

PHILCO MODEL 22B4008

TRADE NAME	Philco	Models 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Deflection Ch. D-201, RF Ch. R-201) Code 150.
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.	
TYPE SET	Television Receiver	
TUBES	Twenty-two	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.42 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video 45.75MC, Sound IF 41.25MC (Intercarrier)	

INDEX

Alignment Instructions	6, 7	Photographs (Cont)	
Drive Cord Stringing (UHF)	16	RF Tuner.....	10
Disassembly Instructions	18	Resistor Identification (RF-IF Chassis)	20
Horizontal Sweep Circuit Adjustments	11	Resistor Identification (Sweep Chassis)	21
Parts List and Descriptions	13 thru 16	Resistance Measurements	8
Photographs		Servicing in the Field	18
Cabinet-Rear View	11	Schematic (TV)	2
Capacitor Identification (RF-IF Chassis)	4	Schematic (UHF Tuner)	17
Capacitor & Misc. Identification (Sweep Chassis) ..	9	Trouble Shooting Aids	12, 17
Chassis-Top View (RF-IF Chassis)	3	Tube Failure Check Chart	5
Chassis-Top View (Sweep Chassis)	3	Tube Placement Chart (Bottom View)	8
Inductor & Alignment Identification	19	Tube Placement Chart (Top View)	5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

"Reproduction or use, without express permission, of editorial or pictorial con-

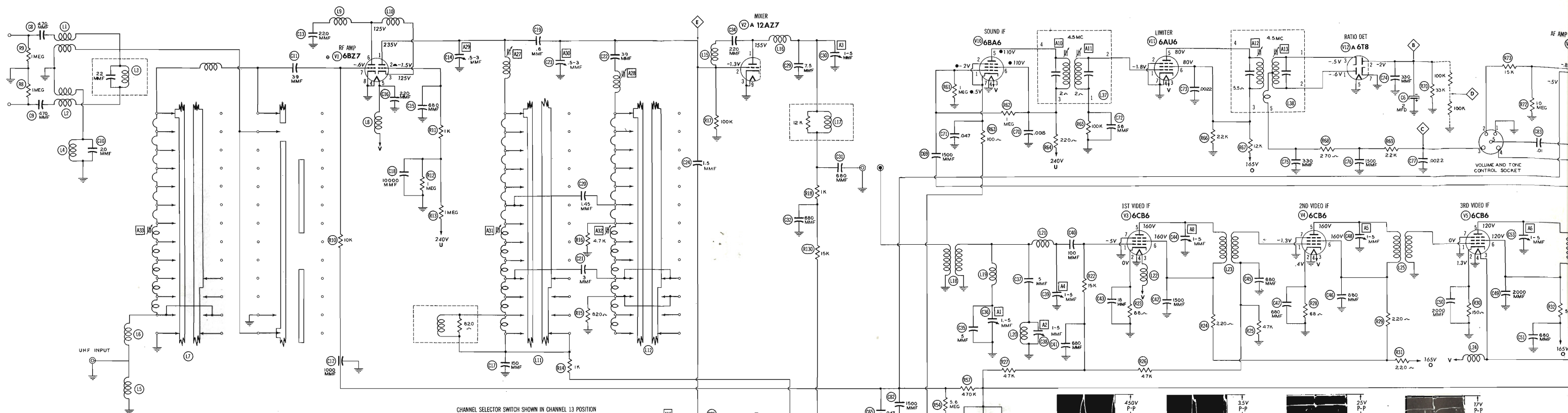
tent, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 6-54

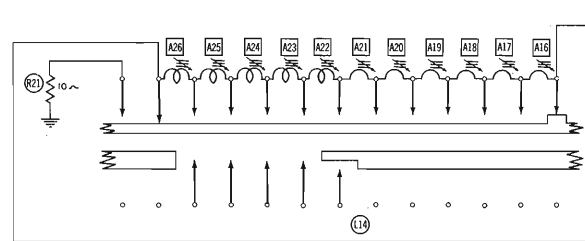
SET 241

FOLDER 11

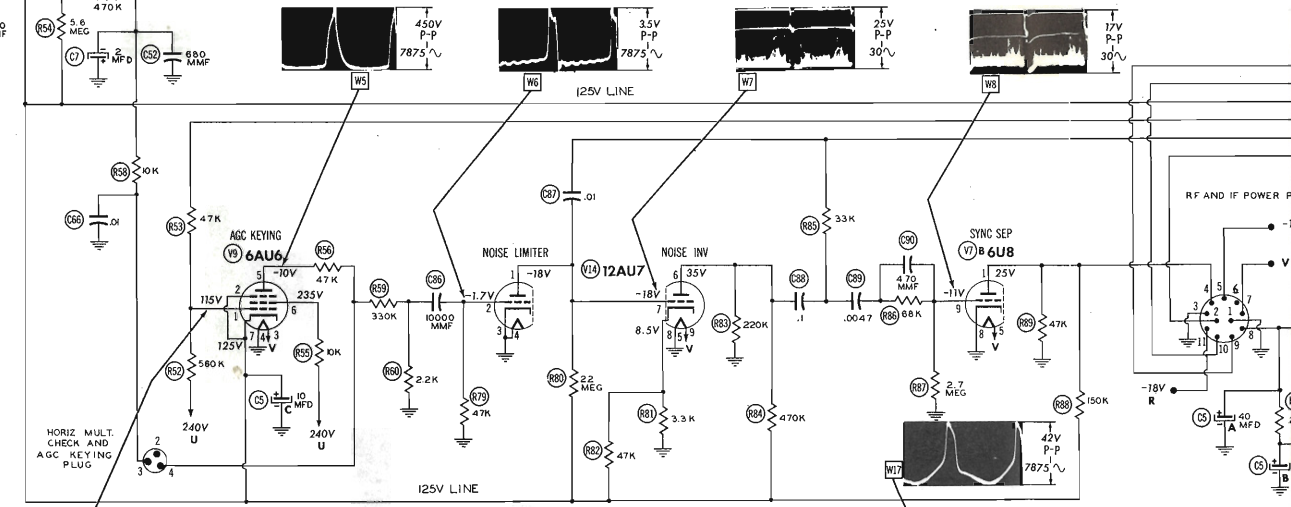
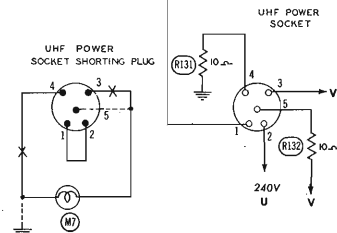
PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)



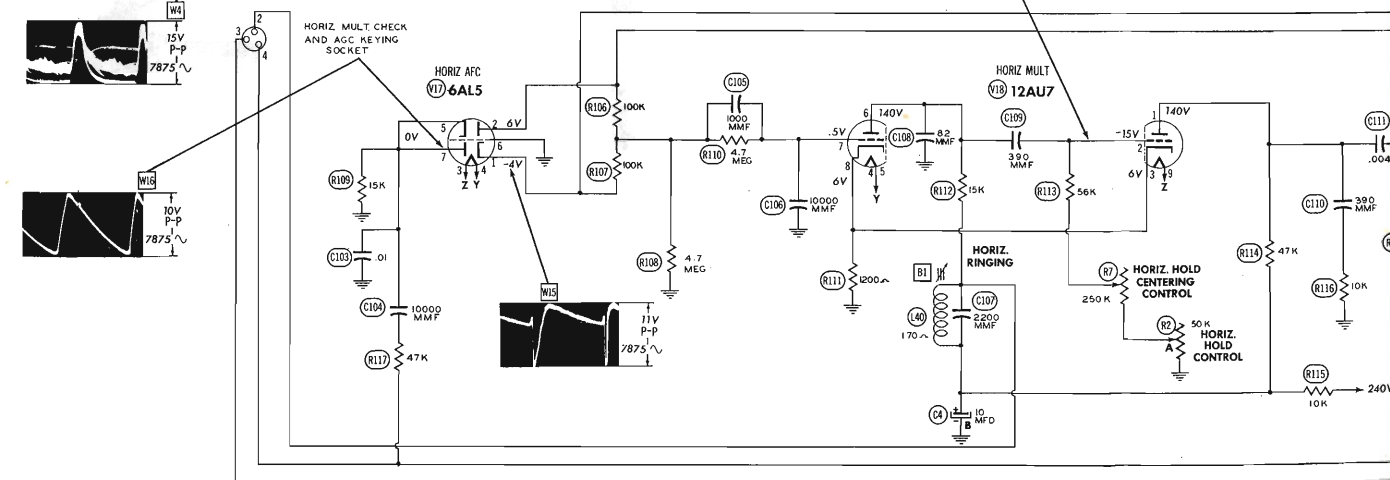
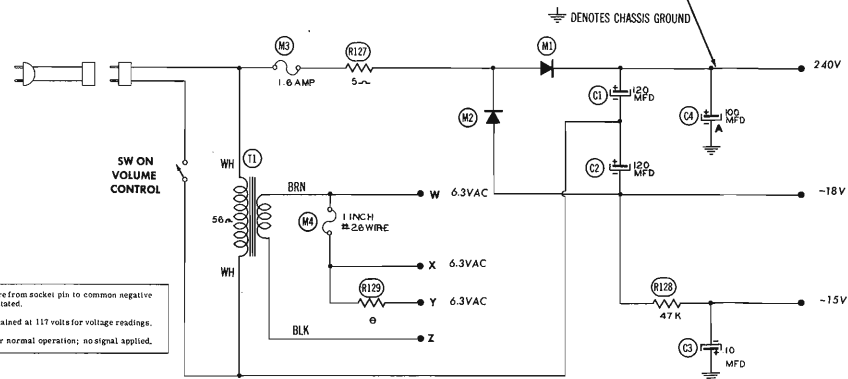
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION



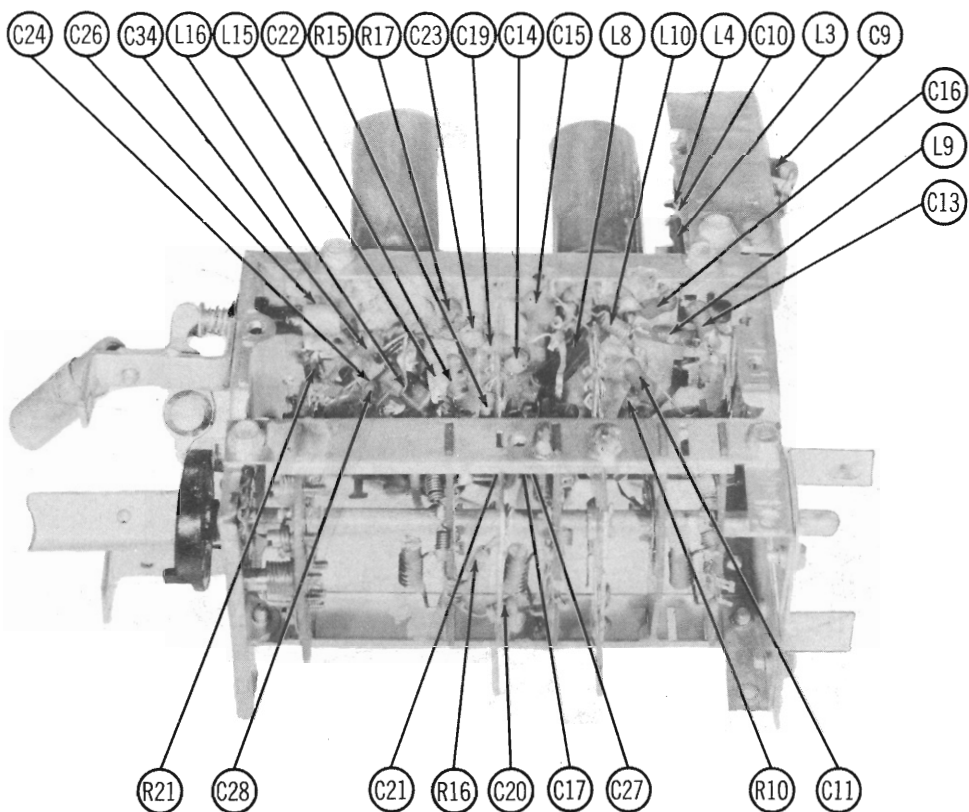
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



