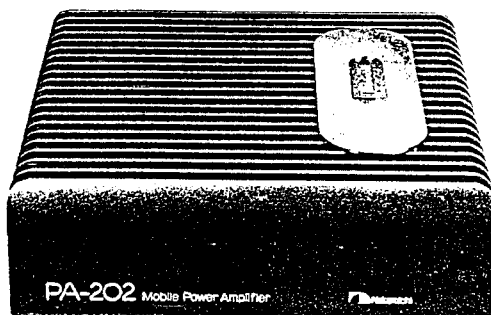


Nakamichi

Service Manual

PA-202

Mobile Power Amplifier



Service durch Gehado



Freigrafenweg 23-29 44357 Dortmund
Telefon 0231-937000-0
Telefax 0231-937000-44

Ersatzteil-Distributor · Reparaturcenter

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1. GENERAL

1.1. Notes on Order of Spare Parts

Note that the Main P.C.B. Ass'y does not include the following parts. Please order the excluded parts together with P.C.B. Ass'y to complete a set of P.C.B. Ass'y.

P. C. B. Ass'y	Excluded Parts	
	Part Name	Remarks
Main P. C. B. Ass'y (BA07679A)	● TR Block A Ass'y1pce. (BA07681A)	Ref. No. 06 in Fig. 4.1. Consists of transistors and heat sink.
	● TR Block B Ass'y1pce. (BA07682A)	Ref. No. 07 in Fig. 4.1. Consists of diodes, tran- sistors and heat sink.

1.2. Destination

- U.S.A. and Canada
- Other
- Europe
- Japan

1.3. Package Ass'y

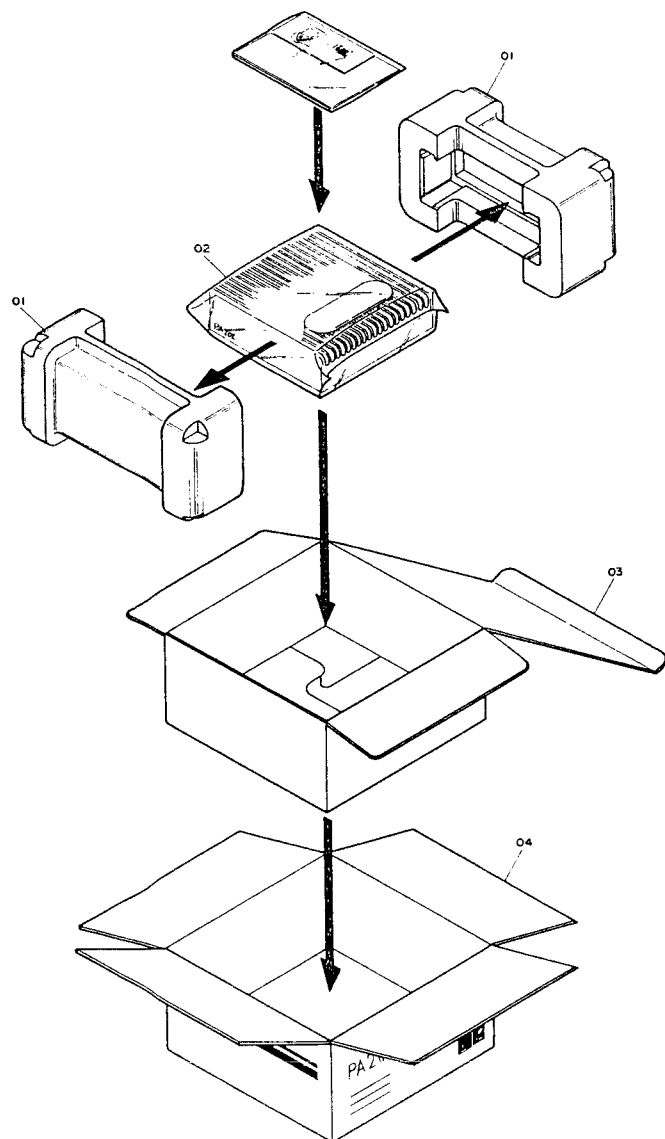


Fig. 1.1

1.4. Accessory Ass'y

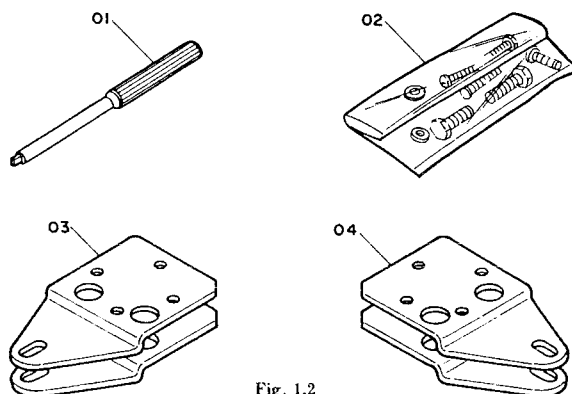


Fig. 1.2

Schematic Ref No.	Part No.	Description	Q'ty
Package Ass'y			
01	0F04282A	Packing (U.S.A./Other/Europe)	2
	0F04283A	Packing (Japan)	2
02	0F03702A	Poly-Bag (300x420x0.08)	1
03	0F04287A	Outer Carton (U.S.A.)	1
	0F04331A	Outer Carton (Other/Europe)	1
	0F04288A	Outer Carton (Japan)	1
04	0F04294A	Inner Carton (U.S.A.)	1
	0F04330A	Inner Carton (Other/Europe)	1
	0F04295A	Inner Carton (Japan)	1
Accessory Ass'y			
01	0D03903C	Screwdriver	1
02	DA04253A	Screw Ass'y	1
03	0H05572A	Mounting Plate A	2
04	0H05589A	Mounting Plate B	2
—	0D04347A	Poly-Bag (320x340x0.08)	1
—	0D04593A	Poly-Bag (80x100x0.05)	1
—	0D04999A	Owner's Manual (English/German/French)	1
—	0D05000A	Owner's Manual (Japanese)	1
—	0D04810A	Important Notice	1

2. REMOVAL PROCEDURE

2.1. Fuse

Pull out F01 (Fuse 10A) toward you. (F01 is hard to remove.)

