

ROTEL®

RA-412

STEREO PRE/MAIN AMPLIFIER

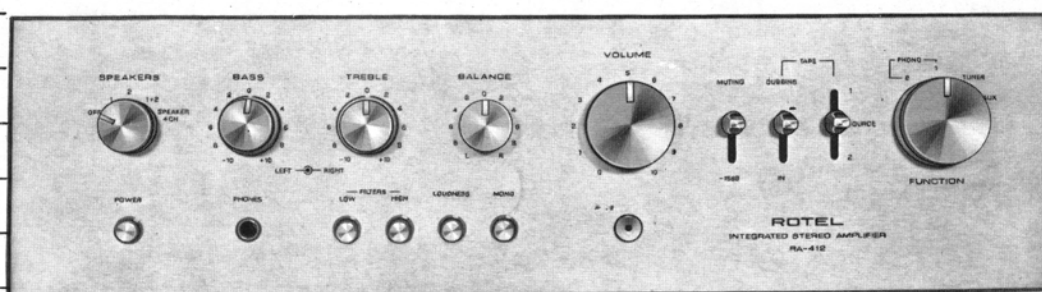
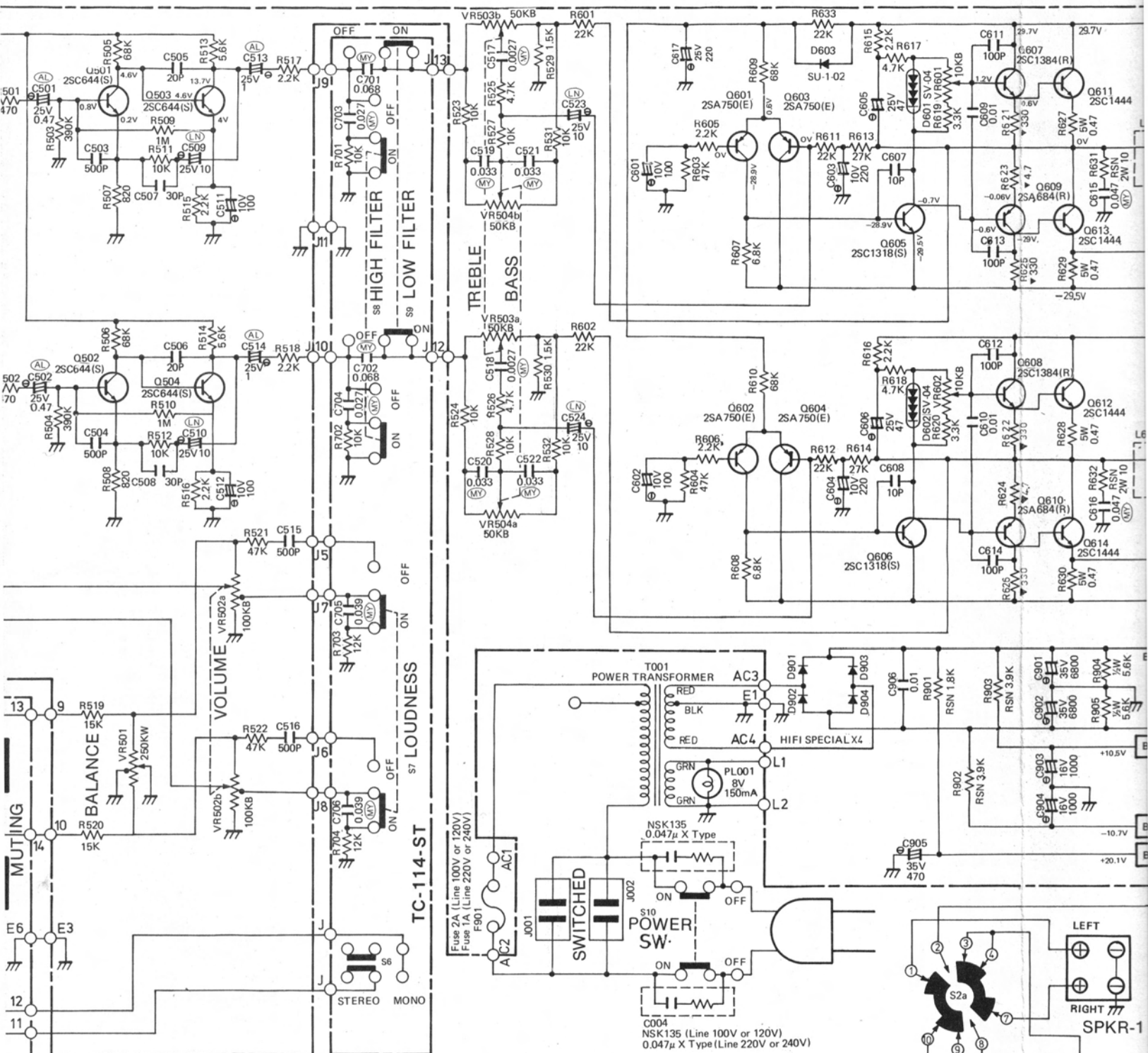


