

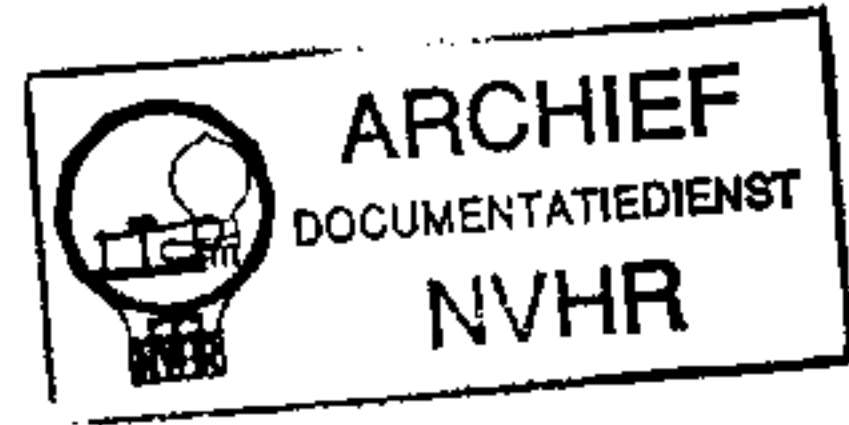
FACT Folder

with CIRCUITRACE<sup>®</sup>

COLUMBIA  
MODEL C-615



Ned. Ver. v. Historie v/d Radio



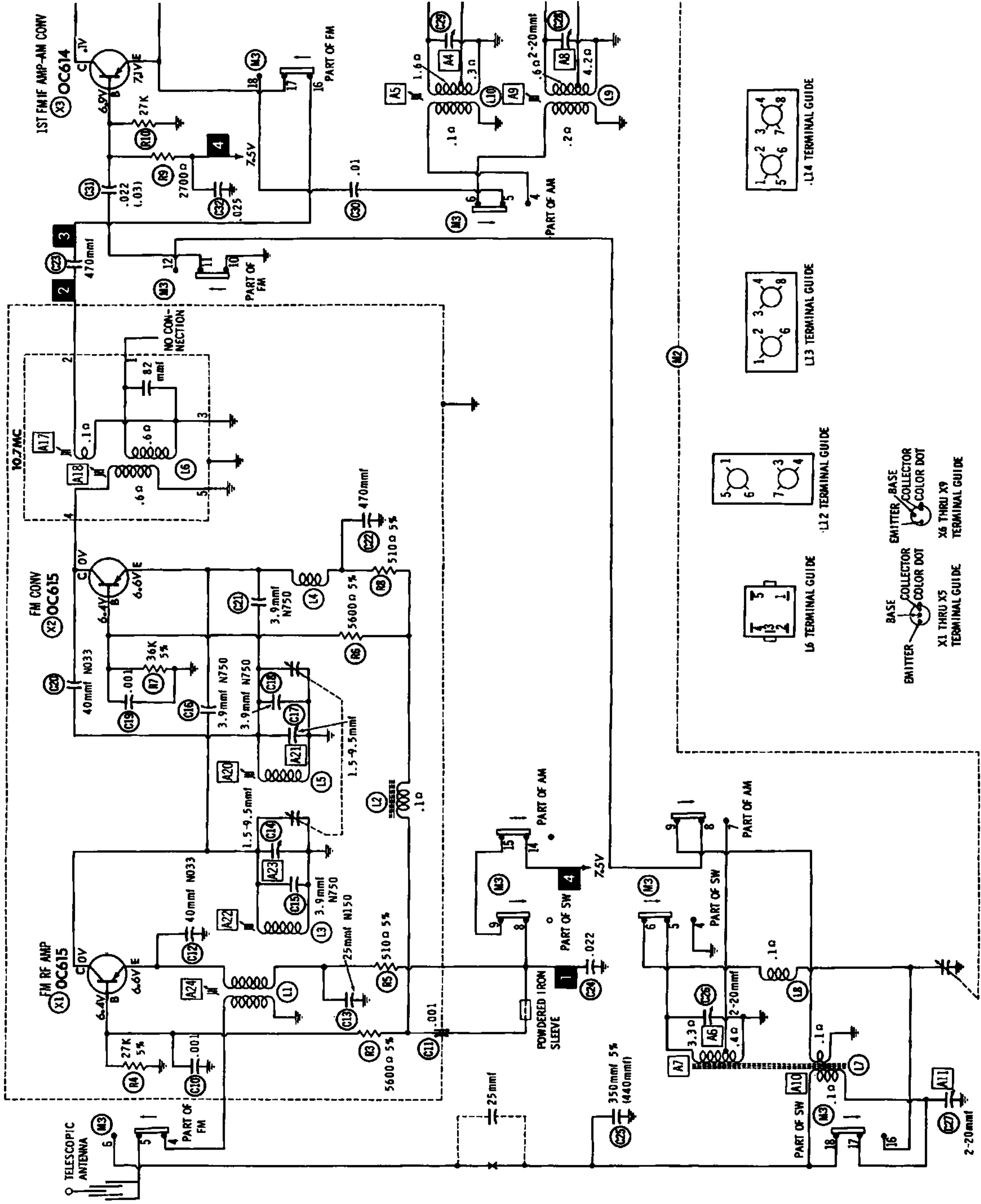
Met dank aan Jef Bos

TRADE NAME	Columbia Model C-615
MANUFACTURER	Columbia Phonographs, Dept. of CBS Electronics, 405 Park Ave., New York 22, N. Y.
TYPE SET	Battery Operated 9 Transistor Portable FM-BC-SW Receiver
POWER SUPPLY	9 Volts DC
	RATING 13MA @ 9 Volts DC (No Signal, Min. Volume)
	45MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	515KC — 1620KC
	SHORT WAVE 1.48MC-3.55MC
	FREQ. MOD. 87.7-108.3MC