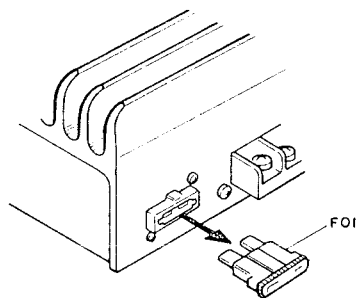


Fig. 2 Rear View

3. ADJUSTMENT

3.1. Parts Location for Adjustment

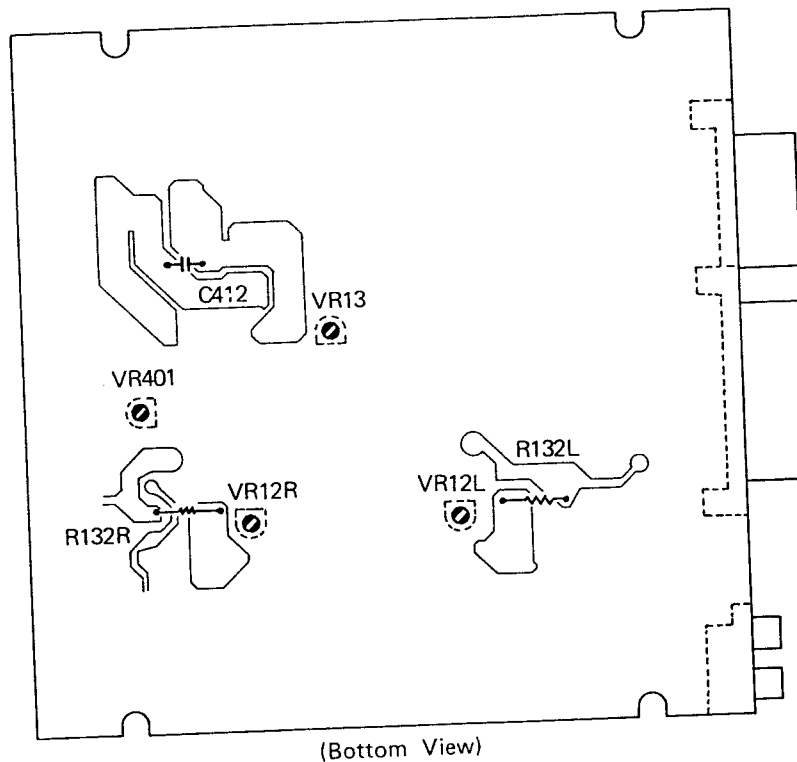


Fig. 3

3.2. Adjustment Procedures

Note: Perform adjustment from the bottom of the PA-202.

3.2.1. Power Supply Output Voltage

- (1) Connect a DC voltmeter across C412.
- (2) Supply 14.4V DC to +14.4V Terminal and Remote Terminal.
- (3) Adjust VR401 to obtain +23.0V on the DC voltmeter.

3.2.2 Idling Current

- (1) Insert shorting pins into Input Pin Jacks.
- (2) Connect a DC millivoltmeter across R132L (R132R).
- (3) Adjust VR12L (VR12R) to obtain 6mV (approx. 27mA) on the DC millivoltmeter.
- (4) Remove the shorting pins.

3.2.3 Soft Clipping Circuit

- (1) Connect 40hm load resistors to the speaker output terminals.
- (2) Turn VR13 fully clockwise viewing from the dip side of P.C.B.
- (3) Feed in 1kHz sine wave to Input Pin Jacks.
- (4) Adjust the Oscillator output so that the voltages at the speaker output terminals are 12.65V (40W).
- (5) Measure the distortion of both channels through 30kHz L.P.F. and make sure which channel has worse distortion.
- (6) Observing the distortion of worse channel, gradually return VR13 counterclockwise, and stop it when distortion gets worse.

