Quality. Uncompromised.

ROTEL®

Technical Manual

STEREO DC INTEGRATED AMPLIFIER

RA-2030

TABLE OF CONTENTS

Chassis Layout (Top View) 2
Adjustment 3
Specifications 5
Addendum 6
Repair Parts List 8
Schematic Diagram 10
Block Diagram 12
PC Board Diagrams 13

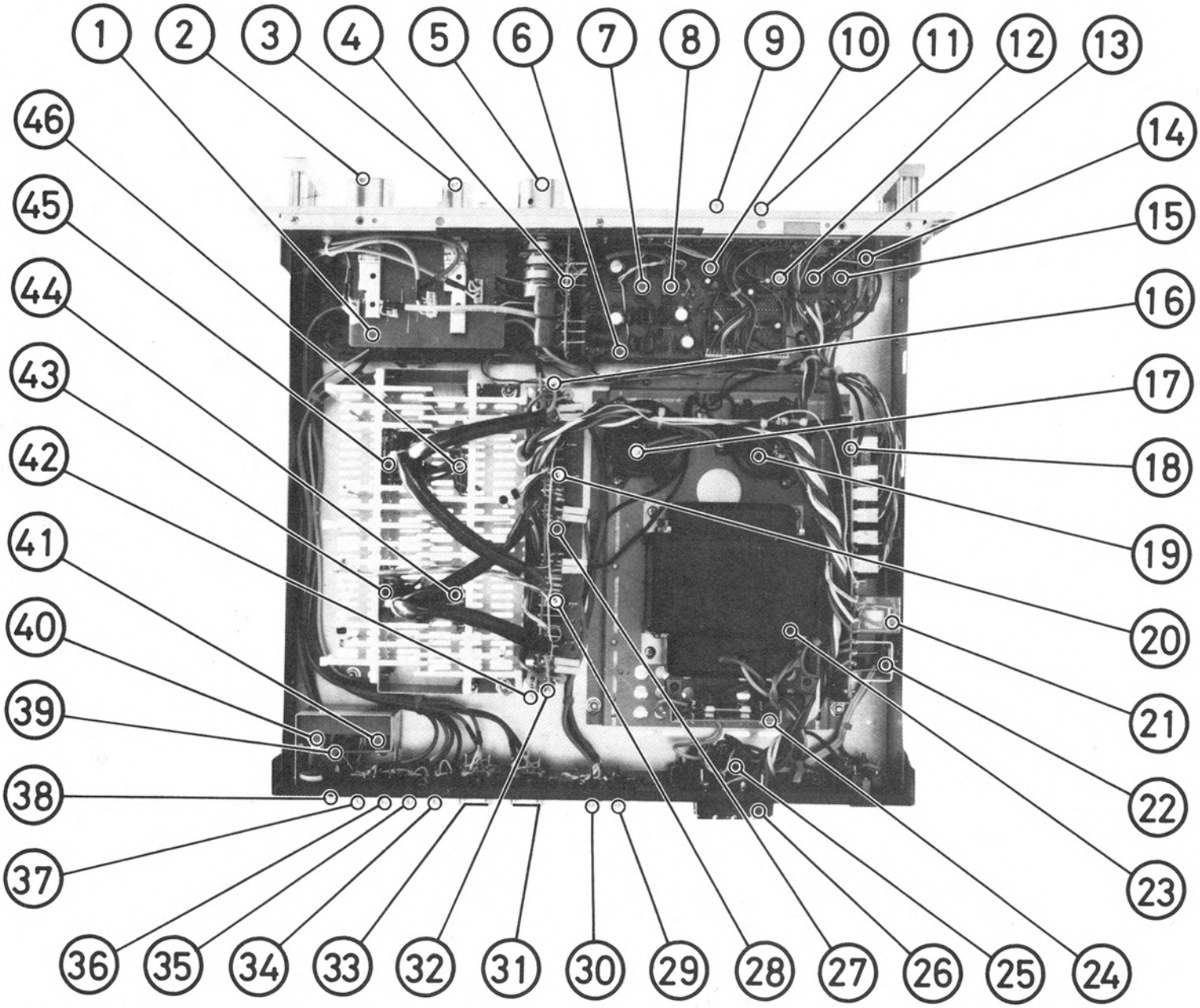
Serial Nos. Beginning
NB80395

THE ROTEL CO., LTD.
1-36-8 OHOKAYAMA, MEGURO-KU, TOKYO 152, JAPAN

ROTEL ELECTRONICS CO., LTD.
2ND FLOOR, EVERGLORY BLDG., NO. 305, SECTION 3, NANKING E. ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA

ROTEL OF AMERICA, INC.
1055 SAW MILL RIVER ROAD, ARDSLEY, N.Y. 10502, U.S.A.

Chassis Layout (Top View)



1. FUNCTION SELECTOR PC BOARD
2. FUNCTION SELECTOR
3. RECORDING SELECTOR
4. VOLUME CONTROL PC BOARD
5. VOLUME CONTROL
6. FILTER AND INDICATOR DRIVER PC BOARD
7. SUPERSONIC FILTER SWITCH
8. SUBSONIC FILTER SWITCH
9. TREBLE CONTROL
10. VR602, PEAK INDICATOR LEVEL ADJ, R-CH
11. BASS CONTROL
12. VR601, PEAK INDICATOR LEVEL ADJ, L-CH
13. SPEAKER B SWITCH
14. SPEAKER SWITCH PC BOARD
15. SPEAKER A SWITCH
16. VR706, OVERLOAD DETECTION LEVEL ADJ, R-CH
17. C001, SMOOTHING CAPACITOR
18. POWER SUPPLY AND PROTECTION PC BOARD
19. C002, SMOOTHING CAPACITOR
20. VR704, IDLING CURRENT ADJ, R-CH
21. RY301, SPEAKER RELAY
22. D808, RECTIFIER
23. T001, POWER TRANSFORMER
24. FUSE PC BOARD
25. VOLTAGE SELECTOR (NOT USED ON UNITS FOR EUROPEAN TYPE)
26. SPEAKER TERMINALS
27. VR702, DC BALANCE ADJ, R-CH
28. VR703, IDLING CURRENT ADJ, L-CH
29. MAIN AMP IN JACK
30. PREAMP OUT JACK
31. TAPE MONITOR-1 JACKS
32. VR705, OVERLOAD DETECTION LEVEL ADJ, L-CH
33. TAPE MONITOR-2 JACKS
34. AUX INPUT JACK
35. TUNER INPUT JACK
36. PHONO-1 INPUT JACK
37. PHONO-2 INPUT JACK
38. PHONO-3 (MC) INPUT JACK
39. MC HEAD-AMP PC BOARD
40. VR101, DISTORTION ADJ, L-CH
41. VR102, DISTORTION ADJ, R-CH
42. DRIVER PC BOARD
43. Q901, a, c, POWER AMP (UPPER HALF CYCLES), L-CH
44. Q902, b, d, POWER AMP (LOWER HALF CYCLES), R-CH
45. Q902, a, c, POWER AMP (LOWER HALF CYCLES), L-CH
46. Q901, b, d, POWER AMP (UPPER HALF CYCLES), R-CH

Adjustment

Instruments: Audio Generator, Oscilloscope, AC voltmeter, DC millivoltmeter, HD Analyzer.

Note:

Set Balance Control to mid-position, Muting and Filter Switches to OFF, Mode Switch to STEREO and Tape Monitor Switch to SOURCE.

A. Main Amp DC Balance Adjustment

Before starting this adjustment, calibrate the oscilloscope as follows: set the vertical gain control at 0.1 volt/cm. Set AC-GND-DC switch to GND to determine zero point on the screen. Then set the switch to DC position.

1. Short-circuit Main-In terminals. Set UNITE-SEPARATE switch to SEPARATE. Connect the oscilloscope to the speaker terminals, and adjust potentiometer VR701 (VR702 for R-channel) so that the horizontal line on the oscilloscope screen, which indicates voltage, comes to 0-volt position.
2. Next, check that when Main-In terminals are opened, or when UNITE-SEPARATE switch is set to UNITE position with Main-In terminals open, fluctuation of voltage is within ±0.04 volts.

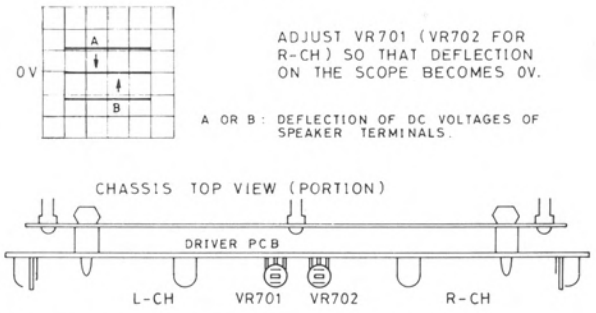


Fig. 1. Main Amp DC Balance Adjustment

B. Idling Current (Bias) Adjustment

Before starting this adjustment, warm up the unit for 3 minutes or so to stabilize the power transistors and the heat sink, with Volume Control set at minimum.

1. Connect the plus lead of DC millivoltmeter to pin 19 (pin 20 for R-channel) and the minus lead to pin 13 (pin 14 for R-channel) on the Driver PC board.
2. Adjust potentiometer VR703 (VR704 for R-channel) on the Driver PC board so that DC millivoltmeter reads 16.5mV.

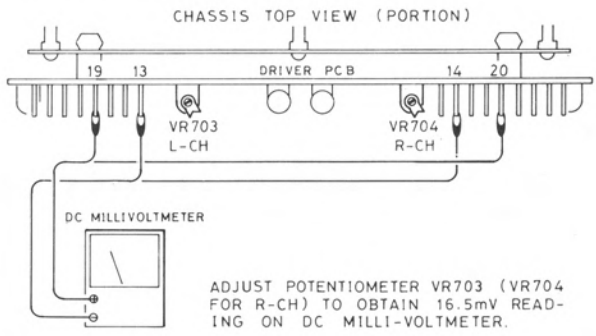


Fig. 2. Idling Current (Bias) Adjustment

C. Overload Protection Level Adjustment

Make this adjustment for left and right channels separately (feed signal only to the channel to be adjusted).

- Before making adjustment, warm up the unit adequately to prevent fluctuation of the preset level caused by temperature rise.
- Do not short-circuit the output pins for more than one minute. This requires the adjustment to be made bit by bit by repeating the action of turning the potentiometer a bit and short-circuiting the pins momentarily.

  Note that short-circuiting output pins for a prolonged period of time when the protection circuit is not activated will damage power transistors, etc.

1. Connect an 8-ohm load resistor to speaker terminals. Connect AC voltmeter in parallel with the load resistor. Set Volume Control to maximum. Connect Audio Generator to AUX input jack and feed in 1,000Hz (sine wave) signal. Adjust the input level with the attenuator of Audio Generator to obtain 0.4-volt reading on AC voltmenter.
2. Adjust potentiometer VR705 (VR706 for R-channel) on Driver PC board so that the protection circuit is activated (i.e. Speaker relay is set to OFF) the instant pins 15 and E3 (pins 16 and E2 for R-channel) are short-circuited.
3. Reduce the input level until AC voltmeter reads 0.35 volts. Then, make certain that the protection circuit is not activated (i.e. Speaker Relay keeps ON) when pins 15 and E3 (pins 16 and E2 for R-channel) are shorted.

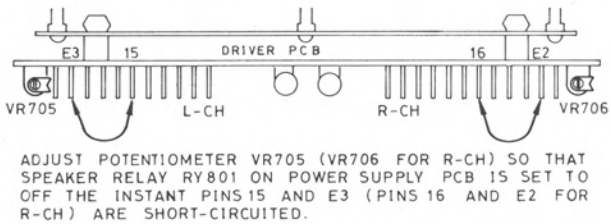


Fig. 3. Overload Protection Level Adjustment

D. Distortion Adjustment of PHONO-3 (MC) Head Amp

1. Connect HD Analyzer to Tape Monitor Out jack. Connect Audio Generator to PHONO-3 (MC) jack. Feed in 1,000Hz (sine wave) signal and adjust input level to obtain 3-volt reading on HD Analyzer.
2. Adjust potentiometer VR101 (VR102 for R-channel) on MC Head Amp PC board so that HD Analyzer gives minimum distortion.

