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ROTEL®

Technical Manual

**STEREO
DC INTEGRATED AMPLIFIER**

RA-1010

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**Serial Nos. Beginning
NC59118**

ADDENDA (November, 1981)

1. FETs Q401 and Q402 on the MC head-amp circuit can accept both (S) and (R) I_{DSS} ranks.
 - a. Therefore it is necessary to use appropriate drain resistors R403 and R404 according to the I_{DSS} rank of the FETs.

2SK155: For I_{DSS} (S) rank; R403, R404 – 820 ohms (conventional value)
For I_{DSS} (R) rank: R403, R404 – 2.7 kilohms
 - b. A 2.2-kilohm resistor is additionally installed between the junction of R438 and R439 on +B circuit of the MC head-amp when (R) rank FET is used.
 - c. 2SK155 (R) and 2SK155 (S) are replaceable by 2SK130A (K) and 2SK130A (L) respectively.

Part No. 2SK130A (K) – 302001135
2SK130A (L) – 302001136
2. For 220V/240V spec. units, noise cancellers C002 and C003 installed between the primary side of the power supply circuit are eliminated.

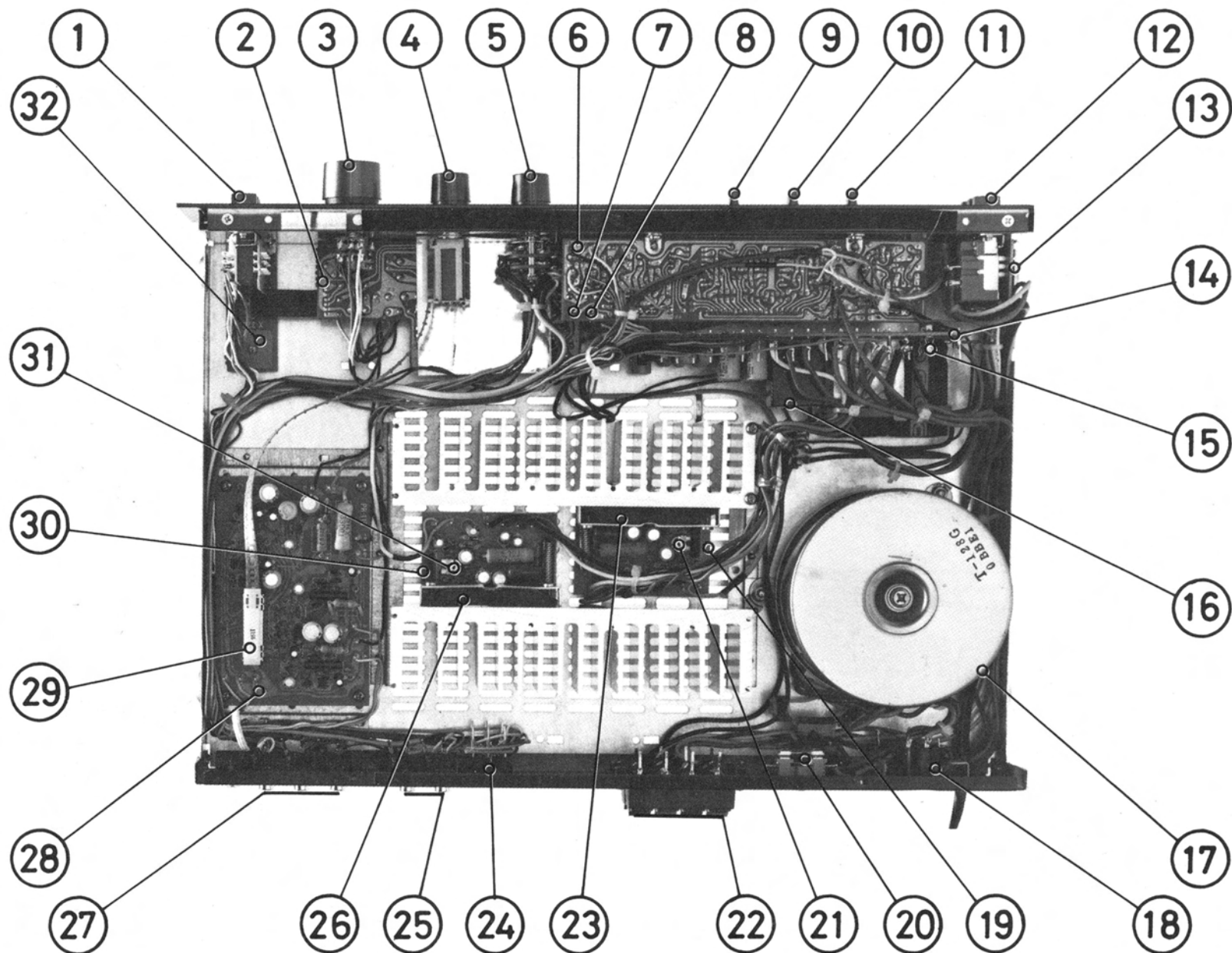
C001 is changed from 0.047 to 0.022 (PME265MB-522, Part No. 470101136).
3. For 220V/240V spec. units, secondary fuse F901 is changed from F1A to T1A (Part No. 345952100).

