



Stereophonic

THE FISHER

X-202

SERVICE

MANUAL



MODEL X-202

**CHASSIS SERIAL NUMBERS
10001 - 19999 INCLUSIVE**

PRICE: \$1.00

FISHER RADIO CORPORATION • NEW YORK

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, 30uuf; N150, 1000V	C50070-3
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

RESISTORS AND POTENTIOMETERS

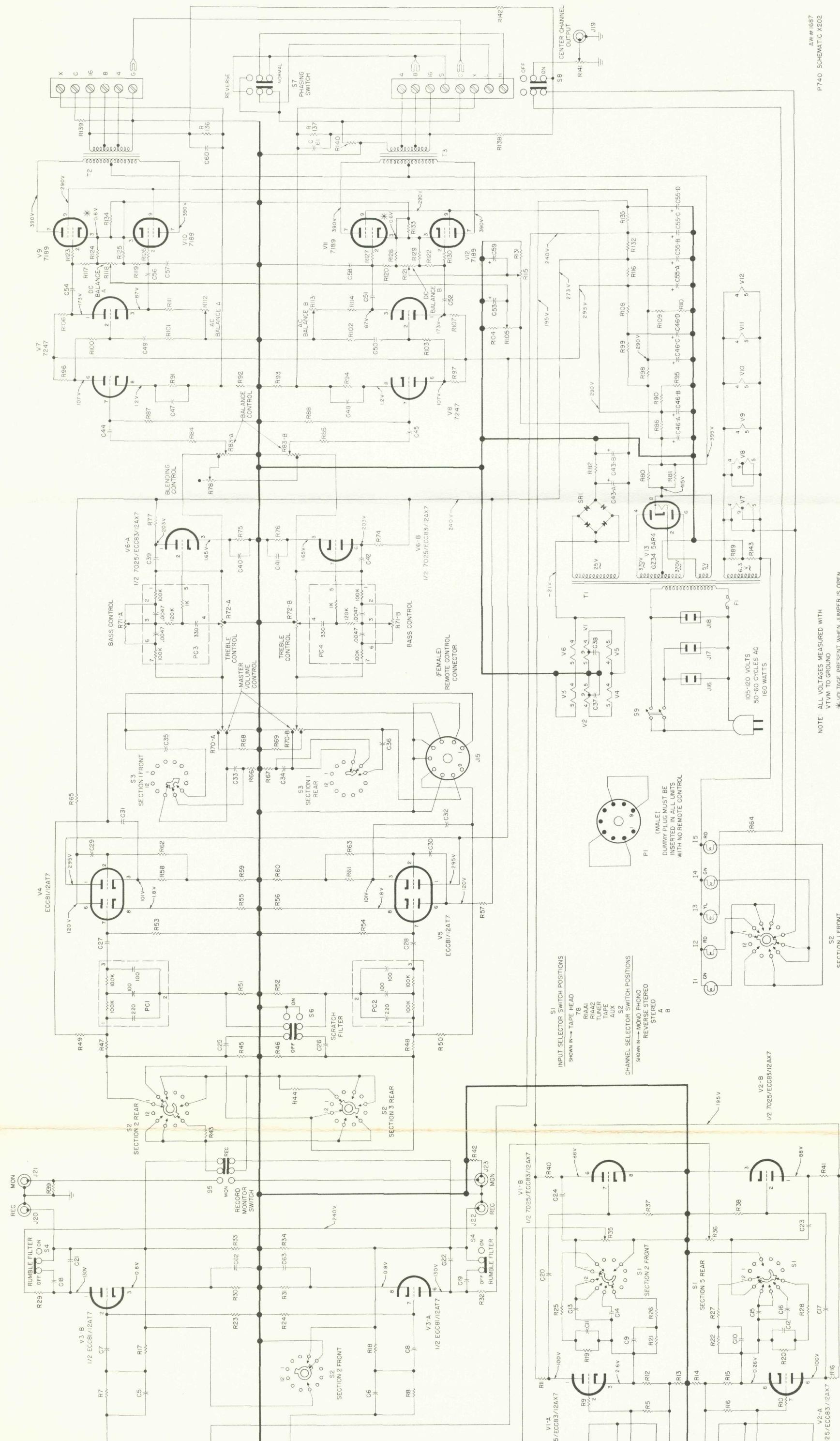
In ohms, 10% tolerance, 1/2 watt, unless otherwise noted. K = kilohm, M = megohm.

