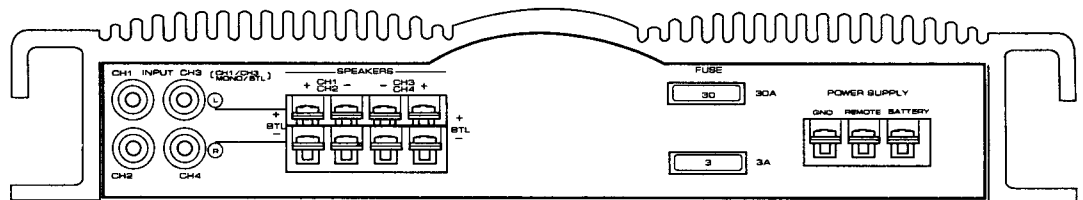
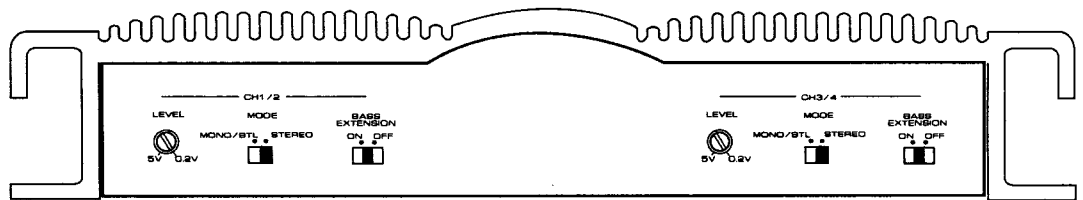


4/3/2-CHANNEL POWER AMPLIFIER

YPA-720

SERVICE MANUAL

YPA-720



IMPORTANT NOTICE

This manual has been provided for the use of authorized YAMAHA Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically YAMAHA Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components, and failure of the product to perform as specified. For these reasons, we advise all YAMAHA product owners that any service required should be performed by an authorized YAMAHA Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of YAMAHA are continually striving to improve YAMAHA products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and part replacement. Recheck all work before you apply power to the unit.

■ CONTENTS

CONNECTIONS	1~2	ADJUSTMENTS	5
SPECIFICATIONS	2	PRINTED CIRCUIT BOARD	6~9
BLOCK DIAGRAM	3	SCHEMATIC DIAGRAM	10
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DISASSEMBLY PROCEDURES	4		

100403

YAMAHA
YAMAHA CORPORATION
P.O. Box 1, Hamamatsu, Japan

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHATSOEVER!

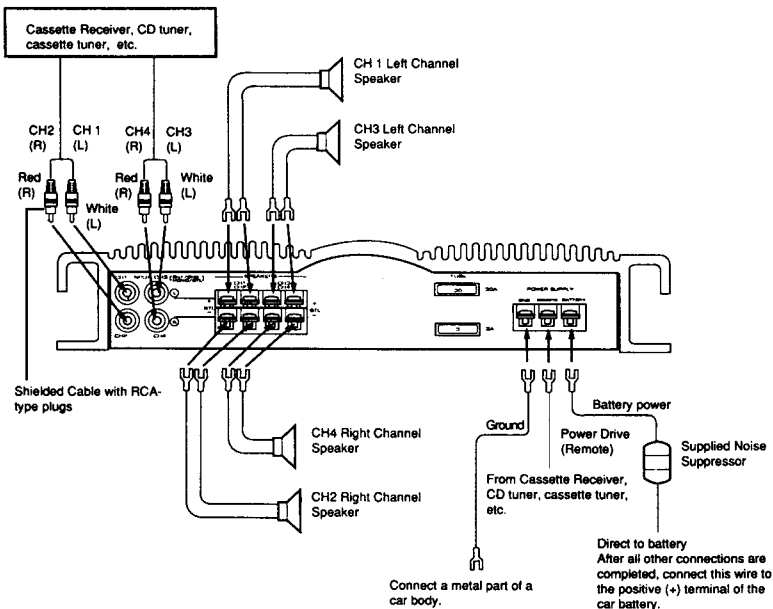
Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

CONNECTIONS

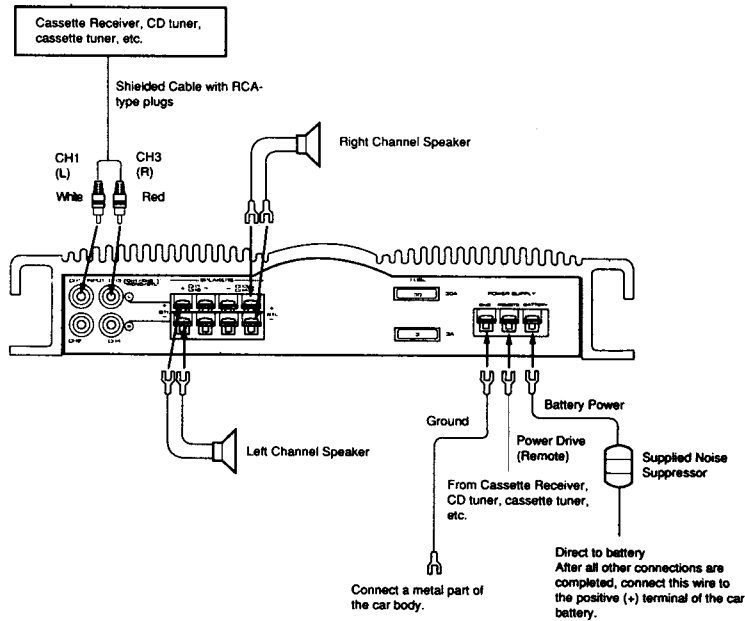
4-channel system

- Set both **MODE** switches to **STEREO**.



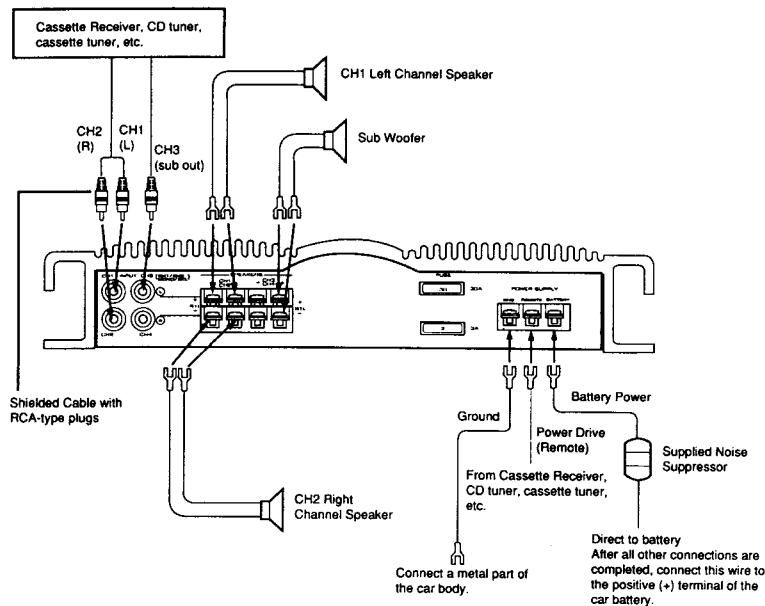
2-channel system

- Set both **MODE** switches to **MONO/BTL**.



3-channel system

- Set MODE switch to MONO/BTL for CH 3 and to STEREO for CH 1 and CH 2.



