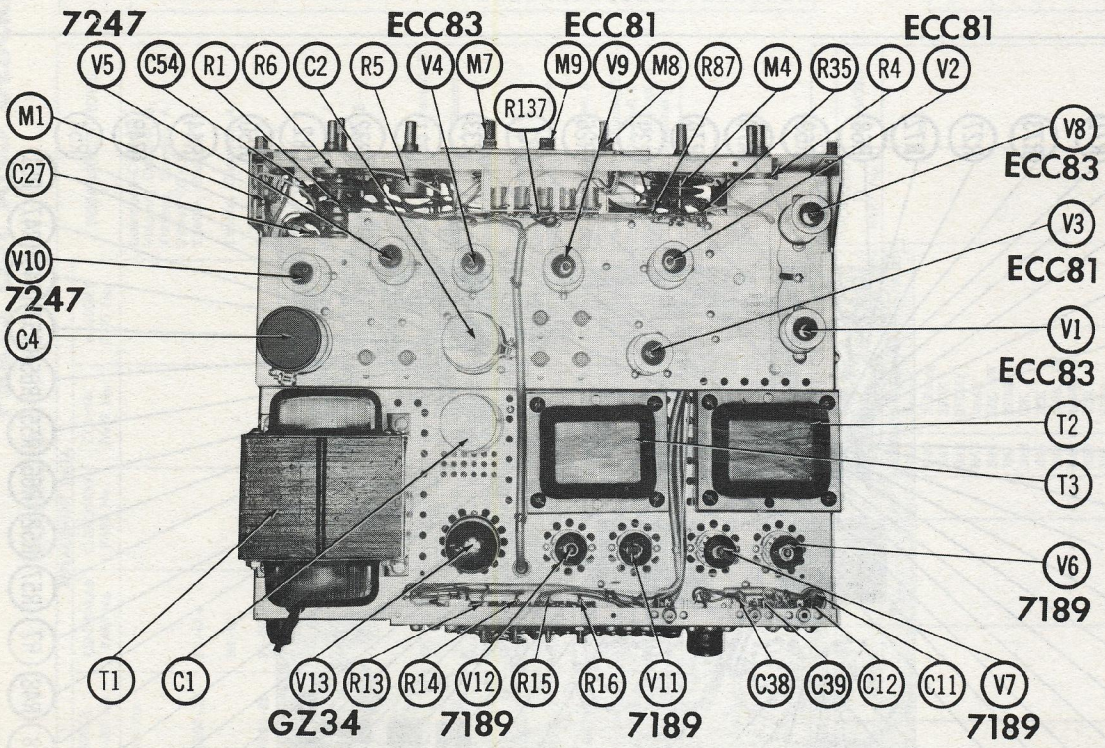
PHOTOFACT® Folder

FISHER
MODEL X-202

FISHER
MODEL X-202

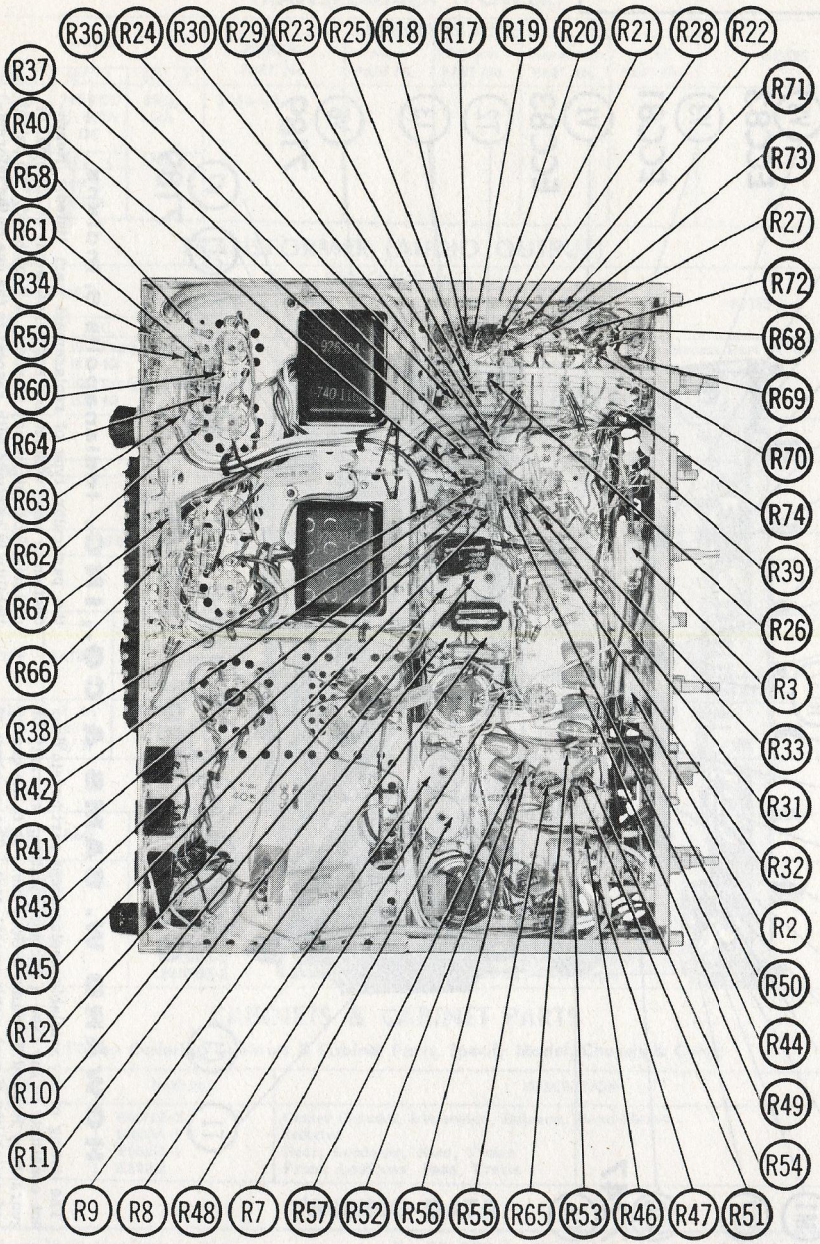
TRADE NAME	Fisher Model X-202
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated 13 Tube Stereo Amplifier
POWER SUPPLY	105 — 120 Volts AC, 50-60 Cycles RATING 160 Watts, 1.5 Amp. @117 Volts AC



