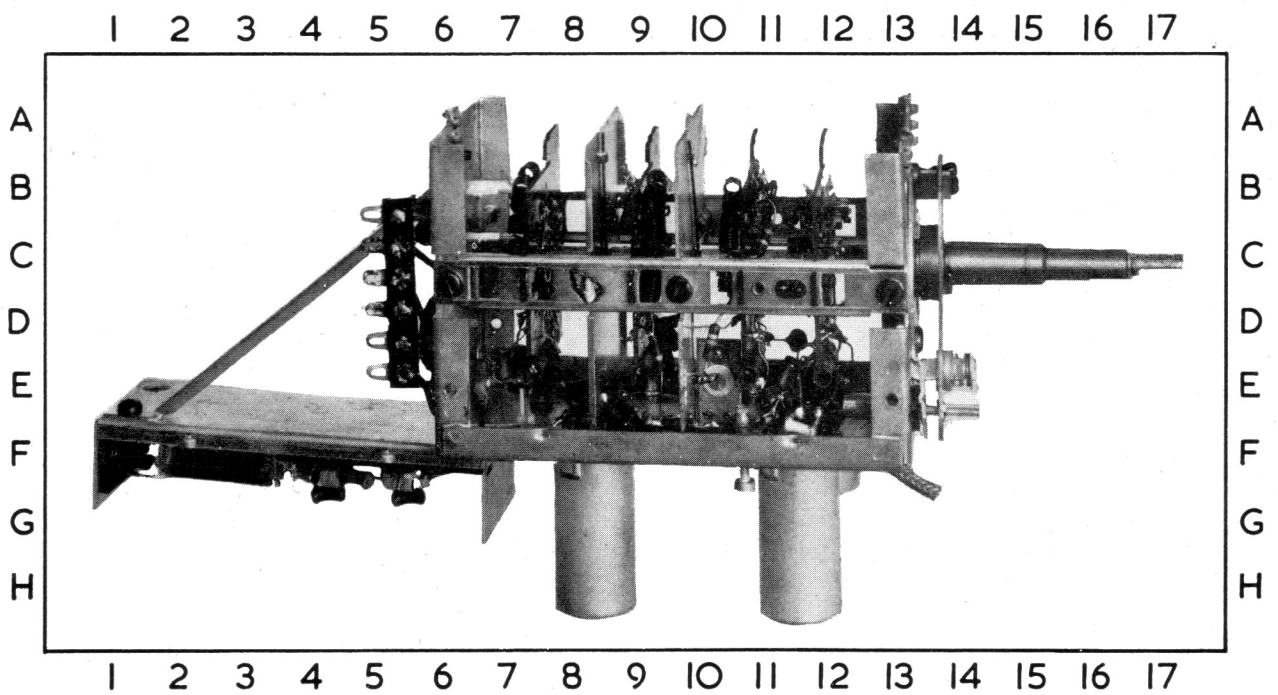


FIG. 19
TUNER LAYOUT

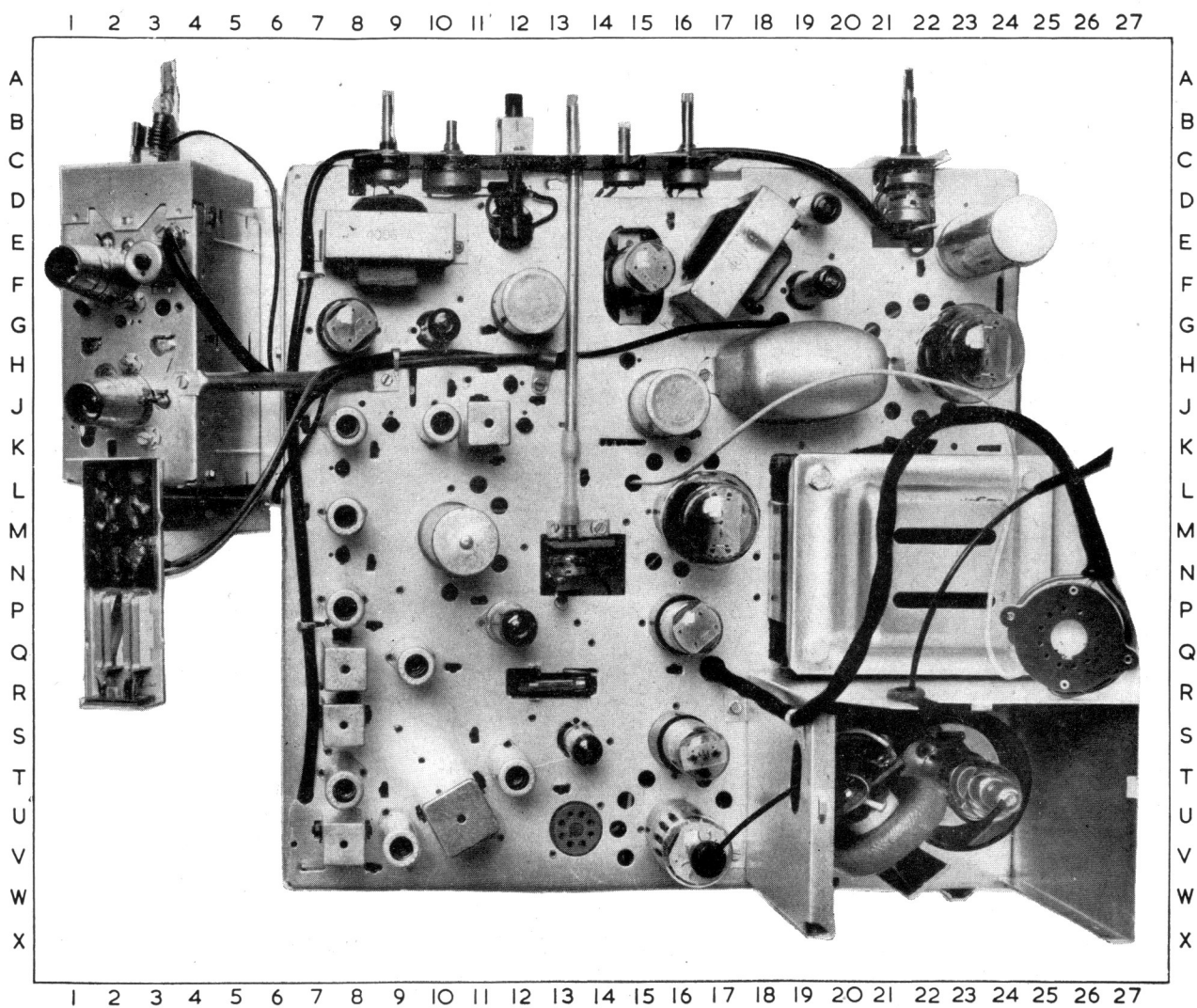


FIG. 20
TOP LAYOUT

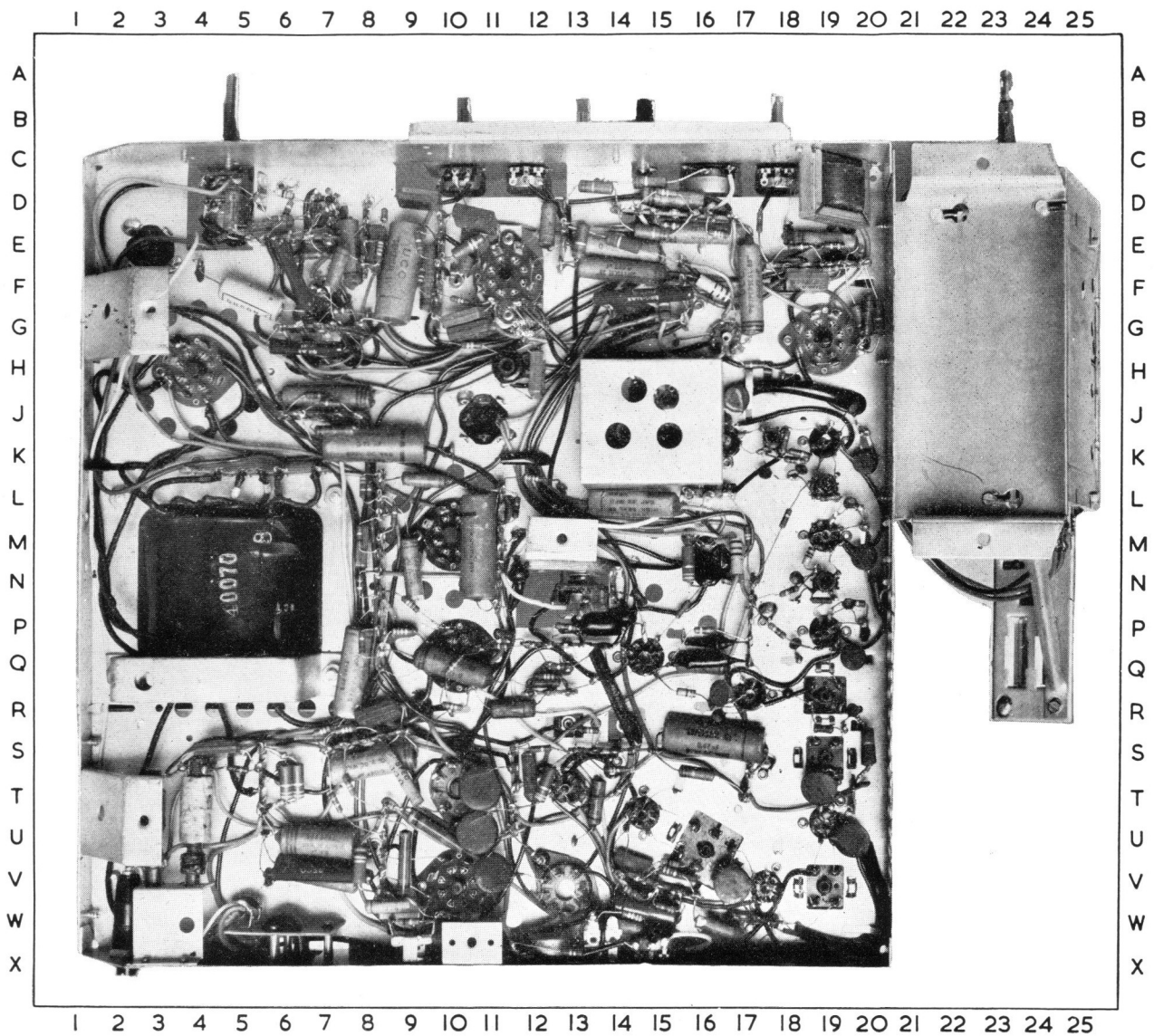


FIG. 21
BOTTOM LAYOUT

CIRCUIT CODE MODELS 204-T AND 205-C

CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION	CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION
INDUCTORS									
L1	Composite Filter Coils	40344	19	F4	L204	INDUCTORS (continued) Detector Filter Choke	40323	21	Q16
L2		40345	19	F4	L205		40117	21	P16
L3		40346	19	F5	L206		40120	21	P13
L4		40347	19	F5	L207		40118	21	P14
L5	Aerial Section Inductor	40300	19	E7	L208		40119	21	N12
L6			19	D8	L401		40050	20	H15
L7	Aerial Section Segment		19	C8	L402		40048	21	U3
L8		40169	19	C8	L403		602019 or 214516	21	T9
L9			19	B8			40770	21	T4
L10		40304	19	B7	L404				
L11	Channel 5 Aerial Section Inductor	40305	19	B7	L405	Horizontal Width Coil			
L12	Channel 4 Aerial Section Inductor	40314	19	B7	L406				
L13	Channel 3 Aerial Section Inductor	40315	19	C7	L407		40760		
L14	Channel 2 Aerial Section Inductor	40316	19	C7	L408				
L15	Channel 1 Aerial Section Inductor	40108	19	E8	L409	Deflection Yoke			
L16	Interstage Coupling 6BQ7A	40312	19	E9			40113A	20	E19
L17	6BQ7A Plate Section Inductor		19	D9		Filter Choke			
L18			19	D9					
L19	S3 Rear	40169	19	C9		RESISTORS			
L20	6BQ7A Plate Section Segment		19	C9	R1		820 ohms	± 10%	
L21	Channel 5 6BQ7A Plate Sect. Inductor	40302	19	C9	R2		6.8K ohms	± 10%	19
L22	Channel 4 6BQ7A Plate Sect. Inductor	40303	19	B9	R3		120 ohms	± 10%	19
L23	Channel 3 6BQ7A Plate Sect. Inductor	40317	19	B9	R4		1 megohm	± 10%	19
L24	Channel 2 6BQ7A Plate Sect. Inductor	40318	19	C9	R5		1 megohm	± 10%	19
L25	Channel 1 6BQ7A Plate Sect. Inductor	40319	19	D9	R6		100K ohms	± 10%	19
