

PHOTOFACT® Folder

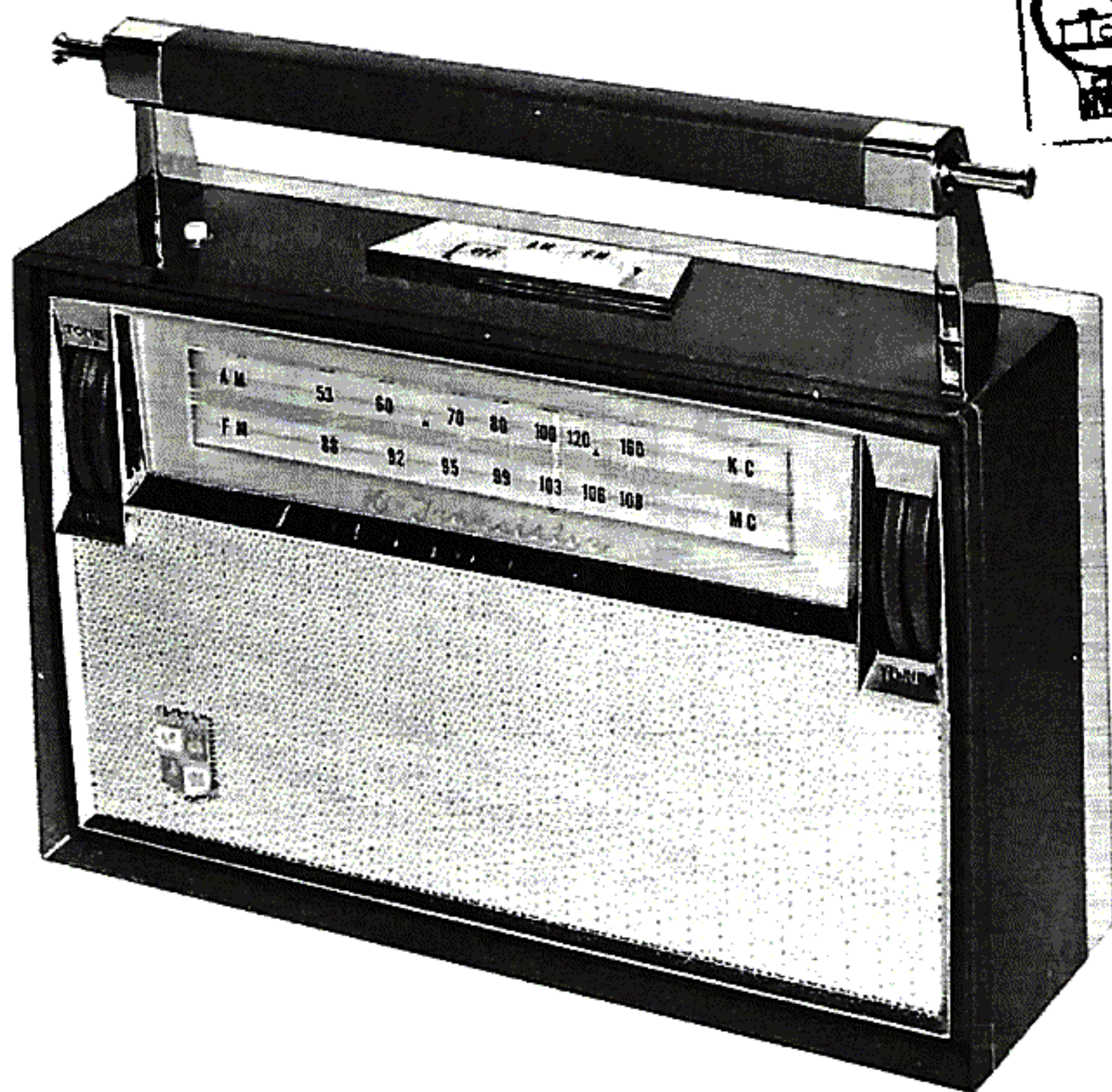
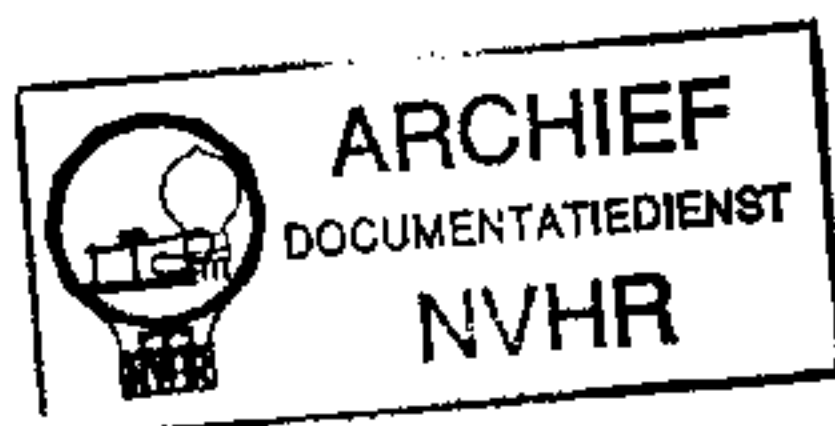
with **CIRCUITRACE**