4. MECHANISM ASS'Y AND PARTS LIST

4.1. Synthesis

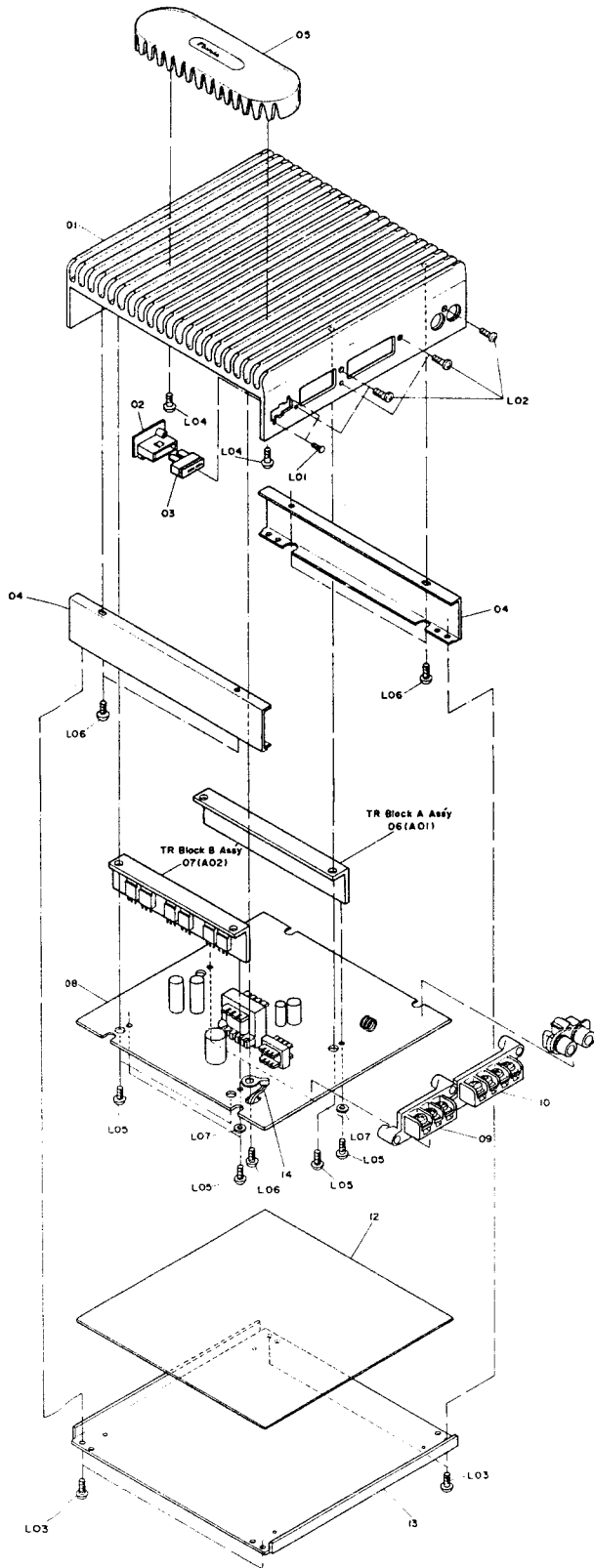


Fig. 4.1

Schematic Ref. No.	Part No.	Description	Q'ty
4.1. Synthesis			
		Synthesis	
01	0H05617A	Heat Sink	1
02	BA07680A	Fuse P.C.B. Ass'y	1
03	0B90423A	Fuse 10A	1
04	0H05573A	Side Chassis	2
05	HA05753A	Transformer Cover Ass'y	1
06	BA07681A	TR Block A Ass'y	1
07	BA07682A	TR Block B Ass'y	1
08	BA07679A*	Main P.C.B. Ass'y	1
09	0B84106A	Terminal 3P (U.S.A.) (TM-401)	1
	0B84152A	Terminal 3P Gold (Other/Europe/Japan) (TM-401)	1
10	0B84107A	Terminal 4P (U.S.A.) (TM-101)	1
	0B84153A	Terminal 4P Gold (Other/Europe/Japan) (TM-101)	1
11	0B81630A	Pin Jack 2P (PJ101)	1
12	0J05924A	Bottom Sheet	1
13	0H05620A	Bottom Cover	1
14	0B19013A	Thermistor (TH401)	1
L01	0E00974A	BT 2x8 ⊕ Binding (Black Chromate)	
L02	0E00948A	BT 3x8 ⊕ Binding (Black Chromate)	
L03	0E00860A	BT 3x6 ⊕ Binding (Black Chromate)	
L04	0E00865A	BT 3x10 ⊕ Binding	
L05	0E00868A	BT 3x8 ⊕ Binding	
L06	0E03013A	BT 3x5 ⊕ Binding	
L07	0E00172A	Washer 3mm Toothed Lock	

* : See item 1.1.

4.2. TR Block A Ass'y (A01)

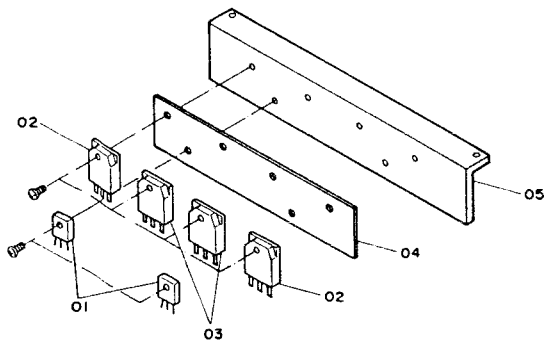


Fig. 4.2

4.3. TR Block B Ass'y (A02)

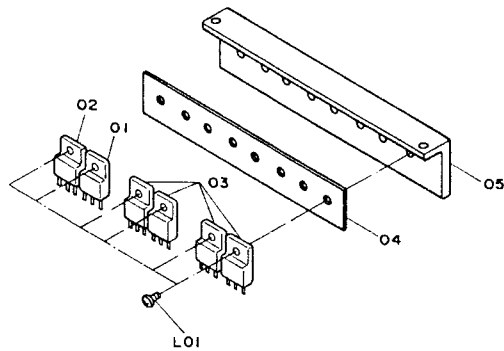


Fig. 4.3

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
4.2. TR Block A Ass'y (A01)				4.3. TR Block B Ass'y (A02)			
A01	BA07681A	TR BLock A Ass'y		A02	BA07682A	TR Block B Ass'y	
01	0B10199A	TR 2SC3421 (Q106L,R)	2	01	0B12646A	SiD FMU22S (D403)	1
02	0B10339A	TR 2SC44666 (Q111L,R)	2	02	0B12647A	SiD FMU22R (D404)	1
03	0B10340A	TR 2SA1693 (Q112L,R)	2	03	0B10341A	TR 2SC4064 (0, Y)	2
04	0J05945A	Transistor Sheet A	1	04	0J05946A	Transistor Sheet B	1
05	0J05920B	Heat Sink A	1	05	0J05921A	Heat Sink B	1
L01	0E03319A	M 3x8 ⊕ Binding (Nickel)	6	L01	0E03319A	M 3x8 ⊕ Binding	6

5. MOUNTING DIAGRAMS

Notes : 1. Mounting diagram shows a dip side view of the printed circuit board.