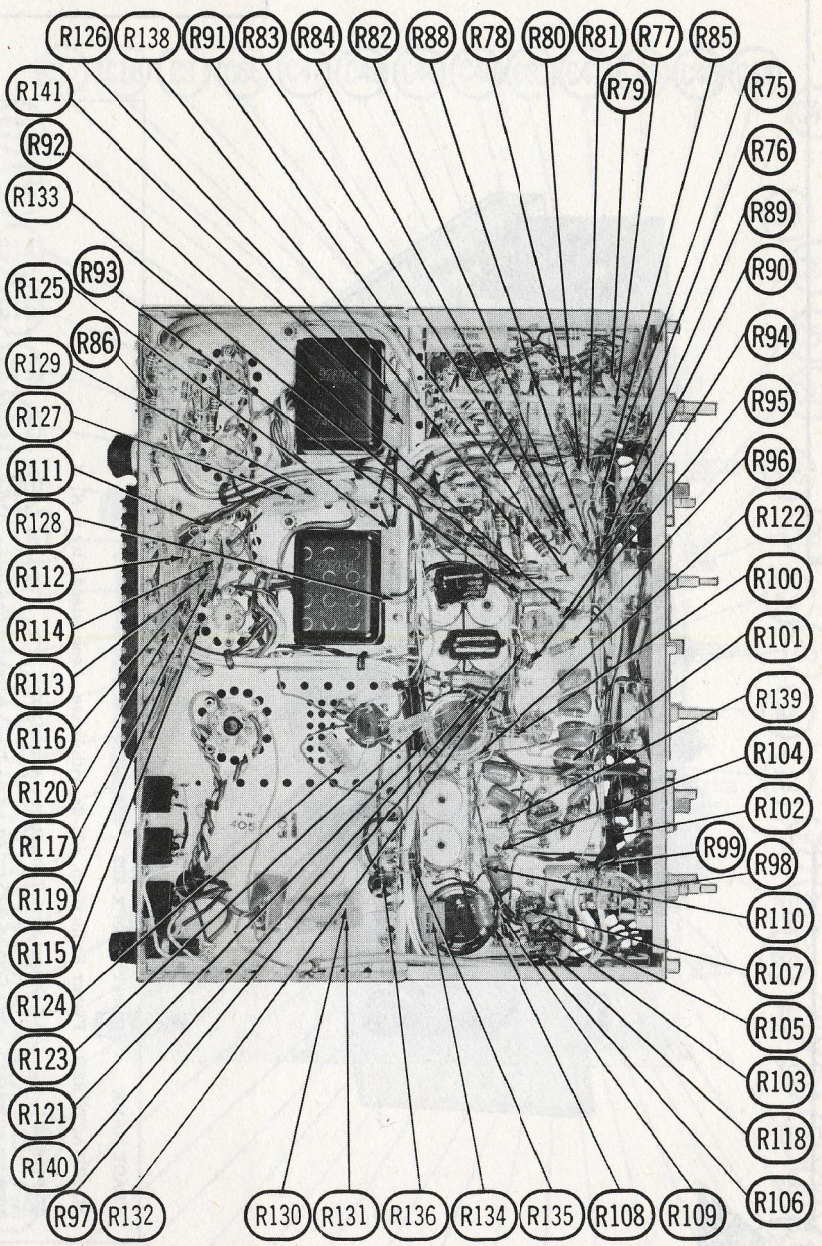
FISHER
MODEL X-202

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

SET 526 FOLDER 4



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA FISHER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
	PRI.	SEC. 1	SEC. 2						
T1	117V ⓐ ⓐ 1.5A	740 VCT ⓐ .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 FISHER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
	PRI.	SEC.						
T2	8000Ω CT	16Ω Tap ⓐ 8Ω, 4Ω	T740-116A ①					① Alternate Part #T740-116
T3	8000Ω CT	16Ω Tap ⓐ 8Ω, 4Ω	T740-116A ①					

