

PHOTOFACT® Folder



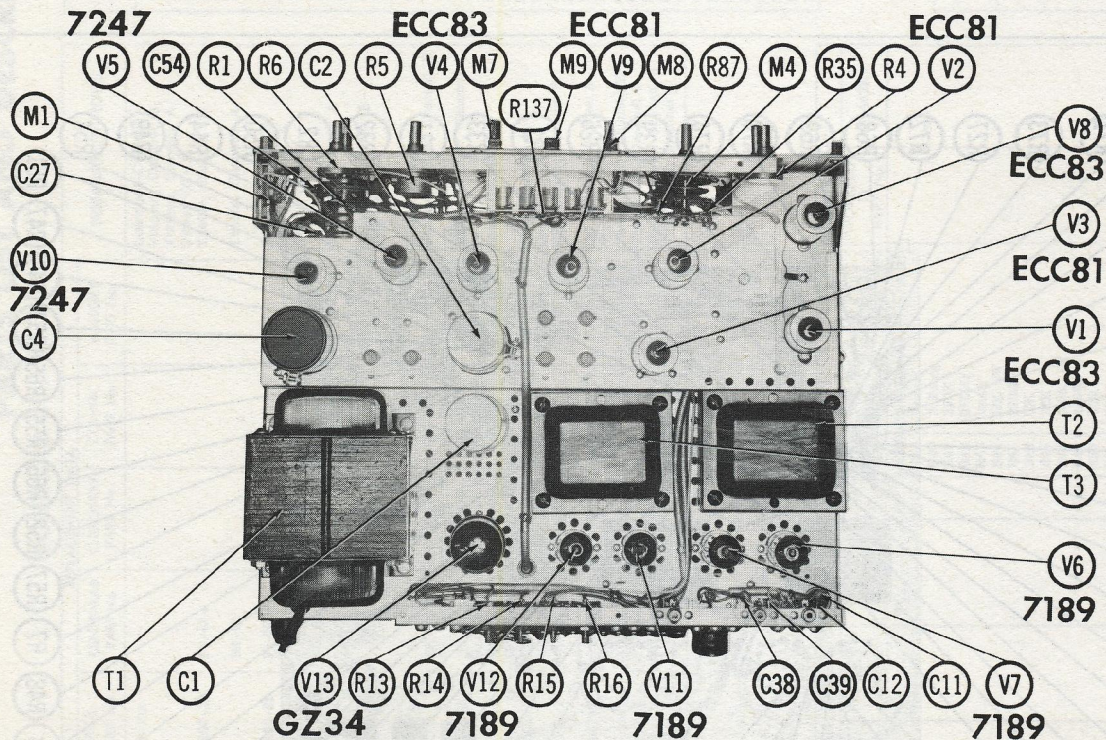
FISHER
MODEL X-202



FISHER
MODEL X-202

TRADE NAME	Fisher Model X-202
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated 13 Tube Stereo Amplifier
POWER SUPPLY	105 - 120 Volts AC, 50-60 Cycles RATING 160 Watts, 1.5 Amp. @117 Volts AC

FISHER
MODEL X-202



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

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PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING	REPLACEMENT DATA				NOTES
		FISHER PART No.	Merit PART No.	Stancor PART No.	Thornderson PART No.	
T1	117V @ ① 1.5A	740VCT ① .200A DC	5V @ 1.9A	T740-115		
	SEC. 3	SEC. 4	SEC. 5			
	6.3V @ 3.8A	24V @ .650A				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA				NOTES
		FISHER PART No.	Merit PART No.	Stancor PART No.	Thornderson PART No.	
T2	8000Ω CT	160 Tap @ 8Ω, 4Ω	T740-116A ①			
T3	8000Ω CT	160 Tap @ 8Ω, 4Ω	T740-116A ①			① Alternate Part #T740-116

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
		FISHER PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	420A	SRT740-137 *				* Bridge Type Selenium

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA			
			FISHER PART No.	HOLDER	LITTELFUSE PART No.	BUSS PART No.
M2	3AG	3.2A 125V S/B	F3319	X1036	31303.2 (3AG 3 2/10A 125V S/B)	342001 MDX 3 2/10 HKP

MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES			
			M3	M4	M5	M6
M3	Switch	S740-130	Selector (Rotary Water Type)			
M4	Switch	S740-129	Mono-Stereo (Rotary Water Type)			
M5	Switch	S50200-2	Rumble Filter (DPDT, Slide Type)			
M6	Switch	S50200-2	Tape-Monitor Off-On (DPDT, Slide Type)			
M7	Switch	S50200-2	Scratch Filter (DPDT, Slide Type)			
M8	Switch	S50200-2	Phase, Reverse-Normal (DPDT, Slide Type)			
M9	Switch	S50200-2	Center Channel Off-On (DPDT, Slide Type)			

