



Stereophonic
THE FISHER X-202

SERVICE

MANUAL



MODEL X-202

**CHASSIS SERIAL NUMBERS
 30001 - 39999 INCLUSIVE**

PRICE: \$1.00

FISHER RADIO CORPORATION • NEW YORK

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 30001 - 39999 INCLUSIVE**

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PARTS DESCRIPTION LIST

CAPACITORS

10% tolerance for all fixed capacitors, unless otherwise noted or marked GMV (guaranteed minimum value.)

Symbol	Description	Part No.
C1, 2	Ceramic, 390uuf; 1000V	C50072-6
C3, 4	Ceramic, 180uuf; 1000V	C50072-23
C5, 6	Ceramic, 15uuf; N75; 1000V	C50070-18
C7, 8	Ceramic, .001uf; 1000V	C50072-3
C9, 12	Ceramic, 560uuf; 1000V	C50072-14
C10, 11	Ceramic, 1200uuf; 1000V	570072-4
C13, 15	Ceramic, 390uuf; 1000V	C50072-6
C14	Ceramic, 100uuf; N1500; 1000V	C50070-6
C16	Ceramic, 100uuf; N1500; 1000V	C50070-6
C17	Mylar, .01uf; 250V	C50197-48
C18, 19	Ceramic, 02uf; 20%, 500V	C50089-5
C20	Mylar, .01uf; 250V	C50197-48
C21, 22	Ceramic, .0033uf; 1000V	C50072-11
C23, 24	Ceramic, .02uf; 20%, 500V	C50089-5
C25	Ceramic, 24uuf; 5%, N150, 1000V	C50070-8
C26	Ceramic, 30uuf; N150, 1000V	C50070-3
C27, 28	Ceramic, .001uf; 1000V	C50072-3
C29, 30	Ceramic, .005uf; 20%, 500V	C50089-1
C31, 32	Mylar, .68uf; 250V	C50197-57
C33, 34	Mylar, .047uf; 250V	C50197-52
C35, 36	Ceramic, 330uuf; 1000V	C50072-1
C37, 38	Ceramic, .005uf; 20%, 500V	C50089-1
C39, 40	Mylar, .1uf; 250V	C50197-54
41, 42		
C43	Electrolytic, two section: A — 1000uf, 30V B — 1000uf, 30V	C50180-7
C44, 45	Mylar, .01uf; 250V	C50197-48
C46	Electrolytic, 4 section: A — 40uf, 450V C — 10uf, 450V B — 10uf, 450V D — 40uf, 450V	C-50180-10
C47, 48	Electrolytic, 25uf; 6V	C639-114
C49, 50	Ceramic, .02uf; 20%; 500V	C50089-5
C51, 52	Mylar, .047uf; 400V	C50197-30
C53	Electrolytic, 8uf; 50V	C629-138
C54	Mylar, .047uf; 400V	C50197-30
C55	Electrolytic, 4 section: A — 40uf, 450V C — 20uf, 450V B — 20uf, 450V D — 10uf, 450V	C50180-9
C56	Mylar, .047uf; 400V	C50197-30
C57	Ceramic, 10uuf; NPO, 1000V	C50070-11
C58	Ceramic, 15uuf; N75, 1000V	C50070-18
C59	Electrolytic, 8uf; 50V	C629-138
C60, 61	Ceramic, 820uuf; 1000V	C50072-7
C62, 63	Electrolytic, 25uf; 6V	C639-114
C64	Electrolytic, 20uf, 250V	C746-145

