



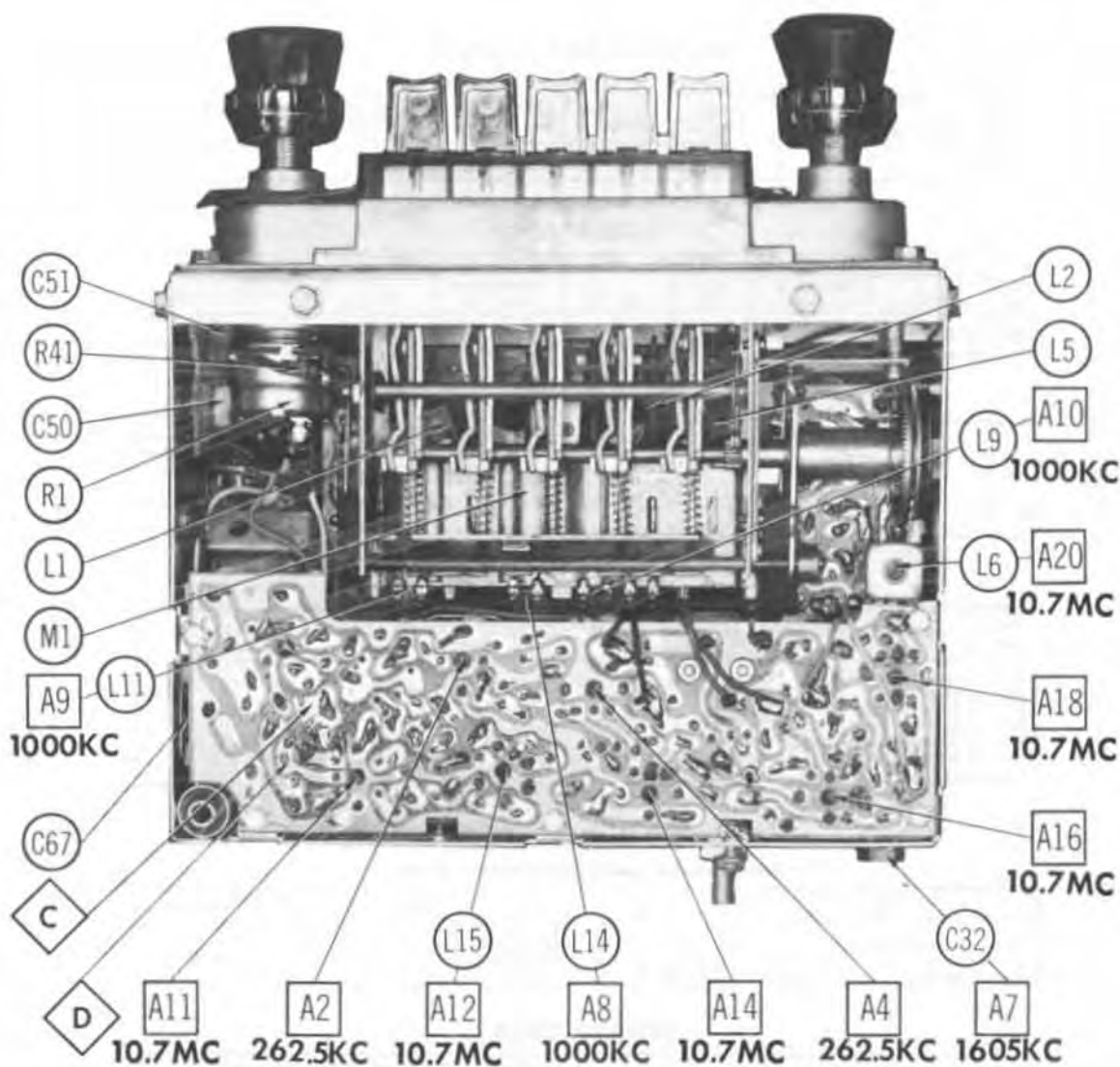
# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>



TRADE NAME : Volvo Model 7FBVOX (1967 P144, P1200, P1300, P1800, P2200)  
 SUPPLIER : For Current Address, See Annual Index  
 TYPE SET : 11-Transistor AM-FM Receiver  
 POWER SUPPLY : 12 Volts Storage Battery  
 RATING : .25 Amp. @ 12.6 Volts DC

VOLVO MODEL 7FBVOX



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

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# ALIGNMENT INSTRUCTIONS

Check for specified source voltage.  
Use only enough generator output to provide a usable indication.  
Suggested Alignment Tools:

A1 thru A23. GENERAL CEMENT: 9440  
WALSCO: 2501

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1. High side thru .1mfd to point $\diamond$ , low side to ground.	262.5KC (400v Mod.)	High Freq. End Stop.	Output Meter across voice coil.	A1, A2, A3, A4	Adjust for maximum.
2. Thru dummy (Fig. 1) to antenna receptacle.	1605KC	"	"	A5, A6, A7	"
Step 3 is not necessary unless tuner has been tampered with or associated components have been replaced. IF necessary, back tuning cores (A8, A9, A10) out of coils but not out of forms. Repeat step 2.					
3. Thru dummy (Fig. 1) to antenna receptacle.	1000KC	Tune to Signal.	Output Meter across voice coil.	A8, A9, A10	Adjust for maximum. Repeat steps 2 & 3 until no further improvement is noted.
With radio installed in car and antenna extended 30', tune in a weak station near 1400KC and adjust A7 for maximum output.					

### FM ALIGNMENT USING AM SIGNAL GENERATOR - SELECTOR IN FM POSITION

High side thru .01mfd to point  $\diamond$ , low side to ground.

GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
4. 10.7MC (Unmod.)	Point of non-interference.	DC probe of VTVM to point $\diamond$ ; common to ground.	A11, A12, A13, A14, A15, A16, A17, A18, A19, A20.	Adjust for maximum.
5. "	"	DC probe to point $\diamond$ ; common to ground.	A21.	Adjust for zero reading. A positive or negative reading will be obtained on either side of the correct setting.