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

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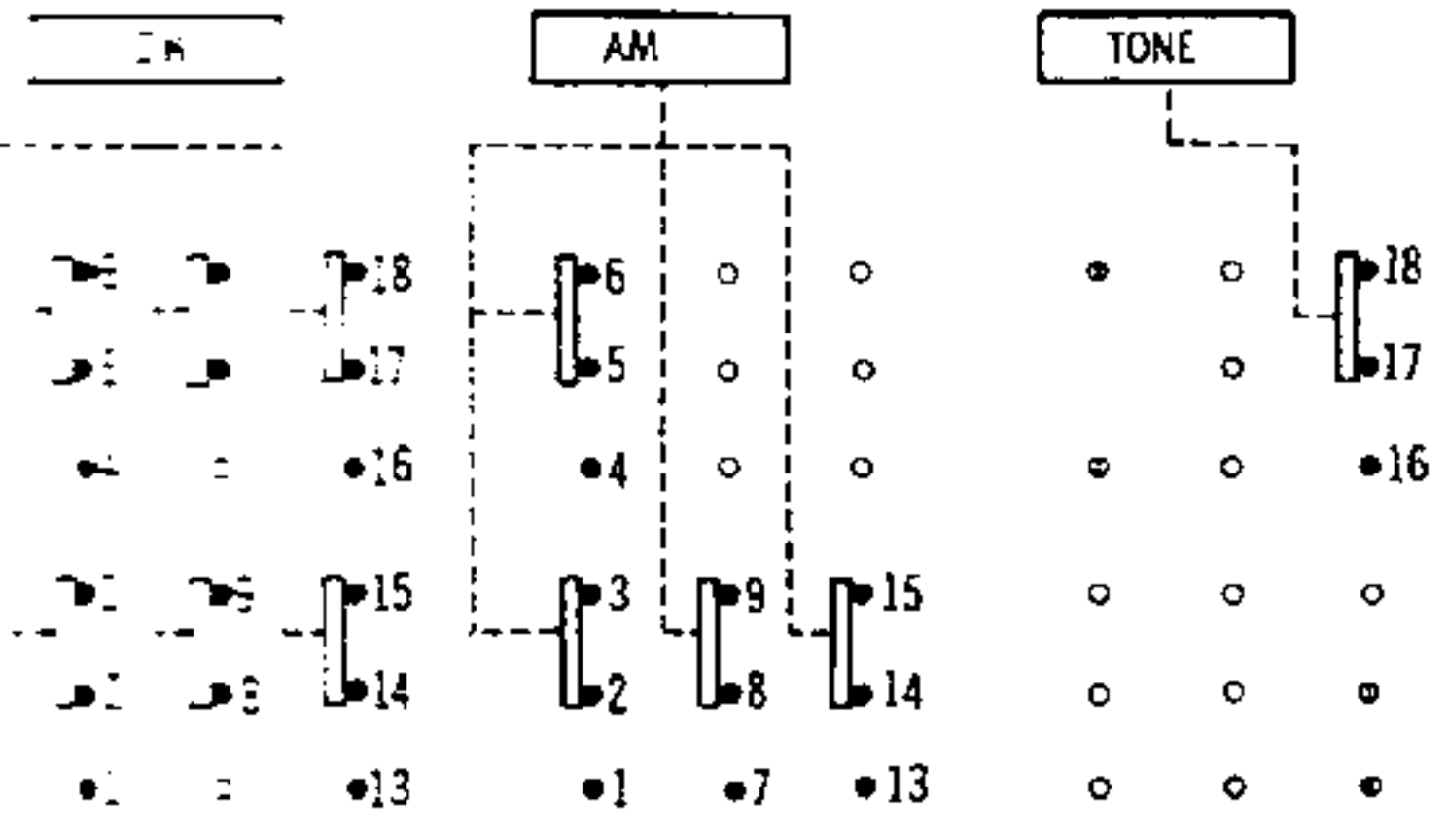
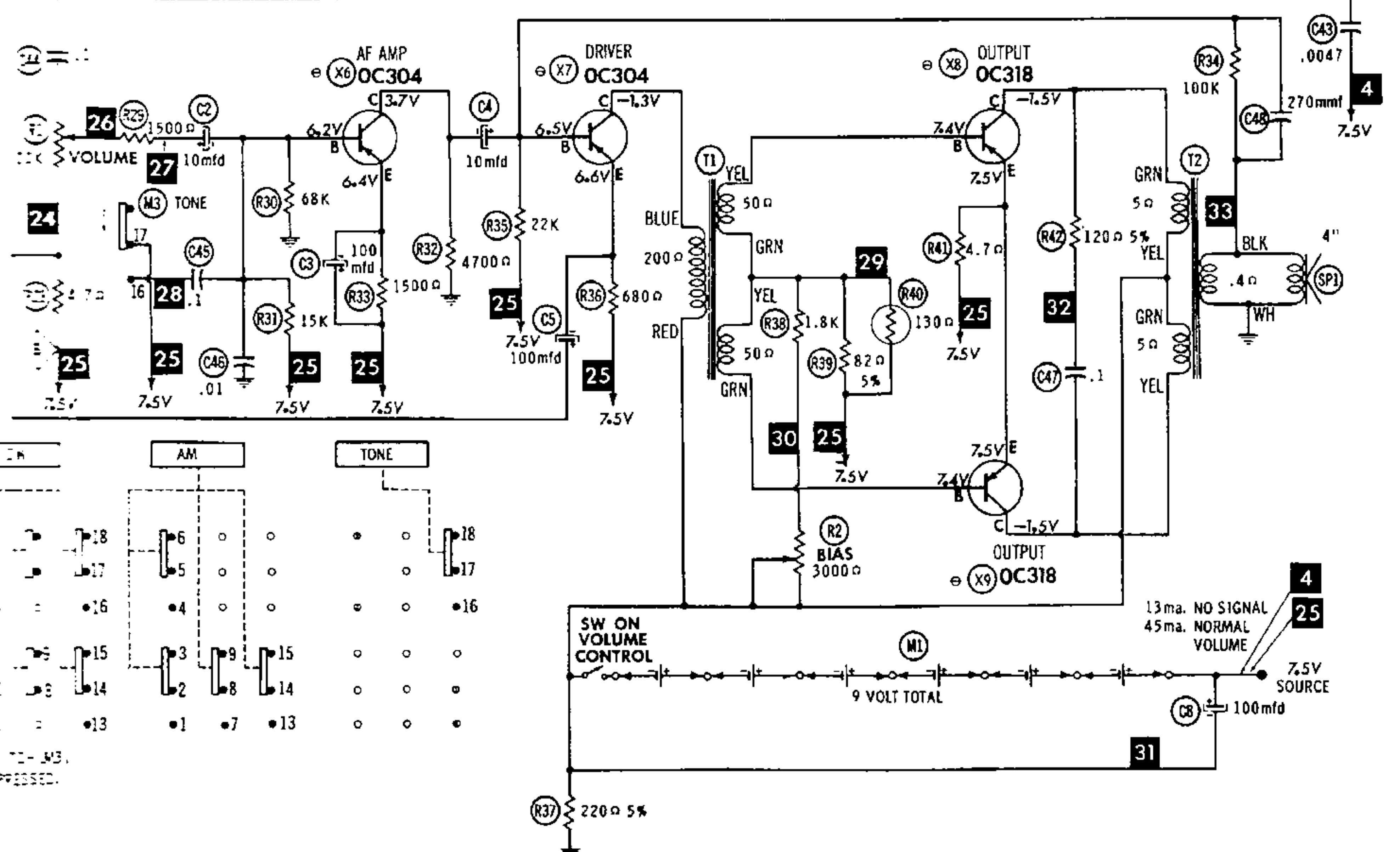
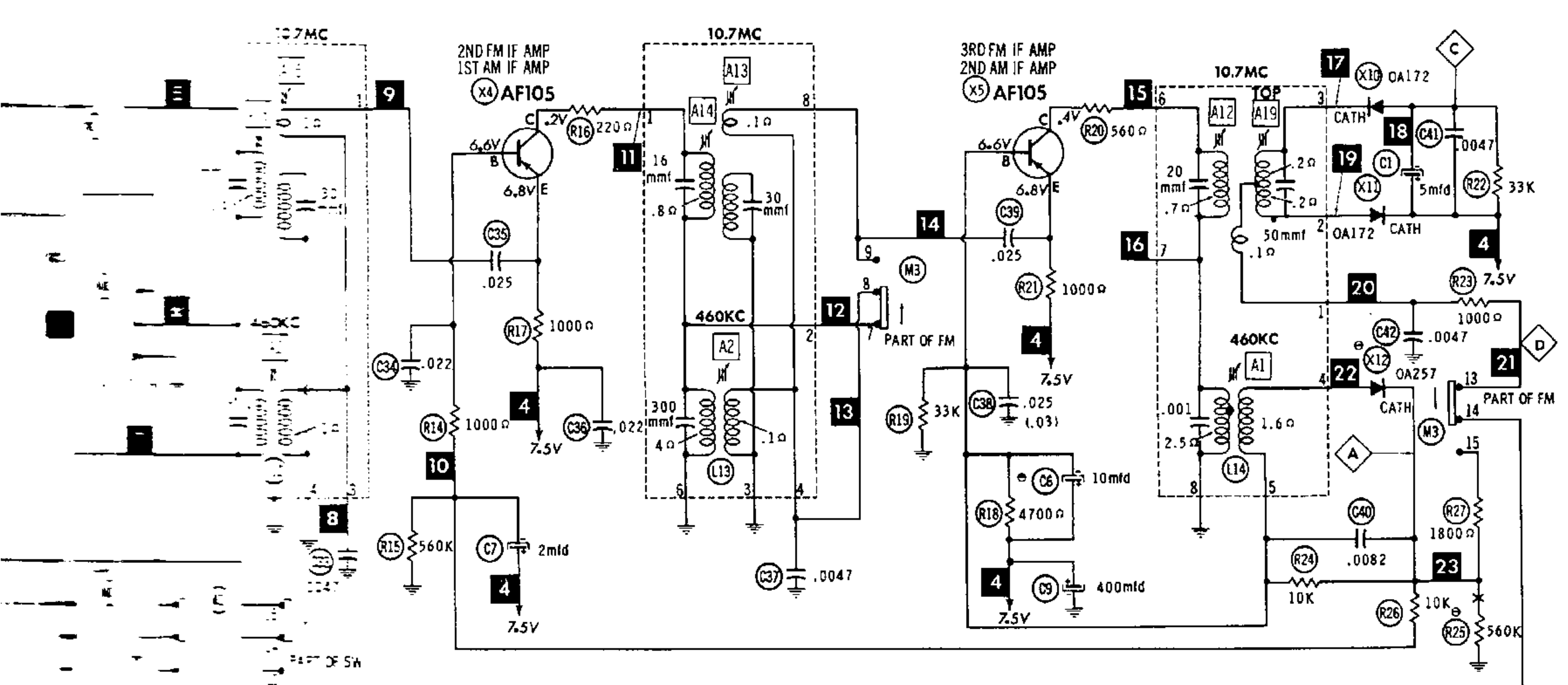


