

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Disconnect antenna leads. Remove ten screws holding cabinet back and lift back from set. Remove all knobs from cabinet front. Remove four screws holding tuner assembly and two screws holding front control panel. Remove one screw holding antenna block.

Disconnect CRT socket, HV anode lead, deflection yoke plug, degaussing coil plug, speaker leads, and ground wires. Remove two screws holding chassis. Lift control assemblies from cabinet. Slide chassis from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Remove two screws holding convergence board. Loosen and remove CRT neck assemblies. Remove four screws holding degaussing shield and lift shield from cabinet. Remove eight screws holding CRT and lift CRT from cabinet. Do not lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A circuit breaker is used for AC line protection. (See photo, Cabinet - Rear View.)

VHF TUNER

The fine tuning mechanically engages oscillator slug for adjustment (one slug for each channel).

UHF TUNER

The UHF tuner employs a detent mechanism for channel selection. Fine tuning is adjusted by rotating the fine tuning knob.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the horizontal frequency coil. (See Placement Chart.)

HIGH VOLTAGE

For adjustment of the high voltage, refer to Miscellaneous Adjustments.

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet - Rear View.)

AGC

The AGC may be varied by an RF Delay control. (See Placement Chart.)

SET 1743 FOLDER 2

PHILCO
CHASSIS E21-19/-20/-22

PHOTOFACT® Folder

with CIRCUITRACE

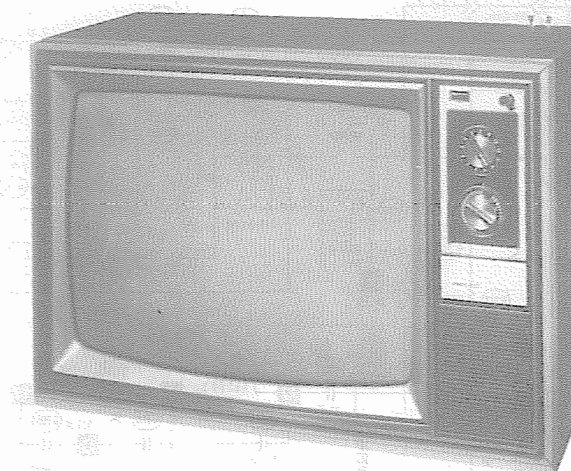
For Supplier Address See PHOTOFACT Index

PHILCO
CHASSIS E21-19/-20/-22

COLOR TV

MODEL	CHASSIS
C2902JWA	E21-19
C2912JWA	E21-20
C3101JWA	E21-22

Covering codes 00 thru 02 in Ch. E21-19/-20, 00 and 01 in Ch. E21-22.



MODEL C3101JWA

SAFETY PRECAUTIONS

See Page 4.

SERVICE INFORMATION

See Page 4.

INDEX

	Page		Page
Alignment		Photos (Continued)	
TV.....	6	CRT Socket Board.....	15
Block Diagram.....	49	Main Board.....	7 thru 14,
Convergence Adjustments.....	16		38 thru 46
Disassembly Instructions.....	53	UHF Tuner.....	32,35
Miscellaneous Adjustments.....	17	VHF Tuner.....	19,20,23,31,51
Parts List		Placement Chart.....	5
TV.....	24 thru 30	Resistance Measurements.....	48
UHF Tuner.....	18,21,32,35,36	Safety Precautions.....	4
VHF Tuner.....	23,31,33,34,52	Schematics	
Photos		TV.....	2,3,50
Cabinet-Rear View.....	53	UHF Tuner.....	18,21,36
Chassis-Top View.....	47	VHF Tuner.....	19,20,22,51
Control Board.....	15,21,32	Service Information.....	4
Convergence Board.....	37	Servicing in the Field.....	53
CRT Neck Assembly.....	16	Troubleshooting Check Chart.....	48

HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

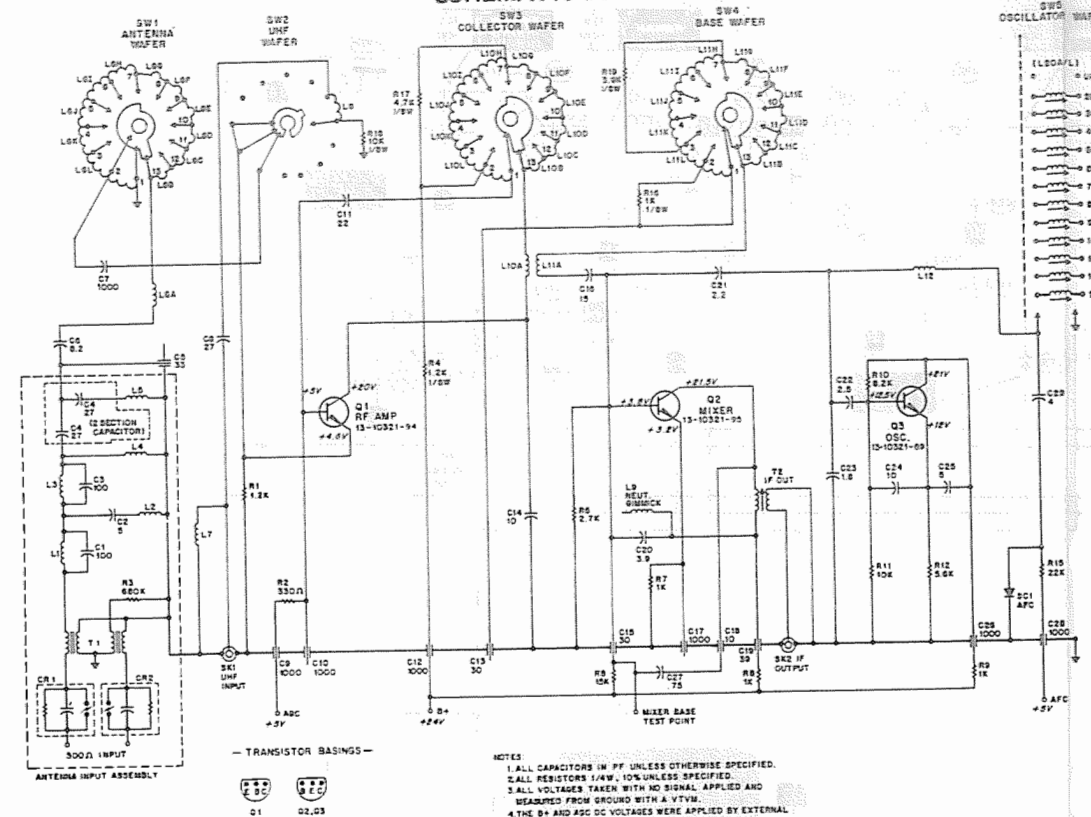
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. 8PD2050

Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1978 Howard W. Sams & Co., Inc., Indianapolis, Indiana 46206. Printed in U. S. of America

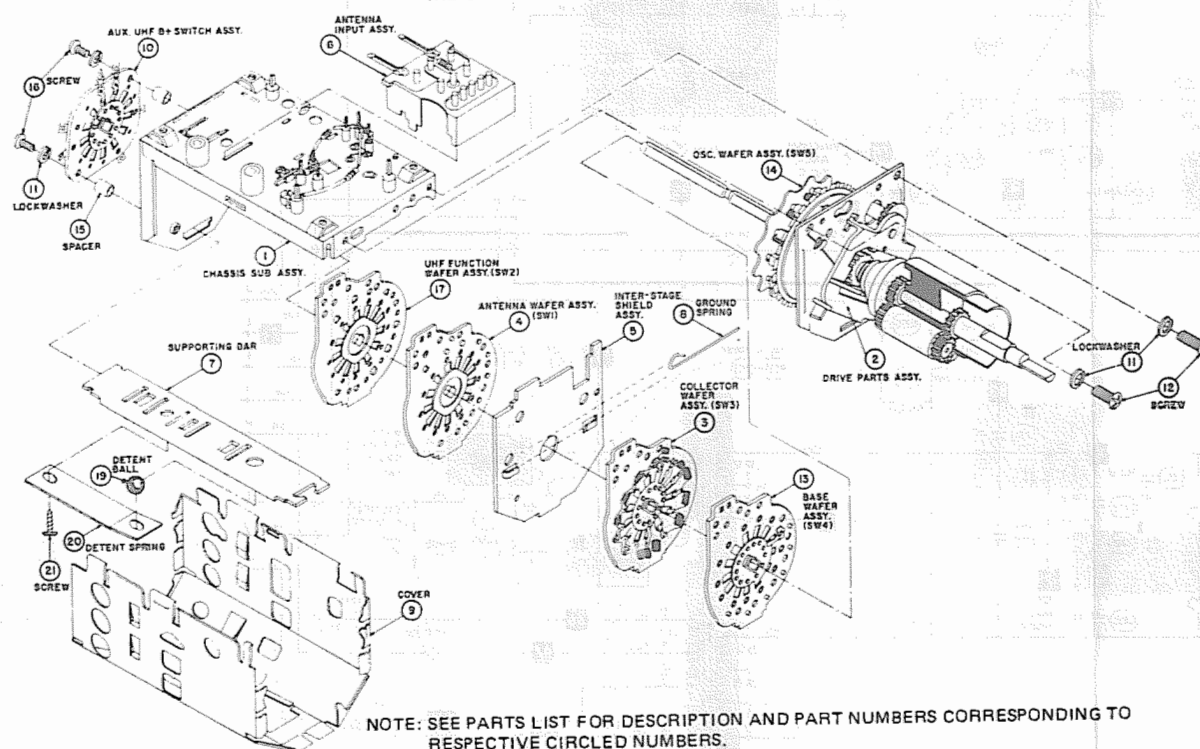
DATE 6-78

SET 1743 FOLDER 2

SCHEMATIC DIAGRAM



MECHANICAL PARTS LAYOUT



TUNER - VHF 39854-1

REPLACEMENT PARTS LIST (54-39854-1)

SCHEMATIC SERVICE
CODING PART NO. DESCRIPTION

CAPACITORS (All in PF, unless otherwise specified)

C1*		100, NPO
C2*		5, NPO
C3*		100, NPO
C4*		27, N330 (2 Section Disc)
C5	43-96130-133	33, Feedthrough
C6		8.2, NPO
C7		1000
C8		27
C9	43-96130-134	1000, Feedthrough
C10	43-96130-109	1000, Feedthrough
C11		22
C12	43-96130-134	1000, Feedthrough
C13	43-96130-104	30, Feedthrough
C14		10, (N470)
C15	43-96130-104	30, Feedthrough
C16		15, NPO
C17	43-96130-109	1000, Feedthrough
C18	43-96130-107	10, Feedthrough
C19	43-96130-103	39, Feedthrough
C20		3.9
C21		2.2
C22		2.5
C23		1.8
C24		10
C25		5
C26	43-96130-109	1000 - Feedthrough
C27		.75
C28	43-96130-134	1000 - Feedthrough
C29		4

*Part of Antenna Input Assembly

RESISTORS (All 10%, 1/4W, unless otherwise specified)

R1	1.2K
R2	330
R3	680K
R4	1.2K, 1/8W
R5	15K
R6	2.7K
R7	1K
R8	1K
R9	1K
R10	8.2K
R11	10K
R12	5.6K
R15	22K
R16	1K, 1/8W
R17	4.7K, 1/8W
R18	10K, 1/8W
R19	3.9K, 1/8W

COILS & TRANSFORMERS

L1*	Coil - FM Trap
L2*	Coil - FM Trap
L3*	Coil - IF Trap
L4*	Coil - IF Trap
L5*	Coil - IF Trap
L6	Coil - Ant. Adjust

SCHEMATIC SERVICE
CODING PART NO. DESCRIPTION

COILS & TRANSFORMERS (CONTINUED)

L7		Coil - CH. 1 Shunt
L8		Coil - CH. 1 Series
L9		Neutralizing Gimmick
L10		Coil - Collector Adjust
L11		Coil - Base Adjust
L12		Coil - Osc. Adjust
T1	50-31052-1	Input Balun - 300 ohm
T2	50-96187-47	IF Output

*Part of Antenna Input Assembly

SEMI-CONDUCTOR DEVICES

Q1	13-10321-94	Transistor - RF Amp
Q2	13-10321-95	Transistor - Mixer
Q3	13-10321-89	Transistor - Oscillator
SC1	13-10321-96	Diode - AFC

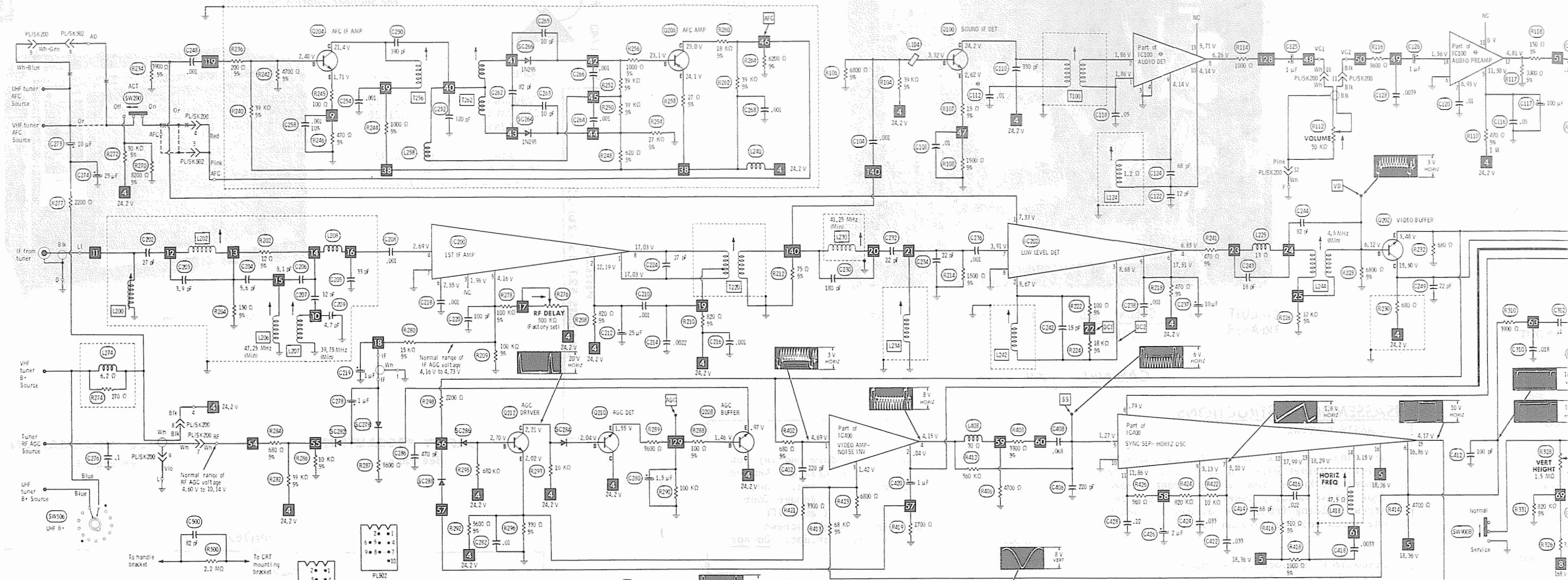
MISCELLANEOUS ELECTRICAL & MECHANICAL PARTS

CR1, CR2	43-31049-1	Capacitor
SW1		Antenna Wafer Asm.
SW2		UHF Function Switch Asm.
SW3		Collector Wafer Asm.
SW4		Base Wafer Asm.
SW5		Osc. Wafer Asm.

MECHANICAL & ELECTRICAL PARTS LAYOUT

ITEM NO.	SERVICE PART NO.	DESCRIPTION
1		Chassis Sub Assy.
2	54-31048-1	Drive Parts Assy.
3		Collector Wafer Assy. (SW3)
4		Antenna Wafer Assy. (SW1)
5		Inter-stage Shield Assy.
6		Antenna Input Assy.
7		Supporting Bar
8		Ground Spring
9		Cover
10*	33-31033-20	Aux. (UHF B+) Switch Assy.
11		Lockwasher
12		Screw
13		Base Wafer Assy. (SW4)
14		Osc. Wafer Assy. (SW5)
15		Spacer
16		Screw
17		UHF Function Wafer Assy. (SW2)
19		Detent Ball
20		Detent Spring
21		Screw

NOTES:
 1. *Not shown on Tuner Schematic Diagram - Refer to TV chassis schematic, where this tuner is used.
 2. Item no. with no part number are not stocked.



For SAFETY use only equivalent replacement part.

--- Circuitry not used in some versions

--- Circuitry used in some versions

See parts list

* Nominal value

Ground

Flame retardant resistor

Waveforms: triggered scope, keyed rainbow generator
Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltage maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Arrow at control indicates direction of advance.

Terminal identification may not be found on unit.

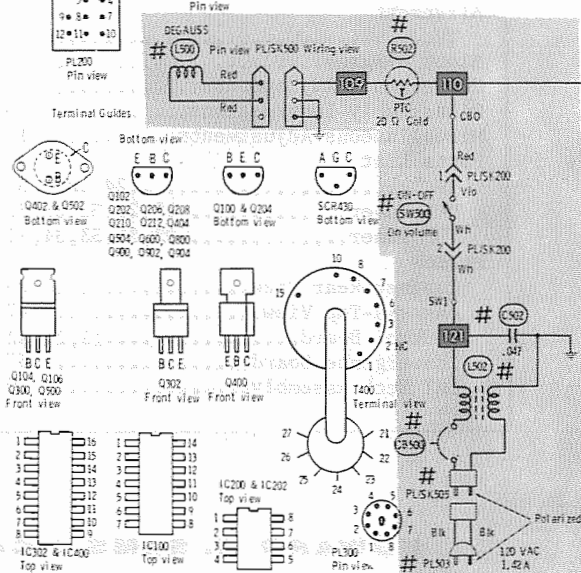
Resistors are 1/2W or less, 10% unless noted.

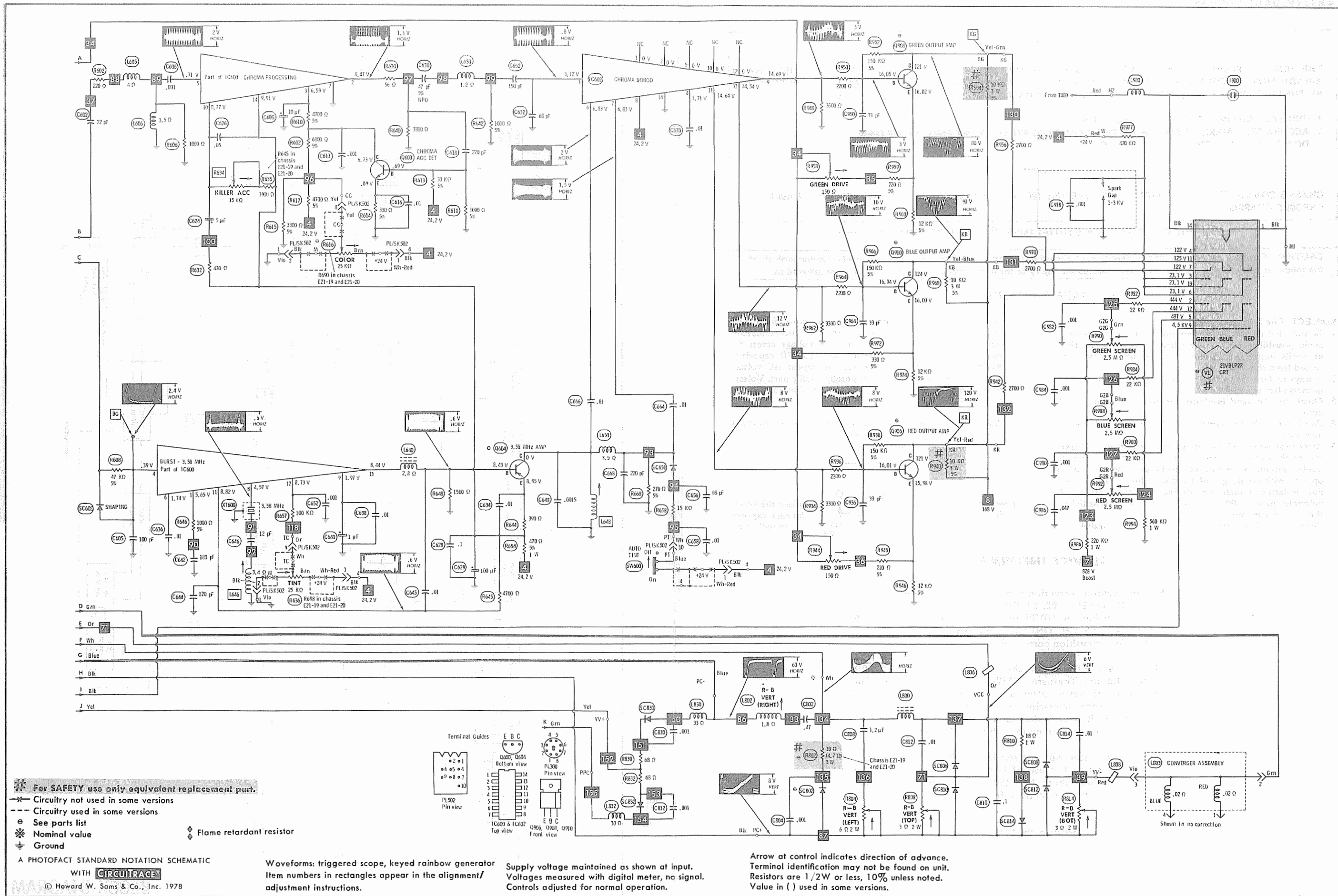
Value in () used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

WITH CIRCUITACE

© Howard W. Sams & Co., Inc. 1978





CHASSIS E21-19/20/22

PHILCO

FOLDER 2

RESISTANCE MEASUREMENTS

MEASUREMENTS BELOW TAKEN WITH METER HAVING .08V MAX BETWEEN PROBE TIPS													
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 13
V1	FIL	1.2M	470K	40K(1)	1.3M	470K	40K	NC	60M	NC	40K(1)	1.1M	470K
IC100	1H	1H	0	0	1100	0	9000	1H	6000	6000	1H	2400	6000
IC200	1600	1600	200	5600	55K	5300	0	1600					65K
IC202	3900	1H	1H	4900	1200	8500	0						
IC302	1H	1.2M	18K(1)	0	1H	150	13K(1)	4000	1H	900	18K(1)	750	35K
IC400	1200	1H	2400	4700	565K	20K(1)	1H	2200	1H	0	1H	20K(1)	35K
IC600	1H	3300	13K	49K	1H	1H	0	3700	1H	7300	6000	9000	1500
IC602	1H	1H	4000	4000	1H	8600	8000	750	3300	1H	3300	1500	1200
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C
Q100	1515	6000	750		Q212	330	680K	11K		Q600	330	1000	9000
Q102	51	5600	1H(2)		Q300	750	900	15K(1)		Q604	1600	1500	0
Q104	39K	1500	790		Q302	1	150	15K(1)		Q800	200	3700	2600
Q106	39K	1H(2)	0		Q400	0	470	15K(1)		Q900	220	1H(2)	33K
Q202	450	4500	1450		Q402	.5	2.2	17K(1)		Q902	220	1H(2)	1700
Q204	570	4400	1750		Q404	2200	14K	1750		Q904	1300	1700	56
Q206	780	50K	24K		Q500	1H(2)	45K	17K(1)		Q906	1500	5600	37K(1)
Q208	5600	100K	750		Q502	17K(1)	1H(2)	17K(1)		Q908	1500	5600	37K(1)
Q210	105K	1H(2)	750		Q504	770	1300	100		Q910	1500	5600	37K(1)

(1) This reading will vary depending upon the condition of the electrolytic in the circuit.
(2) Reading depends upon polarity of meter connections.