### FM IF ALIGNMENT USING FM SIGNAL GENERATOR - SELECTOR IN FM POSITION

High side thru .01mfd to point  $\diamond$ , low side to ground. Use only enough marker signal to obtain indication. Use 60v frequency modulated signal with 450KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.

GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
4. 10.7MC (450KC Swp.)	Point of non-interference	Vert. amp. of Scope to point $\diamond$ ; low side to ground.	A11, A12, A13, A14, A15, A16, A17, A18, A19, A20.	Adjust for maximum gain and symmetry of response similar to Fig. 2 with marker as shown.
5. "	"	Vert. amp. to point $\diamond$ ; low side to ground.	A21.	Adjust A21 (Secondary) to place marker at center of crossover lines similar to Fig. 3. Adjust A 11 (Primary) for maximum amplitude and straightness of crossover lines.

### FM RF ALIGNMENT

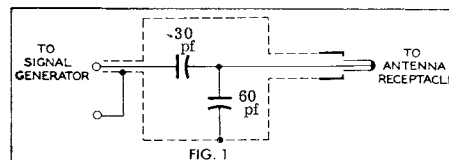
Connect generator across antenna terminals with 120Ω carbon resistors in series with each lead.

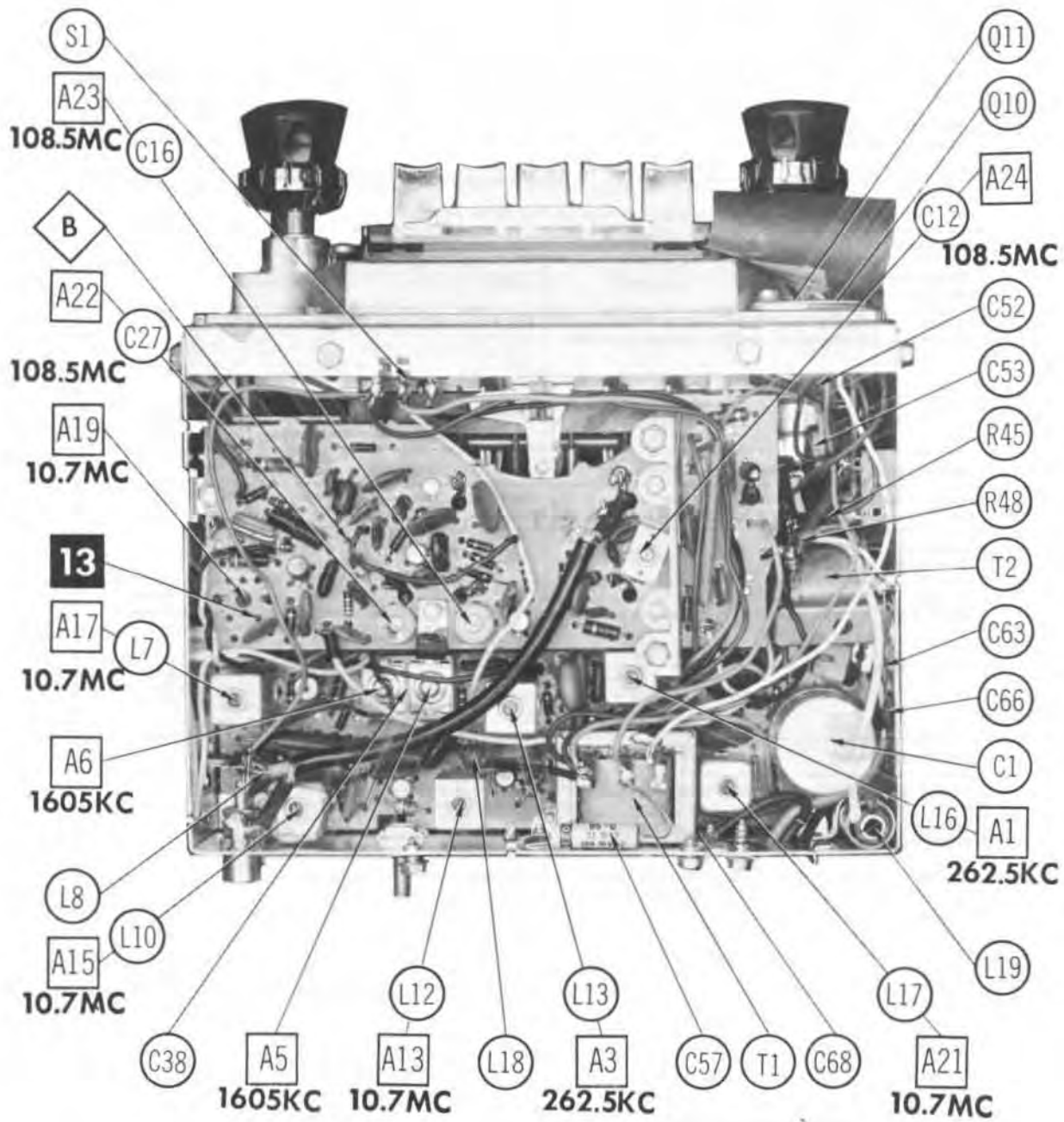
GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
6. 108.5MC	108.5MC	DC probe of VTVM to point $\diamond$ ; common to ground.	A22, A23, A24.	Adjust for maximum.

Antenna Adjustment (A7) located right rear.