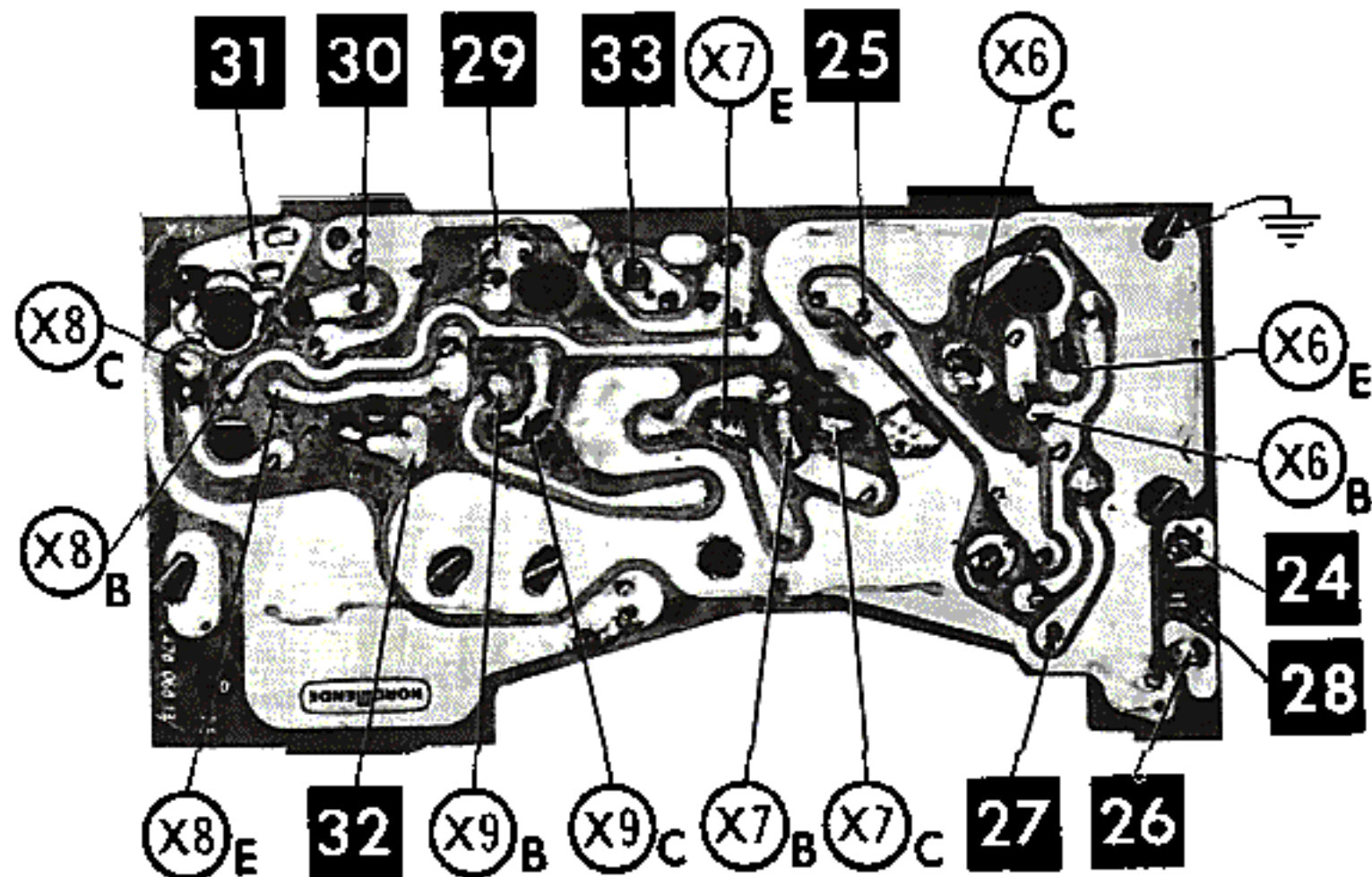
FIG. 10-14 10-143.  
 A BUTTON DEPRESSED.