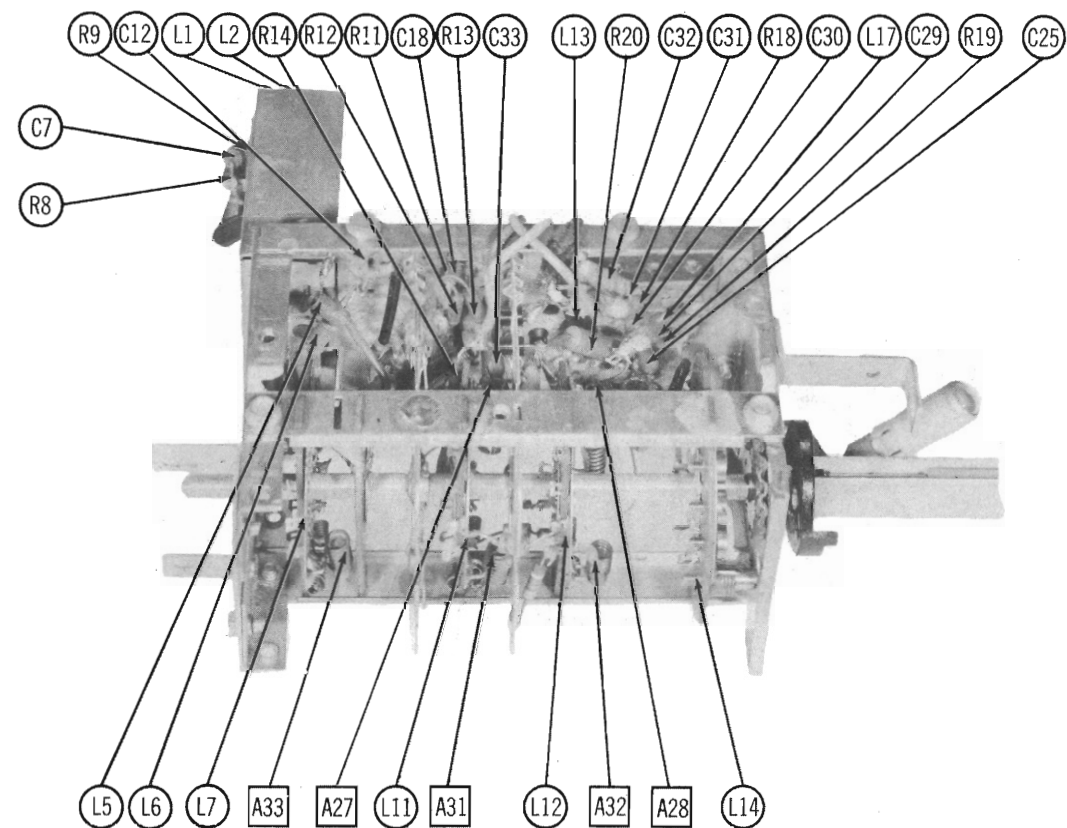
- MEASURED FROM PIN 3 OF V1
 - MEASURED FROM 125V LINE
 - SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
 - DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
 - DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
- WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
- DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
 - Pin numbers are counted in a clockwise direction on bottom of socket.
 - Measured values are from socket pin to common negative unless otherwise stated.
 - Line voltage maintained at 117 volts for voltage readings.
 - All controls set for normal operation; no signal applied.



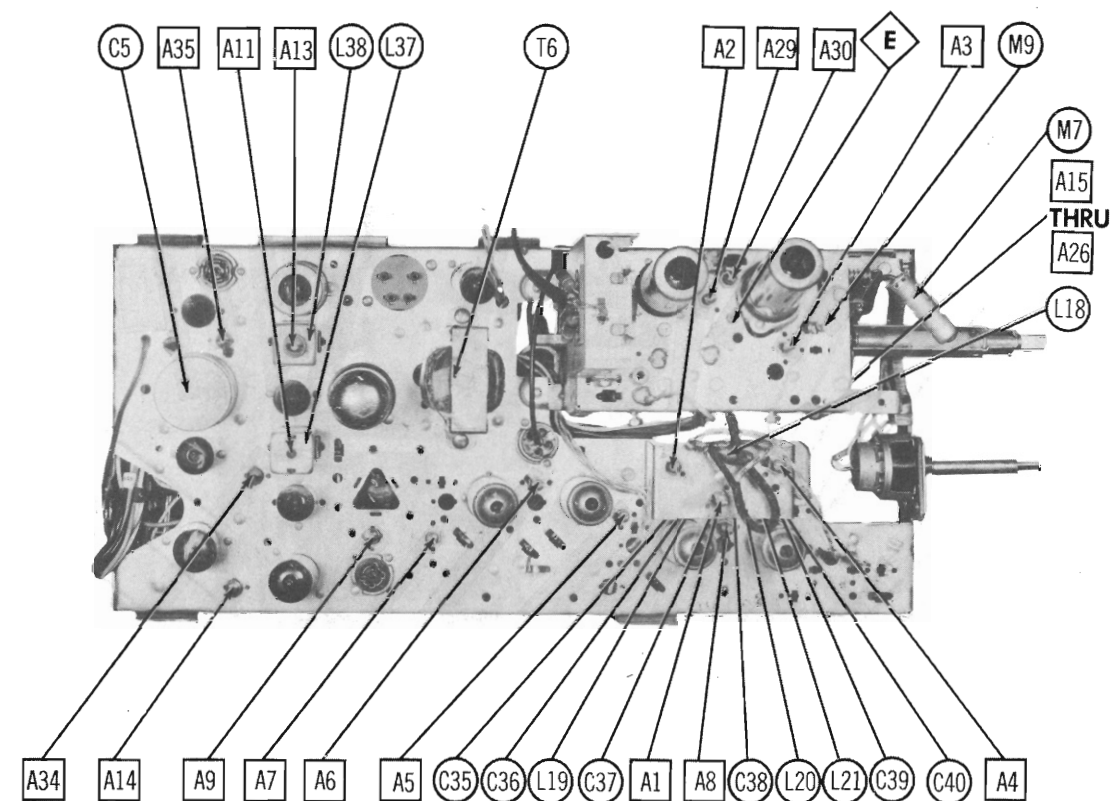
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1954



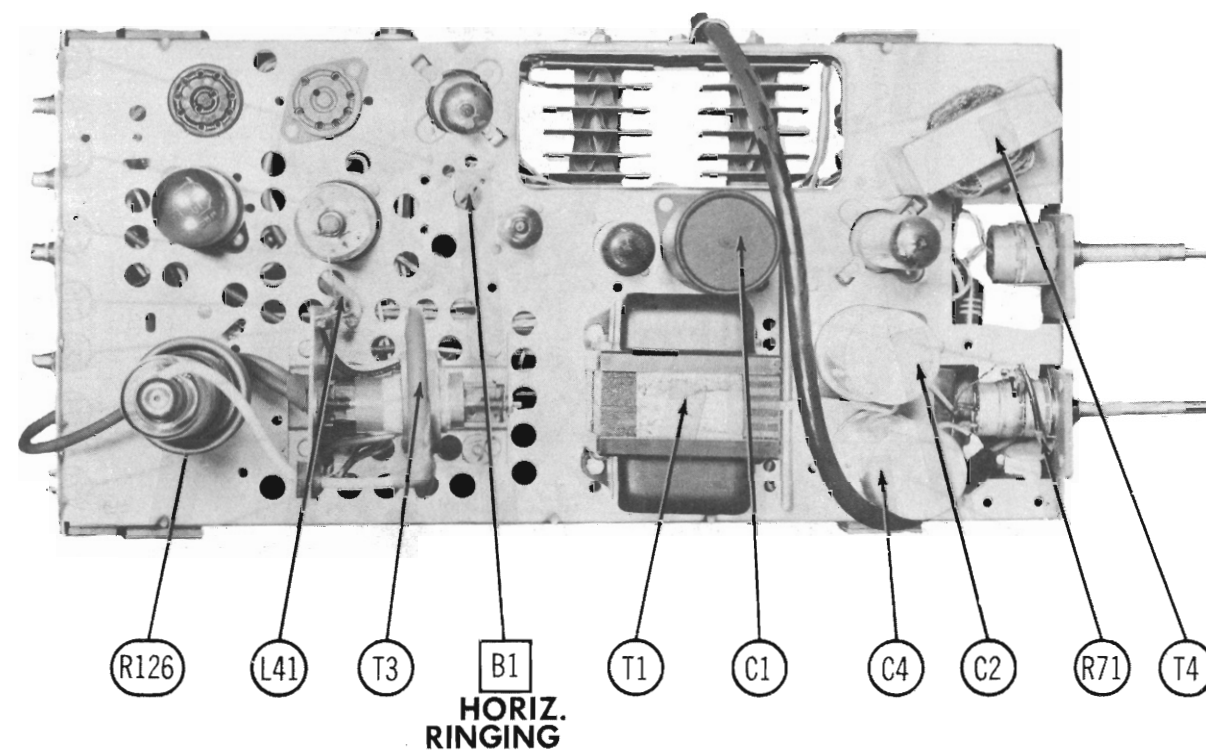
VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE



RF-IF CHASSIS-TOP VIEW

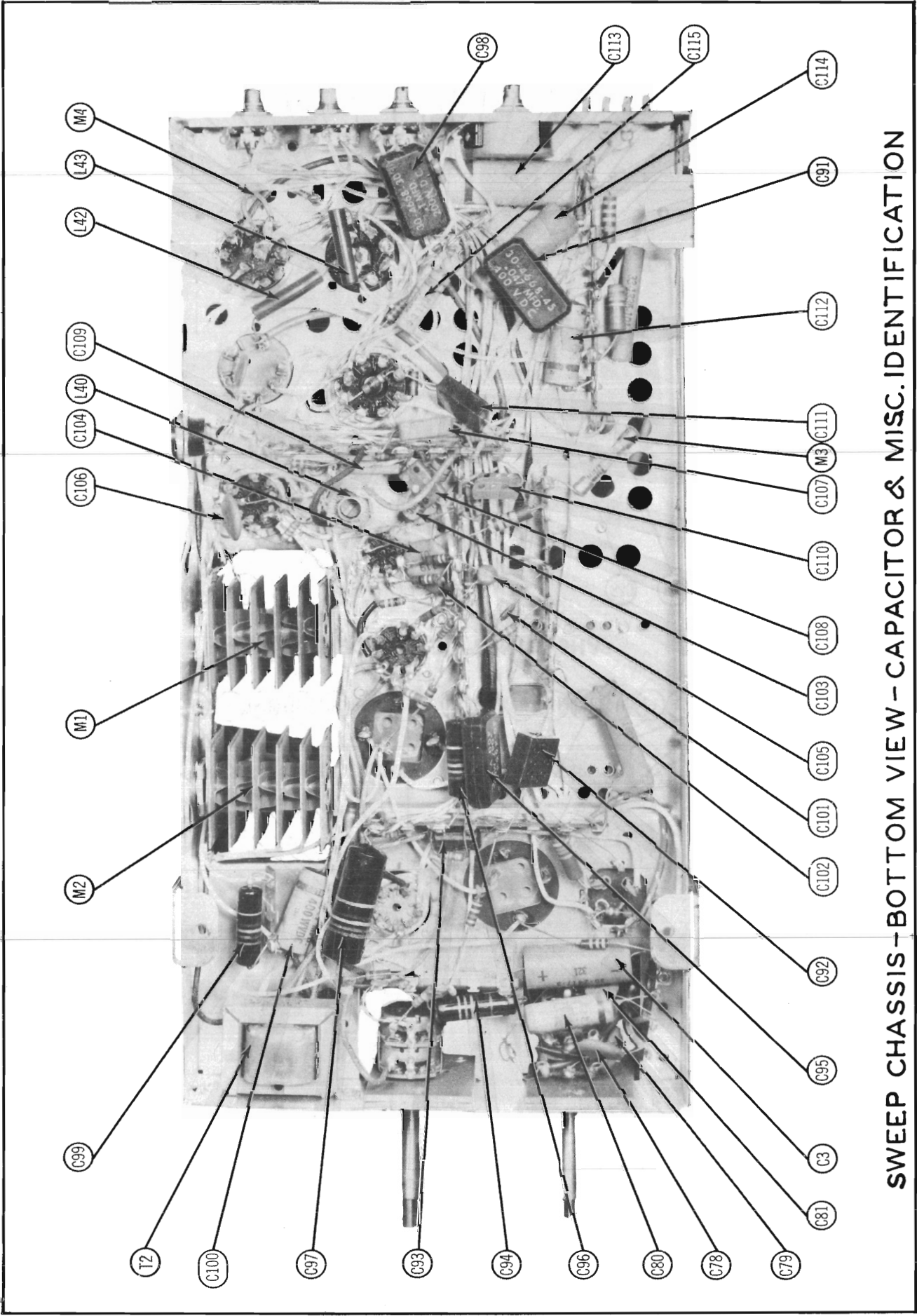


SWEEP CHASSIS-TOP VIEW

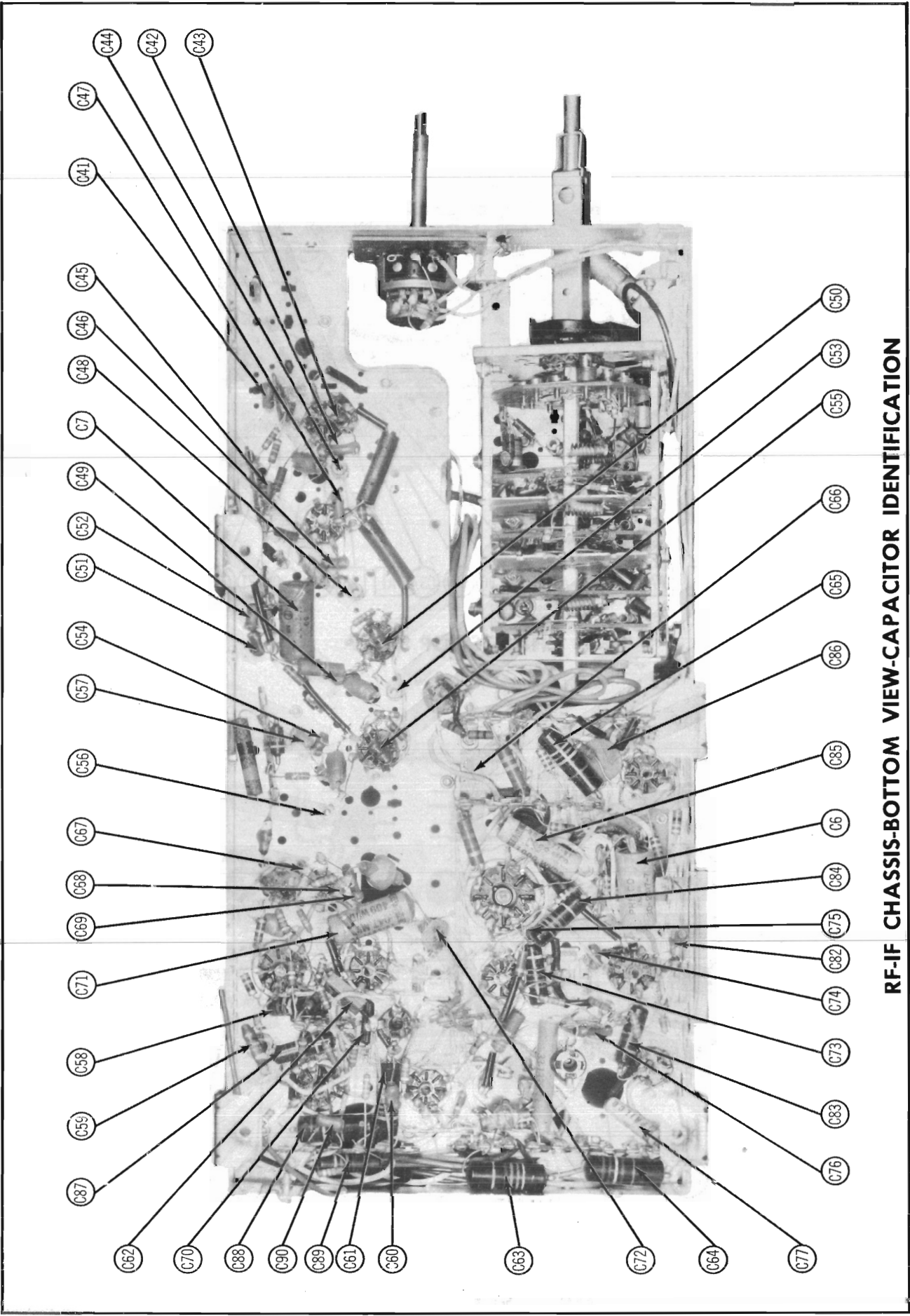
SET 241 FOLDER 11

PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)

NOTIFICATION: CSIM & ROLICAPAC - MEIA MOLLTOB - SSSVHC DEEMS



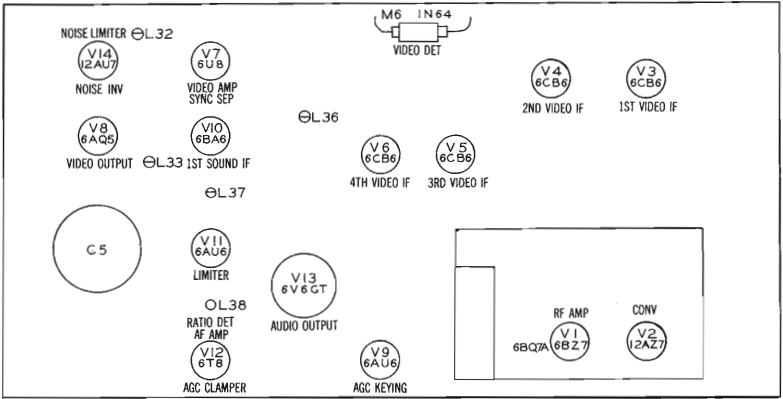
RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



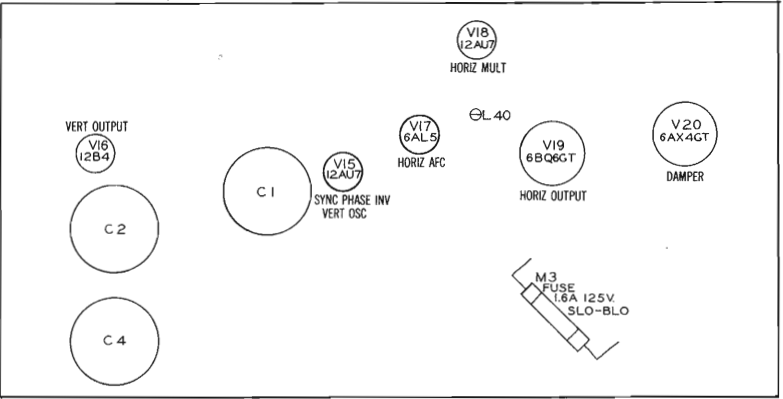
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1KΩ	1 Meg	INF	0Ω	.1Ω	INF	570KΩ	0Ω	0Ω
V 2	12AZ7	† 16KΩ	100KΩ	0Ω	.1Ω	.1Ω	† 15KΩ	10KΩ	0Ω	0Ω
V 3	6CB6	110KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	† 2.4KΩ	0Ω		
V 4	6CB6	47KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	† 2.4KΩ	0Ω		
V 5	6CB6	1.5Ω	150Ω	.1Ω	0Ω	† 7.6KΩ	† 7.6KΩ	0Ω		
V 6	6CB6	1.5Ω	150Ω	.1Ω	0Ω	† 2.2KΩ	† 2.2KΩ	0Ω		
V 7	6U8	† 50KΩ	3.3KΩ	■ 4.7K	0Ω	.1Ω	■ 8.1KΩ	33Ω	0Ω	2.7 Meg
V 8	6AQ5	1.5Meg	390Ω	.1Ω	0Ω	† 2.5KΩ	† 0Ω	1.5 Meg		
V 9	6AU6	■ 52KΩ	22KΩ	.1Ω	0Ω	180KΩ	† 10KΩ	22K		
V 10	6BA6	† 540KΩ	■ 100Ω	.1Ω	0Ω	† 220Ω	† 220Ω	■ 100Ω		
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 12KΩ	† 12KΩ	0Ω		
V 12	6T8	INF	33KΩ	INF	.1Ω	0Ω	600KΩ	0Ω	10 Meg	† 275KΩ
V 13	6V6GT	INF	.1Ω	† 5.2K	† 4.7KΩ	680KΩ	† 0Ω	0Ω	120Ω	
V 14	12AU7	■ 22 Meg	47KΩ	0Ω	0Ω	0Ω	■ 180KΩ	■ 22Meg	3.3KΩ	.1Ω
V 15	12AU7	† 14KΩ	1 Meg	2.2KΩ	0Ω	0Ω	■ 1.8Meg	350KΩ	1KΩ	.1Ω
V 16	12B4	470Ω	4.2Meg	0Ω	.1Ω	.1Ω	INF	4.2Meg	INF	† 284Ω
V 17	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15KΩ	INF	15KΩ		
V 18	12AU7	† 57KΩ	140KΩ	1.2KΩ	.1Ω	.1Ω	† 25KΩ	9.4Meg	1.2KΩ	0Ω
V 19	6BQ6GT	1.6Meg	.1Ω	† 11.4KΩ	† 4.6KΩ	1 Meg	47KΩ	0Ω	0Ω	TOP CAP ■ 27Ω
V 20	6AX4GT	† 0Ω	INF	150KΩ	INF	† 2Ω	■ 45Ω	0Ω	.1Ω	TOP CAP ■ 867Ω
V 21	1B3GT			PINS 1-8 HAVE INF. RESISTANCE						
V 22	21ZP4A	0Ω	470KΩ	■ 47KΩ	† 220KΩ	.1Ω				

† MEASURED FROM OUTPUT OF M1.
■ MEASURED FROM PIN 7 OF V10.
▲ MEASURED FROM PIN 3 OF V20.

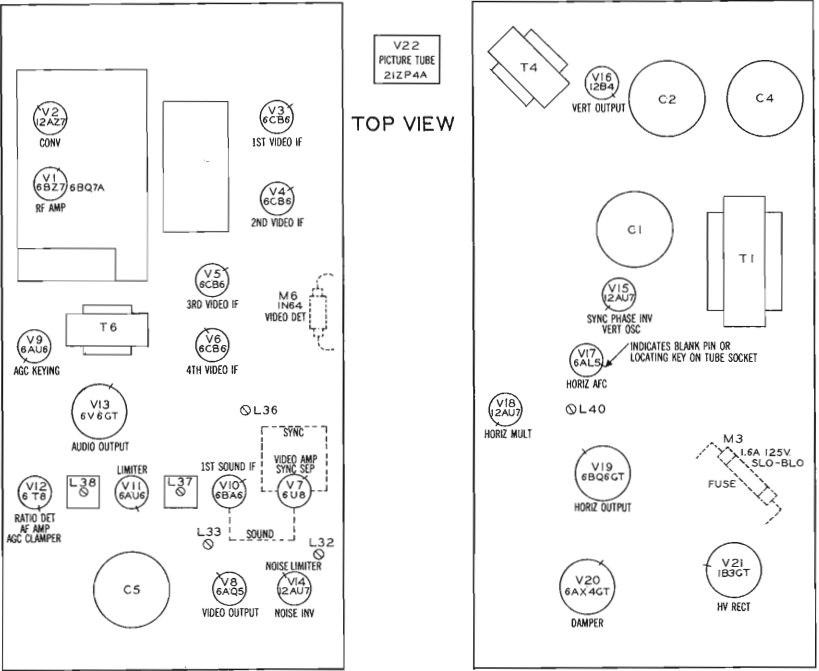


BOTTOM VIEW



TUBE PLACEMENT CHART

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1 & M2) fuse (M3 & M4)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V18, V22
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V15
No horiz. sync - V15, V17, V18
No vert. or horiz. sync - V7, V15

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V22
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, M1, M2
Vert. off freq. - V15
Horiz. off freq. - V15, V17, V18

PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V18) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Set the contrast and brightness controls at maximum counter clockwise rotation.
Connect a 10KΩ carbon resistor to pin 1 of the video AGC test jack and another 10KΩ resistor to pin 5 of the same jack. Connect the free ends of the 10KΩ resistors together and attach the negative lead of a 10 volt bias supply to their junction. Connect the positive lead of the battery to chassis.
The IF shield must be in place during alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	Not used	47.25MC (400%Mod)	4	Vert. Amp. thru 15KΩ to point A. (Pin 2 of Video AGC test jack). Low side to chassis.	A1	Adjust for MINIMUM 400% indication on scope.
2. "	"	"	41.25MC	"	"	A2	"
3. "	"	"	42.7MC	"	"	A3	Adjust for maximum 400% indication on scope.
4. "	"	"	44.75MC	"	"	A4	"
5. "	"	"	45.7MC	"	"	A5	"
6. "	"	"	44.4MC	"	"	A6	"
7. "	"	"	43.0MC	"	"	A7	"
8. "	"	"	42.0MC	"	"	A8	Adjust for maximum 400% indication on scope. Increase bias until pattern on scope is reduce 50% in amplitude and retouch A8 for maximum 400% indication on scope. Restore bias to -10 volts.
9. "	"	44MC (10MC Swp)	42.0MC 45.75MC	"	"		Check for response curve similar to Fig. 1. If necessary, adjust A6 and A7 for maximum improvement. A6 affects tilt and A7 affects dip. A3 affects slope at 42.0MC side of curve. Adjust A4 and A5 for proper level at 45.75MC.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove the first video IF tube (V3) from its socket.
Connect two matched 100KΩ (±1%) resistors in series from point B to chassis. The junction of these two resistors is alignment point D as shown on the schematic.
Leave the bias connected as under "Video IF Alignment". This will help to reduce circuit noise indications.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10. 2200Ω carbon resistor	High side to point A. Low side to chassis.	4.5MC (Unmod)	Any	DC Probe to point B. Common to chassis.	A9, A10, A11, A12	Adjust for maximum deflection. Attenuate generator to maintain not more than 5 volts at VTVM.
11. "	"	"	"	DC Probe to point C. Common to point D.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Remove V3 from its socket. Leave bias connected as under "Video IF Alignment".