TROUBLESHOOTING CHECK CHART

The following chart lists component failures most likely to produce the indicated symptom.

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Circuit breaker, SC404, SC504, B+ Reg, Reg Driver.

NO PIC, NO SOUND, HAS RASTER: Tuner, 1st IF Amp(IC200), Low Level Det(IC202).

NO PIC, NO SOUND, HAS SNOW: Tuner, AGC Driver, AGC Det, AGC Buffer.

NO PIC, HAS SOUND, NO RASTER: Video Amp/Driver, Black Clamp Amp, SC918, CRT.

NO PIC, HAS SOUND, HAS RASTER: Video Buffer/Driver.

HAS PIC, NO SOUND: Sound IF Det, Audio Det/Pre Amp/Driver/Outputs.

OVERLOADED PICTURE: Tuner, AGC Driver, AGC Det, AGC Buffer.

LOW OR EXCESSIVE BRIGHTNESS: Video Amp/Driver, Black Clamp Amp, SC918, SC996.

SWEEP

NO RASTER, HAS SOUND: H.V. Tripler, CRT.
NO RASTER, NO SOUND: Horiz Osc(IC400)/Driver/Output, HV Shut Down, Current Limiter, SC448.

NO VERT DEFLECTION: Vert Osc-Driver (IC302)/Outputs.

POOR VERT LIN OR FOLDOVER: Vert Osc-Driver (IC302)/Outputs.

POOR HORIZ LIN OR FOLDOVER: Horiz Driver/Output, SC448.

NARROW PICTURE: Horiz Driver/Output, SC448.
VERT OFF FREQUENCY: Vert Osc-Driver(IC302).
HORIZ OFF FREQUENCY: Horiz Osc(IC400).

SYNC

NO VERT SYNC: Vert Osc-Driver(IC302).
NO HORIZ SYNC: Horiz Osc(IC400).
NO VERT/HORIZ SYNC: Sync Sep(IC400).

RASTER

YELLOW (NO BLUE): Chroma Demod, Blue Output Amp, CRT.

CYAN (NO RED): Chroma Demod, Red Output Amp, CRT.

MAGENTA (NO GREEN): Chroma Demod, Green Output Amp, CRT.

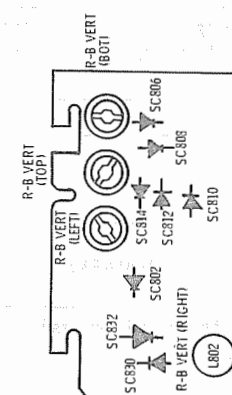
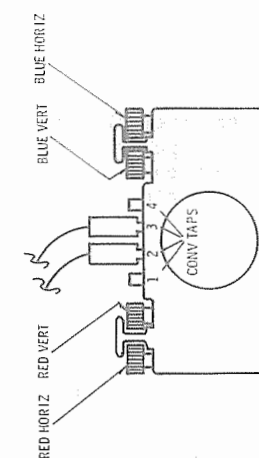
COLOR (B/W operating normally)

NO COLOR: Chroma Processing-Burst-3.58MHz (IC600)/Demod(IC602), 3.58MHz Amp.

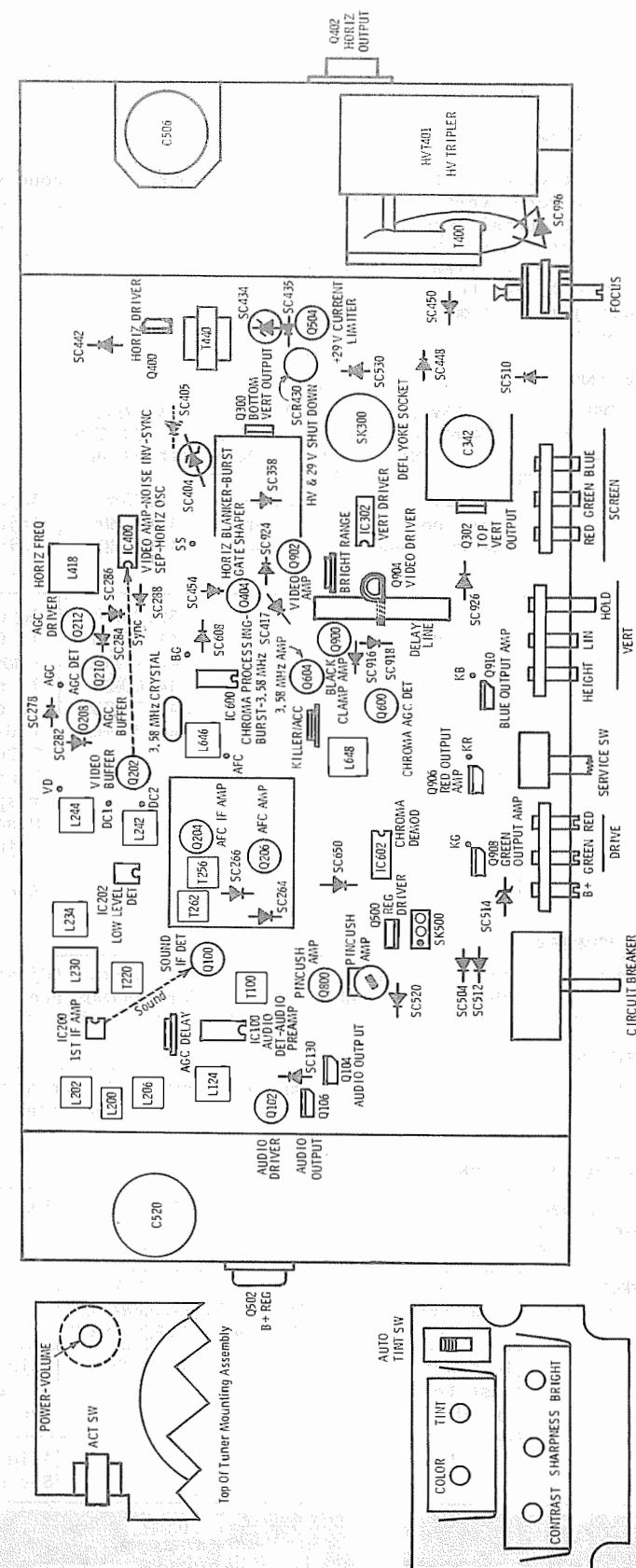
WEAK COLOR: Chroma Processing-Burst-3.58MHz (IC600)/Demod(IC602), 3.58MHz Amp, Chroma AGC Amp.

NO COLOR SYNC: Burst-3.58MHz (IC600), 3.58MHz Amp.

NO GREEN: Chroma Demod, Green Output Amp.
NO BLUE: Chroma Demod, Blue Output Amp.
NO RED: Chroma Demod, Red Output Amp.
INCORRECT HUE (TINT): Burst-3.58MHz (IC600), 3.58MHz Amp.