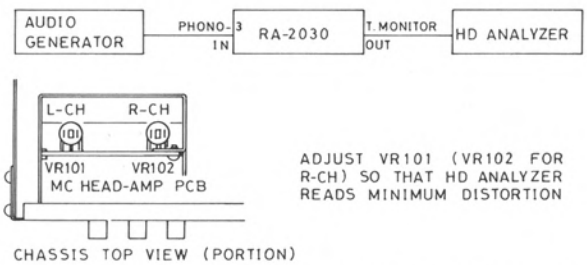
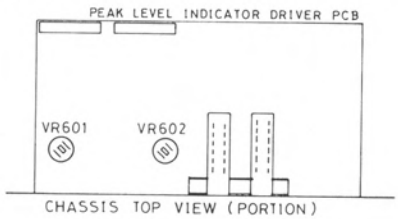


Fig. 4. Distortion Adjustment of Phono-3 (MC) Head Amp

Fig. 5. Peak Level Indicator Adjustment



E. Peak Level Indicator Calibration

1. Connect an 8-ohm load resistor to speaker terminals. Connect AC voltmeter in parallel with the resistor. Connect Audio Generator to AUX input and feed in 1,000Hz (sine wave) signal. Adjust the input level to obtain 25.3-volt reading on AC voltmeter. Set the sensitivity changeover switch for Peak Level Indicator to NORMAL.
2. Maintaining this state, adjust by turning potentiometer VR601 (VR602 for R-channel) on the Indicator Driver PC board so that the Level Indicator lights up to 0dB position.
3. Adjust the input level so that AC voltmeter indicates the point 20dB lower than that at 25.3-volt reading. Push on the sensitivity changeover switch to −20dB position. Check that the Peak Level Indicator lights up to 0dB position.

Specifications

A. POWER AMPLIFIER SECTION

- Continuous Power Output . . . . 80W* per channel, both channels driven at 8Ω from 20Hz to 20,000Hz with no more than 0.01% total harmonic distortion.
- Total Harmonic Distortion. . . . No more than 0.01% (continuous rated power output).
  No more than 0.006% (40W per channel, 8Ω load).
  No more than 0.009% (1W per channel, 8Ω load).
- Intermodulation Distortion . . . (60Hz : 7KHz = 4 : 1) No more than 0.015% (40W per channel, 8Ω load).
  No more than 0.009% (1W per channel, 8Ω load).
- Frequency Response . . . . . 4Hz to 100,000Hz (+0dB, −1dB)
  2Hz to 200,000Hz (+0dB, −3dB)
  (1W per channel, 8Ω load).
- Input Sensitivity/Impedance. . . 1V/50kΩ (1,000Hz, at rated output)
- Output . . . . . Speaker A, B (4Ω to 16Ω)
  Speaker A + B (8Ω to 16Ω)
- Damping Factor. . . . . 60 (20Hz to 20,000Hz, at 8Ω load)
- Hum and Noise . . . . . 105dB (short-circuited input, IHF A Network)
- Crosstalk. . . . . 60dB at 10kHz (reverse channel shorted)

B. EQUALIZER AMPLIFIER SECTION

- Output Voltage/Impedance at 1,000Hz
  Tape Monitor-1, -2 Output. . 150mV/2kΩ
  DIN Socket Output. 50mV/80kΩ
  Maximum Output at 0.5% THD. 20V
- Harmonic Distortion (20Hz to 20,000Hz, at 5V output)
  Phono-1, -2 (MAG) 0.005%
  Phono-3 (MC) 0.006%
- Phono Equalization (20Hz to 20,000Hz)
  Phono-1, -2 (MAG) . . . . . RIAA STD ±0.3dB
  Phono-3 (MC) . . . . . RIAA STD ±0.3dB
- Hum and Noise (1V output, IHF A Network)
  Phono-1, -2 (MAG) 74dB
  Phono-3 (MC) 64dB
- Input Sensitivity / Impedance (at rated output, 1,000Hz)
  Phono-1 (MAG) 2mV/35kΩ, 50kΩ, 75kΩ/0pF, 100pF, 200pF
  Phono-2 (MAG) 2mV/50kΩ
  Phono-3 (MC) 200μV/150Ω
- Crosstalk (at 20,000Hz, reverse channel shorted): 55dB
- Overload (at 1,000Hz, 0.1% THD)
  Phono-1, -2 (MAG) 300mV
  Phono-3 (MC) 10mV

C. PREAMPLIFIER SECTION

- Output Voltage/Impedance (at PRE-OUT)
  Rated output (at 1,000Hz) . 1V/600Ω
  Maximum Output
  (at 1,000Hz, 0.5% THD) . . . 7V
- Harmonic Distortion (20Hz to 20,000Hz, at rated output) 0.008%
- Frequency Response . . . . . 4Hz to 160,000Hz (+0dB, −1dB)
- Hum and Noise (short-circuited input, IHF A Network)
  TUNER, AUX. 95dB
  TAPE MONITOR-1, -2. . . . 95dB
  RESIDUAL (Volume Control at Min) 6μV/100dB
- Input Sensitivity/Impedance (at rated output, 1,000Hz)
  TUNER, AUX. . . . . 150mV±1dB/50kΩ
  TAPE MONITOR-1, -2. . . . 150mV±1dB/50kΩ
- Overload (at 0.5% THD, 1,000Hz)
  TUNER, AUX. 15V
  TAPE MONITOR-1, -2. . . . 15V
- Crosstalk at 1,000Hz . . . . . 70dB AVE
- Intermodulation Distortion 60Hz:7kHz=4:1. . . . . 0.01%

D. CONTROL CHARACTERISTICS

- Tone Control Bass (at 100Hz). . ±10dB
  Treble (at 10kHz). ±10dB
- Loudness (at 100Hz/10kHz). . . +8dB/+4dB
- Supersonic Filter (at 24kHz) . . 12dB/oct
- Subsonic Filter (at 15Hz) 12dB/oct
- Audio Muting . . . . . −15dB±1dB

E. MISCELLANEOUS

- Power Requirements . . . . . 120V/60Hz, 220V or 240V/50Hz or 100V, 120V, 220V or 240V/50Hz or 60Hz (Switchable)
- Power Consumption . . . . . 500W Max.
- Dimensions (Overall) . . . . . 482(W) × 143(H) × 408(D) mm

Note: Specifications and design are subject to possible modification without notice.
*Measured pursuant to Federal Trade Commission's Trade Regulation Rule on Power Claims for Amplifiers. (Applicable to U.S. only.)

Addendum

The Overload Detector Circuit has been modified. This change is applicable to all units with serial numbers NB84111 or over.

1. The new Overload Detector Circuit saves adjustment of overload protection. Accordingly, resistors R749, 777, 781 and VR705 (R750, 778, 782 and VR706 for R-channel) and transistors Q719 and 720 (R-channel) are eliminated from the Driver Circuit of the new unit.
2. Because of the modification explained in 1, the new Driver PC Board assembly used for repair is given a new number, to distinguish it from conventional Driver PC Board.
   a. The new Driver PC Board assembly (Part No. 141610324) and the newly designed Overload Detector PC Board assembly (Part No. 141810874) are applicable to units with serial numbers NB84111 or over.
3. To attach the new Overload Detector PC Board to conventional units (with serial numbers up to NB84110), it is necessary to drill two holes in the Driver PC Board fitting plate. The following parts are necessary to attach the new PC Board.
4. Parts Required
   a. PC Board fitting plate:
      Part No. 120012231 . . . . . 2 pcs.
   b. Screw 3 x 6mm:
      Part No. 705213006 . . . . . 4 pcs.
   c. Nut, M3 hex:
      Part No. 770402201 . . . . . 2 pcs.
5. How to attach
   a. Drill two ϕ3.5 holes in the Driver PC Board fitting plate. See Fig. A.
   b. Attach the Overload Detector PC Board to the Driver PC Board fitting plate as shown in Fig. B.
   c. The fitting position of the Overload Detector PC Board as seen from chassis top is illustrated in Fig. C.
6. See Figs. D and E for the new Overload Detector Circuit and connection.
7. To check operation of Overload Protection Circuit when new Overload Detector PC Board is employed:
   a. Connect an 8-ohm load resistor to speaker terminals and produce 1.2-volt output (1,000Hz sine wave signal) at the terminals.
   b. Maintaining this state, check that Speaker Relay RY801 is set to OFF the instant the speaker terminals are short-circuited.

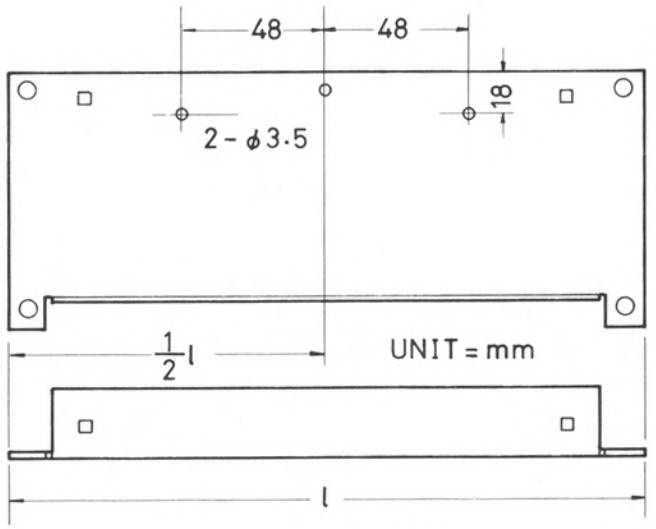


Fig. A.

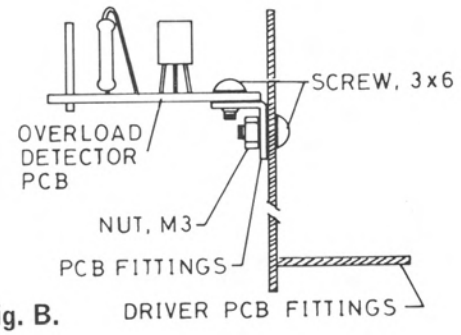


Fig. B.

   c. Next, increase the output voltage at the speaker terminals to 25.3V (both channels driven).
      1) Check to see that Speaker Relay is not set to OFF by connecting a 1.5-ohm resistor to the terminals.
      2) Check to see that Speaker Relay is set to OFF by connecting 0.5-ohm resistor to the terminals.

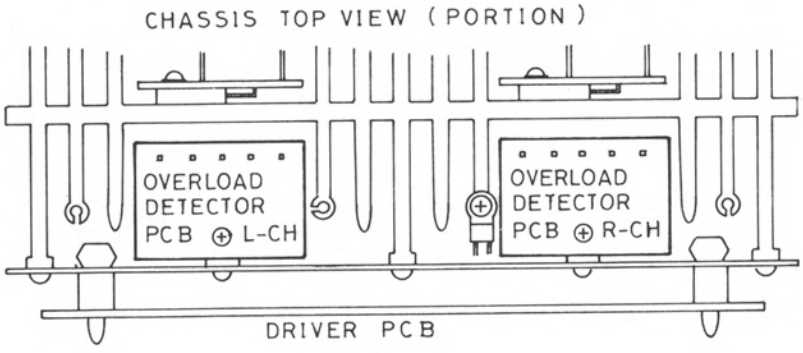


Fig. C.