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TECHNICAL MANUAL

SCHEMATIC DIAGRAM



ITEM	SCHEMATIC LOCATION (LAST)
EQUALIZER AMP	R416
	C414
TONE CONTROL AMP.	R532
	C524
TONE CONTROL AMP.	R633
	C617
TONE CONTROL AMP.	R704
	C706
MAIN AMP.	R806
	C 0
POWER SUPPLY	R905
	C906
CHASSIS	R007
	C004

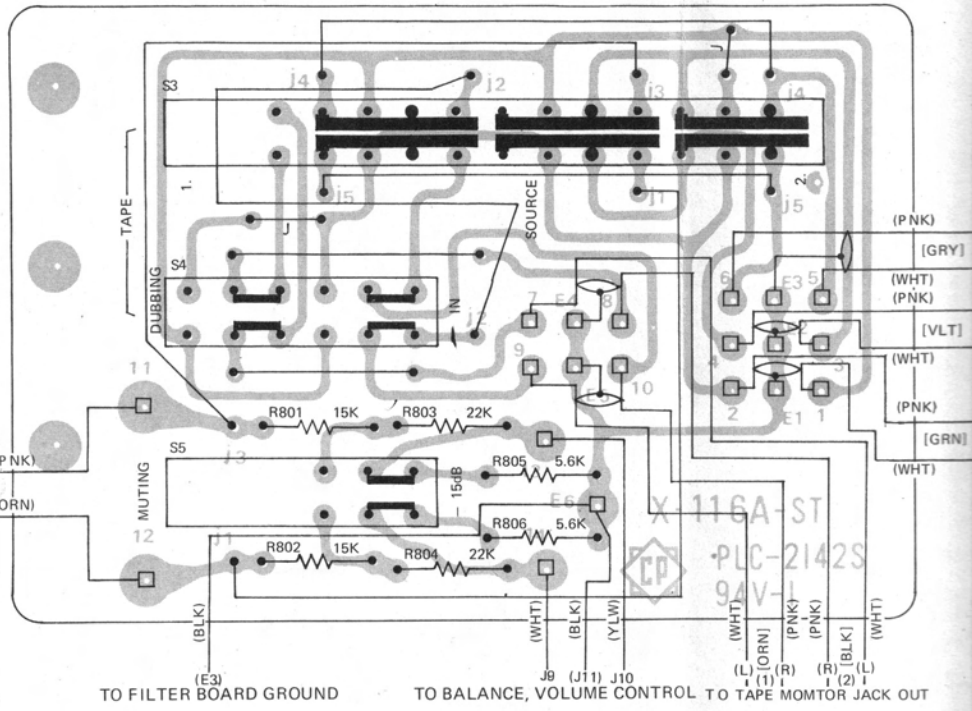
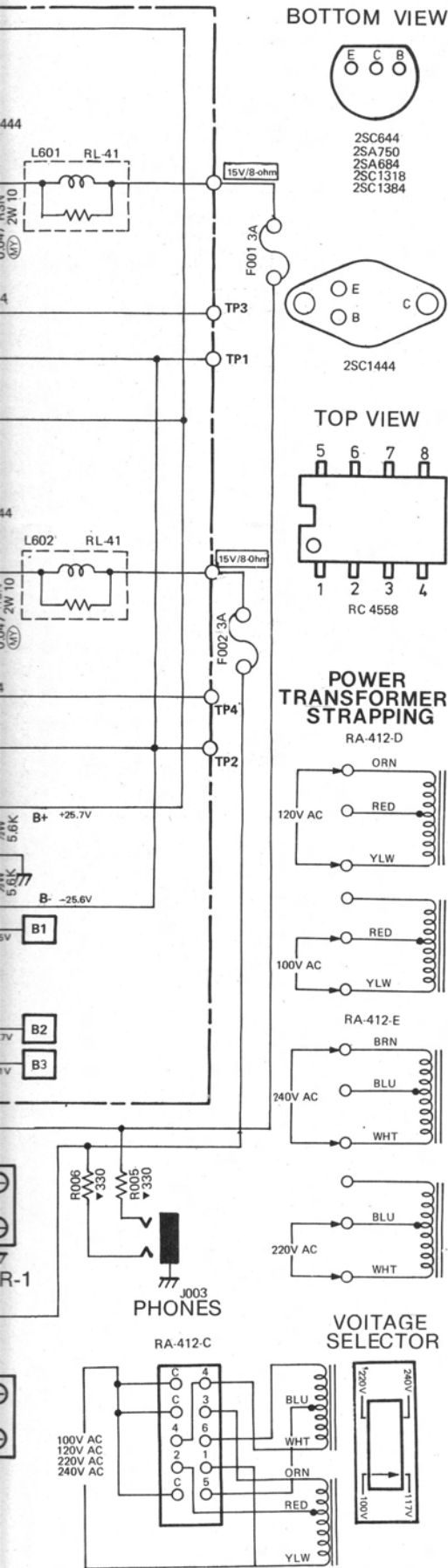
RESISTORS