RESISTORS AND POTENTIOMETERS

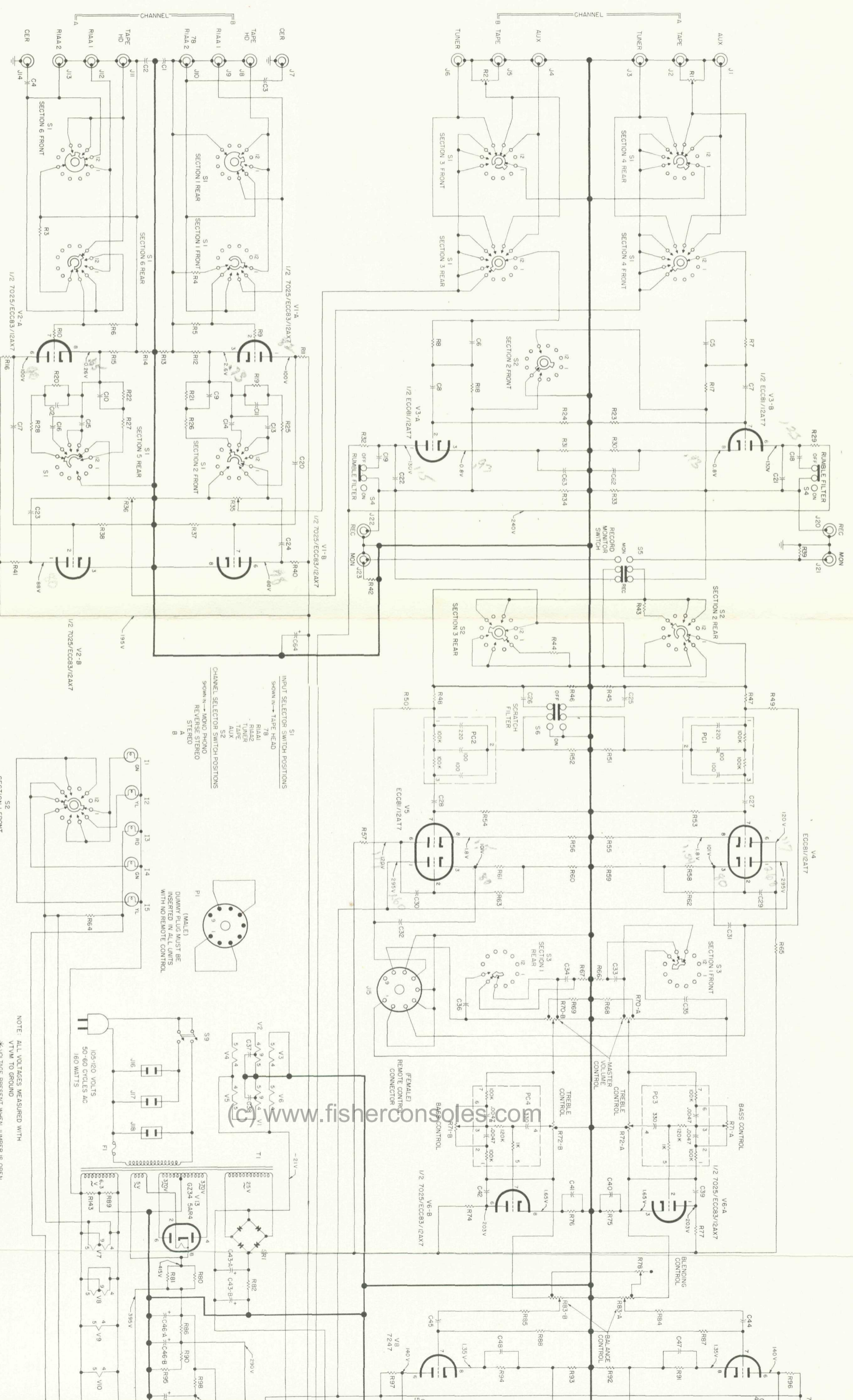
In ohms, 10% tolerance, 1/2 watt, unless otherwise noted. K = kilohm, M = megohm.