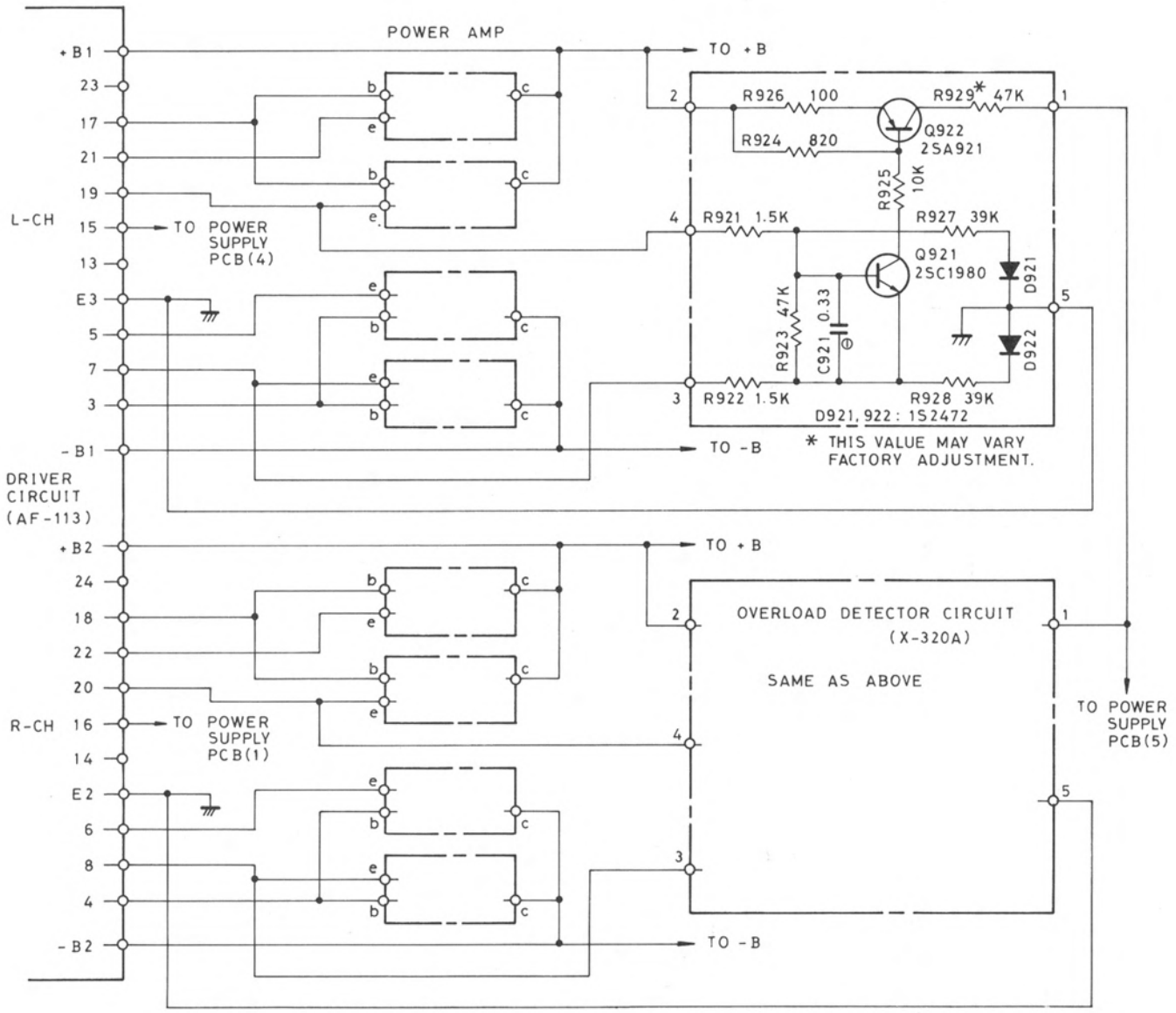
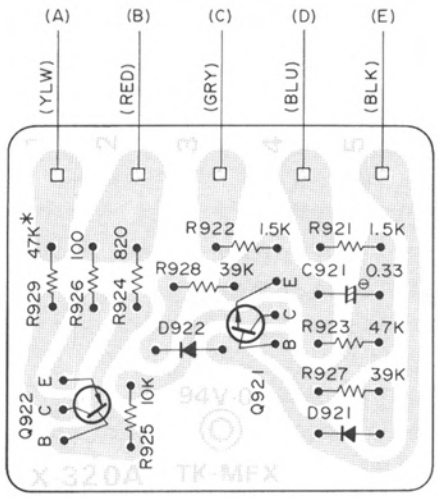


Fig. D.



* THIS VALUE MAY VARY FACTORY ADJUSTMENT

Fig. E.

	CONNECTION OF OVERLOAD DETECTOR CIRCUIT BOARD	
	For L-channel	For R-channel
A	To R-ch, Overload Detector PCB (1)	To L-ch Overload Detector PCB (1) To Power Supply PCB (5)
B	To Driver PCB (+B1)	To Driver PCB (+B2)
C	To Driver PCB (19)	To Driver PCB (20)
D	To Driver PCB (7)	To Driver PCB (8)
E	To Driver PCB (E3)	To Driver PCB (E2)

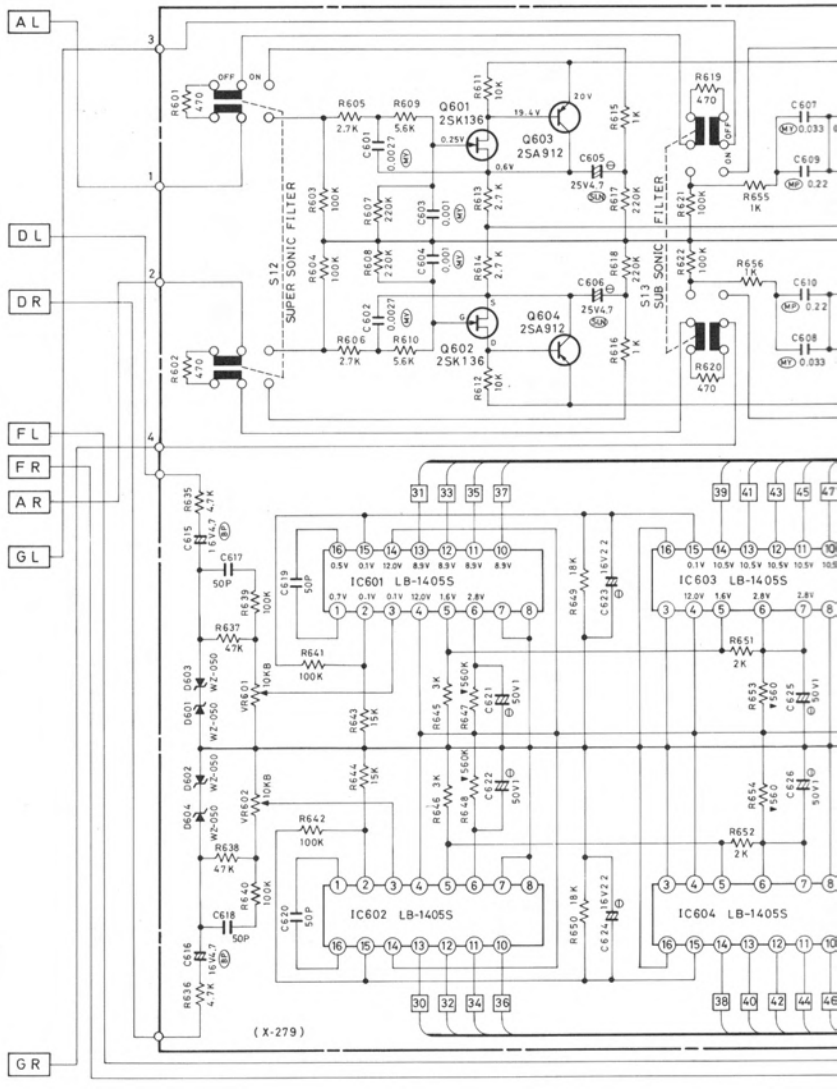
Repair Parts List

Schematic Location	Part No.	Description
TRANSISTORS, DIODES AND IC'S		
Q101, 102, 103 104, 105, 106	302001113	2SK68A (M), MC Head Amp
Q107, 209, 210 407, 408, 701 702, 703, 704 711, 712, 713 714, 804	301201164	2SC1885 (R), (S)
Q201, 202, 203 204, 401, 402 403, 404, 601 602, 605, 606	302001118	2SK136 (R), (S)
Q205, 206, 405 406, 719, 720	301001145	2SA921 (S), (T)
Q207, 208, 409 410, 411, 412 707, 708	301201171	2SC1980 (S), (T)
Q211, 212, 603 604, 607, 608 707, 708, 709 710	301001142	2SA912 (R), (S)
Q501, 502, 503 504	301201134	2SC1327 (S), (T)
Q705, 706	302001122	μPA63H, FET
Q715, 716, 801 803	301201165	2SC1913 (R), (Q)
Q717, 718, 802	301001143	2SA913 (R), (Q)
Q721, 722	301301134	2SD571 (K), (L)
Q723, 724	301101124	2SB605 (K), (L)
Q901	301201189	2SC2580 (R), (O), (Y), Power Amp
Q902	301001159	2SA1105 (R), (O), (Y), Power Amp
D201, 202, 203 204, 703, 704 705, 706	300212008	KB-165, Varistor
D601, 602, 603 604	300313028	WZ-050, Zener Regulator, 5V, 0.5W
D701, 702	300313009	BZ-240, Zener Regulator, 12V, 1W
D707, 708, 709 710, 804, 805	300111010	1S2472
D801, 802	300313032	BZ-350, Zener Regulator, 35V, 1W
D803	300313004	BZ-120, Zener Regulator, 12V, 1W
D806, 807	300919024	SRIK4, Rectifier
D808	300919033	S-10VB-20, Rectifier
D901	300414021	SLP-237, Power Ind LED, (Green)
D902 ~ 928	300414020	SLP-137B, Level and Protection Ind LED (Red)
D001, 002	300212015	SV-03S, Varistor
IC101	303452189	NJM 78L-15A, Regulator, 15V
IC601, 602, 603 604	303452188	LB-1405S, Level Ind Driver
IC801	303452187	HA-12002W, Protection
VARIABLE RESISTORS		
VR101, 102	510502178	330B or 1KB (Part No. 510502181) MC Head Amp Distortion Adj
VR401, 402	525101157	50KBx2, Bass, Treble Control
VR501	525101143	100KBHx2, Balance Control
VR502	525121141	100KBTx2 + 50KCx2, Volume Control
VR601, 602	510502138	10KB, Indicator Level Cal
VR701, 702	510502176	100B, DC Balance Adj
VR703, 704	510502147	10KB, Bias Current Adj
VR705, 706	510502146	5KB, Overload Detection Level Adi
SWITCHES		
S1, 2, 3	601011335	Load Impedance, Additional Capacitance, Phono Selector
S4	601011337	Recording Selector
S5	601011339	Function Selector
S6	614030819	Tape Monitor Sw
S7	614010133	Muting Sw
S8	611001269	Mode Sw
S9	611001275	Tone Sw
S10	611001274	Indicator Sw
S11	614010132	Loudness
S12, 13 (1 Set)	614020424	Supersonic, Subsonic
S14	613000022	Separate Sw
S15, 16 (1 Set)	614020408	Speaker Sw
S17	611001271	Power Sw
OTHERS		
	626110028	Headphones Receptacle
	624205202	Pin Jack, 2P, Phono-3 Input
	624200204	Pin Jack, 4P, Tape Monitor, Pre Out, etc.
	624206204	Pin Jack, 4P, Phones 1, 2 Input
	642400111	Push Terminal, 4P, Speakers
	648211121	Voltage Selector (Multi-voltage Type only)
	648211141	AC Outlet (not used on units for UK)
	625001114	DIN Socket, 5P
	141810840	Phono-3 (MC) Head Amp PC Board Ass'y
	141510166	Phono Equalizer Amp PC Board Ass'y
	141710303	Volume Control Amp PC Board Ass'y
	141710304	Tone Control Amp PC Board Ass'y
	141610317	Driver PC Board Ass'y*
	141810841	Power Supply PC Board Ass'y
	141810827	Speaker Switch PC Board Ass'y
	141810828	Level Indicator PC Board Ass'y
	141810829	Function Selector PC Board Ass'y
	141810830	Tape Monitor Switch PC Board Ass'y
	141810836	Filter and Level Indicator Driver PC Board Ass'y
	141810837	Fuse PC Board Ass'y for 100V/120V Areas
	141810838	Fuse PC Board Ass'y for 220V/240V Areas