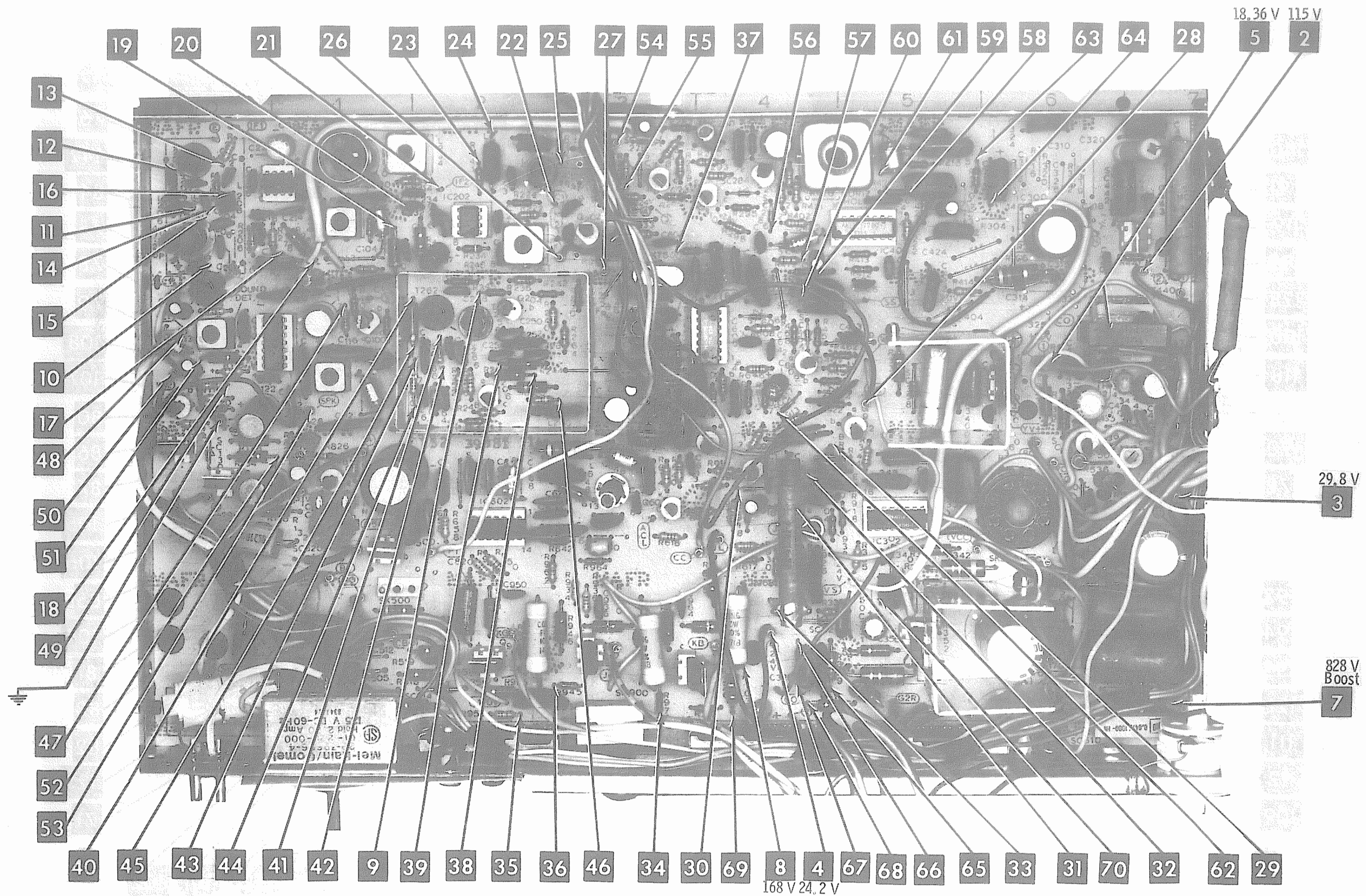
TOP VIEW



PLACEMENT CHART

PHILCO
CHASSIS E21-19/-20/-22

FOLDER 2



MAIN BOARD

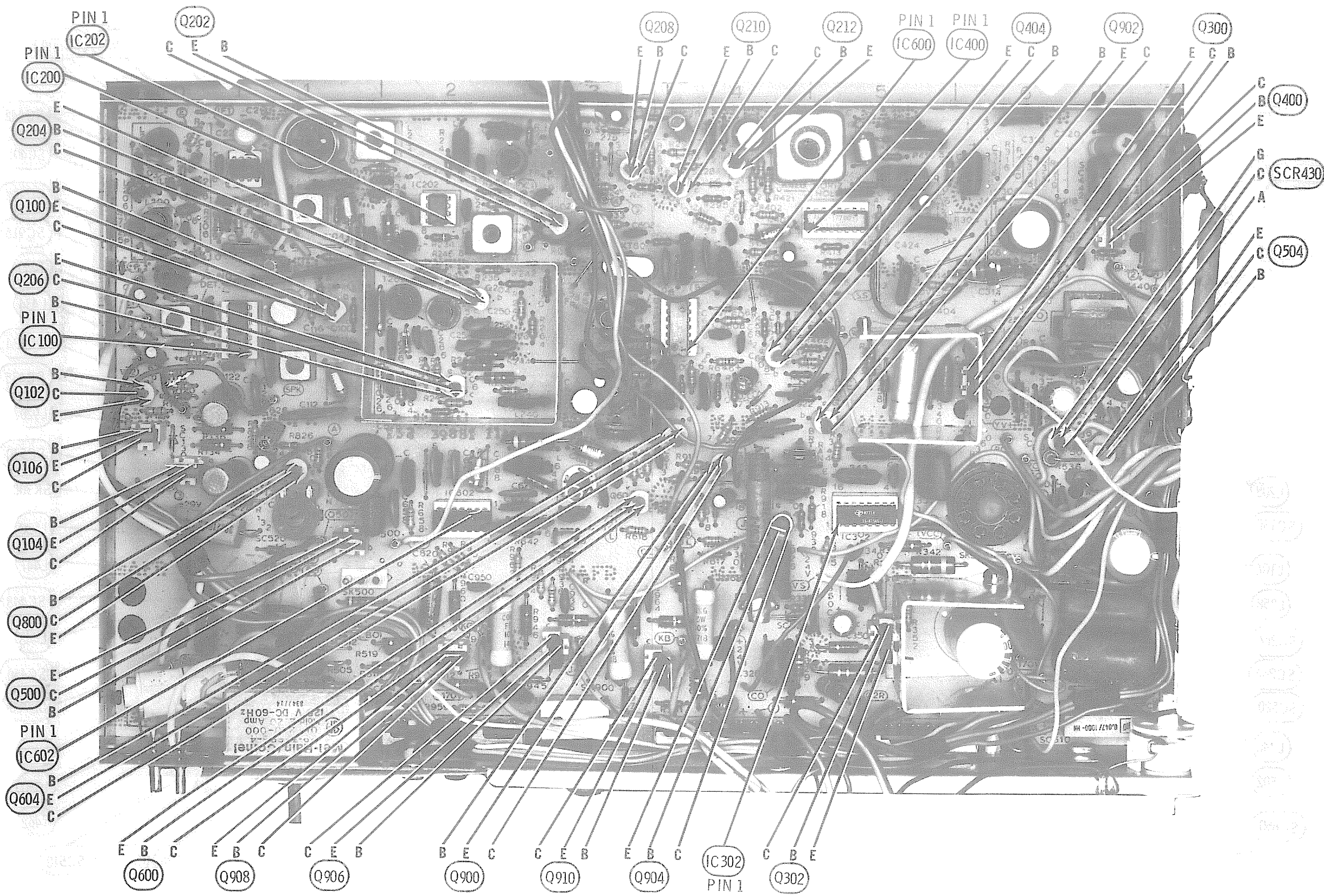
A Howard W. Sams CIRCUITRAGE Photo

MAIN BOARD

PILCO
CHASSIS E21-19/-20/-22

FOLDER 2

Q202
Q204
Q100
Q206
Q102
Q106
Q104
Q800
Q500
Q602
Q604
Q600
Q908
Q906
Q900
Q910
Q904
Q302

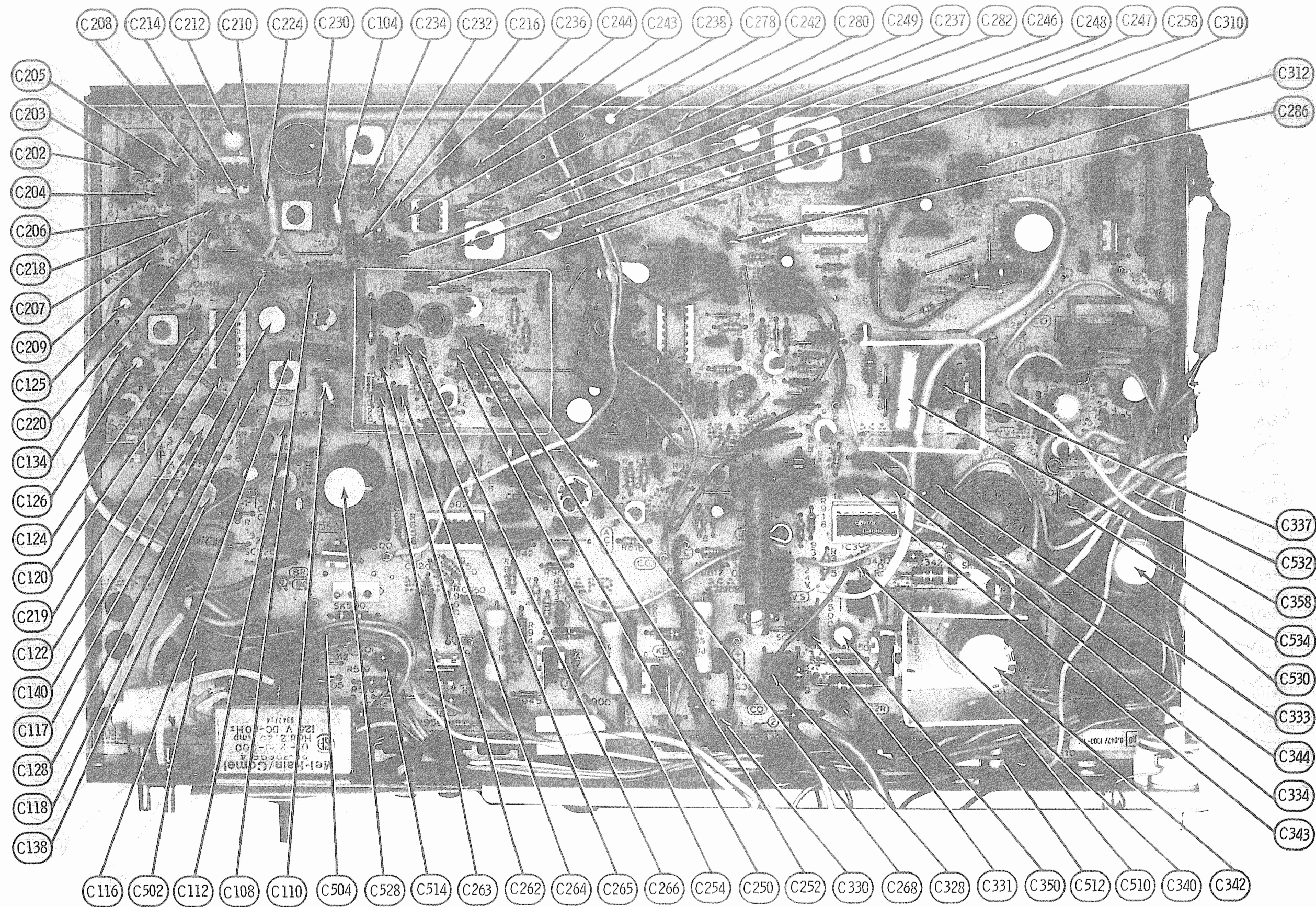


MAIN BOARD

MAIN BOARD

PHILCO
CHASSIS E21-19/20/22

FOLDER 2

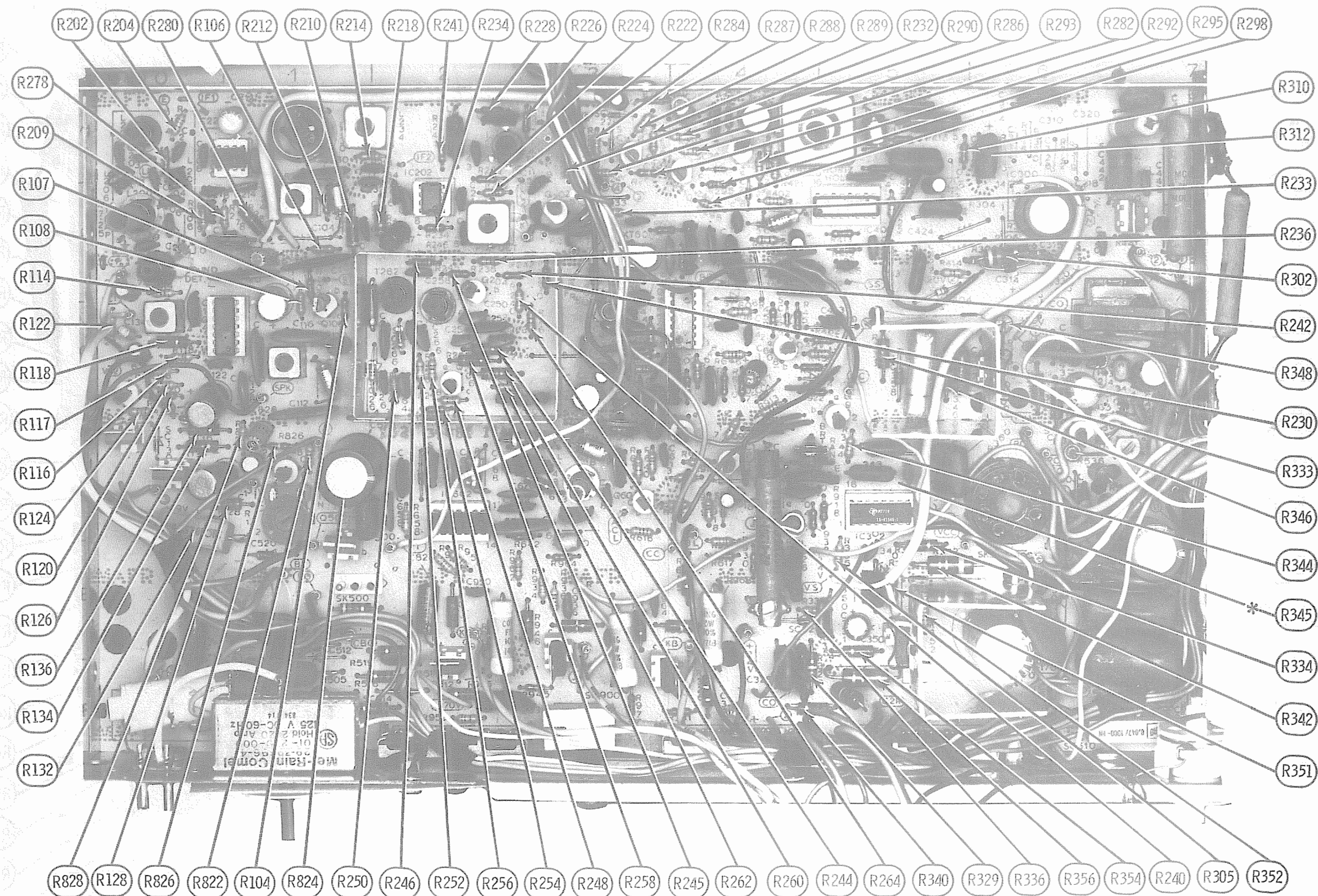


MAIN BOARD

MAIN BOARD

PHILCO
CHASSIS E2-1-19/-20/-22

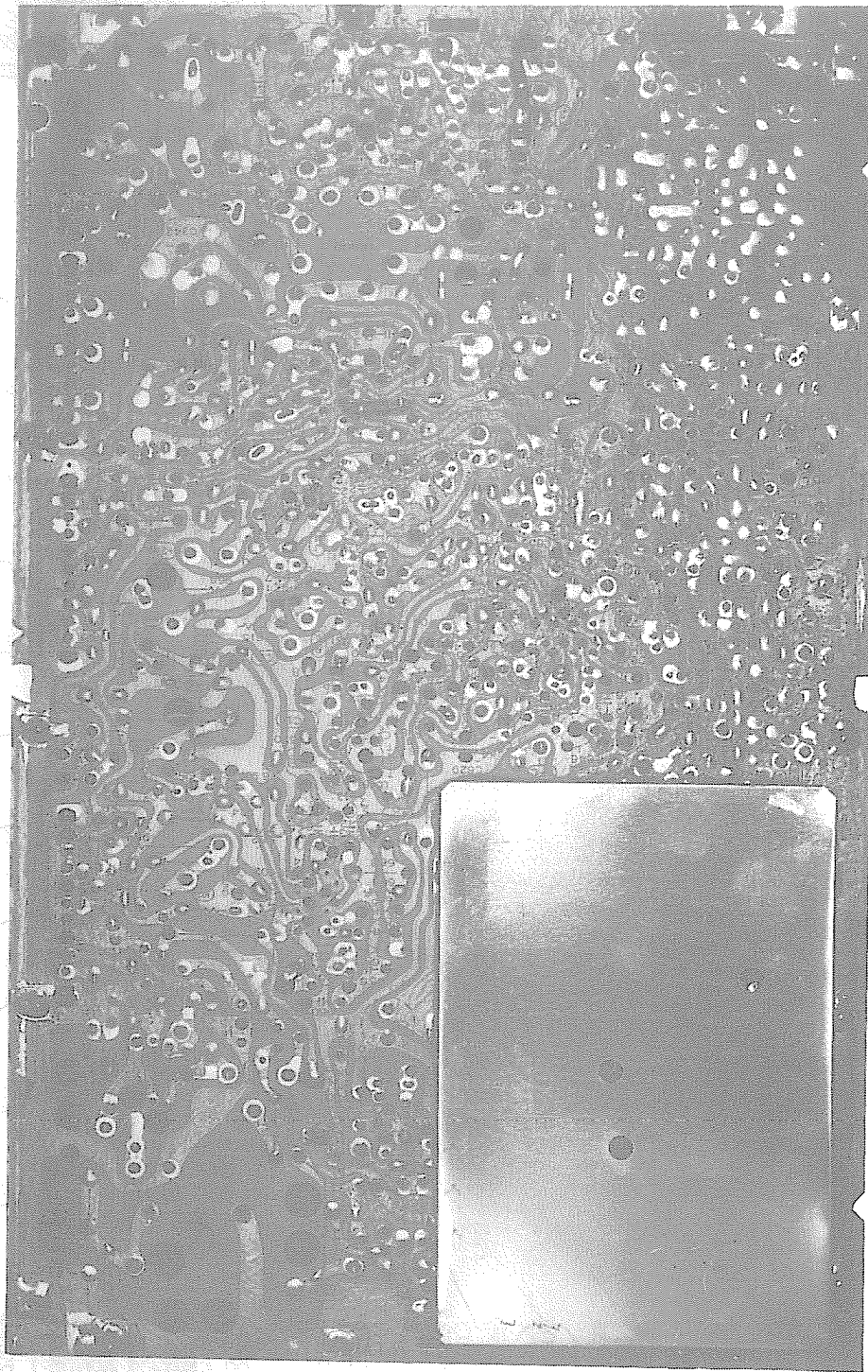
FOLDER 2



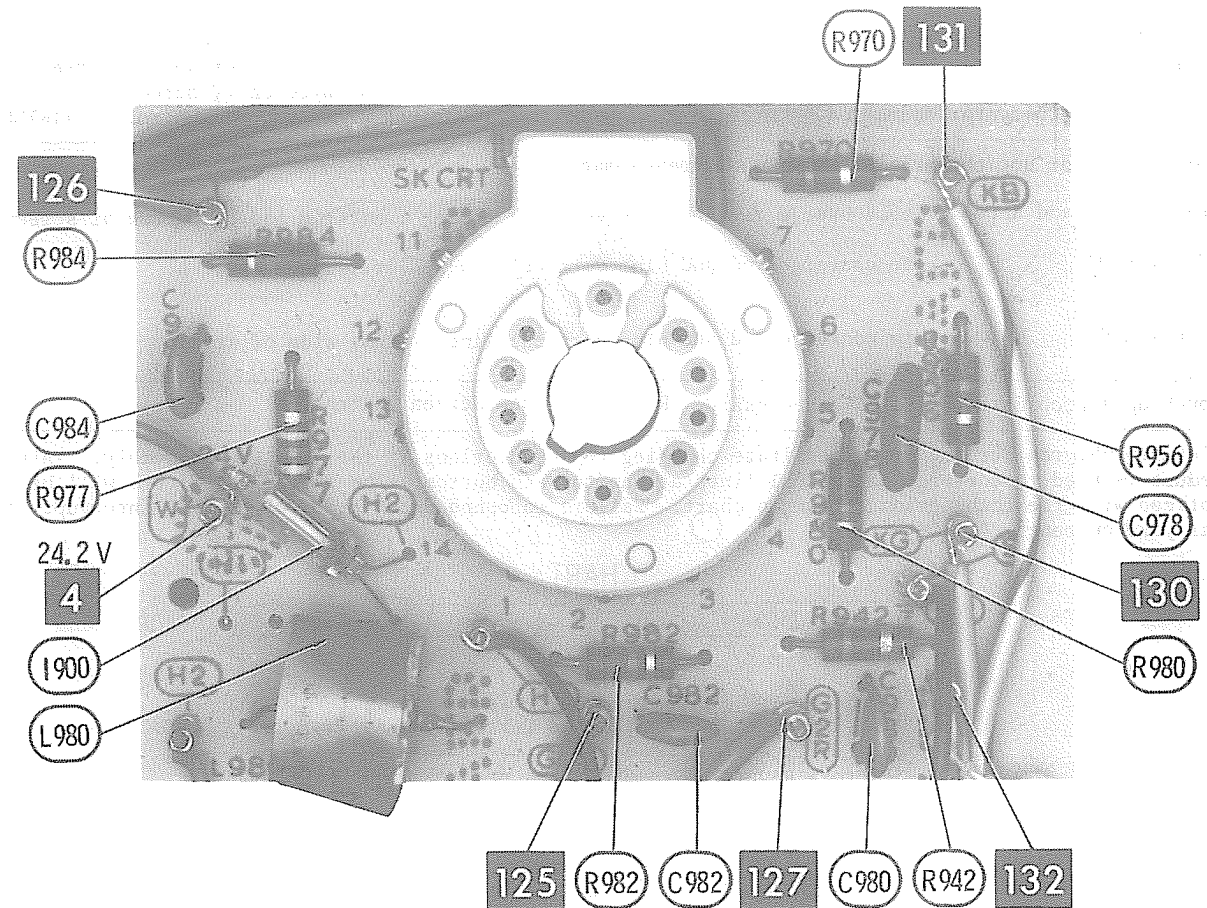
* Located on bottom of board

MAIN BOARD

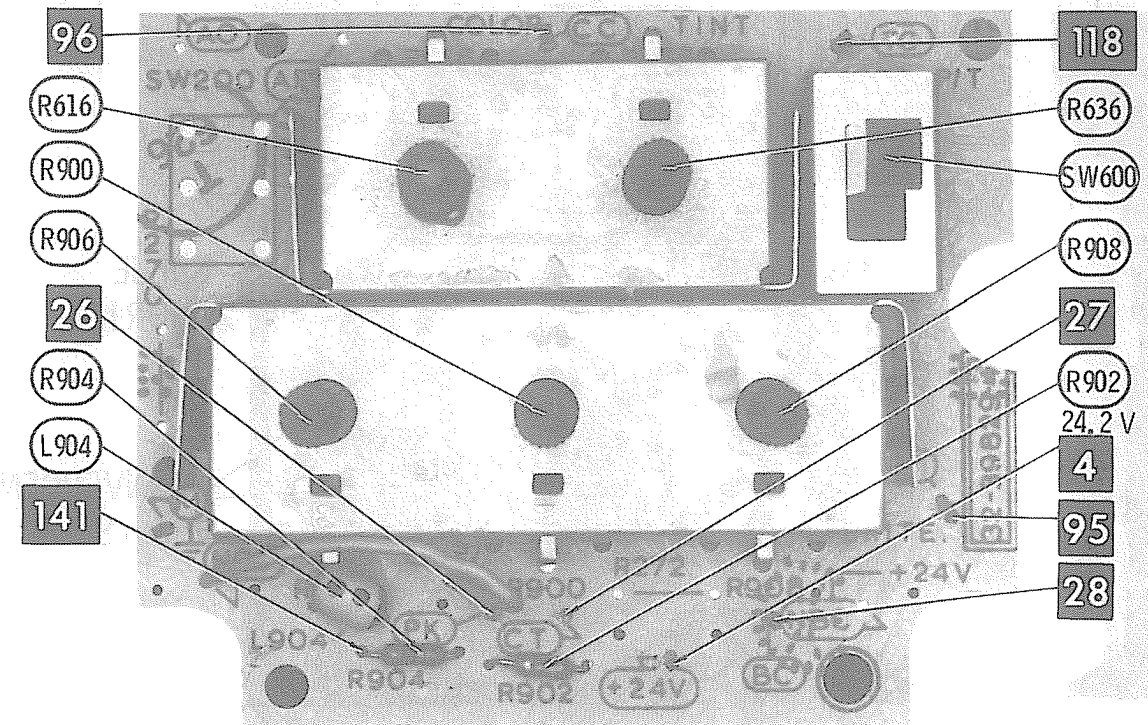
MAIN BOARD



MAIN BOARD-SHIELD LOCATION



A Howard W. Sams **CIRCUITRACE** Photo CRT SOCKET BOARD



A Howard W. Sams **CIRCUITRACE** Photo CONTROL BOARD

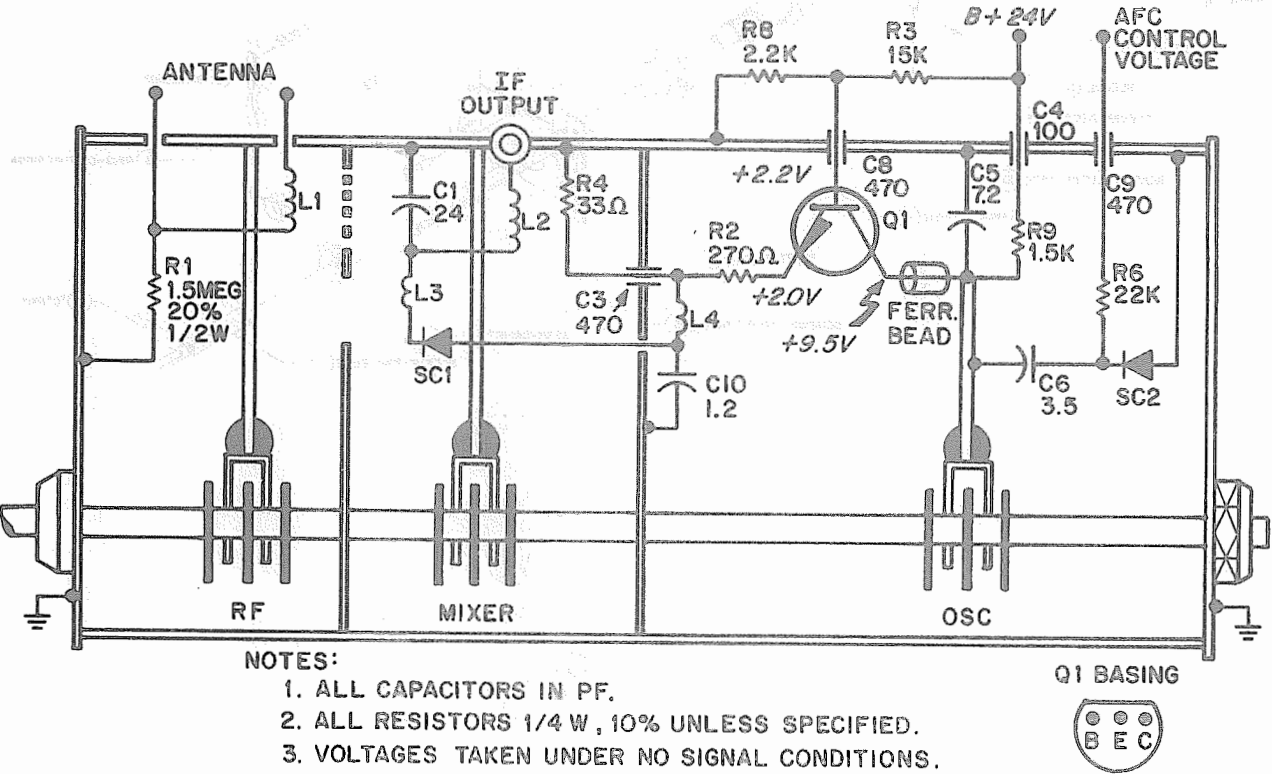
MISCELLANEOUS ADJUSTMENTS

REPLACEMENT PARTS LIST

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
CAPACITORS (All in PF)		
C1	24, 5%	
C3	470, Feedthrough	
C4	100, Feedthrough	
C5	7.2, N220	
C6	3.5, N330	
C8	470, Feedthrough	
C9	470, Feedthrough	
C10	1.2	
RESISTORS (All 1/4W, 10%, unless otherwise specified)		
R1	1.5 meg., 1/2W, 20%	
R2	270 ohm	
R3	15K	
R4	33 ohm	
R6	22K	

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
RESISTORS (CONTINUED)		
R8	2.2K	
R9	1.5K	
COILS		
L1		Antenna Coil
L2		IF Coil
L3	50-98187-44	RF Coupling Loop
L4		Mixer Induction Loop
SEMI-CONDUCTOR DEVICES		
Q1	13-10321-91	Transistor - RF
SC1	13-10321-92	Diode - Mixer
SC2	13-10321-49	Diode - AFC

SCHEMATIC DIAGRAM



- NOTES:
1. ALL CAPACITORS IN PF.
 2. ALL RESISTORS 1/4 W, 10% UNLESS SPECIFIED.
 3. VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS.

TUNER - UHF 54-39973-1

Courtesy of the Manufacturer

Suggested Alignment Tools: GC ELECTRONICS:
L646, L648..... 9296, 9297, 9300
L418..... 9440

BRIGHTNESS RANGE ADJUSTMENT

Tune in a picture and set Contrast Control to midrange and Brightness Control to MINIMUM. Adjust Brightness Range Control (R921) until highlights of the picture are just visible. Readjust Contrast and Brightness Controls for a normal picture.

B+ and HIGH VOLTAGE ADJUSTMENT

Adjust brightness and contrast for a normal picture. Connect a DC meter to the emitter of Q502. Adjust B+ Control (R514) for 115 volts in Chassis E21-22. Adjust R514 for 112 volts in Chassis E21-19/-20.

This regulated voltage determines the voltages in the set, including the high voltage supply.

HORIZONTAL HOLD ADJUSTMENT

Tune in a picture and adjust all controls for a normal picture. Connect a jumper from test point SS to ground. Adjust Horizontal Frequency Coil (L418) until the picture stops or slowly drifts across the screen. Remove jumper from SS.

AGC ADJUSTMENT

Tune in a weak station and adjust RF AGC Delay Control (R276) for maximum contrast and MINIMUM snow.

SIDE PINCUSHION ADJUSTMENT

Connect a crosshatch generator to the antenna terminals. Adjust Pincushion Amplitude Control (R820) for straight vertical lines at sides of the raster.

COLOR AFC ADJUSTMENT

Connect a color bar generator to the antenna terminals. Connect a jumper from test point BG to ground. Set contrast and brightness to normal. Set Tint Control to midrange and Color Control to maximum. Turn Color Killer Control

(R634) fully clockwise, then slowly counter-clockwise until color is visible and free running. Adjust the 3.58MHz Frequency Adjustment Coil (L646) until the color stops or slowly drifts across the screen. Remove the jumper from test point BG.