■ SPECIFICATIONS

Continuous Power Output

Per channel, 4Ω, both channels driven

With 0.1% THD, 1kHz 45W + 45W + 45W + 45W
 110 W + 110 W (BTL)

With 0.1% THD,
 20Hz — 20kHz 40W + 40W + 40W + 40W
 90W + 90W (BTL)

Speaker Impedance 4Ω

Frequency Response (at 1W, 4Ω) 10Hz to 100kHz
 (+0, -1dB)

Signal-to-Noise Ratio
 (input short, 1 kohms, A-weighted) 100dB

Total Harmonic Distortion
 At 40W + 40W/40W + 40W, 1kHz, 4Ω 0.01%

Input Impedance 10kΩ/2CH, 4CH

Input Sensitivity 0.2V — 5.0V/4CH
 0.15V — 4.0V/BTL

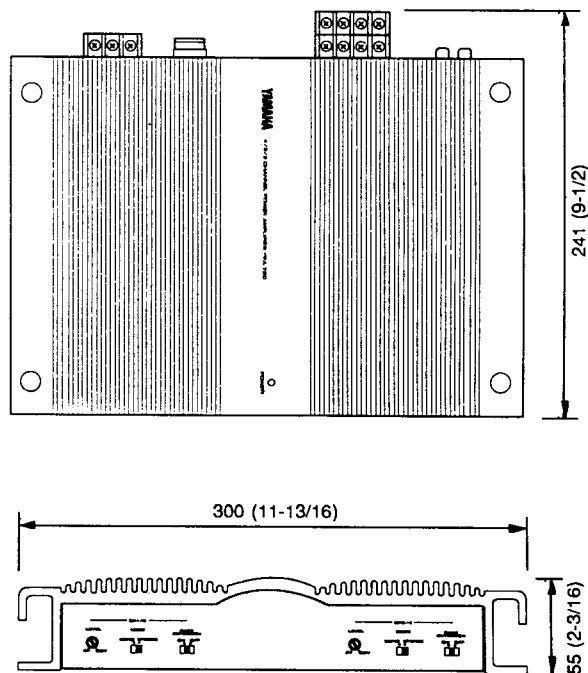
Rated Supply Voltage 10.0V — 16.0V

Dimensions (W x H x D) 300 x 55 x 241mm
 (11-13/16" x 2-3/16" x 9-1/2")

Weight 3.2kg (7lbs, 1oz)

* Specifications subject to change without notice.

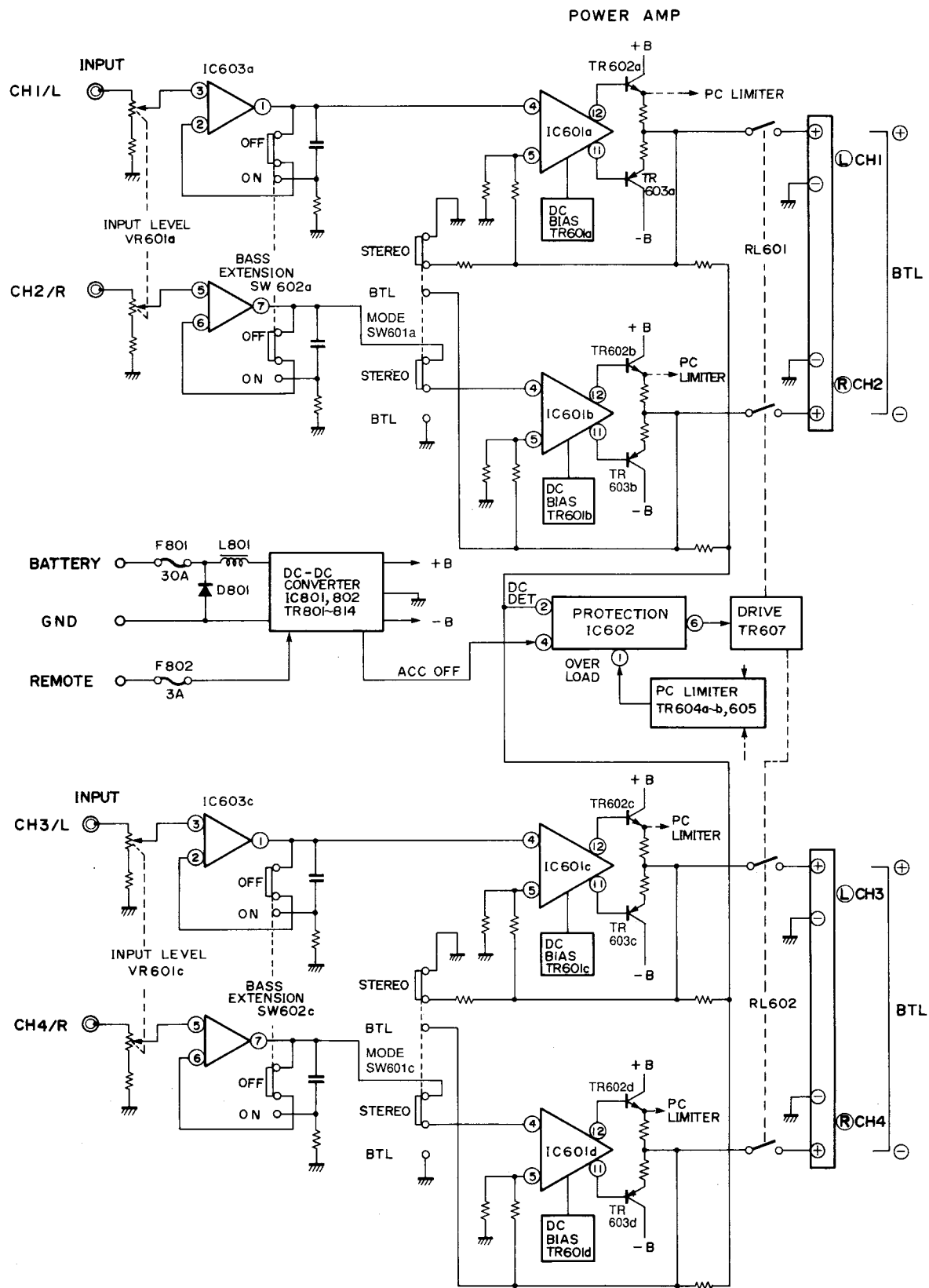
● DIMENSIONS



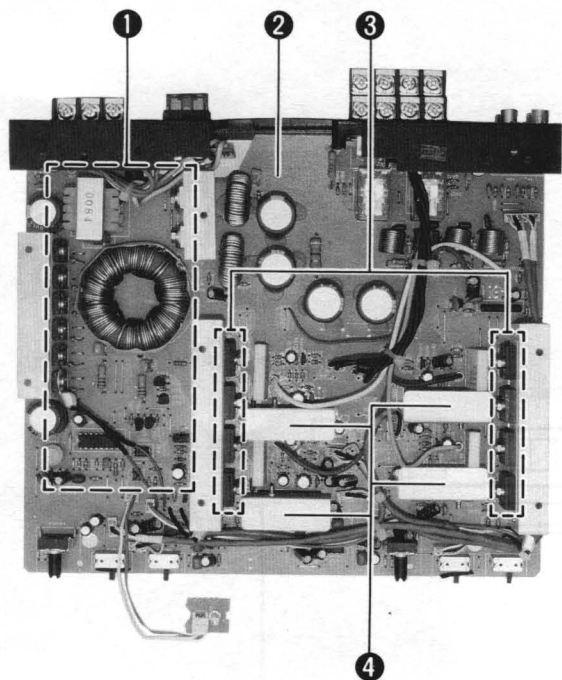
Unit : mm (inch)

■ BLOCK DIAGRAM

YPA-720



■ INTERNAL VIEW



- ① DC-DC CONVERTER BLOCK
- ② MAIN CIRCUIT BOARD
- ③ POWER TRANSISTOR (2SA1232, 2SC3012)
- ④ POWER IC (μ PC1225H)

■ DISASSEMBLY PROCEDURES

(Remove parts in the order as numbered.)

1. **Removal of Bottom Plate**
Remove 4 screws (①) in Fig. 1.
2. **Removal of Main Circuit Board**
Remove 9 screws (②, ③) in Fig. 1.