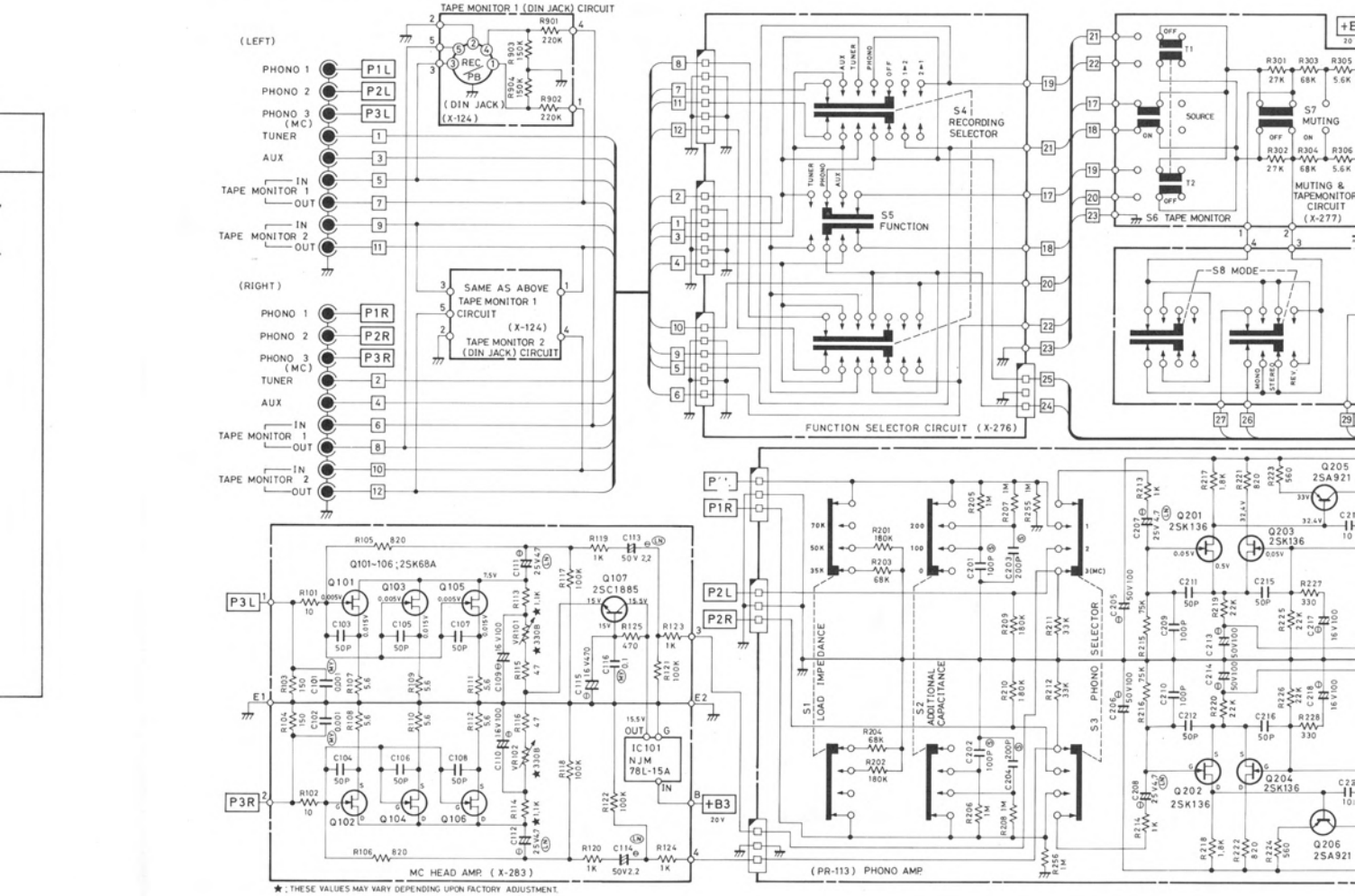
* Refer to Addendum.

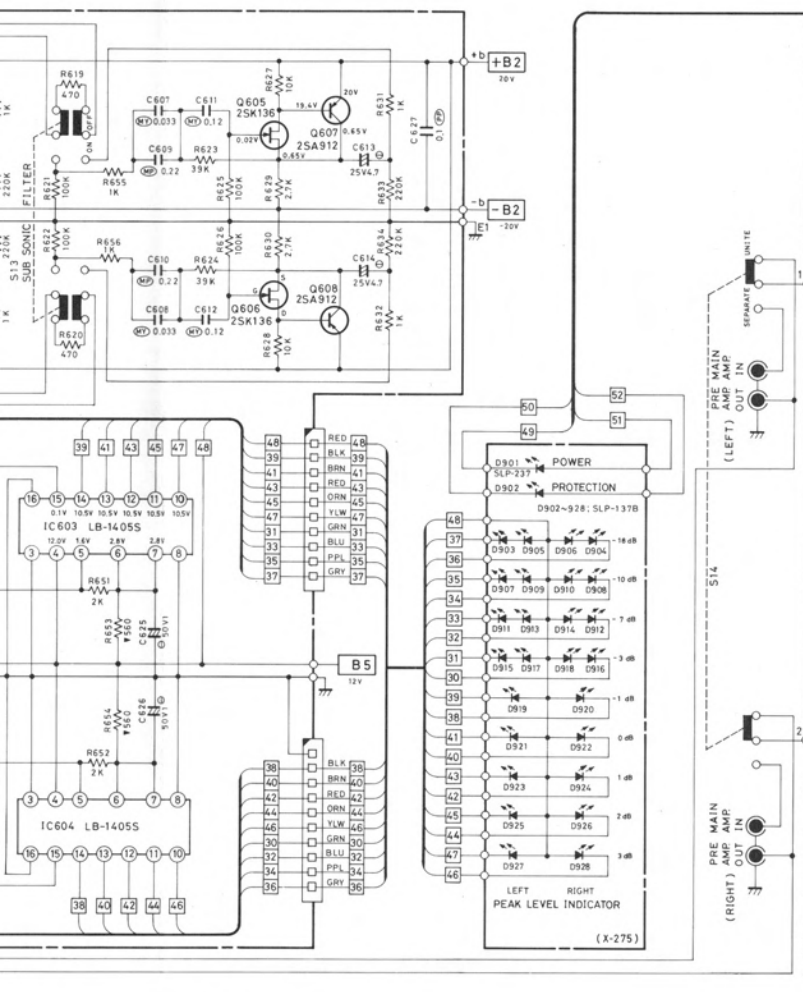
Schematic Location	Part No.	Description
	141810839	Fuse PC Board Ass'y for European Type
	141810730	DIN Socket PC Board Ass'y
	141810872	Power Amp (Lower Half Cycles) PC Board Ass'y
	141810873	Power Amp (Upper Half Cycles) PC Board Ass'y
L701, 702	228641124	Coil, Anti-parasitic
RY801	240111241	Relay, Speakers
T001	205001442	Power Transformer, (Standard Type)
	206001442	Power Transformer, (European Type)
F901, 902	341221700	Fuse, 7A-3AG (Long)
	345952630	Fuse, 6.3 AT (Midget)
F903	341221700	Fuse, 7A-3AG (Long)
	345952315	Fuse, 3.15AT (Midget)
C001, 002	410150350	Electrolytic Capacitor, 15,000mfd, 50V, Ripple Filter
	648211146	Clip, Long Fuse
	648211147	Clip, Midget Fuse
	111911409	Front Panel Ass'y w/o Handle
	138011296	Top Cover
	116310235	Knob, Function, Volume
	116310236	Knob, Balance, Phono Selector
	116310237	Knob, Recording Selector
	116310238	Knob, Bass, Treble, etc.
	116310242	Knob, Power, Mode, etc.
	116210046	Button, Push Switch
	670101118	Handle
	673402018	Plastic Foot
	770911216	Collar, Handle Mtg
	770911119	GND Terminal
	770911209	Cap Screw, 6x40mm (BLZ)
	770911211	Spacer, Panel Mtg
	766213006	Screw, 3x6mm (Ni), Tap-tight
	762213006	Screw, 3x6mm (Ni), Oval Countersunk
	766223008	Screw, 3x8mm (BLZ), Tap-tight
	725223008	Screw, 3x8mm (BLZ), Tapping
	705213004	Screw,3x4mm(Ni),Binding
	770911166	Screw, 3x8mm (BLZ), Flat
	766223012	Screw, 3x12mm (BLZ), Tap-tight
	766213012	Screw, 3x12mm (Ni), Tap-tight
	766213015	Screw, 3x15mm (Ni), Tap-tight
	725213008	Screw, 3x8mm (Ni), Tapping
	725213015	Screw, 3x5mm (Ni), Tapping
	725214512	Screw, 4.5x12mm (Ni), Tapping
	765214008	Screw, 4x8mm (Ni), Tap-tight
	765214012	Screw, 4x12mm, Tap-tight

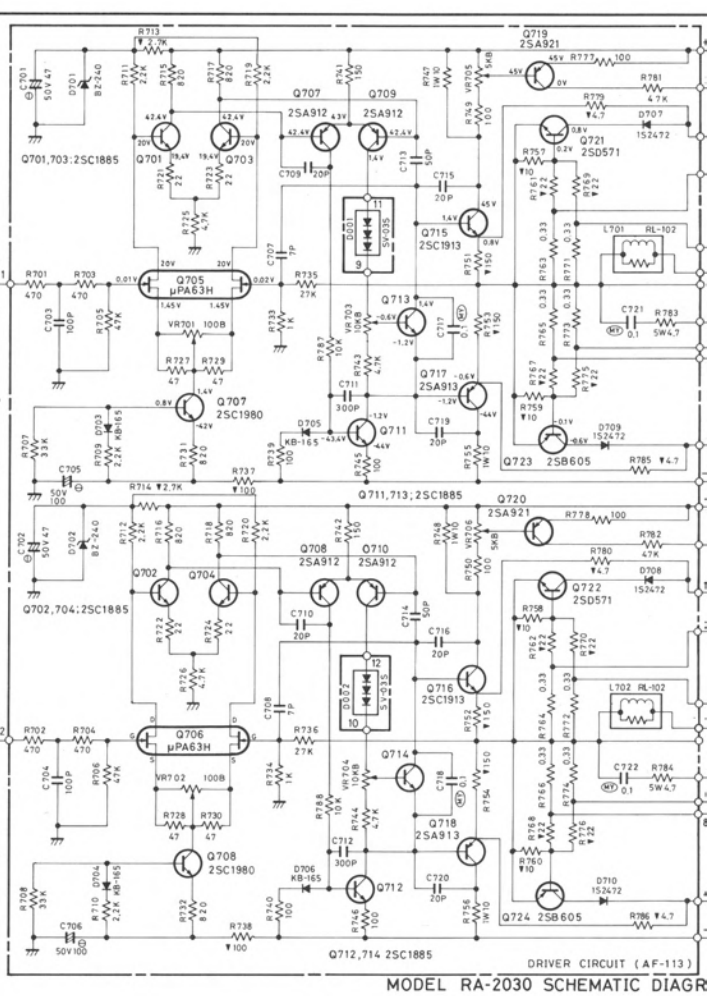
Schematic Location	Part No.	Description
	705223008	Screw, 3x8mm (BLZ), Binding
	705224008	Screw, 4x8mm (BLZ), Binding
	770402205	Nut, M7, Hex
	770402206	Nut, M8, Hex
	770402209	Nut, M12, Hex
	770402201	Nut, M3, Hex
	770911144	Nut, M3, Square
	770402210	Nut, M5, Hex
	770402204	Nut, M6, Hex
	770500006	Washer, ϕ7
	770500007	Washer, ϕ8
	770500009	Washer, ϕ12
	770500014	Teethed Washer, ϕ3
	770500010	Spring Washer, ϕ3
	770500003	Washer, ϕ3
	770500029	Spring Washer, ϕ5
	770500033	Washer, ϕ5
	770500012	Spring Washer, ϕ6
	992001111	Collar, Insulation