MAGNAVOX MODEL FM-90



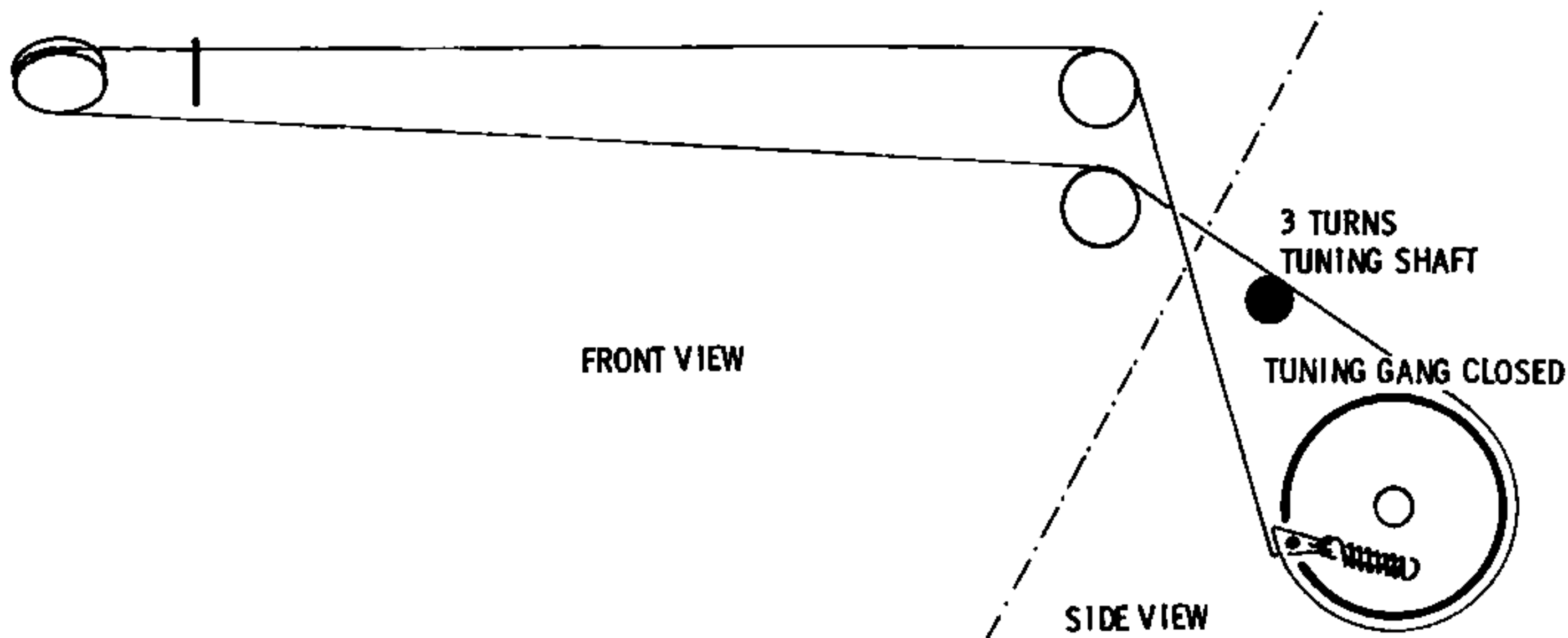
Ned. Ver. v. Historie v/d Radio

Met dank aan Jef Bos



TRADE NAME	Magnavox Model FM-90		
MANUFACTURER	The Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana		
TYPE SET	Battery Operated 10 Transistor Portable AM-FM Receiver		
POWER SUPPLY	9 Volts DC	RATING	12 MA @ 9 Volts DC (No Signal, Min. Volume) 16 MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE--BROADCAST	535 - 1605KC		