CABINETS & CABINET PARTS

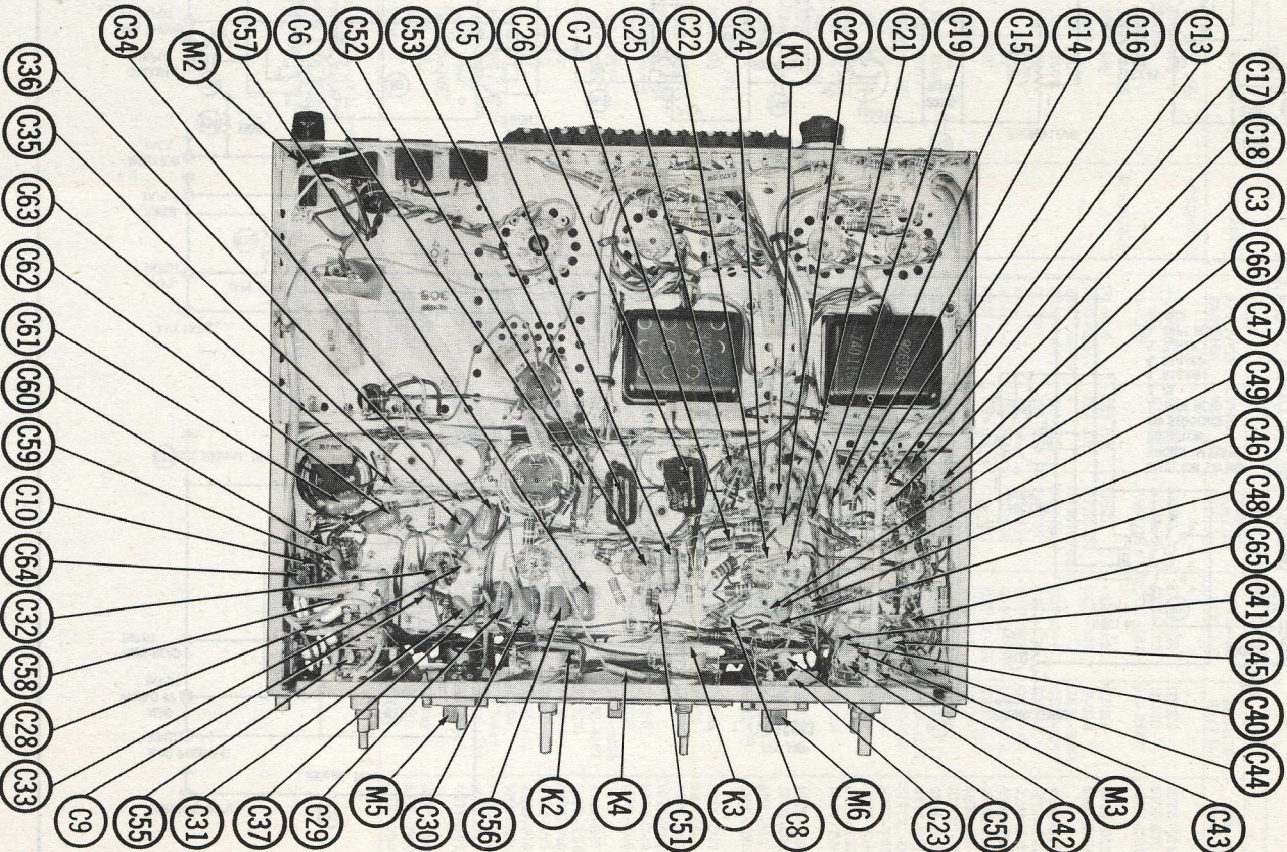
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	E50133-2	Center Channel, Dimension, Balance, Mono-Stereo
Knob	E50134-1	Selector
Knob	E50133-1	Rear: Loudness, Bass, Treble
Knob	E50132	Front: Loudness, Bass, Treble

WIRING DATA

General-use Unshielded Hook-up Wire Use BELDEN No. 8530 (Solid) Available in Ten Colors
 8524 (Stranded) Available in Ten Colors
 Power Cord Use BELDEN No. 1765-B (6 Ft. Length)
 1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS

TUBES

GENERAL ELECTRIC		RAYTHEON		SYLVANIA	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A Preamp.	ECC83/12AX7(7025)*	V7	Channel A Output	7189
V2	Channel A AF Amp.	ECC81/12AT7	V8	Channel B Preamp.	ECC83/12AX1 (7025) *
V3	Channel B AF Amp.	ECC81/12AT7	V9	Channel B AF Amp.	ECC81/12AT7
V4	Channel A AF Amp. - Cathode Follower	ECC83/12AX7(7025) *	V10	Cathode Follower	7247
V5	Channel A AF Amp. - Channel B AF Amp. - Channel A Phase Inv. - Channel A Output	7247 7189	V11	Channel B Phase Inv.	7189
V6		7189	V12	Channel B Output	7189
			V13	Rectifier	GZ34/5AR4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
		FISHER PART No.	AEROVOX PART No.	CORNELL DUBLER PART No.	MALLOY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	450	C50180-10	AFH4-18-10	D0171	FP446	TMQ-4640	TYL-4771.8	
C1B	450							
C2A	450	C50180-9	AFH4-15-10	D0179.7	FP444.5	TMQ-4637	TYL-4771.6	
C3	450							
C4A	30	C746-145	PR81570	BR2025	TC55	TD-20-250	TVA-1508 TVLS-2243 *	①
C5	50	C623-138	PPT-50008	NLW8-100	TT150X8	MLYU-50	TE-1303.3	
C7	50	C623-138	PPT-50008	NLW25-6	TT150X8	MLYU-50	TE-1303.3	
C8	6	C638-114	PPT-6025	NLW23-6	TT16X25	ML25-6	TE-1091	
C9	6	C638-114	PPT-6025	NLW23-6	TT16X25	ML25-6	TE-1091	
C10	6	C639-114	PPT-6025	NLW23-6	TT16X25	ML25-6	TE-1091	

① Not used in some versions.
 * Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBLER PART No.	ELEMENTCO PART No.	MALLOY PART No.	SPRAGUE PART No.
C11	180 10%		DI-180	DD-181	LI0718	CCD-181	GP318	107S-718
C12	390 10%		DI-390	DD-391	LI0739	CCD-391	GP339	107S-739
C13	1200 10%		DI-1200	DD-122	5R8D12	CCD-122	GP212	107S-D12
C14	560 10%		DI-560	DD-561	5R8T56	CCD-561	GP356	107S-756
C15	100 N1500	#C50070-6	DI-390	DD-391	LI0739	CCD-391	GP339	107S-739
C16	390 10%		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C17	10000		BPD-02	DD-203	BYB8S2	CCD-203	B-120	5HK-S20
C18	20000							

Note 1. Not used in some versions.
 † Alternate Value.