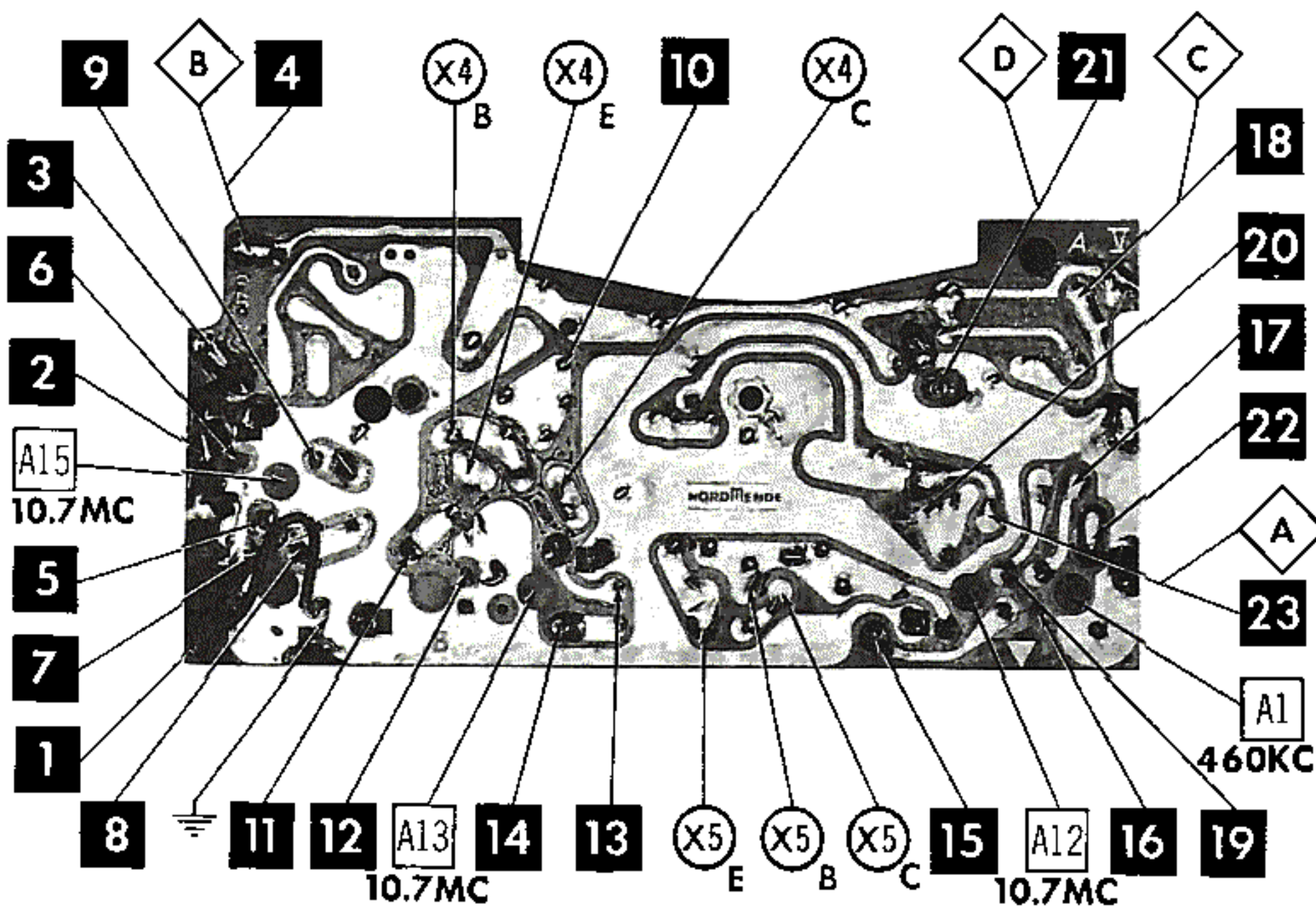
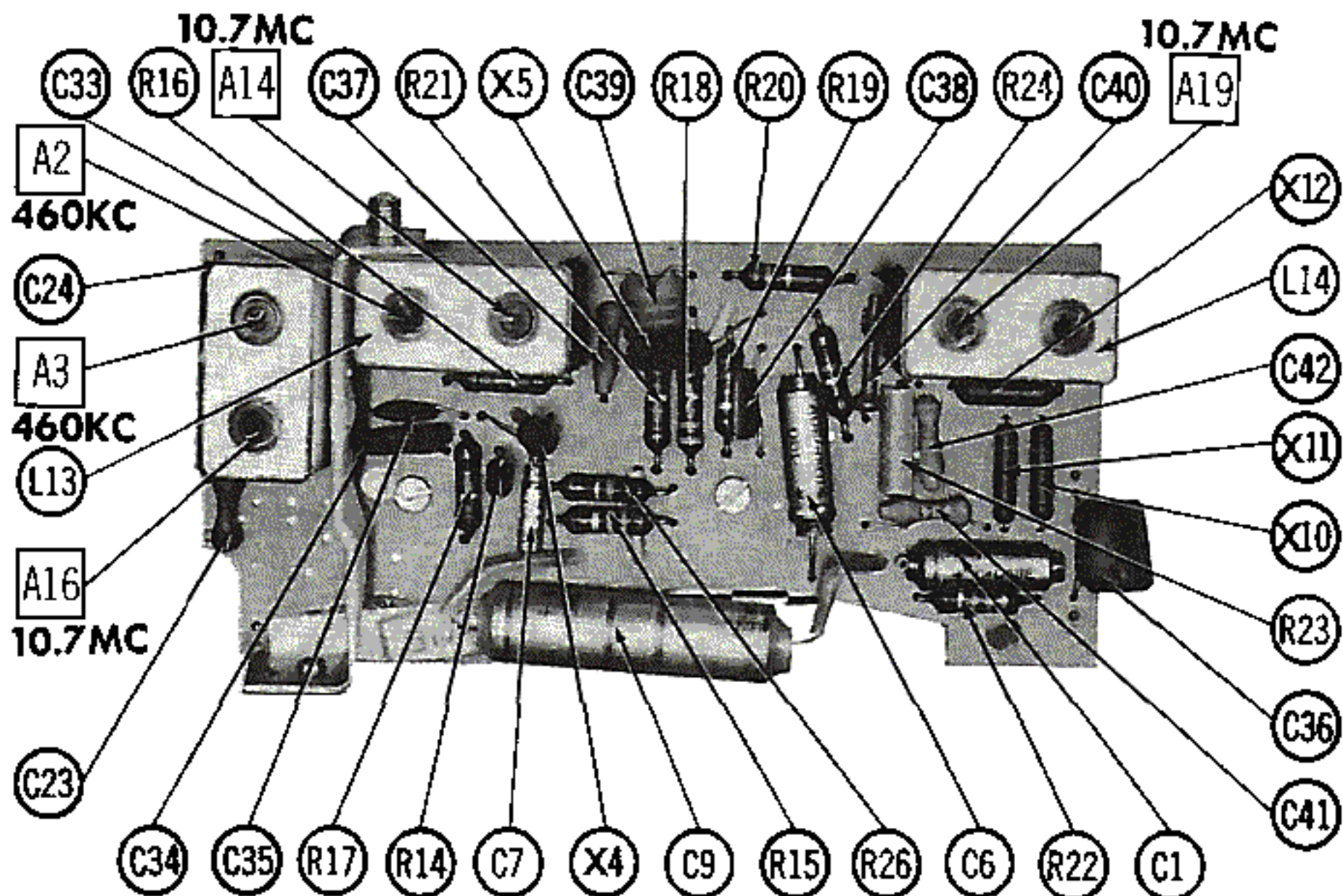
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