**THE ROTEL CO., LTD.
ROTEL ELECTRONICS CO., LTD.
ROTEL OF AMERICA, INC.
ROTEL HI FI LIMITED**

1-36-8 OHOKAYAMA, MEGURO-KU, TOKYO 152, JAPAN
2ND FLOOR, EVERGLORY BLDG., NO. 305, SECTION 3,
NANKING E. ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA

1055 SAW MILL RIVER ROAD, ARDSLEY, N.Y. 10502, U.S.A.
24 ERICA ROAD, STACEY BUSHES, MILTON KEYNES,
BUCKINGHAMSHIRE, ENGLAND

Chassis Layout (Top View)



- | | |
|------------------------------|----------------------------------|
| 1. FUNCTION SELECTOR | 17. POWER TRANSFORMER |
| 2. TONE AMP PCB | 18. VOLTAGE SELECTOR |
| 3. VOLUME CONTROL | 19. MAIN AMP PCB, L-CH |
| 4. PHONO SELECTOR UNIT | 20. FUSE, F001, PRIMARY |
| 5. TAPE MONITOR SWITCH | 21. VR601, DC BALANCE ADJ, L-CH |
| 6. INDICATOR DRIVER PCB | 22. SPEAKER TERMINALS |
| 7. VR812, R-CH LEVEL IND CAL | 23. POWER AMP IC, IC601, L-CH |
| 8. VR811, L-CH LEVEL IND CAL | 24. DIN SOCKET |
| 9. TREBLE CONTROL | 25. TAPE MONITOR JACKS |
| 10. MID CONTROL | 26. POWER AMP IC, IC601', R-CH |
| 11. BASS CONTROL | 27. INPUT JACKS |
| 12. POWER SWITCH | 28. PHONO AMP PCB |
| 13. SPEAKER SWITCH PCB | 29. PHONO SWITCH |
| 14. POWER SUPPLY PCB | 30. MAIN AMP PCB, R-CH |
| 15. FUSE, F901, SECONDARY | 31. VR601', DC BALANCE ADJ, R-CH |
| 16. PROTECTION RELAY | 32. MUTING SWITCH PCB |

Adjustment Procedures

DC BALANCE ADJUSTMENT

Instrument: Oscilloscope

- It will take 3 to 7 seconds for the unit to go into operation after power is turned on.

1. Set vertical gain control of the oscilloscope to 0.01V/cm, and vertical input switch to GND. Bring the trace to central position on the screen; then set the vertical input switch to DC.

2. Connect the oscilloscope to speaker terminals of amplifier. Set volume control of the amplifier to minimum position. Turn on the power.