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

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBLER PART No.	ELEMENTCO PART No.	MALLOY PART No.	SPRAGUE PART No.
C19	15 NT5 10%	#C50070-18	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C20	1000 10%		DI-02	DD-203	BYB8S2	CCD-203	B-120	5HK-S20
C21	2000 10%		DI-3300		PM6D33	CCD-332	JL-233	107S-D33
C22	330 10%	#C50070-8	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C23	24 N150 5%		BPD-005	DD-502	DEMS4P68	CCD-502	GP250	5HK-D50
C24	1000 10%		P488N-47	DD-503	CUB4S47	CCD-503	GEM-6068	4TM-S47
C25	5000		P488N-1	DD-330	LI0733	CCD-331	GEM-4147	107S-T33
C26	68 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C27	497 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C28	330 10%		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C29	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C30	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C31	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C32	2000	Note 1	BPD-02	DD-203	BYB8S2	CCD-203	B-120	5HK-S20
C33	47 N150 10%	(30-N150) †	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C34	497 400V		P488N-47	DD-503	CUB4S47	CCD-503	GEM-4147	4TM-S47
C35	10 N150 10%		P488N-10	DD-100	CUB4S47	CCD-100	CNO-410	107CC-Q40
C36	10 N150 10%		P488N-10	DD-100	CUB4S47	CCD-100	CNO-410	107CC-Q40
C37	820 10%		DI-820	DD-821	5R8T82	CCD-821	GP382	107S-T82
C38	180 10%		DI-390	DD-391	LI0718	CCD-391	GP318	107S-T18
C39	390 10%		DI-390	DD-391	LI0739	CCD-391	GP339	107S-T39
C40	100 N1500		DI-390	DD-391	LI0739	CCD-391	GP339	107S-T39
C41	100 N1500		DI-390	DD-391	LI0739	CCD-391	GP339	107S-T39
C42	560 10%		DI-560	DD-561	5R8T56	CCD-561	GP356	107S-T56
C43	1200 10%		DI-122	DD-122	5R8D12	CCD-122	GP212	107S-D12
C44	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C45	20000		BPD-02	DD-203	BYB8S2	CCD-203	B-120	5HK-S20
C46	15 NT5 10%	#C50070-18	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C47	1000 10%		BPD-02	DD-203	BYB8S2	CCD-203	JL-233	107S-D33
C48	2000 10%		DI-3300		PM6D33	CCD-332		
C49	330 10%	#C50070-3	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C50	30 N150 10%		BPD-005	DD-502	BYA10S5	CCD-502	GEM-6068	4TM-S47
C51	1000 10%		P488N-47	DD-503	DEMS4P68	CCD-503	GEM-4147	4TM-S47
C52	5000		P488N-1	DD-331	LI0733	CCD-331	GP333	107S-T33
C53	68 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C54	497 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C55	330 10%		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C56	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C57	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C58	1 250V		P488N-1	DF-104	CUB4P1	CCD-3104	GEM-401	4TM-P10
C59	20000	Note 1	BPD-02	DD-203	BYB8S2	CCD-203	B-120	5HK-S20
C60	47 N150 10%	(30-N150) †	DI-1000	DD-102	5R8D1	CCD-102	GP210	107S-D10
C61	497 400V		P488N-47	DD-503	CUB4S47	CCD-503	GEM-4147	4TM-S47
C62	497 400V		P488N-47	DD-503	CUB4S47	CCD-503	GEM-4147	4TM-S47
C63	15 NT5 10%	#C50070-18	DI-890	DD-821	5R8T82	CCD-821	GP382	107S-T82
C64	820 10%		BPD-005	DD-502	BYA10S5	CCD-502	GP250	5HK-D50
C65	5000		BPD-005	DD-502	BYA10S5	CCD-502	GP250	5HK-D50
C66	5000		BPD-005	DD-502	BYA10S5	CCD-502	GP250	5HK-D50