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10. 2200Ω Carbon Resistor	High side to point A. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point B. Low side to chassis.	A9, A10, A11, A12	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
11. "	"	"	"	"	Vert. Amp. to point C. Low side to chassis.	A13	Reconnect stabilizing capacitor. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY adjust A12 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

4.5MC TRAP ALIGNMENT

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12. 2200Ω Carbon Resistors	High side to point A. Common to chassis.	Not used	4.5MC (400%Mod)	Any	Vert. Amp. thru detector (Fig. 4) to picture tube grid (pin 2). Low side to chassis.	A14	Adjust signal generator for maximum output and set vertical gain of scope to maximum. Adjust A14 for MINIMUM 400% indication on scope.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and turn the fine tuning control clockwise until a 4.5MC beat pattern appears in picture. Adjust A14 for minimum 4.5MC beat in picture (screw should be out of chassis approximately 5/8").

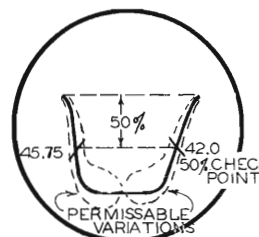


FIG. 1

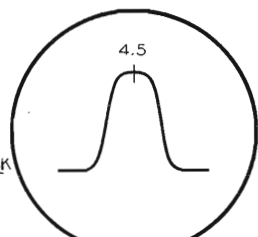


FIG. 2

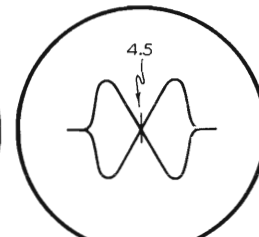


FIG. 3

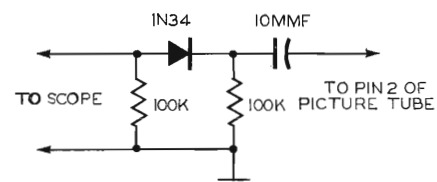


FIG. 4

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the white lead on top of the tuner. Connect the positive lead to chassis.
Remove the gate pulse plug from its socket. Couple the 45.75MC output of a second signal generator to the first video IF amplifier tube (V3) by removing the tube shield and attaching the output leads of the generator to the ends of a few turns of wire wrapped around the tube.
The output is set at 45.75MC throughout the entire oscillator alignment.
Set the fine tuning control at the middle of its range (with the cam stop opposite the channel 8 oscillator tuning core).
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	211.25MC 205.25MC 199.25MC 193.25MC 187.25MC 181.25MC 175.25MC 83.25MC 77.25MC 67.25MC 61.25MC 55.25MC	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 15KΩ to point A. Low side to chassis.	A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26	Adjust for zero beat with 45.75MC marker IF signal as indicated on scope.

RF AND MIXER ALIGNMENT

Leave the 1.5 volt bias battery connected as under Oscillator alignment.
Adjust the scope controls so that the width of the response curve is double the height.
Overload may then be checked by varying the generator output. Readjust the scope vertical gain control to maintain the 2 to 1 ratio as the generator output is increased. Any change in shape of response curve indicates overload and generator output should be reduced.
The 2 to 1 width to height ratio should be maintained when comparing the response curves from channel to channel.
Disconnect the tuner coupling link at the IF terminal strip (near V3) and solder a 68Ω carbon resistor to the open end of the link. Remove the first IF tube (V3) from its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14. Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	213MC	13	Vert. amp. thru 100KΩ to point E. Low side to chassis.	A27, A28	Check for a symmetrical approximately centered band pass similar to Fig. 5. If response is not flat between limits shown detune A28 counter clockwise until single peak appears. Adjust A27 until peak falls at 213MC. Adjust A28 for response similar to Fig. 5.
15. "	"	177MC (10MC Swp)	177MC	7	"	A29, A30	Check for response as indicated by dotted lines in Figs. 6A and 6B. Adjust A29 and A30 for mirror image of original response curve (tilt in opposite direction); for example, if response curve appears as in Fig. 6A, adjust A29 and A30 until curve appears as in 6B. This adjustment over compensates to allow for channel 13 adjustment in next step. Repeat steps 14 and 15 until centered and symmetrical response curves are obtained on channels 13 and 7.
16. "	"	85MC (10MC Swp)	85MC	6	"	A31, A32 A33	Adjust A31 and A32 for symmetrical approximately centered band pass. Detune A32 counter clockwise until single peak appears. Adjust A31 until peak falls at 85MC. Adjust A33 for maximum curve height and symmetry. Readjust A31 and A32 for symmetrical response as in Fig. 5.

VIDEO PEAKING COIL ADJUSTMENTS

In cases of excessive overshoot or smear on some stations it may be necessary to adjust A34 and A35. Alignment of the tuner and IF portions of the receiver must be correct before these adjustments are made. Counter clockwise adjustment will reduce the amount of overshoot and clockwise adjustment will reduce the amount of smear. Proper adjustment is the point of minimum smear and trailing whites.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable.
Alignment of this portion of the receiver should not be required in the field.

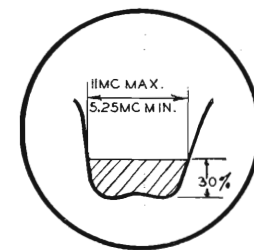


FIG. 5

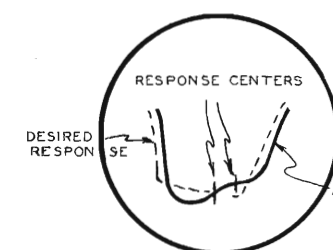


FIG. 6A

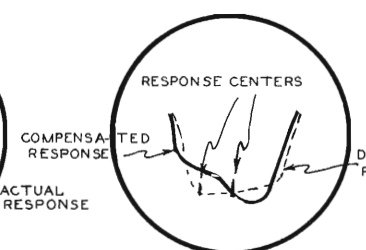


FIG. 6B

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

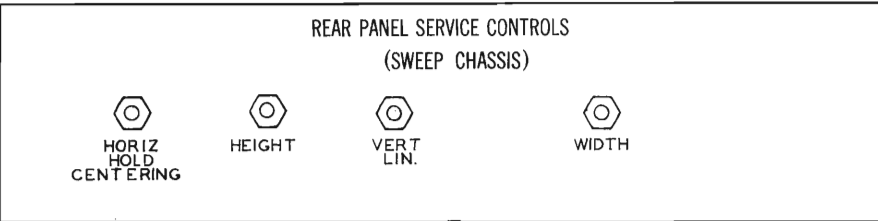
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding wood strip at bottom of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary tor remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis . Set the horizontal hold control at the mid-position of its range and adjust the horizontal hold centering control until picture synchronizes horizontally. If results are unsatisfactory, see horizontal sweep circuit adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L38) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used . One for LV power supply protection and one for filament protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side and up and down until the picture is properly centered.

BUILT-IN ANTENNA TUNING

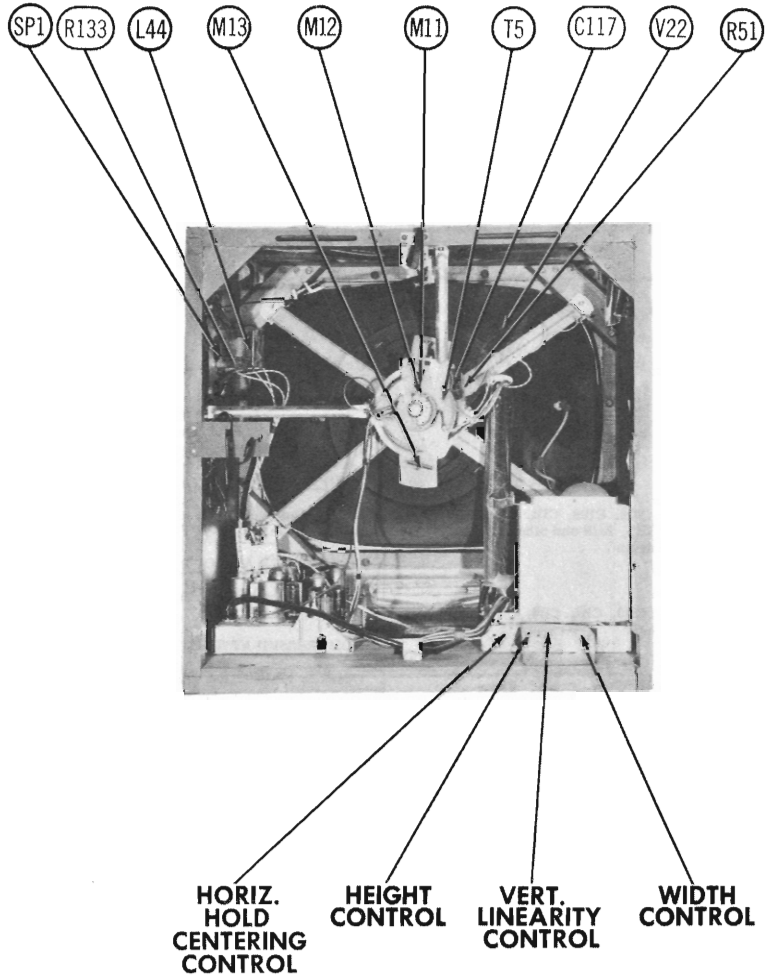
The built-in antenna can be adjusted from top rear of cabinet. Adjust for a picture of maximum contrast and minimum ghost.

ANTI-PIN CUSHION ADJUSTMENTS

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the coreners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 9 push on type control knobs from front panel.
2. Disconnect built-in antenna and transmission line.
3. Remove 10 wood screws. Remove rear cover.
4. Disconnect speaker plug, CRT socket, HV plug, inter-chassis plugs and yoke plug.
5. Remove 4 chassis bolts from each chassis. Remove both chassis.
6. Remove 4 speaker nuts. Remove speaker.



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Reduce the picture width until approximately one inch of blank screen appears on each side of the picture. Increase the brightness control setting until the blanking time becomes visible as indicated by a dark bar at each side of picture.

Connect a .1MF D capacitor from pin 2 of the gate pulse socket to chassis.

Set the horizontal hold control at the center of its range.

Adjust the horizontal hold centering control until the picture is centered between the two blanking bars.

Remove the 1 MFD capacitor.

Adjust the horizontal ringing coil slug (B1) until the picture is again centered between the two blanking bars.

Rotate the horizontal hold control through its range. The picture should lose sync at both extremes of rotation. If it does not, readjust the horizontal hold centering control until that condition is obtained. Check the number of diagonal bars on either side of the pull in range of the horizontal hold. There should be 1 or 2 bars present . If proper pull-in is not obtained, repeat the above procedure.