L26	Converter Grid Section Inductor	40311	19	E11	R7		1K ohms	± 10%	19
L27			19	E11	R8		1K ohms	± 10%	19
L28	S2 Front	40168	19	D11	R9		1K ohms	± 10%	19
L29	Converter Grid Section Segment		19	C11	R10		120 ohms	± 10%	19
L30			19	C11	R11		3.3K ohms	± 10%	19
L31	Channel 5 Converter Grid Sect. Inductor	40301	19	B11	R12		100K ohms	± 10%	19
L32	Channel 4 Converter Grid Sect. Inductor	40170	19	B11	R13		100K ohms	± 10%	19
L33	Channel 3 Converter Grid Sect. Inductor	40320	19	B10	R14		15K ohms	± 5%	19
L34	Channel 2 Converter Grid Sect. Inductor	40321	19	C10	R15		100K ohms	± 10%	19
L35	Channel 1 Converter Grid Sect. Inductor	40322	19	D10	R16		5.6K ohms	± 10%	19
L36	Oscillator Filament Choke	40107	19	E11	R101		82 ohms	± 10%	19
L37	Oscillator Section Inductor	40313	19	E12	R102		15K ohms	± 10%	19
L38	Channel 9 Oscillator Section Inductor	40310	19	D11	R103		56K ohms	± 10%	19
L39	Oscillator Section Segment		19	D12	R104		1K ohms	± 10%	19
L40		40167	19	C12	R105		47 ohms	± 10%	19
L41			19	C12	R106		47K ohms	± 10%	19
L42		40306	19	B12	R107		4.7K ohms	± 5%	19
L43	Channel 5 Oscillator Sect. Inductor	40182	19	B12	R108		4.7K ohms	± 5%	19
L44	Channel 4 Oscillator Sect. Inductor	40307	19	B12	R109		10K ohms	± 10%	19
L45	Channel 3 Oscillator Sect. Inductor	40308	19	C12	R110A	Volume Brightness	500K ohms	± 10%	20
L46	Channel 2 Oscillator Sect. Inductor	40309	19	C12	R110B		200K ohms	± 10%	20
L47	Channel 1 Oscillator Sect. Inductor	40106	19	E9	R111		10 megohms	± 10%	21
L48	6BQ7A Filament Choke	40073	20	J12	R112		47 ohms	± 10%	21
L201	37.5 Mc/s. Trap	40074	20	H12	R113		330K ohms	± 10%	21
L202	28.5 Mc/s. Trap		20	H12	R114		470K ohms	± 10%	21
L203	I.F. Filament Choke	40368	21	N20					