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING	REPLACEMENT DATA		FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS - IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
		IRC PART No.	WORKMAN TV PART No.						
R1A	Switch 100K *			R140-128					Loudness - Contour Volume, Channel B Volume, Channel A Power Off-On
R1B	Switch 100K *			R50160-39	F3-42 *				Treble, Channel B
R1C	Switch 500K Tap			R4-42					Treble, Channel A
R1D	Switch 500K Tap			R50160-25	F1-56 *				Base, Channel B
R2A	500K Tap			R50160-36	B-5				Base, Channel A
R2B	500K Tap			R50160-37	Not Req.				Center Channel
R3A	500K Tap					A47-1000-S			Balance, Channel A
R3B	500K Tap					FS-3			Balance, Channel B
R3C	400K Tap								Balance, Channel B
R4A	50K			R50160-38	EX-31	A47-50K-S			Stereo Dimension
R4B	50K			R50103-3	Not Req.	FKS-1/4			Phase Inverter, Channel B
R4C	50K			R50103-3	Not Req.	FKS-1/4			Phase Inverter, Channel A
R4D	50K			R50103-4	Not Req.	FKS-1/4			Phase Inverter, Channel A
R5A	5000Ω			R50103-4	Not Req.	A47-5000-S			Bias, Channel B
R5B	5000Ω			R50103-4	Not Req.	FKS-1/4			Bias, Channel A
R5C	5000Ω			R50103-4	Not Req.	FKS-1/4			Bias, Channel A
R6A	50K			R50103-2	Not Req.	A47-50K-S			DC Balance, Channel B
R6B	50K			R50103-2	Not Req.	A47-50K-S			DC Balance, Channel A
R6C	50K			R50103-2	Not Req.	FKS-1/4			DC Balance, Channel A
R6D	50K			R50103-2	Not Req.	FKS-1/4			DC Balance, Channel A
R7A	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel B
R7B	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel B
R7C	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A
R7D	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A
R8A	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A
R8B	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A
R8C	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A
R8D	50K			R50160-11	Not Req.	MLC254L			Phone Level, Channel A

* Tap @ 40K and 60K.
 † 500K Tap Not used.
 ‡ Use AK-32 Friction Springs.

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

RESISTORS

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		IRC PART No.	WORKMAN TV PART No.			IRC PART No.	WORKMAN TV PART No.			IRC PART No.	WORKMAN TV PART No.
R17	100K			R38	2.7meg			R59	2200Ω		
R18	100K			R39	10meg			R60	47K		
R19	100K			R40	2.2meg			R61	100 2W		
R20	330K 1W			R41	220K			R62	2200Ω		
R21	2700Ω 1W			R42	2700Ω			R63	220K		
R22	15Ω			R43	1meg			R64	47K		
R23	120K			R44	18K 1W			R65	3900Ω		
R24	10meg			R45	270Ω			R66	5600Ω		
R25	1.5meg			R46	10K			R67	47Ω 5W		
R26	270K			R47	22K			R68	100K		
R27	4.7meg			R48	100K 1W			R69	100K		
R28	220K			R49	2200Ω			R70	330K 1W		
R29	470K			R50	47K			R71	100K		
R30	1.8meg			R51	820K			R72	2700Ω 1W		
R31	470K 1W			R52	470K			R73	15Ω		
R32	470K			R53	3900Ω			R74	10meg		
R33	330K			R54	2200Ω			R75	1.5meg		
R34	330K			R55	2.2meg			R76	270K		
R35	90K			R56	1.3meg			R77	470K		
R36	2.2meg			R57	8200Ω			R78	220K		
R37	560K			R58	2200Ω			R79	220K		
R38	560K			R59	2200Ω			R80	470K		
R39	560K			R60	2200Ω			R81	1.8meg		
R40	560K			R61	10meg			R82	2.2meg		
R41	560K			R62	10K			R83	47K 1W		
R42	560K			R63	330K			R84	470Ω		
R43	560K			R64	330K			R85	330K		
R44	560K			R65	330K			R86	330K		
R45	560K			R66	330K			R87	56K		
R46	560K			R67	2.2meg			R88	560K		
R47	560K			R68	10meg			R89	560K		
R48	560K			R69	10meg			R90	10meg		
R49	560K			R70	2.2meg			R91	2.2meg		
R50	560K			R71	2.2meg			R92	2.2meg		
R51	560K			R72	2.2meg			R93	2.2meg		
R52	560K			R73	2.2meg			R94	2.2meg		
R53	560K			R74	2.2meg			R95	2.2meg		
R54	560K			R75	2.2meg			R96	10K 1W		
R55	560K			R76	2.2meg			R97	270Ω		
R56	560K			R77	2.2meg			R98	10K		
R57	560K			R78	2.2meg			R99	22K		
R58	560K			R79	2.2meg			R100	100K 1W		

* Alternate Value.

RESISTORS (cont)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		IRC PART No.	WORKMAN TV PART No.			IRC PART No.	WORKMAN TV PART No.			IRC PART No.	WORKMAN TV PART No.
R59	220K			R101	2200Ω			R121	27K		
R60	47K			R102	47K			R122	4700Ω		
R61	100 2W			R103	820K			R123	2200Ω 5W	PW5-2200	10W-2200
R62	2200Ω			R104	470K			R124	2200Ω 5W	PW5-2200	10W-2200
R63	220K			R105	3900Ω			R125	1500Ω 1W	PW10-1500	10W-1500
R64	47K			R106	220Ω			R126	1500Ω 1W	PW10-1500	10W-1500
R65	3900Ω			R107	2.2meg			R127	4000Ω 5W	PW5-4000	5W-SQ-4000
R66	5600Ω			R108	1.5meg			R128	7500Ω 1W	PW10-7500	10W-7500
R67	47Ω 5W			R109	8200Ω			R129	4000Ω 7W	PW5-4000	5W-SQ-4000
R68	100K			R110	18K			R130	2500Ω 7W	PW10-2500	10W-2500
R69	100K			R111	2200Ω			R131	2500Ω 7W	PW10-2500	10W-2500
R70	330K 1W			R112	220K			R132	4700Ω		
R71	100K			R113	47K			R133	4700Ω		
R72	2700Ω 1W			R114	100 2W			R134	15Ω 2W	PW5-15	5W-SQ-15
R73	15Ω			R115	2200Ω			R135	2200Ω		
R74	10meg			R116	220K			R136	2200Ω		
R75	1.5meg			R117	47K			R137	47Ω		
R76	270K			R118	3900Ω			R138	2.2meg		
R77	470K			R119	5600Ω			R139	18K		
R78	220K			R120	0.47Ω 5W			R140	2200Ω 1W		
R79	220K			R121	27K			R141	7500Ω 1W		
R80	470K			R122	4700Ω			R142			
R81	1.8meg			R123	2200Ω 5W			R143			
R82	2.2meg			R124	2200Ω 5W			R144			
R83	47K 1W			R125	1500Ω 1W						
R84	470Ω			R126	1500Ω 1W						
R85	330K			R127	4000Ω 5W						
R86	330K			R128	7500Ω 1W						
R87	56K			R129	4000Ω 7W						
R88	2.2meg			R130	2500Ω 7W						
R89	560K			R131	2500Ω 7W						
R90	10meg			R132	4700Ω						
R91	2.2meg			R133	4700Ω						
R92	2.2meg			R134	15Ω 2W						
R93	2.2meg			R135	2200Ω						
R94	2200Ω			R136	2200Ω						
R95	10K 1W			R137	47Ω						
R96	10K 1W			R138	2.2meg						
R97	270Ω			R139	18K						
R98	10K			R140	2200Ω 1W						
R99	22K			R141	7500Ω 1W						
R100	100K 1W			R142							