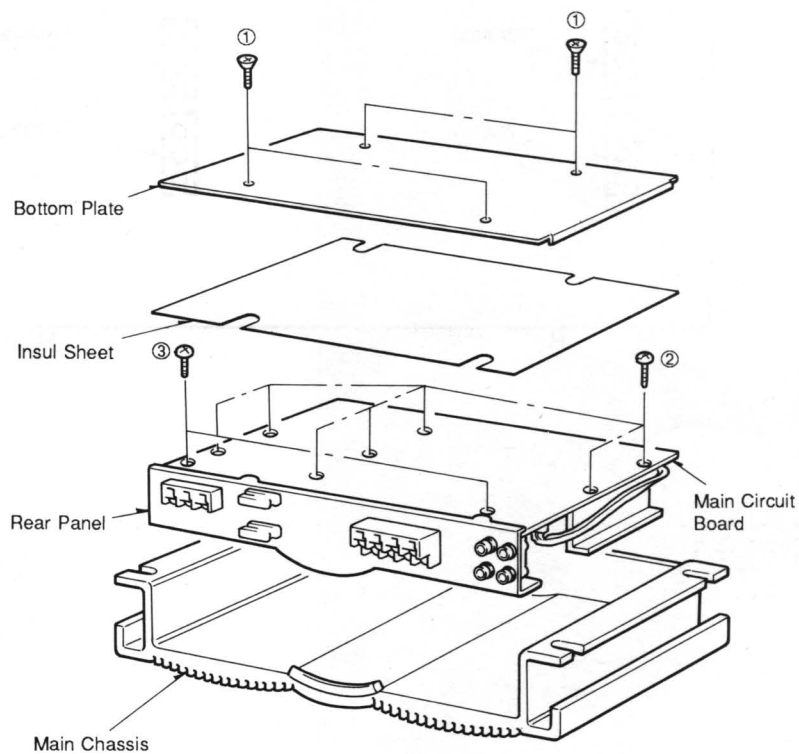
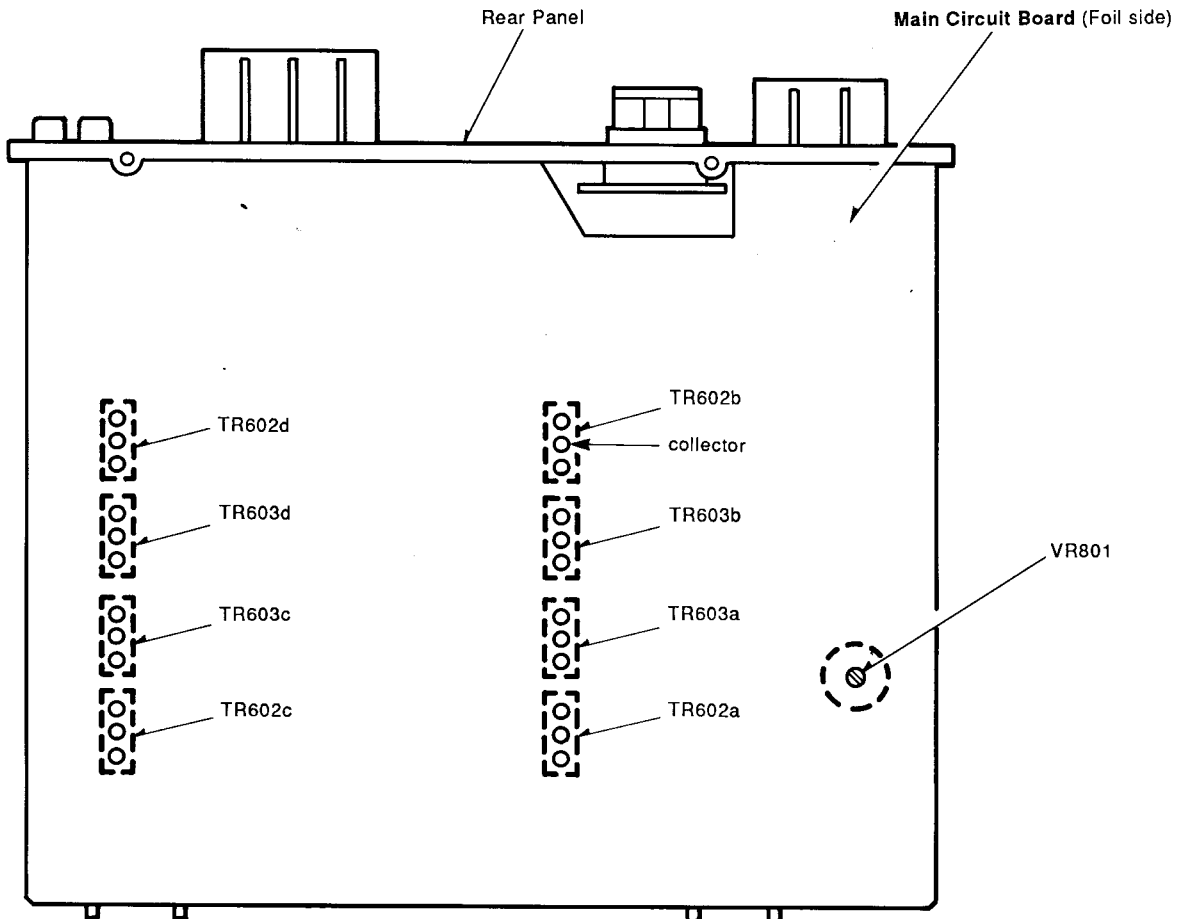


Fig. 1

■ ADJUSTMENTS

Secondary side voltage adjustment

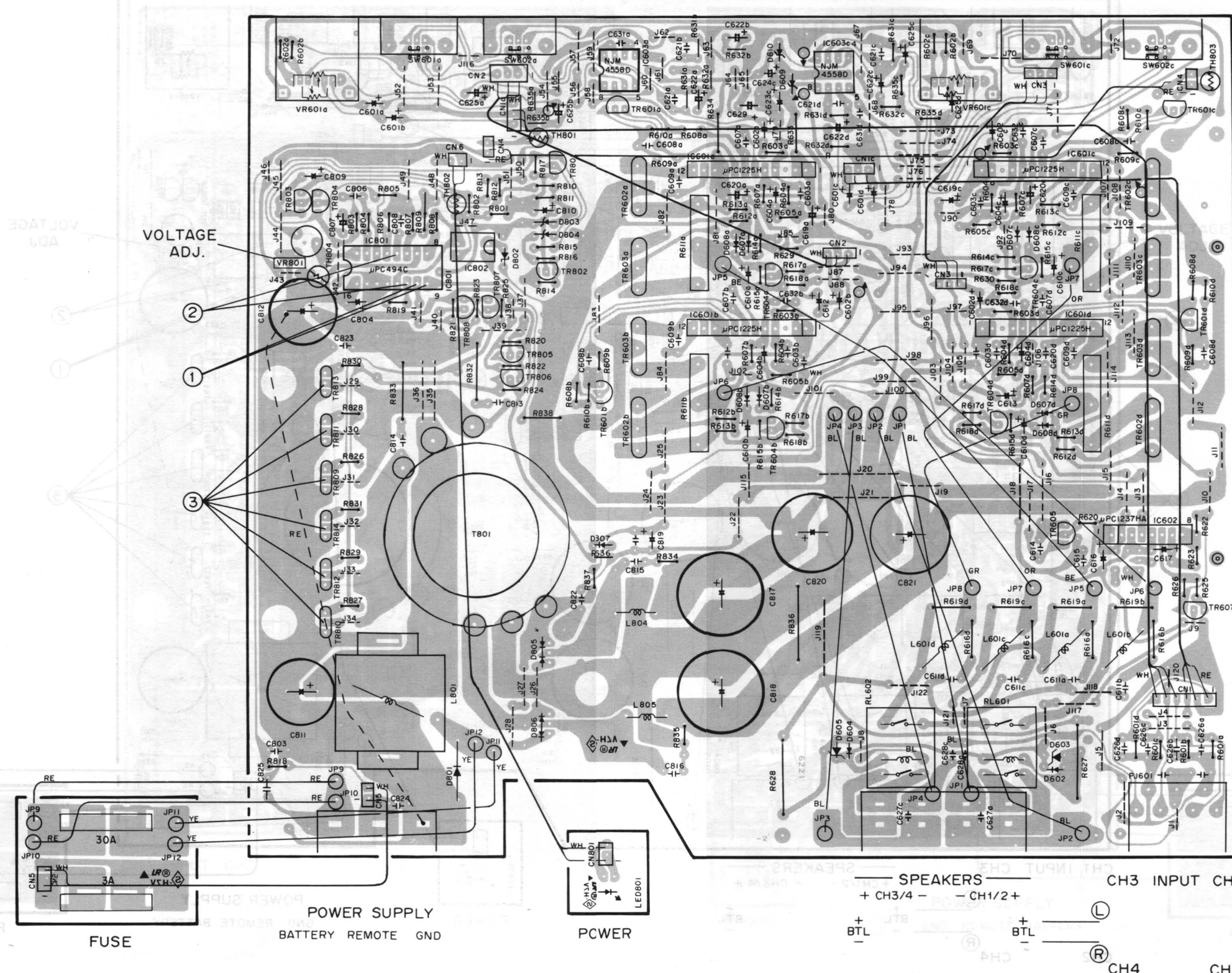
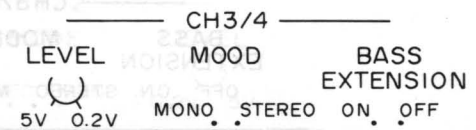
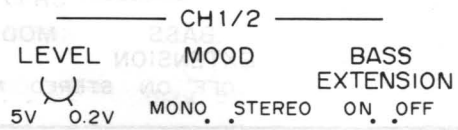
- Set DC power supply voltage to 14.4V, with no load or signal applied.
- Adjust VR801 so that the collector (+B) of the transistor TR602a—d becomes $23.5V \pm 0.2V$.