CIRCUIT CODE MODELS 204-T AND 205-C

CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION	CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION
R115	47K ohms		21	F7	R312	2.2 megohms			
R116	390K ohms		21	D7	R313	470K ohms			Q8
R117	1 megohm	40736	20	C16	R314	15K ohms			P9
R118	1K ohm		21	D6	R315	4.7K ohms			L9
R119	680K ohms		21	D8	R316	22K ohms			L8
R120	250 ohms		21	E6	R317	22K ohms			Q13
R121	330 ohms	(W.W.)	21	H7	R318	270K ohms			Q12
R201	1K ohms	(W.W.)	21	K16	R319	220K ohms			Q10
R202	4.7K ohms		20	J11	R320	39K ohms			Q11
R203	100 ohms		21	K16	R321	10K ohms			Q13
R204	1K ohms		21	K18	R322	680K ohms			R10
R205	150K ohms		21	L17	R323	2.7K ohms			N8
R206	150K ohms		21	M17	R324	1 megohm			M8
R207	15K ohms		21	K18	R325	2.7K ohms			F19
R208	5.6K ohms		21	J18	R326	8.2K ohms			G20
R209	1.5K ohms		21	L18	R327	27K ohms			G20
R210	12K ohms		21	L19	R328	2.7K ohms			E19
R211	68 ohms		21	L20	R329	1 megohm		40399	C9
R212	1K ohms		21	N18	R330	1.2 megohms			D17
R213	10 ohms		21	M18	R331	10 megohms			E18
R214	1.5K ohms		21	N19	R332	270K ohms			S7
R215	180 ohms		21	N20	R333	150K ohms			T8
R216	1K ohms		21	P18	R334	2.5 megohms		40367	C14
R217	10K ohms		21	S20	R335	680K ohms			E16
R218	4.7K ohms		20	R8	R336	3.9K ohms			E15
R219	1 megohm	(in T205)	21	T19	R337	150K ohms			D15
R220	3.9K ohms		21	P16	R338	47K ohms			D14
R221	33 ohms		21	R16	R339	2.2 megohms			H17
R222	47K ohms		21	N15	R340	220 ohms			D15
R223	220 ohms		21	P15	R341	1.5K ohms		40355	C10
R224	6.75K ohms	(W.W.)	21	R14	R342	150 ohms			F16
R225	3.3K ohms		21	P13	R343	27K ohms			E13
R226	15K ohms		20	N13	R344	1K ohms			G15
R227	1K ohms	40354	21	L11	R345	3.3K ohms			J7
R228	330K ohms		21	M11	R346	15K ohms			J7
R229	470K ohms		21	L12	R401	150K ohms			G10
R230	270K ohms		21	S7	R402	220K ohms			F10
R231	2.5 megohms		21	X12	R403	820K ohms			F9
R301	120K ohms		21	L16	R404	330K ohms			F10
R302	2.2 megohms		21	S16	R405	68K ohms			E9
R303	270K ohms		21	S14	R406	3.9K ohms			G7
R304	100K ohms		21	S13	R407	120K ohms			E10
R305	47K ohms		21	T12	R408	39K ohms			D12
R306	56K ohms		21	S12	R409	47 ohms			W10
R307	680K ohms		21	N9	R410	1 megohm			W9
R308	12K ohms		21	T14	R411	100 ohms			V7
R309	470K ohms		21	W14	R412	820K ohms			V8
R310	220K ohms		21	X13	R413	39K ohms			V9
R311	500K ohms		21	X15	R414	68K ohms			T7
		40351/2							