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, 12	RC20BF120K
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 base	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, 3.9K	RC20BF392K
R92, 93	Composition, 220	RC20BF221K
R94	Composition, 3.9K	RC20BF392K
R95	Wirewound, 7.5K, 7W	R740-138
R96, 97	Composition, 680K	RC20BF684K
R98	Wirewound, 4K, 5W	R692-130
R99	Wirewound, 2.2K, 5W	R740-143
R100	Composition, 68K	RC20BF683K
R101, 102	Composition, 22K	RC20BF223K
R103	Composition, 68K	RC20BF683K
R104	Composition, 4.7K	RC20BF472K
R105	Potentiometer, 5K	R50103-4
R106, 107	Composition, 68K, 1W	RC30BF683K
R108	Wirewound, 2.2K, 5W	R740-143
R109, 110	Wirewound, 7.5K, 7W	R740-138
R111	Composition, 39K	RC20BF393K
R112, 113	Potentiometer, 50K	R50103-3
R114	Composition, 39K	RC20BF393K
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

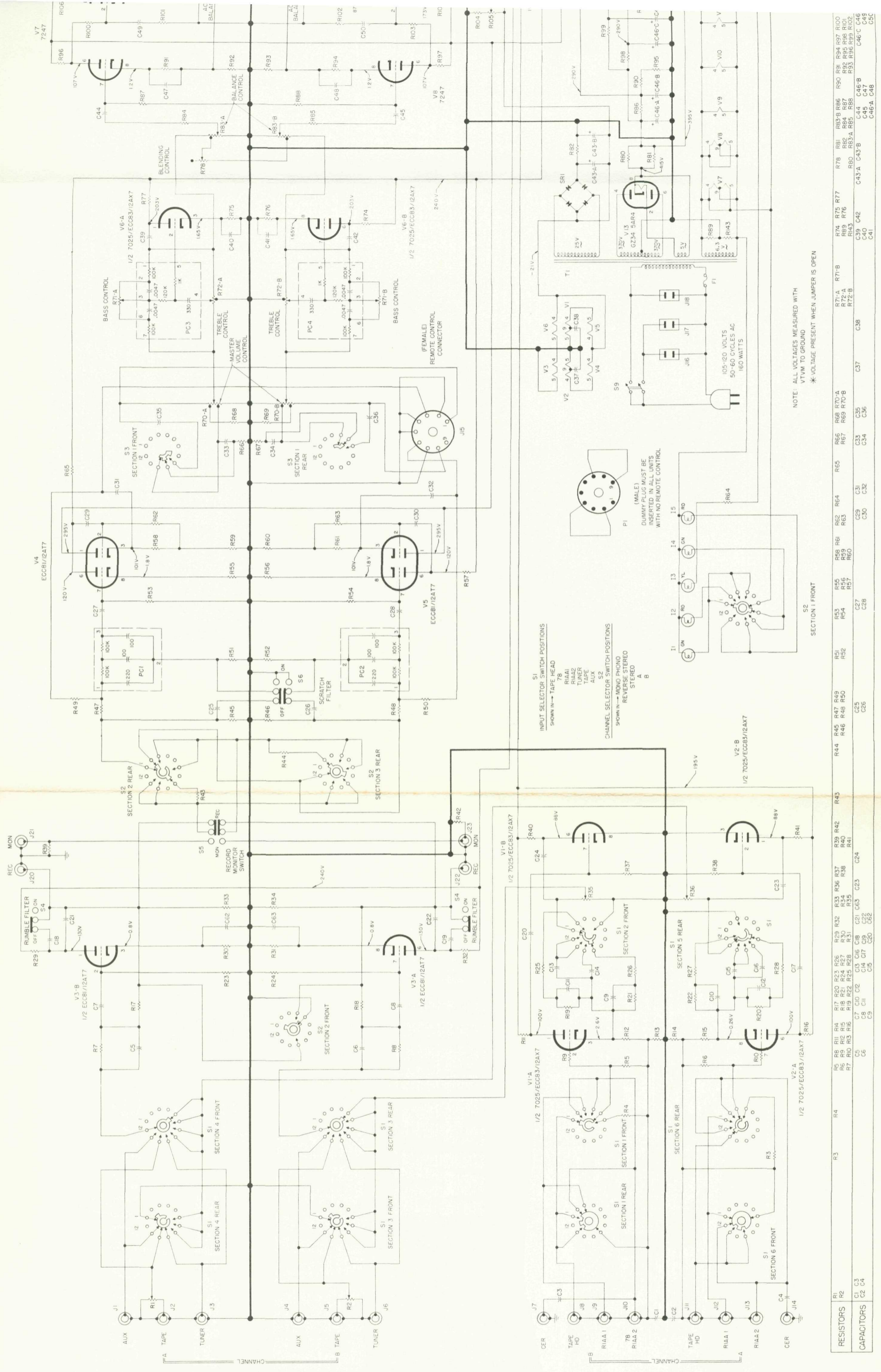


P740 SCHEMATIC X202

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

R5	R8	R11	R4	R7	R10	R13	R16	R19	R22	R25	R28	R31	R34	R37	R40	R43	R46	R49	R52	R55	R58	R61	R64	R67	R70	R73	R76	R79	R82	R85	R88	R91	R94	R97	R100	R103	R106	R109	R112	R115	R118	R121	R124	R127	R130	R133	R136	R139	R142												
C1	C2	C3	C4	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	C43	C44	C45	C46	C47	C48	C49	C50	C51	C52	C53	C54	C55	C56	C57	C58	C59	C60	C61	C62