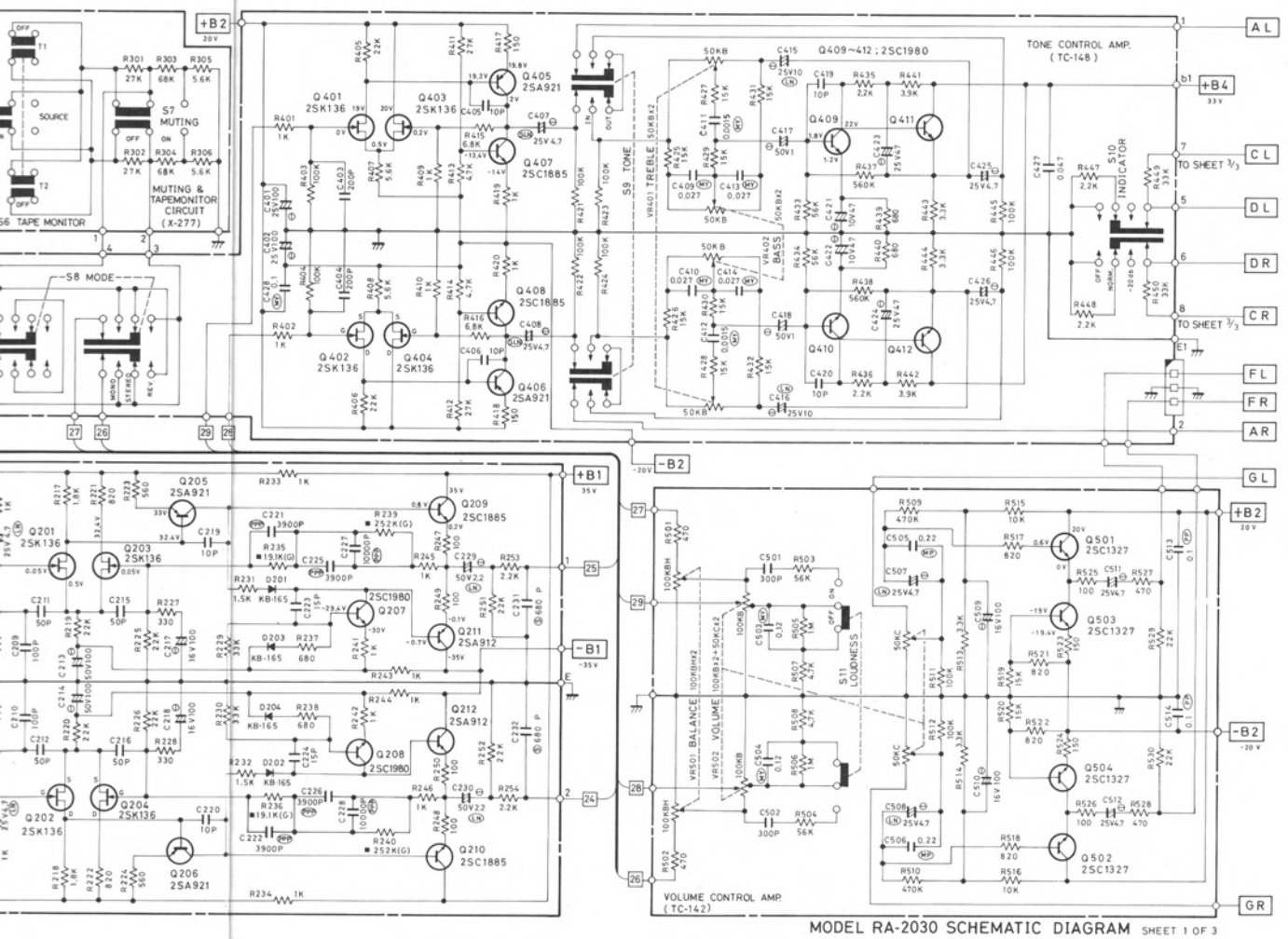
Schematic Diagram



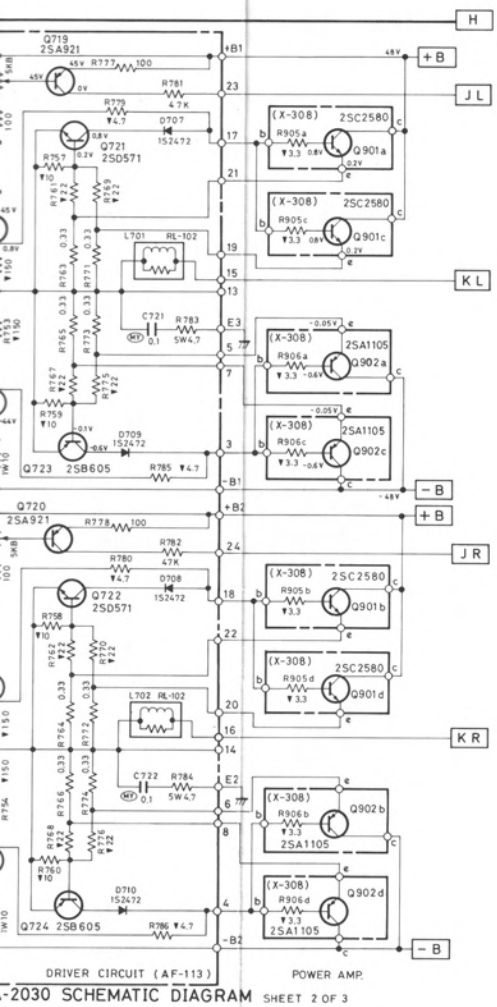




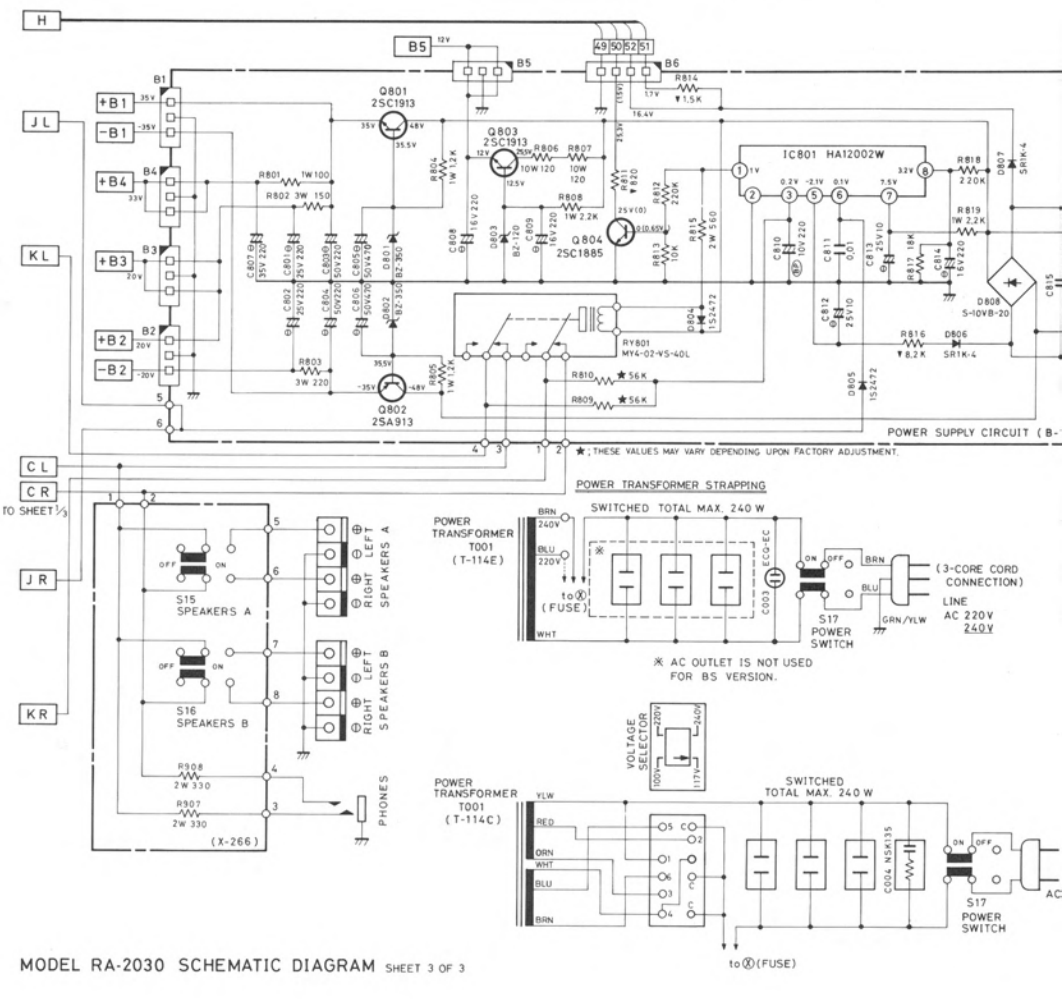
MODEL RA-2030 SCHEMATIC DIAGR



MODEL RA-2030 SCHEMATIC DIAGRAM SHEET 1 OF 3

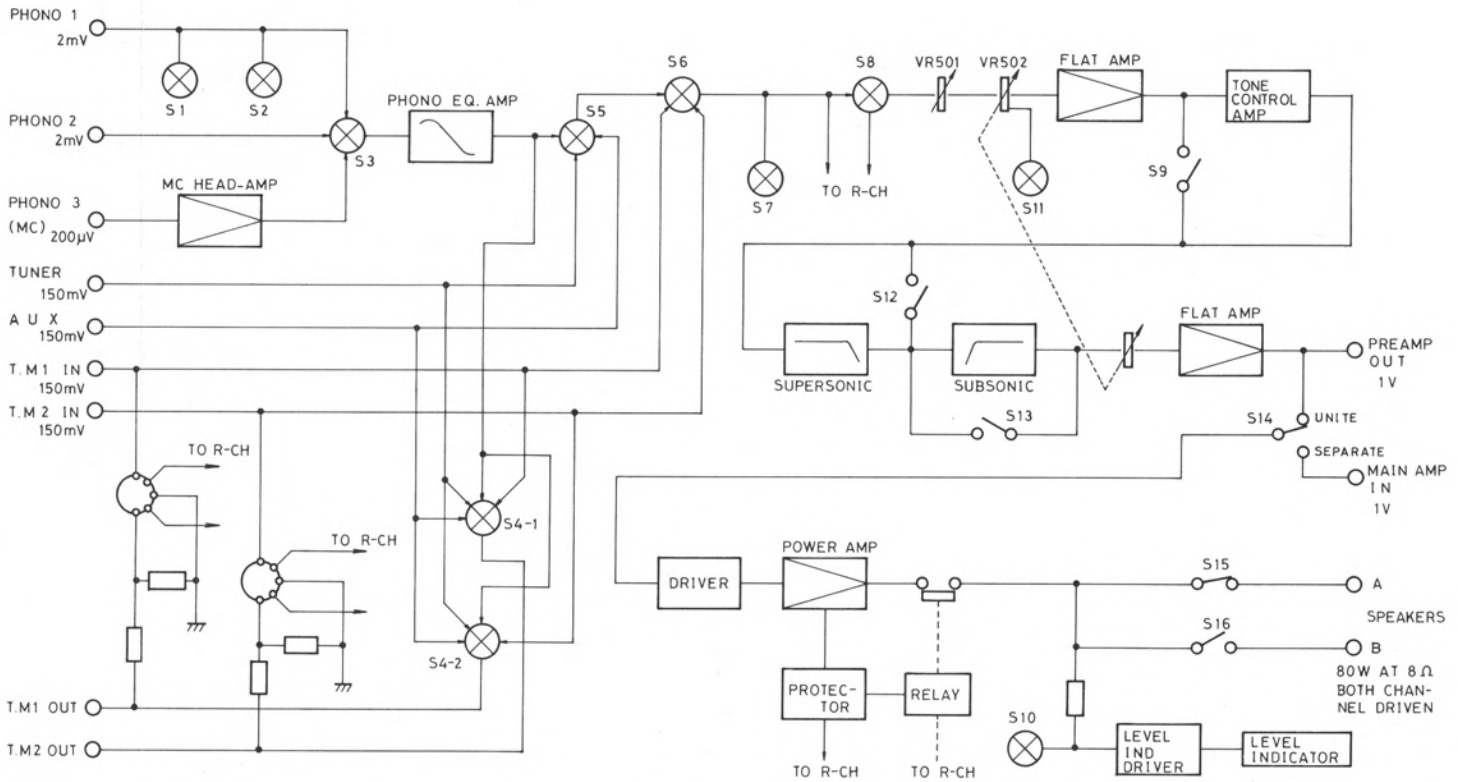


MODEL RA-2030 SCHEMATIC DIAGRAM SHEET 2 OF 3



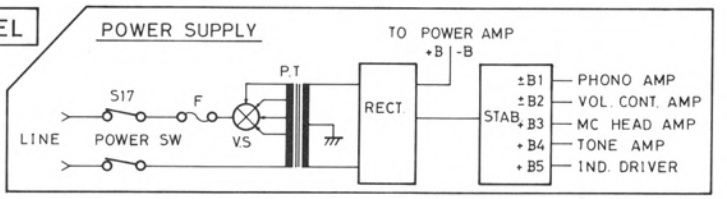
MODEL RA-2030 SCHEMATIC DIAGRAM SHEET 3 OF 3

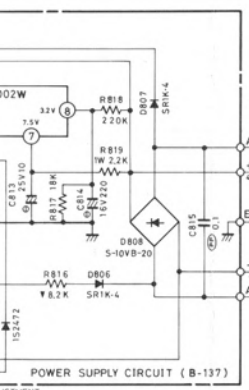
Block Diagram



RIGHT CHANNEL IS SAME AS ABOVE LEFT CHANNEL

S1 LOAD IMPEDANCE SW	S6 TAPE MONITOR SW	S11 LOUDNESS SW
S2 ADD. CAP SELECTOR	S7 MUTING SW	S12 SUPERSONIC SW
S3 PHONO SELECTOR	S8 MODE SW	S13 SUBSONIC SW
S4 RECORDING SELECTOR	S9 TONE SW	S14 PRE MAIN SW
S5 FUNCTION SELECTOR	S10 INDICATOR SW	S16 SPEAKER B SW





FUSE TABLE OF VALUE

	STANDARD TYPE (LONG FUSE)		EUROPEAN TYPE (MIDGET FUSE)
	100 or 117 V	220 or 240 V	220 or 240 V
F901	7 A	7 A	6.3 AT
F902	7 A	7 A	6.3 AT
F903	7 A	3.5 A	3.15 AT

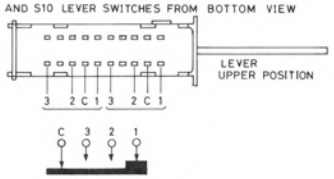
POWER TRANSFORMER (T001)

(NOTE)
PRIMARY WIRING OF POWER TRANSFORMER IS DIFFERENT ACCORDING TO DESTINATION. SEE SEPARATE POWER TRANSFORMER STRAPPING DIAGRAM.

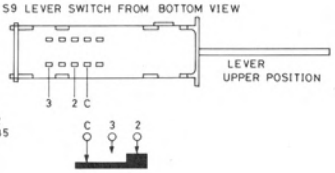
ITEM		SCHEMATIC LOCATION (LAST)	
MC HEAD AMP.	(X-283)	R125	C116
PHONO AMP.	(PR-113)	R256	C232
MUTING & TAPE MONITOR CIRCUIT	(X-277)	R306	C ——
TONE CONTROL AMP.	(TC-148)	R450	C428
VOLME CONTROL AMP.	(TC-142)	R530	C514
FILTERS & LED DRIVE CIRCUIT	(X-279)	R656	C627
DRIVER CIRCUIT	(AF-113)	R788	C722
POWER SUPPLY CIRCUIT	(B-137)	R819	C815
OTHERS	(X-308, X-276, X-275, X-266, X-296)	R908	C ——
CHASSIS		R ——	C004

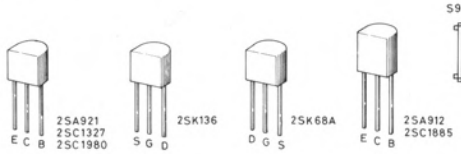