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.

# OUTPUT CHASSIS PRINTED BOARD

B - BASE  
E - EMITTER  
C - COLLECTOR





# 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, A9, A12, A13, A14, A15,

A16, A17, A18, A19, A20, A22, A24.....GENERAL CEMENT #8282, 8606, 8606-L, 9091

WALSCO #2526, 2541, 2542, 2543, 2544

A4, A6, A8, A11, A21, A23.....GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089

WALSCO #2512, 2525, 2528

### AM ALIGNMENT — SELECTOR IN AM POSITION

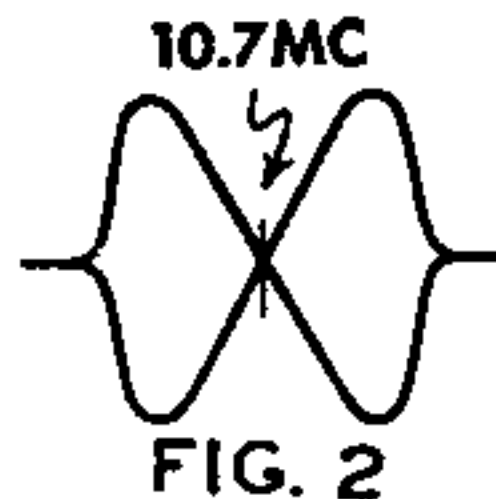
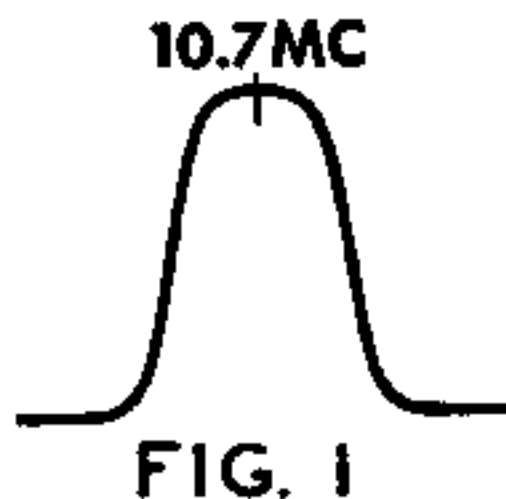
SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1. Fashion loop of several turns of wire and radiate signal into loop of receiver.	460KC (Unmod.)	(BC) Tuning gang fully open.	DC probe to point $\diamond A$ , common to point $\diamond B$ .	A1, A2, A3	Adjust for maximum deflection.
2. "	1620KC	"	"	A4	"
3. "	550KC	550KC Signal.	"	A5	Adjust for maximum deflection while rocking tuning gang. Repeat Steps 2 & 3.
4. "	1480KC	1480KC Signal.	"	A6	Adjust for maximum deflection.
5. "	550KC	550KC Signal.	"	A7	Adjust for maximum output by moving antenna coil turns along ferrite core.
6. "	3.55MC	(SW) Tuning gang fully open.	"	A8	Adjust for maximum deflection.
7. "	1.48MC	Tuning gang fully closed.	"	A9	Adjust for maximum deflection. Repeat Steps 6 & 7.
8. "	1.6 MC	1.6 MC Signal.	"	A10	Adjust for maximum output by moving antenna coil turns along ferrite core.
9. "	3.2MC	3.2MC Signal.	"	A11	Adjust for maximum deflection.