**PUSH-BUTTON ADJUSTMENT**

1. Pull button out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining buttons.





44 50 43 47 2 45 20 1 19 53 52 54

42

46

Q7  
C  
E  
B

41

38

36

37

Q6  
C  
B  
E

29

Q5  
C  
E  
B



C B E  
Q4

26 22 23 21 25 14 24

55

49

51

4

48

39

35

34

33

30

32

3

31

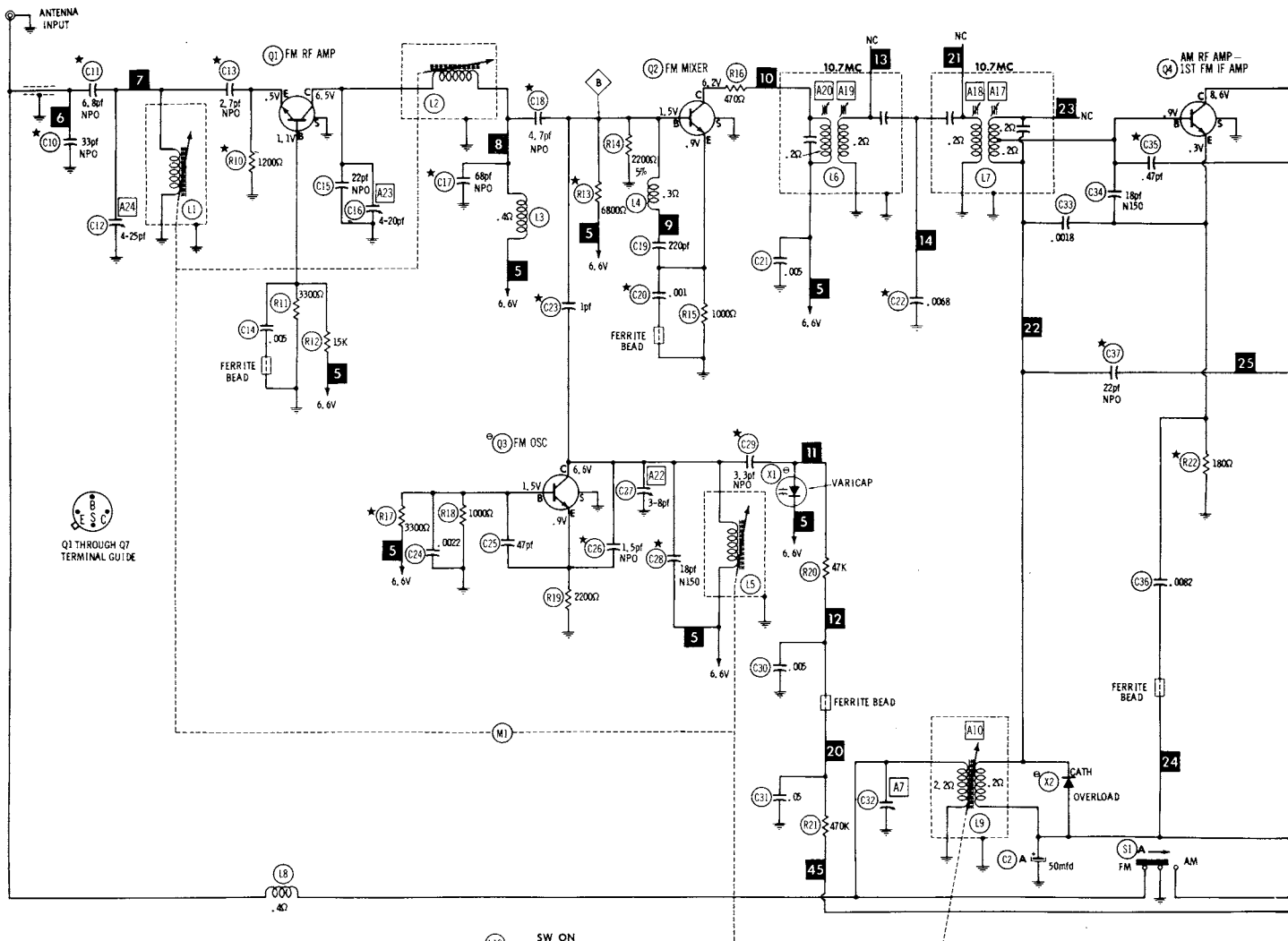
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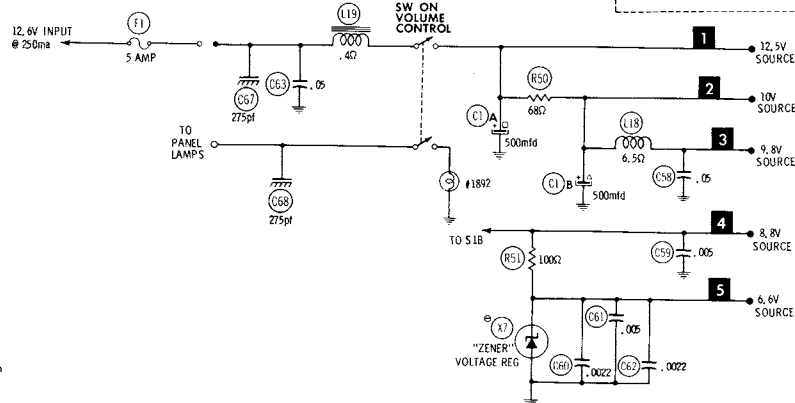
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VOLVO MODEL 7FBVOX



Q1 THROUGH Q7  
TERMINAL GUIDE



All measurements taken in "FM" position unless otherwise designated.

NC: No Connection

\* Nominal value, may vary.