CIRCUIT CODE MODELS 204-T AND 205-C

CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION	CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION
RESISTORS (continued)					CAPACITORS (continued)				
R415	11K ohms ± 10%	3 watts	21	U10	C107	470 pF 500V Working Mica ± 5%			V15
R416	.47 ohms ± 20%	$\frac{1}{2}$ watt (high volt. box)			C108	470 pF 500V Working Mica ± 5%			V14
R417	2.2K ohms ± 10%	$\frac{1}{2}$ watt	21	S5	C109	10 uF 65 P.V. Electrolytic			V14
R418	1K ohms ± 10%	$\frac{1}{2}$ watt (high volt. box)			C110	0.001 uF 600V Working ± 10%			W16
R419	560 ohms ± 10%	$\frac{1}{2}$ watt (in yoke)			C111	0.01 uF 200V Working ± 20%			W16
R420	560 ohms ± 10%	$\frac{1}{2}$ watt (in yoke)			C112	0.022 uF 200V Working ± 10%			D5
R421	10K ohms ± 10%	$\frac{1}{2}$ watt	21	U12	C113	0.01 uF 200V Working ± 20%			D6
R422	4.65K ohms ± 10%	10 watts (W.W.)	21	G14	C114	0.0047 uF 400V Working ± 20%			E7
R423	150 ohms ± 10%	1 watt	21	M17	C115	0.047 uF 400V Working ± 20%			E8
CAPACITORS					C116	220 pF 1000V Working Mica ± 10%			D9
C1	18 pF Tubular ± 5% NPO				C117	12 pF 1000V Working Mica ± 10%			E8
C2	5.6 pF Tubular ± 5% NPO		19	G4	C118	25 uF 40 P.V. Electrolytic			F5
C3	18 pF Tubular ± 5% NPO		19	F5	C119A	20 uF 450 P.V. Electrolytic			G12
C4	470 pF Disc ± 100% — 0% K5000		19	F6	C119B	50 uF 65 P.V. Electrolytic			G12
C5	0.01 uF Disc ± 100% — 0% K5000		19	E5	C119C	10 uF 450 P.V. Electrolytic			G12
C6	0.001 uF Feed Thru ± 100% — 0% K5000		19	D6	C120	0.0022 uF 600V Working ± 10%			F7
C7	270 pF Tubular ± 20% K1200		19	E7	C201	10 - 160 pF Trimmer	231124		J15
C8	10 pF Tubular ± 5% NPO		19	E8	C202	27 pF Ceramic ± 5% NPO			K15
C9	6.8 pF Tubular ± 5% NPO		19	E7	C203	12 pF Ceramic ± 5% NPO			K15
C10	12 pF Tubular ± 5% NPO		19	E8	C204	0.22 uF 200V Working ± 20%			H14
C11	4 - 10 pF Trimmer	231123	19	E9	C205	0.0047 uF Ceramic ± 100% — 0%			L14
C12	0.001 uF Disc ± 100% — 0% K5000		19	E9	C206	470 pF Ceramic ± 100% — 0%			J17
C13	0.001 uF Disc ± 100% — 0% K5000		19	E9	C207	33 pF Ceramic ± 5% NPO (in T201)			K16
C14	0.5 - 3 pF Trimmer	231122	19	E9	C208	470 pF Ceramic ± 100% — 0%			J11
C15	180 pF Style "B" Tubular ± 5% N750		19	D9	C209	470 pF Ceramic ± 100% — 0%			L17
C16	50 - 140 pF Trimmer Mica	40038	19	E10	C210	0.0047 uF Ceramic ± 100% — 0%			K18
C17	0.001 uF Feed Thru ± 100% — 0% K5000		19	D10	C211	0.0047 uF Ceramic ± 100% — 0%			J19
C18	0.001 uF Feed Thru ± 100% — 0% K5000		19	E10	C212	470 pF Ceramic ± 100% — 0%			K20
C19	0.001 uF Feed Thru ± 100% — 0% K5000		19	D10	C213	0.0047 uF Ceramic ± 100% — 0%			K19
C20	0.5 - 3 pF Trimmer	231122	19	E11	C214	0.0047 uF Ceramic ± 100% — 0%			L19
C21	270 pF Tubular ± 20% K1200		19	E9	C215	470 pF Ceramic ± 100% — 0%			M20
C22	0.88 pF Bead ± 20% NPO		19	B11	C216	0.001 uF Ceramic ± 100% — 0%			N18
C23	82 pF Style "C" Disc ± 10% N750		19	E12	C217	0.0047 uF Ceramic ± 100% — 0%			N19
C24	270 pF Disc ± 20% K1200		19	F12	C218	0.001 uF Ceramic ± 100% — 0%			Q20
C25	0.63 pF Bead ± 20% NPO		19	D11	C219	470 pF Ceramic ± 100% — 0%			P18
C26	12 pF Tubular ± 5% N750		19	F12	C220	4.7 pF Ceramic ± .5 pF N750 (in T205)			R16
C27	0.5 - 3 pF Trimmer	231122	19	F11	C221	0.001 uF Ceramic ± 100% — 0%			R8
C28	10 pF Tubular ± 5% NPO		19	E11	C222	0.0047 uF Ceramic ± 100% — 0%			R20
C29	Trimmer (Fine Tuning) A.W.A. Special	40135	19	E13	C223	4.7 pF Ceramic ± .5 pF N750			R18
C30	470 pF Disc ± 100% — 0% K5000		19	C6	C224	15 pF Ceramic ± 10% N750			S19
C31	470 pF Disc ± 100% — 0% K5000		19	C6	C225	0.0047 uF Ceramic ± 100% — 0% (in T206)			S8
C101	0.01 uF Ceramic ± 100% — 0% K5000		21	T19	C226	39 pF Ceramic ± 5% N750			N14
C102	0.01 uF Ceramic ± 100% — 0% K5000		21	U19	C227	0.018 uF 400V Working ± 10%			Q16
C103	39 pF Ceramic ± 10% N220 (in T101)		20	V8	C228	12 pF Ceramic ± 5% N750			P13
C104	39 pF Ceramic ± 10% N220 (in T101)		20	V8	C229	47 pF Ceramic ± 5% N750			P14
C105	0.01 uF Ceramic ± 100% — 0% K5000		21	V17	C230	47 pF Ceramic ± 5% N750			P13
C106	100 pF 500V Working Mica ± 5% (in T102)		20	U11	C231A	5 uF 450 P.V. Electrolytic			M10
					C231B	5 uF 600 P.V. Electrolytic			M10
					C231C	25 uF 450 P.V. Electrolytic			M10