DIAL CORD STRINGING

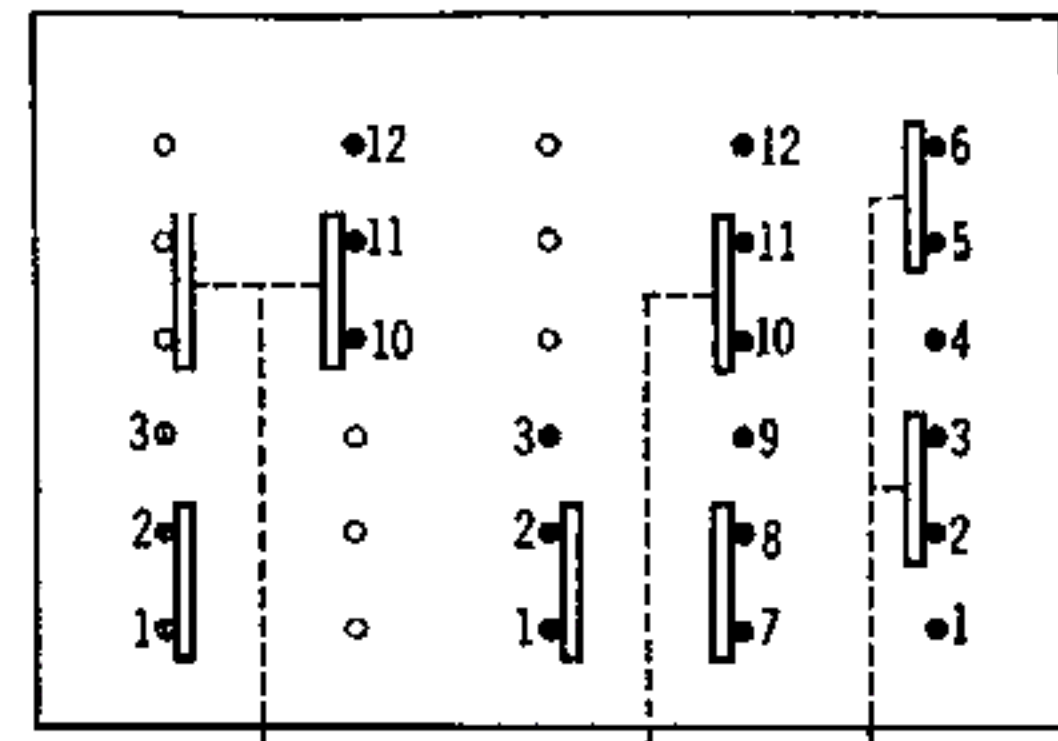
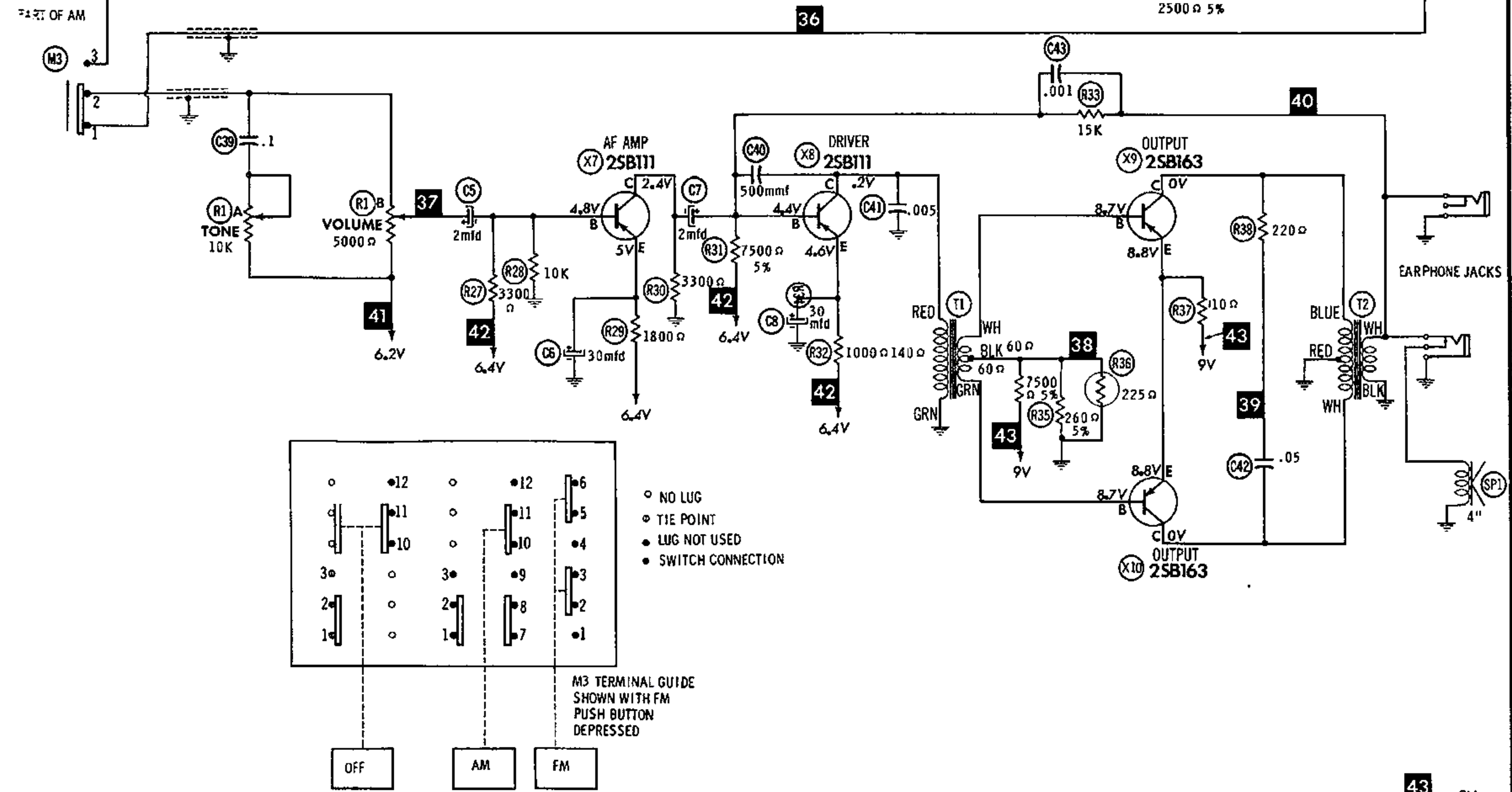
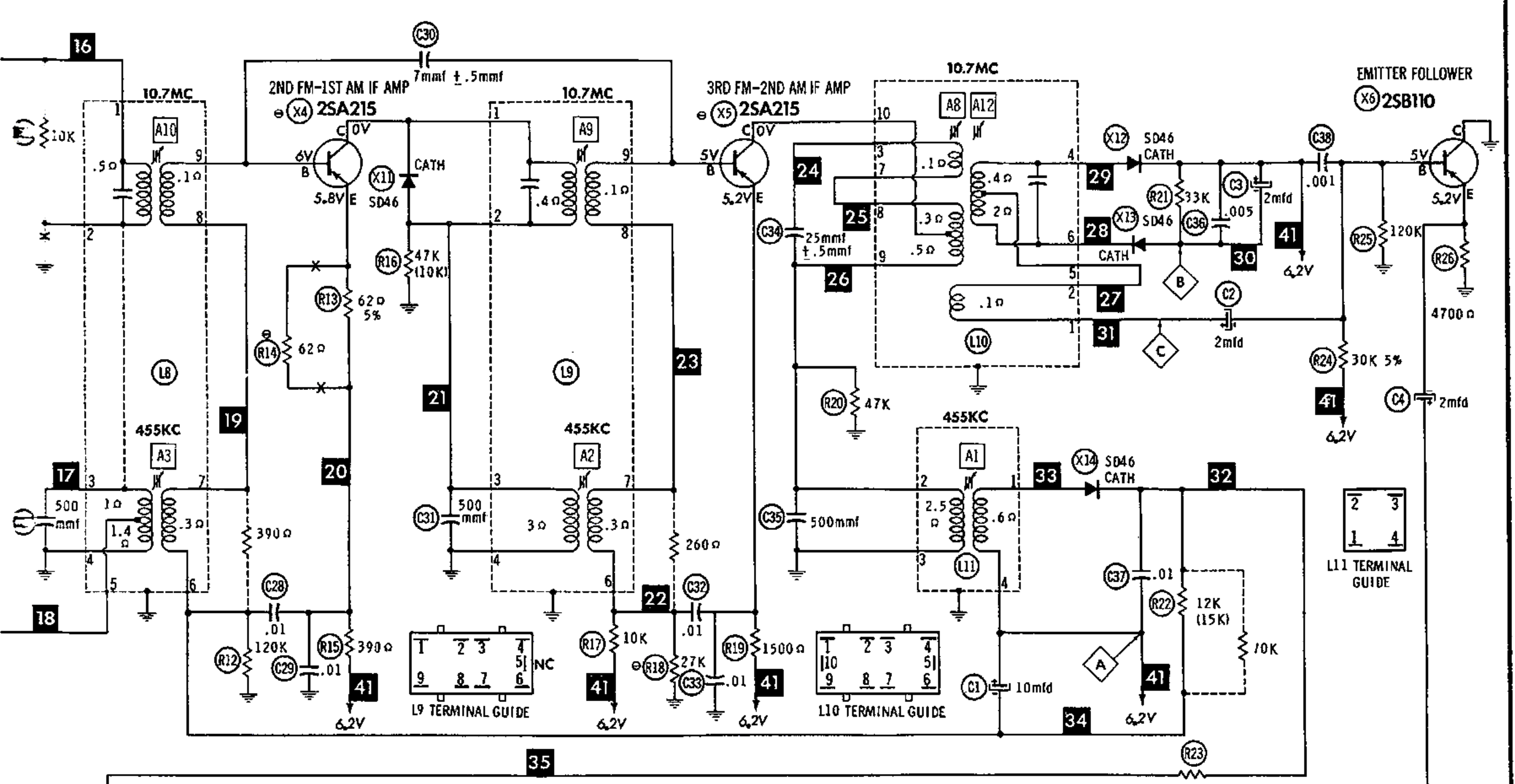


HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

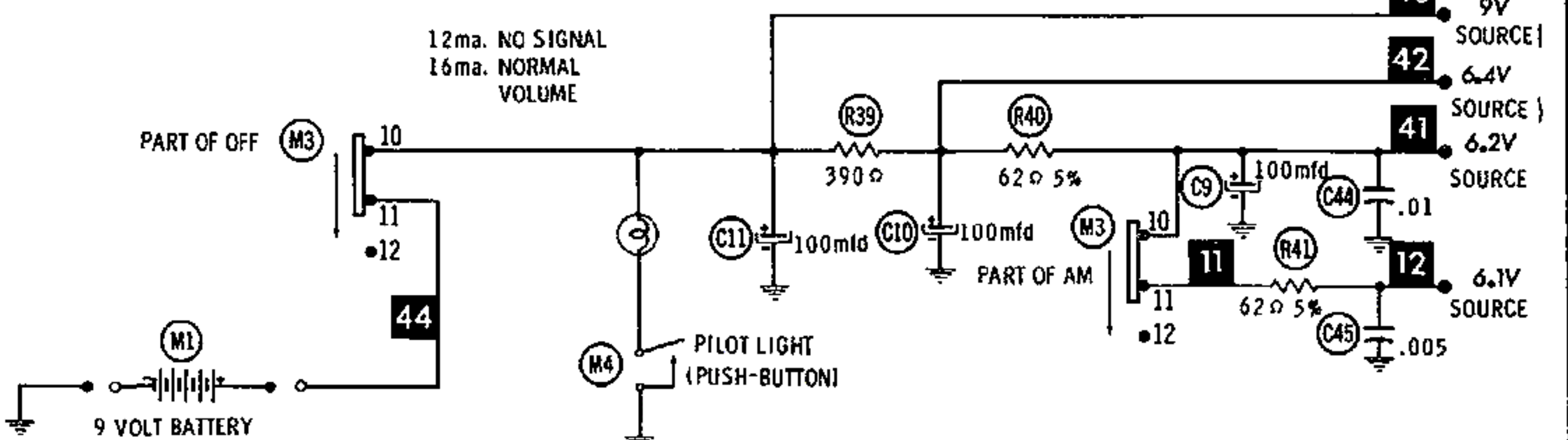


The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of LK492

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- NO LUG
- TIE POINT
- LUG NOT USED
- SWITCH CONNECTION

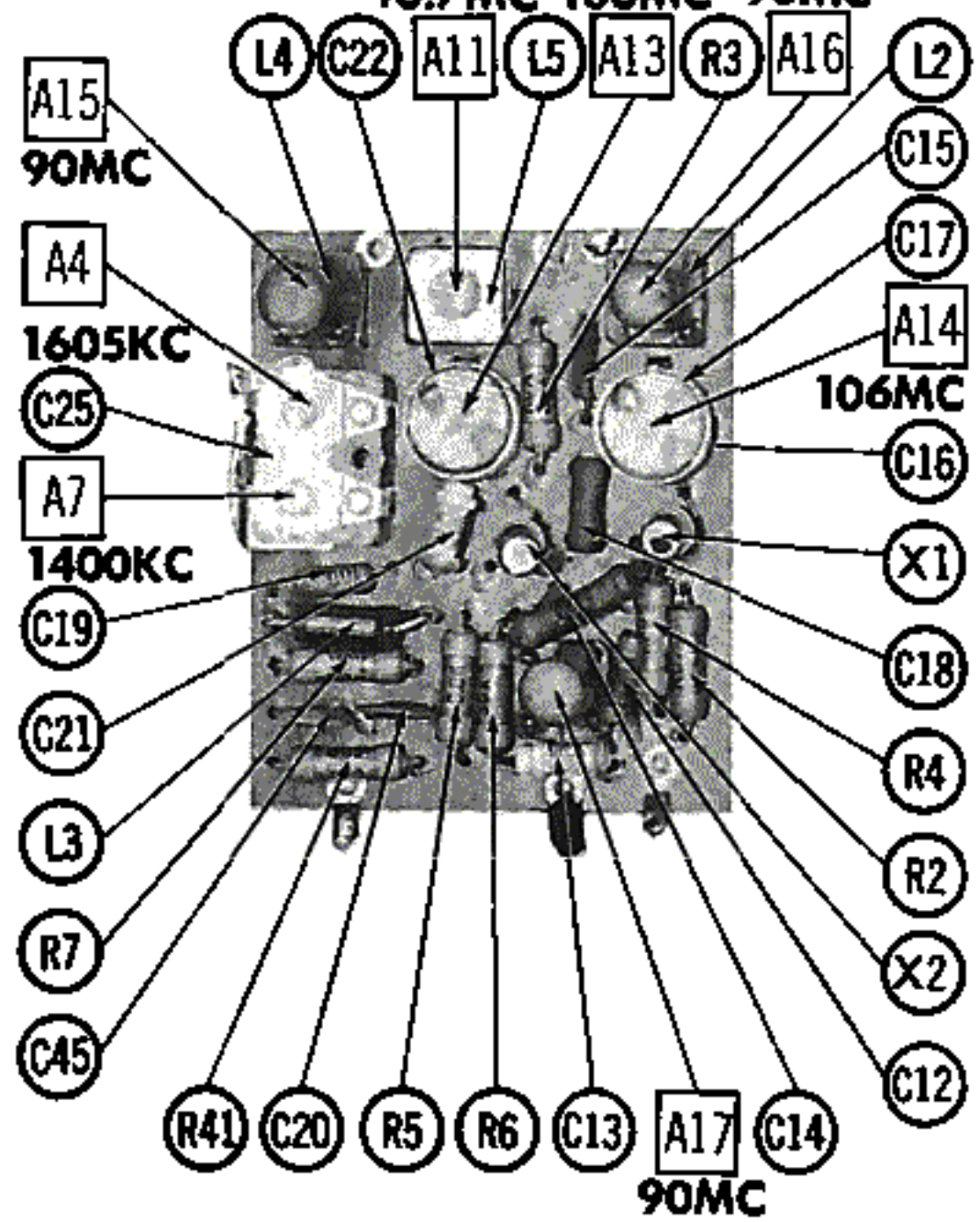
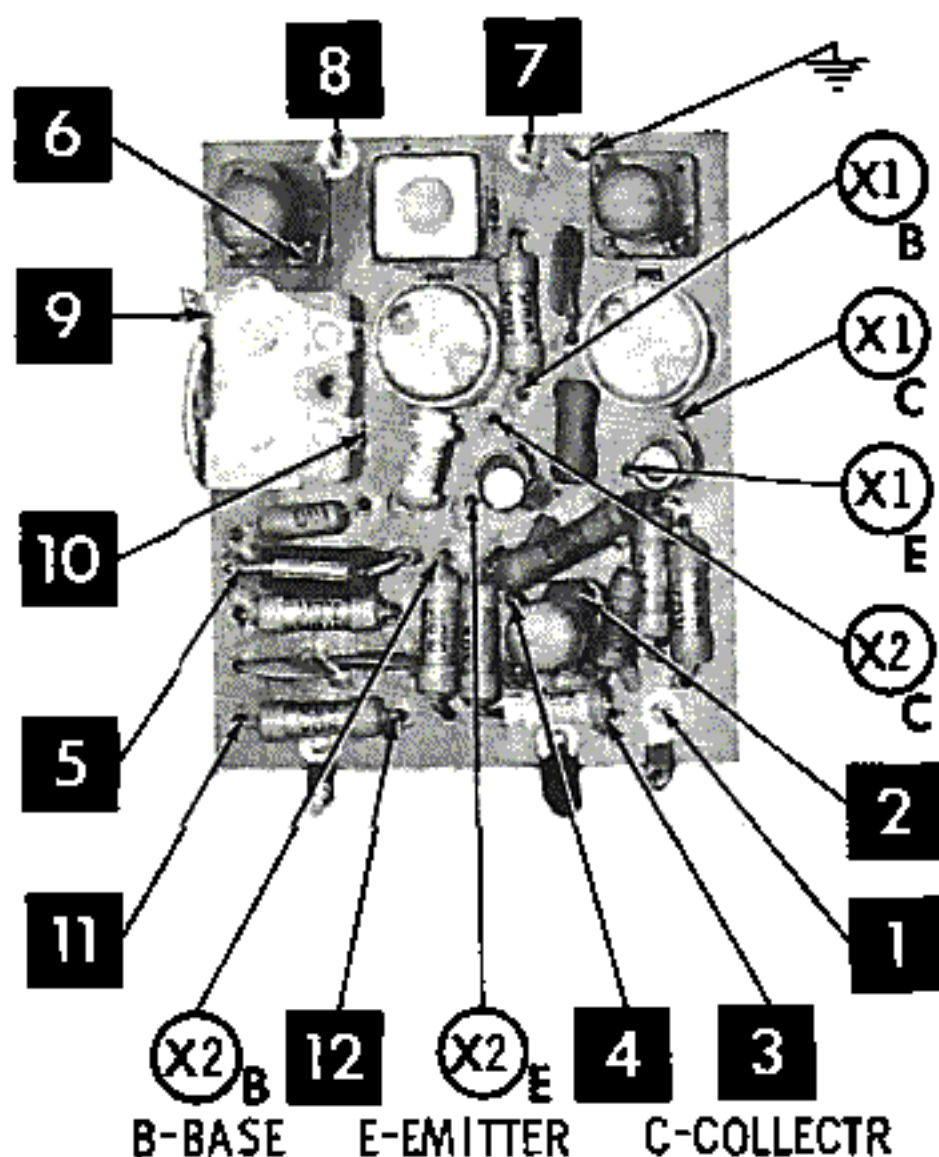