PRINTED CIRCUIT BOARD (Foil side)

① to ③ : WAVEFORM OF TEST POINT (See page 10)

Main Circuit Board

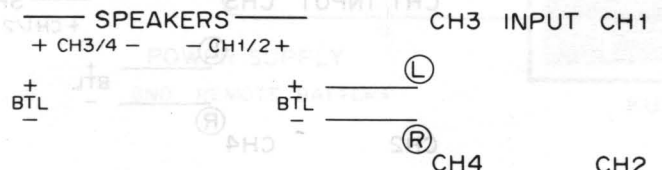
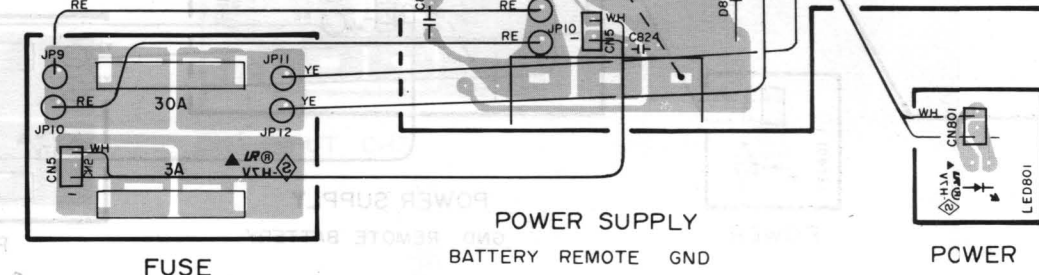


VOLTAGE ADJ.

②

①

③

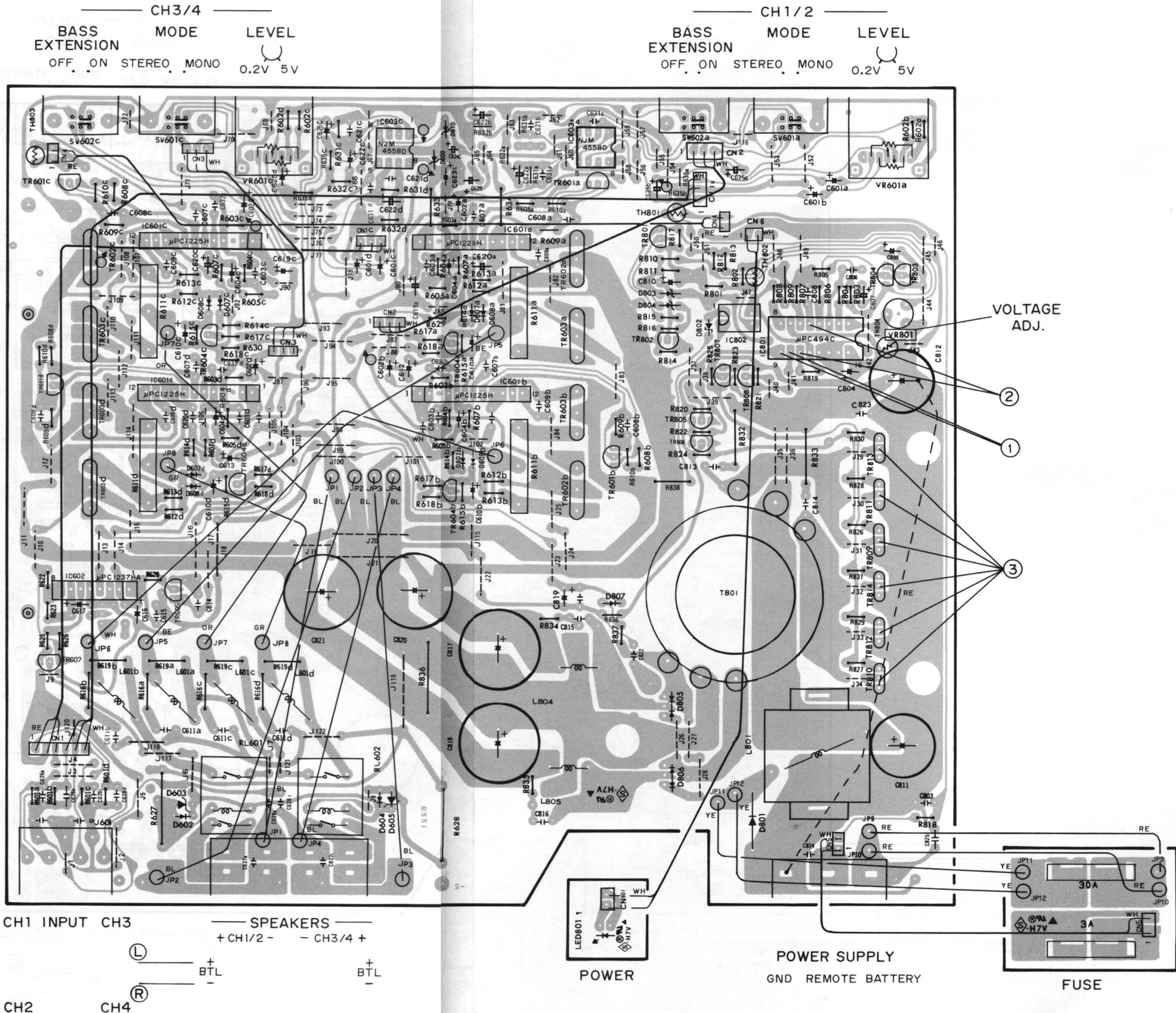


1
2
3
4
5
6

■ PRINTED CIRCUIT BOARD (Parts side)

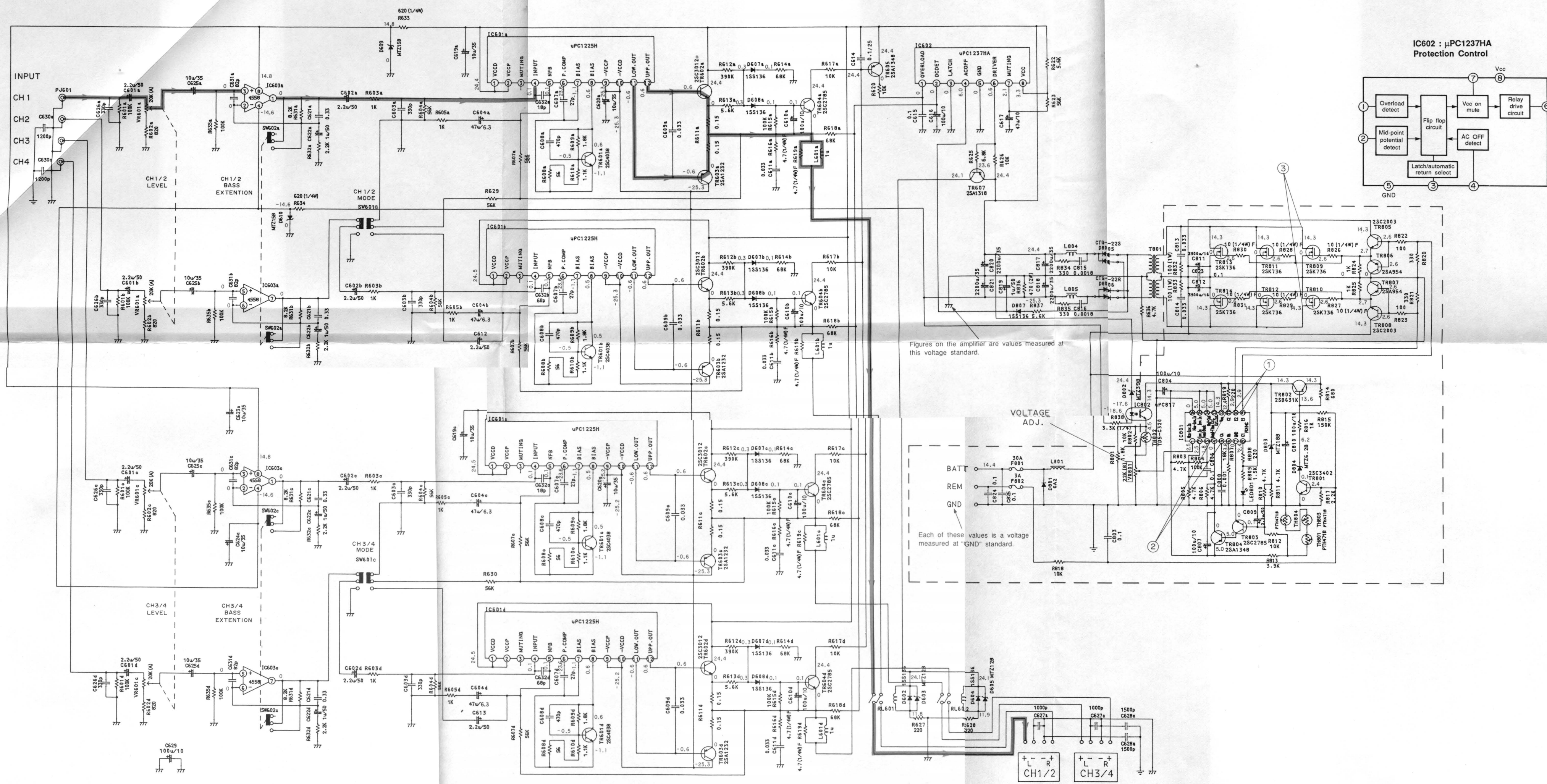
① to ③ : WAVEFORM OF TEST POINT (See page 10)