5% TOLERANCE UNLESS OTHERWISE NOTED
 K --- KILO OHM
 M --- MEGA OHM
 * --- COMPOSITION RESISTORS 1/2 WATT
 NON MARK --- LOW NOISE TYPE CARBON RESISTOR 1/2 WATT

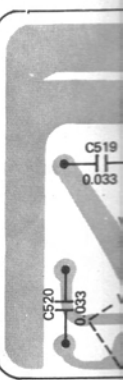
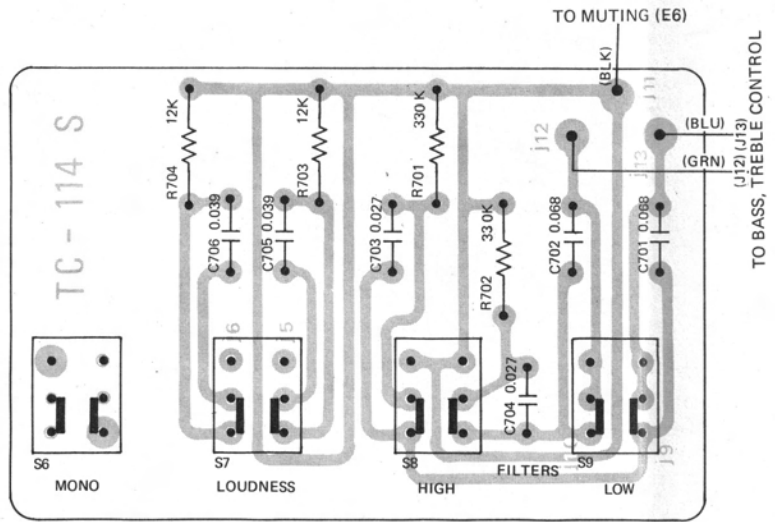
CAPACITORS