Adjust the horizontal width control for a picture slightly wider than necessary to fill the picture mask horizontally.

PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)

TROUBLE SHOOTING AIDS

CAUTION

Use a line isolation transformer of at least 225 watts rating, to remove shock hazard and prevent damage to receiver and/or test equipment.

SWEEP

HORIZONTAL	VERTICAL								
<p>LOSS OF SWEEP</p> <p>Follow procedure outlined under "Loss of High Voltage".</p> <p>INSUFFICIENT SWEEP</p> <p>Check by substitution V18, V19 and V20. Check adjustment of the width control. Check waveform W18.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Check T3, T5A, C112, C113, C114, R120, R124, R125 and other associated components.</td><td>Check C108, C109, C111, R111, R112, R114, R115, R119 and other associated components.</td></tr> </table> <p>DRIVE LINES</p> <p>Check by substitution V18, V19 and V20. Check C110, C111, C114, C116, T3, T5A, R116, R124 and other associated components.</p> <p>COMPRESSED AT LEFT SIDE</p> <p>Check by substitution V18, V19 and V20. Check components associated with the horizontal output and damper stages especially T3 and T5A.</p> <p>FOLDS</p> <p>Follow procedure outlined under Drive Lines.</p> <p>PIE CRUST EFFECT</p> <p>Check by substitution V18, V19 and V20. Check C106 for open. Check T3 and T5A.</p> <p>XMAS TREE EFFECT</p> <p>Substitute V18. Check L40, C107, C108, C109 and other associated components.</p>	If Satisfactory	If Unsatisfactory	Check T3, T5A, C112, C113, C114, R120, R124, R125 and other associated components.	Check C108, C109, C111, R111, R112, R114, R115, R119 and other associated components.	<p>LOSS OF SWEEP</p> <p>Check by substitution V15 and V16. Check waveform W12.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Check T4, T5B, R103 and other associated components.</td><td>Check R102, C96, C97, T2 and other associated components.</td></tr> </table> <p>INSUFFICIENT SWEEP</p> <p>Check adjustment of height and vertical linearity controls. Follow procedure outlined under "Loss of Sweep".</p> <p>COMPRESSED AT BOTTOM</p> <p>Check by substitution V15 and V16. Check T4, T5B, C4D and other associated components.</p> <p>COMPRESSED AT TOP</p> <p>Check by substitution V15 and V16. Check T2, C95, C97 and other associated circuit components.</p> <p>FOLDS</p> <p>Check by substitution V15 and V16. Check associated components especially T2, T4, C95 and C97.</p>	If Satisfactory	If Unsatisfactory	Check T4, T5B, R103 and other associated components.	Check R102, C96, C97, T2 and other associated components.
If Satisfactory	If Unsatisfactory								
Check T3, T5A, C112, C113, C114, R120, R124, R125 and other associated components.	Check C108, C109, C111, R111, R112, R114, R115, R119 and other associated components.								
If Satisfactory	If Unsatisfactory								
Check T4, T5B, R103 and other associated components.	Check R102, C96, C97, T2 and other associated components.								

SYNC

<p>LOSS OF VERTICAL AND HORIZONTAL SYNC</p> <p>Check by substitution V7, V14 and V15. Check C87, C88, C89, C91, R87, R89, R90, R80, R83, and other associated components.</p> <p>LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY</p> <p>Check by substitution V7, V14 and V15. Check waveform W10.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Check components associated with V15B especially T2 and R96.</td><td>Check vertical integrator and other associated components. Check video IF stages for overloading.</td></tr> </table>	If Satisfactory	If Unsatisfactory	Check components associated with V15B especially T2 and R96.	Check vertical integrator and other associated components. Check video IF stages for overloading.	<p>LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY</p> <p>Check by substitution V17 and V18. Check C100, C102, C107, C108, C109, R113, R114, R109, R117, C103, C104 and other associated components.</p> <p>HORIZONTAL BENDING</p> <p>Check by substitution V7, V14, V15, V17 and V18. Check horizontal AFC filter network. Check waveform W15 for vertical sync pulses.</p>
If Satisfactory	If Unsatisfactory				
Check components associated with V15B especially T2 and R96.	Check vertical integrator and other associated components. Check video IF stages for overloading.				

VIDEO

<p>LOSS OF VIDIO</p> <p>Check by substitution V7 and V8. Check C61, C63, R43, R46, picture tube and other associated components.</p> <p>SOUND BARS (4.5MC BEAT)</p> <p>Adjust tuner fine tuning for best picture and sound. Check 4.5MC trap adjustment (A14). Check video IF alignment.</p> <p>POOR CONTRAST</p> <p>Check by substitution V7 and V8. Check video detector crystal and assembly. Check contrast control, picture tube and other associated components.</p>	<p>NEGATIVE PICTURE</p> <p>Check by substitution V9, V8, V7, V4, V3 and V1. Check video detector assembly. Check AGC operation. Check picture tube.</p> <p>SMEAR</p> <p>Check by substitution V7 and V8. Check video detector assembly. Check C61, C63, R40, R42, R43, R46, R48, L35, picture tube and other associated components.</p> <p>WIDE BLACK BAR ACROSS PICTURE</p> <p>Check V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.</p>
---	---

AUDIO

<p>WEAK OR NO SOUND</p> <p>Check by substitution V10, V11, V12 and V13. Check stages V12B and V13 using audio signal generator. Apply audio signal across R72.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Check ratio detector and audio IF alignment and components.</td><td>Check components associated with V12B and V13 especially C84 and T6.</td></tr> </table>	If Satisfactory	If Unsatisfactory	Check ratio detector and audio IF alignment and components.	Check components associated with V12B and V13 especially C84 and T6.	<p>BUZZ</p> <p>Adjust tuner fine tuning for best picture and sound. Adjust A13 for minimum buzz. If still unsatisfactory, substitute V12. Check C6 and C74 for leakage.</p> <p>DISTORTED</p> <p>Follow procedure outlined under "Weak or No Sound".</p>
If Satisfactory	If Unsatisfactory				
Check ratio detector and audio IF alignment and components.	Check components associated with V12B and V13 especially C84 and T6.				

TROUBLE SHOOTING AIDS (cont)

POWER

<p>DEAD SET</p> <p>If filaments fail to light, check fuse M4, AC interlock assembly, switch on volume control and T1. If filaments light, check M1, M2, M3, C1, C2, C4A and other associated components.</p>	<p>SMALL AND/OR DIM PICTURE</p> <p>Measure B+ at 240V point.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Proceed as outlined under "Insufficient High Voltage".</td><td>Check M1, M2, C1, C2, C4A and other associated components.</td></tr> </table>	If Satisfactory	If Unsatisfactory	Proceed as outlined under "Insufficient High Voltage".	Check M1, M2, C1, C2, C4A and other associated components.
If Satisfactory	If Unsatisfactory				
Proceed as outlined under "Insufficient High Voltage".	Check M1, M2, C1, C2, C4A and other associated components.				

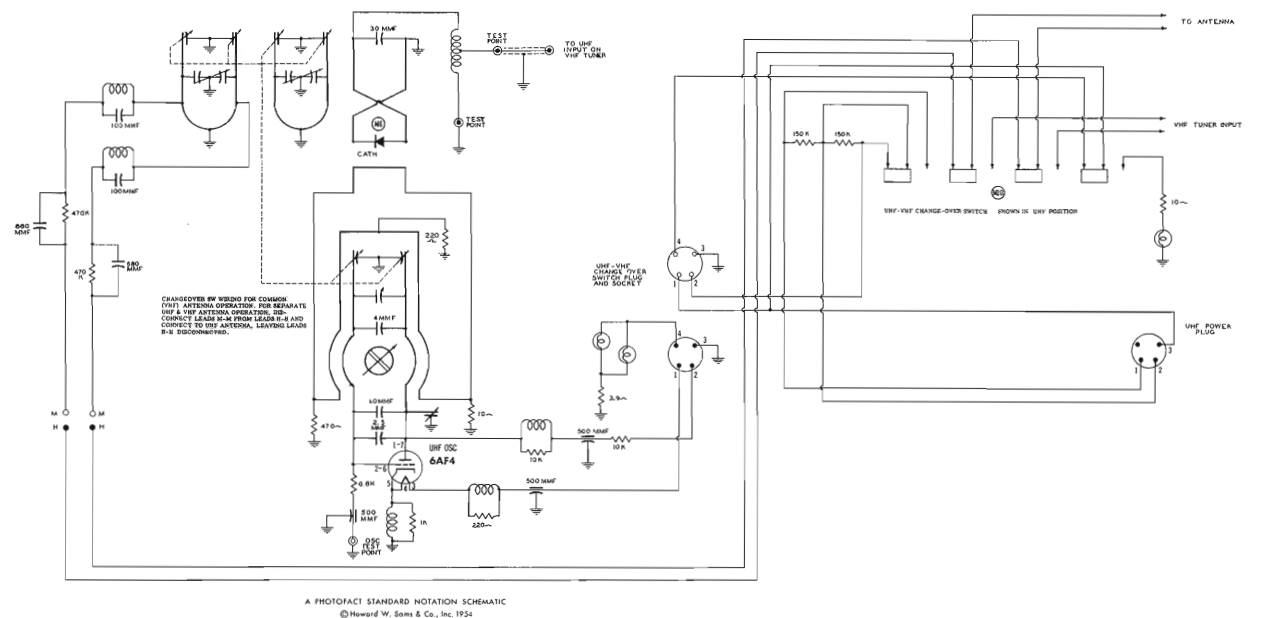
HIGH VOLTAGE

<p>LOSS OF HIGH VOLTAGE</p> <p>Check by substitution V18, V19, V20 and V21. Check waveform W18.</p> <table> <tr> <td>If Satisfactory</td><td>If Unsatisfactory</td></tr> <tr> <td>Check R126, T3, T5A, C112, R120, R4 and other associated components.</td><td>Check R119, R114, R111, C109, C111 and other associated components.</td></tr> </table>	If Satisfactory	If Unsatisfactory	Check R126, T3, T5A, C112, R120, R4 and other associated components.	Check R119, R114, R111, C109, C111 and other associated components.	<p>INSUFFICIENT HIGH VOLTAGE</p> <p>Check by substitution V18, V19, V20 and V21. Check picture tube. Proceed as outlined under "Loss of High Voltage".</p> <p>BLOOMING</p> <p>Check by substitution V18, V19, V20 and V21. Check R126, T3, T5A, C112, R120, R4 and other associated circuit components.</p>
If Satisfactory	If Unsatisfactory				
Check R126, T3, T5A, C112, R120, R4 and other associated components.	Check R119, R114, R111, C109, C111 and other associated components.				

GENERAL

<p>RASTER SOUND NO PICTURE</p> <p>Follow procedure outlined under "Loss of Video".</p> <p>RASTER PICTURE NO SOUND</p> <p>Follow procedure outlined under "Weak or No Sound".</p> <p>RASTER NO SOUND NO PICTURE</p> <p>Check by substitution V1, V2, V3, V4, V5, and V6. Check video detector assembly. Check video IF and tuner components.</p>	<p>NO RASTER NO SOUND</p> <p>Follow procedure outlined under "Dead Set".</p> <p>KEYSTONE EFFECT</p> <p>Check T5, C116, R124, R104, and R105.</p> <p>INTERMITTENT STREAKS</p> <p>Check high voltage section for corona discharge and arcing.</p>
--	--

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



UHF TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CURRENT		PHILCO PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.280ADC		34-8003-7	5QS1	1023	6S350A	350A	
M2	.280ADC		34-8003-7	5QS1	1023	6S350A	350A	

FUSES

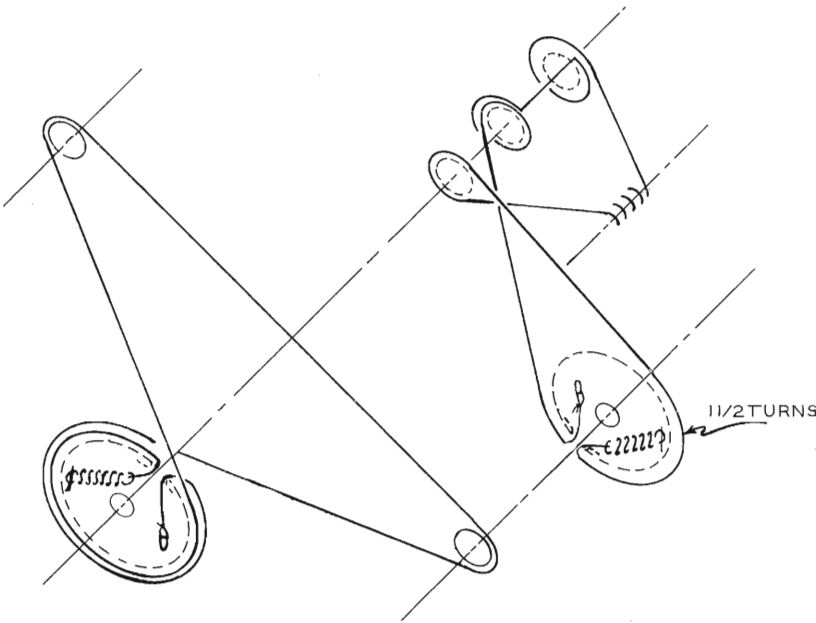
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG S/B P/T	1.6A 125V	45-2656-23		31501.6 (3AG S/B P/T 1.6A)		MDV 1 6/10	
M4			Piece of #26 Wire 1" long.					