Tune to an off UHF station (snow signal) and connect a jumper from test points DC1 to DC2. Adjust the Color Killer Control (R634) counter-clockwise until the colored snow is just killed. Remove the jumper from test points DC1 and DC2.

Connect scope to point KR and check for proper phasing. If necessary, place Tint Control to midrange and adjust 3.58MHz Output Coil (L648) for correct tint range. See waveform on schematic. Check B-Y and G-Y outputs (points KB and KG).

PURITY ADJUSTMENTS

Perform center convergence if necessary. If the picture tube appears to be magnetized, use a degaussing coil to demagnetize tube and mounting brackets.

Turn Blue and Green screen controls to MINIMUM. Turn Red Screen Control to maximum. Loosen the deflection yoke and move it back far enough to obtain a vertical red bar near the center of the raster. If necessary, loosen convergence clamp screw and slide convergence assembly approximately 1/4 inch to the rear. Center the vertical red bar by spreading the purity tabs. Slide yoke forward and position it for best overall red screen. Re-position convergence assembly.

GRAY SCALE ADJUSTMENTS

Move Service Switch to Service position. Turn channel selector to an unused channel. Set Contrast, Brightness, Color and Red, Blue and Green Screen Controls to MINIMUM.

Advance screen controls, one at a time, until each produces a barely visible line on the screen.

Return Service Switch to Normal position. Rotate the channel selector to the strongest station in the area. Set contrast and brightness for a normal picture. Adjust the Green and Red Drive Controls to obtain best black-and-white picture.

PHILCO
CHASSIS E21-19/-20/-22

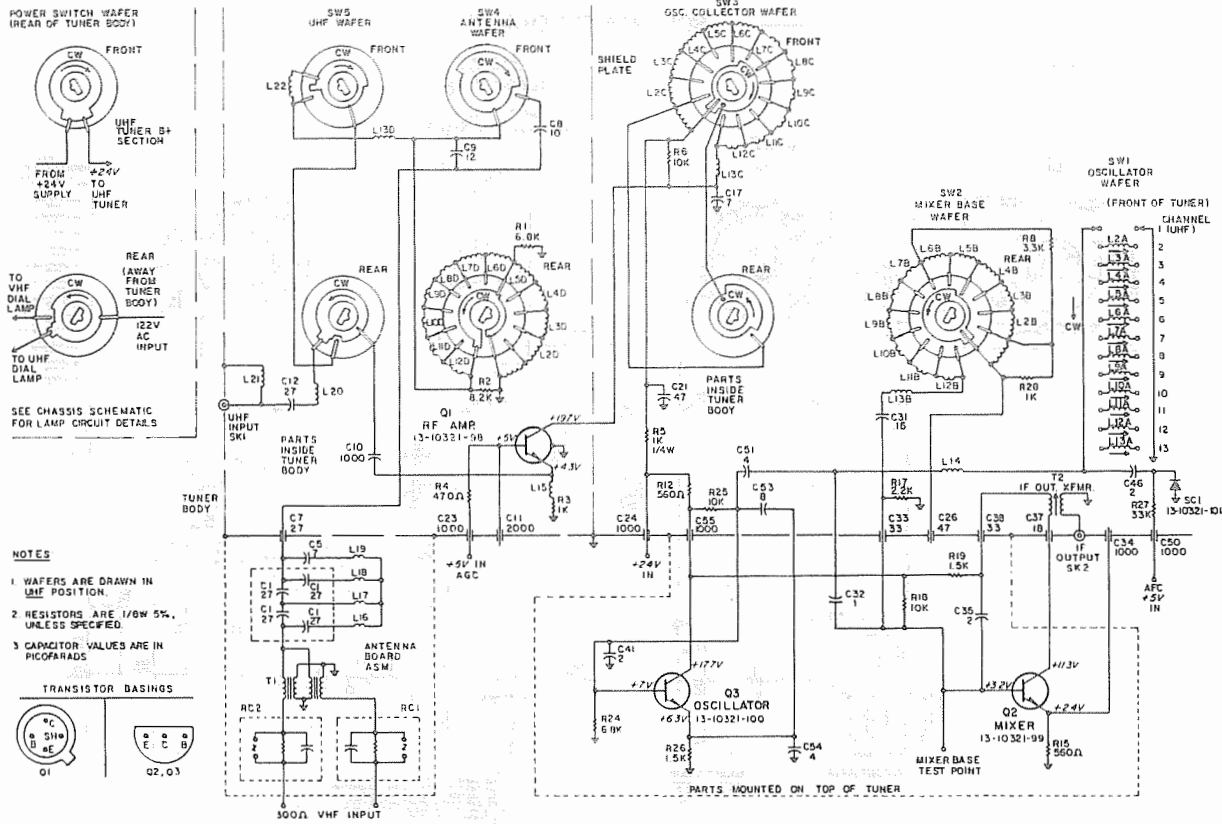
FOLDER 2

REPLACEMENT PARTS LIST (54-43087-1)

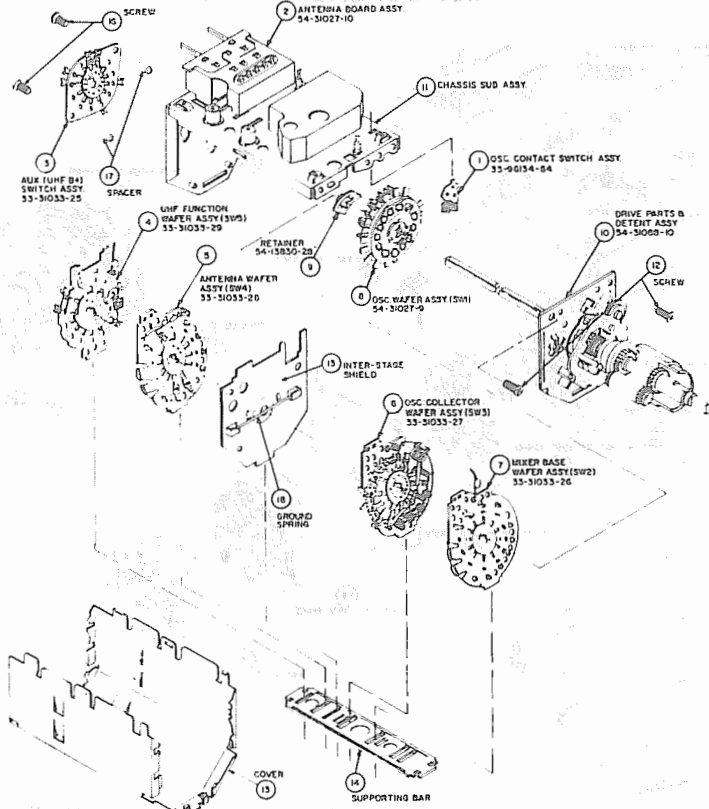
SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
CAPACITORS (All in PF, unless otherwise specified)		
C1*	43-96130-135	27, N750 (4 Section Disc.)
C5*	7	
C7	43-96130-136	27, Feedthrough
C8	10	
C9	12	
C10	1000	
C11	43-96130-137	2000, Feedthrough
C12	27	
C17	7	
C21	47	
C23	43-96130-138	1000, Feedthrough
C24	43-96130-138	1000, Feedthrough
C26	43-96130-139	47, Feedthrough
C31	15	
C32	1.0, N330	
C33	43-96130-140	33, Feedthrough
C34	43-96130-138	1000, Feedthrough
C35	2	
C37	18, Feedthrough	
C38	43-96130-140	33, Feedthrough
C41	2	
C46	2, NPO	
C50	43-96130-144	1000, Feedthrough
C51	4, N220	
C53	8, N220	
C54	4, NPO	
C55	43-96130-144	1000, Feedthrough
*Part of Ant. Board Assy.		
RESISTORS (All 1/8W, 5% unless otherwise specified)		
R1	6.8K	
R2	8.2K	
R3	1K	
R4	470 ohm	
R5	1K, 1/4W	
R6	10K	
R8	3.3K	
R12	560 ohm	
R15	560 ohm	
R17	2.2K	
R18	10K	
R19	1.5K	
R24	6.8K	
R25	10K	
R26	1.5K	
R27	33K	
R28	1K	
COILS & TRANSFORMERS		
L14	Coil, Osc. Adjust	
L15	Coil	
L16*	Coil, IF Trap	

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
COILS & TRANSFORMERS (CONTINUED)		
L17*		Coil - IF Trap
L18*		Coil - IF Trap
L19*		Coil - FM Trap
L20		Coil - UHF Series
L21		Coil - UHF Shunt
L22		Coil
T1*	50-31052-2	Input Balun - 300 ohm
T2	50-96187-48	IF Output Tran.
*Part of Ant. Board Assy.		
SEMI-CONDUCTOR DEVICES		
Q1	13-10321-98	Transistor - RF Amp.
Q2	13-10321-99	Transistor - Mixer
Q3	13-10321-100	Transistor - Oscillator
SC1	13-10321-101	Diode - AFC
MISCELLANEOUS ELECTRICAL & MECHANICAL PARTS		
RC1, RC2*	43-31049-5	Capristor
SW1	54-31027-9	Osc. Wafer Assy.
SW2	33-31033-26	Mixer Base Wafer Assy.
SW3	33-31033-27	Osc. Collector Wafer Assy.
SW4	33-31033-28	Antenna Wafer Assy.
SW5	33-31033-29	UHF Function Wafer Assy.
*Part of Ant. Board Assy.		
MECHANICAL & ELECTRICAL PARTS LAYOUT		
ITEM NO.	SERVICE PART NO.	DESCRIPTION
1	33-96134-64	Osc. Contact Switch Assy.
2	54-31027-10	Ant. Board Assy.
3	33-31033-25	Aux. (UHF B+) Power Switch Wafer Assy.
4	33-31033-29	UHF Function Wafer Assy. (SW5)
5	33-31033-28	Antenna Wafer Assy. (SW4)
6	33-31033-27	Osc. Collector Wafer Assy. (SW3)
7	33-31033-26	Mixer Base Wafer Assy. (SW2)
8	54-31027-9	Osc. Wafer Assy. (SW1)
9	54-13830-28	Retainer
10	54-31088-10	Drive Parts & Detent Assy.
11		Chassis Sub Assy.
12		Screw
13		Inter-Stage Shield
14		Supporting Bar
15		Cover
16		Screw
17		Spacer
18		Ground Spring
NOTE: Item numbers with no part number are not stocked.		

SCHEMATIC DIAGRAM



MECHANICAL PARTS LAYOUT



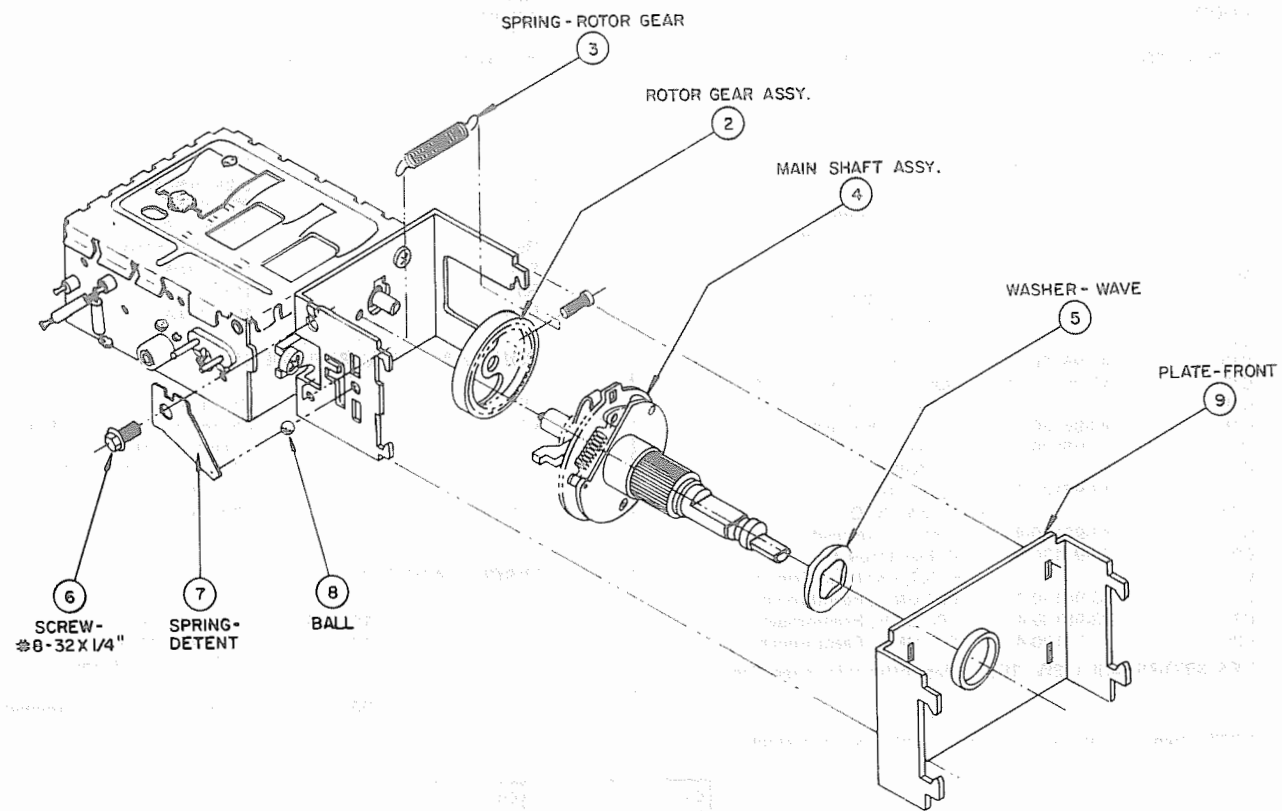
TUNER - VHF54-43087-1

Courtesy of the Manufacturer

NOTE: SEE PARTS LIST FOR DESCRIPTION AND PART NUMBERS CORRESPONDING TO RESPECTIVE CIRCLED NUMBERS.

TUNER - VHF 54-43087-1

UHF TUNER (54-41526-1) MECHANICAL PARTS LAYOUT



MECHANICAL REPLACEMENT PARTS LIST (54-41526-1)

ITEM NO.	SERVICE PART NO.	DESCRIPTION
2	54-31080-10	Rotor Gear Assy.
3	77-31040-12	Spring - Rotor Gear
4	54-31020-4	Main Shaft Assy.
5	70-13814-18	Washer - Wave
6		Screw - No. 8 - 32 x 1/4"
7		Spring - Detent
8		Ball
9		Plate - Front

NOTE: Item numbers with no part number are not stocked.

REPLACEMENT PARTS LIST (54-41526-1)

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
------------------	------------------	-------------

CAPACITORS (All in PF)

C1		24, ±10%
C3	43-96130-154	470, Feedthrough
C4	43-96130-162	1000, Feedthrough
C5		8.5, ±10%
C6		2.5, ±10%
C8	43-96130-154	470, Feedthrough
C9		470, Feedthrough
C10		1.7

RESISTORS (All 1/4W, 5% unless otherwise specified)

R1		1.5 meg, 1/2W, 10%
R2		270 ohm
R3		12K
R4		27 ohm
R6		22K
R8		2.2K

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
------------------	------------------	-------------

RESISTORS (CONTINUED)

R9		1K
----	--	----

COILS

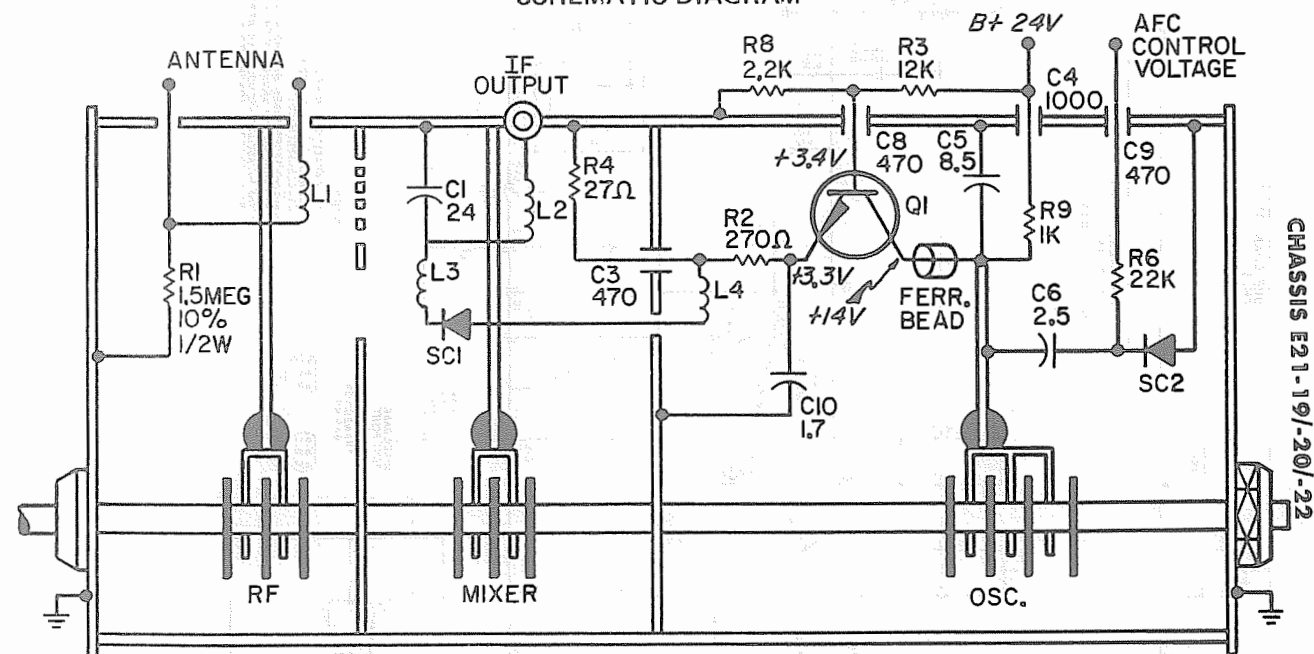
L1		Antenna Coil
L2		IF Coil
L3		RF Coupling Loop
L4		Osc. Coupling Loop

SEMI-CONDUCTOR DEVICES

Q1	13-10321-91	Transistor - RF
SC1	13-10321-92	Diode - Mixer
SC2	13-10321-120	Diode - AFC

NOTE: Item numbers with no part number are not stocked.

SCHEMATIC DIAGRAM



NOTES:

1. ALL CAPACITORS IN PF.
2. ALL RESISTORS 1/4W, 5% UNLESS SPECIFIED.
3. VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS.

IMPORTANT: Avoid mistakes, order Sylvania parts by part number.

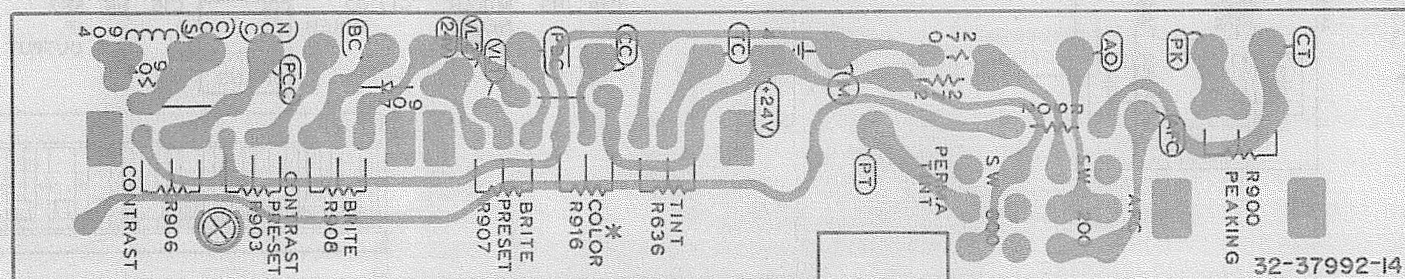
Price \$.50

TUNER - UHF 54-41526-1

Q1 BASING



CONTROL/SWITCH PANEL/CONTROLS BRACKET (E21-19,-20 CH.)



* - CODING ON BOTTOM ROAD MAP IS INCORRECT - SHOULD BE R616.

BOTTOM VIEW

Courtesy of the Manufacturer

Courtesy of the Manufacturer

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PART No.	NOTES
	Printed Circuit Board	02-41070-1	Convergence Assembly, Chassis E21-19/-20
	Printed Circuit Board	02-14476-5	CRT Socket
	Printed Circuit Board	02-41074-5	Control/Switch, Chassis E21-19
	Socket	73-37879-9	CRT
	UHF Tuner	54-39973-1	
	UHF Tuner	54-41526-1	
	UHF Tuner	54-41525-1	
	VHF Tuner	54-39854-1	
	VHF Tuner	54-43617-1	
	VHF Tuner	54-43651-1	
	VHF Tuner	54-43087-1	

For SAFETY use only equivalent replacement part.

(1) Used in Model C3101JWA only.

(2) Used in Models C2902JWA and C2912JWA only.