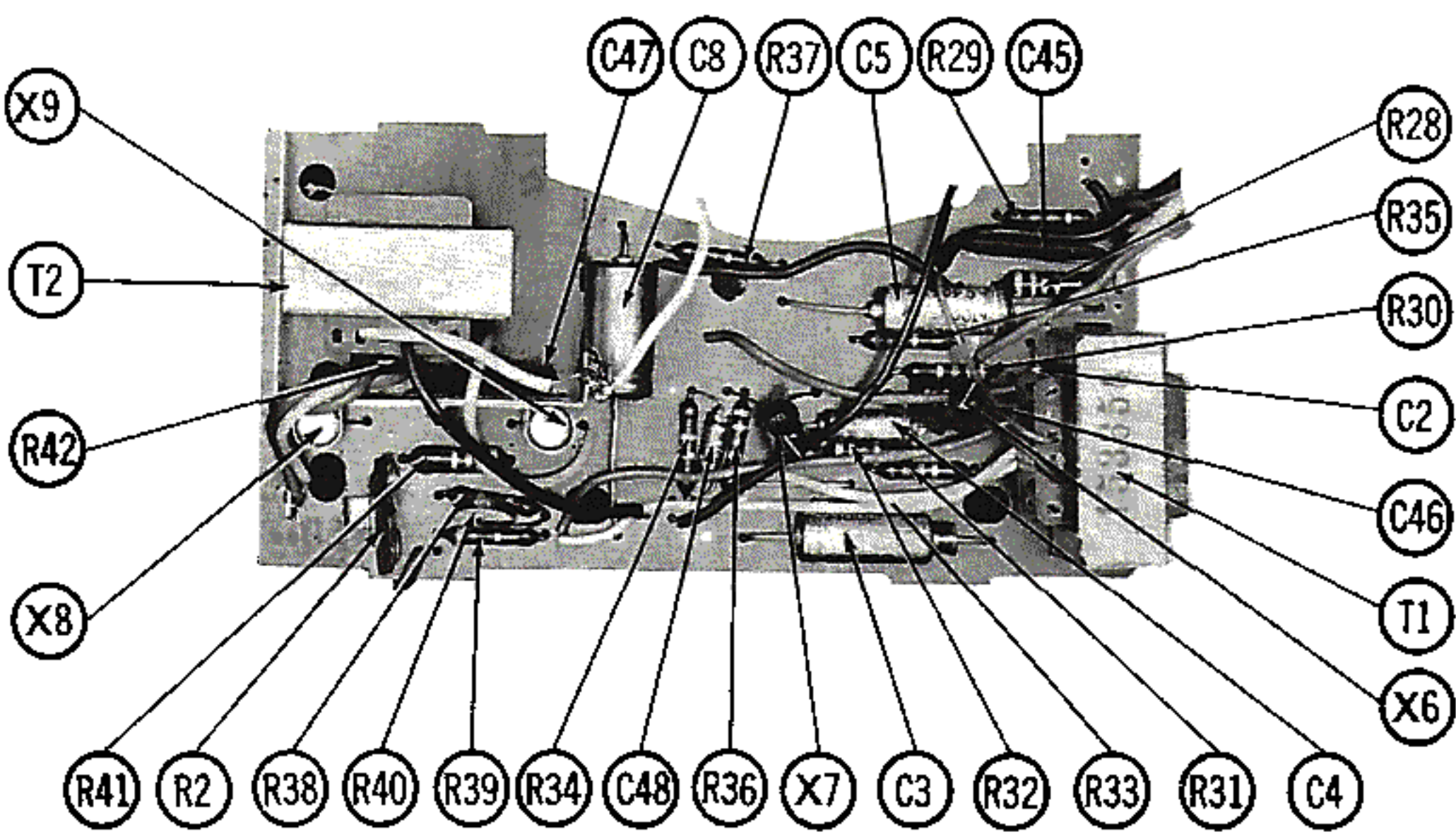
### FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM — SELECTOR IN FM POSITION

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10. Fashion loop of several turns of wire and radiate signal into loop of receiver.	10.7MC (Unmod.)	(FM) Tuning gang fully open.	DC probe to point $\diamond C$ , common to point $\diamond B$ .	A12, A13, A14, A15, A16, A17, A18	Adjust for maximum deflection.
11. "	"	"	DC probe to point $\diamond D$ , common to point $\diamond B$ .	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

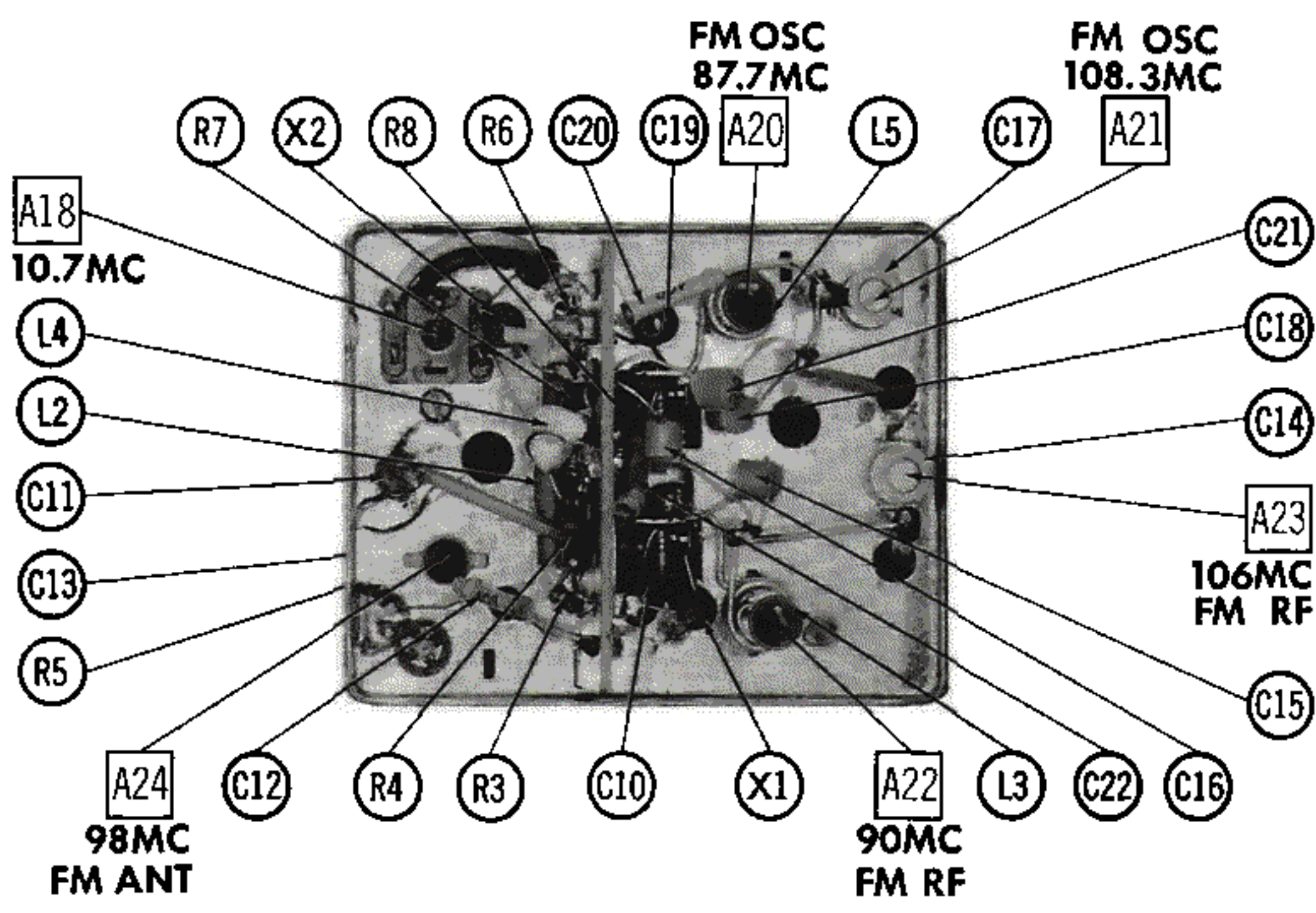
### FM RF ALIGNMENT — SELECTOR IN FM POSITION