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	FISHER PART No.	REPLACEMENT DATA
K1	Scratch Filter	100mmf, 100mmf, 220mmf, 100K, 100K	PC5087-2	
K2	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 120K	PC651-140A	
K3	Scratch Filter	100mmf, 100mmf, 220mmf, 100K, 100K	PC5087-2	
K4	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 120K	PC651-140A	

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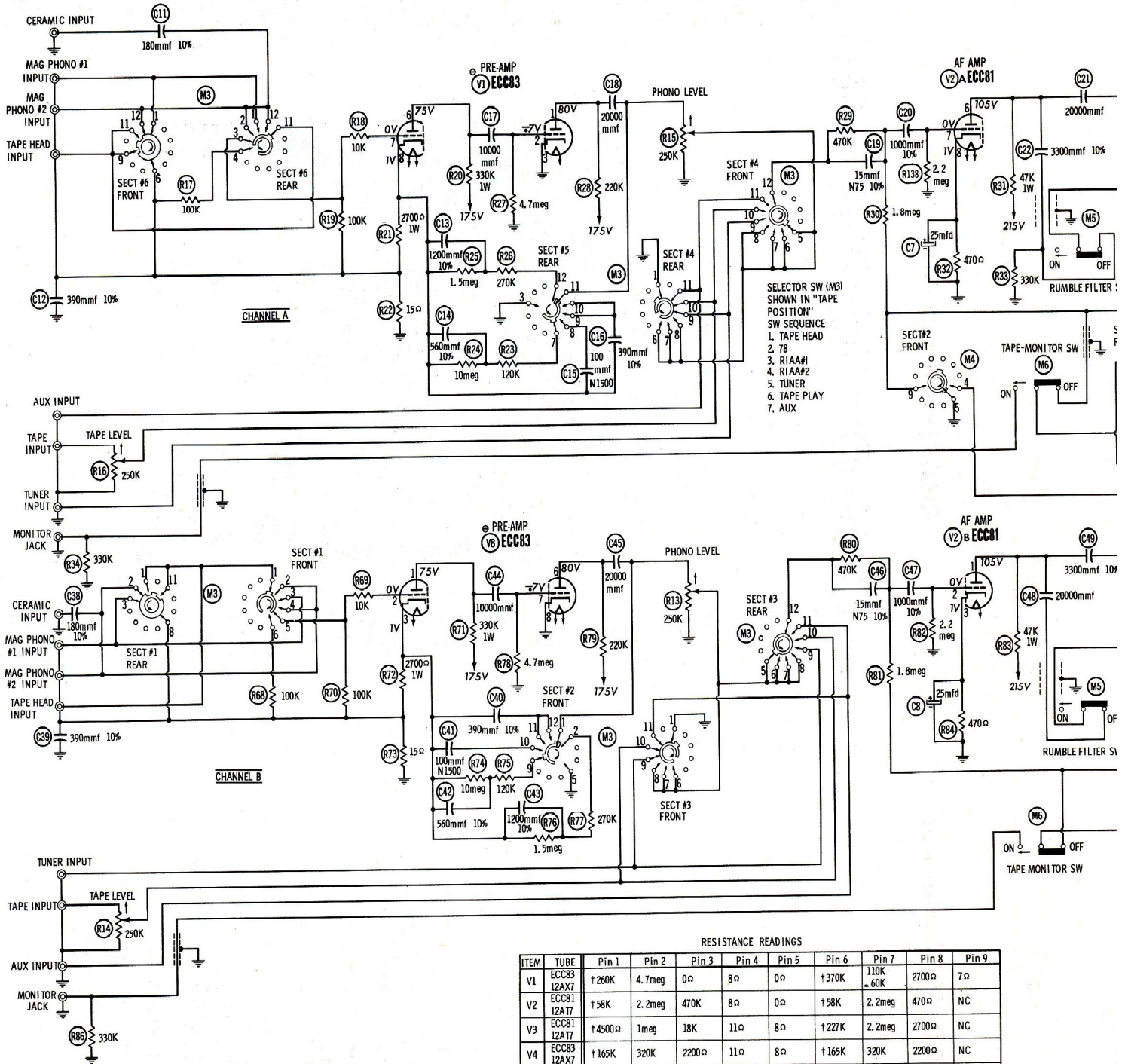
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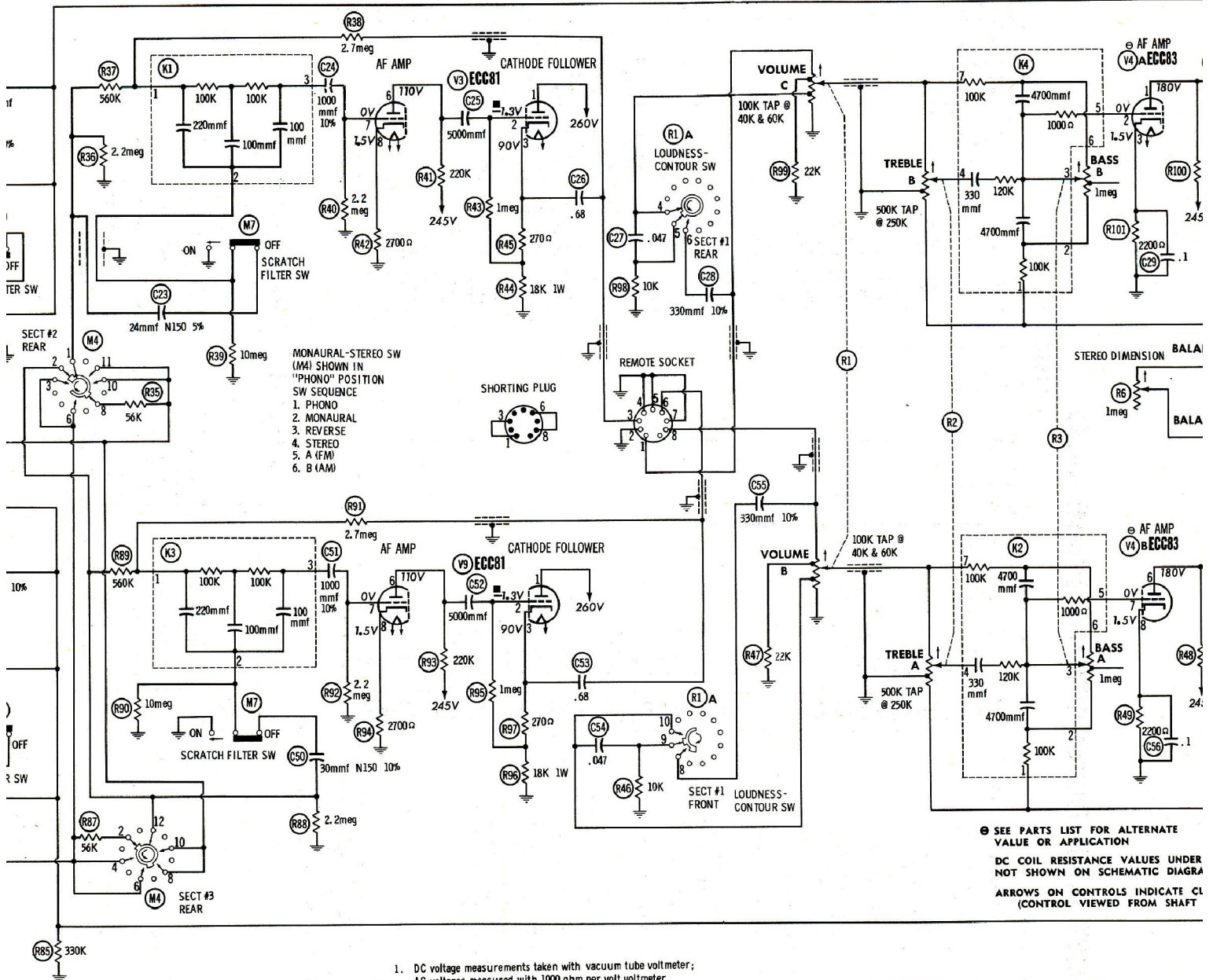
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RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†260K	4.7meg	0Ω	8Ω	0Ω	†370K	110K -60K	2700Ω	7Ω
V2	ECC81 12A7	†58K	2.2meg	470K	8Ω	0Ω	†58K	2.2meg	470Ω	NC
V3	ECC81 12A7	†4500Ω	1meg	18K	11Ω	8Ω	†227K	2.2meg	2700Ω	NC
V4	ECC83 12AX7	†165K	320K	2200Ω	11Ω	8Ω	†165K	320K	2200Ω	NC
V5	7247	†32K	1.5meg	32K	110Ω	110Ω	†475K	820K	4100Ω	110Ω
V6	7189	NC	260K	0Ω	110Ω	110Ω	NC	†210Ω	NC	†4100Ω
V7	7189	NC	260K	0Ω	110Ω	110Ω	NC	†220Ω	NC	†4100Ω