Main Circuit Board



1
2
3
4
5
6
8

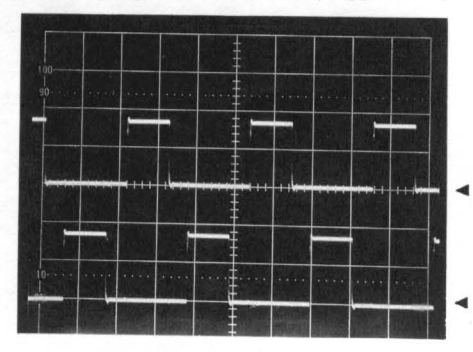
SCHEMATIC DIAGRAM



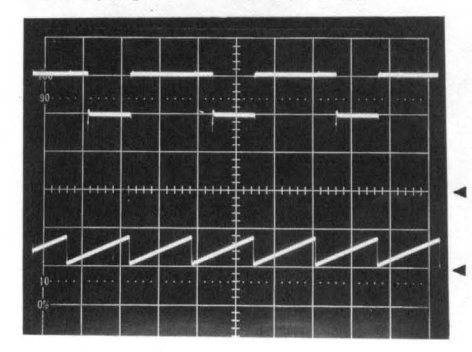
Figures on the amplifier are values measured at this voltage standard.

Each of these values is a voltage measured at "GND" standard.

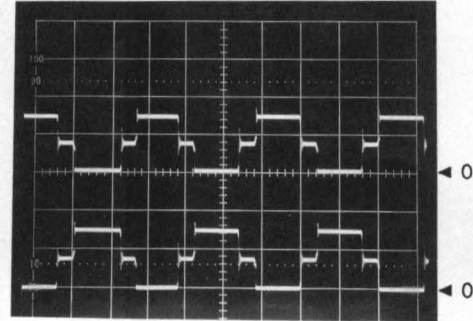
Point ①
 (CH1 : Pin9 of IC801 CH2 : Pin10 of IC801)
 V : 0.5V/div H : 10 $\mu\text{sec/div}$
 DC coupling 10 : 1 probe (Trigger CH1)



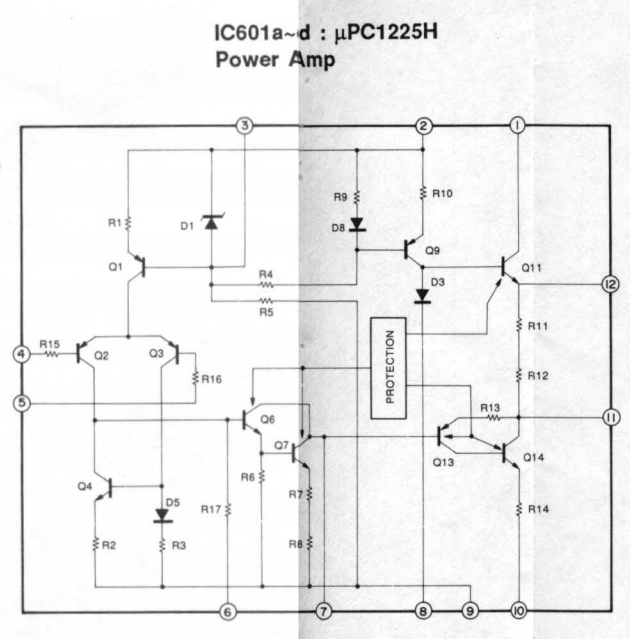
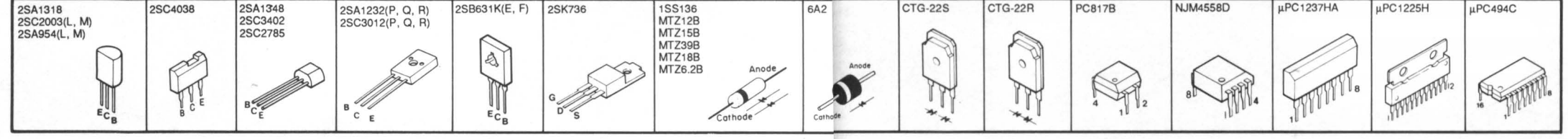
Point ②
 (CH1 : Pin11 of IC801 CH2 : Pin5 of IC801)
 V : 0.5V/div H : 10 $\mu\text{sec/div}$
 DC coupling 10 : 1 probe (Trigger CH1)



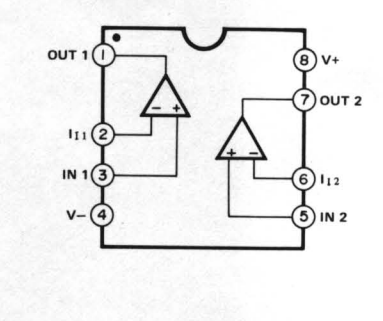
Point ③
 (CH1 : Drain of TR809, 811, 813)
 (CH2 : Drain of TR810, 812, 814)
 V : 2V/div H : 10 $\mu\text{sec/div}$
 DC coupling 10 : 1 probe (Trigger CH1)



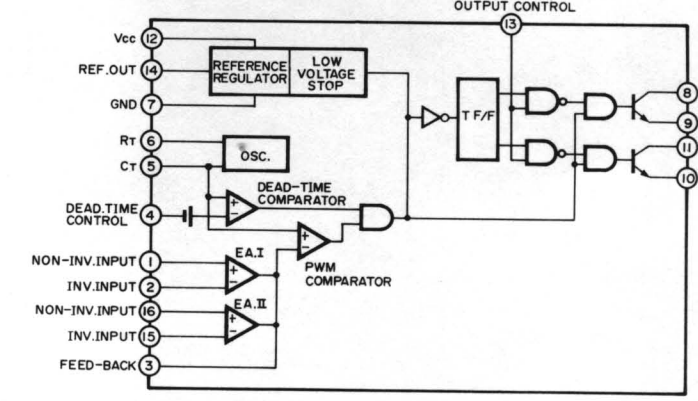
PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.



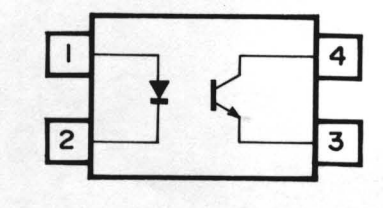
IC603a, c : NJM4558D Dual Op-amp



IC801 : μPC494C PWM Power Controller



IC802 : PC817B Photo Coupler



* All voltage are measured with a 10M Ω /DC electric volt meter.
 * Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.
 * Schematic diagram is subject to change without notice.

PARTS LIST

■ ELECTRICAL PARTS

■ WARNING

Components having special characteristics are marked \triangle and must be replaced with parts having specifications equal to those originally installed.

- Carbon resistors (1/6W or 1/4W) are not included in the ELECTRICAL PARTS List. For the parts No. of the carbon resistors, refer to P. 17.