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
12. Fashion loop of several turns of wire and radiate signal into loop of receiver.	87.7MC (Unmod.)	87.7MC Signal.	(FM) DC Probe to point $\diamond C$ , common to point $\diamond B$ .	A20	Adjust for maximum deflection.
13. "	108.3MC	108.3MC Signal.	"	A21	Adjust for maximum deflection. Repeat Steps 12 & 13.
14. "	90MC	90MC Signal.	"	A22	Adjust for maximum deflection.
15. "	106MC	106MC Signal.	"	A23	"
16. "	98MC	98MC Signal.	"	A24	"





OUTPUT CHASSIS - TOP VIEW



FM RF SUBCHASSIS - BOTTOM VIEW

# PARTS LIST AND DESCRIPTIONS

## TRANSISTORS

IFPM No.	CIRCUIT TYPE	LINE	REPLACEMENT DATA		TYPE
			REPLACEMENT PART No.	REPLACEMENT PART No.	
X1	OC610	FM IF Amp	2N1177		PNP
X2	OC610	FM Converter	2N1170		PNP
X3	OC614	1st FM IF Amp. AM Conv.	2N1180		PNP
X4	AF105	2nd FM-1st AM IF Amp.	2N1180		PNP
X5	AF105	3rd FM-2nd AM IF Amp.	2N1180		PNP
X6	OC304	AF Amplifier	2N400	2N362	PNP
	OC71*	AF Amplifier	2N400	2N362	PNP
X7	OC304	Driver	2N400	2N362	PNP
	OC71*	Driver	2N400	2N362	PNP
X8	OC318	Output	2N408	2N360	PNP
	OC74*	Output	2N408	2N360	PNP
X9	OC318	Output	2N408	2N360	PNP
	OC74*	Output	2N408	2N360	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.	
X10		464.022.015				Ratio Detector (OA172) AM Detector * Alternate OA160, Part # 464.021
X11		464.022.015				
X12		OA257*				

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	COLUMBIA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.
C1	5	70	443.081	SRE150V5	NLW5-150	MT1-4	TT150X5	MLV5-100	TE-1404
C2	10	16	443.082	PTT79	NLW10-25	MT1-5	TT25X10	MLV10-25	TE-1204
C3	100	3	443.083	PTT13	NLW100-3	MT1-18	TT6X100	MLV100-3	TE-1059.5
C4	10	16	443.082	PTT79	NLW10-25	MT1-5	TT25X10	MLV10-25	TE-1204
C5	100	3	443.083	PTT13	NLW100-3	MT1-18	TT6X100	MLV100-3	TE-1059.5
C6	10	30	443.082	PTT92	NLW10-50	MT1-8	TT50X10	MLV10-50	TE-1304
C7	2	3	443.080	PTT2	NLW2-50	MT1-1	TT8X2	MLV2-8	TE-1051
C8	100	16	443.084	PTT73	NLW100-15	MT1-19	TT15X100	MLV100-15	TE-1162
C9	400	12	443.048	BCD12500					

① Some versions may use 16 volt unit in this application (Part #443.082).

## 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.
C10	.001		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C11	.001		EF-001	MFT-1000		CCF-102	CT280A	
C12	40 N033					*		
C13	25 N150					*		10TCP-Q27
C14	1.5-9.5	#447.036						
C15	3.9 N750							
C16	3.9 N750							
C17	1.5-9.5	#447.036						
C18	3.9 N750							
C19	.001		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C20	40 N033					*		
C21	3.9 N750							
C22	470		SI 470	D6-471	BYA10T47	CCD-471	GP347	10TS-T47
C23	470		SI 470	D6-471	BYA10T47	CCD-471	GP347	10TS-T47