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M5	1N64	34-8022	1N132	1N64A	Video detector
M6		34-8026	1N82 or A		UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M7	Dial Light	34-2068	VHF (Two added for UHF) #47 bayonet
M8	Tuner	43-6701	UHF adaptor UT20B
M9	Tuner	76-7600-3	VHF
M10	Switch	42-1996-6	UHF-VHF changeover
M11	Focus Magnet	76-6126-4	Includes centering device
M12	Ion Trap	76-6077-2	
M13	Correction Magnet		2 used
	Cabinet	10979-9 or -10	18B3104 & 18BU3104
	Cabinet	11015	22B4008, 22BU4008
	Cabinet	10993 or -1	22B4110, 22BU4110
	Cabinet	10993-2	22B4110L, 22BU4110L
	Cabinet	11016	22B4308, 22BU4308
	Cabinet	10997 or -1	22BU4108, 22B4108
	Knob	76-8457	Brightness and vertical hold
	Knob	76-8455	Channel Selector
	Knob	76-6048-5	Contrast and horizontal hold
	Knob	76-8456	Fine tuning
	Knob	76-6213-4	Tone
	Knob	76-8459	Off/on/volume
	Knob	76-8457-3	Brightness and vertical hold
	Knob	76-8455-4	Channel Selector
	Knob	76-6048-6	Contrast and horizontal hold
	Knob	76-8459-1	Off/on/volume
	Knob	76-8508	UHF Selector
	Knob	54-8993	UHF dial background
	Safety glass	54-7943-57	3104 Models
	Safety glass	54-7943-62	4008 Models
	Safety glass	54-7943-56	4108 and 4308 Models
	Safety glass	54-7943-69	4110 Models



UHF DRIVE CORD STRINGING

PARTS LIST & DESCRIPTION

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1A	RF Amplifier	6BZ7	6BZ7	9AJ	
B	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	12AZ7	12AZ7	9A	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier-Sync Separator	6U8	6U8	9AE	
V8	Video Output	6AQ5	6AQ5	7BZ	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6BA6	6BA6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Detector-AF Amp.-AGC Clamper	6T8	6T8	9E	
V13	Audio Output	6V6GT	6V6GT	7S	
V14	Noise Limiter-Noise Inverter	12AU7	12AU7	9A	
V15	Sync Phase Inv.-Vert. Oscillator	12AU7	12AU7	9A	
V16	Vert. Output	12B4	12B4	9AG	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	12AU7	12AU7	9A	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	PHILCO PART No.	REPLACEMENT DATA			RETMA BASE TYPE	NOTES
		SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.		
V22	21ZP4A	21ZP4A 21ZP4B 21ZP4C 21YP4 21YP4A	21ZP4A	21ZP4A	12N 12N 12L 12L	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	120	150	30-2568-51	AFH51-73		XA007		FP140	TVL-1428	
C2	120	150	30-2568-51	AFH51-73		XA007		FP140	TVL-1428	
C3	10	50	30-2417-3	PRS350/10		BR105		TC32	TVA-1304	
C4A	100	300	30-2584-27			DL17		FP465	TVL-4802	
B	10	300						2N531		
C	10	475								
D	100	25								
C5A	40	300	30-2570-57	AFH4-18		DL11		FP476	TVL-4578	
B	10	300								
C	10	300								
D	20	300								
C6	2	50	30-2417-7	E26E6		BBR2-50		TC302	TVA-1301	
C7	2	50	30-2417-7	E26E6		BBR2-50		TC302	TVA-1301	
C8	470		30-1225-18	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C9	470		30-1225-18	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C10	20		62-020309 011	SI20NP0	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C11	39		62-039409011	SI39	D6-390	TP28	GPIK-390	UC-5439	5GA-Q39	
C12	1000		30-1245-1	EF-001	MFT-1000			503C-D1	5GA-T22	
C13	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C14	1.5-3		31-6520-3		829-3		3115-01-OR5	CT565A		
C15	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C16	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C17	150		30-1238-9	BPD-00015	D6-151	G046	811-151	UC-5315	5GA-T15	
C18	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C19	1.6		311-5050-3							
C20	1.45									
C21	3									
C22	39		62-039409011	SI39	D6-390	TP28	GPIK-390	UC-5439	5GA-Q39	
C23	1.5-3		31-6520-3		829-3		311-01-OR5	CT565A		
C24	1.5		30-1221-8							
C25	12		30-1224-57							
C26	5		30-1224-35	SI5NP0	TCN-5	N011	N750K-050	DC-521	5TCUB-V5	
C27	1000		30-1245-1	BPD-001	DD-102	K069	801-001	UC-5322	5HK-D1	
C28	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C29	7.5		30-1224-13							
C30	1-5		31-6520-11		829-6		3139-01-10	ZT-555	5TCCB-V47	
C31	680		62-168001021	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C32	680		62-168001021	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C33	1000		30-1245-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C35	5		30-1224-28	SI5NP0	TCZ-4.7	Z011	NP0-831-050	ZT-555	5TCCB-V47	
C36	1-5		31-6520-9		829-6		3139-01-10			
C37	5		30-1224-28	SI5NP0	TCZ-4.7	Z011	NP0-831-050	ZT-555	5TCCB-V47	
C38	1-5		30-6520-9		829-6		3139-01-10			
C39	1-5		30-6520-9		829-6		3139-01-10			
C40	100		30-1224-18	SI100	D6-101	TP34	GPIK-101	UC-531	5GA-T1	
C41	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C42	1500		62-215001011	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C43	18		62-018400021	SI18	D6-180	TP12	GPIK-180	UC-5418	5GA-Q18	
C44	1-5		31-6520-9		829-6		3139-01-10			
C45	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C46	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C47	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	

PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP. VOLT	REPLACEMENT DATA							NOTES
		PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C48	1-5	31-6520-9	SI2000	829-6	TP56	3139-01-10	UC-522	5HK-D2	
C49	2000		SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C50	2000		SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C51	680	62-168001001	SI880	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C52	680	62-168001001	SI880	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C53	1-5	31-6520-9	SI2000	829-6	TP56	3139-01-10	UC-522	5HK-D2	
C54	2000		SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C55	2000		SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C56	1-5	31-6520-9	SI2000	829-6	TP56	3139-01-10	UC-522	5HK-D2	
C57	10	62-010409001	SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C58	.015	200	P688-015	SI10	TP09	GP1K-100	UC-541	5GA-Q1	
C59	68	62-068409001	SI68	D6-680	TP32	GP1K-680	UC-5468	5GA-Q68	
C60	33	62-033009001	SI33	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C61	.047	200	P288-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C62	220	500	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C63	.047	400	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C64	.047	200	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C65	.047	200	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C66	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C67	2.2	30-1221-6	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2	UC-522	5HK-D2	
C68	18	62-018400021	SI18NP0	TCZ-18	TZ12	NP0K-180	UC-522	5HK-D2	
C69	1500		SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C70	.0015	400	P688-0015	D6-152	CUB6D15	GP2L-152	UC-5215	5HK-D15	
C71	.047	400	P488-047	D6-471	CUB4547	PT4147	UC-547	5GA-Q47	
C72	56	30-1224-25	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C73	.0022	400	P688-0022	D6-560	CUB6D22	GP2K-331	UC-5333	5GA-T33	
C74	330	62-133001001	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C75	330		SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C76	1500		SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C77	.0022	400	P688-0022	D6-222	CUB6D22	GP2-333-222	UC-5222	5HK-D22	
C78	10000		BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C79	10000		BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C80	.03	400	P688-03	DD-103	CUB6S3	811-005	DC-521	5HK-D5	
C81	5000		BPD-005	DD-502	K080	811-005	DC-521	5HK-D5	
C82	1500		SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C83	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C84	.0068	400	P688-0068	D6-682	CUB6D68	GP2-333-682	UC-522	5HK-D2	
C85	.0068	1000	P1088-0068	D6-682	CUB6D68	GP2-333-682	UC-522	5HK-D2	
C86	10000		BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C87	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C88	.1	200	P288-.1	DF-104	CUB2P1	PT401	UC-547	5GA-Q47	
C89	.0047	600	P688-0047	DF-503	CUB6D47	GP2-333-472	UC-522	5HK-D2	
C90	.047	400	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C91	.047	400	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C92	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C93	.0022	400	P688-0022	D6-222	CUB6D22	GP2-333-222	UC-522	5HK-D2	
C94	.033	200	P488-033	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C95	.047	400	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C96	.015	400	P688-015	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C97	.22	400	P488-22	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C98	.1	200	P288-.1	DF-104	CUB2P1	PT401	UC-547	5GA-Q47	
C99	.022	400	P488-022	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C100	.047	400	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C101	1000		BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C102	1000		BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C103	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C104	10000		BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C105	1000		BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C106	10000		BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C107	2200	500	60-20225004	IR5D22	22R5Q82	UC-522	5HK-D2	5HK-D2	
C108	82	500	60-00825317	5R5T39	5R5T39	UC-522	5HK-D2	5HK-D2	
C109	390	500	60-10395417	5R5T39	5R5T39	UC-522	5HK-D2	5HK-D2	
C110	390	500	60-10395417	5R5T39	5R5T39	UC-522	5HK-D2	5HK-D2	
C111	.0047	600	P688-0047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C112	.047	400	P488-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C113	.47	200	P288-.47	DF-104	CUB2P1	PT401	UC-547	5GA-Q47	
C114	.047	600	P688-047	DF-503	CUB4547	PT4147	UC-547	5GA-Q47	
C115	.01	400	P488-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	
C116	68	2000	HVD30-000068						
C117	.01	600	P688-01	D6-103	CUB451	GP2-333-103	UC-522	5HK-D2	

Note 1. Value may vary from .01MFD to .05MFD. Use same value for replacement.

CONTROLS

ITEM No.	RATING RESISTANCE WATTS	REPLACEMENT DATA					INSTALLATION NOTES
		PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	5 Meg	33-5563-44	* QJ-340	RTV-360	SBBT-652-S	UF108L	Tone-Panel
R2A	2 Meg	33-5563-50	* QJ-356	RTV-358	SBB-718	UR26T95	Volume-tapped at 1 Meg - Rear
R3A	250KΩ	Not Req.				US-26	Attach to R1B
R4A	100KΩ	Not Req.				UF54L	Horiz. Hold - Panel
R5A	12,500Ω	Not Req.				UR254L	Vert. Hold-Rear
R6A	2.5 Meg	33-5565-51	* QJ-357	RTV-359		WF252	Contrast-Panel Wire wound
R7A	2.5 Meg	33-5565-51				UR15L	Brightness-Rear
R8A	2.5 Meg	33-5565-51				RI5000L	Width - Wire wound
R9A	2.5 Meg	33-5565-51				Not Req.	Attach to R4A
R10A	2.5 Meg	33-5565-51				SU-87	Vert. Linearity
R11A	2.5 Meg	33-5565-51				Not Req.	Attach to R5A
R12A	2.5 Meg	33-5565-51				SU-565	Height
R13A	2.5 Meg	33-5565-51				Not Req.	Attach to R6A
R14A	2.5 Meg	33-5565-51				SU-46	Horiz. Hold Centering
R15A	2.5 Meg	33-5565-51				Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B12-141 & P1-200 (Panel)

B18-139 & R1-216 (Rear) & SWITCH 76-1.