CIRCUIT CODE MODELS 204-T AND 205-C

CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION	CODE No.	DESCRIPTION	PART No.	FIG. No.	LOCATION
CAPACITORS (continued)					TRANSFORMERS				
C231D	70 uF 450 P.V. Electrolytic		20	M10	T1	Aerial Matching Transformer	40156	19	F2
C232	0.22 uF 400V Working $\pm 20\%$		21	M11	T2	Converter I.F.	40325	19	F12
C301	0.47 uF 200V Working $\pm 20\%$		21	S16	T101	Sound I.F.	40093	20	V8
C302	0.01 uF 400V Working $\pm 20\%$		21	T13	T102	Radio Detector	40077	20	U11
C303	0.0033 uF 600V Working $\pm 10\%$		21	T12	T103	Audio Output	21435	20	H19
C304	0.0015 uF 600V Working $\pm 20\%$		21	W14	T201	Link I.F.	40072	20	J11
C305	0.033 uF 400V Working $\pm 20\%$		21	N9	T202	1st Video I.F.	40071	20	J9
C306	330 pF 500V Working Mica $\pm 10\%$		21	L9	T203	2nd Video I.F.	40071	20	K8
C307	0.0022 uF 600V Working $\pm 10\%$		21	Q10	T204	3rd Video I.F.	40071	20	M8
C308	0.1 uF 400V Working $\pm 20\%$		21	Q12	T205	4th Video I.F.	40075	20	R8
C309	330 pF 500V Working Mica $\pm 10\%$		21	R11	T206	Sound Take Off	40076	20	S8
C310	0.0068 uF 600V Working $\pm 20\%$		21	P11	T301	Vertical Oscillator	40066B	21	D19
C311	47 pF Ceramic $\pm 5\%$ N750		21	M8	T302	Vertical Output	40067A	20	D9
C312	560 pF 1000V Working Mica $\pm 10\%$		21	G10	T401	Horizontal Blocking Oscillator	40047	20	D12
C313	82 pF 1000V Working Mica $\pm 10\%$		21	G20	T402	Horizontal Output	40073	20	V21
C314	0.0047 uF 400V Working $\pm 20\%$		21	E19	T403	Power Transformer	40070C	20	N22
C315	0.027 uF 400V Working $\pm 10\%$		21	F18					
C316	0.0068 uF 500V Working Mica $\pm 5\%$		21	E16					
C317	0.047 uF 600V Working $\pm 10\%$		21	F17					
C318	0.047 uF 600V Working $\pm 20\%$		21	E12					
C319	0.001 uF 1600V Working $\pm 10\%$		21	D15					
C320	0.068 uF 200V Working $\pm 10\%$		21	E14					
C321	0.022 uF 1000V Working $\pm 10\%$		21	F14					
C322	0.027 uF 1000V Working $\pm 10\%$		21	J7					
C323	0.047 uF 600V Working $\pm 20\%$		21	K8					
C324	0.0047 uF 400V Working $\pm 20\%$		21	G10					
C325	0.22 uF 400V Working $\pm 20\%$		21	F9					
C401	82 pF 1000V Working Mica $\pm 10\%$		21	E10					
C402	0.047 uF 400V Working $\pm 20\%$		21	F9					
C403	0.022 uF 400V Working $\pm 20\%$		21	D10					
C404	0.47 uF 200V Working $\pm 20\%$		21	H12					
C405	270 pF 1000V Working Mica $\pm 5\%$		21	W9					
C406	0.01 uF 500V Working Mica $\pm 5\%$		21	W8					
C407	0.0012 uF 500V Working Mica $\pm 5\%$		21	X9					
C408	560 pF 1000V Working Mica $\pm 10\%$		21	U7					
C409	2-220 pF Trimmer		21	V7					
C410	0.1 uF 600V Working $\pm 20\%$		21	W10					
C411	0.27 uF 200V Working $\pm 10\%$		21	R8					
C412	0.1 uF 600V Working $\pm 20\%$		21	S8					
C413	270 pF 1000V Working Mica $\pm 20\%$		21	Q8					
C414	0.047 uF 1000V Working $\pm 10\%$		21	T10					
C415	0.047 uF 1000V Working $\pm 10\%$		21	U11					
C416	560 pF 1000V Working Mica $\pm 10\%$		21	V11					
C417	330 pF 1500V Ceramic $\pm 10\%$		21	E24					
C418	270 pF 2500V Ceramic $\pm 10\%$		21	J15					
C419	150 pF 2500V Ceramic $\pm 10\%$		20						
C420	220 pF 2500V Ceramic $\pm 10\%$ (in yoke)		20						
C421	90 uF 525 P.V. Electrolytic		20						
C422	50 uF 400 P.V. Electrolytic		20						
SWITCHES					PILOT LAMP				
					S1	Channel Selector		19	D12
					S2	Channel Selector		19	D11
					S3	Channel Selector		19	D9
					S4	Channel Selector		19	D7
					S401	Power/Volume (on R110A)		20	E22
FUSES					LOUDSPEAKERS				
					PL1	12V, 2.2 watt M.E.S.		20	B3
					F401	.375 amp. Cartridge		20	R13
					F402	1.5 amp. Cartridge		21	W2
					LS101	7 x 5 P.M. Table Model	21045		
					LS102	7 x 5 P.M. Table Model	21034		
					LS101	9 x 6 P.M. Console Model	21520		
					LS102	9 x 6 P.M. Console Model	21519		



TECHNICAL INFORMATION AND SERVICE DATA

ADDENDUM SHEET FOR 204-T AND 205-C SERVICE MANUAL

Video I.F. Alignment for models 204-TY, 205-CY and 206-CY.

These models have "Y" stamped on the back of the chassis

Modifications include:—

T201: Coil 41041 now replaces previous 40072 type.

C203: Changed from a 12 pF to a 5.6 pF $\pm 5\%$ N.P.O. capacitor.

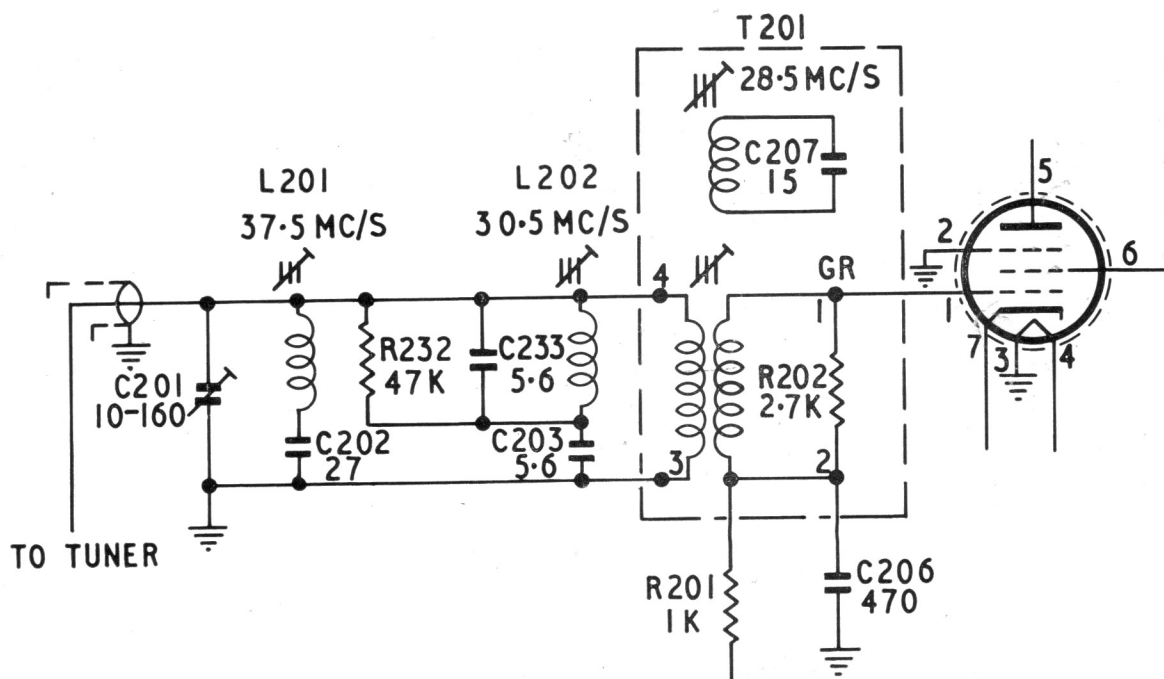
The following components have been added:—

C233: 5.6 pF $\pm 5\%$ N.P.O. ceramic (see circuit below).