When DC output appears on the screen (the trace will shift upwards or downwards as shown in Fig. 1), adjust potentiometer VR601 on the main-amplifier PC board so that the DC output trace falls on zero position (the position set up in step 1).

3. Repeat the adjustment in step 2 for the other channel.

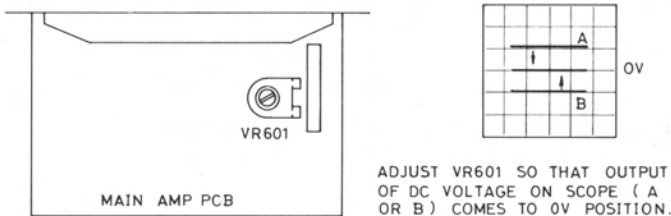


Fig. 1

POWER LEVEL INDICATOR CALIBRATION

Instruments: Audio Generator, AC Voltmeter, Oscilloscope, Load Resistor (8-ohm, 100 watts, non-inductive)

- Connect the load resistor to the speaker terminal. Connect AC voltmeter and oscilloscope in parallel with the resistor.

Connect the Audio Generator to AUX terminal. Turn the volume control of the unit to maximum. Then feed 1,000Hz (sine wave) signal from Audio Generator and adjust the input level so that AC voltmeter reads 21.9V (60 watts, 8 ohms).

Maintaining this state, adjust the potentiometer VR811 or VR 812 on the Indicator Driver PC board so that the level indicator reads 0dB (0dB LED turns on). See Fig. 2.

- Follow the same procedures to adjust the other channel by turning VR812 or VR811.

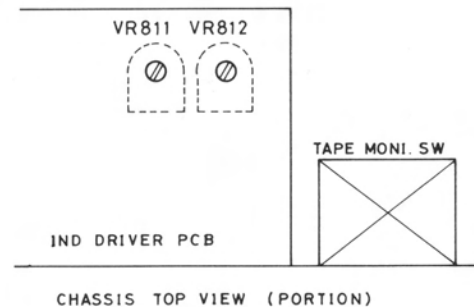


Fig. 2

Specifications

AMPLIFIER SECTION

Continuous Power Output . . .	.60 watts* per channel, min. RMS, both channels driven at 8 ohms from 20 to 20,000Hz with no more than 0.03% total harmonic distortion
Total Harmonic Distortion . . .	.No more than 0.03% (continuous rated power output) No more than 0.009% (continuous 1/2 rated power output) No more than 0.01% (1 watt per channel power output)
Intermodulation Distortion . . .	.No more than 0.02% (continuous rated power output) 60Hz : 7kHz = 4 : 1 No more than 0.03% (continuous 1/2 rated power output) No more than 0.03% (1 watt per channel power output)
Damping Factor . . . . .	.50 (20 to 20,000Hz, 8 ohms)

Input Sensitivity Impedance

PHONO (MM) . . . . .	.25mV/70, 50, 35 kilohms
PHONO (MC) . . . . .	.0.12mV/30 ohms
TUNER, AUX . . . . .	.150mV/30 kilohms
TAPE MONITOR 1, 2 . . . . .	.150mV/30 kilohms

Overload Level (T.H.D. 0.5%, 1kHz)

PHONO (MM) . . . . .	.240mV
PHONO (MC) . . . . .	.11mV
TUNER, AUX . . . . .	.6V

Frequency Response

AUX, TAPE IN . . . . .	.5-70,000Hz, +0dB, -1.0dB (at 1 watt per channel power output)
PHONO (MM) . . . . .	.20-20,000Hz, ±0.5dB (RIAA STD)

Tone Control

BASS	±12dB (50Hz)
MID	±12dB (1kHz)
TREBLE	±12dB (15kHz)
HIGH Filter . . . . .	.12dB/oct (20kHz)
SUBSONIC Filter . . . . .	.12dB/oct (15kHz)
LOUDNESS (volume control set at -40dB position)	. . . . . +10dB (100Hz), +4dB (10kHz)

Signal-to-Noise Ratio (IHF, A Network)

PHONO (MM) . . . . .	.76dB
PHONO (MC) . . . . .	.68dB
TUNER, AUX . . . . .	.92dB
TAPE MONITOR 1, 2 . . . . .	.92dB

Residual Noise 1.4mV

Audio Muting -15dB

MISCELLANEOUS

Power Requirement 120V/60Hz, 220V/50Hz, 240V/50Hz or 120, 220, 240V/50-60Hz

Power Consumption 490 watts (max.)