2. Diode is 1SS176 unless otherwise specified.

3. Following transistors are interchangeable with each other.

a. 2SA733, 2SA608SP, 2SA1048, 2SA1175

b. 2SC945, 2SC536SP, 2SC2458, 2SC2785

4. Abbreviation for part name:

TR—Transistor, SiD—Silicon Diode, ZD—Zener Diode

RK—Carbon Resistor, RM—Metal Film Resistor

RC—Cement Resistor, RF—Fail Safe Type Resistor

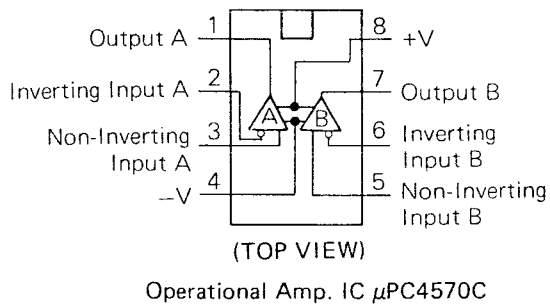
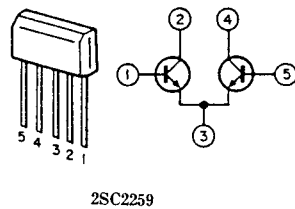
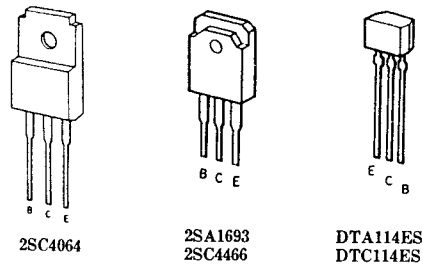
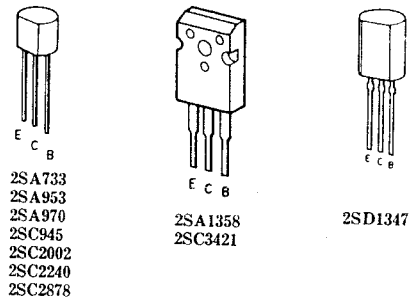
C—Mica Capacitor, CE—Electrolytic Capacitor