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B11-123 & P1-200 (Panel)

B11-130 & R1-216 (Rear)

* CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS W17-111 & P3-131 (Panel)

B11-128 & R1-216 (Rear)

† Universal replacement (Mallory exact duplicate Part No. UE966)

†† Add 2500Ω resistor in series with the control.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI. SEC. 2	REPLACEMENT DATA						
		PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Hallidorsen PART No.	Thordarson PART No.
T1	117VAC 6.3VAC @ 9.1A	32-8574-1	P-8306②	P-2948①	F-21A①			

① Tape center tap on 6.3 volt winding.

② Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						
		PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Hallidorsen PART No.	Thordarson PART No.
T2	Vert. Osc. Trans.	32-8431-8	A-8126 ②	A-3004		232T1 ①		
T3	Horiz. Output Trans.	32-8431-2 ①						
T4	Vert. Output Trans.	32-8807	A-8220 ③④		D-24 & WC-11 ⑤			FLY-8 & WC-20 ⑥
T5A	Yoke-Horiz. (29MH)	32-8539-1	A-8147					
T5B	Yoke-Vert. (40MH)	32-8539-2	DY-12 ⑦⑧	MDF-71 ⑨	Y-24 ⑩⑪		DF604 ⑫⑬	

① Alternate vertical oscillator transformer.

② Drill one new mounting hole.

③ Connect as in original circuit.

④ Use original mounting plate.

⑤ Connect terminal #8 to terminal #7, then connect original terminal #5 to new terminal #9, original #2 to new #5, original #6 to new #11, original #1 to new #1. Connect primary of WC-11 across terminals #1 and #3. Secondary to AFC and AGC. If picture is out of phase reverse secondary.

⑥ Connect original terminal #5 to new terminal #2, original #2 to new #8, original #6 to new #7, original #1 to new #5, connect primary of WC-20 across terminals #5 and #6, secondary to AFC and AGC. If picture is out of phase, reverse secondary.

⑦ Alternate vertical output transformer.

⑧ Use original yoke network.

⑨ Use original yoke plug and leads connected as in original circuit.

⑩ Connect original terminal #5 to new terminal #10, original #2 to new #9, original #1 to new #3, original #8 to new #2, original #7 to new #1. Disconnect one end of C115 and insert R124 in series with it.

TRANSFORMER (AUDIO OUTPUT)

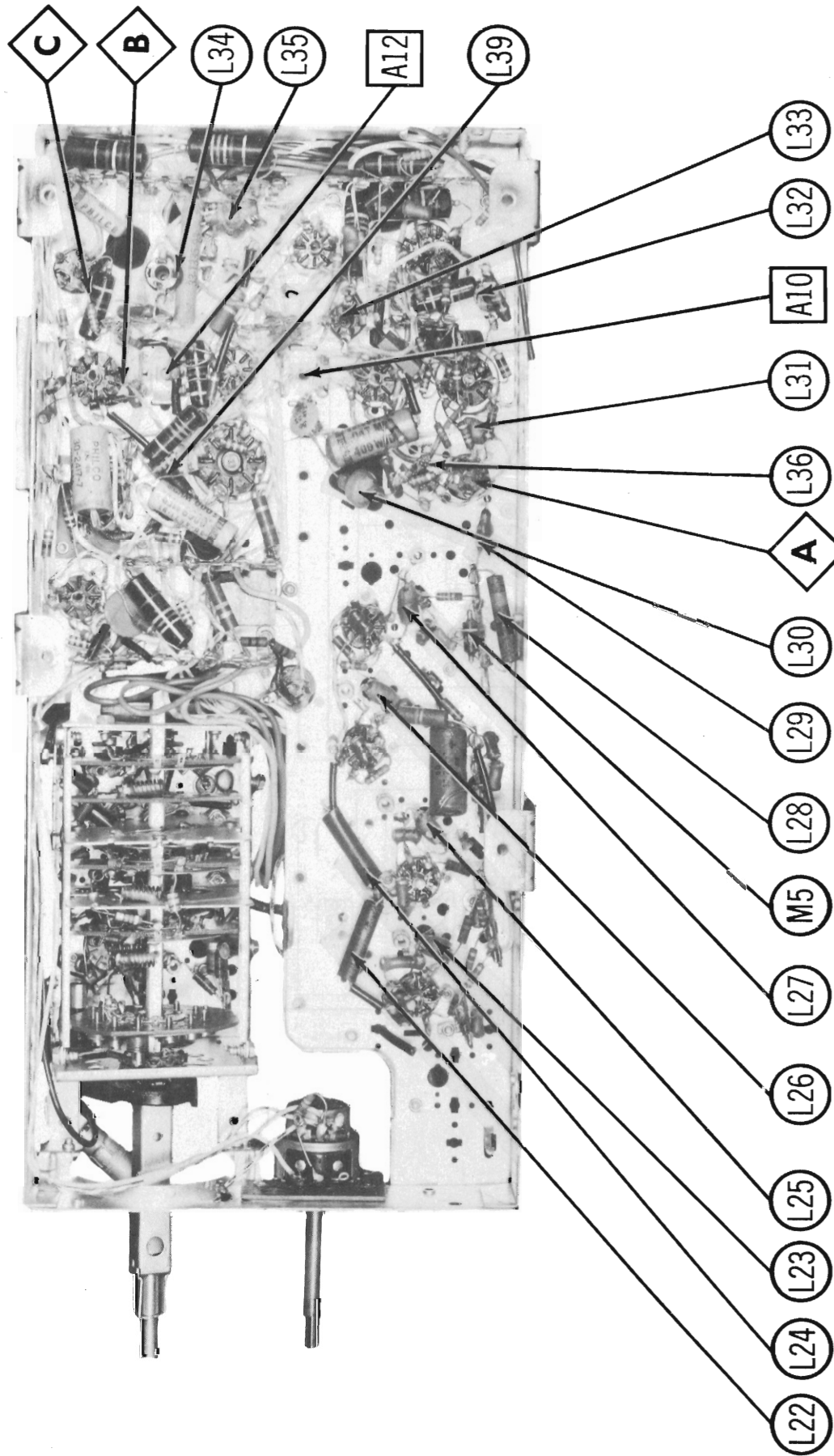
ITEM No.	IMPEDANCE PRI. SEC.	REPLACEMENT DATA					NOTES
		PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Hallidorsen PART No.	
T6	4.2KΩ 3.4Ω	32-8582	A-3849	A-3019	S-5X①	Z1002	① Drill one new mounting hole.

SPEAKER

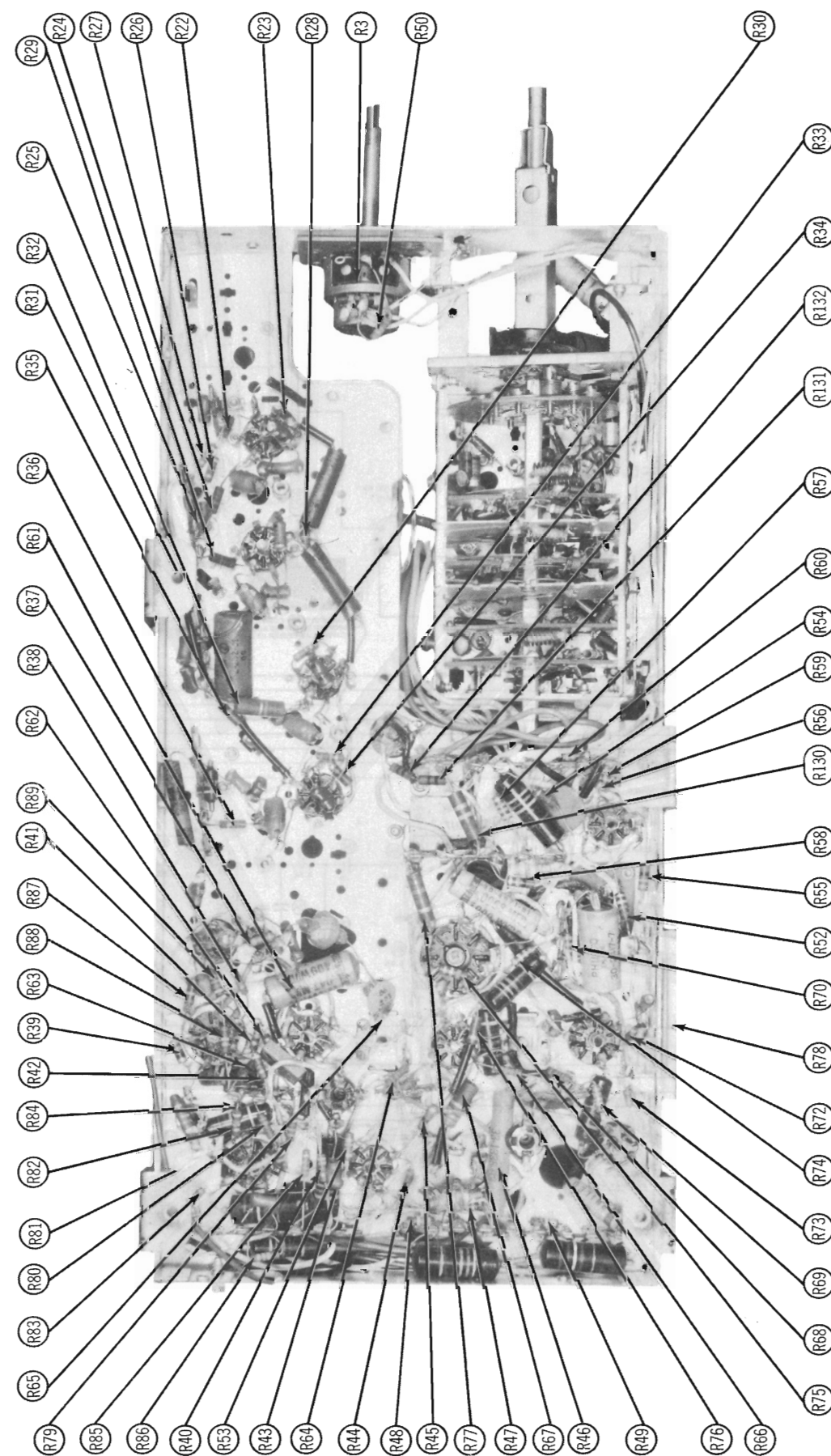
ITEM No.	RATINGS SIZE FIELD V. C. IMP.	REPLACEMENT DATA			NOTES
		PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6" PM 3.4Ω	36-1641-16	ST-108 Mod. P6-X	6A21	

COILS (RF-IF)