1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of $\pm 15\%$ in voltage and resistance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

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

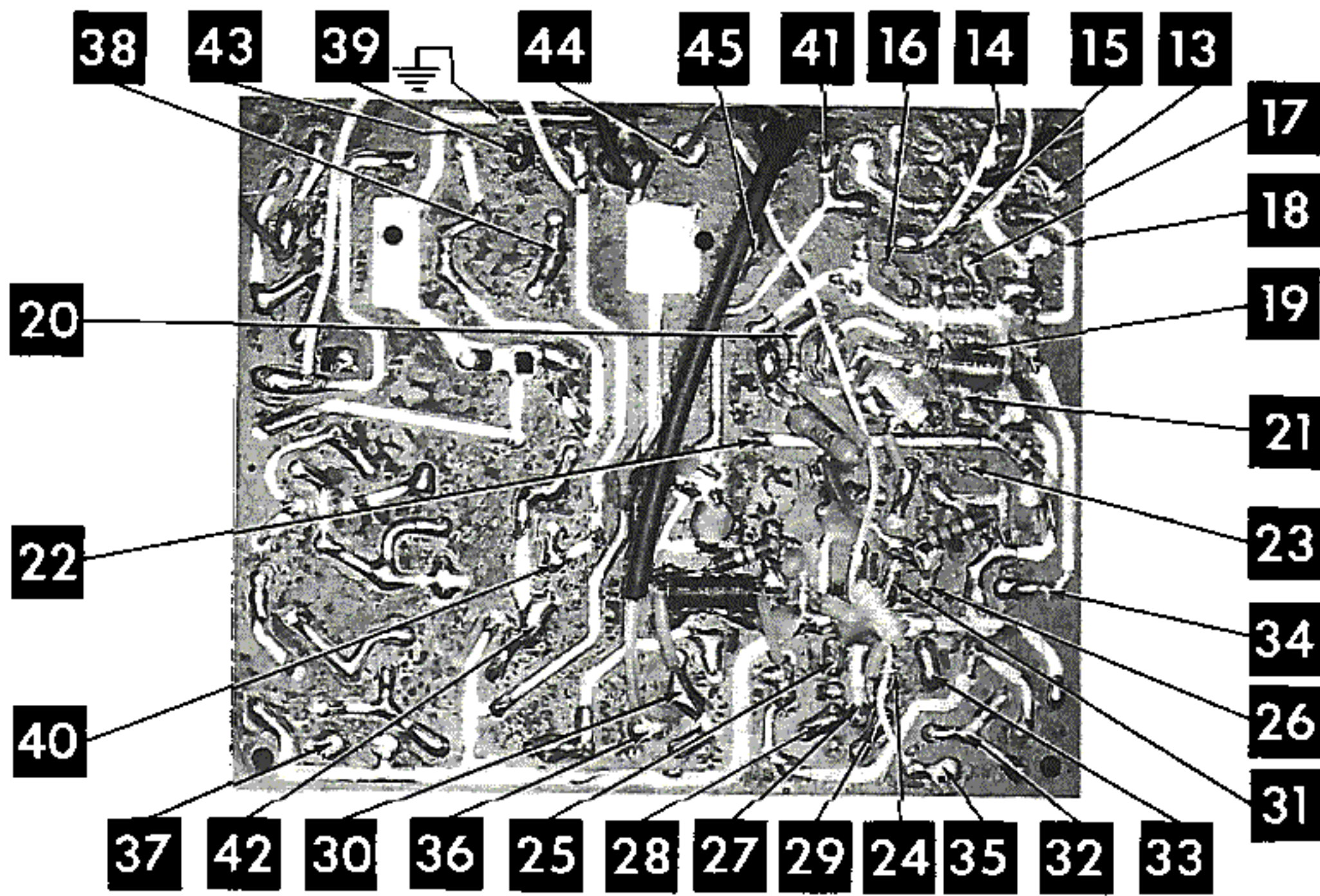
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACIT STANDARD NOTATION SCHEMATIC with **CIRCUITRACE**