CC—Ceramic Capacitor, CPP—PP Capacitor

CML—Mylar Capacitor

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
5.1. Main P.C.B. Ass'y			R129L,R	0B01933A	RK 220 1/4W J	C402	0B41822A	CML 0.47 μ 50V J
			R130L,R	0B05695A	RK 1.0 1/4W J	C403	0B40079A	CE 220 μ 16V
	BA07697A (Note)	Main PCB Ass'y	R131L,R	0B05695A	RK 1.0 1/4W J	C404	0B41917A	CC 0.1 μ 25V Z
			R132L,R	0B24226A	RC 0.22 5W	C405	0B40661A	CE 3300 μ 16V
			R133L,R	0B24226A	RC 0.22 5W	C406	0B09860A	CML 0.022 μ 50V J
	0B60742A	Main PCB	R134L,R	0B09709A	RK 22K 1/6W J	C407	0B40643A	CE 330 μ 35V
U101	0B11713A	IC μ PC4570C	R135L,R	0B09709A	RK 22K 1/6W J	C408	0B40642A	CE 180 μ 35V
U401	0B06427A	IC μ PC494C	R136L,R	0B20093A	RK 1.5M 1/6W J	C409	0B41084A	CML 0.0015 μ 50V J
Q101L,R	0B06299A	TR 2SC2878	R137L,R	0B09743A	RK 560K 1/6W J	C410,411	0B41082A	CML 0.001 μ 50V J
Q102L,R	0B10125A	TR 2SC2259 (F,G,H)	R138L,R	0B09701A	RK 10K 1/6W J	C412,413	0B40641A	CE 1200 μ 25V
Q103L,R	0B06142A	TR 2SC2240 (BL)	R139L,R	0B24229A	RF 3.3 1W J	C414,415	0B40077A	CE 47 μ 16V
Q104L,R	0B10050A	TR 2SA970 (BL)	R140L,R	0B24095A	RF 4.7 1W J	C416	0B40113A	CE 2.2 μ 50V
Q105L,R	0B06142A	TR 2SC2240 (BL)	R141L,R	0B09737A	RK 330K 1/6W J	C417	0B40077A	CE 47 μ 16V
Q107L,R	0B06142A	TR 2SC2240 (BL)	R142	0B22338A	RM 9.99K 1/4W F	C418	0B41917A	CC 0.1 μ 25V Z
Q108L,R	0B10050A	TR 2SA970 (BL)	R143	0B09749A	RK 1.0M 1/6W J	C419	0B40052A	CE 470 μ 6.3V
Q109L,R	0B10199A	TR 2SC3421	R144,145	0B05794A	RK 680 1/4W J	C420	0B41082A	CML 0.001 μ 50V J
Q110L,R	0B10198A	TR 2SA1358	R146,147	0B09685A	RK 2.2K 1/6W J	C421	0B41298A	CML 0.1 μ 50V J
Q113L,R	0B06142A	TR 2SC2240 (BL)	R148,149	0B22266A	RM 2.21K 1/4W F	C422	0B41082A	CML 0.001 μ 50V J
Q114	0B10050A	TR 2SA970 (BL)	R150	0B09677A	RK 1.0K 1/6W J	C423	0B41008A	CML 0.0033 μ 50V J
Q115	0B06142A	TR 2SC2240 (BL)	R151,152	0B09701A	RK 10K 1/6W J	C424	0B40079A	CE 220 μ 16V
Q116	0B06013A	TR 2SA733 (P,Q)	R153	0B09677A	RK 1.0K 1/6W J	C425	0B40206A	CE 100 μ 16V
Q117	0B06100A	TR 2SC945 (K,P,Q)	R154	0B09717A	RK 47K 1/6W J	C426	0B40637A	CE 220 μ 35V (LN)
Q118	0B06013A	TR 2SA733 (P,Q)	R155	0B09727A	RK 120K 1/6W J	C427	0B41298A	CML 0.1 μ 50V J
Q119	0B06100A	TR 2SC945 (K,P,Q)	R156	0B09749A	RK 1.0M 1/6W J	FC101	0B83747A	Ribbon Cable 4P
Q120	0B06013A	TR 2SA733 (P,Q)	R157	0B09701A	RK 10K 1/6W J	FC102	0B83773A	Ribbon Cable 3P
Q121	0B06100A	TR 2SC945 (K,P,Q)	R158	0B09729A	RK 150K 1/6W J	S101	0B70154A	Slide Switch 4-2
Q405,406	0B10046A	TR 2SD1347 (T,U)	R159	0B09709A	RK 22K 1/6W J	T401	0B50162A	Converter Transformer
Q407	0B06322A	TR 2SC2002 (K,L)	R160	0B09725A	RK 100K 1/6W J	5.2. Fuse P.C.B. Ass'y		
Q408	0B06372A	TR 2SA953 (K,L)	R401,402	0B24170A	RF 0.47 1W J		BA07680A	Fuse P.C.B. Ass'y
Q409,410	0B06100A	TR 2SC945 (K,P,Q)	R403,404	0B24170A	RF 0.47 1W J		0B60743A	Fuse P.C.B.
Q411	0B06013A	TR 2SA733 (P,Q)	R405,406	0B24229A	RF 3.3 1W J		0B80248A	Wire AWG16 RED 100mm
Q412,413	0B06100A	TR 2SC945 (K,P,Q)	R407,408	0B24243A	RF 4.7 2W J		0B80249A	Wire AWG16 RED 80mm
Q414	0B10058A	TR DTA114ES	R409,410	0B24042A	RF 220 1W J		0B84108A	Auto Fuse Holder
Q415,416	0B06100A	TR 2SC945 (K,P,Q)	R411,412	0B09797A	RK 120 1/4W J			
Q417,418	0B06013A	TR 2SA733 (P,Q)	R413	0B24122A	RF 10 2W J			
Q419	0B10068A	TR DTC114ES	R414	0B24231A	RF 100 1W J			
Q420	0B06100A	TR 2SC945 (K,P,Q)	R415,416	0B09677A	RK 1.0K 1/6W J			