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA FISHER PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	420A	SR740-137 *				* Bridge Type Selenium

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA FISHER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
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	Switch	S740-130	Selector (Rotary Wafer Type)
M4	Switch	S740-129	Mono-Stereo (Rotary Wafer 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)

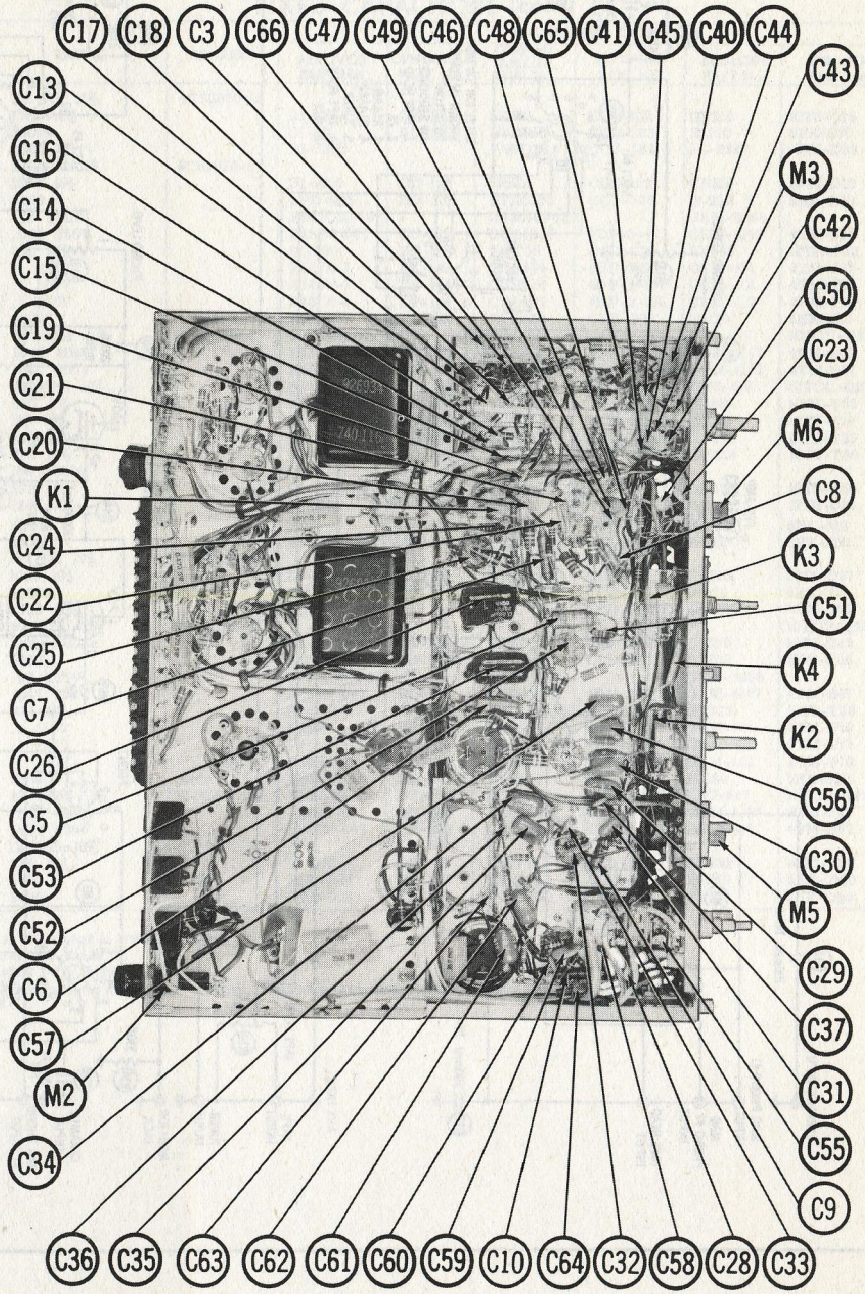
NAME	PART NO.	DESCRIPTION
Knob	E50133-2	Center Channel, Dimension, Balance, Mono-Stereo
Knob	E50154-1	Selector
Knob	E50153-1	Rear; Loudness, Bass, Treble
Knob	E50152	Front; Loudness, Bass, Treble