CONNECTION DIAGRAMS OF S8, S9 AND S10 LEVER SWITCHES

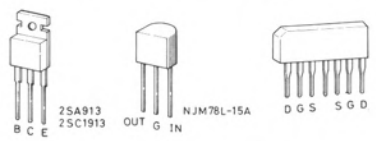
S8 AND S10 LEVER SWITCHES FROM BOTTOM VIEW

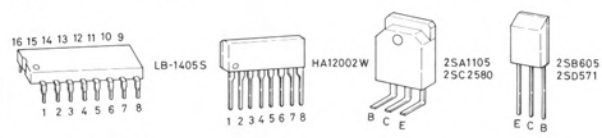


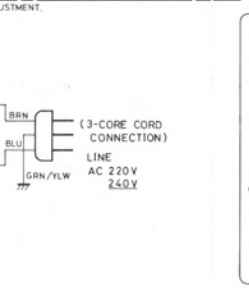
S9 LEVER SWITCH FROM BOTTOM VIEW

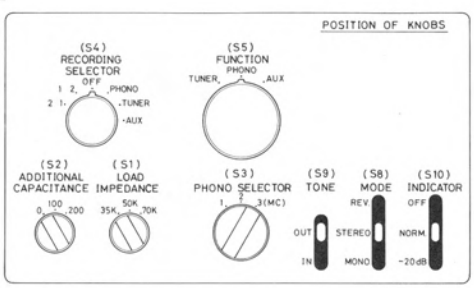


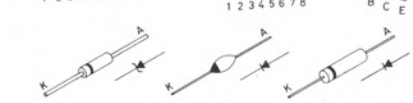


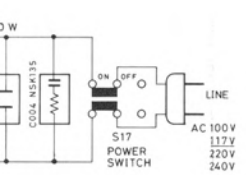












(RESISTORS)
5% TOLERANCE UNLESS OTHERWISE NOTED.
K --- KILO OHM.
M --- MEGA OHM.
▼ --- NON FLAMMABLE CARBON FILM RESISTORS 1/2 WATT.
■ --- FIXED PRECISION METAL FILM RESISTORS. (F):1%, (G):2%

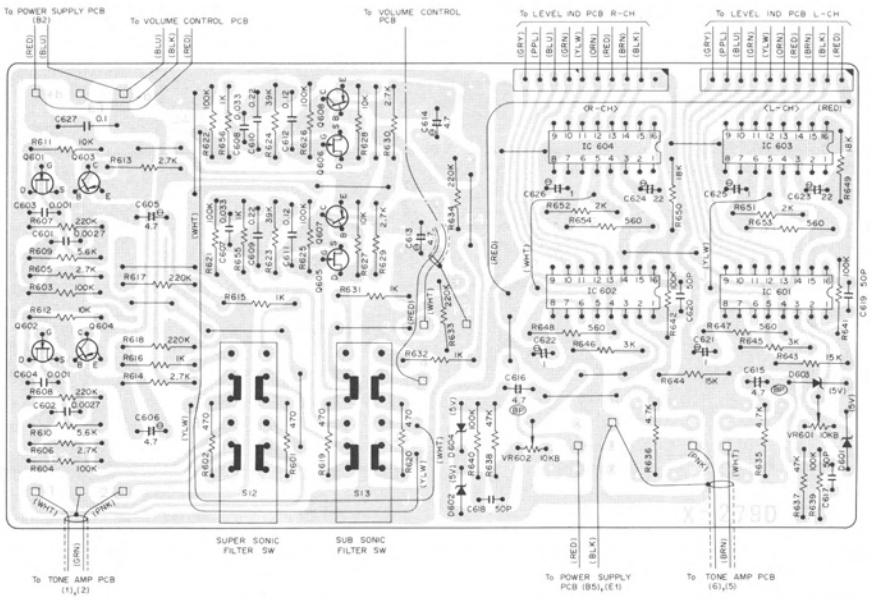
NON MARK ---LOW NOISE TYPE CARBON RESISTORS 1/4 WATT.

(CAPACITORS)
(S) --- POLYSTYRENE FILM CAPACITORS.
(MT) --- MYLAR FILM CAPACITORS.
(PP) --- POLYPROPYLENE FILM CAPACITORS.
(BP) --- BI-POLAR ELECTROLYTIC CAPACITORS.
(LN) --- LOW NOISE TYPE CAPACITORS.
(SLN) --- SUPER LOW NOISE TYPE CAPACITORS.
(PPS) --- POLYPROPYLENE AND POLYESTER FILM CAPACITORS.
(MP) --- METALIZED POLYESTER FILM CAPACITORS.
⊣⊢ --- ELECTROLYTIC CAPACITORS.
NON MARK --- CERAMIC CAPACITORS.

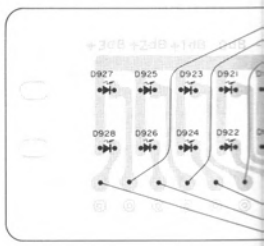
- UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD.
- VOLTAGE READING WITH VTVM FROM THE POINT SHOWN TO THE CHASSIS GROUND (LINE VOLTAGE 117 VOLTS).
- VOLTAGE READING MAY VARY ±20%.

PC BOARD DIAGRAMS

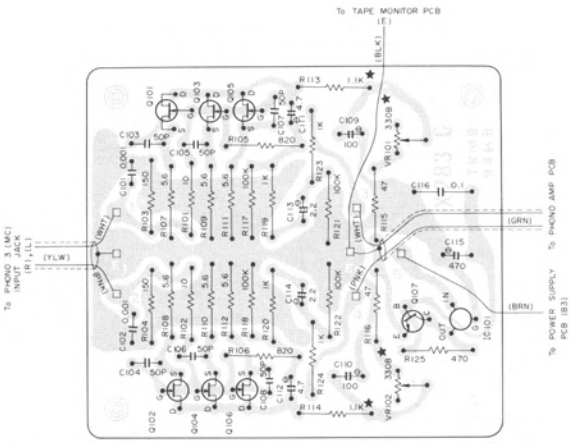
Filter and LED Driver Circuit



Peak Level Indicator

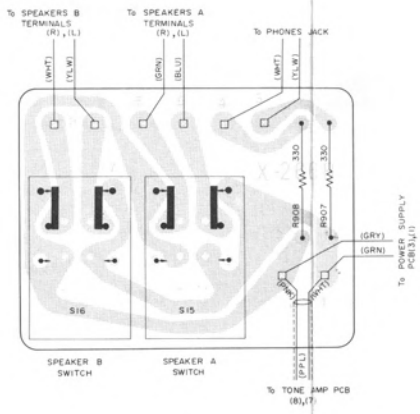


Phono-3 (MC) Head Amp Circuit

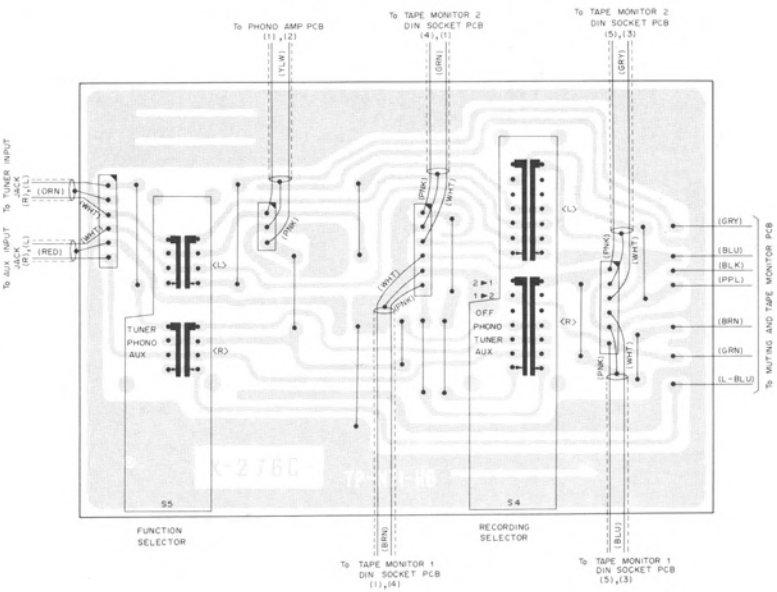


*These values may very due to factory adjustment.