ZD11L,R	0B12360A	ZD 2.7V RD2.7ESB2	R417,418	0B09665A	RK 330 1/6W J			
ZD12,13	0B12186A	ZD 18V RD18JSB2	R419,420	0B24232A	RF 820 1W J			
ZD401,402	0B12198A	ZD 27V RD27JSB2	R422,423	0B09669A	RK 470 1/6W J			
ZD403	0B12186A	ZD 18V RD18JSB2	R424	0B09701A	RK 10K 1/6W J			
ZD404	0B12144A	ZD 4.7V RD4.7 SB2	R425	0B09697A	RK 6.8K 1/6W J			
ZD405,406	0B12623A	ZD 11V RD11ESB2	R426	0B09685A	RK 2.2K 1/6W J			
D101L,R	0B06398A	SID 1SS176	R427	0B09721A	RK 68K 1/6W J			
D102L,R	0B12624A	SID 1SS177	R428,429	0B09677A	RK 1.0K 1/6W J			
D103L,R	0B12624A	SID 1SS177	R430	0B09689A	RK 3.3K 1/6W J			
D104L,R	0B06398A	SID 1SS176	R431,432	0B09693A	RK 4.7K 1/6W J			
D105,106	0B06398A	SID 1SS176	R433	0B09701A	RK 10K 1/6W J			
D107,108	0B06398A	SID 1SS176	R434	0B09669A	RK 470 1/6W J			
D109,110	0B06398A	SID 1SS176	R435	0B09701A	RK 10K 1/6W J			
D401	0B06458A	SID 30D-2	R436	0B09700A	RK 9.1K 1/6W J			
D402	0B12418A	SID UB-151	R437	0B09741A	RK 470K 1/6W J			
D405,406	0B06398A	SID 1SS176	R438	0B09693A	RK 4.7K 1/6W J			
L101L,R	0B51315A	Output Coil 0.8	R439	0B09701A	RK 10K 1/6W J			
L401	0B51227A	Chork Coil	R440	0B09685A	RK 2.2K 1/6W J			
L402,403	0B51339A	Chork Coil OWD18	R441	0B09733A	RK 220K 1/6W J			
VR11L,R	0B32164A	Semi-VR 10K	R442	0B09677A	RK 1.0K 1/6W J			
VR12L,R	0B32072A	Semi-VR 470 (B)	R443,444	0B09701A	RK 10K 1/6W J			
VR13	0B32074A	Semi-VR 1.0K (B)	R445	0B09694A	RK 5.1K 1/6W J			
VR401	0B32080A	Semi-VR 10K (B)	R446	0B09709A	RK 22K 1/6W J			
R101L,R	0B09694A	RK 5.1K 1/6W J	R447,448	0B09725A	RK 100K 1/6W J			
R102L,R	0B09713A	RK 33K 1/6W J	R449	0B09677A	RK 1.0K 1/6W J			
R103L,R	0B09677A	RK 1.0K 1/6W J	R450,451	0B09709A	RK 22K 1/6W J			
R104L,R	0B22197A	RM 523 1/4W F	R452	0B09707A	RK 18K 1/6W J			
R105L,R	0B22338A	RM 9.09K 1/4W F	R453	0B09689A	RK 3.3K 1/6W J			
R106L,R	0B22283A	RM 3.09K 1/4W F	R454	0B09677A	RK 1.0K 1/6W J			
R107L,R	0B22327A	RM 7.15K 1/4W F	R456,457	0B09709A	RK 22K 1/6W J			
R108L,R	0B09697A	RK 6.8K 1/6W J	R458	0B09677A	RK 1.0K 1/6W J			
R109L,R	0B09697A	RK 6.8K 1/6W J	R459	0B09699A	RK 8.2K 1/6W J			
R110L,R	0B09665A	RK 330 1/6W J	C101L,R	0B09249A	C 33p 50V J			
R111L,R	0B09695A	RK 5.6K 1/6W J	C102L,R	0B09322A	CPP 330p 100V J			
R112L,R	0B09665A	RK 330 1/6W J	C103L,R	0B09933A	CE 2.2 μ 50V (LN)			
R113L,R	0B24227A	RF 12K 1/2W J	C104L,R	0B41119A	CPP 560p 100V G			
R114L,R	0B09657A	RK 150 1/6W J	C105L,R	0B05653A	CML 1500p 50V J			
R115L,R	0B09647A	RK 56 1/6W J	C106L,R	0B09249A	C 33p 50V J			
R116L,R	0B09669A	RK 470 1/6W J	C107L,R	0B41292A	CML 0.033 μ 50V J			
R117L,R	0B22283A	RM 3.09K 1/4W F	C108L,R	0B09242A	C 47p 50V J			
R118L,R	0B09646A	RK 51 1/6W J	C109L,R	0B40113A	CE 2.2 μ 50V			
R119L,R	0B09709A	RK 22K 1/6W J	C110L,R	0B41302A	CML 0.022 μ 50V J			
R120L,R	0B09701A	RK 10K 1/6W J	C111L,R	0B41294A	CML 0.047 μ 50V J			
R121L,R	0B22327A	RM 7.15K 1/4W F	C112,113	0B40466A	CE 47 μ 25V (LN)			
R122L,R	0B09686A	RK 2.4K 1/6W J	C114,115	0B40075A	CE 22 μ 16V			
R123L,R	0B09669A	RK 470 1/6W J	C116	0B40250A	CE 100 μ 16V (BP)			
R124L,R	0B01846A	RK 4.7K 1/4W J	C117,118	0B41298A	CML 0.1 μ 50V J			
R125L,R	0B01846A	RK 4.7K 1/4W J	C119	0B40075A	CE 22 μ 16V			
R126L,R	0B09629A	RK 10 1/6W J	C120	0B40113A	CE 2.2 μ 50V			
R127L,R	0B09629A	RK 10 1/6W J	C121L,R	0B41291A	CML 0.027 μ 50V J			
R128L,R	0B01933A	RK 220 1/4W J	C401	0B41917A	CC 0.1 μ 25V Z			