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
V1	Channel A Preamp.	ECC83/12AX7(7025)*
V2	Channel A AF Amp. - Channel B AF Amp.	ECC81/12AT7
V3	Channel A AF Amp. - Cathode Follower	ECC81/12AT7
V4	Channel A AF Amp. - Channel B AF Amp.	ECC83/12AX7(7025) *
V5	Channel A AF Amp. - Channel A Phase Inv.	7247
V6	Channel A Output	7189
V7	Channel A Output	7189
V8	Channel B Preamp.	ECC83/12AX7 (7025) *
V9	Channel B AF Amp. - Cathode Follower	ECC81/12AT7
V10	Channel B AF Amp. - Channel B Phase Inv.	7247
V11	Channel B Output	7189
V12	Channel B Output	7189
V13	Rectifier	GZ34/5AR4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	C50180-10	AFH4-18-10	D0171	FP446	TMQ-4640	TVL-4771.8	
B	■10	450							
C	▲10	450							
D	40	450							
C2A	▲40	450	C50180-9	AFH4-15-10	D0179.7	FP444.5	TMQ-4637	TVL-4771.6	
B	■20	450							
C	▲20	450							
D	10	450							
C3	20	250	C746-145	PRS1570	BR2025	TC55	TD-20-250	TVA-1508	①
C4A	▲1000	30	C50180-7					TVLS-2243 *	
B	▲1000	30							
C5	8	50	C629-138	PTT-50008	NLW8-100	TT150X8	MLV10-50	TE-1303.3	
C6	8	50	C629-138	PTT-50008	NLW8-100	TT150X8	MLV10-50	TE-1303.3	
C7	25	6	C639-114	PTT-6025	NLW25-6	TT6X25	ML25-6	TE-1091	
C8	25	6	C639-114	PTT-6025	NLW25-6	TT6X25	ML25-6	TE-1091	
C9	25	6	C639-114	PTT-6025	NLW25-6	TT6X25	ML25-6	TE-1091	
C10	25	6	C639-114	PTT-6025	NLW25-6	TT6X25	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

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.
C11	180 10%		DI-180	DD-181	L10T18	CCD-181	GP318	10TS-T18
C12	390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C13	1200 10%		DI-1200	DD-122	5R5D12	CCD-122	GP212	10TS-D12
C14	560 10%		DI-560	DD-561	5R5T56	CCD-561	GP356	10TS-T56
C15	100 N1500	#C50070-6		TCL-100		*		
C16	390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20