Ref. NO.	PART NO.	Description			部 品 名	Remarks	
	MX609730	P.C.B. ASS'y, MAIN			メイン基板ASSY		MX6385A0
	FX606530	ELECTROLYTIC CAP	2.2uF	50V	ケミコン	C601A-601D	20230C228M81
	FX606540	ELECTROLYTIC CAP	2.2uF	50V	ケミコン	C602A-602D	2025J228M861
	FG212330	CERAMIC CAP	330pF	50V	セラコン	C603A-603D	20151331K801
	FX606550	ELECTROLYTIC CAP	47uF	6.3V	ケミコン	C604A-604D	2025J470M261
	FX606560	CERAMIC CAP	27pF	50V	セラコン	C607A-607D	20170270K801
	FX606570	CERAMIC CAP	470pF	50V	セラコン	C608A-608D	20151471K801
	FX606580	TF FILM CAP	0.033uF	50V	TFコン	C609A-609D	20090333J803
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C610A-610D	2025J101M361
	FX606580	TF FILM CAP	0.033uF	50V	TFコン	C611A-611D	20090333J803
	FX606540	ELECTROLYTIC CAP	2.2uF	50V	ケミコン	C612, 613	2025J228M861
	FZ004130	CERAMIC CAP	0.1uF	25V	半導体セラコン	C614	20194104Z523
	FX606600	CERAMIC CAP	0.1uF	25V	セラコン	C615	20194104Z517
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C616	2025J101M361
	FX606610	ELECTROLYTIC CAP	47uF	10V	ケミコン	C617	2025J470M361
	FX606620	ELECTROLYTIC CAP	10uF	35V	ケミコン	C619A, 619C, 620A, 620C	2025J100M661
	FX606630	POLYESTER FILM CAP	0.33uF	50V	ポリエステルコン	C621A-621D	20090334K809
	FX606480	ELECTROLYTIC CAP	1uF	50V	ケミコン	C622A-622D	2052J108M861
	UJ767100	ELECTROLYTIC CAP	10uF	50V	ケミコン	C623C, 624C	20230C100M81
	FX606620	ELECTROLYTIC CAP	10uF	35V	ケミコン	C625A-625D	2025J100M661
	FG212330	CERAMIC CAP	330pF	50V	セラコン	C626A-626D	20151331K801
	FG213100	CERAMIC CAP	1000pF	50V	セラコン	C627A, 627C	20151102K801
	FG213150	CERAMIC CAP	1500pF	50V	セラコン	C628A, 628C	20151152K801
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C629	2025J101M361
	FX606650	CERAMIC CAP	1200pF	50V	セラコン	C630A, 630C	20151122K801
	FX606660	CERAMIC CAP	82pF	50V	セラコン	C631A-631D	20170820K801
	FX606490	CERAMIC CAP	82pF	50V	セラコン	C631B, 631C	20170820K800
	FX606500	CERAMIC CAP	18pF	50V	セラコン	C632A	20170180K800
	FX606670	CERAMIC CAP	68pF	50V	セラコン	C632B	20170680K801
	FX606680	CERAMIC CAP	18pF	50V	セラコン	C632C	20170180K801
	FX606670	CERAMIC CAP	68pF	50V	セラコン	C632D	20170680K801
	FZ004130	CERAMIC CAP	0.1uF	25V	半導体セラコン	C803	20194104Z523
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C804	2025J101M361
	FX603610	TF FILM CAP	0.1uF	50V	TFコン	C806	20090104J803
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C807	2025J101M361
	FX606690	POLYESTER FILM CAP	0.001uF	50V	ポリエステルコン	C808	20058102K831
	FX606540	ELECTROLYTIC CAP	2.2uF	50V	ケミコン	C809	2025J228M861
	FX606590	ELECTROLYTIC CAP	100uF	10V	ケミコン	C810	2025J101M361
	FX606510	ELECTROLYTIC CAP	3900uF	16V	ケミコン	C811, 812	2027392400G4
	FX606700	POLYESTER FILM CAP	0.033uF	50V	ポリエステルコン	C813, 814	20058333K831
	FX606710	POLYESTER FILM CAP	0.0018uF	50V	ポリエステルコン	C815, 816	20058182K831
	FX606520	ELECTROLYTIC CAP	2200uF	35V	ケミコン	C817, 818	2025Z222M680
	FX606640	ELECTROLYTIC CAP	1uF	50V	ケミコン	C819	2025J108M861
	FX606520	ELECTROLYTIC CAP	2200uF	35V	ケミコン	C820, 821	2025Z222M680
	FZ004130	CERAMIC CAP	0.1uF	25V	半導体セラコン	C823	20194104Z523
	FX606600	CERAMIC CAP	0.1uF	25V	セラコン	C824, 825	20194104Z517
	1X608920	DIODE	1SS136		ダイオード	D602	205040005019
	IF008600	ZENER DIODE	MTZ12B		ツェナーダイオード	D603	2050Z0120B5F
	1X608920	DIODE	1SS136		ダイオード	D604	205040005019
	IF008600	ZENER DIODE	MTZ12B		ツェナーダイオード	D605	2050Z0120B5F

*New Parts (新規部品)

ランク : Japan only

Ref. NO.	PART NO.	Description	部 品 名	Remarks		
	IXG08920	DIODE	1SS136	ダイオード	DG07A-607D, G08A-G08D	205040005019
	IF009520	ZENER DIODE	MTZ15B	ツェナーダイオード	D609, 610	205020150B5F
	IXG09140	DIODE	6A2	ダイオード	D801	205050028109
	IF009280	ZENER DIODE	MTZ39B	ツェナーダイオード	D802	205020390B5F
	IF008970	ZENER DIODE	MTZ18B	ツェナーダイオード	D803	205020180B5F
	IF010740	ZENER DIODE	MTZ6.2B	ツェナーダイオード	D804	205020062B5F
	IXG08900	DIODE	CTG22S	ダイオード	D805	205050036007
	IXG08910	DIODE	CTG22R	ダイオード	D806	205050037007
	IXG08920	DIODE	1SS136	ダイオード	D807	205040005019
	XX685590	SOCKET, FUSE	H-0448	ヒューズホルダー	FH801, 802	34233001
	IG067100	IC	uPC1225H	I C	IC601A-601D	205413000606
	XF663A00	IC	uPC1237HA	I C	IC602	205419000206
	IX621100	IC	NJM4558D	I C	IC603A, 603C	20541000630A
	IX621110	IC	uPC494C	I C	IC801	205424000106
	IX609700	PHOTO COUPLER	PC817E	フォトカプラ	IC802	20522900006E
	GX600190	COIL, CHOKE	1uH	チョークコイル	L601A-601D	35199022
	GX606140	COIL, CHOKE		チョークコイル	L801	35800084
	GX600200	COIL, CHOKE	FN-12-50	チョークコイル	L804, 805	35199038
	IX621970	LED	GL4EG8 (GRN)	L E D	LED801	20520020093E
	LX606120	PIN JACK	T5858-AAAF	ピンジャック	PJ601	33043600
	HX605860	TWIN CEMENT FIXED RESISTOR	0.15Ωx2 2W	プレート抵抗	R611A-611D	203806159K50
	HX605870	FLAME PROOF CARBON RESISTOR	4.7Ω 1/4W	不燃化カーボン抵抗	R616A-616D, 619A-619D	20333478J146
	HX605880	METAL FILM RESISTOR	220Ω 2W	金属被膜抵抗	R627, 628	20352221J022
	HX605890	FLAME PROOF CARBON RESISTOR	10Ω 1/4W	不燃化カーボン抵抗	R826-831	20333100J140
	HX605810	METAL FILM RESISTOR	100Ω 1W	金属被膜抵抗	R832, 833	20352101J012
	HX605900	METAL FILM RESISTOR	470Ω 2W	金属被膜抵抗	R836	20352471J022
	XX685760	RELAY	FBR323D012	リレー	RLG01, 602	82000321
	KX603350	SLIDE SWITCH	SSSF1-2-2	スライドSW	SW601A, 601C, 602A, 602C	27300132
	XX685570	POWER TRANSFORMER		電源トランス	T801	35900620
	IX608780	POSISTOR	PTH487A01BE471	ポジスター	TH801	204514710007
	IX608770	THERMISTOR	TD5C320D	サーミスタ	TH802	204502030005
	IX608780	POSISTOR	PTH487A01BE471	ポジスター	TH803, 804	204514710007
	IX621980	TRANSISTOR	2SC4038E Q, R, S	トランジスタ	TR601A-601D	2050C403800
	IX609160	TRANSISTOR	2SC3012	トランジスタ	TR602A-602D	2050C3012006
	IX609100	TRANSISTOR	2SA1232	トランジスタ	TR603A-603D	2050A1232006
	IX621130	TRANSISTOR	2SC2785 E, F, K	トランジスタ	TR604A-604D	2050C278500
	IX608810	TRANSISTOR	2SA1348	トランジスタ	TR605	2050A134800
	IX608800	TRANSISTOR	2SA1318 S, T	トランジスタ	TR607	2050A131802
	IX608830	TRANSISTOR	2SC3402	トランジスタ	TR801	2050C340200
	IX608820	TRANSISTOR	2SB631K E, F	トランジスタ	TR802	30100081
	IX621130	TRANSISTOR	2SC2785 E, F, K	トランジスタ	TR803	2050C278500
	IX608810	TRANSISTOR	2SA1348	トランジスタ	TR804	2050A134800
	IX609680	TRANSISTOR	2SC2003	トランジスタ	TR805	2050C2003006
	IX609670	TRANSISTOR	2SA954	トランジスタ	TR806, 807	2050A0954006
	IX609680	TRANSISTOR	2SC2003	トランジスタ	TR808	2050C2003006
	IX609580	FET	2SK736	F E T	TR809-814	2050K0736006
	HX605910	POTENTIOMETER	20KΩ RK14K12120KA	V R	VR601A, 601C	206002227901
	HX605920	SEMI VARIABLE RESISTOR	22KΩ RH1051CJ	半固定抵抗	VR801	206102230013
	HX603470	CORD	SCN-SCN 6P 345	コード	CH1	62902427
	HX603170	CORD	SCN-SCN 3Px160	コード	CH2	62902229