Symbol	Description	Part No.
R1, 2	Potentiometer, 250K	R50160-11
R3, 4, 5, 6	Composition, 100K	RC20BF104K
R7, 8	Composition, 470K	RC20BF474K
R9, 10	Composition, 10K	RC20BF103K
R11	Composition, 330K, 1W	RC30BF334K
R12	Composition, 2.7K, 1W	RC30BF272K
R13, 14	Composition, 15	RC20BF150K
R15	Composition, 2.7K, 1W	RC30BF272K
R16	Composition, 330K, 1W	RC30BF334K
R17, 18	Composition, 1.8M	RC20BF185K
R19, 22	Composition, 1.5M	RC20BF155K
R20, 21	Composition, 10M	RC20BF106K
R23, 24	Composition, 2.2M	RC20BF225K
R25	Composition, 270K	RC20BF274K
R26, 28	Composition, 120K	RC20BF124K
R27	Composition, 270K	RC20BF274K
R29	Composition, 47K, 1W	RC30BF473K
R30, 31	Composition, 470	RC20BF471K
R32	Composition, 47K, 1W	RC30BF473K
R33, 34	Composition, 330K	RC20BF334K
R35, 36	Potentiometer, 250K	R50160-11
R37, 38	Composition, 4.7M	RC20BF475K
R39	Composition, 330K	RC20BF334K
R40, 41	Composition, 220K	RC20BF224K
R42	Composition, 330K	RC20BF334K
R43, 44	Composition, 56K	RC20BF563K
R45, 46	Composition, 2.2M	RC20BF225K
R47, 48	Composition, 560K	RC20BF564K
R49, 50	Composition, 2.7M	RC20BF275K
R51, 52	Composition, 10M	RC20BF106K
R53, 54	Composition, 2.2M	RC20BF225K
R55, 56	Composition, 2.7K	RC20BF272K
R57	Composition, 220K	RC20BF224K
R58	Composition, 270	RC20BF271K
R59, 60	Composition, 18K, 1W	RC30BF183K

R61	Composition, 270	RC20BF271K
R62, 63	Composition, 1M	RC20BF105K
R64	Composition, 47	RC20BF470K
R65	Composition, 220K	RC20BF224K
R66, 67	Composition, 10K	RC20BF103K
R68, 69	Composition, 22K	RC20BF223K
R70	Potentiometer, 100K, .dual volume	R740-128
R71	Potentiometer, 1M, dual bass	R50160-25
R72	Potentiometer, 500K, dual treble	R50160-39
R73	not used	
R74	Composition, 100K, 1W	RC30BF104K
R75, 76	Composition, 2.2K	RC20BF222K
R77	Composition, 100K, 1W	RC30BF104K
R78	Potentiometer, 1M dimension	R50160-38
R79	Composition, 100K	RC20BF104K
R80, 81	Wirewound, 250, 7W	R539-121
R82	Wirewound, 15, 5W	R719-106
R83	Potentiometer, 500K; dual balance	R50160-37
R84, 85	Composition, 47K	RC20BF473K
R86	Wirewound, 4K, 5W	R692-130
R87, 88	Composition, 820K	RC20BF824K
R89	Composition, 220	RC20BF221K
R90	Wirewound, 7.5K, 7W	R740-138
R91	Composition, 5.6K	RC20BF562K
R92, 93	Composition, 220	RC20BF221K
R94	Composition, 5.6K	RC20BF562K
R95	Wirewound, 7.5K, 7W	R740-138
R96, 97	Composition 470K	RC20BF474K
R98	Wirewound, 4K, 5W	R692-130
R99	Wirewound, 2.2K, 5W	R740-143
R100	Composition 2.2M	RC20BF225K
R101, 102	Composition, 1.5M	RC20BF155K
R103	Composition 2.2M	RC20BF225K
R104	Composition, 4.7K	RC20BF472K
R105	Potentiometer, 5K	R50103-4
R106, 107	Composition 18K, 1W	RC20BF183K
R108	Wirewound, 2.2K, 5W	R740-143
R109, 110	Wirewound, 7.5K, 7W	R740-138
R111	Composition, 8.2K	RC20BF822K
R112, 113	Potentiometer, 50K	R50103-3
R114	Composition, 8.2K	RC20BF822K
R115	Potentiometer, 5K	R50103-4
R116	Composition, 2.2K, 1W	RC30BF222K
R117	Composition, 220K	RC20BF224K
R118	Potentiometer, 25K	R50103-2
R119, 120	Composition, 220K	RC20BF224K
R121	Potentiometer, 25K	R50103-2
R122	Composition, 220K	RC20BF224K
R123	Composition, 2.2K	RC20BF222K
R124, 125	Composition, 47K	RC20BF473K
R126, 127	Composition, 2.2K	RC20BF222K
R128, 129	Composition, 47K	RC20BF473K
R130	Composition, 2.2K	RC20BF222K
R131	Composition, 4.7K	RC20BF472K
R132	Composition, 4.7K	RC20BF472K
R133, 134	Wirewound, 10, 5%; 2W	R782-120
R135	Composition, 27K	RC20BF273K
R136, 137	Composition, 3.9K	RC20BF392K
R138	Composition, 5.6K	RC20BF562K
R139, 140	Wirewound, .47; 5W	R729-146
R141	Potentiometer, 1K, Center ch. volume	R50160-36
R142	Composition, 5.6K	RC20BF562K
R143	Composition, 220	RC20BF221K