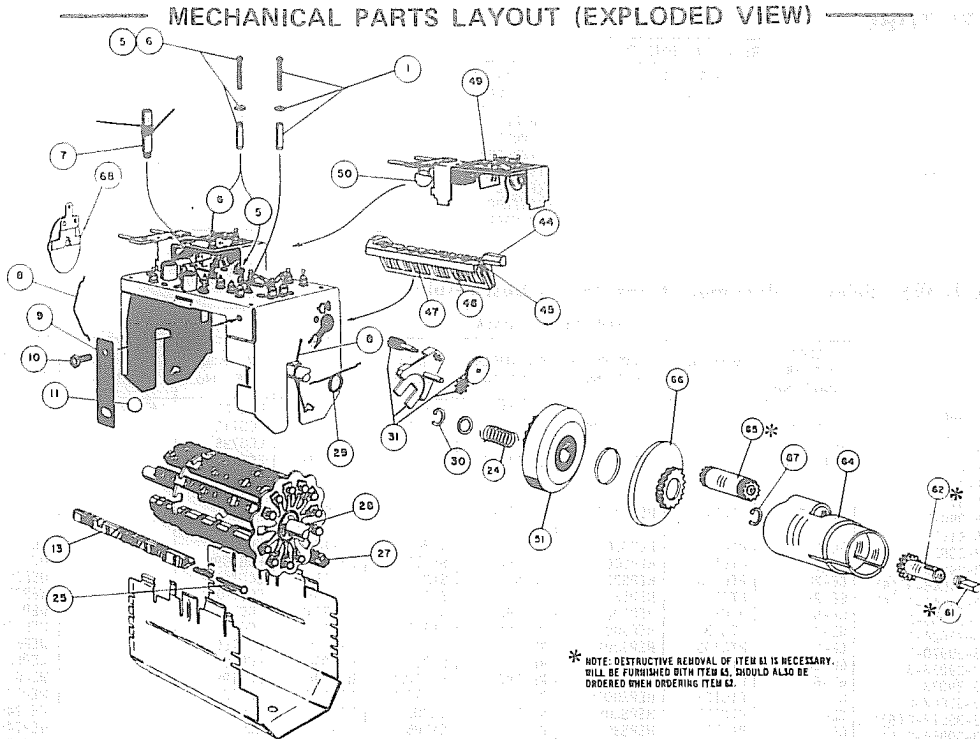
CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	PART No.	PART No.	PART No.	PART No.
	MODEL C2902JWA	MODEL C2912JWA	MODEL C3101JWA		
Cabinet Front	10-39151-21	10-39151-22	10-29707-11		
Cabinet Back	10-39153-25	10-39153-22	10-23361-27		
Handle Assembly	74-41131-5	74-41131-5			
VHF Dial Assembly	74-14443-7	74-14443-7			
Door, Controls			74-43038-2		
Inlay, Secondary Controls			74-43194-2		
Mask			74-43155-1		
Overlay, Control Area			74-43184-2		
Overlay, Door			74-43185-1		
UHF Dial Assembly			74-14443-7		
Foot, Cabinet			86-15207-1		
Knob, Act Switch			74-41151-9		
Knob, Brightness/Color/Contrast/Tint	74-33457-9	74-33457-9			
Knob, On-Off/Volume	74-41121-4	74-41121-3	74-35298-4		
Knob, UHF Channel Selector	74-43577-2	74-43577-4	74-43577-4		
Knob, UHF Fine Tuning	74-41305-1	74-41305-1	74-41305-1		
Knob, VHF Channel Selector	74-43577-1	74-43577-3	74-43577-1		
Knob, VHF Fine Tuning	74-41304-3	74-41304-3	74-41304-3		

WIRING DATA

High Voltage Lead	Use BELDEN No. 9865 (50 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
	8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELOEN No. 8528 (Solid) Available in 13 Colors
	8225 (Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELOEN No. 8225
75-Ohm Tuner Input Lead	Use BELOEN No. 8241
300-Ohm Antenna Lead-in	Use BELOEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELOEN No. 8464 (Flat) or 8484 (Round) 4-Conductor
	8485 (Round) 5-Conductor
	8488 (Round) 8-Conductor

TUNER - VHF 54-43617-1



MECHANICAL PARTS LIST

ITEM NO.	SERVICE PART NO.	DESCRIPTION	ITEM NO.	SERVICE PART NO.	DESCRIPTION
1		Trimmer - Osc. - C24	25		Tuning Screw
5		Trimmer - Mixer - C7	27	54-13860-14	Strip - UHF - Channel 1
6		Trimmer - RF - C6	28	54-13817-43	Shaft & Coil Support Assy.
7	50-96187-38	Transformer - IF Output - T2	29		Spring Slide Return
8		Drum Retaining Spring	30	229-191-21	"C" Ring Limiter
9		Detent Spring	31		Preset Slide Assy.
10		Screw - Mounting	44		Stator Assembly
11		Detent Ball	45		Lock Pin
13	54-31047-2	Strip - VHF - Channel 2	46		Stator Contact
	54-31047-3	Strip - VHF - Channel 3	47		Ground Spring
	54-31047-4	Strip - VHF - Channel 4	49	54-96135-41	Ant. Input Assy. (Isolated)
	54-31047-5	Strip - VHF - Channel 5	50		Capristor
	54-31047-6	Strip - VHF - Channel 6	51	54-96188-73	Cone - Tuning
	54-31047-7	Strip - VHF - Channel 7	61	54-96174-18	Boot
	54-31047-8	Strip - VHF - Channel 8	62	54-96188-71	Fine Tune Shaft
	54-31047-9	Strip - VHF - Channel 9	64	54-96188-77	Gear Housing
	54-31047-10	Strip - VHF - Channel 10	65	54-13816-61	Transfer Gear w/Boot
	54-31047-11	Strip - VHF - Channel 11	66	54-96188-76	Gear - Coupling
	54-31047-12	Strip - VHF - Channel 12	67	229-191-21	"C" Ring
	54-31047-13	Strip - VHF - Channel 13	68	33-31033-33	UHF B+ Indicator Lamp Switch Assy.
24		Spring - Cone Return			

NOTE: Item numbers with no part number are not stocked.

IMPORTANT: Avoid mistakes, order Sylvania parts by part number.

Courtesy of the Manufacturer

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
OL920	Delay Line	32-41261-1	1197-76-40		
L124	Audio Detector	50-39912-1			
L200	Video Input IF	50-23828-3			
L202	44.5MHz Trap	57-23832-5			
L206	47.25MHz Trap	57-23827-7			
L207	39.75MHz Trap	50-37714-3			
L208	RF Choke	50-23828-1			
L225	Peaking (36uH)	50-41071-1			
L230	41.25MHz Trap	50-34409-12			
L234	Detector Input	50-37714-1			
L240	RF Choke (10uH)	50-85953-14		72F105AP	
L242	45.75MHz Trap	57-23832-4			
L244	4.5MHz Trap	50-35309-4			
L258	RF Choke (5.6uH)	50-15904-4			
L274	Peaking (100uH)	50-17985-7		72F104AP	
L340	Peaking (47uH)	50-15318-4		72F475AP	
L350	RF Choke (27uH)	50-34939-6			
L403	Peaking (820uH)	50-15318-19		72FB24AP	
L434	Peaking (47uH)	50-39415-29			
L502	Line Choke	50-41781-1			
L530	Peaking (47uH)	50-39415-29			
L605	Peaking (47uH)	50-15318-4		72F475AP	
L606	RF Choke (10uH)	50-35059-19			
L630	Peaking (47uH)	50-39415-29			
L640	RF Choke (10uH)	50-85953-14		72F105AP	
L646	3.58MHz Osc	50-39052-2			
L648	Tint Centering	50-39053-1			
L650	RF Choke (10uH)	50-39059-19			
L800	Peaking (500uH)	50-39064-1	570710		
L830	Peaking (1000uH)	50-15318-20		72FB24AP	
L832	Peaking (1000uH)	50-15318-20		72FB24AP	
L904	RF Choke (15uH)	50-39415-24			
L920	Peaking (47uH)	50-15318-4		72F475AP	
L926	Peaking (100uH)	50-15318-8		6112	
L938	Peaking (270uH)	50-15318-13		72F274AP	
L980	RF Choke	50-41563-1			
T100	Sound IF	50-39084-1			
T220	1st Video IF	50-39062-1			
T256	AFC Discriminator (Pri)	50-37714-7	570723 119A-77-03 119A-76-39		
T262	AFC Discriminator (Sec)	50-37713-1			

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA				
		MFR. PART No.	OTHER IDENTIFICATION	MILLER PART No.	THORDARSON PART No.	TRIAD PART No.
L418	Horiz Freq	50-39121-2	286-1			
L470	Horiz Linearity	50-39206-1				
L801	Yoke Horiz = 1.06mH 90° Vert = 2.56mH	51-43712-3				
L802	Right R/B Vert	51-39707-3 (1)	082-1	H-1132		
L803	Convergence Yoke	50-39082-1				
T400	Horiz Output	22-39138-1				
T440	Horiz Output	50-41705-1	411-1			0491F (2)
	Horiz Driver	50-41705-2 (3) 56-41411-1				

For SAFETY use only equivalent replacement part.

- (1) Used in Models C2902JWA, C2912JWA.
(2) See Connection Data Chart.
(3) Used in Chassis E21-19/-20, (Code 02) E21-22 (Code 01).

SWEEP COMPONENT CONNECTION DATA

ORIGINAL →	HORIZONTAL OUTPUT										VERTICAL OUTPUT									
REPLACEMENT ↓	Original Connections										Original Connections									
THORDARSON																				
TRIAD																				
ORIGINAL →	YOKE										YOKE PLUG									
REPLACEMENT ↓	Original Connections										TO YOKE TERMINALS									
THORDARSON																				
TRIAD																				

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C117	100 35V	41-32477-65		VT1100K50	QV1-99	EV-1530
C125	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C126	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C134	.22 25V	41-34346-2				
C138	100 35V	41-32477-65	PC100-50	VT1100K50	QV1-99	EV-1530
C140	100 35V	41-32477-65	PC100-50	VT1100K50	QV1-99	EV-1530
C212	22 25V	41-32477-48	PC25-25	VT1100G25	QV1-57	EV-1324
C219	1 25V	41-34346-4	PC1-50	VT11A50	QV1-9	EV-1315
C237	10 25V	41-32477-47	PC10-25	VT110B25	QV1-43	EV-1322
C247	5 25V	41-32477-46	PC5-50	TT25X5	QE1-107	TVA-1203
C273	10 25V	41-23765-6	WBR10-25	TT25X10	QE1-179	TVA-1204
C274	25 25V	41-23765-7	WBR25-25	TC26C	QE1-293	TVA-1205
C278	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C280	1.5 25V	41-34346-6				EV-1316
C330	1.5 25V	41-34346-6				EV-1316
C342	2000 25V	41-32478-55	WBR2000-25*	TC2520A*	QE1-629*	TVA-1213*
C350	33 25V	41-39148-51		VT133D25	QV1-63	EV-1325
C403	470 25V	41-32477-53	WBR500-25	VT1470M25	QV1-153	EV-1350
C404	100 25V	41-32477-51	PC100-25	VT1100G25	QV1-97	EV-1330
C420	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C426	2 50V	41-32477-86	PC2-100	VT12R2A50	QV1-19	EV-1517
C432	50 25V	41-32477-50	PC50-25	VT147E25	QE1-353	TVA-1206
C438	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C446	25 50V	41-32477-90	WBR25-50	VT13650	QE1-295	TVA-1306
C506A	10 200V	41-39071-1				
C506B	50 200V					
C506C	100 250V					
C520	1000 200V	41-39103-1				TVLU-1252
C528	1000 35V	41-32477-68	WBR1000-50*	TC50100C*	QE1-594*	TVA-1316*
C530	1000 35V	41-32477-68	WBR1000-50*	TC50100C*	QE1-594*	TVA-1316*
C532	25 25V	41-32477-48	PC25-25	VT133025	QE1-293	TVA-1205
C608	10 25V	41-32477-47	PC10-25	VT110B25	QV1-43	EV-1322
C624	5 25V	41-32477-46	PC5-50	TT25X5	QE1-107	TVA-1203
C629	100 25V	41-32477-51	PC100-25	VT1100G25	QV1-97	EV-1330
C640	1 50V	41-32477-85	PC1-50	VT11A50	QV1-11	EV-1615
C820	2 150V	41-96355-16	WBR2-450	TC595A		TVA-1500.1
C824	10 25V	41-32477-47	PC10-25	VT110B25	QV1-43	EV-1322
C826	1 50V	41-39148-65	PC1-50	VT11A50	QV1-11	EV-1615
C918	2.2 50V	41-32477-86	PC2-100	VT12R2A50	QV1-19	EV-1517
C996	1 50V	41-23765-16	WBR1-50	TT50X1	QE1-11	TVA-1300

For SAFETY use only equivalent replacement part.

* Axial replacement for radial device.

CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
						Q-LINE
						GENERAL LINE
C104	.001 125V 5%			C019F0102J03	SX210	MWC-102
C108	.01 N330 10%					
C110	330 5%			C015F0331J03	SX333	MWA-331
C112	.01 N330					
C116	.001 10%				GP210	10TS-010
C118	.05 100V		0D-102	MGP05	TA150	TG-550
C120	.05 100V		0C-503	MGP05	TA150	TG-550
C122	.01 N330 10%		0C-503			
C124	12 NPO 5%				CN0412	10TCC-Q12
C128	68 N150 5%				* VT133025	10TCP-Q68
C202	.0039 10%			0PMS6039	PVC6239	6PS-Q39
C203	27 N150 5%				*	10TCP-Q27
C204	3.9 N150 ±.25					
C205	5.6 N150 ±.25					
C206	33 N150 5%				*	10TCP-Q33
C208	5.1 N150 5%				*	10TCP-V50
C209	.001 10%				GP210	10TS-010
C210	4.7 N150 ±.25		0D-102			
C214	.001 10%		0D-102		GP210	10TS-010
C216	.0022 10%		0D-102		GP222	10TS-022
C218	.001 10%		0D-102		GP210	10TS-010
C220	.001 10%		0TZ-100	NP0100	CN0310	10TCC-T10
C224	100 10%				*	10TCP-Q27
C230	27 N150 5%					10TCC-T18
C232	180 NPO 5%		0TZ-180	NP022	CN0422	10TCC-Q22
C234	22 NPO 5%		0TZ-22	NP022	CN0422	10TCC-Q22
C236	22 NPO 5%		0TZ-22		GP210	10TS-010
C238	.001 10%		0D-102		GP210	10TS-010
C242	.001 10%					10TCP-Q15
C243	15 N150 5%					10TCP-Q18
C244	18 N150 5%		0TZ-82	NP082	CN0482	10TCC-Q82
C246	82 NPO 5%		0TZ-220			10TCC-T22
C248	220 10%		0D-102		GP210	10TS-010
C249	.001 10%		0TZ-22	NP022	CN0422	10TCC-Q22

CHASSIS E21-19/-20/-22

FOLDER 2

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

CAPACITORS (cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C250	390 10%		DD-391	GP390	GP339		10TS-T39
C252	120 N150 5%						10TCP-112
C254	.001 10%		DD-102		GP210		10TS-D10
C258	.001 10%		DD-102		GP210		10TS-D10
C262	82 N150 5%				*		10TCP-Q82
C263	10 N150 +.5						
C264	.001 10%		DD-102		GP210		10TS-D10
C265	10 N150 +.5						
C266	.001 10%		DD-102		GP210		10TS-D10
C268	.001 10%		DD-102		GP210		10TS-D10
C276	.1 100V			DPMS2P1	ENF1A010	QF1-215	1PB-P10
C282	.01			WMF151	ENF1A110	QF1-91	1PB-S10
C286	470 10%		DD-471	GP470	GP347		10TS-T47
C310	.018 100V			WMF151B	ENF1A11B		1PB-S18
C312	.1 100V			OPMS2P1	ENF1A010	QF1-215	1PB-P10
C326	.1 100V			OPMS2P1	ENF1A010	QF1-216	1PB-P10
C331	.018 100V			WMF151B	ENF1A11B		1PB-S18
C333	.22 200V			OPMS6P22	ENF6022		GPS-P22
C334	.0015		DD-152		GP215		10TS-D15
C337	.22 200V			DPMS6P22	ENF6022		GPS-P22
C340	.0015 10%		DD-152		GP215		10TS-D15
C343	.047 100V 10%			DPMS2547	ENF1A147	QF1-171	1PB-S47
C344	.047 100V			DPMS2547	ENF1A147	QF1-171	1PB-S47
C358	.39 200V			PMAP39			
C402	.220 5%			CD15F0221J03	SX322	QW1-35	MMA-221
C405	.1 100V			DPMS2P1	ENF1A010	QF1-215	1PB-P10
C406	.220 N330				*		10TS-T22
C408	.068 100V			WMF156B	ENF1A16B	QF1-195	1PB-S6B
C412	100 10%		DTZ-100	NP0100	CH0310		10TCC-T10
C414	68 NPO		DTZ-68	NP068	CH046B		10TCC-Q6B
C416	.022 100V			DPMS2522	ENF1A122	QF1-127	1PB-S22
C418	.0033 125V 5%			CD19FD332J03	SX233		MWC-332
C422	.033 100V			DPMS6S33	ENF6133		GPS-S33
C424	.033 100V			OPMS6S33	ENF6133		GPS-S33
C428	.22 100V			OPMS2P22	ENF1A022	QF1-253	1PB-P22
C430	.001 10%		DD-102		GP210		10TS-D10
C440	.001 10%		DD-102		GP210		10TS-D10
C442	.1 200V			DPMS2P1	ENF2010		2PB-P10
C443	470 10%		DD-471	GP470	GP347		10TS-T47
C444	.1 100V			OPMS2P1	ENF1A010	QF1-215	1PB-P10
C447	560 1KV 10%		DD-561		GP356		10TS-T56
C448	.01 1.2KV 5%	45-33037-20			2HV110		10TS-T56
C449	560 1KV 10%		DD-561		GP356		10TS-T56
C450	.01 2KV	43-11028-22			ENF206B		2PB-P6B
C451	560 1KV 10%		DD-561		GP356		10TS-T56
C452	.68 200V 10%	45-33037-15		DMP2P6B	ENF206B		2PB-P6B
C453	150 1KV 10%		DD-151		GP315		10TS-T15
C454	150 1KV 10%		DD-151		GP315		10TS-T15
C455	33 N150 10%				*		10TCP-Q33
C456	15 N150				*		10TCP-Q15
C470	.0022 100V 10%				GP222		10TS-D22
C502	.047 125V AC	45-29666-7		OPMS16S47	PVC16147		16PS-S47
C504	.001 10%		DD-102		GP210		10TS-D10
C510	.001		DD-102		GP210		10TS-D10
C512	.001 10%		DD-102		GP210		10TS-D10
C514	.01		DD-1032	GP1000D	GP110		5GA-S10
C522	.01		DD-1032	GP1000D	GP110		5GA-S10
C534	.001		DD-1032	GP1000D	GP110		10TS-D10
C602	.22 NPO 5%		DTZ-22	NP022	CH0422		10TCC-Q22
C605	100 N330 10%				*		10TCC-T10
C606	.01			WMF151	ENF1A110	QF1-91	1PB-S10
C613	.001 10%		DD-102		GP210		10TS-D10
C616	.01		DD-1032	GP1000D	GP110		5GA-S10
C618	.220 10%		DTZ-220				10TCC-T22
C626	.05 100V		OC-503	MGP05	TA150	QC2-207	TG-S50
C628	.1 100V			DPMS2P1	ENF1A010	QF1-215	1PB-P10
C630	47 NPO 5%		DTZ-47	NP047	CH0447		10TCC-Q47
C632	68 NPO 5%		DTZ-68	NP068	CH046B		10TCC-Q6B
C634	.01		DD-1032	GP1000D	GP110		5GA-S10
C636	.01		DD-1032	GP1000D	GP110		5GA-S10
C638	.01		DD-1032	GP1000D	GP110		5GA-S10
C642	180 10%		DD-181		GP318		10TS-T18
C644	120 10%		DTZ-120		CH0312		10TCC-T12
C645	.01		DD-1032	GP1000D	GP110		5GA-S10
C646	12 N150 5%				CH7412		10TCU-Q12
C648	.0015 5%			CD19FD152J03	SX215		MWC-152
C652	.001 10%		DD-102		GP210		10TS-D10
C656	68 NPO 125V 5%		DD-1032	NP068	CH046B		10TCC-Q6B
C658	.01			GP1000D	GP110		5GA-S10
C660	.1 100V			DPMS2P1	ENF1A010	QF1-215	1PB-P10
C662	150 NPO 10%		DTZ-150		CH0315		10TCC-T15
C664	.01		DD-1032	GP1000D	GP110		5GA-S10
C666	.01		DD-1032	GP1000D	GP110		5GA-S10
C668	.220 5%			CD15F0221J03	SX322	QW1-35	MMA-221
C670	.01		DD-1032	GP1000D	GP110		5GA-S10
C802	.47 250V 10%	45-39738-6		WMF6P47	ENF6047		6PS-P47
C804	.001		DD-102		GP210		10TS-D10
C808	1.2uF 100V 10%	45-39738-8		WMF1W1	ENF1A10	QF1-305	1PB-H10
C810	.1 100V			DPMS2P1	ENF1A010	QF1-215	1PB-P10
C812	.01		DD-1032	GP1000D	GP110		5GA-S10
C814	.01		DD-1032	GP1000D	GP110		5GA-S10
C830	.001 10%		DD-102		GP210		10TS-D10
C832	.001 10%		DD-102		GP210		10TS-D10
C920	47 NPO 5%		DTZ-47	NP047	CH0447		10TCC-Q47
C924	.0015 5%			CD19FD152J03	SX215		MWC-152
C936	33 N150 10%				*		10TCP-Q33