V8	ECC83 12AX7	†370K	110K -60K	2700Ω	8Ω	0Ω	†260K	4.7meg	0Ω	7Ω
V9	ECC81 12A7	†4500Ω	1meg	18K	11Ω	8Ω	†227K	2.2meg	2700Ω	NC
V10	7247	†32K	1.5meg	32K	110Ω	110Ω	†475K	820K	4100Ω	110Ω
V11	7189	NC	260K	0Ω	110Ω	110Ω	NC	†210Ω	NC	†4100Ω
V12	7189	NC	260K	0Ω	110Ω	110Ω	NC	†220Ω	NC	†4100Ω
V13	6Z34 5AR4	NC	†	NC	44Ω	NC	46Ω	NC	†	†

† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
 † MEASURED FROM PIN 8 OF V13. ■ MEASURED FROM CATHODE.
 ● MEASURED WITH SELECTOR IN ANY POSITION EXCEPT TAPE HEAD.
 NC NO CONNECTION



SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
 DC COIL RESISTANCE VALUES UNDER NOT SHOWN ON SCHEMATIC DIAGRA
 ARROWS ON CONTROLS INDICATE CL (CONTROL VIEWED FROM SHAFT)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

ADJUSTMENTS
 The adjustments should be made in the order outlined below. Turn the Level Set controls on rear panel fully counter-clockwise, Mono-Stereo switch to Stereo, Selector to appropriate position, Tape switch to Record and all other controls to Off, Normal or Flat position.