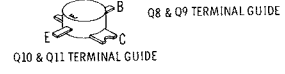
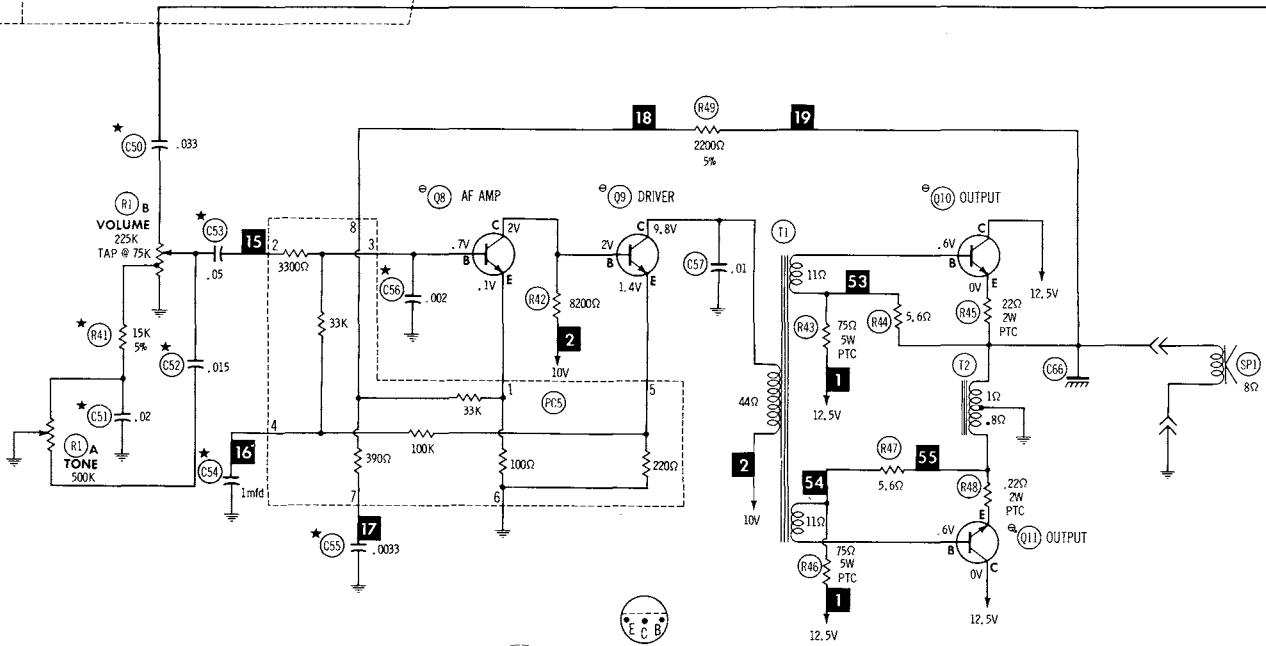
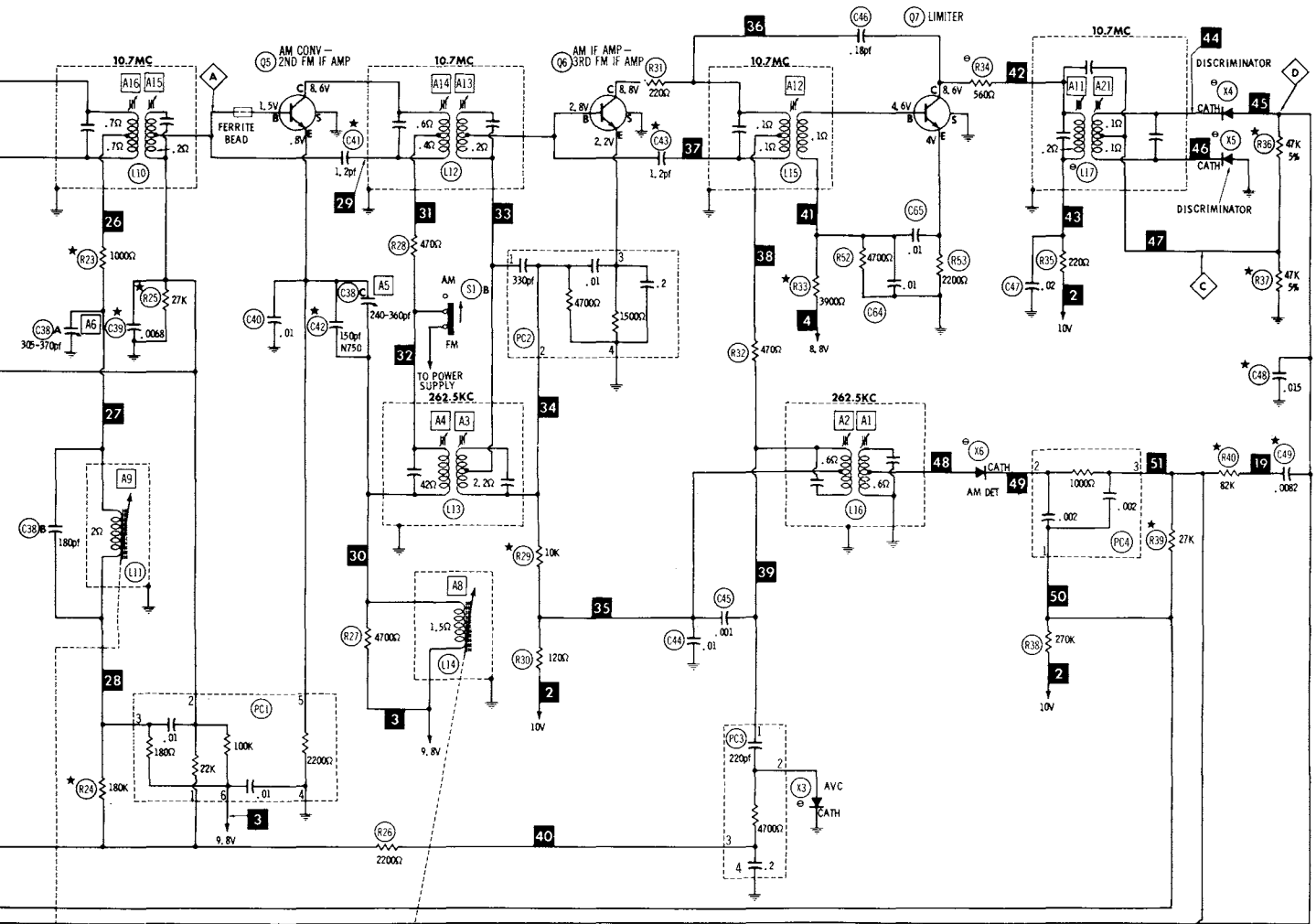
Resistors are 1/2 watt or less and rated 10% or 20% unless otherwise indicated.