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.
C19	15 N75 10%	#C50070-18				*		
C20	1000 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C21	20000		DI-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C22	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C23	24 N150 5%	#C50070-8				*		
C24	1000 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C25	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C26	.68 250V		P484CM-68		DPMS4P68		GEM-6068	
C27	.047 250V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C28	330 10%		DI-330	DD-330	L10T33	CCD-331	GP333	10TS-T33
C29	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C30	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C31	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C32	20000	Note 1	BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C33	47 N750 10%	(30-N150) †	N750-DI 47	DTN-470	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C34	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C35	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C36	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C37	820 10%		DI-820	DD-821	5R5T82	CCD-821	GP382	10TS-T82
C38	180 10%		DI-180	DD-181	L10T18	CCD-181	GP318	10TS-T18
C39	390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C40	390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C41	100 N1500			TCL-100		*		
C42	560 10%		DI-560	DD-561	5R5T56	CCD-561	GP356	10TS-T56
C43	1200 10%		DI-1200	DD-122	5R5D12	CCD-122	GP212	10TS-D12
C44	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C45	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C46	15 N75 10%	#C50070-18				*		
C47	1000 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C48	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C49	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C50	30 N150 10%	#C50070-3				*		10TCP-Q33
C51	1000 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C52	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C53	.68 250V		P484CM-68		DPMS4P68		GEM-6068	
C54	.047 250V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C55	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C56	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C57	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C58	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C59	20000	Note 1	BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C60	47 N750 10%	(30-N150) †	N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C61	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C62	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C63	15 N75 10%	#C50070-18				*		
C64	820 10%		DI-820	DD-821	5R5T82	CCD-820	GP382	10TS-T82
C65	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C66	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

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.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		R740-128					Loudness-Contour
B	100K *	1/2						Volume, Channel B
C	100K *	1/2						Volume, Channel A
D	Switch							Power Off-On
R2A	500K	1/2	R50160-39	F3-42 ♦				Treble, Channel B
	250K Tap							
B	500K	1/2		R4-42				Treble, Channel A
	250K Tap							
R3A	1meg †	1/2	R50160-25	F1-56 ♦				Bass, Channel B
B	1meg †	1/2		R2-56				Bass, Channel A
R4A	1000Ω	1/2	R50160-36	B-5	A47-1000-S	Q11-108	U-4	Center Channel
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	500K	1/2	R50160-37				FA55T15	Balance, Channel A
	100K Tap							
B	500K	1/2					RU55T35	Balance, Channel B
	400K Tap							
C	Shaft						CS3500	
R6	1meg	1/2	R50160-38					Stereo Dimension
R7A	50K	2	R50103-3	BX-31	A47-50K-S	Q11-123	SU-35	Phase Inverter, Channel B
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R8A	50K	1/2	R50103-3	BX-31	A47-50K-S	Q11-123	SU-35	Phase Inverter, Channel A
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R9A	5000Ω	1/2	R50103-4	BX-10	A47-5000-S	Q11-114	U-14	Bias, Channel B
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R10A	5000Ω	1/2	R50103-4	BX-10	A47-5000-S	Q11-114	U-14	Bias, Channel A
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R11A	25K	1/2	R50103-2	AB-26	A47-25K-S	Q11-120	SU-29	DC Balance, Channel B
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R12A	25K	1/2	R50103-2	AB-26	A47-25K-S	Q11-120	SU-29	DC Balance, Channel A
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R13	250K	.2	R50160-11	JP-254			MLC254L	Phono Level, Channel B
R14	250K	.2	R50160-11	JP-254			MLC254L	Tape Level, Channel B
R15	250K	.2	R50160-11	JP-254			MLC254L	Phono, Level, Channel A
R16	250K	.2	R50160-11	JP-254			MLC254L	Tape Level, Channel A

* Taps @ 40K and 60K.
† 500K Tap Not used.
♦ Use AK-32 Friction Spring.

RESISTORS

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

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R17	100K			
R18	10K			
R19	100K			
R20	330K 1W			
R21	2700Ω 1W			
R22	15Ω			
R23	120K			
R24	10meg			
R25	1.5meg			
R26	270K			
R27	4.7meg			
R28	220K			
R29	470K			
R30	1.8meg			
R31	47K 1W			
R32	470Ω			
R33	330K			
R34	330K			
R35	56K			
R36	2.2meg			
R37	560K			
R38	2.7meg			
R39	10meg			
R40	2.2meg			
R41	220K			
R42	2700Ω			
R43	1meg			
R44	18K 1W			
R45	270Ω			
R46	10K			
R47	22K			
R48	100K 1W			
R49	2200Ω			
R50	47K			
R51	820K			
R52	470K			
R53	3900Ω			(5600Ω) *
R54	220Ω			
R55	2.2meg			(68K) *
R56	1.5meg			
R57	8200Ω			(39K) *
R58	2200Ω			