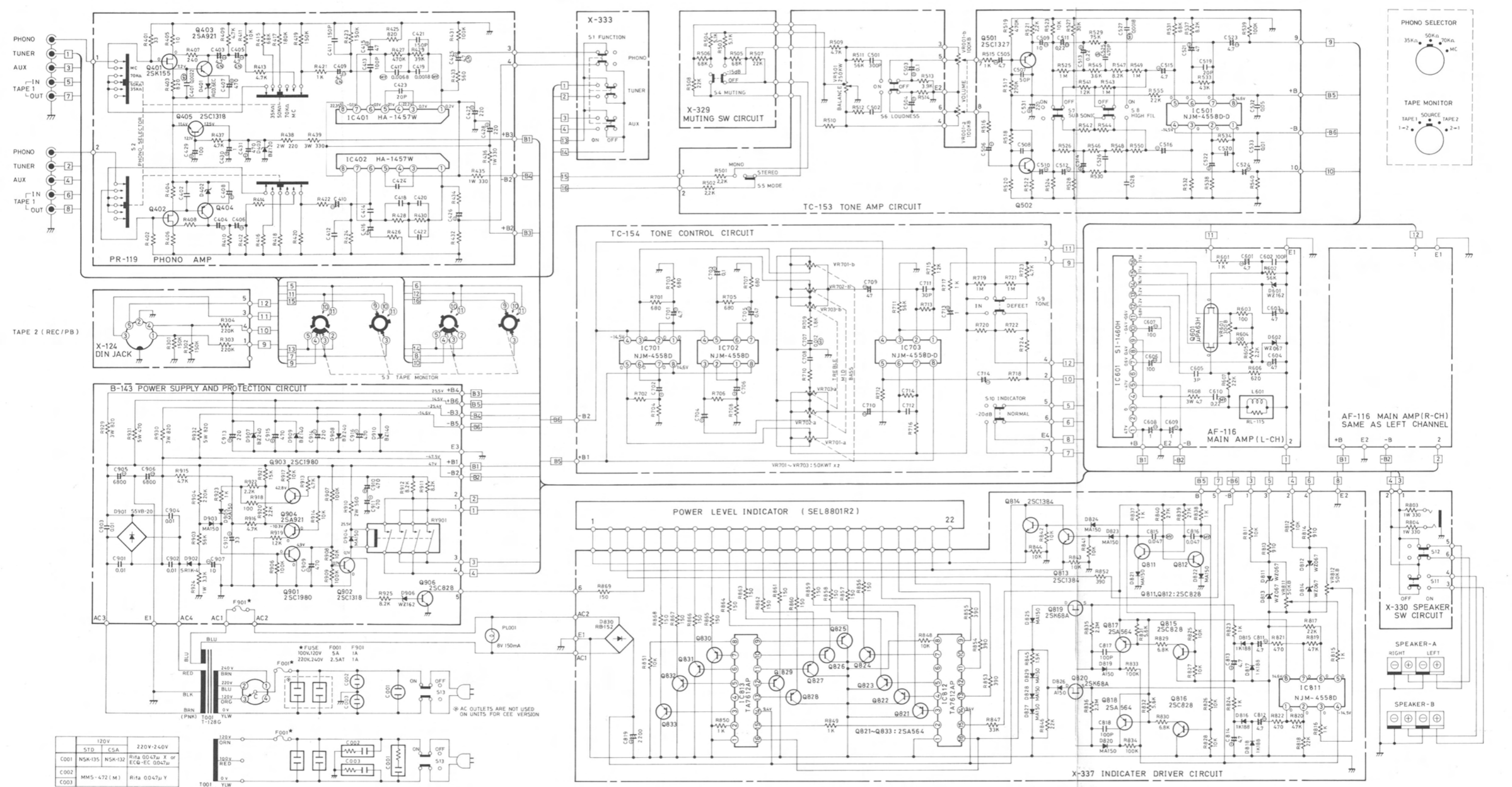
Specifications and design subject to possible modification without notice.