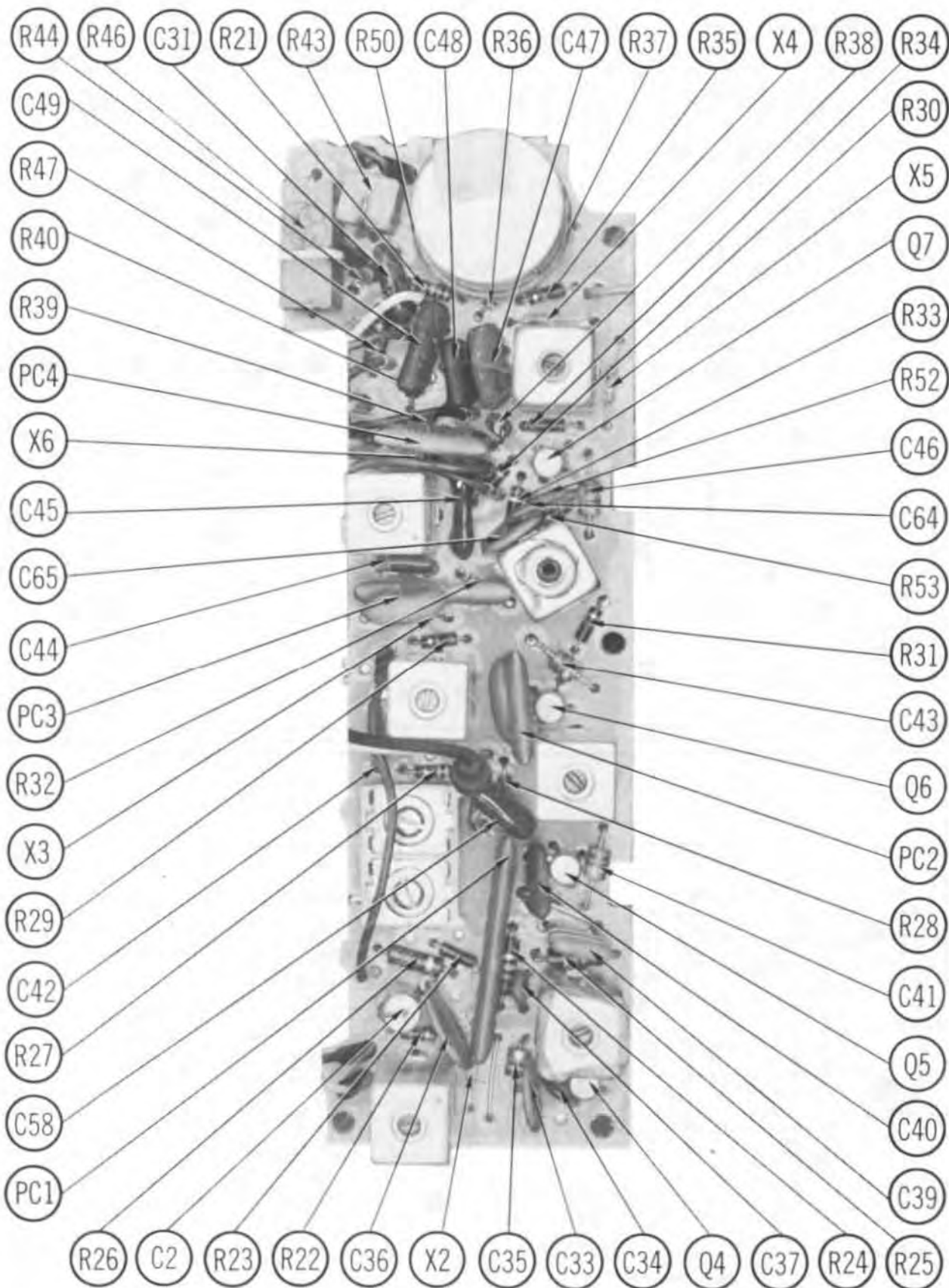
⊙ See parts list

1. Voltage measurements taken with vacuum tube voltmeter.
2. All controls set for normal operation, no signal applied.
3. Measured values are from socket pin or terminal to common ground.
4. All terminals viewed from bottom unless otherwise designated.
5. Numbers assigned to terminals may not be found on the unit.
6. Supply voltage maintained at rated value for voltage readings.
7. Resistance measurements not given because of the wide variation in internal resistance of transistor.

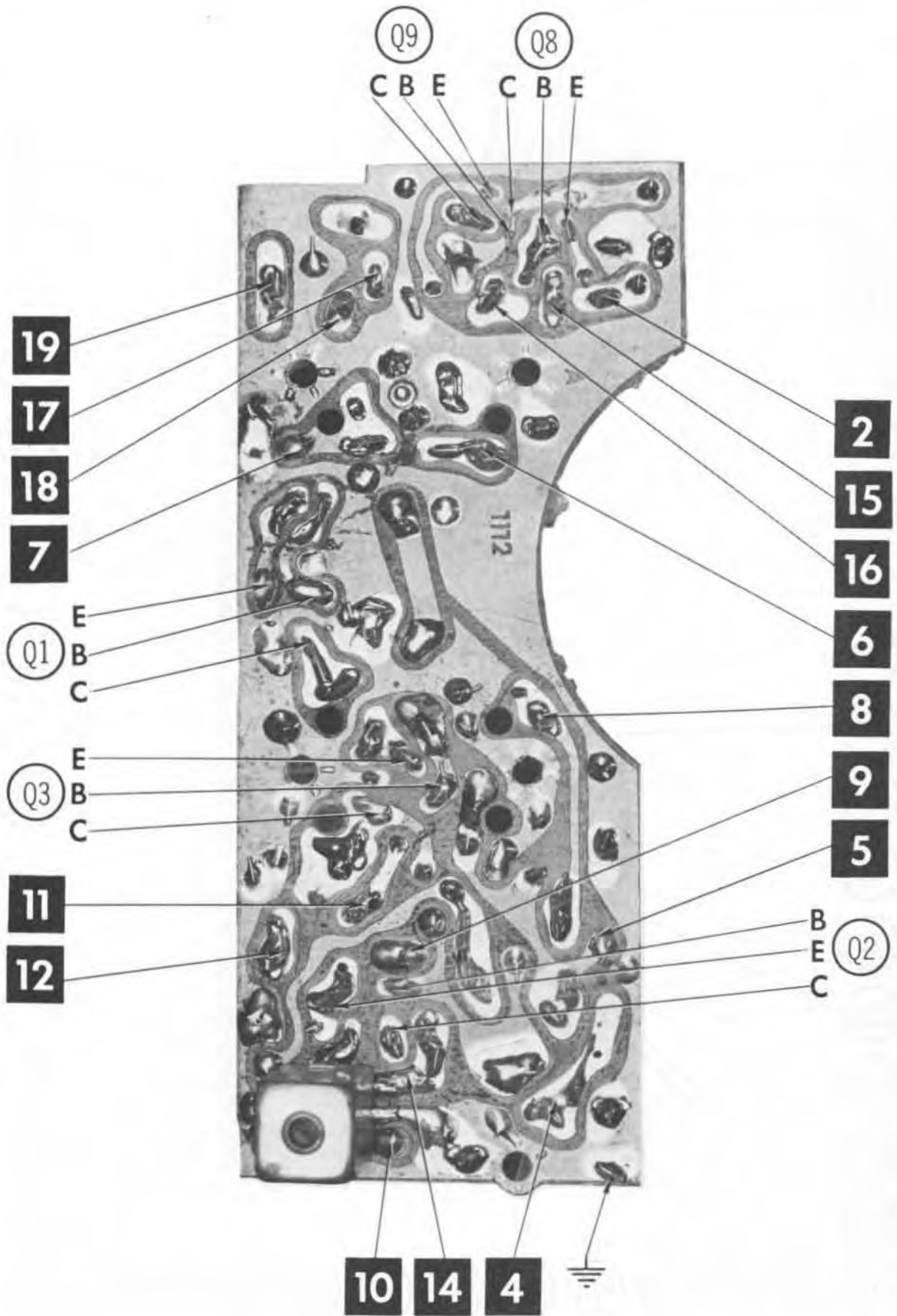
A PHOTOFAC STANDARD NOTATION SCHEMATIC  
with CIRCUITRACE