Note : TR Block A Ass'y and TR Block B Ass'y are not included in the Main P. C. B. Ass'y. (See item 1. 1)



- Notes :
1. Diode is 1SS176 unless otherwise specified.
 2. Following transistors are interchangeable with each other.
 - a. 2SA733, 2SA608SP, 2SA1048, 2SA2785
 - b. 2SC945, 2SC536SP, 2SC2458, 2SC2785
 3. Voltage measuring conditions :
 - With no input signal applied to the input jacks.
 - With no load connected to the speaker terminals.

5.1. Main P.C.B. Ass'y

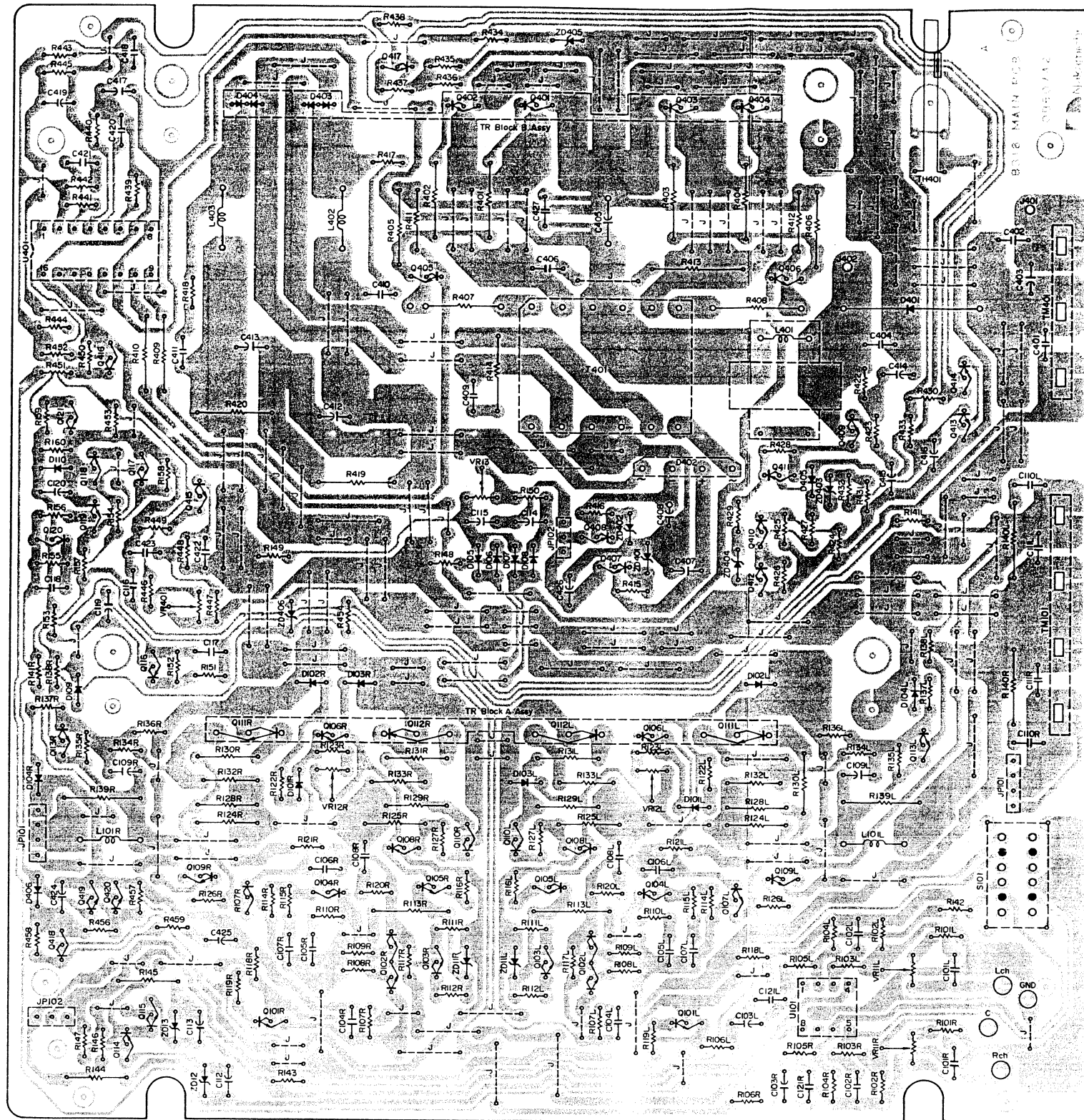


Fig. 5.1

5.2. Fuse P.C.B. Ass'y

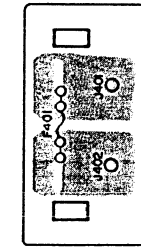


Fig. 5.2

6. SCHEMATIC DIAGRAM

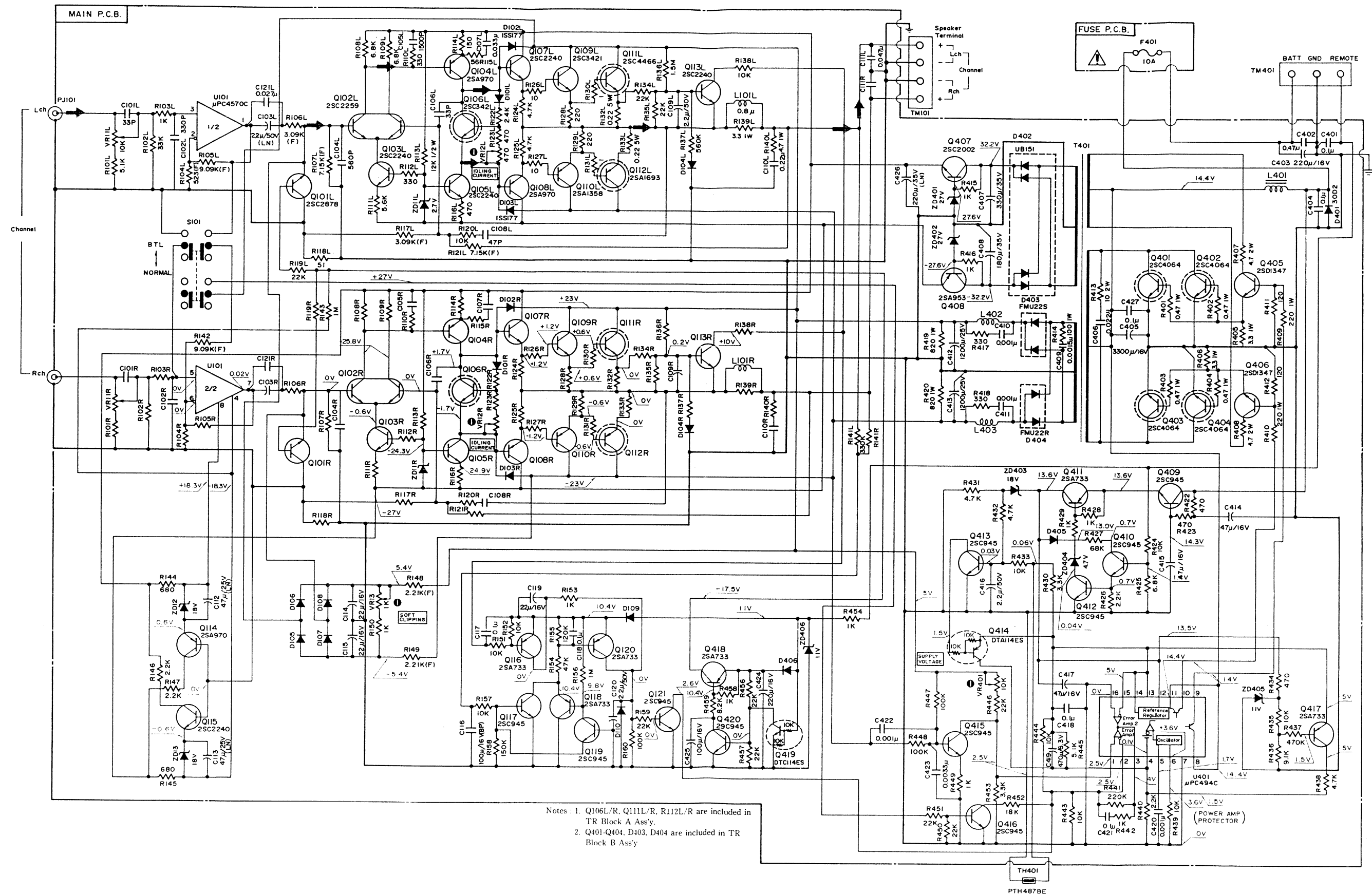


Fig. 6

7. BLOCK DIAGRAM

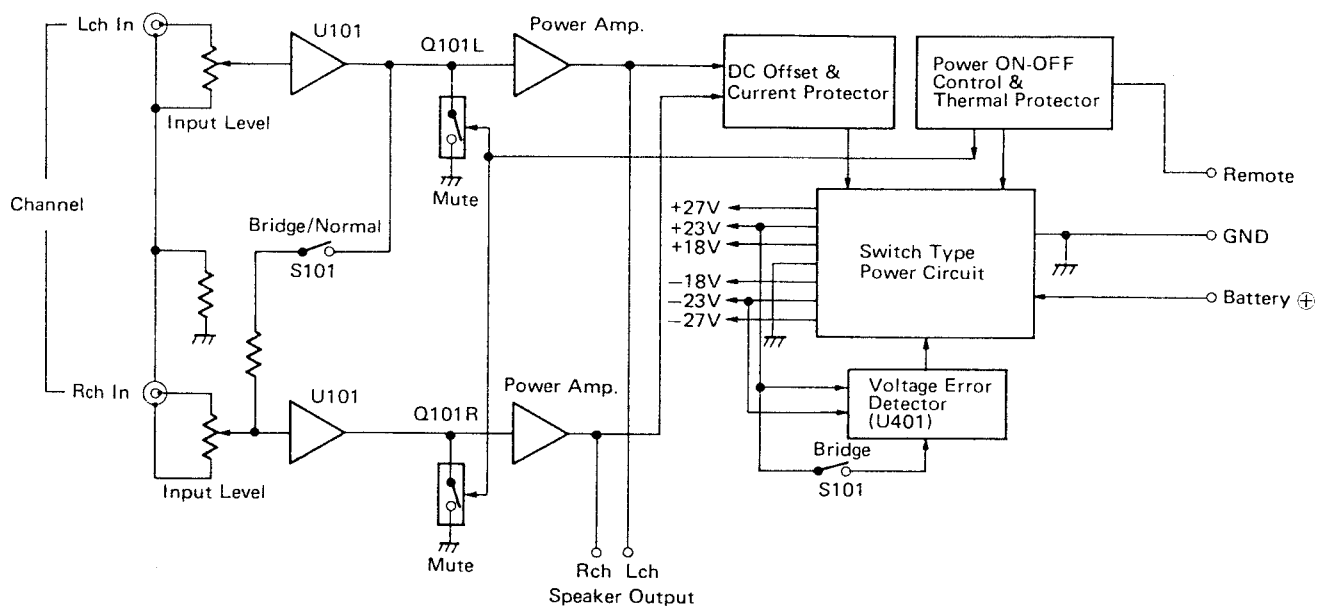


Fig. 7

8. SPECIFICATIONS

Continuous Power Output	40 W × 2 RMS (two channels driven, 4ohms, 1kHz, 0.005% THD) 80 W × 1 RMS (monaural, 4ohms, 1kHz, 0.01% THD)
Power Bandwidth	10–50,000 Hz (4ohms, 0.1% THD)
Total Harmonic Distortion	0.005% (4ohms, 1kHz, 40W × 2)