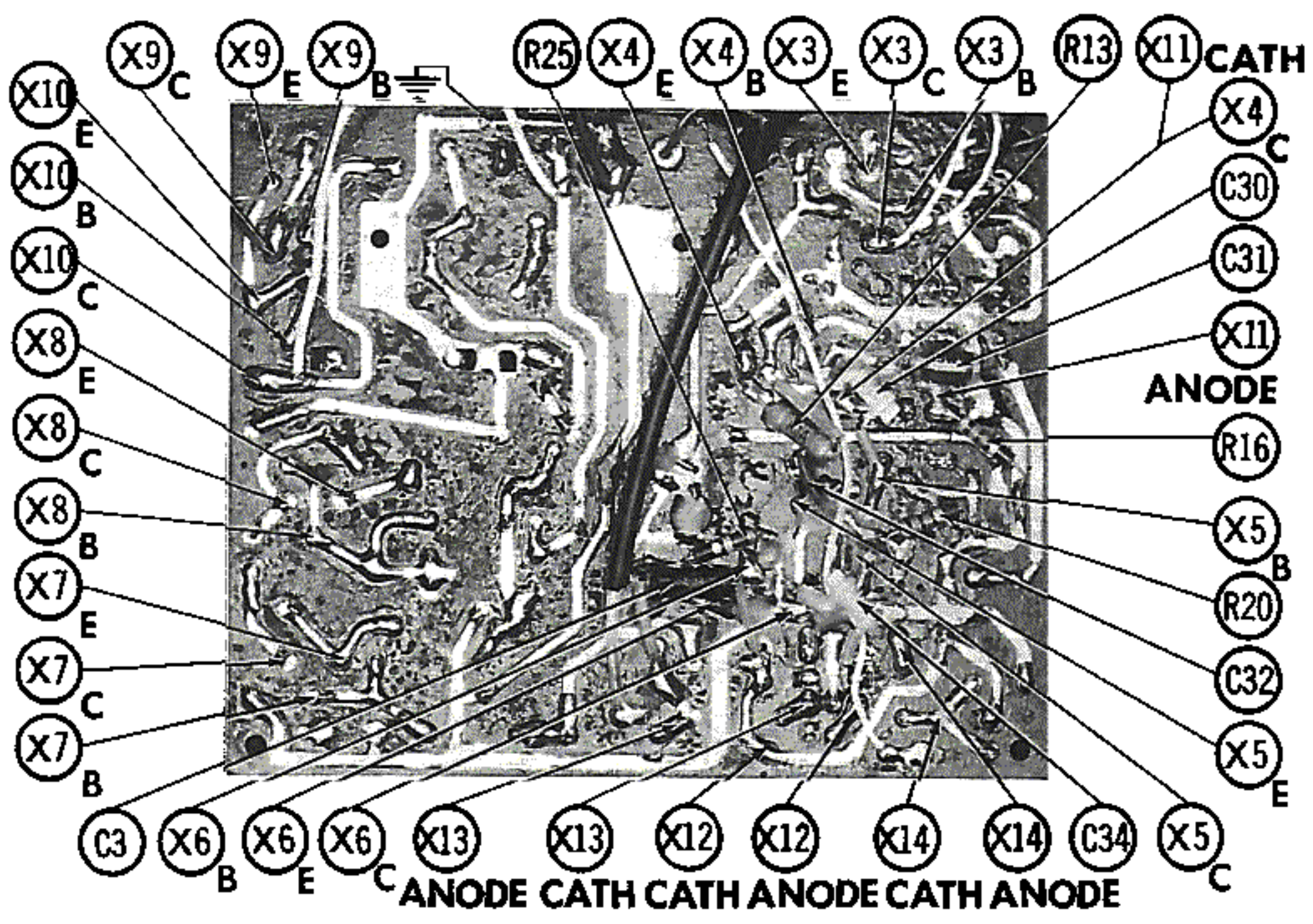
A Howard W. Sams
 CIRCUITRACE Photo

FM RF SUBCHASSIS



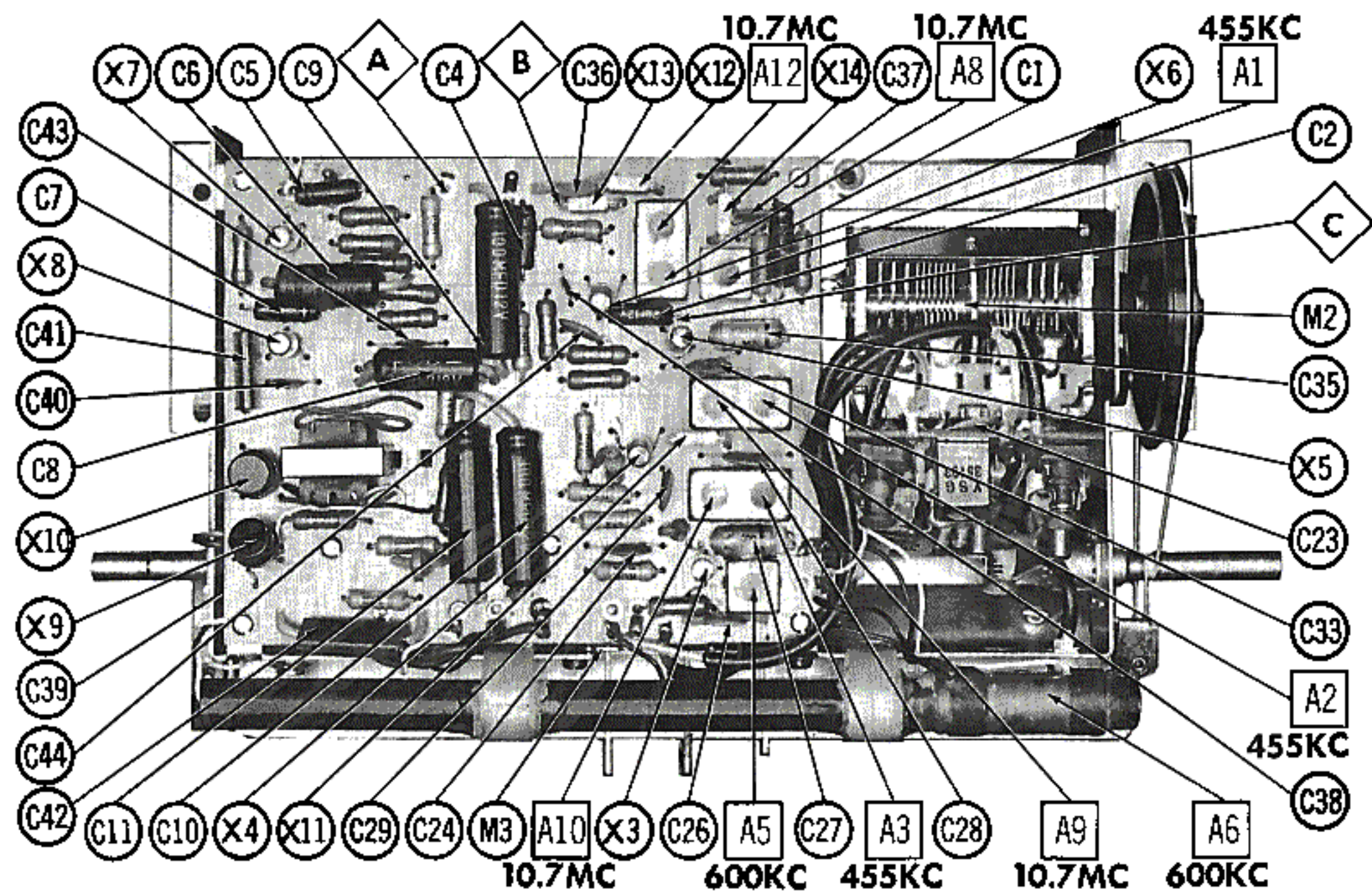
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PRINTED BOARD



PRINTED BOARD

B-BASE E-EMITTER C-COLLECTOR



CHASSIS TOP VIEW - ALIGNMENT, CAPACITOR & MISC. IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:

A1, A2, A3, A5, A8 thru A12,
A15, A16, A17.....