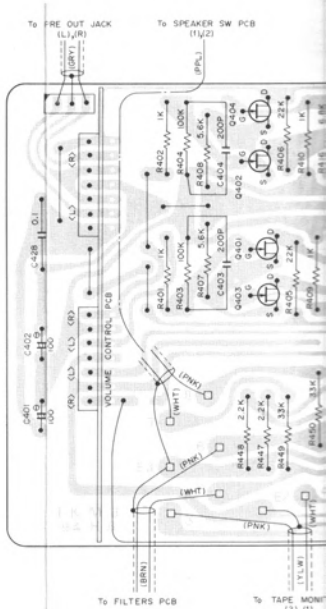
Speaker Switch Circuit



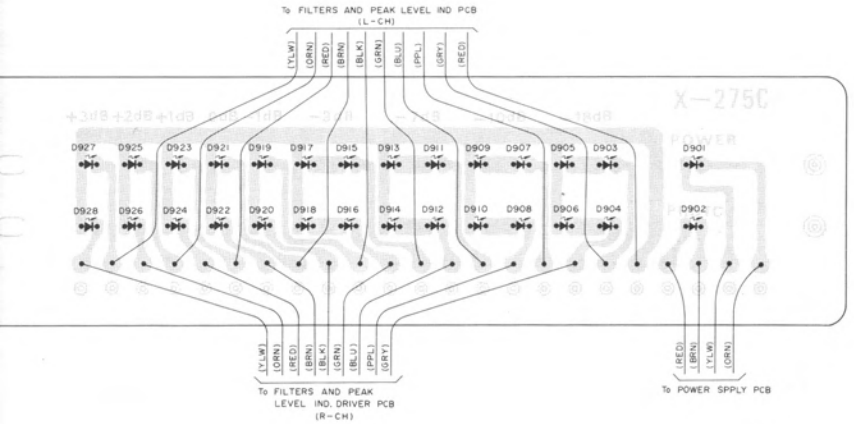
Function Selector Circuit



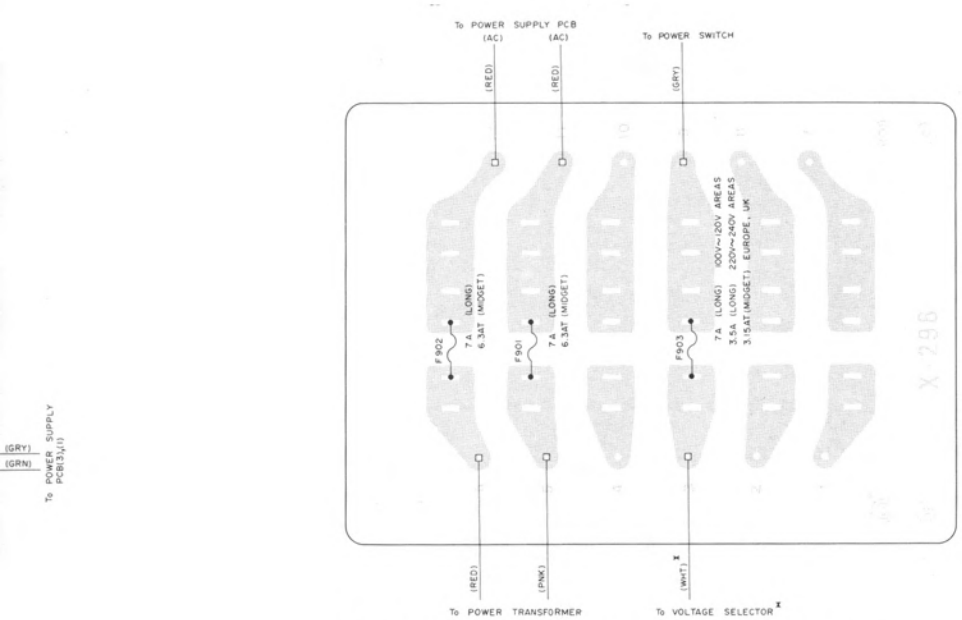
Tone Control Amp Circuit



eak Level Indicator Circuit

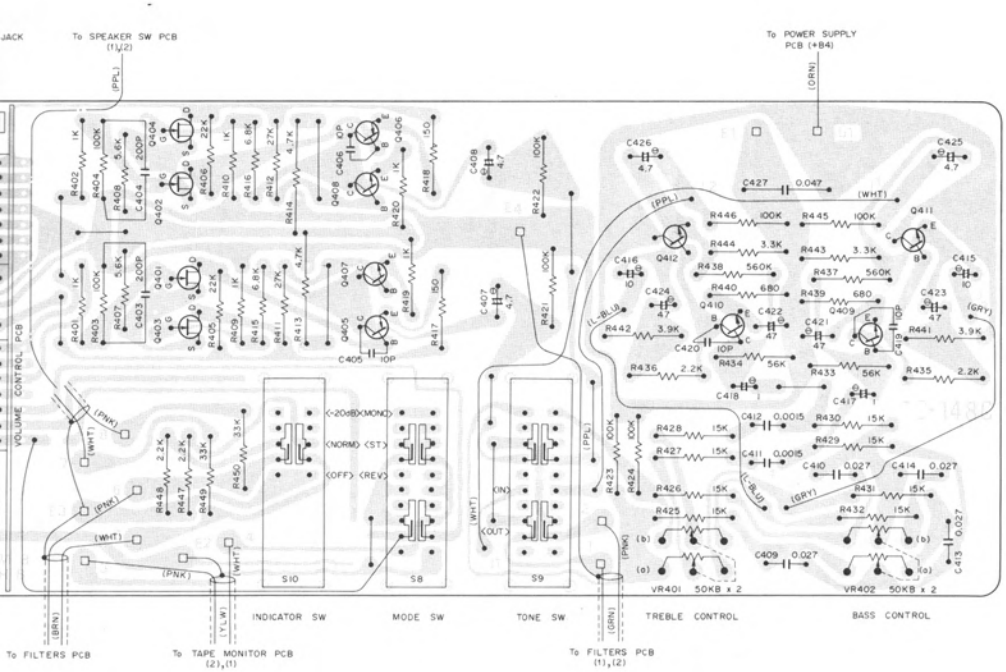


Fuse Circuit

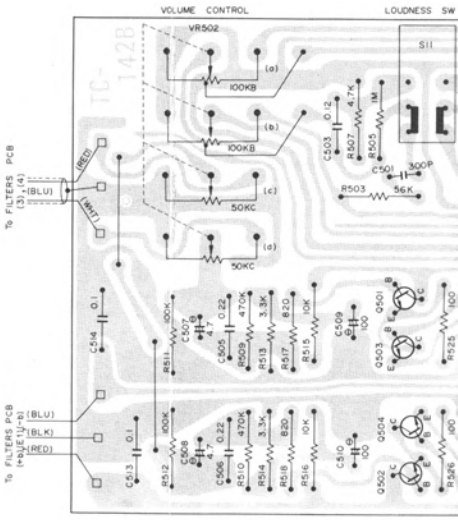


*For European and U.K. types: To power transformer
European (220V) type: BLU, and UK (240V) type: BRN

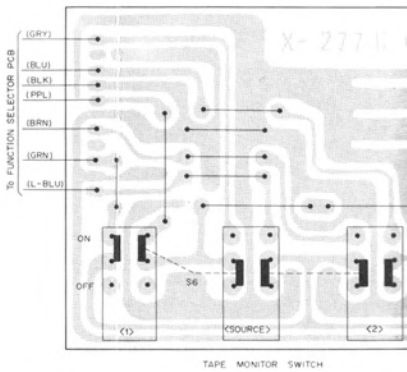
ontrol Amp Circuit



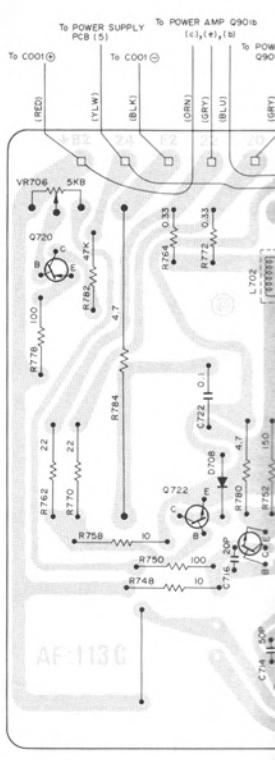
Volume Control Amp Circuit



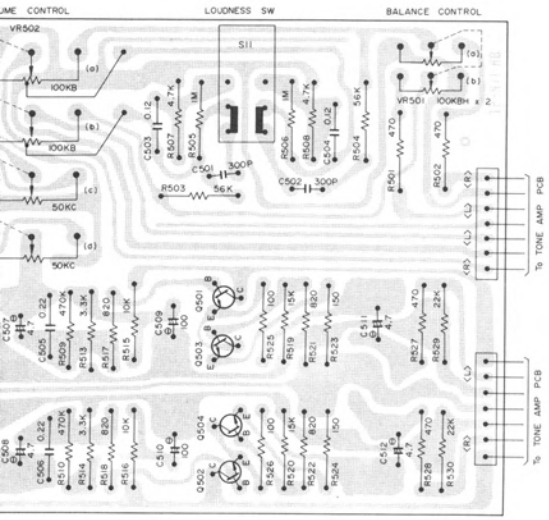
Muting and Tape Monitor Circ



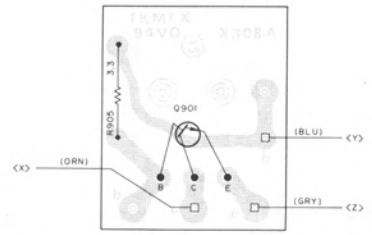
Driver Circuit



rol Amp Circuit

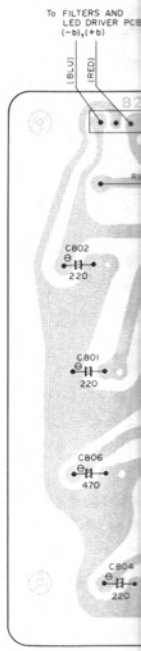


Power Amp Circuit (Upper Half Cycles)