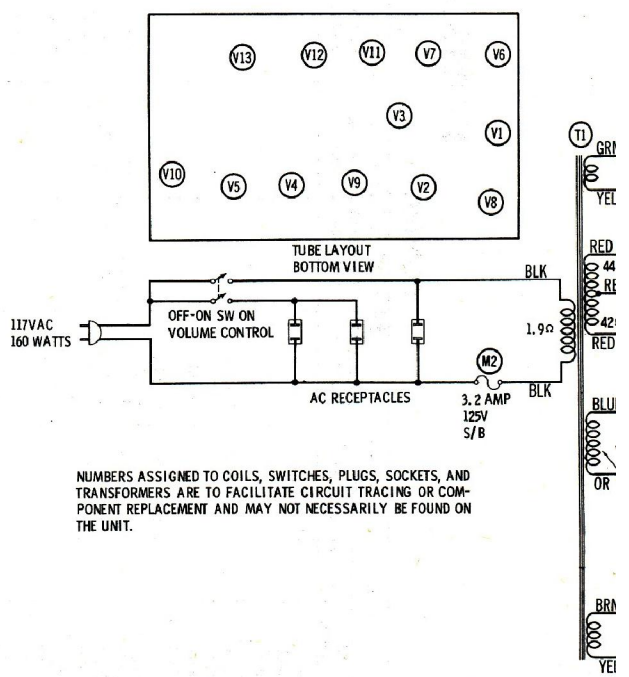
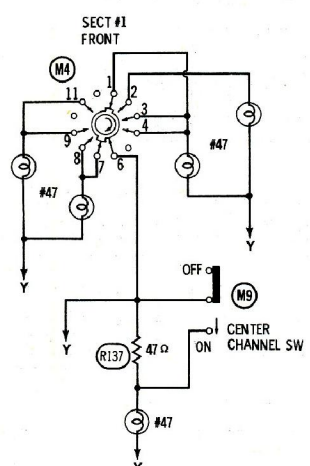
BIAS ADJUSTMENT
 Unsolder one end of the shorting wire of R61 and R14 (10 ohm) in the cathode circuits of Output tubes. Connect a VTVM across the resistor in Channel A. Adjust Channel A Bias Adjust control for 0.6 volts. Repeat the procedure for Channel B.

Recheck Channel A. Do not resolder the wires if the next adjustment is to be performed.

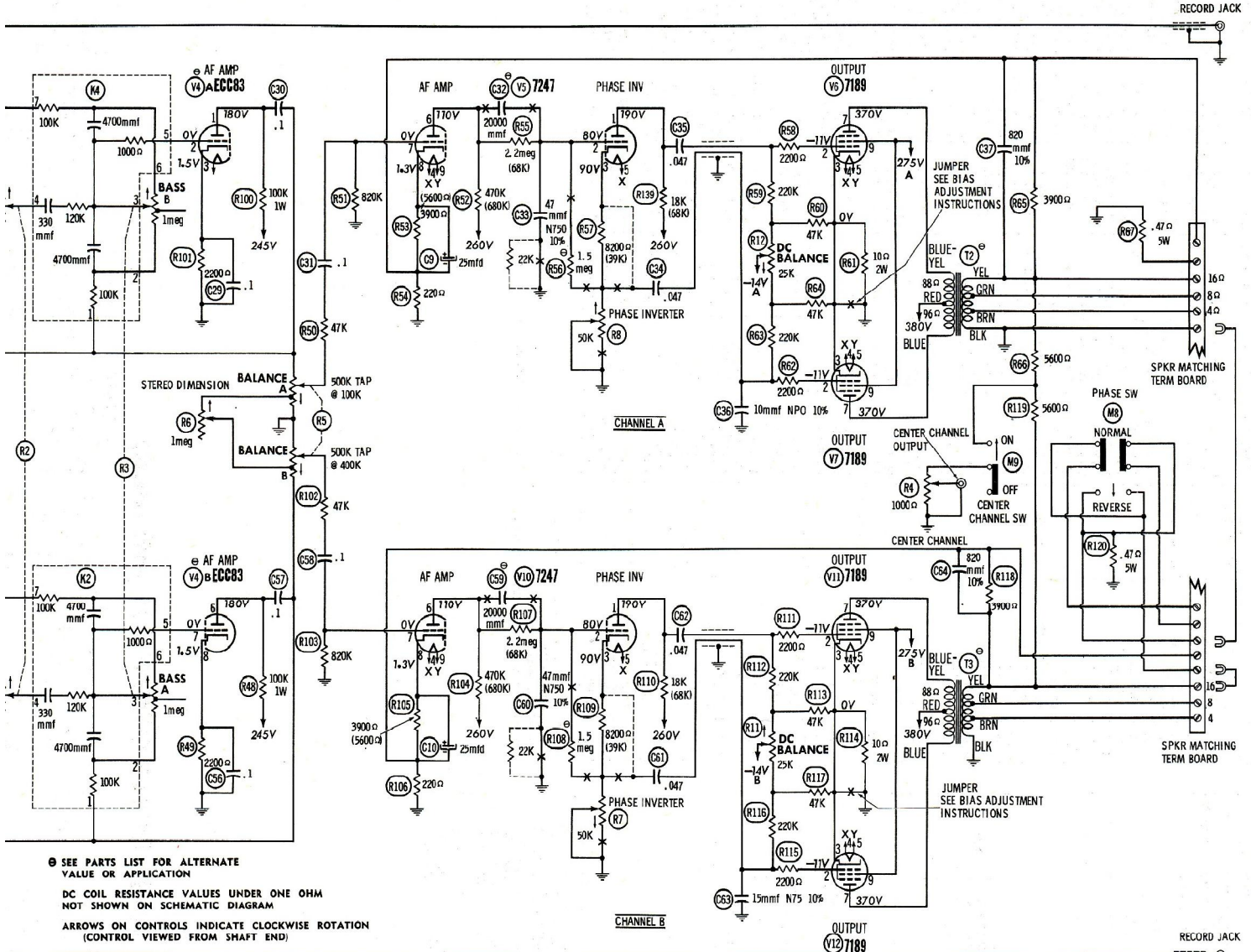
DC BALANCE ADJUSTMENT
 Connect the VTVM across speaker terminals G and I6 in Channel A. Adjust Channel A DC Balance for MINIMUM deflection. This should be 0.5 millivolts or less.