GENERAL CEMENT #8282, 8606, 8606-L, 9091

WALSCO #2526, 2541, 2542, 2543, 2544

A4, A7, A13, A14.....





GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089

WALSCO #2512, 2525, 2528



AM ALIGNMENT -- SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1.	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455KC (Unmod.)	(AM) Tuning gang fully open.	Connect VTVM Across volume control.	A1, A2, A3	Adjust for maximum deflection.
2.	"	1605KC	"	"	A4	"
3.	"	600KC	600KC Signal.	"	A5	Adjust for maximum deflection while rocking tuning gang. Repeat Steps 2 & 3.
4.	"	"	"	"	A6	Adjust for maximum output by moving antenna coil turns along ferrite core.
5.	"	1400KC	1400KC Signal.	"	A7	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM -- SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
6.	Fashion loop of several turns of wire and radiate signal into loop of receiver.	10.7MC (Unmod.)	(FM) Tuning gang fully open.	Connect VTVM DC probe to  , common to  .	A8, A9, A10, A11	Adjust for maximum deflection.
7.	"	10.7MC	"	DC probe to  , common to  .	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct reading.

FM RF ALIGNMENT -- SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
8.	Fashion loop of several turns of wire and radiate signal into loop of receiver.	106MC (Unmod.)	(FM) 106MC Signal.	Connect VTVM DC probe to  , common to  .	A13, A14	Adjust for maximum deflection.
9.	"	90MC	90MC Signal.	"	A15, A16, A17	"

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire Use BELDEN No. 8530 (Solid 22AWG) Available in 12 Colors
 8524 (Stranded 22AWG)
 8570 (Stranded 28AWG)

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA		NOTES
			RCA PART No.	RAYTHEON PART No.	
X1	2SA213	FM RF Amp.			PNP
X2	2SA214	FM Conv.			PNP
X3	2SA216	1st FM IF Amp. -AM Conv.			PNP
	2SA215*	1st FM IF Amp. -AM Conv.			PNP
X4	2SA215	2nd FM-1st AM IF Amp.			PNP
	2SA216*	2nd FM-1st AM IF Amp.			PNP
X5	2SA215	3rd FM-2nd AM IF Amp.			PNP
	2SA216*	3rd FM-2nd AM IF Amp.			PNP
X6	2SB110	Emitter Follower	2N406	2N422	PNP
X7	2SB111	AF Amp.	2N406		PNP
X8	2SB111	Driver	2N406		PNP
X9	2SB163	Output	2N406		PNP
X10	2SB163	Output	2N406		PNP

* Alternate

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	CURRENT RATING (Measured)	ORIGINAL Part or Type No.	RECTIFIERS		DIODES	NOTES
			RCA PART No.	SARKES TARZIAN PART No.	RAYTHEON PART No.	
X11		530063-1			IN80	Overload (SD48) FM Ratio Detector (SD48) AM Detector (SD48)
X12		530063-1			IN80	
X13		530063-1			IN80	
X14		530063-1			IN80	

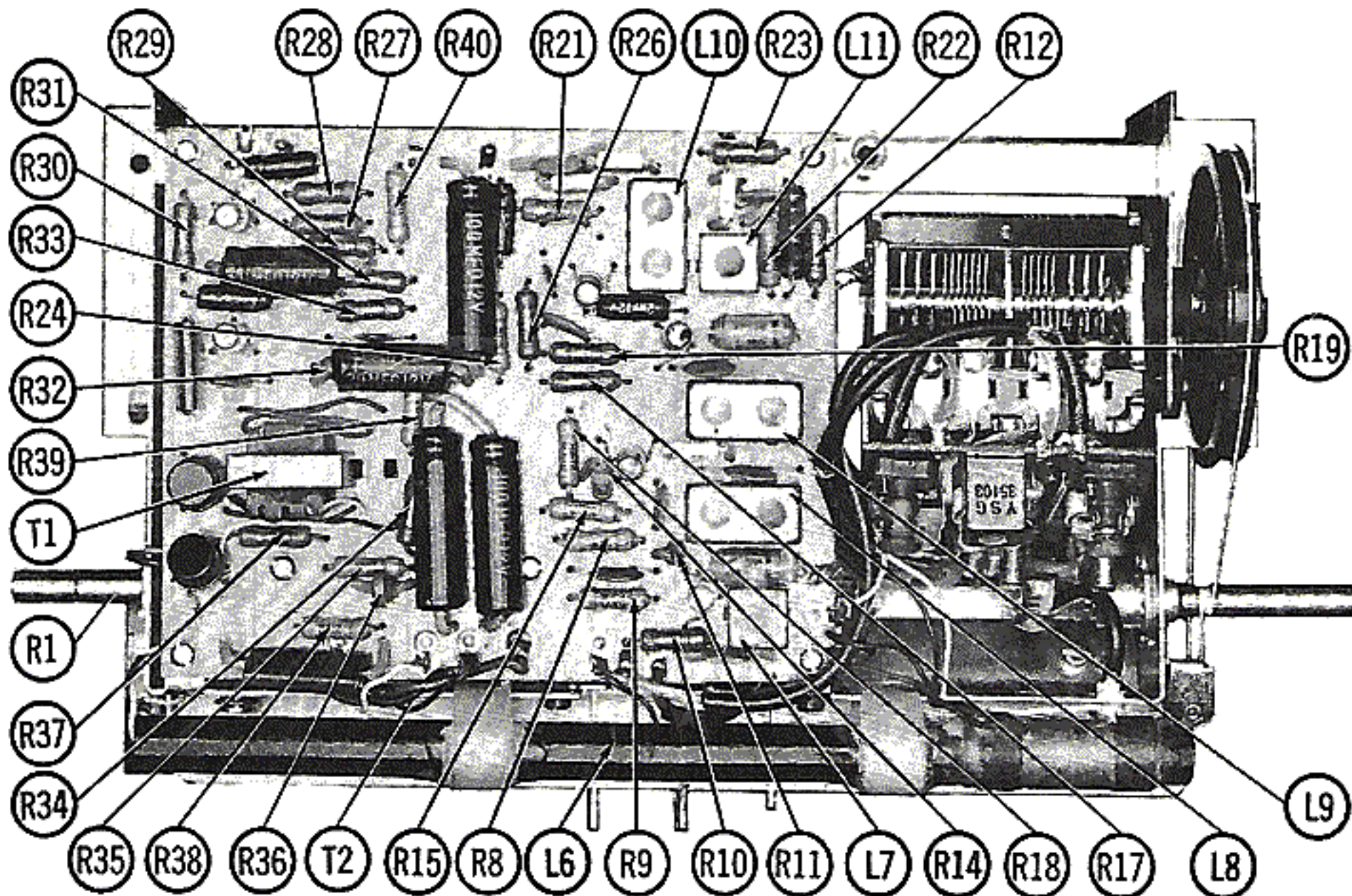
ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.
C1	10	8	270049-1	PTT6	NLW10-6	MT1-5	TT3X10	MLV10-3	TE-1053
C2	2	12	270051-1	PTT49	NLW2-50	MT1-1	TT12X2	MLV2-12	TE-1121
C3	2	12	270051-1	PTT49	NLW2-50	MT1-1	TT12X2	MLV2-12	TE-1121
C4	2	12	270051-1	PTT49	NLW2-50	MT1-1	TT12X2	MLV2-12	TE-1121
C5	2	12	270051-1	PTT49	NLW2-50	MT1-1	TT12X2	MLV2-12	TE-1121
C6	30	12	270058-2	PTT57	NLW30-15	MT1-16	TT15X30	MLV35-12	TE-1158
C7	2	12	270051-1	PTT49	NLW2-50	MT1-1	TT12X2	MLV2-12	TE-1121
C8	30	12	270058-2	PTT57	NLW30-15	MT1-16	TT15X30	MLV35-12	TE-1158
C9	100	12	270058-3	PTT60	NLW100-12	MT1-19	TT12X100	MLV100-12	TE-1135
C10	100	12	270058-3	PTT60	NLW100-12	MT1-19	TT12X100	MLV100-12	TE-1135
C11	100	12	270058-3	PTT60	NLW100-12	MT1-19	TT12X100	MLV100-12	TE-1135