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

CAPACITORS (cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C950	33 N150 10%				*		10TCP-Q33
C964	33 N150 10%				*		10TCP-Q33
C978	.001 2KV		DD30-102	HV3-1000	3HV210		BL-D10
C980	.001 1KV 10%		DD-102		GP210		10TS-D10
C982	.001 1KV 10%		DD-102		GP210		10TS-D10
C984	.001 1KV 10%		DD-102		GP210		10TS-D10
C986	.047 1KV 10%	45-41275-1		PKM10547			10PS-S47

For SAFETY use only equivalent replacement part.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS (All waitages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA			
			MFR. PART No.	CENTRALAB PART No.	MALLORY PART No.	TRW PART No.
# R112	Volume/Switch	50K	37-35105-17			
	Volume/Switch	50K	37-35105-13 (18)			
R276	RF AGC Delay	500K	37-14576-12	T-500KL	MTC55L1	X201R504B
R327	Vert Hold	350K "c"	37-39816-3			
R328	Vert Height	1.5Meg "a"	(7) (19)			
R338	Vert Linearity	15K "b"				
# R462	Focus	20Meg	37-39627-1			
R514	B+ Adjust	20K "a"	37-33036-18			
R944	Red Drive	150 "b"	(7) (20)			
R958	Green Drive	150 "c"				
R616	Color	25K "a"	37-15902-10			H1 (7)
R636	Tint	25K "b"	(7) (21)			[A-E9,A3]
						[B-E9,A3]
	Color	25K	37-29703-22 (18)	F1-25K,SN100	RU253L,SL37,SN875 or [UA253L,SN875]	BU11,CF11,S56A
	Tint	25K	37-29703-22 (18)	F1-25K,SN100	RU253L,SL37,SN875 or [UA253L,SN875]	BU11,CF11,S56A
R634	ACC Killer	25K	37-14576-19	T-25K	MTC253L1	X201R253B
R804	Red/Blue Vert Lines(Left)	6 2W	37-16021-28			
R803	Red/Blue Vert Lines (Top)	3 2W	37-16021-29			
R814	Red/Blue Vert Lines (Bottom)	3 2W	37-16021-29			
R820	Side Pincushion Amp	2000	37-23063-9	T-2500	MTC23L4 (3)	U201R252B
R900	Sharpness	1000 "b"	37-15908-2			
R906	Contrast	1000 "a"	(7) (22)			
R908	Brightness	2000 "c"	37-39937-1 (18)	F1-1000,SNK010 AK-40		BU11,CF6,S56A, DC2
	Sharpness	1000				
	Contrast	1000	37-41483-1 (18)			
	Blank					
R921	Brightness	2000	37-14576-14	T-2500	MTC23L1	X201R252B
R988	Brightness Range	2000	37-33036-11			
	Blue Screen	2.5Meg	(7) (23)			
R990	Green Screen	2.5Meg				
R992	Red Screen	2.5Meg				

For SAFETY use only equivalent replacement part.

(3) For horizontal mounting, bend the two outside terminals to fit PC board. Use jumper to connect center terminal to PC board.

(7) To establish section identification of side-by-side controls, view controls with shaft ends facing you, terminals down.

(18) Used in models using Chassis E21-19 and E21-20.

(19) Includes R327, R328 and R338.

(20) Includes R514, R944 and R958.

(21) Includes R616 and R636.

(22) Includes R900, R906 and R908.

(23) Includes R988, R990 and R992.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFR. PART No.			WORKMAN PART No.	MFR. PART No.
# R132	56 10% 5W WW		36-40078-62	# R524	5.1 5% 10W WW	10W-SQ-5	36-40076-41
R342	.82 5% 2W Carbon		36-34726-18	R526	150 5% 25W WW		36-92898-75
R348	1 5% 2W Carbon		36-34726-20	R530	22 5% 2W Carbon		
R356	1 5% 2W Carbon		36-34726-20		22 5% 2W WW		36-39823-52 (1)
R404	3300 10% 5W Film		35-92495-35	R532	.47 10% 2W Carbon	CB-15	36-39824-12
R442	10K 5% 3W Film		35-92495-109	R536	15 10% 1W Carbon		
R444	1300 10% 5W Film		35-92495-127	R802	10 10% 3W WW		
R446	1.5 10% 2W Carbon		36-39824-24		4.7 10% 3W		36-40077-4B
R448	270 10% 1W Carbon	CB-270 FR605	36-43253-72	R940	10K 5% 3W Film		36-40077-40 (2)
R502	20 Cold PTC		38-33206-1	R954	10K 5% 3W Film		35-92495-109
R504	2.7 10% 25W WW		36-92898-74	R968	10K 5% 3W Film		35-92495-109

For SAFETY use only equivalent replacement part.

(1) Used in late production.

(2) Used in Chassis

PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA			NOTES
	MFGR. PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V1	21VBLP22		21VBLP22 CB21VBLP22 AA21VBLP22 AA19VGLP22 19VFBP22 CB19VFBP22 AA19VFBP22	(1) Used in Model C2902JWA. (2) Used in Model C2912JWA.
	19VGLP22 (1) 19VFBP22 (2)	19VDCP22 19VDCP22		

For SAFETY use only equivalent replacement part.

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA								
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.
HV401		32-39091-9	GE1C-14B	PTC726	HEPC6083P	RE 215	SK3306		ECG523	VMT-08	WEP507
IC100		15-35059-2	GE1C-232			RE 305-1C	SK3072		ECG712		
IC200		15-41856-1	GE1C-218		HEPC6079P	RE 310-1C	SK3237	TVCM-11	ECG795		
IC202		15-43251-2					SK3279	TVCM-60	ECG747		
IC302		15-41545-1							ECG794		
IC400		15-37700-1							ECG792		
IC600		15-39075-1	GE1C-29	PTC741	HEPC7075P	RE 313-1C	SK3167	TVCM-27	ECG738		
IC602		15-41627-2									
Q100		13-23824-1	GE-283	PTC132	HEPS0015*	RE 28*	SK3018*	RT-187*	ECG233*		WEP736*
Q102		13-29033-4	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		121-972
Q104		13-34046-3 (5)	GE-28	PTC110	HEPS3061	RE 42	SK3054	RT-154	ECG186A		WEP751
Q106		13-34047-3 (5)	GE-29	PTC111	HEPS3054	RE 43	SK3083	RT-155	ECG187A		WEP752
Q202		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q204		13-23824-1	GE-283	PTC132	HEPS0015*	RE 28*	SK3018*	RT-187*	ECG233*		WEP736*
Q206		13-39970-1	GE-82	PTC103	HEPS0019	RE 26	SK3466	RT-126A	ECG159		WEP62
Q208		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q210		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q212		13-35807-2	GE-20	PTC123	HEPS0015	RE 13	SK3122*	RT-107*	ECG123A		WEP736
Q300		13-39819-2 (5)(6)	GE-69	PTC111	HEPS3054	RE 22	SK3083	RT-196	ECG153		WEP746
Q302		13-39884-2 (5)(7)	GE-66	PTC110	HEPS3061	RE 21	SK3054	RT-197	ECG152		WEP745
Q400		13-39098-1	GE-27		HEPS3021	RE 73	SK3220	RT-159A	ECG191		WEP854
Q402		13-33181-3	GE-259	PTC146		RE 32	SK3115	RT-140	ECG238		WEP740B
Q404		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q500		13-43005-1	GE-241	PTC167	HEPS3060	RE 222	SK3440	RT-197	ECG291		WEP745
Q502		13-41738-1	GE-14	PTC140	HEPS7004	RE 19	SK3027	RT-131	ECG130		WEP704
Q504		13-29776-2	GE-82	PTC103	HEPS0031	RE 26	SK3466	RT-126A	ECG159		WEP62
Q600		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q604		13-29776-3	GE-82	PTC103	HEPS0013	RE 26	SK3466	RT-126A	ECG159		WEP62
Q800		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q900		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q902		13-29033-3	GE-62*	PTC136	HEPS0015	RE 192*	SK3122*	RT-304*	ECG199*		WEP66*
Q904		13-33178-1	GE-67	PTC177*	HEPS5013	RE 197	SK3138*	RT-115	ECG193		WEP754
Q906		13-33174-1	GE-27		HEPS3021	RE 73	SK3104	RT-159A	ECG171		WEP702
Q908		13-33174-1	GE-27		HEPS3021	RE 73	SK3104	RT-159A	ECG171		WEP702
Q910		13-33174-1	GE-27		HEPS3021	RE 73	SK3104	RT-159A	ECG171		WEP702
SC130		13-34056-1	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC264		1N295	1N295	PTC206	HEPR9134A	RE 47	SK3091	RT-200	ECG109	1N34A	WEP134
SC266		1N295	1N295	PTC206	HEPR9134A	RE 47	SK3091	RT-200	ECG109	1N34A	WEP134
SC278		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC282		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC284		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC286		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC288		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC358		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC404		13-33187-3	GE20-20	ZB20A	HEP20421	RE 126	SK3335	RT-247	ECG5079	1N4747A	WEP1163
SC405		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC417		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC434		13-33187-23									
SC435		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC442		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC448		13-33172-1	GE-511	PTC216	HEPR3012	RE 55	SK3125	RT-203	ECG506		WEP172
SC450		13-33172-1	GE-511	PTC216	HEPR3012	RE 55	SK3125	RT-203	ECG506		WEP172
SC454		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC504		13-39860-1	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC510		13-37868-1	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC512		13-29867-1	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC514		13-33179-9									
SC520		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC530		13-37868-1	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC608		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC650		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC802		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC806		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC808		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC810		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC812		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC814		13-41122-2	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156
SC830		13-17596-2	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC832		13-17596-2	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC916		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC918		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC924		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC926		13-17596-10	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SC996		13-29867-1	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177		WEP1062
SCR430		13-18924-4		PTC651	HEPR1001	RE 246			ECG5400		

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

(5) Half of complementary pair. (Q104 & Q106) (Q300 & Q302).

(6) Part Number 13-39100-1 or 13-39100-2 may be used.

(7) Part Number 13-39099-1 may be used.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP100	4" X 6" PM 16 Ohms 3" X 5" PM 24 Ohms	12-41337-2 12-15749-6	46A2Z16 35A05Z24	Model C3101JWA Models C2902JWA, C2912JWA

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA					
		PART No.		BUSS PART No.		LITTELFUSE PART No.	
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	WORKMAN PART No.
# CB500	Circuit Breaker Break 3.85A Hold 2.2A	29-39E96-4				8153.25	FA4

For SAFETY use only equivalent replacement part.

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
1900	Neon Lamp	30-33062-3	Osc Protection
L104	Ferrite Bead	22-28072-2	
L447	Ferrite Bead	22-28072-4	
L448	Ferrite Bead	22-28072-4	
L450	Ferrite Bead	22-28072-4	
L452	Ferrite Bead	22-28072-4	
L454	Ferrite Bead	22-28072-4	
L500	Degaussing Coil	50-33394-14	Model C3101JWA
	Degaussing Coil	50-33403-2	Models C2902JWA, C2912JWA
L806	Ferrite Bead	22-28072-4	
L808	Ferrite Bead	22-28072-4	
PL200	Connector	73-10302-16	15 Pin
PL300	Connector	73-99237-5	Deflection Yoke
	Connector	73-43833-1	Deflection Yoke, Model C3101JWA
PL500	Connector	73-10302-50	Degaussing Coil
PL502	Connector	73-10302-13	12 Pin
PL503	AC Power Cord	73-43044-1	
PL/SK505	Board	73-15582-2	AC Interlock
SG401	Spark Gap	29-41185-1	
SK200	Connector	73-10302-20	15 Pin
SK300	Socket	72-29680-5	Deflection Yoke
SK500	Socket	73-10302-53	Degaussing Coil
SK502	Connector	73-10302-58	12 Pin
SW200	Switch	33-35548-3	ACT, Used on Chassis E21-20
	Switch	33-16011-15	ACT, Used on Chassis E21-19
	Switch	33-35548-1	ACT, Used on Chassis E21-22
SW500	Switch		Power On/Off, Part of Volume Control
SW506	Switch		UHF B+, Part of Tuner
SW600	Switch		Auto Tint, Chassis E21-19/-20
	Switch		Auto Tint, Chassis E21-22
SW900	Switch		Normal/Service
XT600	Crystal		3.58MHz
	Antenna, UHF	27-17941-1	RUSSELL Replacement 60W-1H
	Antenna, VHF	27-27522-24 (1)	RUSSELL Assembly Replacement BAL-1H,
			RUSSELL Rod Replacement POR-1H
			RUSSELL Assembly Replacement BAL-1H,
			RUSSELL Rod Replacement POR-1H
	Antenna, VHF	27-27522-18 (2)	Convergence Assembly, Chassis E21-22
	Printed Circuit Board	02-41070-5	

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
---------------------	---------------------	-------------

RESISTORS (CONTINUED)

R2	1.2K, 5%, 1/4W
R3	10 ohm, 20%
R4	2.2K
R5	1K
R6	8.2K, 5%, 1/4W
R7	330 ohm
R8	22 ohm, 1/4W
R9	1.2K, 5%, 1/4W
R10	18K, 1/4W
R11	10K
R14	10K, 1/4W

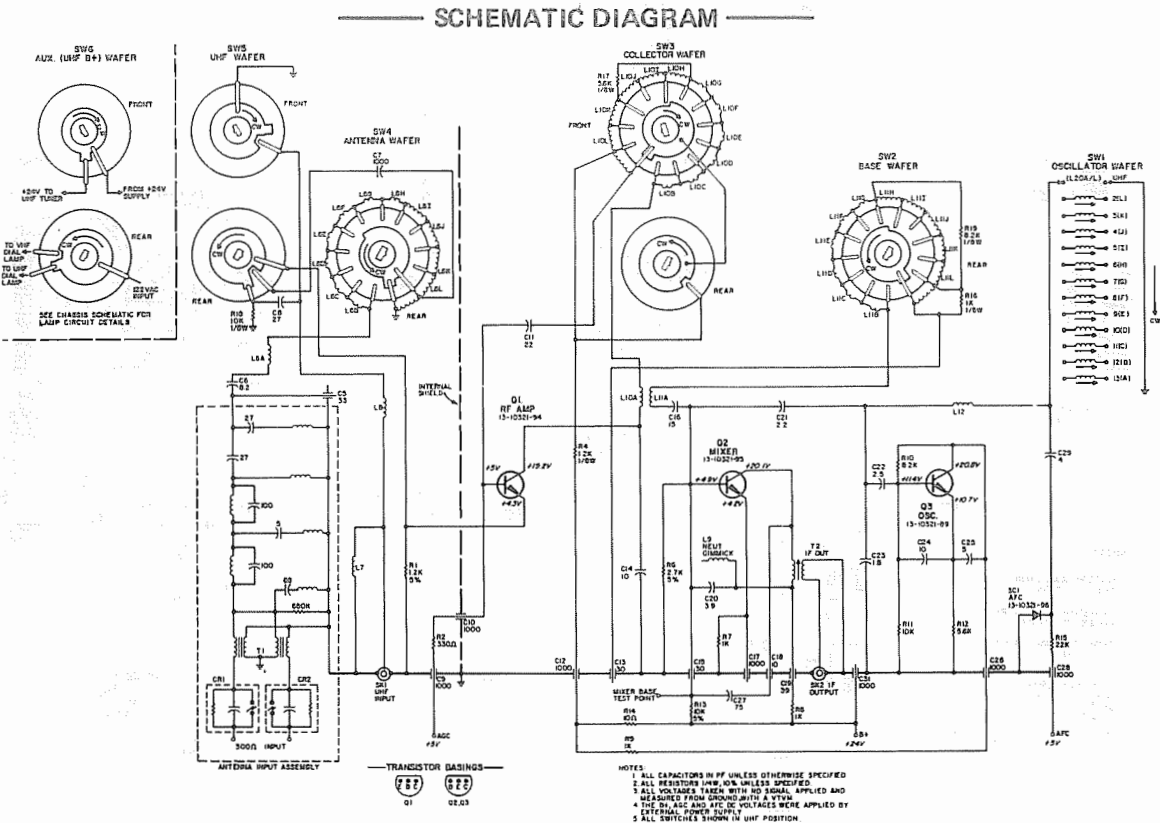
L9	Ferrite Bead
L10	Channel No. 1 Ground Return
L11	Isolation Choke
L14	AFC Coil (Wound on 470 ohm resistor)
L16	Choke Coil
T2	50-96187-38 IF Output Transformer

Q1	13-10321-93	Transistor - RF
Q2	13-10321-46	Transistor - Mixer
Q3	13-10321-81	Transistor - Oscillator
SC1		AFD Diode
	54-96135-41	Antenna Input Asm. (Isolated)

STATOR ASSEMBLY

FOLDER 2

REPLACEMENT PARTS LIST (54-43651-1)



SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
------------------	------------------	-------------

CAPACITORS (All in pF)

C5	43-96130-133	33, Feedthrough
C6		8.2, NPO
C7		1000
C8		27
C9	43-96130-134	1000, Feedthrough
C10	43-96130-108	1000, Feedthrough
C11		22, N330
C12	43-96130-134	1000, Feedthrough
C13	43-96130-104	30, Feedthrough
C14		10, N470
C15	43-96130-104	30, Feedthrough
C16		15, NPO
C17	43-96130-109	1000, Feedthrough
C18	43-96130-107	10, Feedthrough
C19	43-96130-103	39, Feedthrough
C20		3.9
C21		2.2
C22		2.5, NPO
C23		1.8, NPO
C24		10, NPO
C25		5, NPO
C26	43-96130-109	1000, Feedthrough
C27		.75
C28	43-96130-134	1000, Feedthrough
C29		4, NPO
C31		1000, Feedthrough

RESISTORS (All 1/4W, 10% unless otherwise specified)

R1	1.2K, 5%
R2	330 ohm
R4	1.2K, 1/8W
R6	2.7K, 5%
R7	1K
R8	1K
R9	1K
R10	8.2K
R11	10K
R12	5.6K
R13	10K, 5%
R14	10 ohm
R15	22K
R16	1K, 1/8W
R17	5.6K, 1/8W
R18	10K, 1/8W
R19	8.2K, 1/8W

COILS & TRANSFORMERS

L6A	Coil - Ant. Adj.
L7	Coil - UHF Shunt
L8	Coil - UHF Series
L9	Neutralizing Gimmick
L10A	Coil - Collector Adj.
L11A	Coil - Base Adj.

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
------------------	------------------	-------------

COILS & TRANSFORMERS (CONTINUED)

L12		Coil - Osc. Adj.
T1*	50-31052-1	Input Balun - 300 ohm
T2	50-96187-47	IF Output

*Part of Antenna Input Assembly

SEMI-CONDUCTOR DEVICES

Q1	13-10321-94	Transistor - RF Amp.
Q2	13-10321-95	Transistor - Mixer
Q3	13-10321-89	Transistor - Oscillator
SC1	13-10321-96	Diode - AFC

MISCELLANEOUS ELECTRICAL & MECHANICAL PARTS

CR1,CR2*	43-31049-1	Capristor
SW1		Osc. Wafer Assy.
SW2		Base Wafer Assy.
SW3		Collector Wafer Assy.
SW4		Antenna Wafer Assy.
SW5		UHF Wafer Assy.
SW6		Aux. (UHF B+) Wafer Assy.