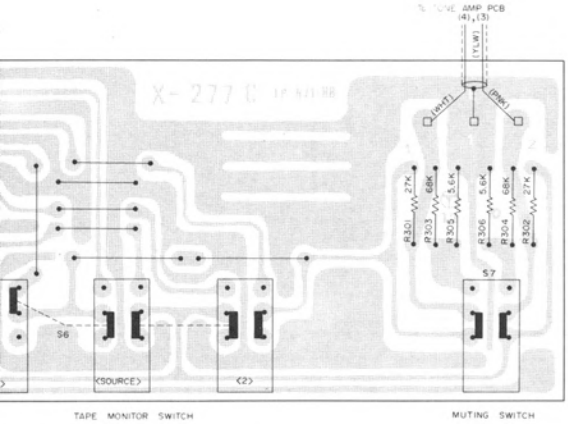


	PCB-a	PCB-b	PCB-c	PCB-d
X	To Driver PCB (+B1)	To Driver PCB (−B1)	To Power Amp PCB a-(c)	To Power Amp PCB b-(c)
	To Power Amp PCB c-(c)	To Power Amp PCB d-(c)		
Y	To Driver PCB (17)	To Driver PCB (18)	To Power Amp PCB a-(b)	To Power Amp PCB b-(b)
	To Power Amp PCB c-(b)	To Power Amp PCB d-(b)		
Z	To Driver PCB (19)	To Driver PCB (20)	To Driver PCB (21)	To Driver PCB (22)

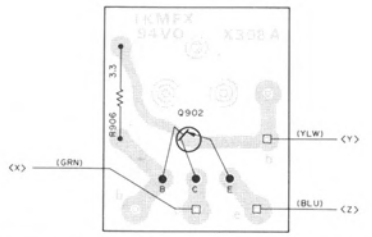
Power Sup



nd Tape Monitor Circuit

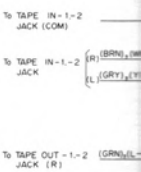


Power Amp Circuit (Lower Half Cycles)



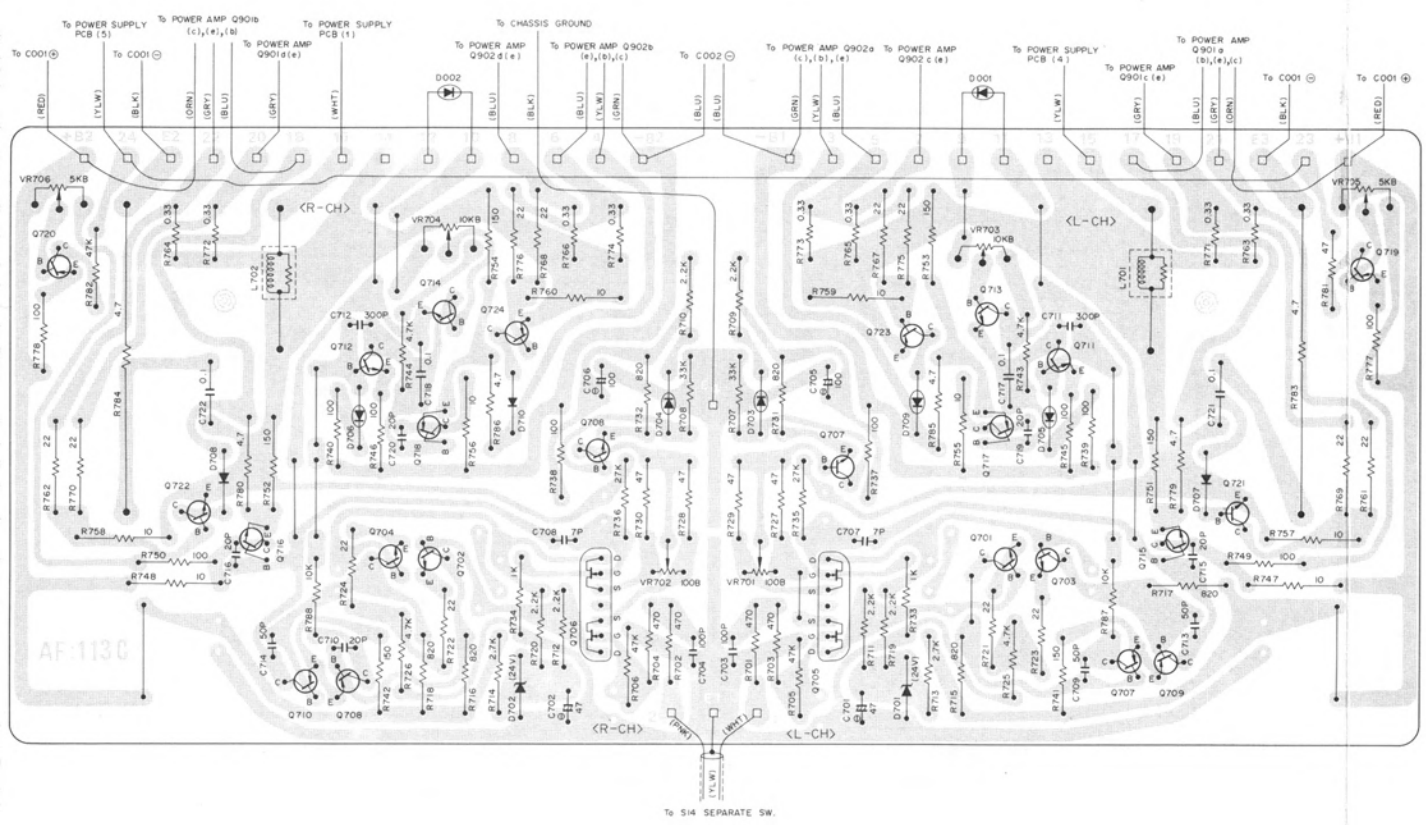
	PCB-a	PCB-b	PCB-c	PCB-d
X	To Driver PCB (−B1)	To Driver PCB (−B2)	To Power Amp PCB a-(c)	To Power Amp PCB b-(c)
	To Power Amp PCB c-(c)	To Power Amp PCB d-(c)		
Y	To Driver PCB (3)	To Power Amp PCB d-(c)	To Power Amp PCB a-(c)	To Power Amp PCB b-(c)
	To Power Amp PCB c-(b)	To Power Amp PCB d-(b)		
Z	To Driver PCB (5)	To Driver PCB (6)	To Driver PCB (7)	To Driver PCB (8)

Tape Moni

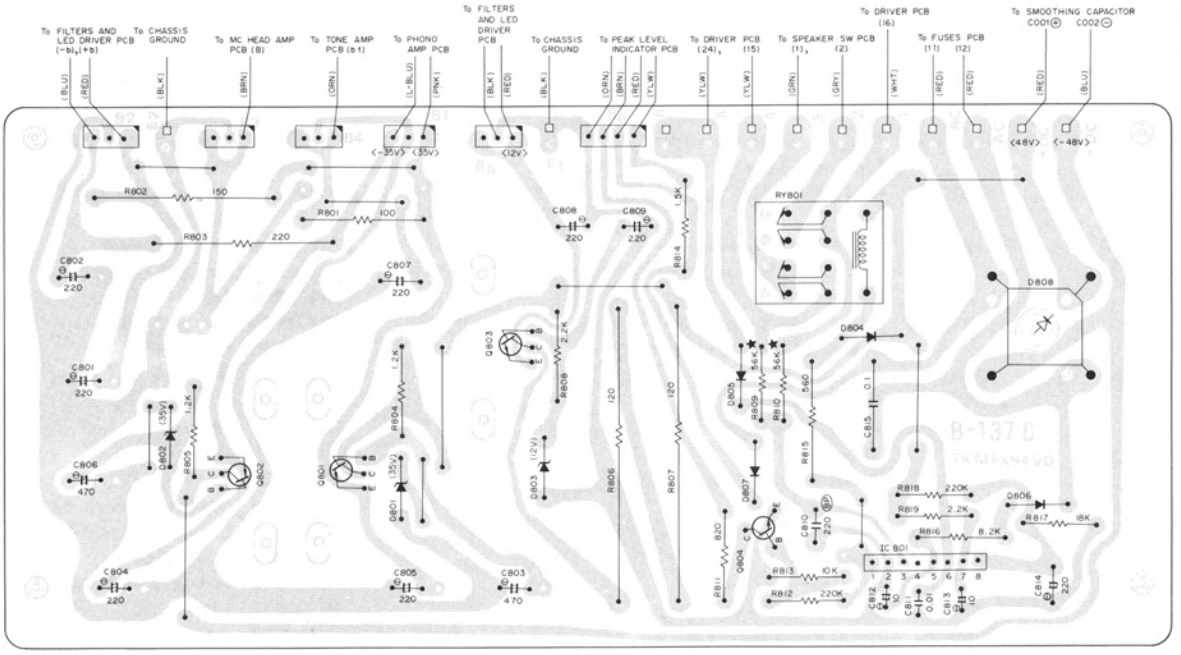


Note: For the
Monitor
board.

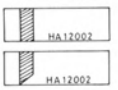
Driver Circuit



Power Supply and Protection Circuit

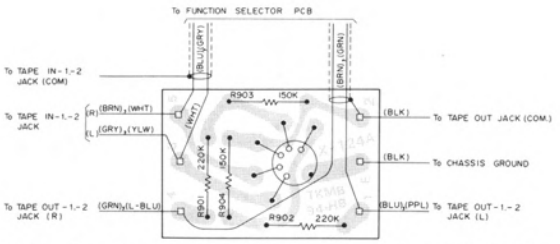


Notes: 1. Resistance values of R809 and R810 vary depending on IC801.
The shape of the band on the IC molding indicates the difference.



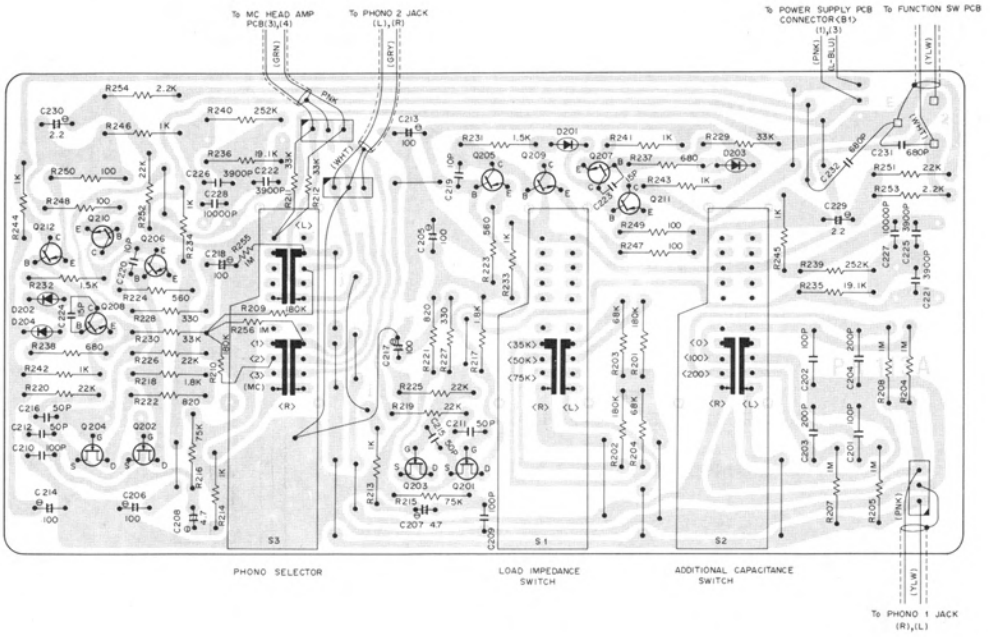
2. Some of the units have a misprint on the component side of the Power Supply PC board: the polarity of Zener Diode (D802) is printed wrong.
The correct polarity is shown in the above diagram.

Tape Monitor-1, -2 (DIN) Circuit



Note: For the lead wires with two colors: first color for Tape Monitor-1 PC board and second for Tape Monitor-2 PC board.

Phono Amp Circuit



'78-12-1K
Printed in Nippon, 835201296