FIXED 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.	
C12	200	#250421-1	CI-200	D6-201	L10T2	CCD-201	GP320	10TS-T20	
C13	30		SI 30	TCZ-30	L10Q3	CCD-300	GP430	10TS-Q30	
C14	300		CI-300	D6-301	L10T3	CCD-301	GP330	10TS-T30	
C15	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50	
C16	15		CI-15	D6-150	L10Q15	CCD-150	GP415	10TS-Q15	
C17									
C18	3				D6-030	L10V33		GP533	10TS-V33
C19	100			CI-100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C20	.005			BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C21	3 ± .25mmf				D6-030	L10V33		GP320	10TS-V33
C22		#250421-1							
C23	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50	
C24	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	

CHASSIS—TOP VIEW



PARTS LIST AND DESC

FIXED CAPACITORS (cont)

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.
C25A B		#250420-1 (.01) †						
C26	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C27	500		BPD-0005	DD-501	BYA10T5	CCD-501	B-350	10TS-T50
C28	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C29	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C30	7 ±.5mmf			TCZ-6R8	L10V68		GP568	10TS-V68
C31	500		BPD-0005	DD-501	L10T5	CCD-501	B-350	10TS-T50
C32	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C33	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C34	25 ±.5mmf		SI 25	TCZ-25	L10Q25	CCD-250	GP425	10TS-Q25
C35	500		BPD-0005	DD-501	BYA10T5	CCD-501	B-350	10TS-T50
C36	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C37	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C38	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C39	.1 50V			DDA-104	H-05P1		TA-010	TG-P10
C40	500		BPD-0005	DD-501	BYA10T5	CCD-501	B-350	10TS-T50
C41	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C42	.05		BPD-05	DD-503			GP150	5HK-S50
C43	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C44	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C45	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

CONTROLS

† Alternate Value.

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

ITEM No.	USE	RESIST-ANCE	REPLACEMENT DATA				
			MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
RIA B	Tone Volume	5000Ω 10K	220176-1				

RESISTORS

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

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN PART No.	REMARKS			IRC PART No.	WORKMAN PART No.	REMARKS
R2	5800Ω				R22	12K			(15K)*
R3	30K 5%				R23	2500Ω 5%			
R4	1500Ω				R24	30K 5%			
R5	6800Ω				R25	120K			
R6	30K 5%				R26	4700Ω			
R7	1500Ω				R27	3300Ω			
R8	30K 5%				R28	10K			
R9	6800Ω				R29	1800Ω			
R10	1500Ω				R30	3300Ω			
R11	10K				R31	7500Ω 5%			
R12	120K				R32	1000Ω			
R13	62Ω 5%				R33	15K			
R14	62Ω			Note 1	R34	7500Ω 5%			
R15	390Ω				R35	280Ω 5%			
R16	47K			(10K)*	R36	225Ω (TC)			#230132-1
R17	10K				R37	10Ω			
R18	27K			Note 2	R38	220Ω			
R19	1500Ω				R39	390Ω			
R20	47K				R40	62Ω 5%			
R21	33K				R41	62Ω 5%			

Note 1. Not used in some versions.

* Alternate Value.

Note 2. Value varies, selected for 1.2V across R19.

Magnavox Part Number.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MAGNAVOX PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman PART No.	
L1	FM Ant.	360902-1					
L2	FM RF	360903-1					

DESCRIPTIONS (Continued)

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MAGNAVOX PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman PART No.	
L3	RF Choke	360904-1					
L4	FM Osc.	360906-1					
L5	1st FM IF	360905-1					
L6	Loopstick	360876-1					
L7	AM Osc.	360906-2					
L8	2nd FM-1st AM IF	360907-1					
L9	3rd FM-2nd AM IF	360907-2					
L10	Ratio Detector	360905-2					
L11	3rd AM IF	360906-3					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
			MAGNAVOX PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	320097-1					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			MAGNAVOX PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2700Ω CT	3-4Ω	320098-1					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
				MAGNAVOX PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	580077-1	4A07R	

BATTERIES

ITEM No.	VOLTAGE	MAGNAVOX PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V 1½V			C6X 130		2356 636		nM-1612 M-14R	6 Required (Alternate)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M2	Tuning Cap.	260163-1	4 Gang FM-AM-Off Pilot Light Telescoping (Left or Right)
M3	Switch Assembly	160354-1	
M4	Switch	160355-1	
	Antenna	700874-1	

CABINETS & CABINET PARTS

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

NAME	PART NO.	DESCRIPTION
Dial Pointer	636972-1	Off AM FM Volume Tone Tuning, Outer Section Tuning, Inner Section (Less Antenna)
Dial Scale	150739-1	
Push Button	140537-1	
Push Button	140537-2	
Push Button	140537-3	
Knob	140538-1	
Knob	140538-2	
Knob	140538-1	
Knob	140538-2	
Handle	120681-1	
Cabinet Front	140539-1	
Cabinet Back	140539-2	