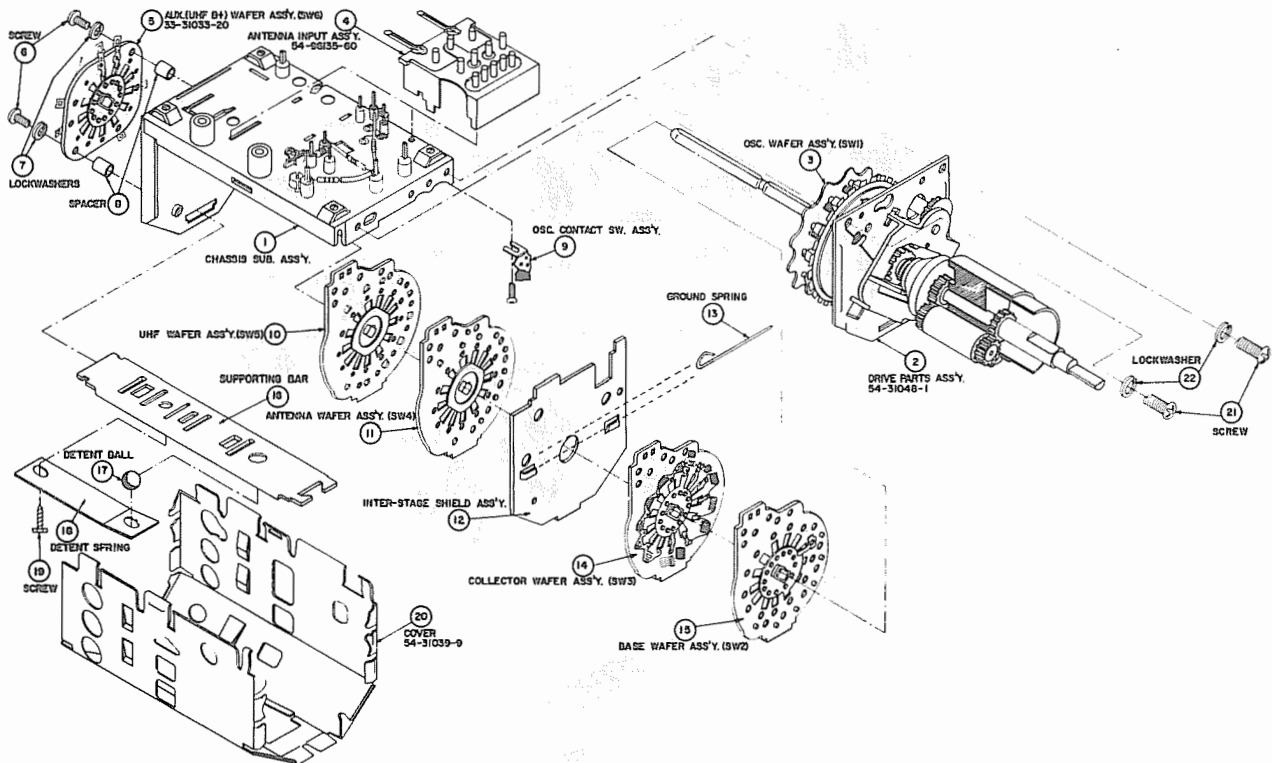
*Part of Antenna Input Assembly

MECHANICAL & ELECTRICAL PARTS LAYOUT

ITEM NO.	SERVICE PART NO.	DESCRIPTION
1		Chassis Sub Assy.
2	54-31048-1	Drive Parts Assy.
3		Osc. Wafer Assy. (SW1)
4	54-96135-60	Ant. Input Assy.
5	33-31033-20	Aux. (UHF B+) Wafer Assy. (SW6)
6		Screw
7		Lockwasher
8		Spacer
9		Osc. Contact SW Assy.
10		UHF Wafer Assy. (SW5)
11		Antenna Wafer Assy. (SW4)
12		Inter-Stage Shield Assy.
13		Ground Spring
14		Collector Wafer Assy. (SW3)
15		Base Wafer Assy. (SW2)
16		Supporting Bar
17		Detent Ball
18		Detent Spring
19		Screw
20	54-31039-9	Cover
21		Screw
22		Lockwasher

NOTE: Item numbers with no part no. are not stocked.

MECHANICAL PARTS LAYOUT



NOTE: SEE PARTS LIST FOR DESCRIPTION AND PART NUMBERS CORRESPONDING TO RESPECTIVE CIRCLED NUMBERS.

REPLACEMENT PARTS LIST

SCHEMATIC
CODING

SERVICE
PART NO.

DESCRIPTION

CAPACITORS (All in PF)

C1		24, ±10%
C3	43-96130-154	470, Feedthrough
C4	43-96130-162	1000, Feedthrough
C5		8.5, ±10%
C6		2.5, ±10%
C8	43-96130-154	470, Feedthrough
C9		470, Feedthrough
C10		1.7

RESISTORS (All 1/4W, 5% unless otherwise specified)

R1		1.5 meg, 1/2W, 10%
R2		270 ohm
R3		12K
R4		27 ohm
R6		22K

SCHEMATIC
CODING

SERVICE
PART NO.

DESCRIPTION

RESISTORS (CONTINUED)

R8		2.2K
R9		1K

COILS

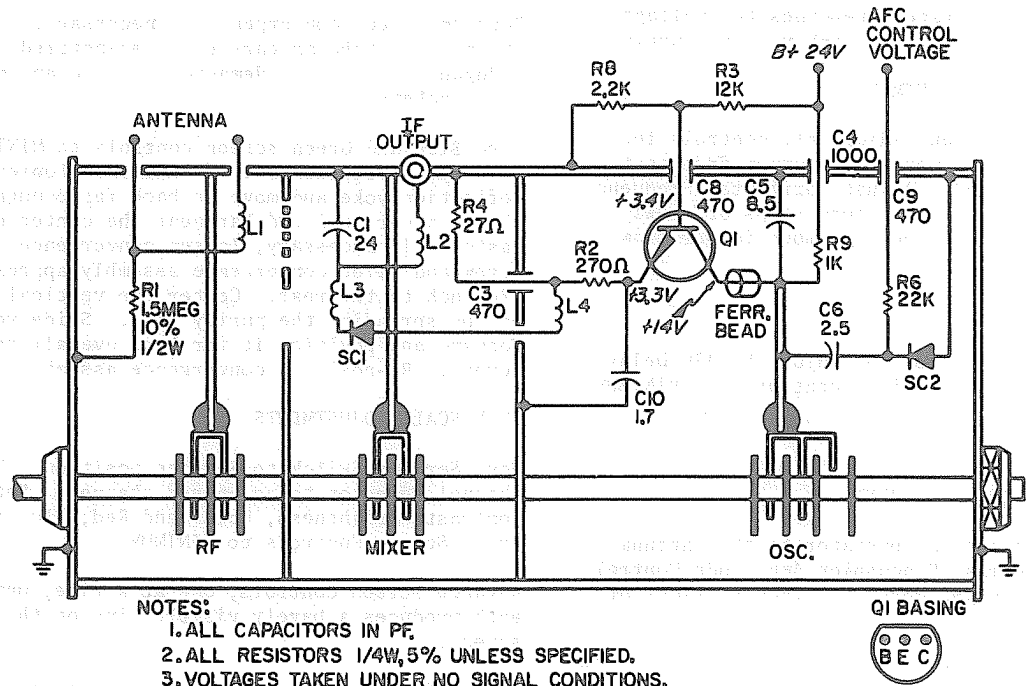
L1		Antenna Coil
L2		IF Coil
L3		RF Coupling Loop
L4		Osc. Coupling Loop

SEMI-CONDUCTOR DEVICES

Q1	13-10321-91	Transistor - RF
SC1	13-10321-92	Diode - Mixer
SC2	13-10321-120	Diode - AFC

NOTE: Item numbers with no part number are not stocked.

SCHEMATIC DIAGRAM



NOTES:
1. ALL CAPACITORS IN PF.
2. ALL RESISTORS 1/4W, 5% UNLESS SPECIFIED.
3. VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS.

IMPORTANT: Avoid mistakes, order Philco parts by part number.

ITEM NO.	DESCRIPTION
1	Sleeve - Fine Tune
2	"C" Ring
3	Ring - Compression
4	Gear - Drive
5	Screws - Mounting
6	Plate - Front
7	Screws
8	Tape Drive Assy.
9	Housing - Cover

SERVICE PART NO.
77-31040-9
54-31075-17
54-31020-16
54-31075-11

ITEM NO.	DESCRIPTION
10	Shaft & Clutch Assy.
11	Spacer
12	Arm - Detent
13	Spring - Detent
14	Screws
15	Bracket - Detent
16	Sleeve
17	Roller - Detent
18	Bracket - Detent Spring

SERVICE PART NO.
54-31020-10
54-31039-6
77-31040-10
54-31039-7

ITEM NO.	DESCRIPTION
19	Housing - Front
20	Spring
21	Spring - Stop
22	Pin - Stop
23	Screw
24	Gear - Internal Tooth
25	Screws - Mounting
26	Housing - Rear

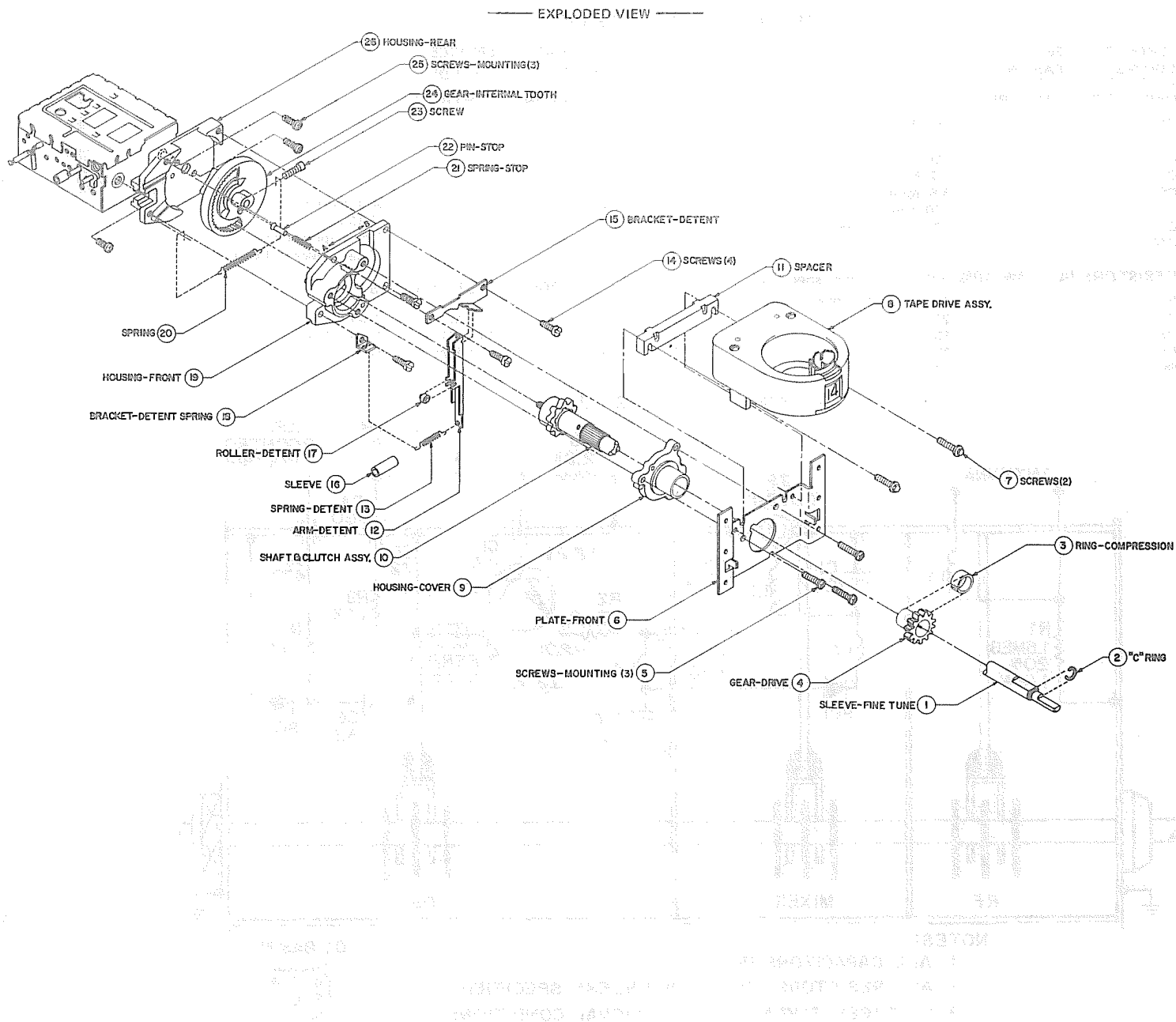
SERVICE PART NO.
54-31075-18
77-31040-13
77-31040-14
54-31039-8
54-31075-19
54-31075-20