RESISTORS (cont)

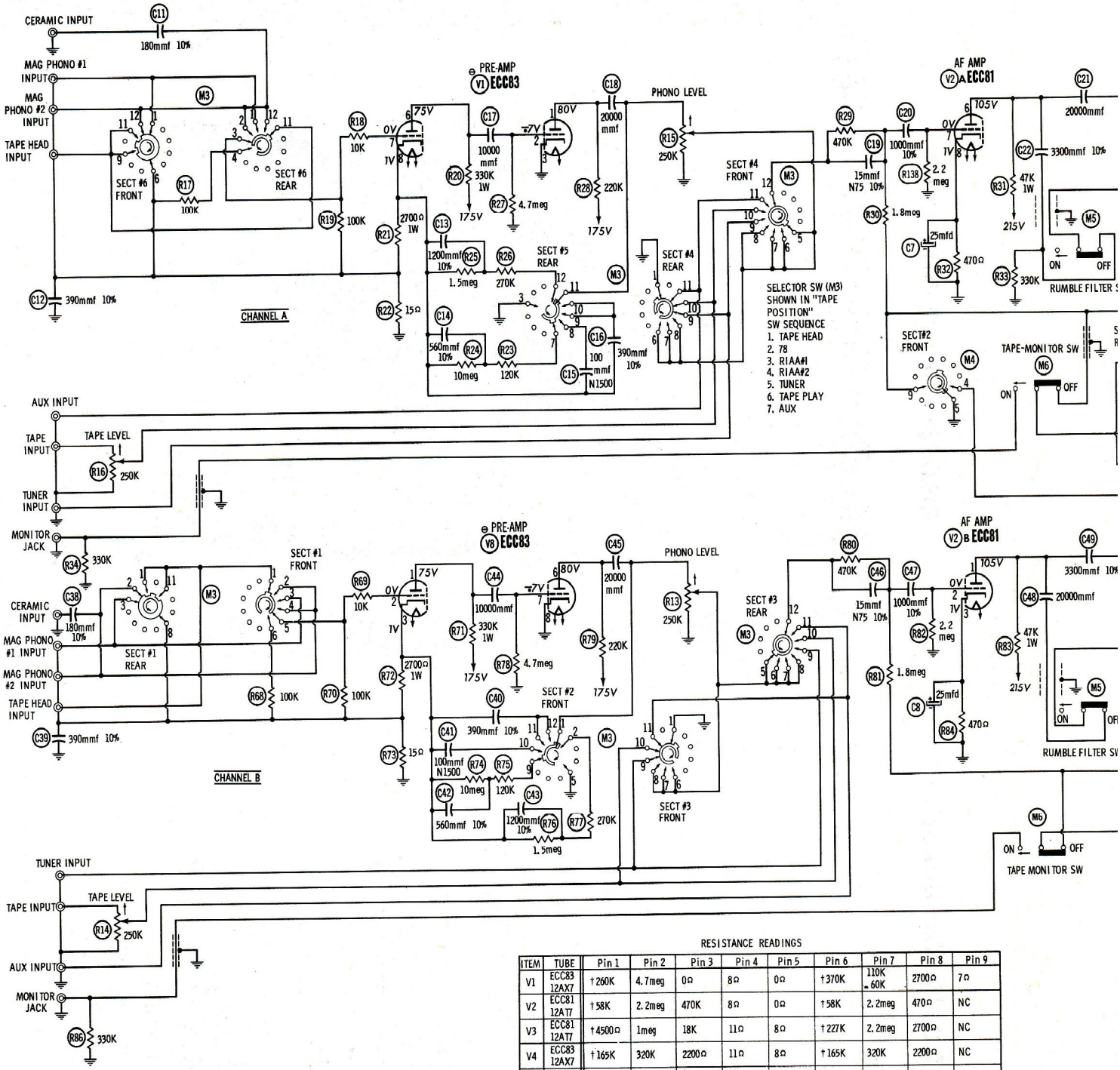
ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R59	220K			
R60	47K			
R61	10Ω 2W			
R62	2200Ω			
R63	220K			
R64	47K			
R65	3900Ω			
R66	5600Ω			
R67	.47Ω 5W		T47	
R68	100K			
R69	10K			
R70	100K			
R71	330K 1W			
R72	2700Ω 1W			
R73	15Ω			
R74	10meg			
R75	120K			
R76	1.5meg			
R77	270K			
R78	4.7meg			
R79	220K			
R80	470K			
R81	1.8meg			
R82	2.2meg			
R83	47K 1W			
R84	470Ω			
R85	330K			
R86	330K			
R87	56K			
R88	2.2meg			
R89	560K			
R90	10meg			
R91	2.7meg			
R92	2.2meg			
R93	220K			
R94	2700Ω			
R95	1meg			
R96	18K 1W			
R97	270Ω			
R98	10K			
R99	22K			
R100	100K 1W			