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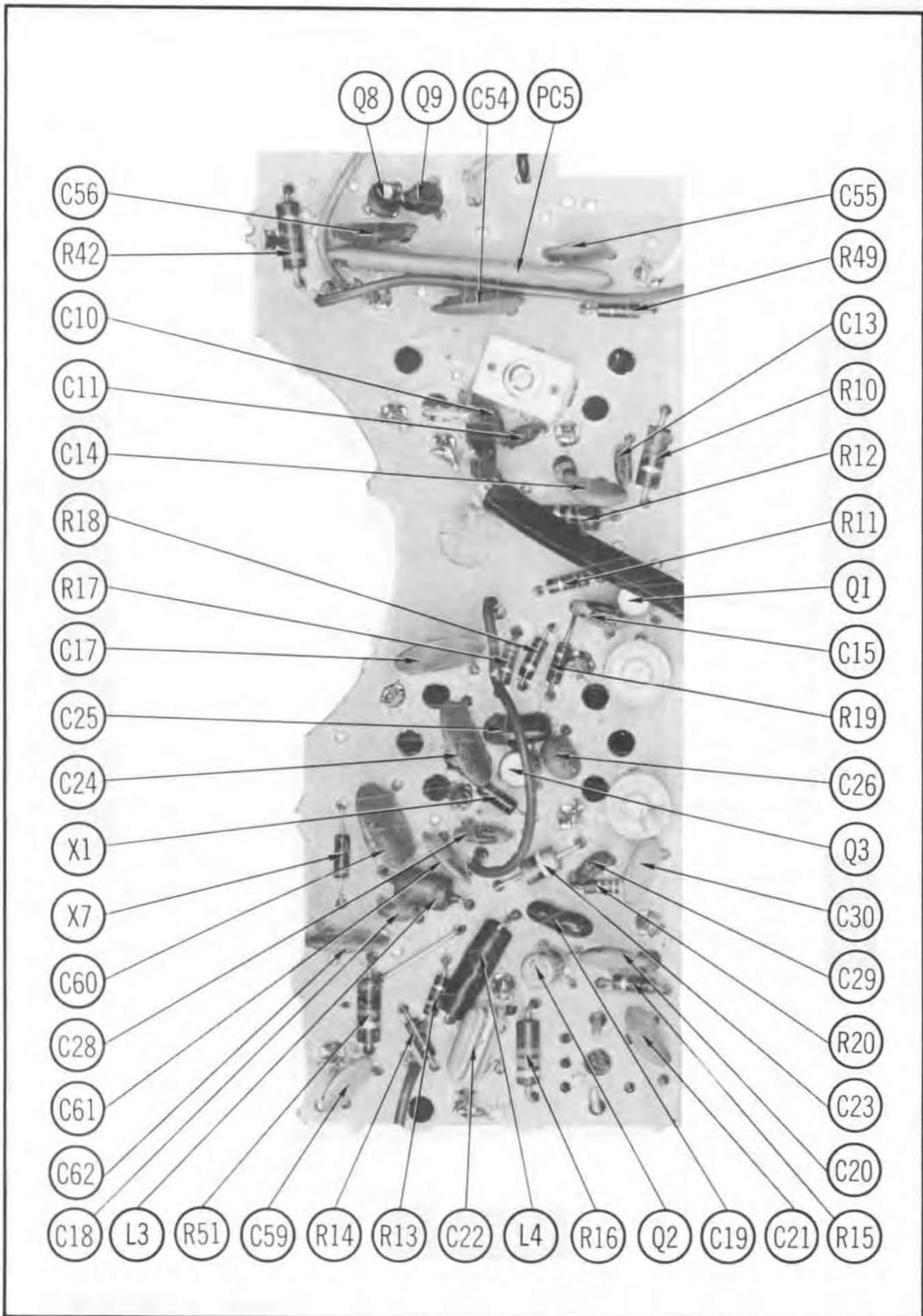












# PARTS LIST AND DESCRIPTION

(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.

## TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES	
			DELCO PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	RCA PART No.	BENDIX PART No.	NOTES
Q1		FM RF Amp	DS-81	GE-11	TR-22	SK-3018	2092417-0711	NPN
Q2		FM Mixer	DS-81	GE-11	TR-22	SK-3018	2092417-0712	NPN
Q3		FM Oscillator	DS-81	GE-11	TR-22	SK-3018	2092417-0713	NPN
Q4		AM RF Amp/1st FM IF Amp	DS-74	GE-11	TR-22	SK-3018	2092418-0715	NPN
Q5		AM Converter/2nd FM IF Amp	DS-74	GE-11	TR-22	SK-3018	2092418-0716	NPN
Q6		AM IF Amp/3rd FM IF Amp	DS-74	GE-11	TR-22	SK-3018	2092418-0717	NPN
Q7		FM Limiter	DS-74	GE-11	TR-22	SK-3018	2092418-0716	NPN
Q8		AF Amp	DS-66	GE-10	TR-21	SK-3020	2092609-0707	NPN
Q9		Driver	DS-66	GE-10	TR-21	SK-3020	2092609-0002	NPN
Q10		Output					2057323-0504	NPN
Q11		Output					2057323-0504	NPN

• When replacing, apply silicone grease to both sides of insulator. Tighten mounting screws securely.

## POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MEASURED CURRENT	ORIGINAL Part or Type No.	RECTIFIERS & DIODES		RECTIFIERS		
			GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MALLORY PART No.	RCA PART No.	SARKES TARZIAN PART No.
X1		2092055-0003					
X2		2092055-0708	1N34AS	1N34A			
X3		2092055-0708	1N34AS	1N34A			
X4		2092055-0007	1N34AS	1N34A			
X5		2092055-0007	1N34AS	1N34A			
X6		2092055-0001	1N34AS	1N34A			
X7		2092055-0710					

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA						
		BENDIX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1A	500 16V	2091503-0712	PWH2-02-40			XC2-43.05	PPF200.65	PCL-2177
C2	500 16V 50 8V	2093667-0711	CRE417A	EA15-50	NLW50-10	MT1-16	TT10X50	TE-1119

## 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	33	NPO	NPO-DI 33	DTZ-33	CS601CG330K	CCTO-330	CNO433	10TCC-Q33	
C11	6.8	NPO	NPO-DI 6.8	DTZ-6R8	CZ601CH6R8D	CCTO-6R8	CNO568	10TCC-V68	
C12	4-25		#2093115-0704						
C13	2.7	NPO	NPO-DI 3.0	DTZ-3R3		CCTO-3R3	CNO533	10TCC-V30	
C14	.005		TTD-005	CK-502	HOY101ZV502P	CCD-502	TA250	TG-D50	
C15	22	NPO	NPO-DI 22	DTZ-22	CY601CG220K	CCTO-220	CNO422	10TCC-Q22	
C16	4-20		#2094703-0702						
C17	68	NPO	NPO-DI 68	DTZ-68	CX601CG680K	CCTO-680	CNO468	10TCC-Q68	
C18	4.7	NPO	NPO-DI 4.7	DTZ-4R7		CCTO-4R7	CNO547	10TCC-V47	
C19	220		ADM-15-221	CPR-220J	CD15F221J500	DM-15-221	SX322	MS-322	
C20	.001		DI-1000	DD-102	JBS601YP102K	CCD-102	GP210	10TS-D10	
C21	.005		TTD-005	CK-502	HOY101ZV502P	CCD-502	TA250	TG-D50	
C22	.0068	25V	DBE6D68	CPR-6800J	WMF1D68	1DP-1-682	PVC4268	6PS-D68	
C23	1pf		NPO-DI 1.0	TCZ-1			CNO510	10TCC-V10	
C24	.0022		DI-2200	DD-222	JBX601YP222K	CCD-222	GP222	10TS-D22	
C25	47		ADM-15-470	CPR-47J	CD15E470J500	DM-15-470	SX447	MS-447	
C26	1.5	NPO	NPO-DI 1.0	TCZ-1			CNO510	10TCC-V10	
C27	3-8		#2094703-0701						
C28	18	N150				*	*	10TCP-Q18	
C29	3.3	NPO	NPO-DI 3.0	DTZ-3R3		CCTO-3R3	CNO533	10TCC-V30	
C30	.005		TTD-005	CK-502	HOY101ZV502P	CCD-502	TA250	TG-D50	
C31	.05	25V	DBE6S5		DPMS6S5	6DP-3-503	PVC615	6PS-S50	
C32			#2093114-0712						
C33	.0018		DI-1500	DD-152		CCD-152	GP215	10TS-D15	
C34	18	N150				*	*	10TCP-Q18	
C35	.47pf		NPO-DI 1.0	TCZ-1			CNO510	10TCC-V10	
C36	.0082		DI-822	DD-822	RR06CW822K	CCD-822	B282	30GA-D82	
C37	22	NPO	NPO-DI 22	DTZ-22	CY601CG220K	CCTO-220	CNO422	10TCC-Q22	
C38A	305-370		#2092422-0716						
C38B	180								
C38C	240-360								
C39	.0068	25V	DBE6D68	CPR-6800J	WMF1D68	1DP-1-682	PVC4268	6PS-D68	
C40	.01	25V	DBE4S1	CPR-10000J	DMF2S1	4DP-1-103	PVC211	2TM-S10	
C41	1.2		NPO-DI 1.0	TCZ-1			CNO510	10TCC-V10	
C42	150	N750	N750-DI 150	DTN-150		CCTN-150	CN7315	10TCU-T15	
C43	1.2		NPO-DI 1.0	TCZ-1			CNO510	10TCC-V10	
C44	.01	25V	DBE4S1	CPR-10000J	DMF2S1	4DP-1-103	PVC211	2TM-S10	
C45	.001		ADM-20-102	CPR-1000J	CD19F102J500	DM-19-102J	SX210	MS-21	
C46	.18pf		#2093231-2188						
C47	.02	25V	DBE4S22		DMF4S22	4DP-2-223	PVC6122	4PS-S22	
C48	.015	25V	DBE4S15		DMF4S15	4DP-1-153	PVC6115	4PS-S15	
C49	.0082	100V	DBE6D82	CPR-8200J	DPMS6D82	6DP-2-822	PVC628	6PS-D82	
C50	.033	25V	DBE4S33		DMF4S33	4DP-2-333	PVC6133	4PS-S33	
C51	.02	25V	DBE4S33		DMF4S33	4DP-2-333	PVC6133	4PS-S33	
C52	.015	25V	DBE4S15		DMF4S15	4DP-1-153	PVC6115	4PS-S15	
C53	.05	25V	DBE6S5		DPMS6S5	6DP-3-503	PVC615	6PS-S50	