R232: 47K ohms $\pm 10\%$ $\frac{1}{2}$ watt (see circuit below).

C234: .0047 μ F Hi-K Disc (in parallel with C231A).

It has also been necessary to earth the I.F. input shield to the earth tag on the terminal strip containing I.F. A.G.C. point.



ALIGNMENT PROCEDURE

VIDEO I.F. ALIGNMENT

NOTE: When two positions of the core appear to give the correct adjustment, the following apply:—

- * coil tuned with core close to chassis.
- † coil tuned with core close to can top.

Connect a source of —5 volts D.C. bias to the junction of R201 and C204.

Turn the A.G.C. control to the extreme clockwise position.

Connect the Voltomyst D.C. probe to pin 2 of V206 (Video Amplifier).

Connect the output of the calibrator to the tuner (TP2) through a 1000 pF capacitor using short leads. Set the tuner on Channel 6. Set the fine tuning control to its mechanical centre and check that the oscillator frequency is $211.25 \text{ Mc/s.} \pm 0.5 \text{ Mc/s.}$

Adjust the calibrator to the frequencies shown and adjust the following transformers for a peak output, reducing the input so that the Voltomyst maintains a reading of approximately —3 volts.

- 33.5 Mc/s T204 (bottom core)*
- 35.3 Mc/s T203 (bottom core)*
- 31.9 Mc/s T202 (bottom core)*

Adjust the calibrator to the frequencies shown and adjust the following for a minimum output, increasing the input to maintain an output of approximately —1 volt.

- 28.5 Mc/s T201 trap (top core)†
- 30.5 Mc/s L202 (bottom core)*
- 37.5 Mc/s L201 (bottom core)*

Disconnect the Voltomyst.

Connect the C.R.O. to pin 2 of V206 (Video Amplifier) using the network shown in Fig. 4.

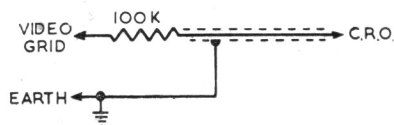


FIG. 4

Connect the sweep generator to pin 1 of V204 (4th Video I.F.). Set the output from the sweep generator at its maximum.

Adjust T205 primary (top core)† and secondary (bottom core)* so that the 36 Mc/s. marker falls at 85% response and the curve is flat topped. The required response is shown in Fig. 5.

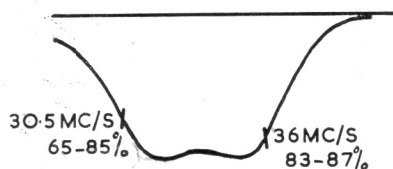


FIG. 5

Connect the sweep generator to the aerial input terminals of the matching unit. Use a 4-pin plug for this purpose and keep the leads to the termination of the sweep output cable very short. It is advisable to have on hand a special cable for connection from tuner to sweep generator with a resistive pad (Fig. 12) having balanced connections, direct to the plug.)

Connect a bias source to the A.G.C. terminal of the tuner and set the bias to —3 volts. The I.F. bias remains at —5 volts. Connect the vertical input of the C.R.O. direct to TP1 on the tuner with a shielded lead. Earth the shield at the tuner.

Set the sweep generator on channel 6.

Check that the R.F. response as viewed on the C.R.O. conforms with that shown in Figs. 13 and 14.

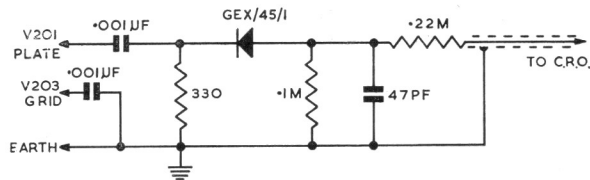


FIG. 6 — LINK CIRCUIT JIG.

Connect the "Link Circuit" jig (Fig. 6) to the chassis next to T203. Connect the crystal lead to pin 5 of V201 (1st Video I.F.) and the "earthy" lead to pin 1 of V203 (3rd Video I.F.). Connect the C.R.O. to the output of the crystal probe.

Loosely couple the calibrator to the plate of V201 making sure that this connection does not change the output waveform.

Set the sweep generator output to give 0.1 volts p/p output on the C.R.O. This corresponds to max. sensitivity on the A.W.A. C.R.O. A56031.

Reduce the capacitance of trimmer C201 to a minimum. Adjust T201 secondary (bottom core)* and T2 core (tuner)* for a round topped response with the 36 Mc/s. marker at 80%. T2 affects the marker position whilst T201 affects the tilt of the response top. Increase the capacitance of C201 to give the 31.75 Mc/s. marker at the low-frequency peak of the response. Repeat this series of adjustments, if necessary, to give the response curve shown in Fig. 7.

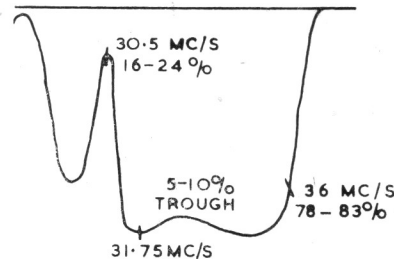


FIG. 7

Some tilt may be necessary to keep the trough within the limits of 5-10%, but this tilt should not exceed 15%.

Remove the "Link Circuit" jig from the chassis and reconnect the C.R.O. to pin 2 of V206 (Video Amplifier).

Loosely couple the calibrator into the I.F. amplifier by connecting it to the I.F. input shield making sure that the output waveform is unchanged by the connection.

View the overall response with 5 volts peak to peak output and re-adjust T204, T203 and T202 if necessary, to give the 36 Mc/s. marker at 45%, the 31.75 Mc/s. marker at 70% and a flat topped response. Increase the C.R.O. gain 10 times and check that the accompanying sound (30.5 Mc/s.) lies between 2% and 4%. The required overall response is shown in Fig. 8.

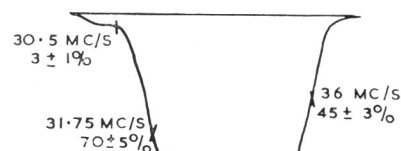


FIG. 8

TECHNICAL INFORMATION AND SERVICE DATA



A.W.A. RADIOLA TELEVISION RECEIVER

Models 206-C and 206-CZ

(21 inch, 24 Valves, A.C. Operated)

Issued by Amalgamated Wireless (Australasia) Ltd.