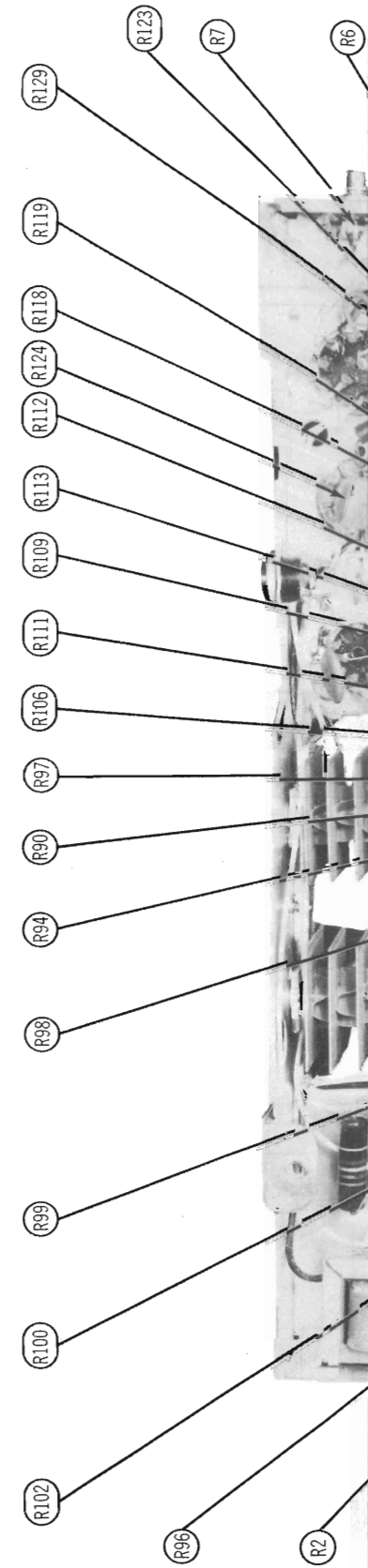
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Trans.	.7Ω	.7Ω	32-4432-3				Wound on 22MMF capacitor
L2	Ant. Trans.	.7Ω	.7Ω	32-4432-3				
L3	IF Trap	0Ω		32-4552-1				
L4	FM Trap	0Ω		32-4550-3				Includes switch wafer with coils
L5	UHF IF Input Coil	0Ω		312-5146-19				
L6	UHF IF Input Coil	0Ω		312-5146-16				
L7	Ant. Coils	0Ω		76-7610				
L8	Fil. Choke	0Ω		32-4550-1				Includes switch wafer with coils
L9	IF Trap	.1Ω		32-4548-13				
L10	Neutr. Coil	0Ω		312-5146-22				
L11	RF Coils	0Ω		76-7608				
L12	Mixer grid coils	0Ω		76-7608				Includes switch wafer with coils
L13	Fil. Choke	0Ω		32-4550-1				Includes switch wafer with coils
L14	Osc. Coils	0Ω		76-8604				Includes switch wafer with coils
L15	Feedback Coil	.9Ω		32-4551-1				Wound on 12KΩ resistor
L16	RF Choke	0Ω		312-5146-8				
L17	RF Choke	.3Ω		312-5151-6				
L18	IF Coupling Trans.	0Ω	0Ω	32-4599-2	17-4524 *			
L19	47. 25MC Trap	.1Ω		32-4597-2	19-1000		4604	1. 2Microhenries
L20	41. 25MC Trap	.6Ω		32-4112-31	19-1001		4604	1. 62Microhenries
L21	IF Coupling	.1Ω		32-4597-3	19-3001	TV-189	6175	. 84 Microhenry
L22	Fil. Choke	.1Ω		32-4112-15	19-3001	TV-189	4608	2. 9 Microhenries
L23	1st Video IF	.1Ω	.1Ω	32-4548-5	20-1045		6219	
L24	Fil. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2. 9 Microhenries
L25	2nd Video IF	.1Ω	.1Ω	32-4598-3	17-4523		6219	
L26	3rd Video IF	.1Ω	.1Ω	32-4548-26	17-4523		6219	
L27	4th Video IF	.1Ω	.1Ω	32-4548-27	17-4523		6219	
L28	Series Peak. Coil	8. 2Ω		32-4422-27	19-1005		4612	10 Microhenries; IRC Part # CL-1
L29	Series Peak. Coil	. 4Ω		32-4480-17	19-1002		4606	3 Microhenries
L30	Shunt Peak. Coil	4. 8Ω		32-4480-9	19-3180	TV-184	6180	180 Microhenries
L31	Series Peak. Coil	8Ω		32-4480-18	19-3160	TV-184	4644	150 Microhenries
L32	4. 5MC Trap	1. 7Ω		32-4463-2	20-1004	TV-151	1470	
L33	Variable Shunt Peaking Coil	6. 5Ω		32-4467-20				60-230 Microhenries
L34	Variable Shunt Peaking Coil	7Ω		32-4467-19				60-230 Microhenries
L35	Series Peak. Coil	2. 1Ω		32-4480-1	19-3036	TV-180	6178	40 Microhenries
L36	1st Sound IF	4. 2Ω		32-4463-9	17-3400		1469	
L37	2nd Sound IF	2Ω	2Ω	32-4497A	16-3445		6203	
L38	Ratio Det.	5. 5Ω	. 8ΩCT	32-4450-6A	17-3497	TV-113	6205	Tertiary windings- 8Ω
L39	Fil. Choke	. 1Ω		32-4112-15	19-3007	TV-189	4606	2. 9 Microhenries
L40	Horiz. Osc.	170Ω		32-4557	19-1576	TV-163	6210	
L41	RF Choke	1. 8Ω			19-1005		4624	15 Microhenries; Part of T3
L42	RF Choke	1. 8Ω		32-4112-24	19-1005		4612	11. 4 Microhenries
L43	RF Choke	1. 8Ω		32-4112-24	19-1005		4612	11. 4 Microhenries



RF-IF CHASSIS-BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION

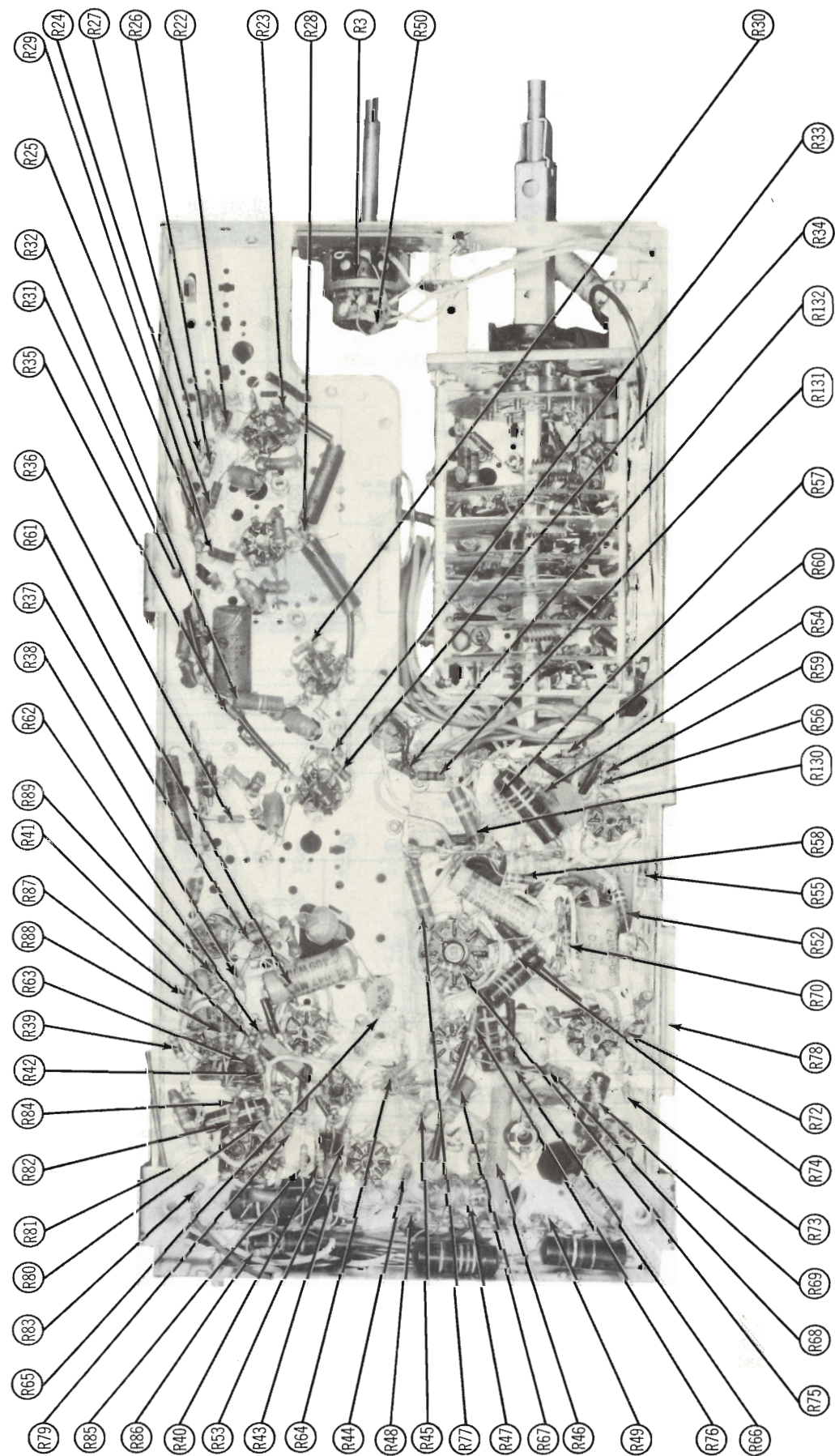


RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

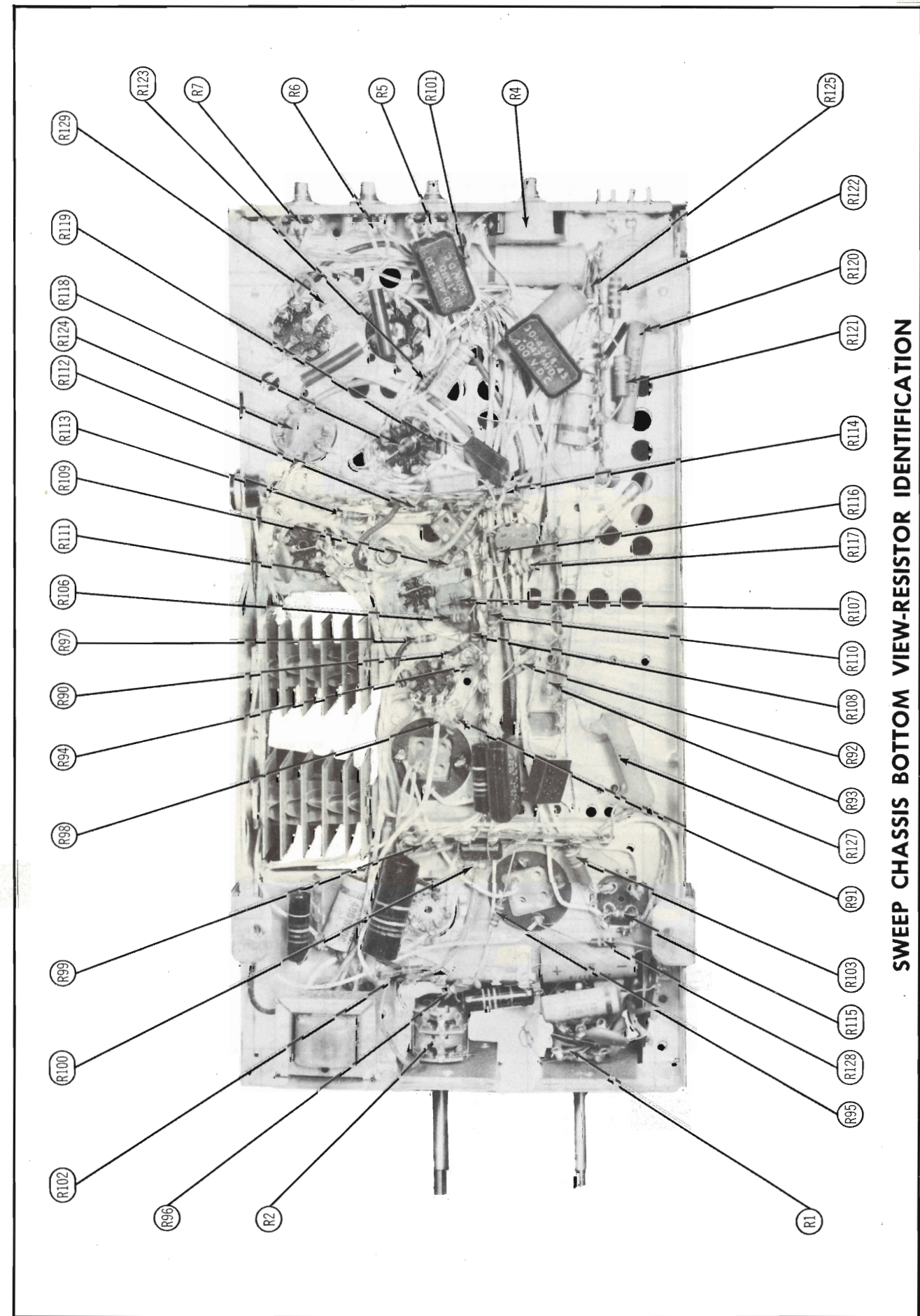


- L22
- L24
- L23
- L25
- L26
- L27
- M5
- L28
- L29
- L30
- A
- L36
- L31
- A10
- L32
- L33

RF-IF CHASSIS-BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION



RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION



SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION