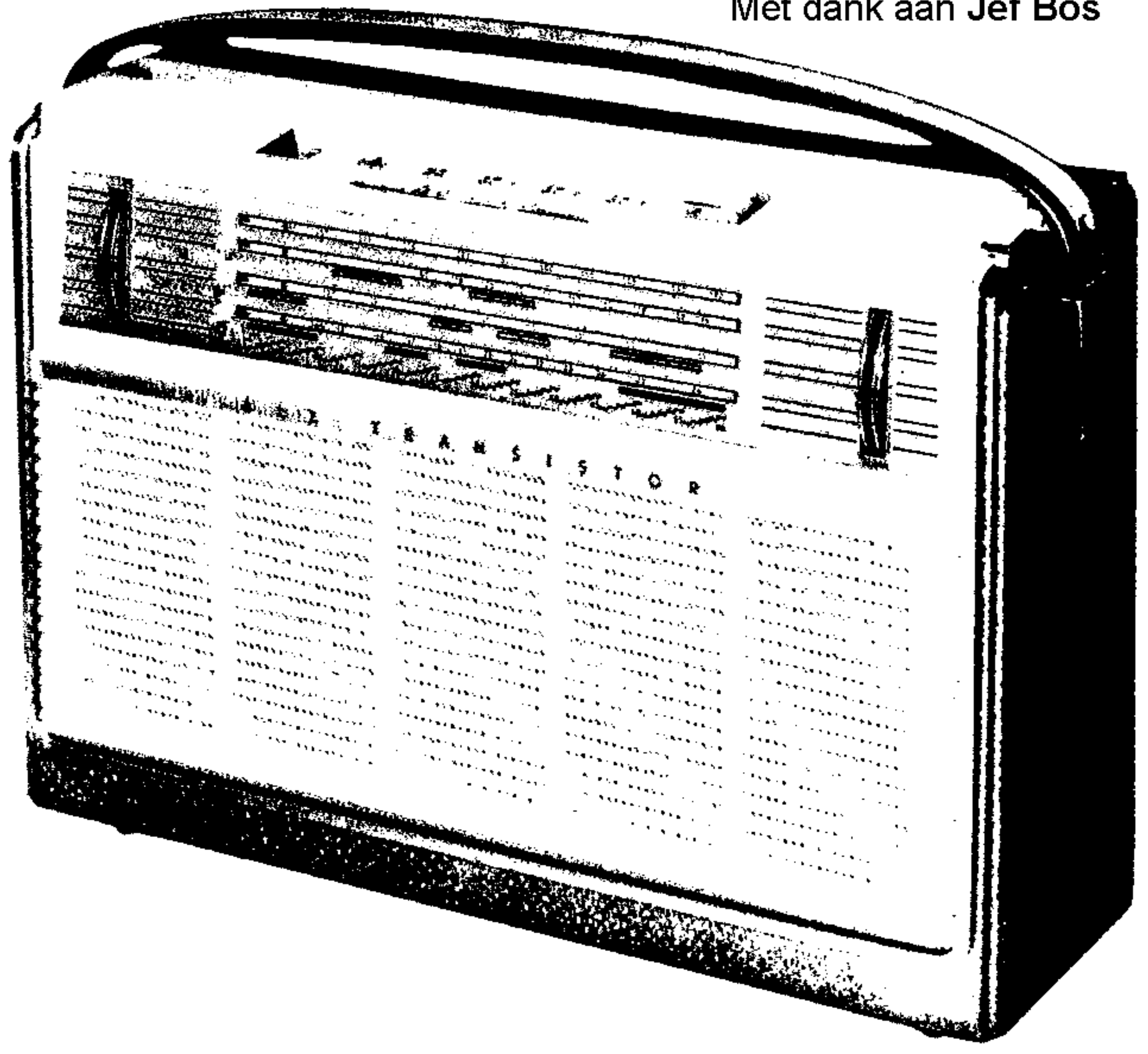


PHOTOFACT® Folder

with CIRCUITRACE®

NORELCO  
MODEL L4X95T

Met dank aan Jef Bos



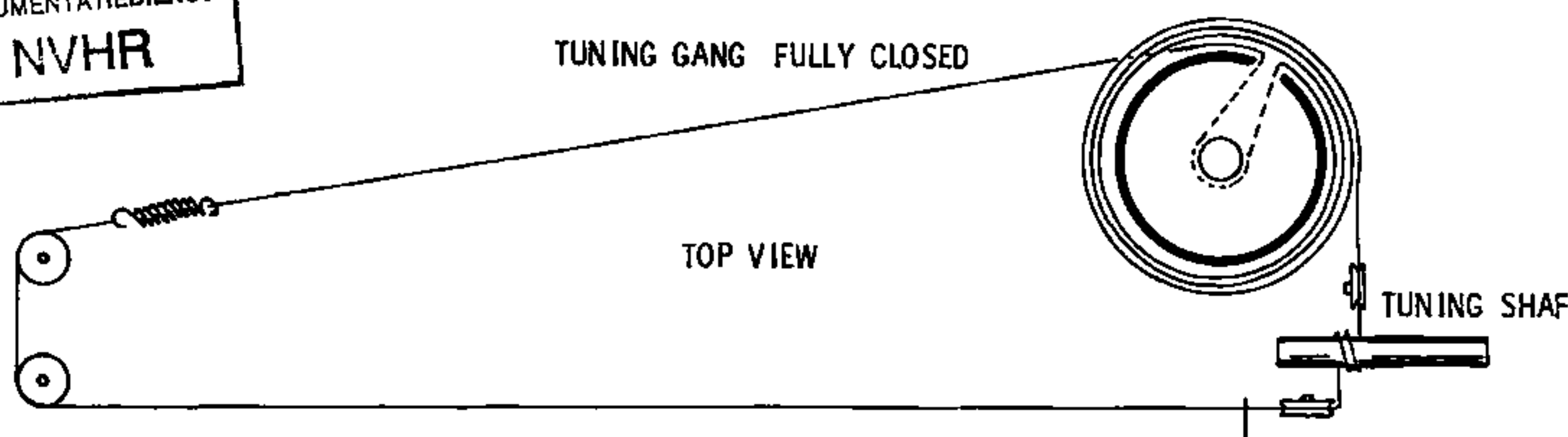
TRADE NAME	Norelco Model L4X95T		
MANUFACTURER	North American Philips Co., Inc., 230 Duffy Ave., Hicksville, N. Y.		
TYPE SET	Battery Operated Transistorized Portable AM Receiver		
POWER SUPPLY	9 Volts DC	RATING	11MA@9 Volts DC (No Signal, Min. Volume) 25MA@9 Volts DC (Signal, Normal Volume)
TUNING RANGES	BROADCAST	517-1622KC	SHORT WAVE 2 4.65 - 9.9MC
	SHORT WAVE 1	11.6 - 22MC	SHORT WAVE 3 1.6 - 3.9MC

I. Ver. v. Historie v/d Radio



## DIAL CORD STRINGING

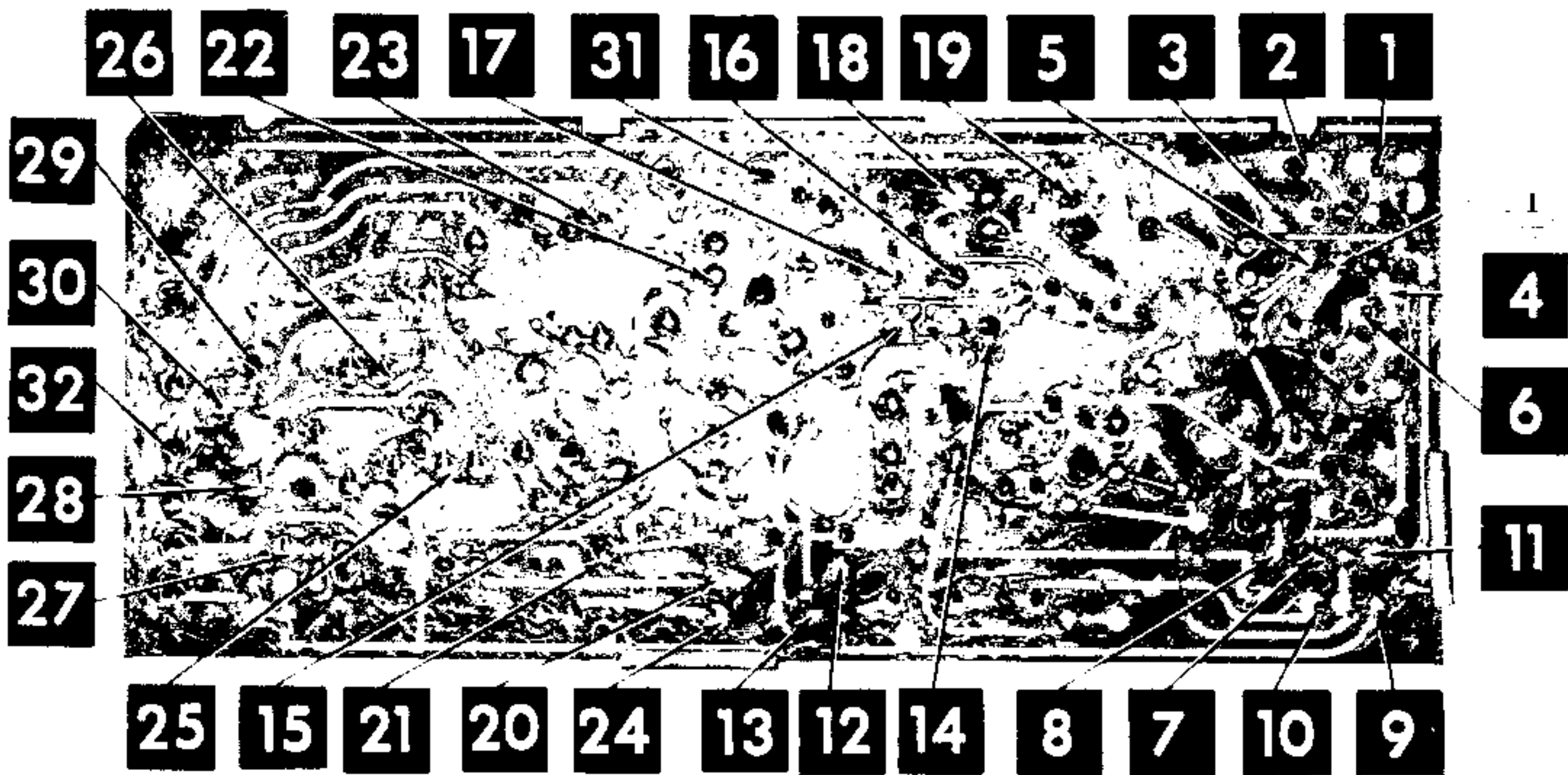
TUNING GANG FULLY CLOSED



**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

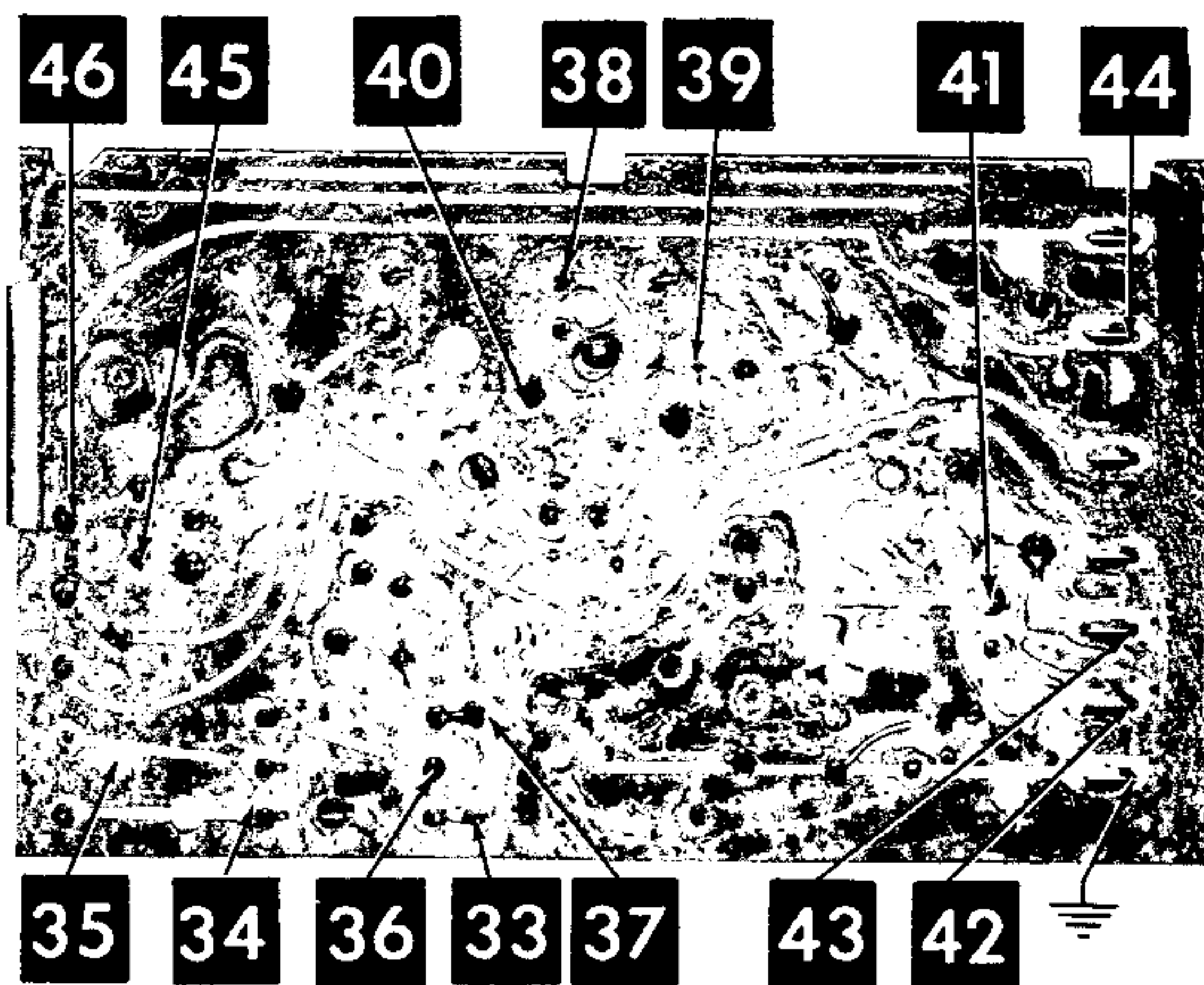
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of KF178

the particular type of replacement part listed. 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. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



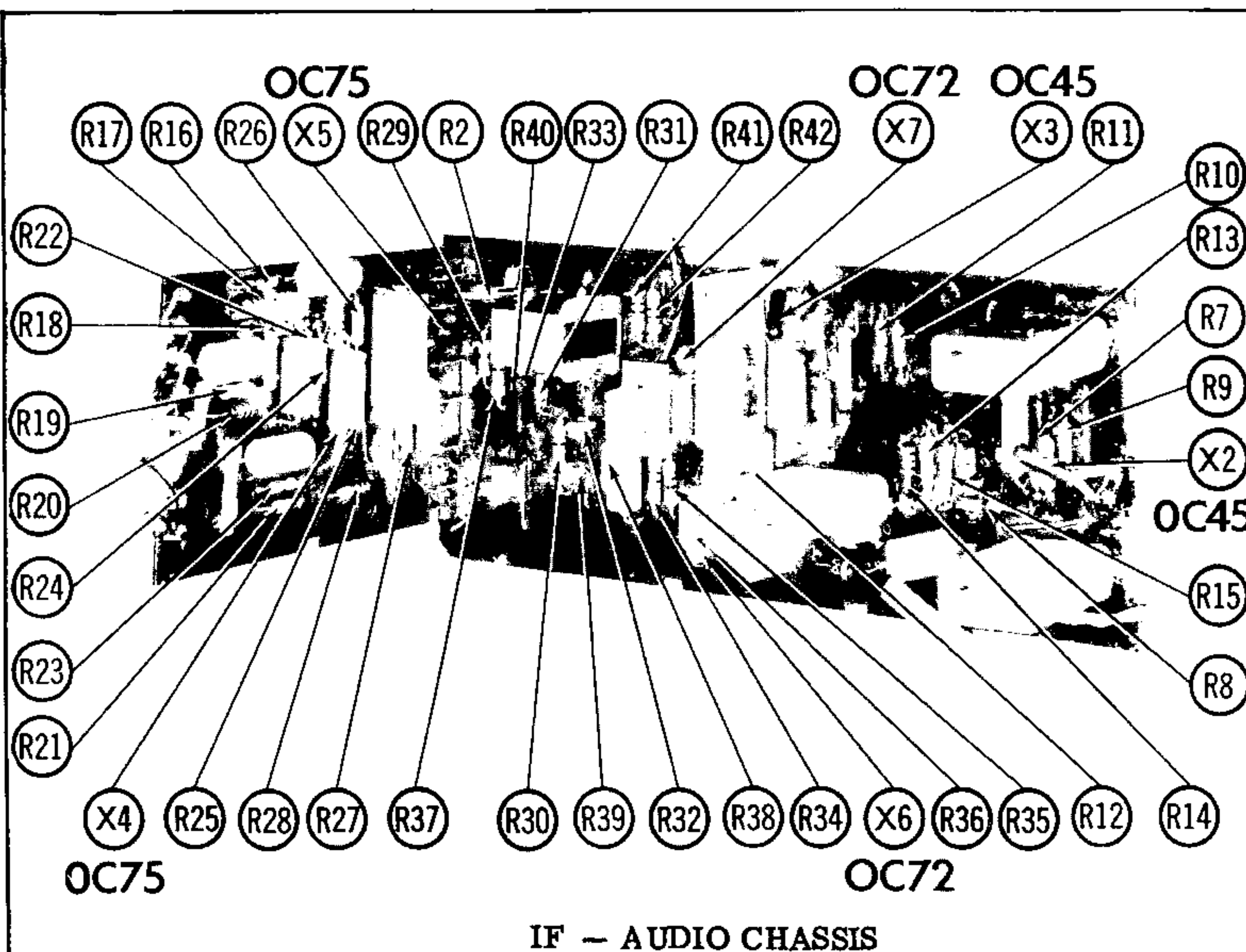
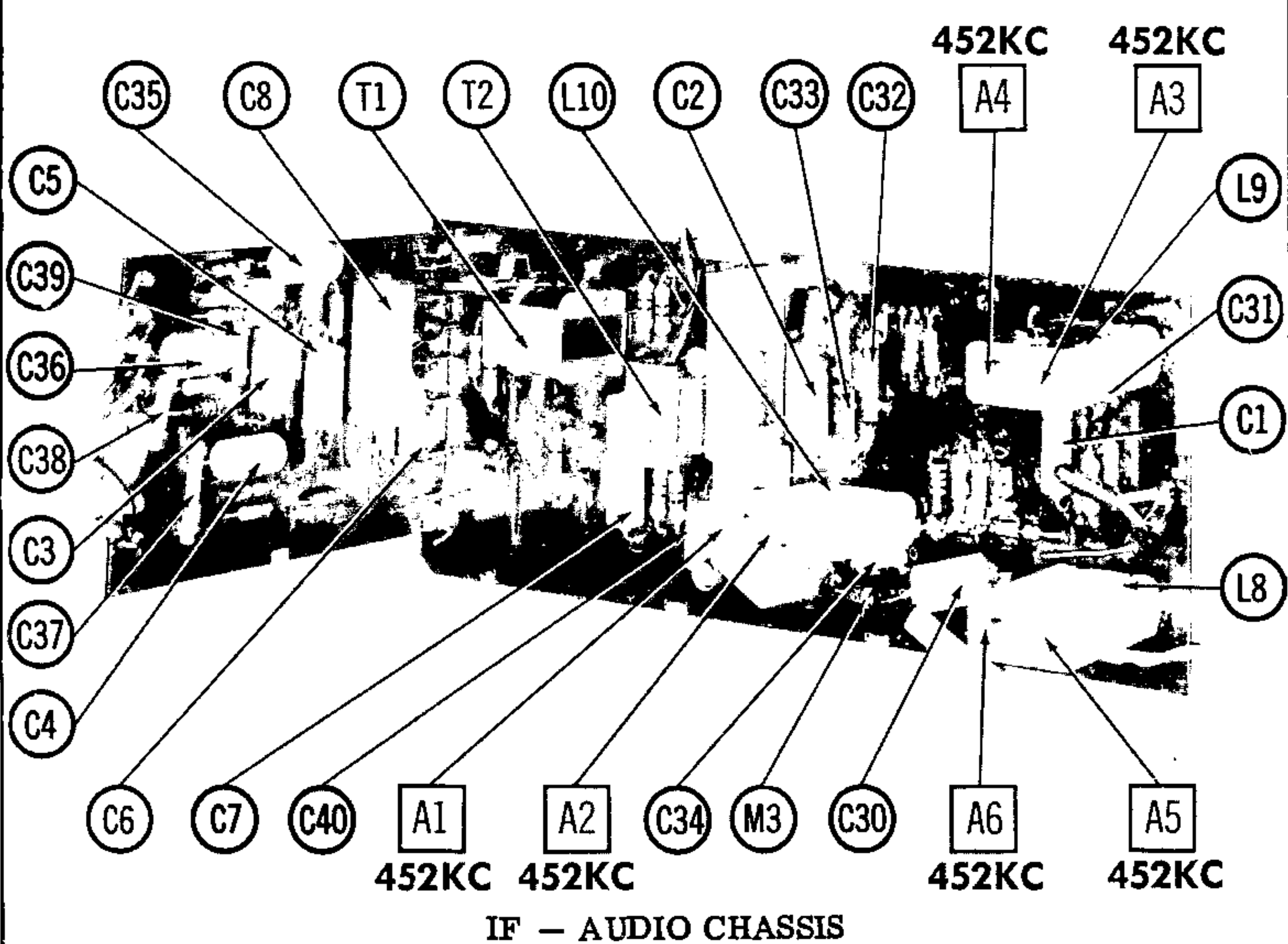
A Howard W. Sams **CIRCUITRACE** Photo