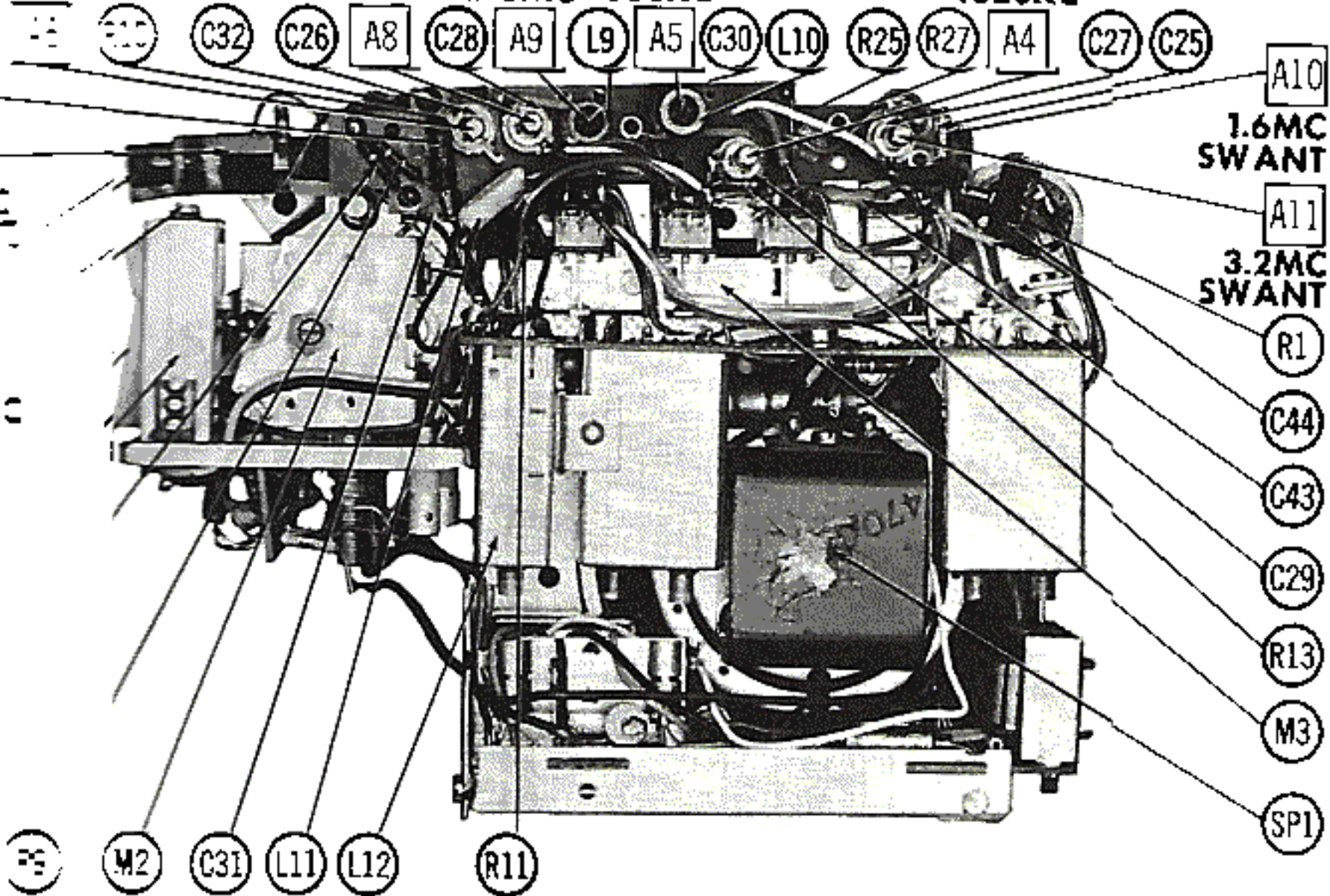
BC ANT  
480KC

SW OSC 3.55MC  
SW OSC 1.48MC  
BC OSC 550KC

BC OSC  
1620KC

CHASSIS TOP VIEW

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A10

1.6MC  
SWANT

A11

3.2MC  
SWANT

R1

C44

C43

C29

R13

M3

SP1

R3

M2

C31

L11

L12

R11

# PARTS LIST AND DESC

## FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNEIL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C24	.022 30V	(440) † #447.030	BPD-02	DA-203	H-05S2	CCD-203	TA-120	TG-S20	
C25	350 5%				5R5T36	CM-19B-36LJ		MS-360	
C26	2-20								
C27	2-20								
C28	2-20								
C29	2-20								
C30	.01			SI 10000	D6-103	BYA10S1	CCD-102	B-110	5HK-S10
C31	.022 30V		(.03) †	BPD-02	DA-203	H-05S2	CCD-203	TA-120	TG-S20
C32	.025					H-05S25		TA-125	TG-S25
C33	.0047		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C34	.022		BPD-02	DA-203	H-05S2		TA-120	TG-S20	
C35	.025 30V		BPD-02	DA-203	H-05S2	CCD-203	TA-125	TG-S25	
C36	.022 30V		BPD-02	DA-203	H-05S2	CCD-203	TA-120	TG-S20	
C37	.0047		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C38	.025	(.03) †			H-05S25		TA-125	TG-S25	
C39	.025				H-05S25		TA-125	TG-S25	
C40	.0082			DD-822		CCD-822	B-282		
C41	.0047		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C42	.0047		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C43	.0047		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47	
C44	.1 150V		P288N-1		CUB2P1	2DP-3-104	GEM-201	2TM-P10	
C45	.1 30V			DA-104	H-05P1		TA-010	TG-P10	
C46	.01		SI 10000	D6-103	BYA10S1	CCD-103	B-110	5HK-S10	
C47	.1 30V			DA-104	H-05P1		TA-010	TG-P10	
C48	270		SI 270	D6-271	L10T27	CCD-271	GP327	10TS-T27	

‡ Columbia Part Number.

† Alternate.

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

## CONTROLS

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

ITEM No.	USE	RESISTANCE	REPLACEMENT DATA				
			COLUMBLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume & Switch	20K	402.512				
R2	Bias	3000Ω	402.087				

## 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
R3	5600Ω 5%				R23	1000Ω			Note 1
R4	27K 5%				R24	10K			
R5	510Ω 5%				R25	560K			
R6	5600Ω 5%				R26	10K			
R7	36K 5%				R27	1800Ω			
R8	510Ω 5%				R28	4.7Ω			
R9	2700Ω				R29	1500Ω			
R10	27K				R30	68K			
R11	180Ω				R31	15K			
R12	1000Ω				R32	4700Ω			
R13	150K				R33	1500Ω			
R14	1000Ω				R34	100K			
R15	560K				R35	22K			
R16	220Ω				R36	680Ω			
R17	1000Ω				R37	220Ω 5%			
R18	4700Ω				R38	1800Ω			
R19	33K				R39	82Ω 5%			
R20	560Ω				R40	130Ω			
R21	1000Ω				R41	4.7Ω			
R22	33K				R42	120Ω 5%			

Note 1. Not used in some versions.

# DESCRIPTIONS (Continued)

## COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		COLUMBIA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman PART No.	
L1	FM Ant.	466.054					
L2	RF Choke (15uh)						
L3	FM RF						
L4	RF Choke						
L5	FM Osc.						
L6	1st FM IF						
L7A	SW Loopstick						
B	BC Loopstick						
L8	RF Choke (15uh)						
L9	SW Osc.						
L10	BC Osc.						
L11	RF Choke						
L12A	2nd FM IF						
B	1st AM IF						
L13A	3rd FM IF						
B	2nd AM IF						
L14A	Ratio Detector						
B	3rd AM IF						

## TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
			COLUMBIA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC.						
T1	1.3	1	522.026.13					

## TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			COLUMBIA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC.						
T2	80Ω CT	3-4Ω	522.027.13					

## SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
				COLUMBIA PART No.	QUAM PART No.	
	SIZE	FIELD	V. C. IMP.			
SP1	4"	PM	3-4Ω	470.063	4A07R	

## BATTERIES

ITEM No.	VOLTAGE	COLUMBIA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1½V			130		635		M-14R	6 Required

## MISCELLANEOUS

ITEM No.	PART NAME	COLUMBIA PART No.	NOTES
M2 M3	Tuning Cap. Switch	446.001 472.050	2 Gang FM-SW-AM-Tone (4 Section Pushbutton Type)

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid 22AWG) Available in 12 Colors  
 8524 (Stranded 22AWG)  
 8570 (Stranded 26AWG)