NOTE: Item numbers with no part number are not stocked

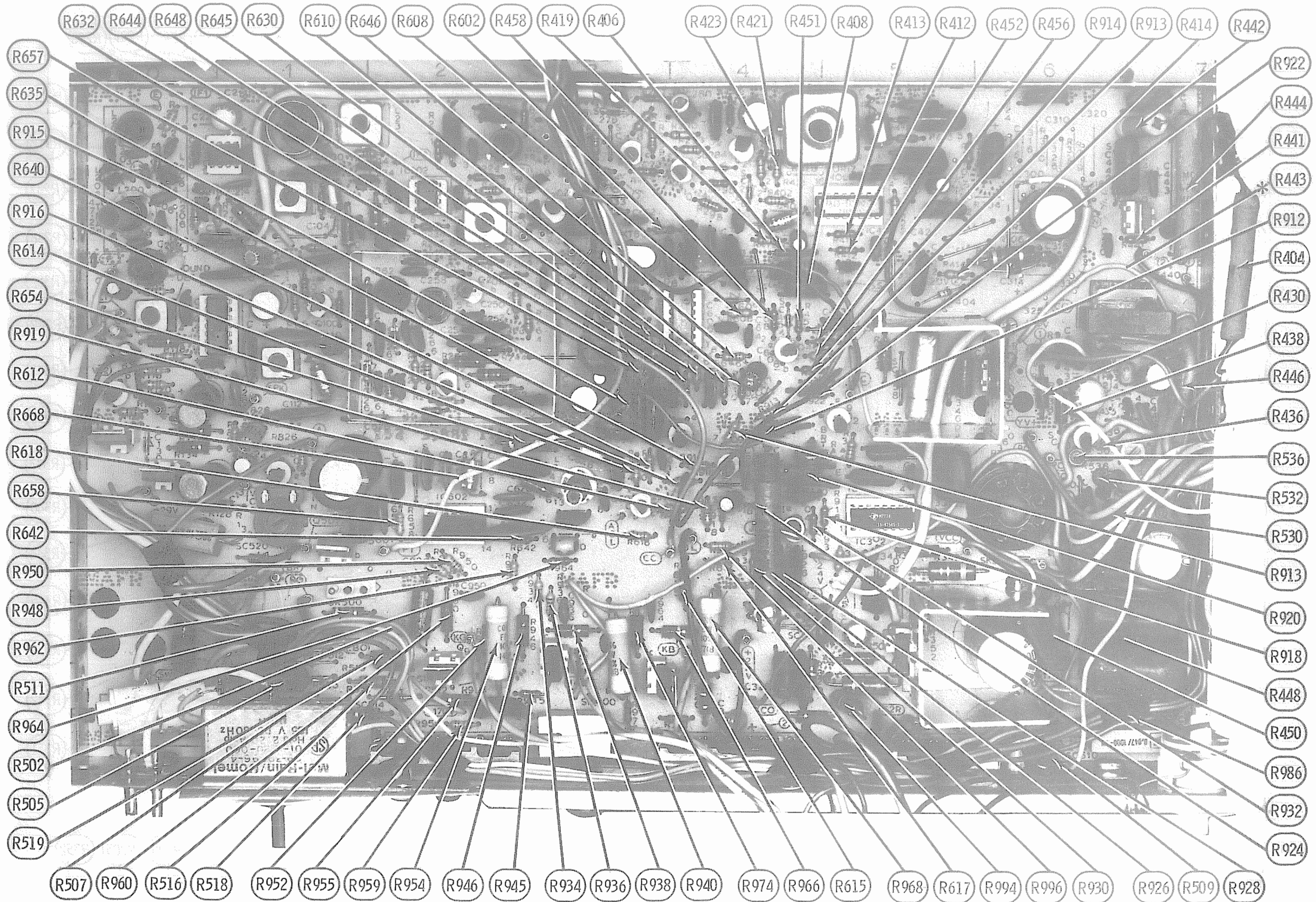
TUNER - UHF 54-41525-1

Courtesy of the Manufacturer

Courtesy of the Manufacturer



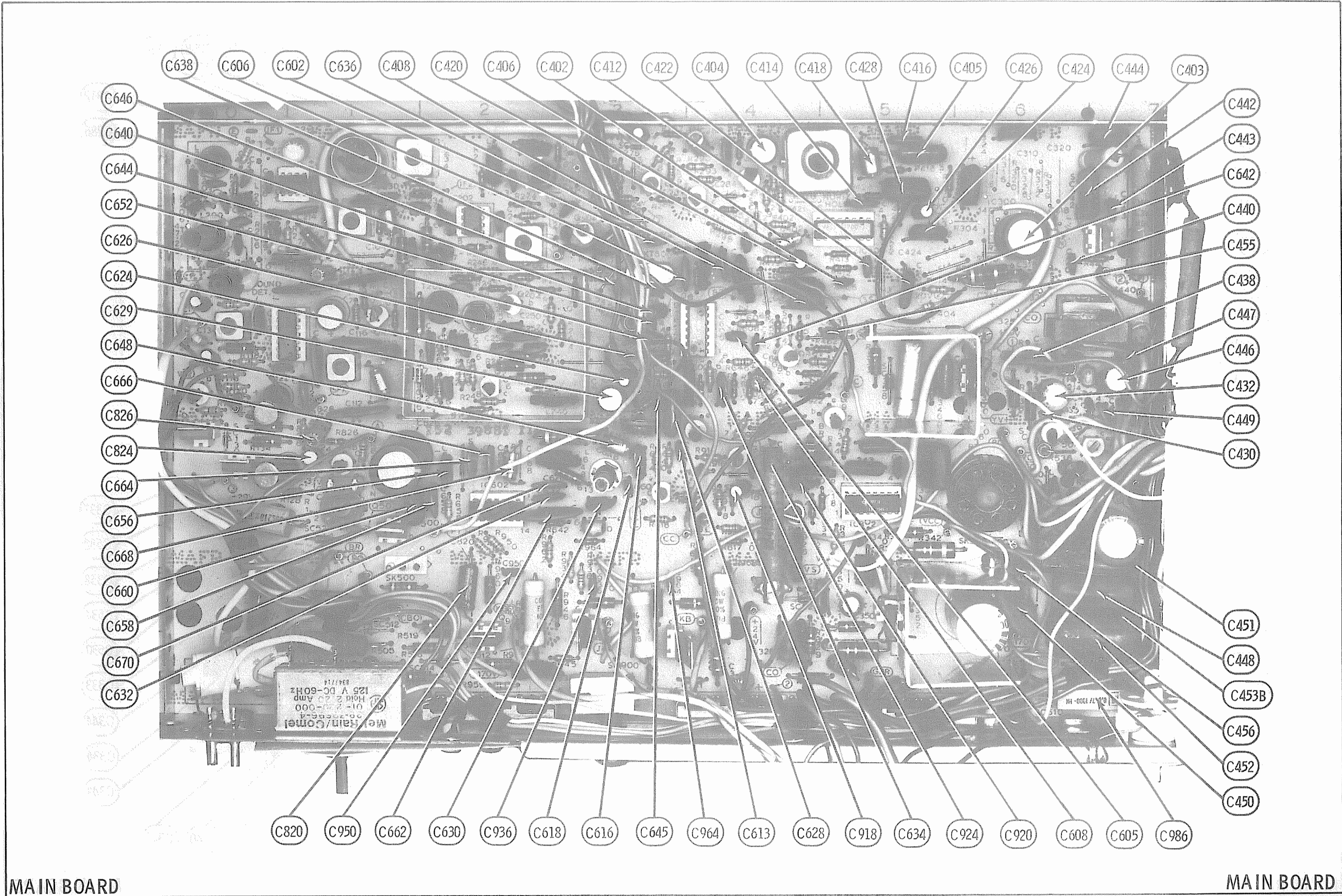
PHILCO
CHASSIS E21-19/-20/-22



MAIN BOARD

* Located on bottom of board

MAIN BOARD



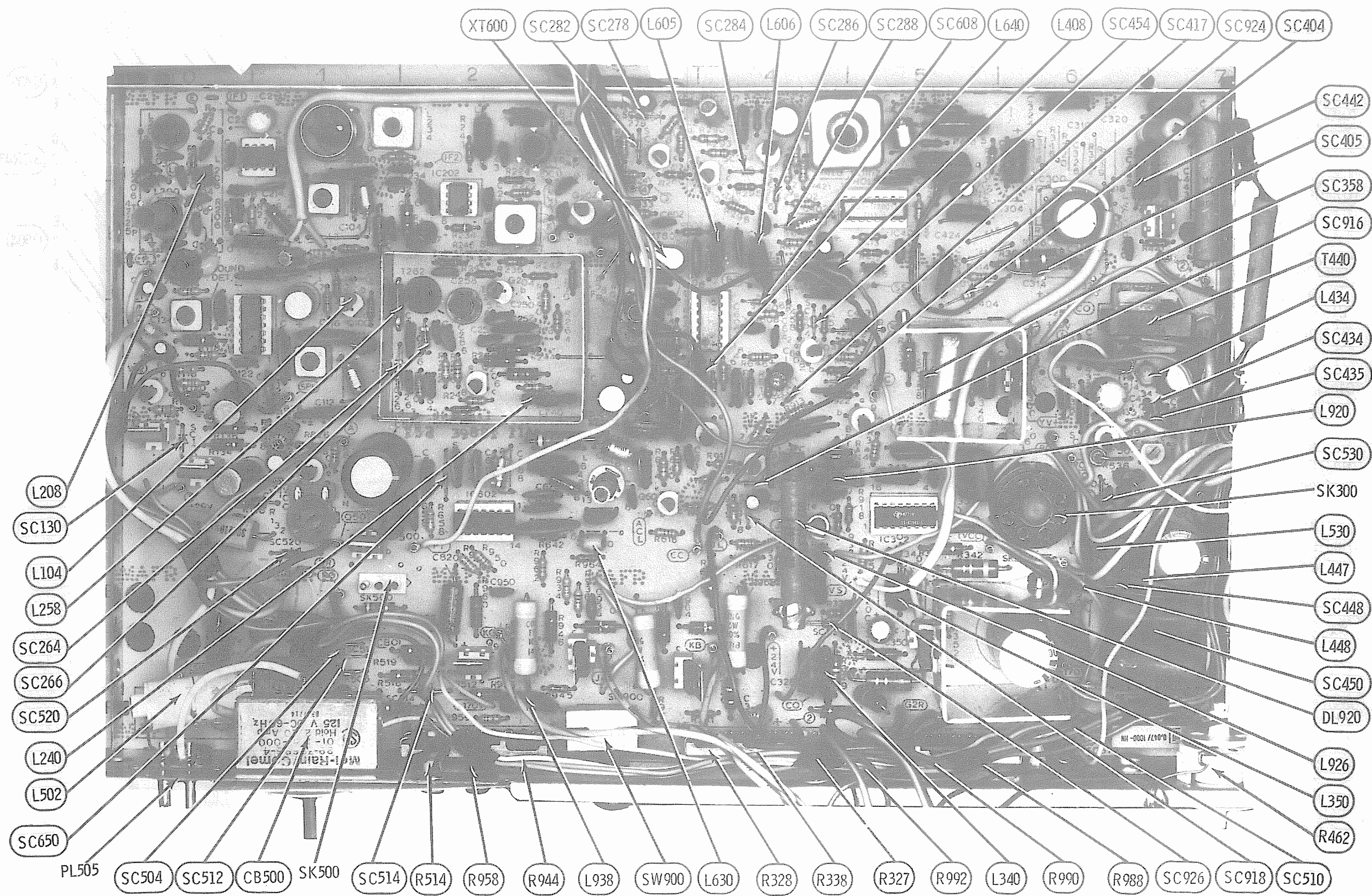
PHILCO
CHASSIS E21-19/20/22

FOLDER 2

MAIN BOARD

MAIN BOARD

CHASSIS E21-19/20-22

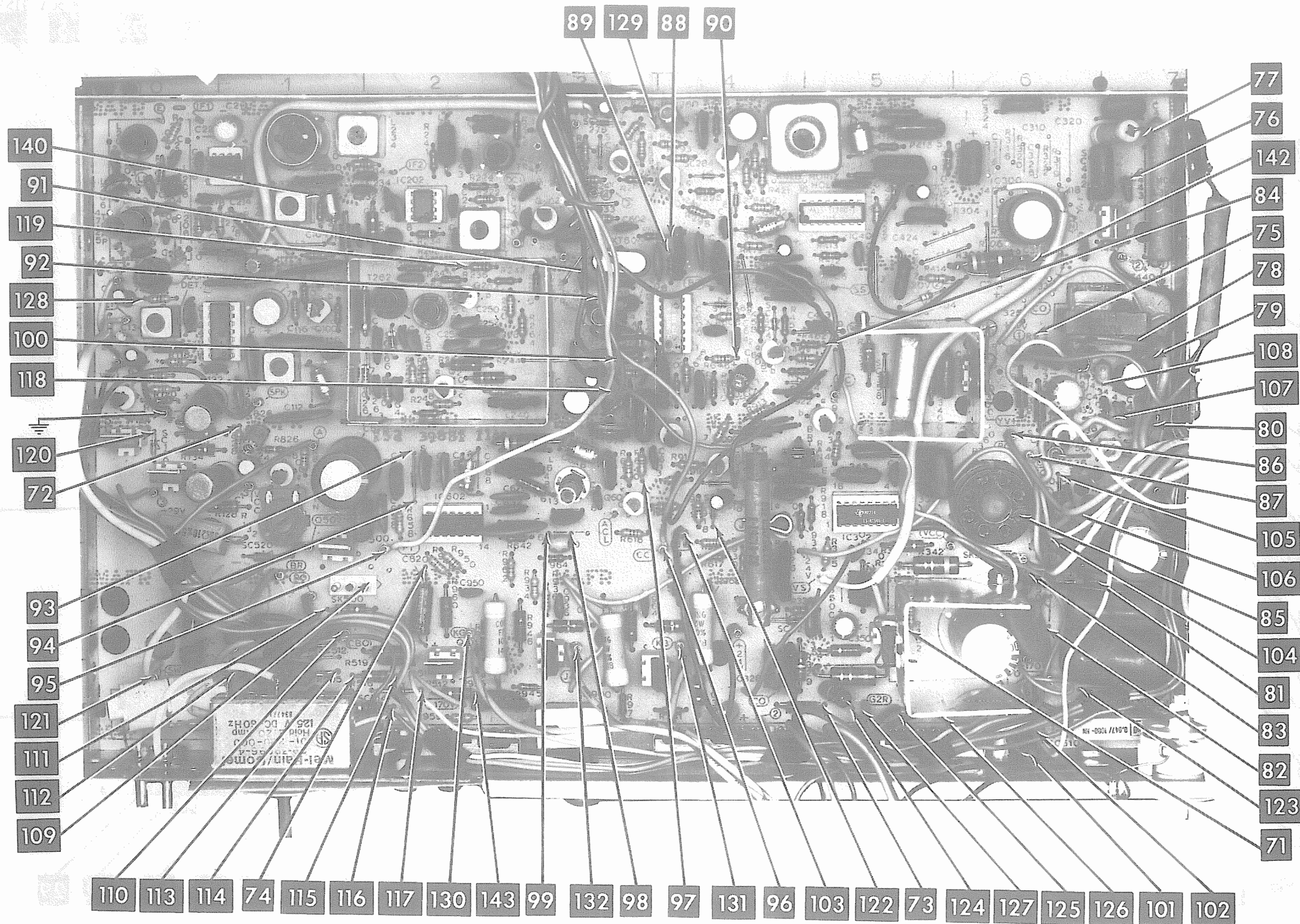


MAIN BOARD

MAIN BOARD

PHILCO
CHASSIS E21-19/20-22

FOLDER 2



MAIN BOARD

A Howard W. Sams CIRCUITRACE® Photo

MAIN BOARD

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer, or observe polarity, and maintain line voltage at 120VAC. Allow a 20-minute warm-up period for receiver and test equipment.

Suggested Alignment Tools:
L202, L207, L230, L234, L242, T256, T262,
VHF Tuner IF Output Coil..... 9296, 9297, 9300
L124, L206, L244, T100, T220..... 9440

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.

Note: Response may vary slightly from that shown.
Connect a + 10 volt bias to test point AGC.
Connect a short jumper from DC1 to DC2.
Move Service Switch to Service position.

VIDEO IF ALIGNMENT

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To test point VD	To mixer base test point on VHF tuner.	44MHz (10MHz Sweep)	39.75MHz 41.25MHz 47.25MHz	Adjust L207 for MINIMUM. Adjust L230 for MINIMUM. Adjust L206 for MINIMUM. See Figure 1.
"	"	"	39.75MHz 41.25MHz 42.17MHz 44.00MHz 45.75MHz 47.25MHz	Adjust L202, T220, L234 and tuner IF Output Coil for maximum gain and symmetry of response. If necessary adjust L200 by spreading or compressing coil. L202 affects 44.00MHz. T220 and L234 affect 42.17MHz. Tuner IF Output Coil affects overall response. Disconnect jumper from DC1 to DC2 and adjust L242. L242 affects 44.00 and 45.75MHz. See Figure 2.

4.5MHz TRAP ALIGNMENT

Tune in a strong TV signal and set the contrast at maximum. Adjust the fine tuning until a beat pattern is visible on the screen. Adjust L244 for MINIMUM beat interference.

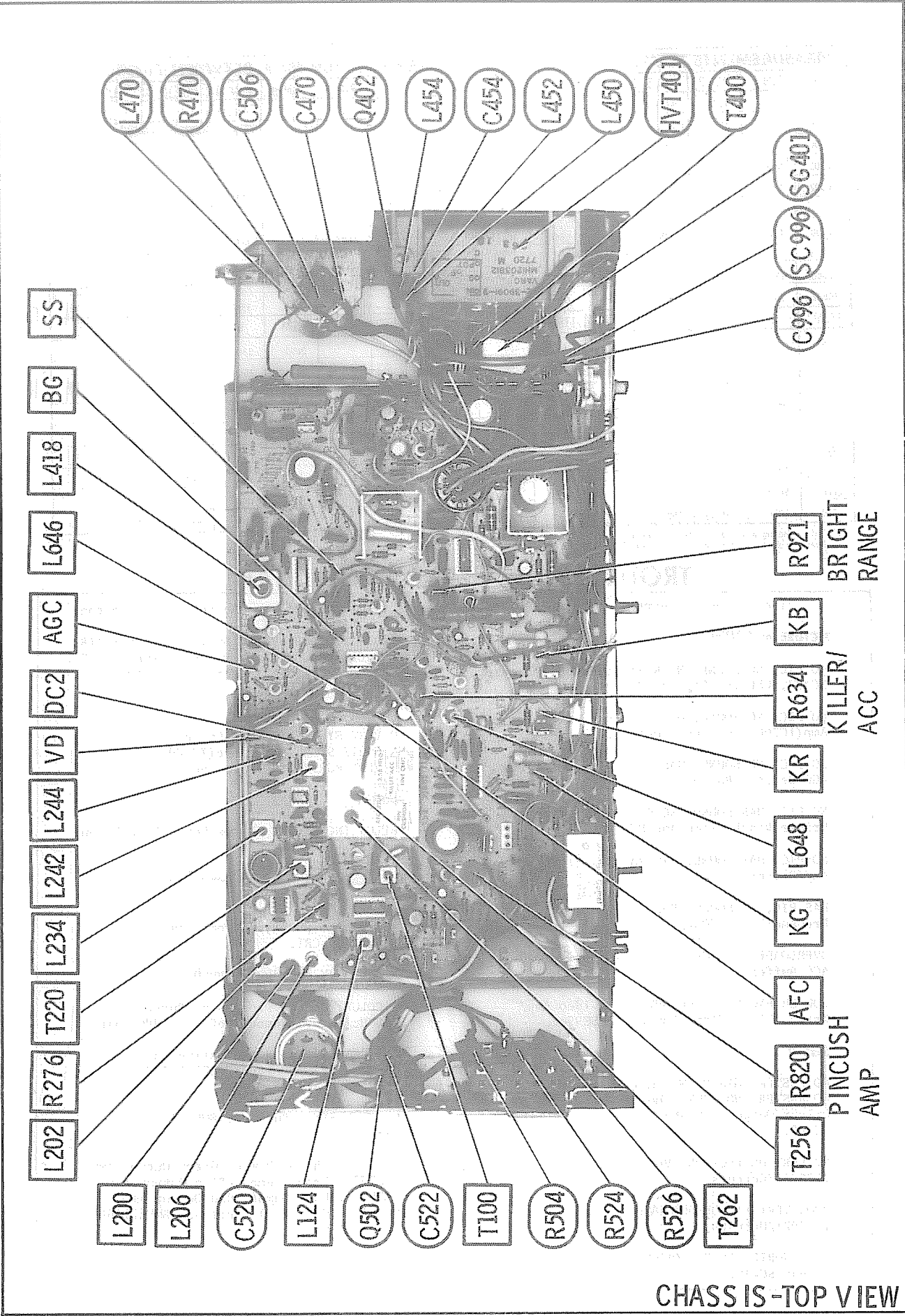
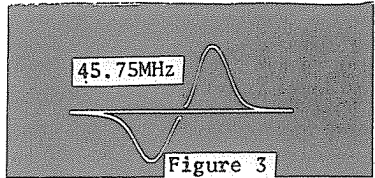
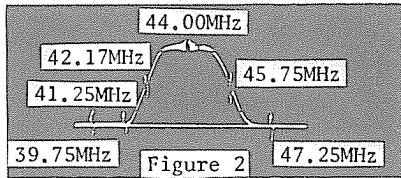
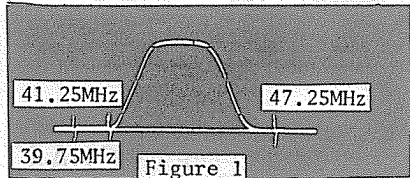
SOUND IF ALIGNMENT

Tune in a station and adjust T100 for maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting L124.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.
Disconnect jumper from DC1 to DC2.
Set AFC Switch to off position.

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To AFC test point.	To mixer base test point on VHF Tuner.	44.00MHz (10MHz Sweep)	45.75MHz	Adjust T256 for maximum gain and symmetry of response. See Figure 3.
"	"	"	"	Adjust T262 to place 45.75MHz marker. See Figure 3.



CHASSIS E21-19/20/22

PHILCO

FOLDER 2

SAFETY PRECAUTIONS

IMPORTANT:

THE PRIMARY SOURCE OF X-RADIATION IN A COLOR TELEVISION RECEIVER IS THE PICTURE TUBE. THE X-RADIATION EXPOSURE IS DEPENDENT UPON THE SETTING OF THE HIGH VOLTAGE WHICH IS GOVERNED BY THE SETTING OF R514 (+112V ADJUST CONTROL, +115V ADJUST CONTROL -22,-23 CH. ONLY).

TO PROTECT AGAINST POSSIBLE X-RADIATION:

1. ACCURATELY ADJUST R514 FOR +112V (+115V -22, -23 CH. ONLY) AT EMITTER OF Q502.
2. DO NOT DISPLACE THE DEFLECTION YOKE.

WARNING

CHASSIS CONNECTED TO ONE SIDE OF AC LINE, USE ISOLATION TRANSFORMER WHEN APPLYING POWER TO EXPOSED CHASSIS.

PRODUCT SAFETY GUIDELINES FOR ALL PRODUCTS

CAUTION: Do NOT modify any circuit. Service work should be performed only after you are thoroughly familiar with all of the following safety checks. Risk of potential hazards and injury to the user increases if safety checks are not adhered to.

- SAFETY CHECKS

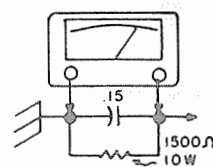
SUBJECT: Fire & Shock Hazard

1. Be sure that all components are positioned in such a way to avoid possibility of shorts to adjacent components. This is especially important on those chassis which are transported to and from the repair shop.
2. Always replace all protective devices such as insulators and barriers after working on a set.
3. Check for damaged insulation on wires including the AC cord.
4. Check across-the-line components for damage and replace if necessary.
5. After re-assembly of the set, always perform an AC leakage test on the exposed metallic parts of the cabinet such as the knobs, antenna terminals, etc. to be sure the set is safe to operate without danger of electrical shock. Do not use a line isolation transformer during this test. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner:
Connect a 1500 ohm 10 watt resistor, paralleled by

.15MFD AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination 1500 ohm resistor and .15MFD capacitor. Reverse the AC plug on the set and repeat AC voltage measurements again for each exposed metallic part. Voltage measured must not exceed .3 volts R.M.S. This corresponds to 0.2 milliamp AC.

Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

AC VOLTMETER



good earth ground
such as the water
pipe, conduit, etc.

place this probe
on each exposed
metallic part

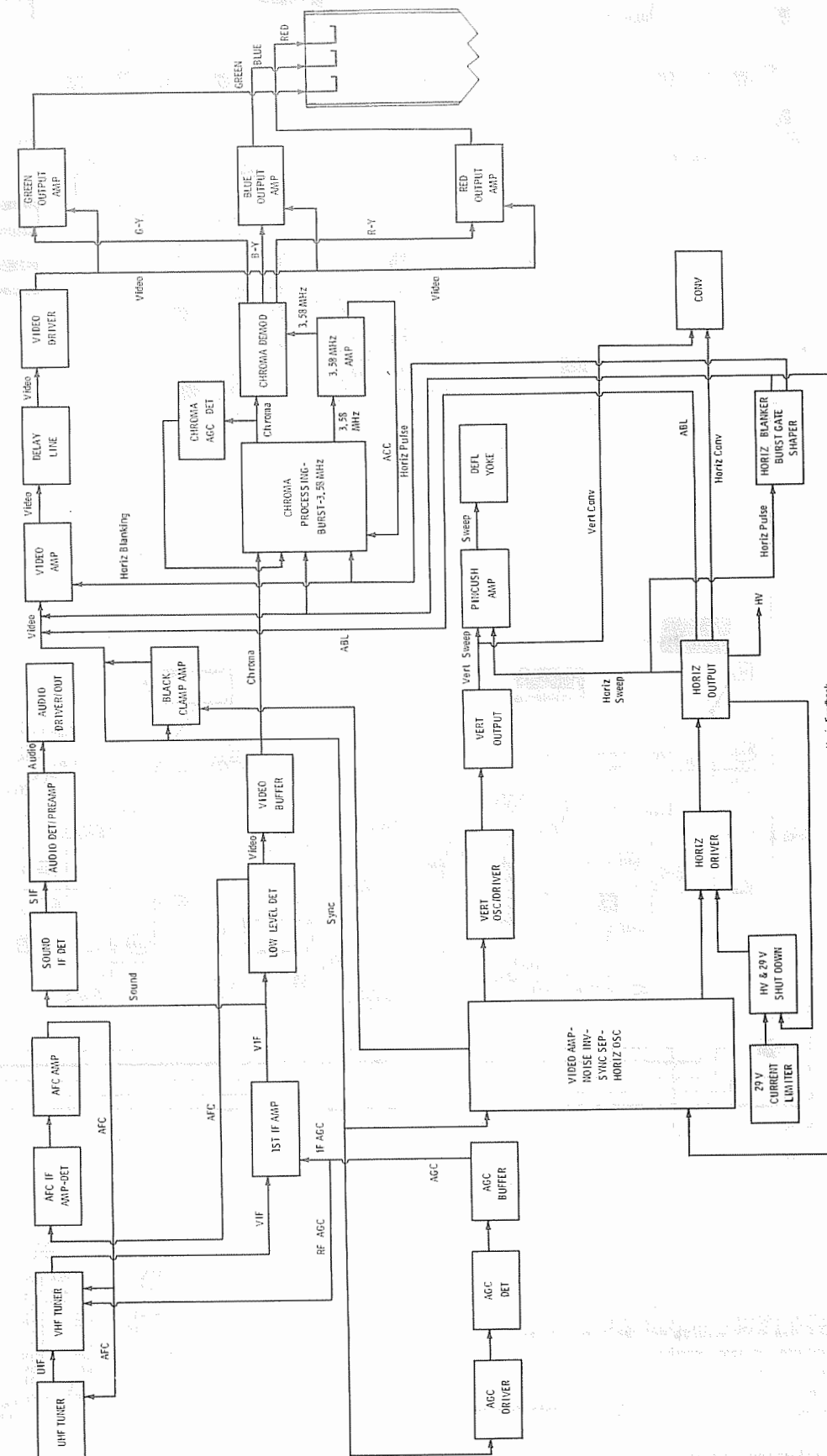
SERVICE INFORMATION

Side pincushion correction is accomplished by modulating the +112V B+ (+115V -22,-23 CH. ONLY) at a vertical rate. Do not misinterpret the 10VPP parabola waveshape of +112V B+ (+115V -22,-23 CH. ONLY) as excessive hum, because it is normal for pincushion correction.

The HV and +29V Shut Down SCR (SCR430) and +29V Current Limiter Transistor (Q504) protect the set from fault conditions. However, after a temporary fault the set will return to normal operation, after it has been turned off for one minute. Repeated shut down indicates a B+ Regulator failure or excessive load on the +29V or +24V source.

The B+ Regulator will not regulate if the horizontal circuits are not operating because of insufficient load on the power supply, nor will there be +29V, +24V and +170V source voltages, since they are derived from the flyback.

Courtesy of the Manufacturer



BLOCK DIAGRAM

PHILCO
CHASSIS E21-19/-20/-22

FOLDER 2