*New Parts (新規部品)

ランク : Japan only

Ref. NO.	PART NO.	Description	部 品 名	Remarks		
	MXG03460	CORD	SCN-SCN 3P×1001	コード	CN3	62902321
	MXG03440	CORD	SCN-SCN 2P×190	コード	CN4	62902234
	MXG03450	CORD	SCN-SCN 2P×80	コード	CN5	62902235
	MXG03430	CORD	SCN-EH 2P×110	コード	CN6	62902231
	LXG06110	CONNECTOR	EH 2P S	コネクタ	CN801	87002071
	MXG03480	CORD	SIN-SIN 1P×150	コード	JP1-4	62902236
	MXG03510	CORD	SIN-SIN 1P×180 B	コード	JP5	62902239
	MXG03520	CORD	SIN-SIN 1P×170 W	コード	JP6	62902240
	MXG03530	CORD	SIN-SIN 1P×160 O	コード	JP7	62902241
	MXG03540	CORD	SIN-SIN 1P×110 G	コード	JP8	62902242
	MXG03490	CORD	2M-2M 1P×100 R	コード	JP9,10	62902318
	MXG03500	CORD	2M-2M 1P×100 Y	コード	JP11,12	62902319
	MXG03550	JUMPER	20mm	ジャンパー線	JP20,21	92010120
	LXG05680	LUG TERMINAL	8P	ラグ端子板		51137002
	LXG06100	LUG TERMINAL, BATTERY	3P	ラグ端子板		51138002
	CXG16940	SPACER, LED	LE60-05	スパーサーLED		55135001
	AXG14810	MISC WIRE HOLD PIN		ホールドピン		19407001
	CXG18320	TUBE	UL BLK 1X30	チューブUL		31501066
	MXG03160	WIRE KIT		線材キット		2090385A0063
※	BXG02120	HEAT SINK		放熱板		15237001
※	BXG02040	HEAT SINK SUB (B)		放熱板サブ (B)		15360001
※	BXG02170	HEAT SINK SUB (A)		放熱板サブ (A)		15359001
※	BXG02130	HAET SINK SUB		放熱板サブ		15295001
※	CXG18540	INSULATION SHEET (B)		シート (B)		75434001
※	CXG18530	INSULATION SHEET (A)		シート (A)		75430001
※	CXG18520	INSULATION COOL	6P	クールシート		75373001
	EXG02040	SPRING WASHER	M3	バネ座金		42250341
	CXG16910	WASHER, FIBER	3.2×8-0.5	ポリワッシャー		42400062
※	EXG01950	HEXAGONAL HEAD SCREW WITH SP	3×12 ZMC2-Y	バネ座付六角ネジ		40000475
	EI030066	BIND HEAD B-TITE SCREW	3×6 ZMC2-Y	バインドBタイトネジ		40630061
	EI030086	BIND HEAD P-TITE SCREW	3×8 ZMC2-Y	バインドBタイトネジ		40630081
※	EXG01940	PAN HEAD SCREW WITH WASHER	3×10 ZMC2-Y	座金付ナベ小ネジ		40000372
※	EXG01960	WASHER	T0-220	ワッシャー		42400065
	CXG18370	TUBE	UL 5.2×60 BL	チューブUL		31501491
	CB069251	BINDING TIE	BK-1	束線止め		84387001

※New Parts (新規部品)