Frequency Response	10–50,000Hz +1, –3dB (with input sensitivity control at max.) 20–20,000Hz ±1dB (with input sensitivity control at max.)
Signal to Noise Ratio	Better than 110dB (IHF A-WTD, at rated power, with input sensitivity control at max.)
Damping Factor	Greater than 1,000 (4ohms, 1kHz)
Input Sensitivity/Impedance	0.3–0.8V variable/10kohms (“Normal” position) 0.2–0.55V variable/10kohms (“Bridge” position)
Stereo Separation	Better than 80dB (4ohms, 1kHz)
Power Source	14.4V DC negative ground (10.8–15.6V allowable)
Current Consumption	
Max.	12A (two channels driven, 4ohms, 40W × 2) 16A (monaural, 4ohms, 80W × 1)
Music	Approx. 5A (4ohms)
Min.	Approx. 1.2A (Idling)
Load Impedance	Above 4ohms
Dimensions*	190 (W) × 56 (H) × 190 (D) mm 7-1/2 (W) × 2-3/16 (H) × 7-1/2 (D) inches
Approximate Weight	2.0kg 4lbs. 7oz.

* : Dimensions do not include protruding parts. Height is the panel height.

- Unless otherwise noted, all measurements are with two channels driven (“Normal” position)
- Specifications and design are subject to change for future improvement without notice.