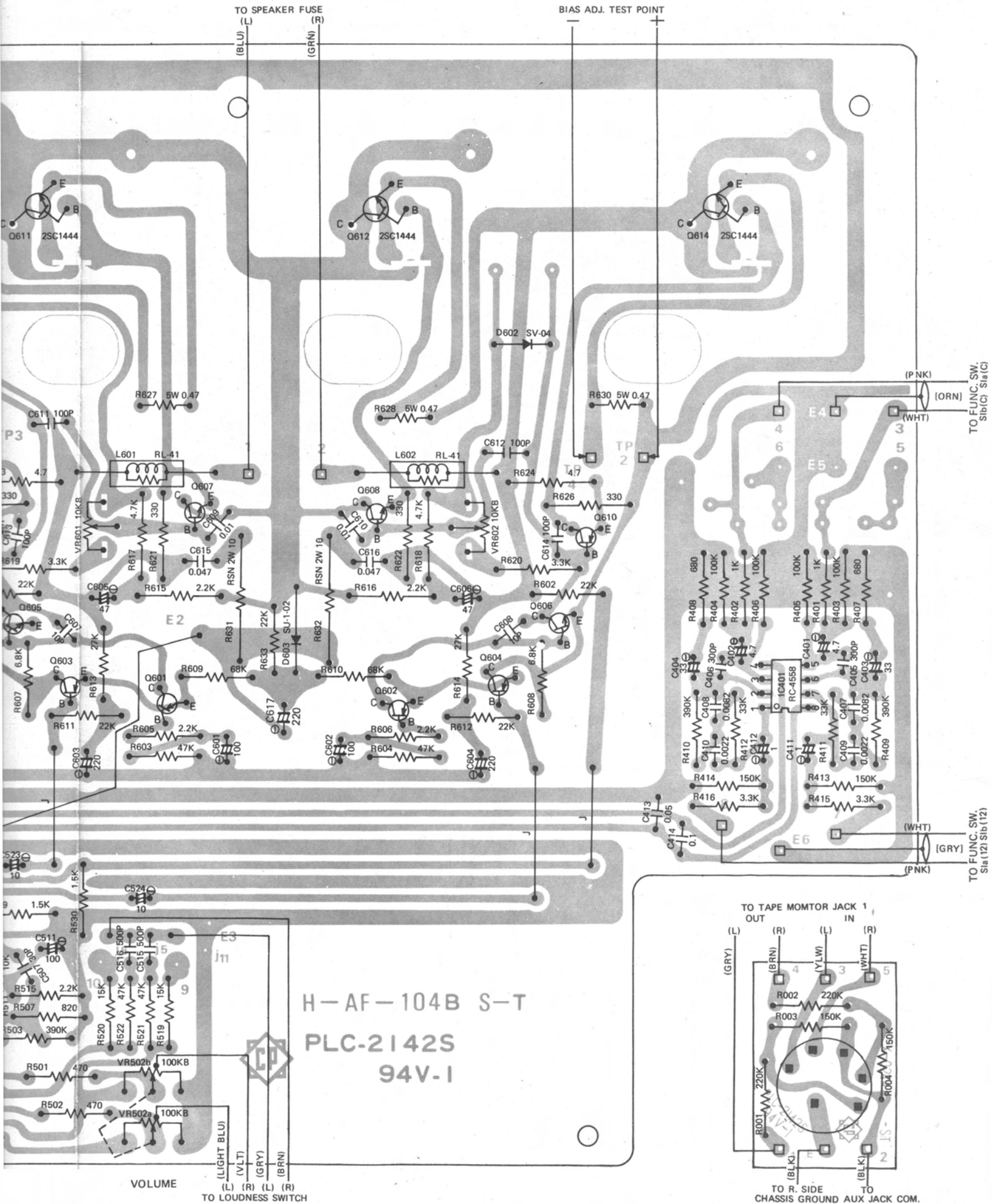
MY --- MYLAR FILM CAPACITORS
 E --- ELECTROLYTIC CAPACITORS
 LN --- LOW NOISE TYPE ELECTROLYTIC CAPACITORS
 AL --- ALUMINUM CAPACITORS
 NON MARK --- CERAMIC CAPACITORS

• UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD
 • VOLTAGE READING MAY VARY ±20%
 • [] INDICATES 1KHz SIGNAL LEVELS FROM PHONO INPUT: [2.5mV] TO PA, OUTPUT: [15V ACROSS 8-ohm LOAD]