Repair Parts List

Schematic Location	Description	Part No.
TRANSISTORS, DIODES AND IC'S		
Q401, 402	2SK155 (S)	302001123
Q403, 404, 904	2SA921 (S or T)	301001145
Q405, 902	2SC1318 (S)	301201155
Q501, 502	2SC1327 (R or S)	301201134
Q601	μPA63H (M1 or M2), Dual FET	302001121
Q811, 812, 815 816, 906	2SC828 (S or T)	301201115
Q813, 814		
Q817, 818, 821 822 to 833	2SC1384 (R or S)	301201162
Q819, 820	2SA564 (Q, R or S)	301001146
Q901, 903	2SK68A (L or M)	302001113
D401, 402	2SC1980 (S or T)	301201171
D403	RD3.6EC, Zener, 3.6V, 400mW	300313039
D601, 906	BZ-120, Zener, 12V, 1W	300313004
D602, 811 to 814	WZ-162, Zener, 16V, 500mW	300313017
D815 to 818	WZ-067, Zener, 6.7V, 500mW	300313036
D819 to 829 903 to 905	1K188, Diode (Ge)	300111008
D830	MA-150, Diode (Si)	300111016
D901	RB-152, Rectifier	300919038
D902	S5VB-20, Rectifier	300919032
D907, 908	SR1K-4, Rectifier	300919024
D909, 910	BZ-240, Zener, 24V, 1W	300313009
IC401, 402	BZ-140, Zener, 14V, 1W	300313005
IC501, 703	SEL8801R02, LED ARRAY	300414039
IC601	HA-1457W-02, Phono Amp	303452192
IC701, 702, 811	NJM4558D-D, Tone Amp, etc.	303452152
IC812, 813	SI-1460H, Power Amp	303452220
	NJM4558D, Tone, etc.	303452215
	TA7612AP	303452208
VARIABLE RESISTORS		
VR501	250KWT, Balance Control	515121130
VR601	300B, DC Balance Adj	510502187
VR701, 702, 703	50KWT x 2, Tone Control	525121148
VR811, 812	50KB, Level Ind Cal	510502191
VR001	100KB x 2, Volume Control	525321118
SWITCHES		
S1	Push 3-key gang, Function Selector	614030827
S2	Slide, Remote, Phono Selector	615212273
S3	Rotary, Tape Monitor	601011271
S4	Push 1-key, Muting	614010144
S5, 6, 7, 8 (1 set)	Push 4-key, Loudness, etc.	614040828
S9, 10 (1 set)	Push 2-key, Tone Defeat, etc.	614020437
S11, 12, 13 (1 set)	Push 3-key, Speaker, Power	614030829
OTHERS		
L601	Coil, Anti-parasitic	228641126
RY901	Relay, Protection	240111247
T001	Power Transformer (120, 220, 240V, Type G)	207001492
	(100, 120V, Type D)	204001492
PL001	Lamp, 8V, 150mA	359101127
F901	Fuse, 1A, 250V, Long Type (STD)	341222100
	Fuse, 1A, 250V, Midget Type (CEE)	345252100
F001	Fuse, 5A, 250V, Long Type (STD)	341222500
	Fuse, 2.5AT, 250V, Midget Type (CEE)	345952250