MISCELLANEOUS

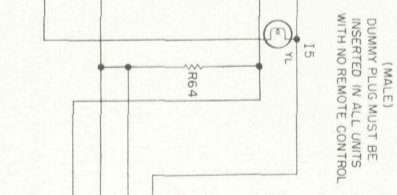
Symbol	Description	Part No.
F1	Fuse, 3.2 ampere, slo-blo	F3319
I1, 2, 3, 4, 5	Lamp, #47	I50009-1
P1	Plug, 9 pin	P50181
PC1, PC2	Printed circuit, scratch filters	PC50187-2
PC3, PC4	Printed circuit, tone controls	PC657-140
S1	Switch-selector	S740-130
S2	Switch mono-stereo	S740-129
S3	Switch loudness	Part of R70
S4, 5, 6, 7, 8	Switch slide	S50200-2
S9	Switch power	Part of R70
SR1	Selenium, bridge rectifier	SR740-137
T1	Transformer, power	T740-115
T2, 3	Transformer, output	T740-116
_____	Knob	E50133-2
_____	Knob, dual rear	E50153-1
_____	Knob, dual front	E50152
_____	Knob, selector	E50154-1
_____	Jewel, blue-green	I50162-4
_____	Jewel, yellow	I50162-2
_____	Jewel, red	I50162-1



RESISTORS	
R1	C1
R2	C2
R3	C3
R4	C4
R5	C5
R6	C6
R7	C7
R8	C8
R9	C9
R10	C10
R11	C11
R12	C12
R13	C13
R14	C14
R15	C15
R16	C16
R17	C17
R18	C18
R19	C19
R20	C20
R21	C21
R22	C22
R23	C23
R24	C24
R25	C25
R26	C26
R27	C27
R28	C28
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R97	C97
R98	C98
R99	C99
R100	C100