* Alternate Value.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R101	2200Ω			
R102	47K			
R103	820K			
R104	470K			(680K) *
R105	3900Ω			(5600Ω) *
R106	220Ω			
R107	2.2meg			(68K) *
R108	1.5meg			
R109	8200Ω			(39K) *
R110	18K			(68K) *
R111	2200Ω			
R112	220K			
R113	47K			
R114	10Ω 2W			
R115	2200Ω			
R116	220K			
R117	47K			
R118	3900Ω			
R119	5600Ω			
R120	0.47Ω 5W		T47	
R121	27K			
R122	4700Ω			
R123	2200Ω 5W	PW5-2200	10W-2200	
R124	2200Ω 5W	PW5-2200	10W-2200	
R125	7500Ω 7W	PW10-7500	10W-7500	
R126	7500Ω 7W	PW10-7500	10W-7500	
R127	4000Ω 5W	PW5-4000	5W-SQ-4000	
R128	7500Ω 7W	PW10-7500	10W-7500	
R129	4000Ω 5W	PW5-4000	5W-SQ-4000	
R130	250Ω 7W	PW10-250	10W-250	
R131	250Ω 7W	PW10-250	10W-250	
R132	4700Ω			
R133	4700Ω			
R134	15Ω 5W	PW5-15	5W-SQ-15	
R135	220Ω			
R136	220Ω			
R137	47Ω			
R138	2.2meg			
R139	18K			(68K) *
R140	2200Ω 1W			
R141	7500Ω 7W			