Schematic Location	Description	Part No.
C001	Noise Canceller, NSK-135 (120V Area)	470101118
	NSK-132 (Canada Only)	470101129
	PME271M, 0.047μF 'X' (220/240V Area)	470101122
	ECQ-EC 0.047μF (220/240V Area)	470101126
C002, 003	Noise Canceller, MMS-472(M) (120V Area)	470101133
	PME271Y447 (220/240V Area)	470101124
	Phono Amp PCB Ass'y	141510175
	Tone Amp & Muting PCB Ass'y	141710329
	Tone Control PCB Ass'y	141710331
	Main Amp PCB Ass'y (w/o Power IC and Heatsink)	141610331
	Power Supply PCB Ass'y (w/Long Fuse)	141810995
	Power Supply PCB Ass'y (w/Midget Fuse)	141811045
	DIN Socket PCB Ass'y	141810996
	Speaker Switch PCB Ass'y (w/Power SW)	141810951
	Function Selector PCB Ass'y	141810958
	Indicator Driver PCB Ass'y	141810997
	Switch Control Unit w/Flex Wire	654101152
	Fuse Holder (Long Fuse)	648211184
	Fuse Holder (Midget Fuse)	648211245
	Voltage Selector	648211247
	AC Outlet (STD)	648211255
	(Canada Only)	648211141
	Pin Jack, 2P, AUX	624200202
	Pin Jack, 4P, PHONO, TAPE MONITOR	624200204
	Speaker Terminal, 4P	642400111
	Ground Terminal	770911119
	Fuse Clip, Long Fuse	648211146
	Fuse Clip, Midget Fuse	648211147
	DIN Socket	625001119
	Headphone Jack	626110033
	Front Panel (Metallic Brown) (Black)	111911498
		111911499
	Knob, Volume (Metallic Brown) (Black)	116310289
		116310302
	Knob, Selector (Metallic Brown) (Black)	116310285
		116310301
	Knob, Balance, etc. (Metallic Brown) (Black)	116310287
		116310288
	Button, Function, etc. (Metallic Brown) (Black)	116210058
		116210059
	Button, Loudness, etc. (Metallic Brown) (Black)	116210056
		116210057
	Scale Board	112011375
	Bonnet	138011304
	Foot (H=9.5mm)	673402025
	Wire Clamper	672200859
	Binder, Capacitor Mtg	672200878
	Screw, M2x4mm (Ni), Binding Head, LED Array Mtg	705212004
	M3x4mm (Ni), Binding Head	705213004
	M3x6mm (Ni), Binding Head	705213006
	M3x8mm (Ni), Binding Head	705213008
	M3x8mm (BLZ), Binding Head	705223008
	M3x10mm (Ni), Binding Head	705213010
	M3x15mm (Ni), Binding Head	705213015
	M3x6mm (Ni), Countersunk, Panel Mtg	701213006
	M3x6mm (Ni), Oval-countersunk	702213006
	M4x8mm (BLZ), w/Flat Washer, Binding Head	715224008
	M3x6mm (BLZ), Flat Head	770911166

Screw, Tapping-II, 3x6mm (Ni), Oval-countersunk	722213006
3x8mm (ZBC), Bottom Cover Mtg	726203008
3x8mm (NI)	726213008
3x10mm (BLZ)	726223010
3x10mm (Ni)	726213010
3x12mm (Ni)	726213012
4x10mm (BLZ), Binding Head	725224010
Screw, Tap-tight, 4x10mm (Ni), Binding Head	765214010
Washer, Flat, M7	770500007
M9	770500008
Washer, Spring, M4	770500004
Washer, Teethed, M3	770500014
Nut, M3	770402201
M4	770402202
M7	770402205
M9	770402207
M12	770402209



RESISTORS
 5% tolerance, 1/4 watts low-noise type carbon film resistors unless otherwise noted.

k Kilohm
 M Megohm

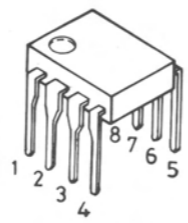
CAPACITORS
 MY Mylar film capacitor
 -E- Electrolytic capacitor
 LN Low-noise type capacitor

Unless otherwise noted, all capacitance values are expressed in mfd.