FILTER CIRCUIT DIAGRAM

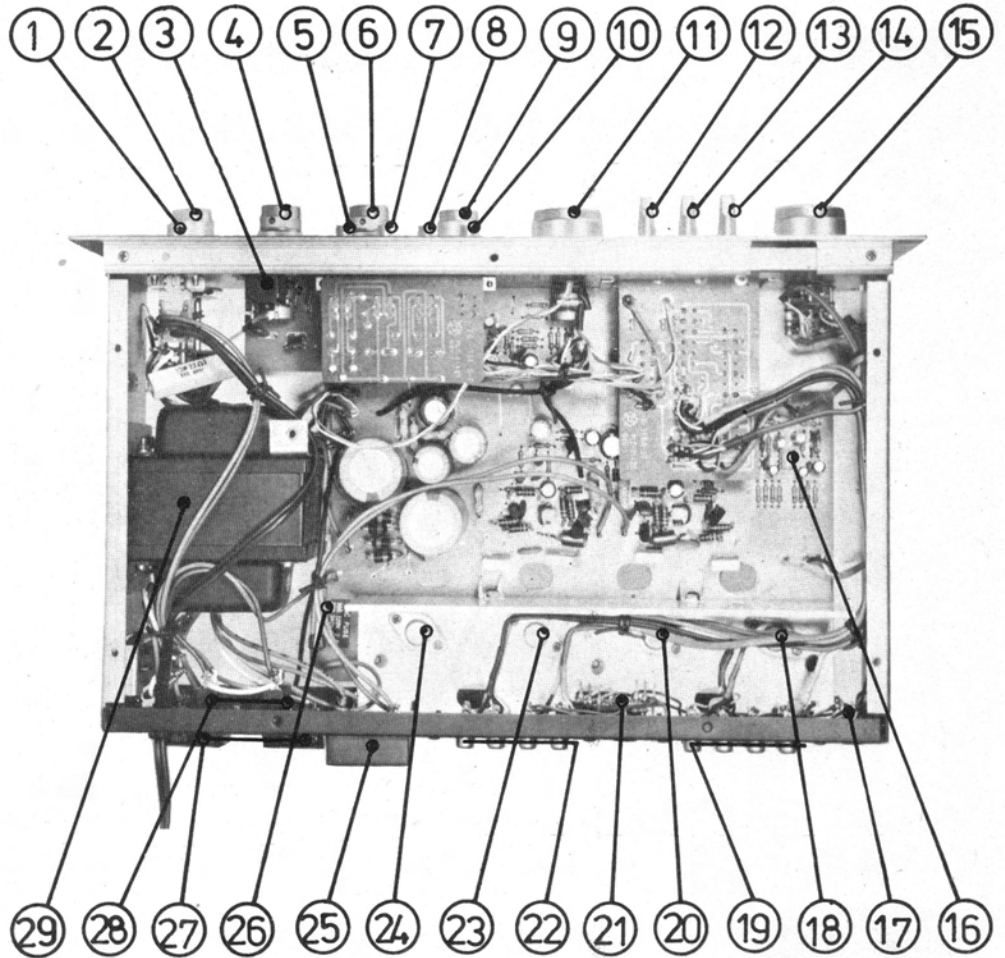




CHASSIS LAYOUT

(1)

1. S10, Power Switch
2. S2, Speaker Selector
3. Head phone Jack
4. Bass Control
5. S9, Low Filter Switch
6. Treble Control
7. S8, High Filter Switch
8. S9, Loudness Switch
9. Balance Control
10. S6, Mono Switch
11. Volume Control
12. S5, Muting Switch
13. S4, Dubbing Switch
14. S3, Tape Monitor Switch
15. S1, Function Switch
16. IC401, Phono Amp. IC
17. Phono Din Jack
18. Q613, Power Amp. (L-ch)
19. Input Terminal
20. Q611, Power Amp. (L-ch)
21. Tape Monitor Din Jack
22. Tape Monitor Terminal
23. Q612 Power Amp. (R-ch)
24. Q614 Power Amp. (R-ch)
25. Speaker Fuse Box.
26. F901, AC Fuse
27. Speaker Terminal 1 and 2.
28. AC Outlet 1 and 2.
29. T001, Power Transformer.



PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the Transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same hfe group as the original type.
4. If one output transistor burns out (open or short)

always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.

5. When mouting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistors failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat conduction.

MAIN AMP BIAS ADJUSTMENT

Instrument: DC Millivolt Meter

1. Rotate Volume Control to Counter-clockwise position (minimum volume).
2. Connect the plus lead of DC millivolt meter to test point 4 ⊕ (on Main Amp.PCB) and minus lead to test point 2 ⊖ (for Right channel).
3. Adjust VR602 (on Main Amp.PCB) to obtain a 15mV reading on DC millivolt meter (no signal input).
4. Repeat the steps 2 and 3 as above for Left channel (Use test point 3 ⊕ , 1 ⊖ and adjust VR601).

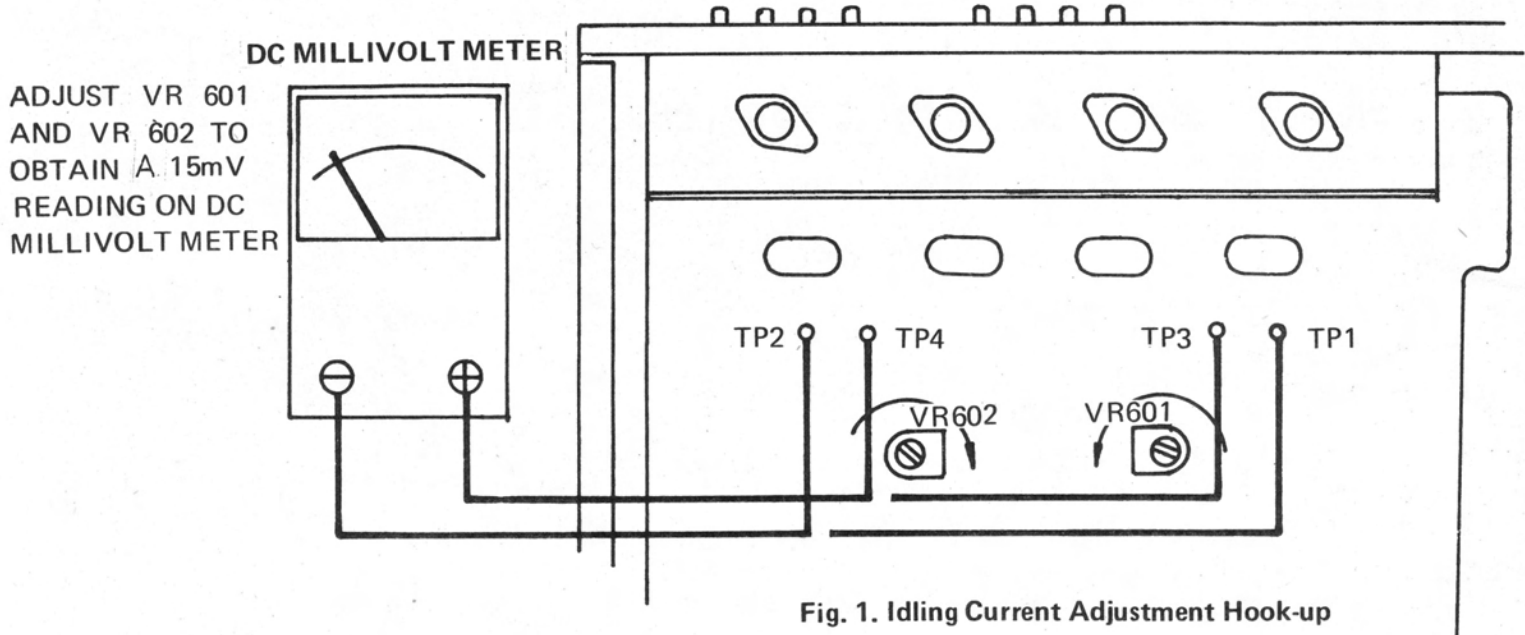
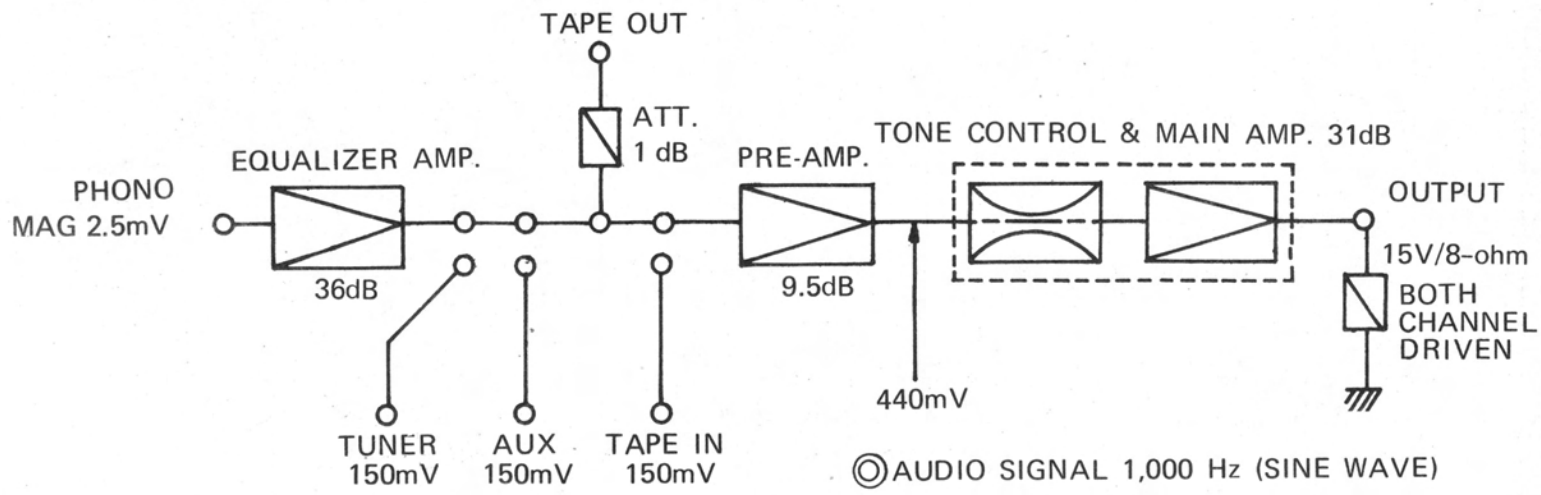


Fig. 1. Idling Current Adjustment Hook-up

GAIN DIAGRAM



Unit Inoperative.

- I. If the pilot lamp does not illuminate, check the flow at the AC Outlet and
 - A. If no voltage across.
 1. The AC Cord may be broken, or
 2. Connections in the power switch may be faulty.
 - B. If there is proper voltage across, check the AC fuse F 901 and
 - a. If the AC fuse is blown
 1. Rectifier D901, 902, 903, 904 may be shorted, or
 2. Capacitor C901, 902, 903, 904, 905 or 906 may be shorted. or
 3. Primary or Secondary winding of the power transformer T001 may be shorted.
- II. If the pilot lamp does illuminate, measure voltage across +B, -B and B₃ (See the schematic diagram) and
 - A. If no voltage across
 - a. Rectifier D901, 902, 903, or 904 may be opened.
 - b. Secondary winding of the power transformer may be opened.
 - B. If there is proper voltage across, check the speaker fuse and
 - a. If the speaker fuse is blown.
 1. Transistor Q11 or Q13 (Q12 or 614 for R-ch) may be shorted, or
 2. Transistor Q601, 603, 605, 607 or 609 (Q602, 604, 606, 608 or 610. for R-ch) may be faulty, or
 3. Output circuit (including speaker system) may be shorted, or
 4. The fuse may be worn out.
 - b. If the speaker fuse is normal and check the minus - point of C523 (C524 for R-ch)
 - i. If there is no signal
 1. Transistor Q501 or 503 (Q502 or 504 for R-ch) may be faulty, or
 2. Capacitor C501, 513 or 523 (C502, 514 or 524 for R-ch) may be faulty
 - ii. If there is a signal
 1. Transistor Q601, 603, 605, 607 or 609 (Q602, 604 606, 608 or 610 for R-ch) may be faulty.