Repeat procedure for Channel B using terminals G and I6, and adjusting Channel B DC Balance control. Resolder the wires across R61 and R14.

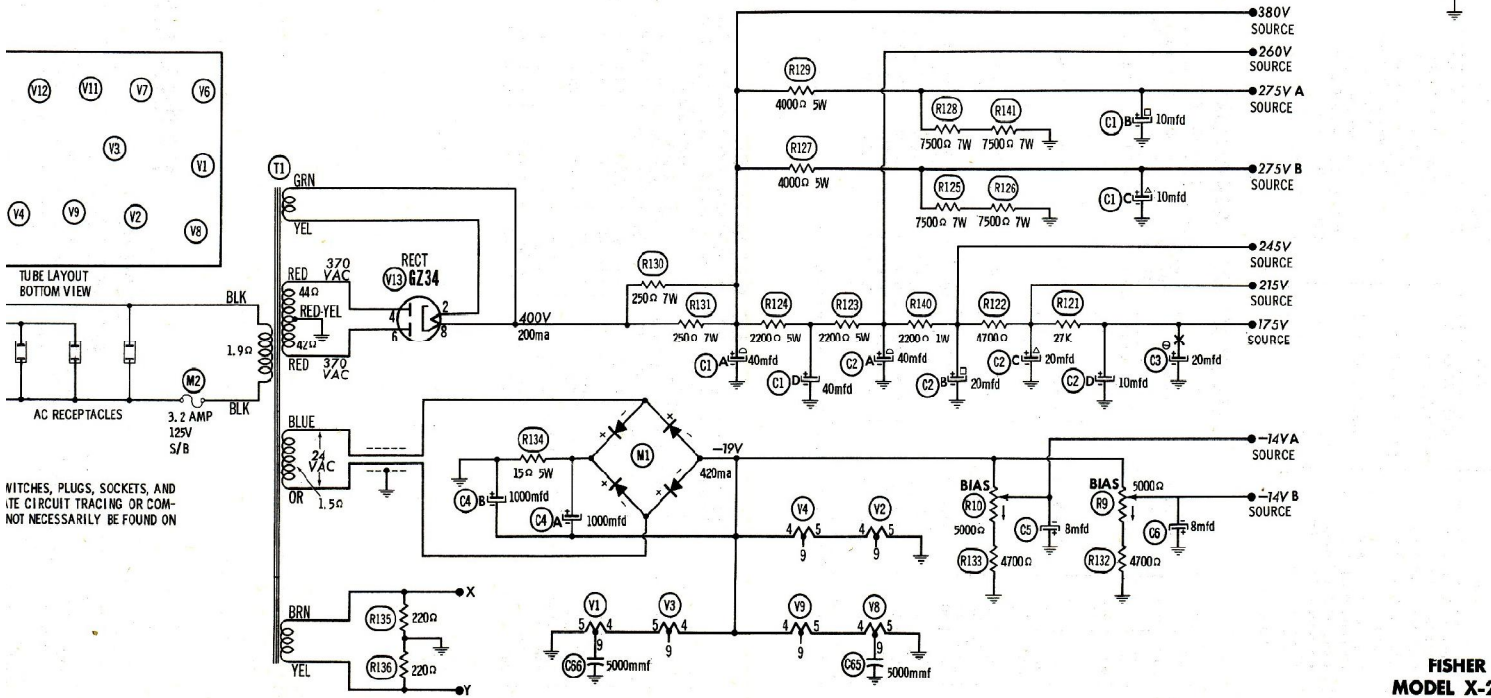
PHASE INVERTER ADJUSTMENT
 Precise adjustments can be made only with an Intermodulation Analyzer and Audio Generator. In lieu of these instruments, set Phase Inv. controls to mid-position.



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
 ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



WITCHES, PLUGS, SOCKETS, AND ITC CIRCUIT TRACING OR COM-NOT NECESSARILY BE FOUND ON