GENERAL DESCRIPTION

The Models 206-C and 206-CZ are "21-inch," 24-valve, A.C. operated Television Receivers.

Features of design include: Inter-carrier F.M. system; Ratio Detector, Aluminised Kinescope, Amplified A.G.C., A.F.C. Horizontal Hold, Twin Loudspeakers.

Refer to the 204-T and 205-C Service Manual for all electrical and mechanical information.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE: Approximately 261 sq. ins. on a 21ALP4A Kinescope.

TELEVISION CHANNELS: All 10 V.H.F. channels.
(Refer Alignment Procedure)

INTERMEDIATE FREQUENCIES

Video I.F. Carrier Frequency 36.0 Mc/s
Sound I.F. Carrier Frequency 30.5 Mc/s

POWER CONSUMPTION: 200 watts max.

UNDISTORTED AUDIO POWER OUTPUT: 5 watts max.

LOUDSPEAKERS—

Model 206-C:

9" x 6" Permanent Magnet No. 21519 and
9" x 6" Permanent Magnet No. 21520.

Model 206-CZ:

9" x 6" Permanent Magnet No. 21177 and
7" x 5" Permanent Magnet No. 21034.

Transformer No. 21147.

V.C. Impedance of combinations.
6—8 ohms at 400 c/s.

- | | |
|------------------------------|--|
| (1) Radiotron 6BQ7A | R.F. Amplifier |
| (2) Radiotron 6U8 | R.F. Oscillator and Converter |
| (3) Radiotron 6AU6 | 1st Sound I.F. Amplifier |
| (4) Radiotron 6AU6 | 2nd Sound I.F. Amplifier |
| (5) Radiotron 6AL5 | Ratio Detector |
| (6) Radiotron 6AV6 | A.F. Amplifier |
| (7) Radiotron 6AQ5 | A.F. Output |
| (8) Radiotron 6BA6 | 1st Video I.F. Amplifier |
| (9) Radiotron 6CB6 | 2nd Video I.F. Amplifier |
| (10) Radiotron 6CB6 | 3rd Video I.F. Amplifier |
| (11) Radiotron 6CB6 | 4th Video I.F. Amplifier |
| (12) Radiotron 6AL5 | Video Detector and A.G.C. Clamp |
| (13) Radiotron 12BY7 | Video Amplifier |
| (14) Radiotron 6CB6 | A.G.C. Amplifier |
| (15) Radiotron 6SN7GTA | Vertical Sync. Separator
and Horizontal Sync. Separator |
| (16) Radiotron 6SN7GTA | Sync. Amplifier and
Vertical Oscillator |
| (17) Radiotron 6AQ5 | Vertical Output |
| (18) Radiotron 6SN7GTA | Horizontal Control and
Horizontal Oscillator |
| (19) Radiotron 6DQ6A | Horizontal Output |
| (20) Radiotron 6AX4GT | Damper |
| (21) Radiotron 1B3GT | High Voltage Rectifier |
| (22) Radiotron 5AS4 | Rectifier |
| (23) Radiotron 5AS4 | Rectifier |
| (24) Radiotron 21ALP4A | Kinescope |

The following parts, however, are peculiar to these models.

ITEM	PART NUMBER
Buffer, Rubber	40896
Cabinet	28147
Cable Ass'y. Antenna	49746
Castor, Sheppards No. 111 x 1½" (206-CZ)	196001
Handle, Door 970/L	396012
Indicator Assembly	40880
Internal Dipole	40879
Lamp Holder Ass'y.	49748
Trim, Baffle	40886
Trim, Stud	40891

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED. MAKE SURE THAT THE EARTH STRAP BETWEEN THE CHASSIS AND THE KINESCOPE ASSEMBLY IS SECURELY FASTENED BEFORE TURNING THE RECEIVER ON.

KINESCOPE HANDLING PRECAUTIONS

DO NOT INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTER-PROOF GOGGLES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

When the receiver has been switched off after operating for a time, the kinescope will retain a certain charge. Therefore it is advisable to discharge it before handling.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. Therefore, kinescopes must be handled with more care than ordinary receiving valves.

The large end of the kinescope bulb, particularly that part at the rim of the viewing surface, must not be struck, scratched or subjected to more than moderate pressure at any time. When installing, if the valve sticks or fails to slip smoothly into its socket or deflecting yoke, do not force it, but investigate and remove the cause of the trouble. All Radiotron replacement kinescopes are packed in special cartons and should be left in the cartons until required for installation.

CIRCUIT A.W.A. TELEVISION RECEIVER MODELS 204T, 205C & 206C

In some chassis, R415 was a 20K ohms 2 watt resistor
 In some chassis, C111 was an 0.047 uF \pm 10% 200V paper capacitor
 In some chassis, C210 was a 470 pF \pm 100% — Hi-K ceramic disc
 In some chassis, C210 was a 470 pF \pm 100% — 0% Hi-K ceramic disc
 In some chassis, C407 was an 0.001 uF \pm 10% 1,000V paper capacitor
 In some chassis, R408 was a 68K ohms \pm 10% 1/2 watt resistor
 In some chassis, C420 was a 150 pF 2,500V tubular capacitor
 In some chassis, R421 was a 4.7K ohms \pm 10% 1/2 watt resistor
 In some chassis, T103 was No. 21147

Other changes incorporated since circuit was drawn:

C114: Changed from .0047 uF to .01 uF \pm 10% 400V paper
 C310: Changed from .0068 uF to .018 uF \pm 10% 400V paper
 C324: Changed from .0047 uF to .018 uF \pm 10% 400V paper
 C423: Added .1 uF \pm 20% 600V paper across C231D
 C424: Added .001 uF \pm 10% 1,600V paper across R421
 R307: Changed from 680K to 560K \pm 10% 1/2 watt
 R412: Changed from 820K to 1 megohm \pm 10% 1 watt
 R416: Changed from .47 ohm to 1.5 ohms \pm 10% 1/2 watt