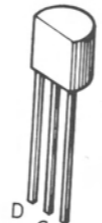
- Notes:**
- Voltage reading with VTVM from the point shown to the chassis ground.
 - Voltage reading tolerance: within 20%



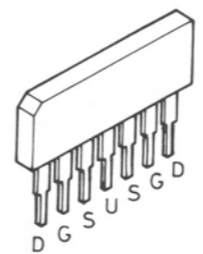
2SC1384
 2SC1318
 2SC828
 2SC1980
 2SA921
 2SC1327
 2SA564



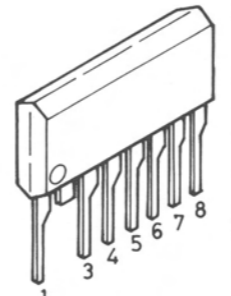
NJM4558D
 NJM4558DD



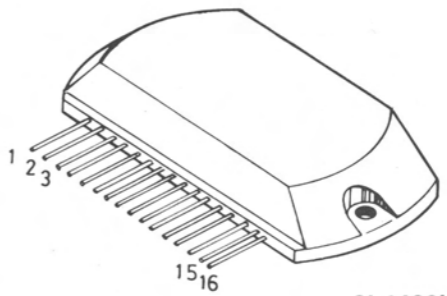
2SK68A
 2SK155



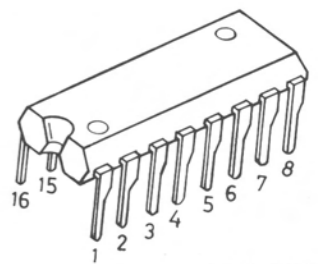
μPA63H



HA1457-02

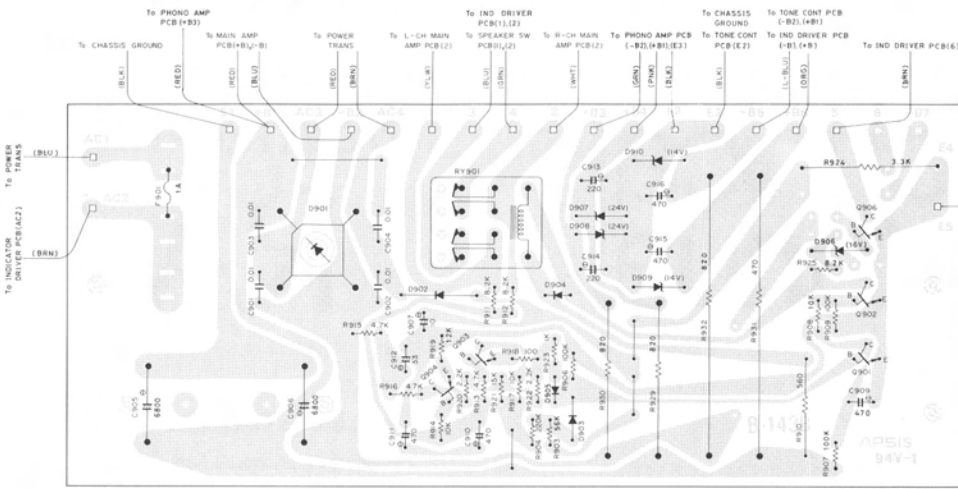


SI-1460H

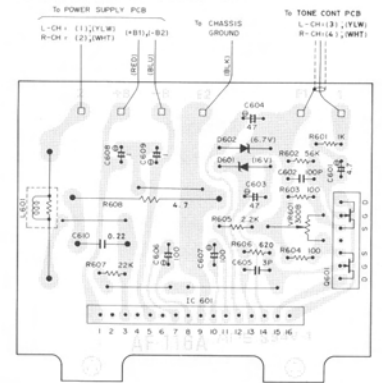


TA7612AP

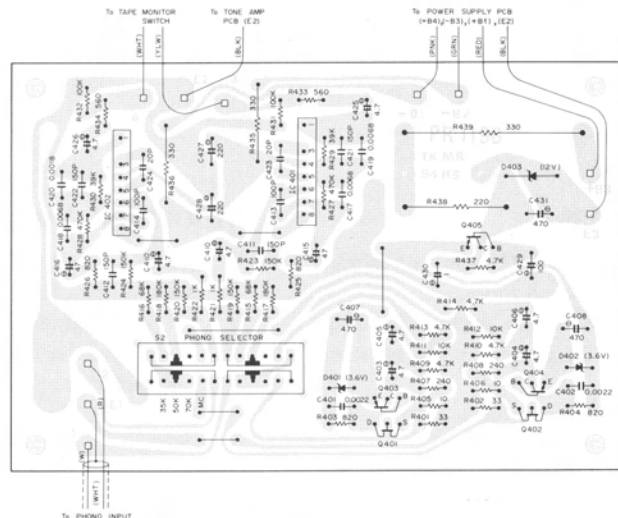
POWER SUPPLY CIRCUIT



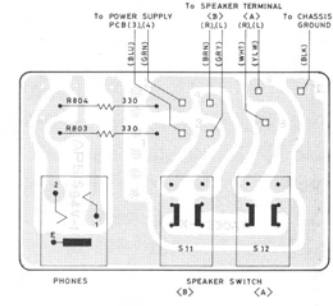
MAIN AMP CIRCUIT



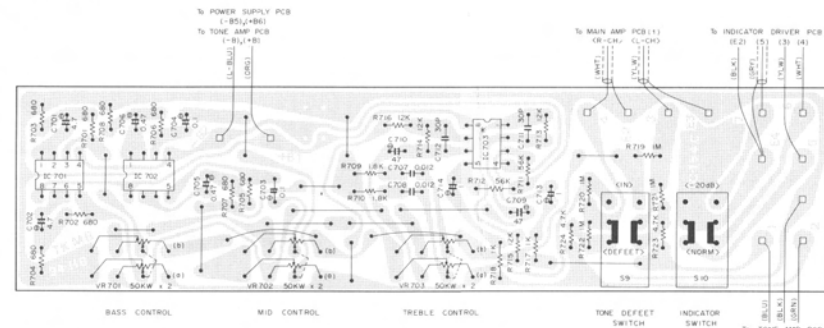
PHONO AMP CIRCUIT



SPEAKER SWITCH CIRCUIT

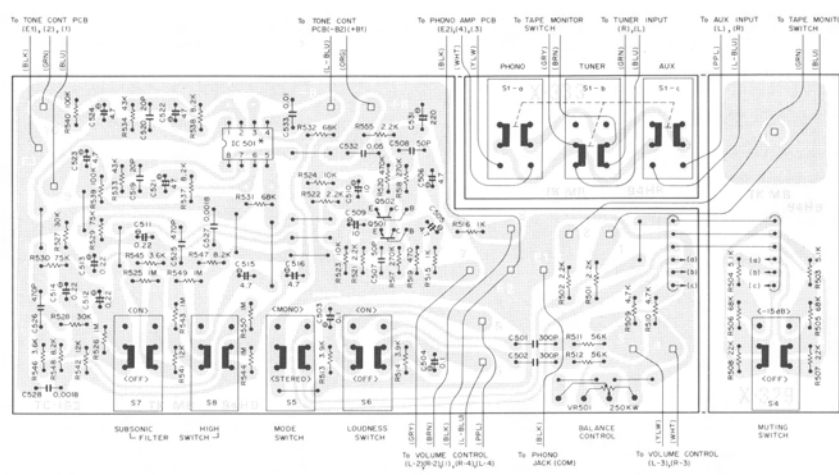


TONE CONTROL CIRCUIT



*IC703 must be Low-noise type.

TONE AMP AND MUTING SWITCH CIRCUIT



*IC501 must be Low-noise type.

INDICATOR DRIVER CIRCUIT