VOLVO MODEL 7FBVOX

# 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	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C54	1mfid 3V			UK-105	HXC3R0XR105P			MAG31	HY-135
C55	.0033		DI-3300	DD-332	JBV601YP332K	CCD-332	GP233	10TS-D33	
C56	.002	10%	DI-2000	DM-202	JBX601YP202K	CCD-202	GP220	5GAB-D22	
C57	.01 200V		DBE4S1	CPR-10000J	DMF2S1	4DP-1-103	PVC211	2TM-S10	
C58	.05 25V		DBE8S5		DPMS8S5	6DP-3-503	PVC615	6PS-S50	
C59	.005		TTD-005	CK-502	HOY101ZV502P	CCD-502	TA250	TG-D50	
C60	.0022		DI-2200	DD-222	JBX601YP222K	CCD-222	GP222	10TS-D22	
C61	.005		TTD-005	CK-502	HOY101ZV502P	CCD-502	TA250	TG-D50	
C62	.0022		DI-2200	DD-222	JBX601YP222K	CCD-222	GP222	10TS-D22	
C63	.05 16V		TTD-05	CK-503	HOY101ZV503Z	TA150	TA150	TG-S50	
C64	.01		TTD-01	CK-103	HOY101ZV103P	CCD-103	TA110	TG-S10	
C65	.01		TTD-01	CK-103	HOY101ZV103P	CCD-103	TA110	TG-S10	
C66	.275	#2093050-0002							
C67	.275	#2093050-0002							
C68	.275	#2093050-0002							

# Bendix Part Number

† Nominal Value

\* 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	RESIST-ANCE	REPLACEMENT DATA				
			BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
RIA B	Tone Volume/Switch	500K 225K Tap @ 75K	2094685-0701	F1-500K, R14-225K, FFS113, RFS206, KR7	NP-500KS, NRF1-250K, UPC-B-113, UR-D-206, NWE-23	† QJ-2276A	■ UE4629S

† "CONCENTRIKT" Equivalent: K15 Kit with Base Elements and Shafts: B11-133, P17-126 (Panel)  
B18-130X, R9-208 (Rear)  
76-2 (Switch)

"SNAPTROL" Equivalent: BU4, CF16, CR29T, SF15, SR51, WF  
■ "STA-LOC" Equivalent: FB55L, RU254T753, OX1812A, IS2375, US42.

## RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN PART No.	BENDIX PART No.			IRC PART No.	WORKMAN PART No.	BENDIX PART No.
R43	75Ω 5W (PTC)			2090574-0003	R46	75Ω 5W (PTC)			2090574-0705
R45	.22Ω 2W (PTC)			2090948-0020	R48	.22Ω 2W (PTC)			2090948-0020

## COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
L1	FM Antenna	2056765-0001 ①			
L2	FM RF	2056766-0001 ①			
L3	RF Choke (2uh)	2092210-0007	19-1002	74F226AP	TA812
L4	FM IF Trap (1uh)	2092210-0005	19-1000	4602	T855
L5	FM Oscillator	2056767-0001 ①			
L6	1st FM IF	2093587-0706			
L7	2nd FM IF	2093587-0708			
L8	RF Choke (2uh)	2092210-0007	19-1002	74F226AP	TA812
L9	AM Antenna	①			
L10	3rd FM IF	2092421-0717			
L11	AM RF	①			
L12	4th FM IF	2093587-0703			
L13	1st AM IF	2092419-0720			
L14	AM Oscillator	①			
L15	5th FM IF	2092421-0718			
L16	2nd AM IF	2092419-0719			
L17	Discriminator	2093856-0703			
L18	RF Choke (85uh)	2092210-0711	19-3100	6112	T305

① Part of M1.

## FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	BENDIX PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
L19	250 ma	.4Ω	470 uh	2094209-0703					

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

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

### TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
			BENDIX PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
	PRI.	SEC.						
T1	5.5	1.1	2092192-0710					

### TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			BENDIX PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
	PRI.	SEC.						
T2	40Ω	Tap @ 8Ω	2094696-0704					

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA			NOTES
		BENDIX PART No.	JENSEN PART No.	QUAM PART No.	
SPI	5" x 7" PM 8Ω	2094859-0701	P5X7V8	57A1Z8	

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	AGA5	2091811-0002	2094348-0528	AGA5	HAF	301005	155004	

### COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART NO.	REPLACEMENT DATA
PC1	RF Biasing Network	180Ω, 2200Ω, 22K, 100K, .01, .01	2094687-0702	
PC2	Bias Network	1500Ω, 4700Ω, 330pf, .01, .2,	2094688-0701	
PC3	AVC Network	4700Ω, 220pf, .2	2094690-0701	
PC4	AM Detector	1000Ω, .002, .002	2094692-0702	
PC5	Audio Bias Network	3300Ω, 33K, 100K, 220Ω, 100Ω, 33K, 390Ω	2056721-0701	

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M1 S1	Tuner Assembly Switch, Selector	2094066-0511 2056700-0701	

### CABINETS & CABINET PARTS

(When Ordering Specify Model, Chassis & Color)

ITEM	PART No.	ITEM	PART No.
Escutcheon	2094551-0505	Dial Pointer	2090129-0085
Dial Glass	2094184-0505	Push Button	2056519-0001
Knob, Tuning or Volume	2091244-0002		

### WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Shielded Hook-up Wire .....	Use BELDEN No. 8885
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)

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