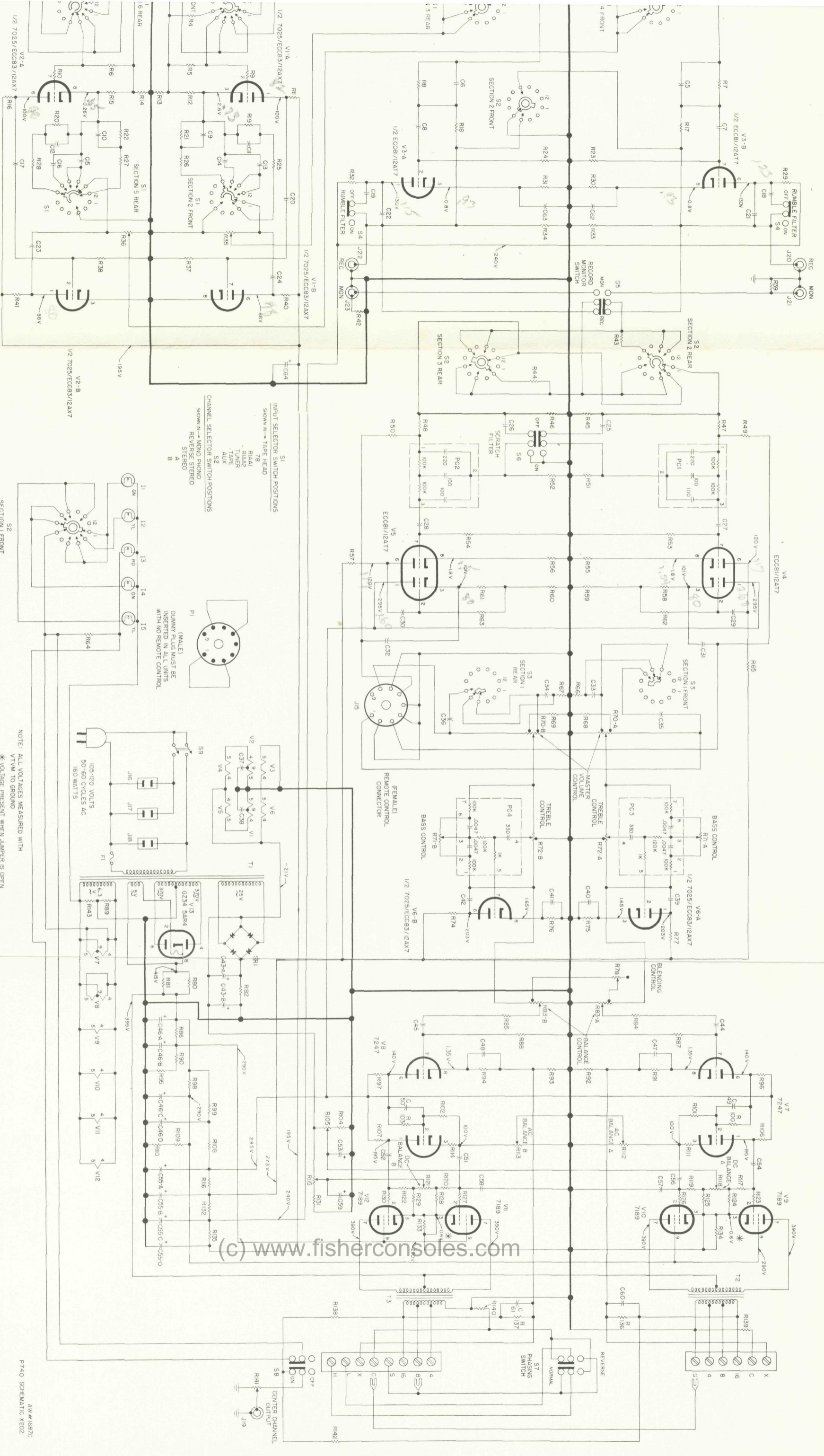
INPUT SELECTOR SWITCH POSITIONS
 SHOWN IN → TAPE HEAD
 RIAA 1
 RIAA 2
 TAPE
 TAPE HD
 CER

CHANNEL SELECTOR SWITCH POSITIONS
 SHOWN IN → MONO PHONO
 REVERSE STEREO
 STEREO
 A
 B



NOTE: ALL VOLTAGES MEASURED WITH VTVM TO GROUND
 * VOLTAGE PRESENT WHEN JUMPER IS OPEN

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NOTE: ALL VOLTAGES MEASURED WITH VTVM TO GROUND
* VOLTAGE PRESENT WHEN JUMPER IS OPEN