COMPONENT COMBINATIONS

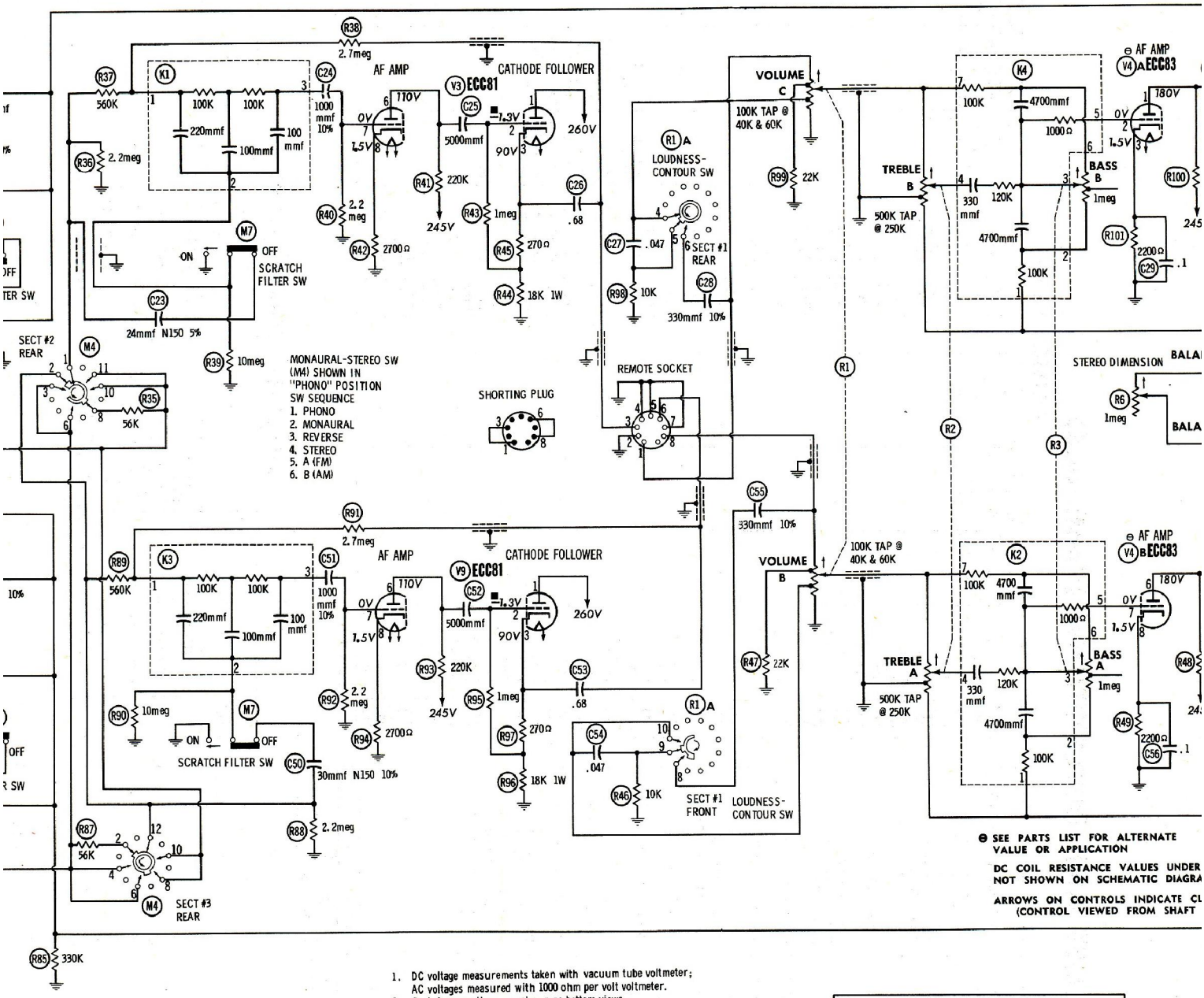
ITEM No.	USE	DESCRIPTION	FISHER PART No.	REPLACEMENT DATA
K1	Scratch Filter	100mmf, 100mmf, 220mmf, 100K, 100K	PC50187-2	
K2	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 120K	PC657-140A	
K3	Scratch Filter	100mmf, 100mmf, 220mmf, 100K, 100K	PC50187-2	
K4	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 120K	PC657-140A	



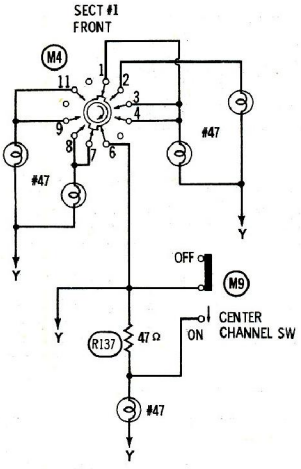
RESISTANCE READINGS

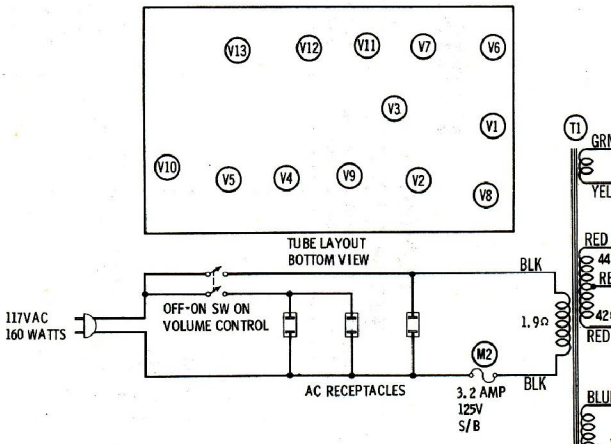
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†260K	4.7meg	0Ω	8Ω	0Ω	†370K	110K ▲60K	2700Ω	7Ω
V2	ECC81 12AT7	†58K	2.2meg	470K	8Ω	0Ω	†58K	2.2meg	470Ω	NC
V3	ECC81 12AT7	†4500Ω	1meg	18K	11Ω	8Ω	†227K	2.2meg	2700Ω	NC
V4	ECC83 12AX7	†165K	320K	2200Ω	11Ω	8Ω	†165K	320K	2200Ω	NC
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 12AT7	†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	GZ34 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



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.





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.

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 R114 (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 16 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 16, and adjusting Channel B DC Balance control. Resolder the wires across R61 and R114.

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.