Only PHONO Section Inoperative

- A. IC401 may be faulty, or
- B. Capacitor C401, 403, or 411 (C402, 404, or 412 for R-ch) may be faulty.

Hum and/or Noise

- A. Hum and / or noise produced with Volume Control set at Minimum.
 1. Transistor Q501 or 503 (Q502 or 504 for R-ch) may be faulty, or
 2. Capacitor C501, 509, 511, 513 or 523 (C502, 510, 512, 514 or 524 for R-ch) may be faulty, or
 3. Resistor R505 or 513 (R506 or 514 for R-ch) may be faulty.
- B. Hum and/or noise produced only in PHONO -
 1. IC401 may be faulty, or
 2. Capacitor C903, 904, 401, or 411 (C903, 904, 402, or 412 for R-ch) may be faulty.

REPAIR PARTS LIST

(4)

Symbol	Parts No.	Description
TRANSISTORS, DIODES AND IC'S		
Q501	301201114	2SC664(S), Flat Amp.
Q502	301201114	2SC644(S), Flat Amp.
Q503	301201114	2SC644(S), Flat Amp.
Q504	301201114	2SC644(S), Flat Amp.
Q601	301001133	2SA750(E), Differential Amp.
Q612	301001133	2SA750(E), Differential Amp.
Q603	301001133	2SA750(E), Differential Amp.
Q604	301001133	2SA750(E), Differential Amp.
Q605	301201155	2SC1318(R), Pre-driver
Q606	301201155	2SC1318(R), Pre-driver
Q607	301201132	2SC1384(R), Driver
Q608	301201132	2SC1384(R), Driver
Q609	301001123	2SA684(R), Driver
Q610	301001123	2SA684(R), Driver
Q611	301201141	2SC1444(Y), Power Amp.
Q612	301201141	2SC1444(Y), Power Amp.
Q613	301201141	2SC1444(Y), Power Amp.
Q614	301201141	2SC1444(Y), Power Amp.
D601	300212006	SV-04, Temperature Compensator
D602	300212006	SV-04, Temperature Compensator
D603	300919021	SU-1-02, DC Balance Regurator
D901	300919017	Hi-Fi Special, Rectifier
D902	300919017	Hi-Fi Special, Rectifier
D903	300919017	Hi-Fi Special, Rectifier
D904	300919017	Hi-Fi Special, Rectifier
IC401	303452152	RC-4558(DN), Phono Equalizer Amp.
VARIABLE RESISTORS		
VR501	515121121	250KW, Balance Control
VR502	525121129	100KBx2, Volume Control
VR503	525101130	50KBx2, Treble Control
VR504	525101130	50KBx2, Bass Control
VR601	510502126	10KB, Idling Current Adj. (L-ch)
VR602	510502126	10KB, Idling Current Adj. (R-ch)

Symbol	Parts No.	Description
OTHERS		
S1	601011283	Switch, Function Selector
S2	601011264	Switch, Speaker Selector
S3	611001639	Switch, Tape Monitor 1 and 2
S4	611001628	Switch, Dubbing
S5	611001632	Switch, Muting
S6	614040810	Switch, Mode
S7		Switch, Loudness
S8		Switch, High Filter
S9		Switch, Low Filter
S10	614010107	Switch, Power Switch
F901	341220020	Fuse, 2A (Line 100V or 120V)
	341220010	Fuse, 1A (Line 220V or 240V)
F001	341220030	Fuse, 3A (Speaker)
F002	341220030	Fuse, 3A (Speaker)
PL001	351080015	Lamp, 8V 150mA.
L601	228641105	Anti-Parastic
L602	228641105	Anti-Parastic
T001	205001403	Transformer, Power Supply (Multi-Voltage Type)
	204001403	Transformer, Power Supply (Line 100V or 120V)
	206001403	Transformer, Power Supply (Line 220V or 240V)
	141610277	Pre/Main Amp. circuit Board Assembly (Without Power Transistors and Heat Sink)
	141710277	Monitor Circuit Assembly "X-116A-ST"
	141710278	Filter Circuit Assembly "TC-114 S-T"

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