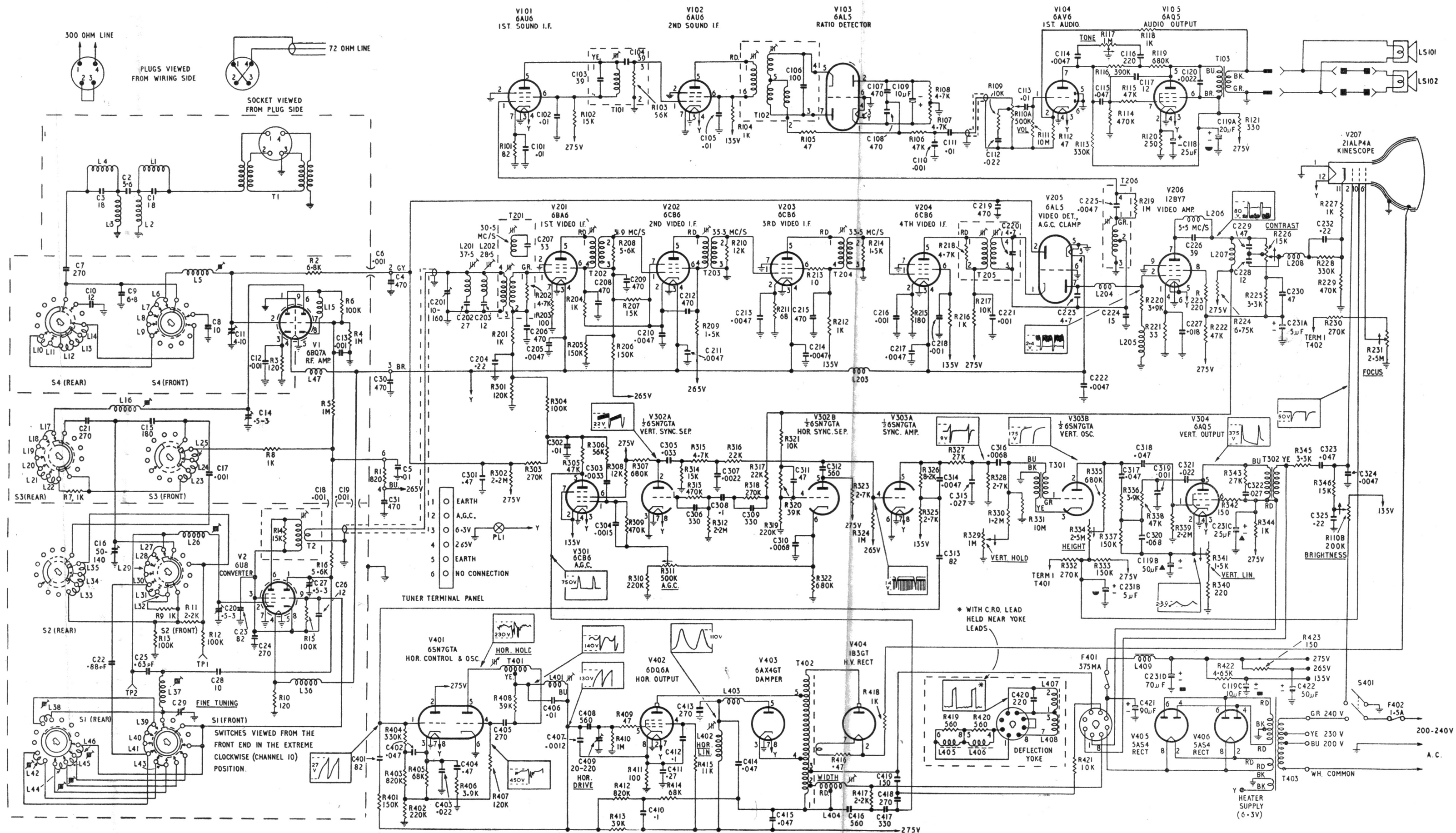
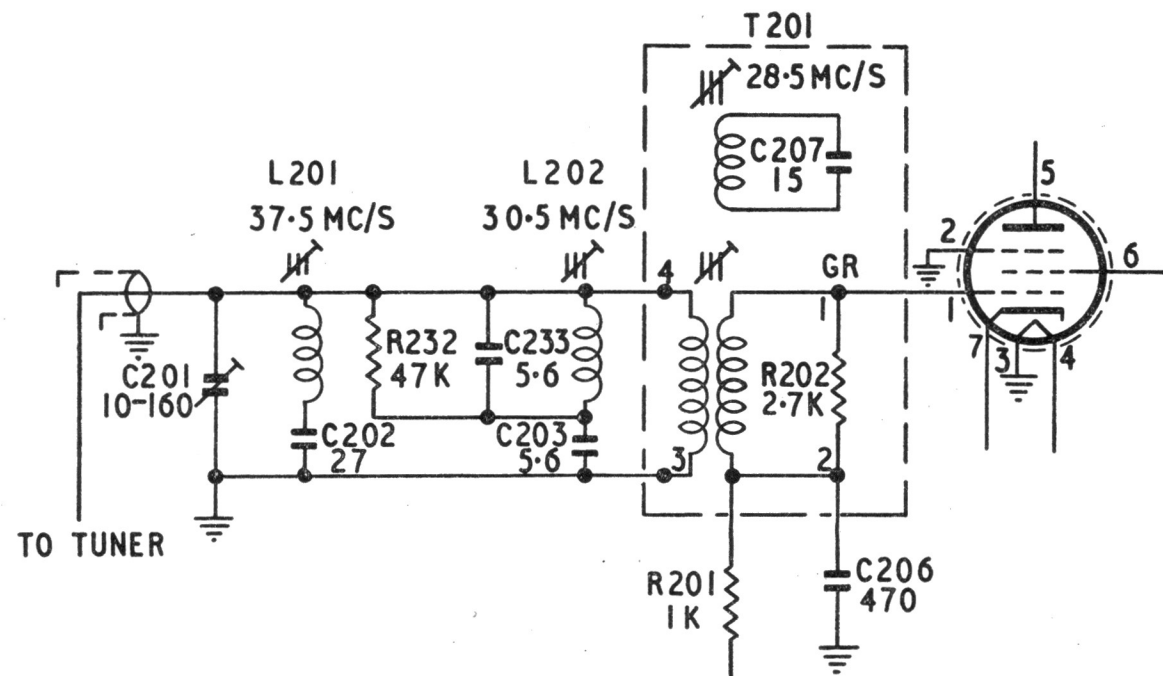
In the "Y" series the following modifications have taken place:—

C102: Changed from .01 uF to .0047 uF \pm 10% 400V paper
 C105: Changed from .01 uF to .0033 uF \pm 10% 400V paper
 T201: Coil 41041 now replaces previous 40072 type
 C203: Changed from a 12 pF to a 5.6 pF \pm 5% N.P.O. capacitor

The following components have been added:—

C233: 5.6 pF \pm 5% N.P.O. ceramic (see circuit below)
 R232: 47K ohms \pm 10% 1/2 watt (see circuit below)
 C234: .0047 uF Hi-K Disc (in parallel with C231A)
 R122: 100 ohms \pm 10% 1/2 watt from cathode V102 to earth

It has also been necessary to earth the I.F. input shield to the earth tag on the terminal strip containing I.F. A.G.C. point.



All voltages shown on waveforms measured with a Voltomyst.