P740 SCHEMATIC X202
AW#16872

R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42																																																													
C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33	C34	C35	C36	C37	C38	C39	C40	C41	C42																																																														
R43	R44	R45	R46	R47	R48	R49	R50	R51	R52	R53	R54	R55	R56	R57	R58	R59	R60	R61	R62	R63	R64	R65	R66	R67	R68	R69	R70	R71	R72	R73	R74	R75	R76	R77	R78	R79	R80	R81	R82	R83	R84	R85	R86	R87	R88	R89	R90	R91	R92	R93	R94	R95	R96	R97	R98	R99	R100	R101	R102	R103	R104	R105	R106	R107	R108	R109	R110	R111	R112	R113	R114	R115	R116	R117	R118	R119	R120	R121	R122	R123	R124	R125	R126	R127	R128	R129	R130	R131	R132	R133	R134	R135	R136	R137	R138	R139	R140	R141	R142

ADJUSTMENT INSTRUCTIONS

ADJUSTMENT OF BIAS ADJUST, DC BALANCE AND AC BALANCE

The adjustment of the controls should be made in the order outlined. Turn the Input Level Sets to minimum, Mono-Stereo Switch to STEREO, Selector to appropriate input position, Tape Switch to RECORD. All other controls in OFF, NORMAL, or FLAT positions.

Remove damping resistors, if any, from speaker terminals. Remove loudspeakers, but retain jumper across terminals S and 16 in Channel B. Connect load resistors across speaker terminals G and 16 in Channel A, and across speaker terminals L and H in Channel B.

BIAS ADJUST: These controls establish the correct bias voltages for maintaining proper operating conditions. Unsolder one end of the shorting wire from each 10 ohm resistor in the cathode circuits of the power amplifiers. Connect the leads of a voltmeter (or VTVM) across the resistor in Channel A. Turn the Channel A Bias Adjust until the meter reads 0.6 volts. Repeat the procedure for Channel B. Then recheck Channel A. Do *not* resolder the shorting wires, if you intend to make the next adjustment.