SCHEMATIC DIAGRAM



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

RESISTORS	CAPACITORS
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
R29	C29
R30	C30
R31	C31
R32	C32
R33	C33
R34	C34
R35	C35
R36	C36
R37	C37
R38	C38
R39	C39
R40	C40
R41	C41
R42	C42
R43	C43
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R46	C46
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R89	C89
R90	C90
R91	C91
R92	C92
R93	C93
R94	C94
R95	C95
R96	C96
R97	C97
R98	C98
R99	C99
R100	C100

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.

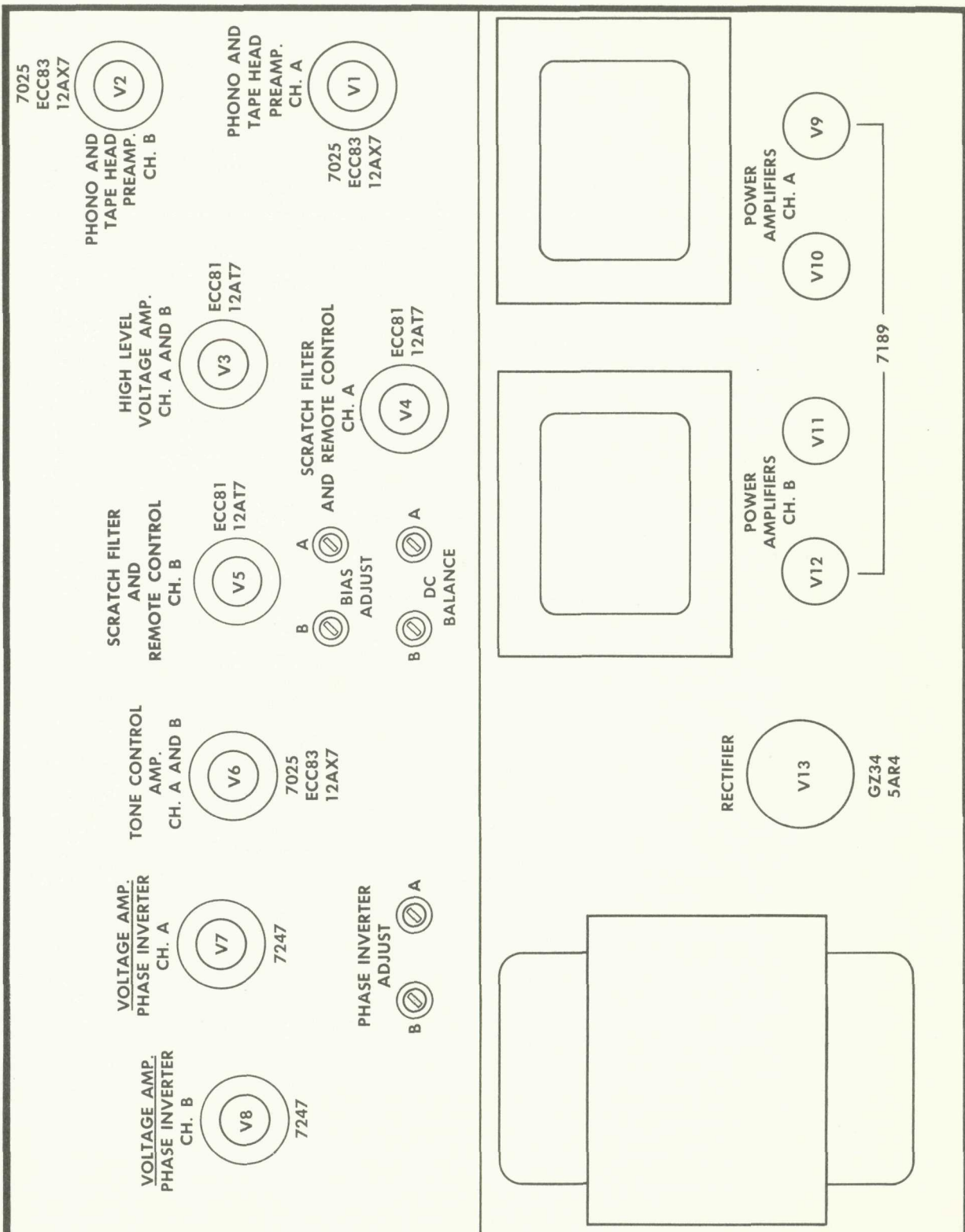
DC BALANCE: These controls equalize the current through each power amplifier, provide balanced operation of the output transformers, and cancel out any DC ripple from the power supply, thus eliminating all hum components.

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.

AC BALANCE: 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





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