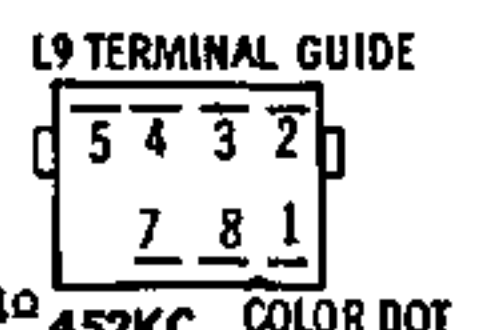
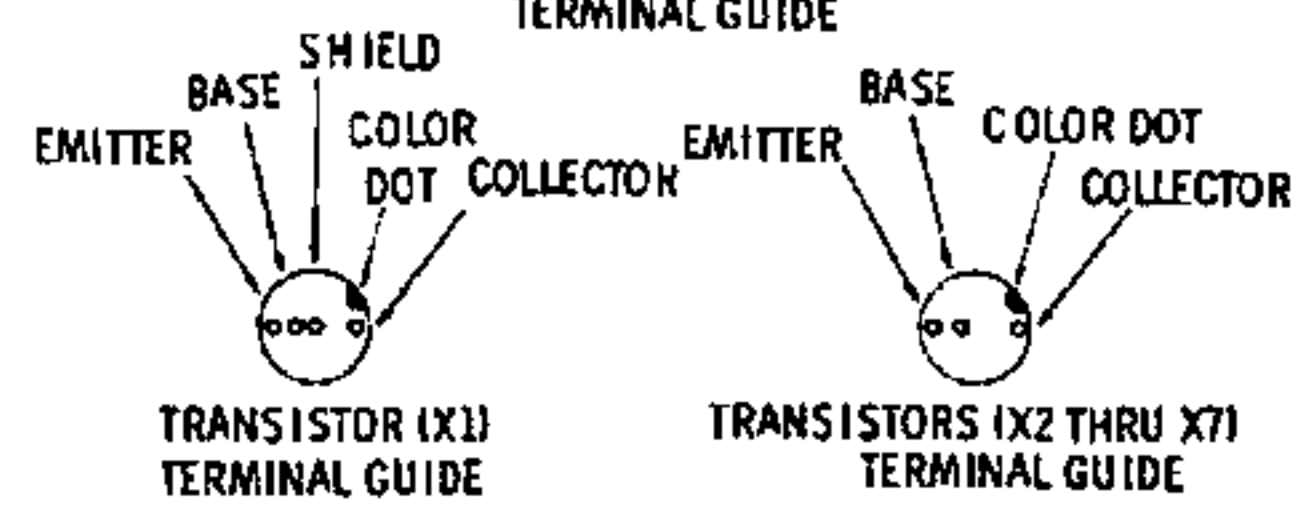
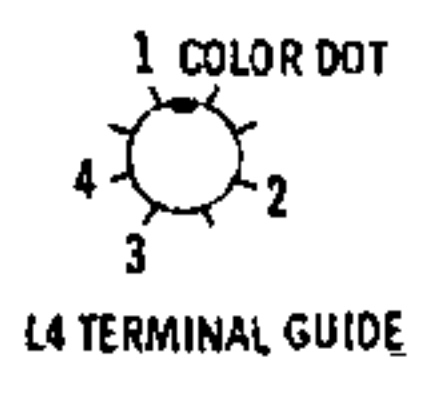
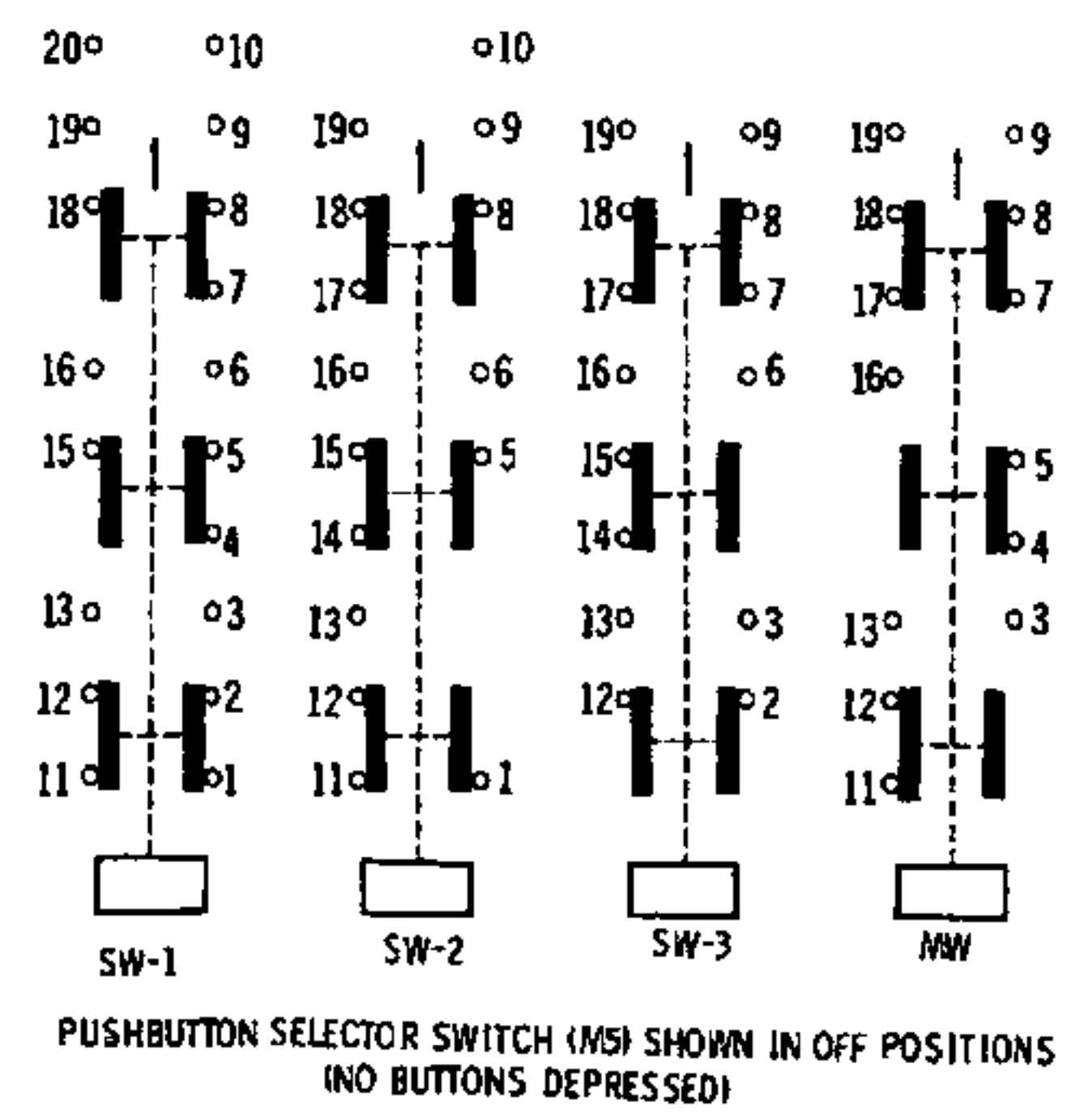
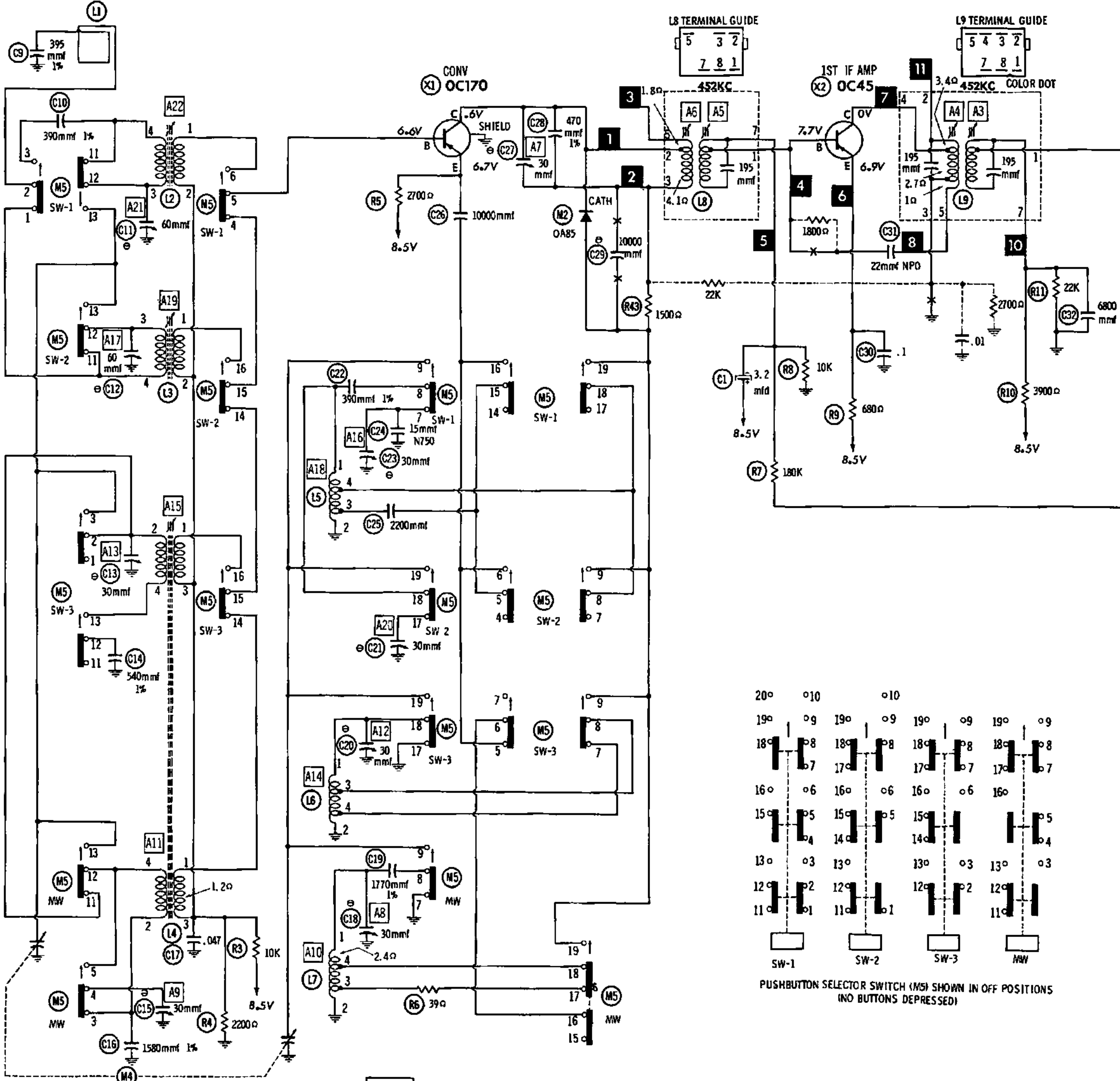
PRINTED BOARD



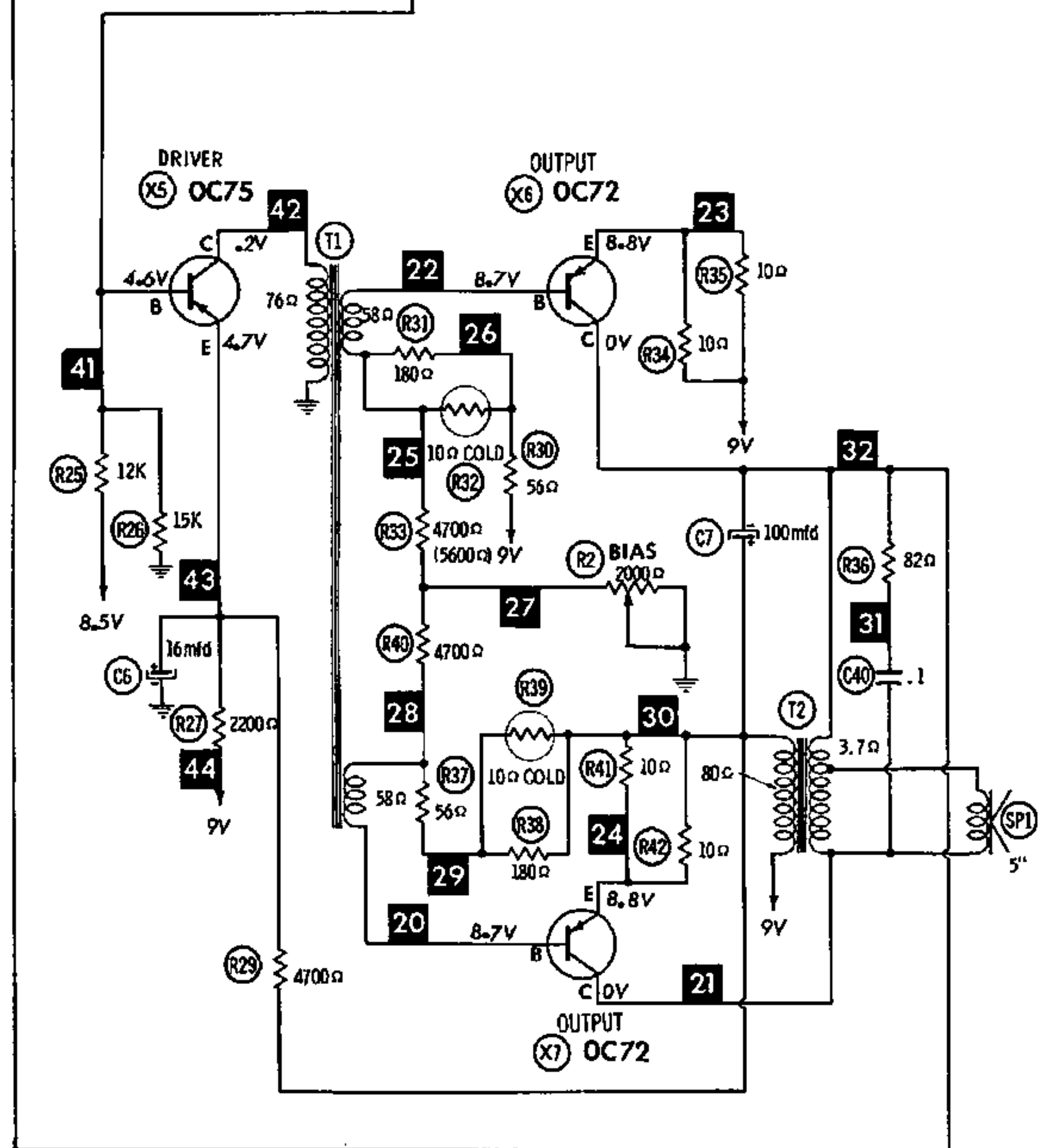
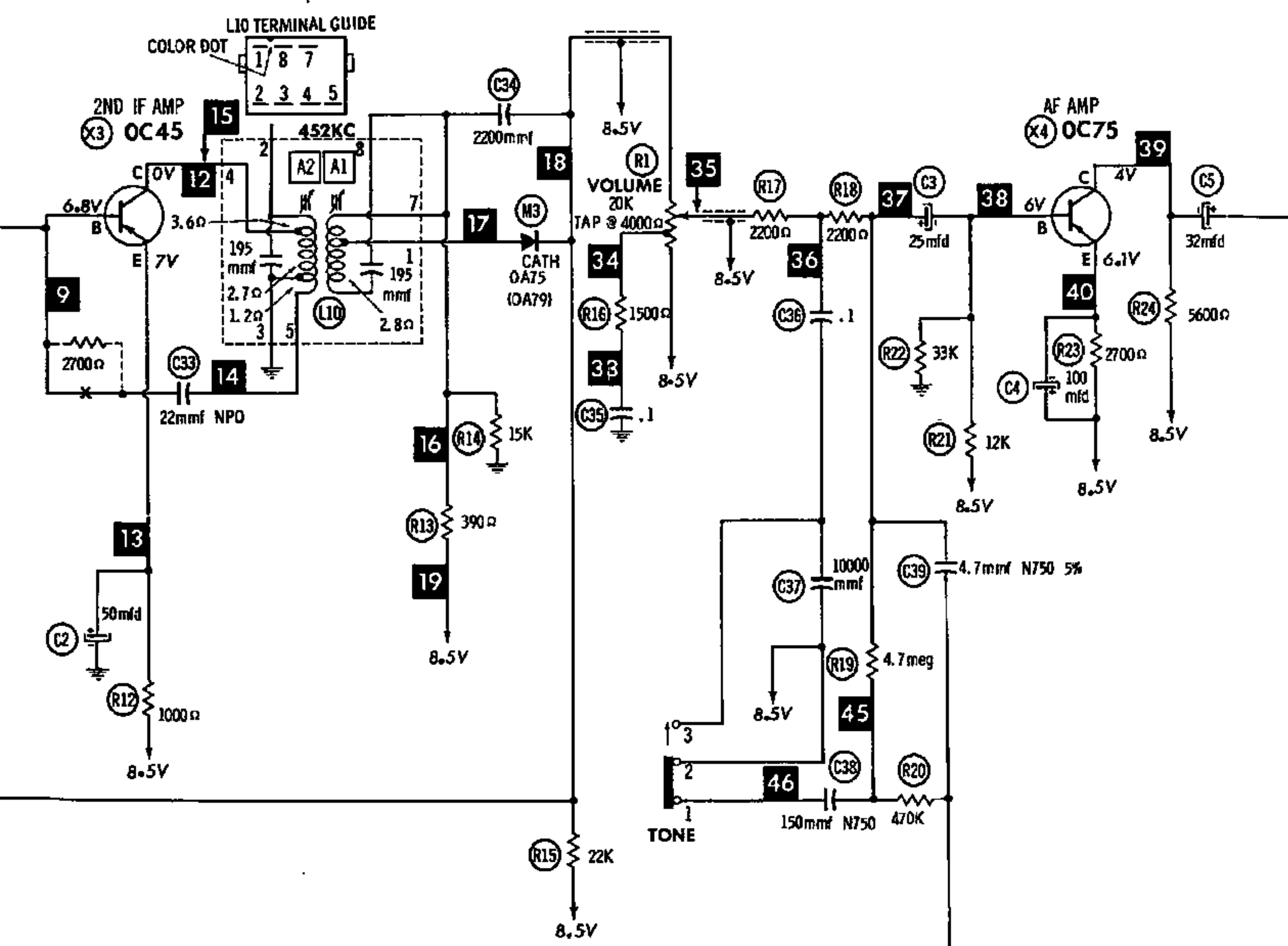
A Howard W. Sams **CIRCUITRACE** Photo

PRINTED BOARD









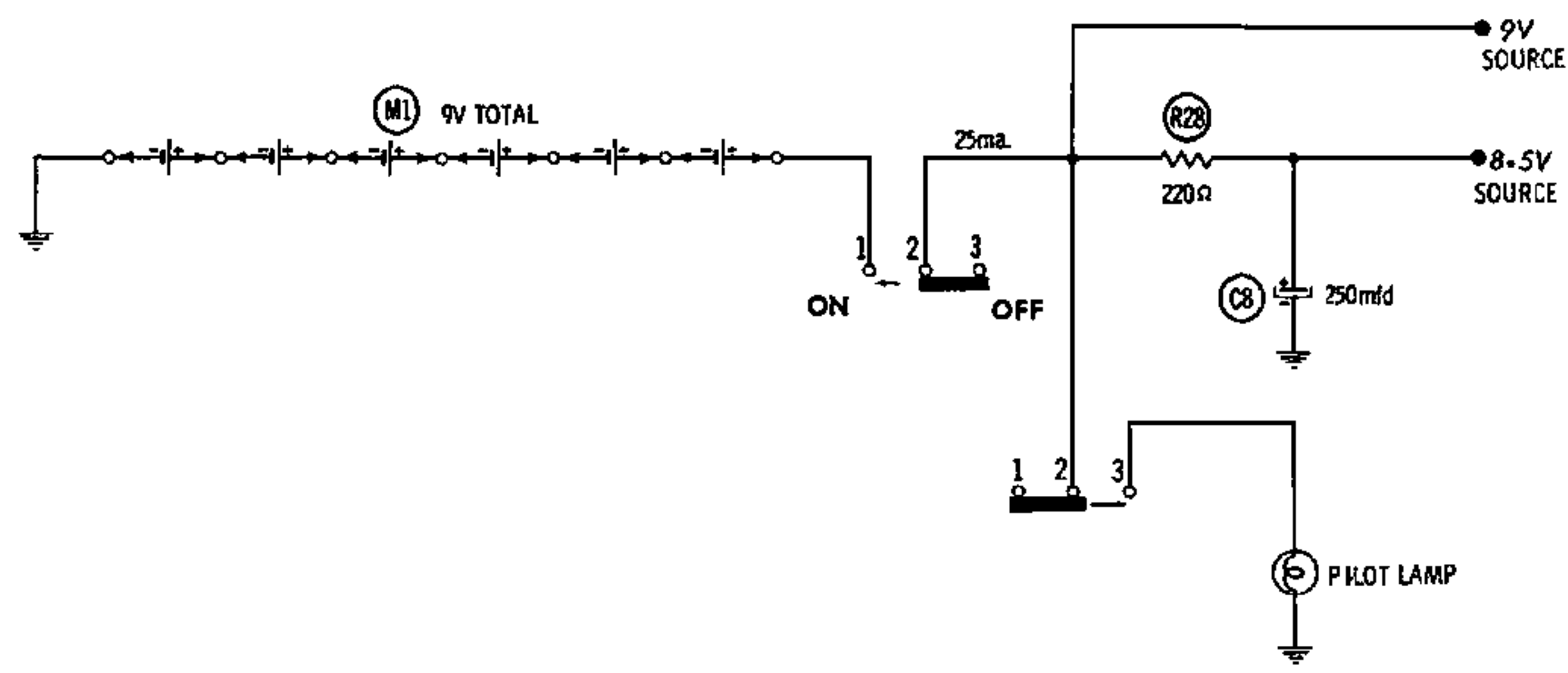
1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of  $\pm 15\%$  in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE



# ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

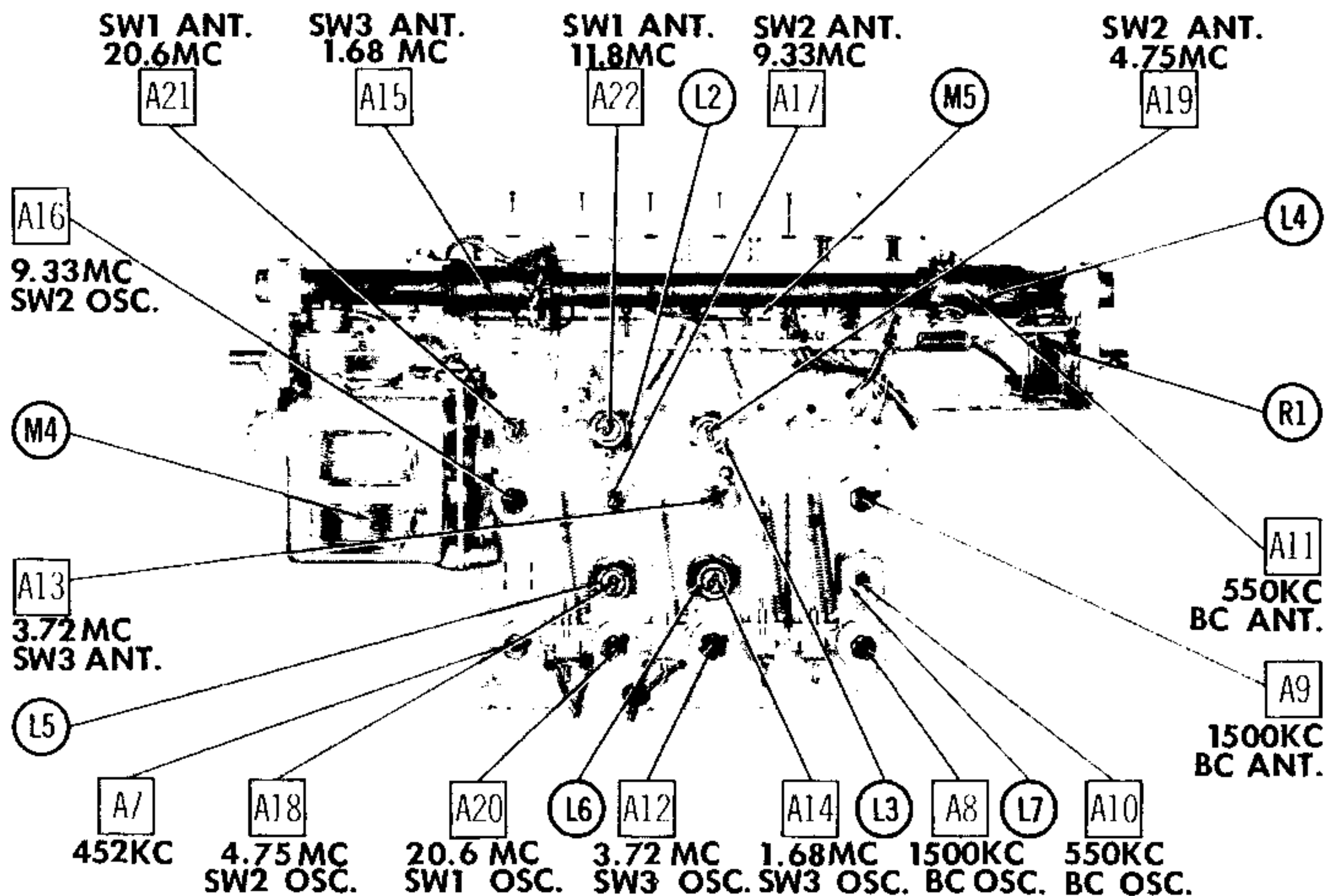
Suggested Alignment Tools: A1 thru A6..... GENERAL CEMENT #8721, 8722  
WALSCO #2519

A10, A11, A14, A15, A18, A19

A22.. GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988,  
8989

WALSCO #2515, 2531, 2532

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	452KC (400v Mod.)	(MW) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4, A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	"	"	"	A7	Adjust for MINIMUM output.
3.	"	1500KC	(MW) 1500KC	"	A8, A9	Adjust for maximum output.
4.	"	550KC	(MW) 550KC	"	A10, A11	"
5.	"	3.72MC	(SW 3) 3.72MC	"	A12, A13	"
6.	"	1.68MC	(SW 3) 1.68MC	"	A14, A15	"
7.	"	9.33MC	(SW 2) 9.33MC	"	A16, A17	"
8.	"	4.75MC	(SW 2) 4.75MC	"	A18, A19	"
9.	"	20.6MC	(SW 1) 20.6MC	"	A20, A21	"
10.	"	11.8MC	(SW 1) 11.8MC	"	A22	Adjust for maximum output. Repeat Steps 3 thru 10.



**RF CHASSIS—TOP VIEW**

# PARTS LIST AND DESCRIPTIONS

## TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	OC170	Converter				PNP
X2	OC45	1st IF Amplifier		2N483	2N410	PNP
X3	OC45	2nd IF Amplifier		2N483	2N410	PNP
X4	OC75	AF Amplifier	2N406	2N362		PNP
X5	OC75	Driver	2N408	2N362		PNP
X6	OC72	Output	2N408	2N632	2N408	PNP
X7	OC72	Output	2N408	2N632	2N408	PNP

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	NORELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	3.2	70		PRS1400	NLW3-100	TT80X4	TD-4-150	TE-1402	
C2	50	12.5		XPP-15050	BBR50-25	TT15X50	ML50-15	TE-1160	
C3	25	25	AC5705/25	PRS1265	BBR25-25	TT25X25	ML30-15	TE-1207	
C4	100	3	AC5710/100	XPP-3100	NLW100-6	TT8X100	ML100-3	TE-1059.5	
C5	32	18	AC5714/32	PWE25030	BBR25-25	TT50X35	ML30-25	TE-1208	
C6	16	16	AC5703/16	XPP-25015	NLW15-25	TT25X15	ML15-25	TE-1205	
C7	100	12.5		SRE15V100	BBR100-25	TT15X100	ML100-15	TE-1162	
C8	250	12.5		BCD20200	BR2502		TD-250-15	TE-1164	

## FIXED CAPACITORS

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

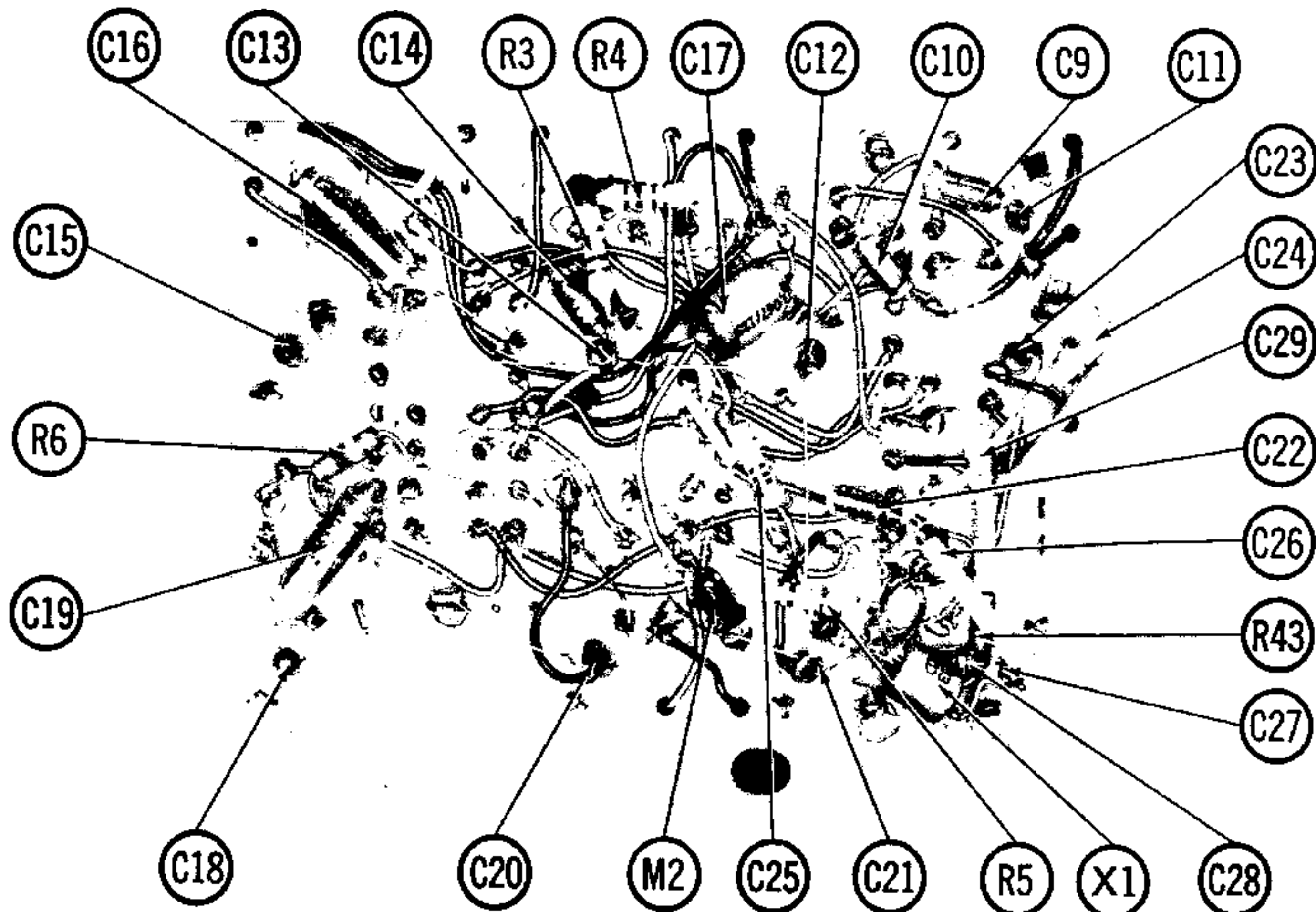
ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C9	395 1%	#B151455						
C10	390 1%	#B151444			5R5T39	VCM-20-391F		
C11	60	Note 1						
C12	60	Note 1						
C13	30	Note 1						
C14	540 1%	#B151456						
C15	30	Note 1						
C16	1580 1%	#B151457						
C17	.047 125V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C18	30	Note 1						
C19	1770 1%	#B151458						
C20	30	Note 1						
C21	30	Note 1						
C22	390 1%	#B151444			5R5T39	VCM-20-391F		
C23	30	Note 1						
C24	15 N750		N750-SI 15	TCN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C25	2200		SI 2200	D6-222	BYA10D22	CCD-222	B-222	5HK-D22
C26	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10
C27	30	Note 1						
C28	470 1%	#B151423			5R5T47	VCM-20-471F	MCE244	
C29	10000	Note 2	SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10
C30	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C31	22 NPO		NPO-SI 22	DTZ-22	C10Q22C	CCTO-221	CNO-422	10TCC-Q22
C32	6800		SI 6800	D6-682	BYA10D68	CCD-682	B-268	5HK-D68
C33	22 NPO		NPO-SI 22	DTZ-22	C10Q22C	CCTO-220	CNO-422	10TCC-Q22
C34	2200		SI 2200	D6-222	BYA10D22	CCD-222	B-222	5HK-D22
C35	.1 125V		P288N-1	DF-104	CUB2P1	2DP-4-104	GEM-201	2TM-P10
C36	.1 125V		P288N-1	DF-104	CUB2P1	2DP-4-104	GEM-201	2TM-P10
C37	10000		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10
C38	150 N750		N750-SI 150	TCN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C39	4.7 N750 5%		N750-SI 4.7	TCN-5	C10V47U	CCTN-4R7	CN7-547	10TCU-V47
C40	.1 125V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10

Note 1. Nominal Value.

Note 2. Not used in some versions.

# Norelco Part Number.

**RF CHASSIS—BOTTOM VIEW**



**OC170**



# PARTS LIST AND DES

## CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NORELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	20K	$\frac{1}{2}$	E098AG/					Volume
R2	4000 $\Omega$ Tap 2000 $\Omega$	$\frac{1}{2}$	00B25 B115454					Bias

## RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R3	10K		R17	2200 $\Omega$		R31	180 $\Omega$	
R4	2200 $\Omega$		R18	2200 $\Omega$		R32	10 $\Omega$ Cold	Pl. #B832001A/ 130E
R5	2700 $\Omega$		R19	4.7meg		R33	4700 $\Omega$	(5600 $\Omega$ ) *
R6	39 $\Omega$		R20	470K		R34	10 $\Omega$	
R7	180K		R21	12K		R35	10 $\Omega$	
R8	10K		R22	33K		R36	82 $\Omega$	
R9	680 $\Omega$		R23	2700 $\Omega$		R37	56 $\Omega$	
R10	3900 $\Omega$		R24	5600 $\Omega$		R38	180 $\Omega$	
R11	22K		R25	12K		R39	10 $\Omega$ Cold	Pt. #B83201A/ 130E
R12	1000 $\Omega$		R26	15K		R40	4700 $\Omega$	
R13	390 $\Omega$		R27	2200 $\Omega$		R41	10 $\Omega$	
R14	15K		R28	220 $\Omega$		R42	10 $\Omega$	
R15	22K		R29	4700 $\Omega$		R43	1500 $\Omega$	
R16	1500 $\Omega$		R30	56 $\Omega$				

\* Alternate Value.

## COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		NORELCO PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Stancor PART No.	
L1	Sw. 1 & Sw. 2 Loop Ant.						
L2	Sw. 1 Ant. Trans.	A380489					
L3	Sw. 2 Ant. Trans.	A380490					
L4A	Sw. 3 Loopstick	A380486					
B	BC Loopstick						
L5	Sw. 1 & Sw. 2 Osc. Coil	A380491					
L6	Sw. 3 Osc. Coil	A380492					
L7	BC Osc. Coil	A312932					
L8	1st IF Trans.	A312935					
L9	2nd IF Trans.	A312934					
L10	3rd IF Trans.	A312933					

## TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	NORELCO PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.6	1	A316211					
		SEC. 2						
		1						

## TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES	
	PRI.	SEC.	NORELCO PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.		Triad PART No.
T2	350 $\Omega$	120 $\Omega$ Tap @ 65 $\Omega$	A315411						

# DESCRIPTIONS (Continued)

## SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	NORELCO PART No.	QUAM PART No.	
SP1	5"	PM	65.0Ω	AD8500KWZ		

## BATTERIES

ITEM No.	VOLTAGE	NORELCO PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			230 *		A100 *		M-13R *	* 6 Required

## CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		NORELCO PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2 M3	OA85 OA75 *				Overload & AVC (Pigtail) Detector (Pigtail)

\* Alternate Type OA79.

## MISCELLANEOUS

ITEM No.	PART NAME	NORELCO PART No.	NOTES
M4 M5	Tuning Cap. Switch Assembly		2 Gang (Ant. 8-533mmf, Osc. 7-181mmf) Function & Tone (Pushbutton Type)

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial	A395574	"S"
Dial	A395576	"O. S. "
Dial	A395589	"CAN"
Knob	P407740/417	Tuning, Volume
Pushbutton	A366658	Battery Switch
Pushbutton	P542022/139	Dial Light, Tone, MW-OM, SW-OC3, SW-OC2, SW-OC1
Cabinet	A300728	Brown Leatherette
Front	A375634	Cabinet, Cream, Plastic
Handle	A335876	Cabinet
Knob	A351053	Handle

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors  
8524 (Stranded) Available in Ten Colors