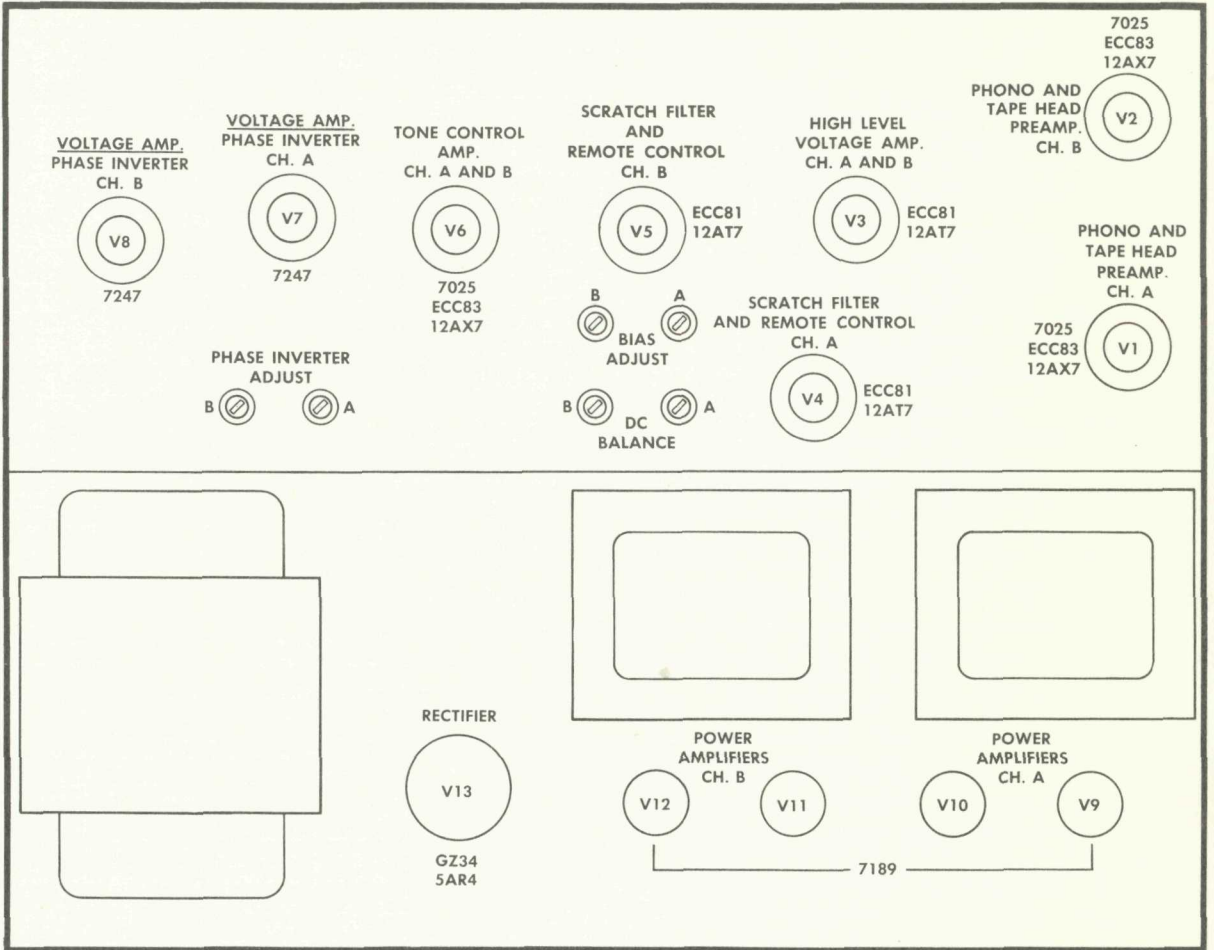
DC BALANCE: These controls equalize the current through each power amplifier, provide balanced operation of the output transformers, and cancel out any DC ripple from the power supply, thus eliminating all hum components.

Connect the leads of a sensitive VTVM across terminals G and 16 in Channel A. Adjust the Channel A DC Balance for *minimum* reading. This should be 0.5 millivolts or less. Repeat this procedure for Channel B, using terminals L and H and adjusting the Channel B DC Balance. Resolder the two shorting wires *temporarily*, if you intend to make the next adjustment.

PHASE INVERTER: The purpose of these controls is to provide balanced signals from the phase inverters to the grids of the output stages, and are adjusted for minimum distortion. Precise adjustments can be made only with an Intermodulation Analyzer, or Harmonic Distortion Analyzer and Audio Generator. (In lieu of adjustment with these instruments, however, a mechanical adjustment can be made. Simply set the controls at a point mid-way between the two extreme positions.)

1. Connect the Audio Generator to a high level input (TUN, TAPE, or AUX) of the appropriate channel on the X-202.
2. Load the output of the amplifier and connect the analyzer across the load.
3. If you are using a Harmonic Analyzer, set the Audio Generator to 1000 cps. If you are using an Intermodulation Analyzer, connect its output to the input of the X-202. Adjust the input signal to the X-202 so that its output is just below the clipping point (about 1 db below.)
4. Keeping this output constant, adjust the AC Balance for minimum distortion on the analyzer.
If you are using a Harmonic Analyzer, distortion should be 0.3% or less.
If you are using an Intermodulation Analyzer, distortion should be 0.15% or less.
5. Unsolder one end of the shorting wire from the 10 ohm cathode resistor of the power amplifier and measure the voltage across the resistor. The reading should be between 0.55 and 0.65 volts.
6. Resolder the shorting wire.

TUBE LAYOUT



AW1679



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