ランク : Japan only

IC601a~IC601d

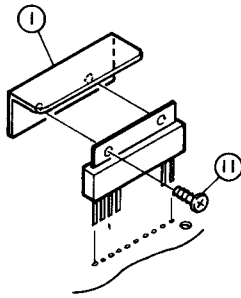


Fig. 1

D805, D806

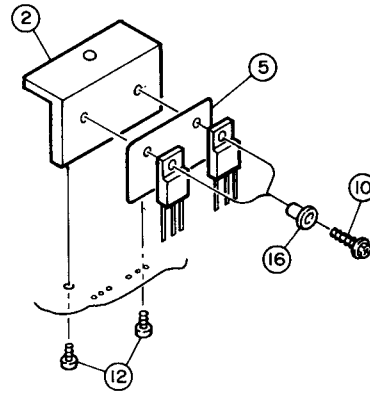


Fig. 4

TR602c-d TR603c-d

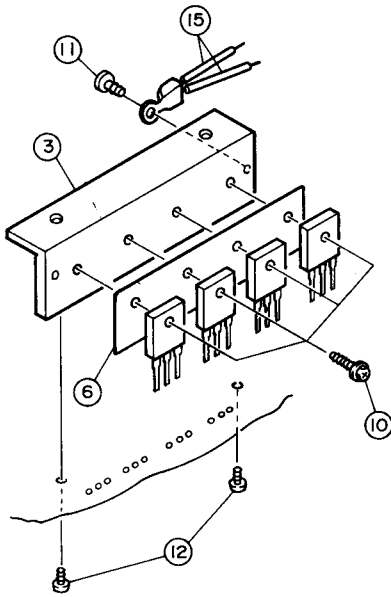


Fig. 2

TR809~TR814

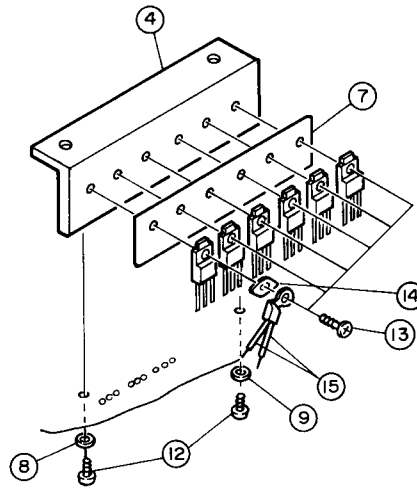


Fig. 5

TR602a-b TR603a-b

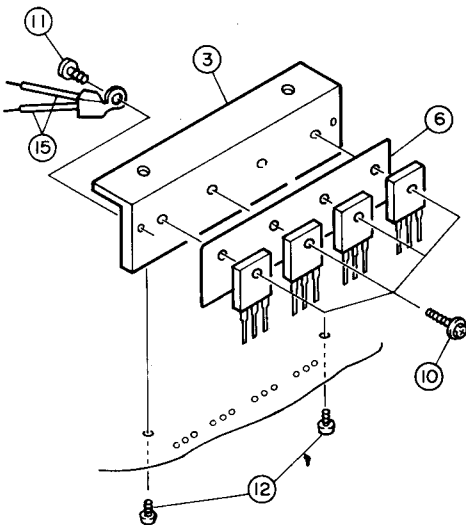
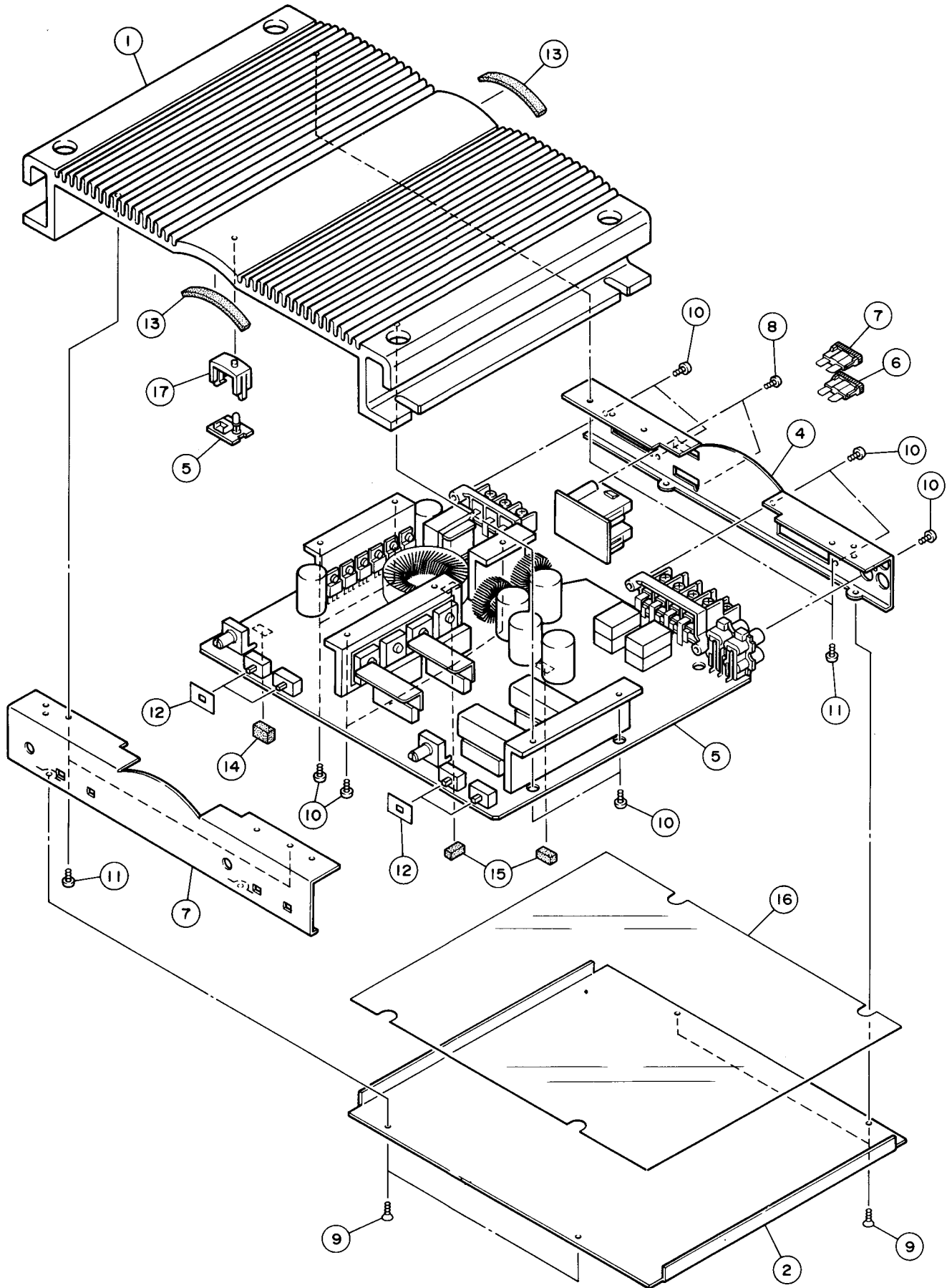


Fig. 3

1 ■ EXPLODED VIEW



MECHANICAL PARTS Note) Ø : Diameter

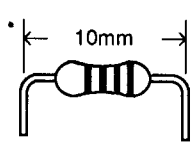
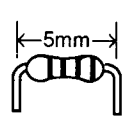
Ref. NO.	PART NO.	Description	部 品 名		Remarks		
1	AXG13150	MAIN CHASSIS			メインシャーシ	01385A01	
2	AXG12600	BOTTOM PLATE			ボトムプレート	05197002	
3	CXG18550	FRONT PANEL			フロントパネル	10385A01	
4	AXG14880	REAR PANEL			リアパネル	11385A01	
5	NXG09730	P.C.B. ASS'y, MAIN			メイン基板ASSY	96622120	
6	XXG85910	FUSE AUTO	3A		ヒューズ	38099001	△
7	XXG85920	FUSE AUTO	30A		ヒューズ	38099009	△
8	AXG14850	PAN HEAD P-TITE SCREW	2x8	FCRM3-BL	ナベPタイトネジ	40000309	
9	AXG14860	FLAT HEAD B-TITE SCREW	3x6	FCRM3-BL	皿Bタイトネジ	40000310	
10	E1330086	BIND HEAD B-TITE SCREW	3x8	FCRM3-BL	バインドBタイトネジ	40000337	
11	E1030066	BIND HEAD B-TITE SCREW	3x6	ZMC2-Y	バインドBタイトネジ	40630061	
12	KXG03390	MASK, SW			マスクSW	73417001	
13	CXG18440	CUSHION	4x65x2		クッション	74562001	
14	CXG18560	CUSHION	7x10x4		クッション	74571001	
15	CXG18450	CUSHION	5x10x4		クッション	74572001	
16	CXG18570	INSULATION			インシュレーター	75435001	
17	CXG18470	MOLD LED LENS			レンズ	84A00591	
	CB069250	BINDING TIE	BK-1		束線止め	84387001	
		ACCESSORIES			付属品		
	GXG06180	COIL, CHOKE	2B-70026		チョークコイル	35800048	△
	XXG85910	FUSE AUTO	3A		ヒューズ	38099001	△
	XXG85920	FUSE AUTO	30A		ヒューズ	38099009	△
	EXG01970	HEXAGON HEAD FRANGE SCREW	5x16	FCRM3-BL	六角フランジ付タップネジ	40000344	

*New Parts (新規部品)

ランク : Japan only

Parts List for Carbon Resistors

Value	1/4W Type Part No.	1/6W Type Part No.	Value	1/4W Type Part No.	1/6W Type Part No.
1.0 Ω	HJ35 3100	HF853100	12 KΩ	HJ35 7120	HF85 7120
1.8 Ω	HJ35 3180	*	15 KΩ	HJ35 7150	HF85 7150
2.2 Ω	HJ35 3220	HF853220	18 KΩ	HJ35 7180	HF85 7180
3.3 Ω	HJ35 3330	HF853330	22 KΩ	HJ35 7220	HF85 7220
4.7 Ω	HJ35 3470	HF853470	27 KΩ	HJ35 7270	HF85 7270
5.6 Ω	HJ35 3560	HF853560	33 KΩ	HJ35 7330	HF85 7330
10 Ω	HJ35 4100	HF854100	39 KΩ	HJ35 7390	HF85 7390
15 Ω	HJ35 4150	HF854150	47 KΩ	HJ35 7470	HF85 7470
22 Ω	HJ35 4220	HF854220	56 KΩ	HJ35 7560	HF85 7560
27 Ω	HJ35 4270	HF854270	68 KΩ	HJ35 7680	HF85 7680
33 Ω	HJ35 4330	HF854330	82 KΩ	HJ35 7820	HF85 7820
39 Ω	HJ35 4390	HF854390	91 KΩ	HJ35 7910	HF85 7910
47 Ω	HJ35 4470	HF854470	100 KΩ	HJ35 8100	HF85 8100
56 Ω	HJ35 4560	HF854560	120 KΩ	HJ35 8120	HF85 8120
68 Ω	HJ35 4680	HF854680	150 KΩ	HJ35 8150	HF85 8150
82 Ω	HJ35 4820	HF854820	180 KΩ	HJ35 8180	HF85 8180
100 Ω	HJ35 5100	HF855100	220 KΩ	HJ35 8220	HF85 8220
110 Ω	HJ35 5110	HF855110	270 KΩ	HJ35 8270	HF85 8270
120 Ω	HJ35 5120	HF855120	330 KΩ	HJ35 8330	HF85 8330
150 Ω	HJ35 5150	HF855150	390 KΩ	HJ35 8390	HF85 8390
160 Ω	HJ35 5160	*	470 KΩ	HJ35 8470	HF85 8470
180 Ω	HJ35 5180	HF855180	560 KΩ	HJ35 8560	HF85 8560
220 Ω	HJ35 5220	HF855220	680 KΩ	HJ35 8680	HF85 8680
270 Ω	HJ35 5270	HF855270	820 KΩ	HJ35 8820	HF85 8820
330 Ω	HJ35 5330	HF855330	1.0 MΩ	HJ35 9100	HF85 9100
390 Ω	HJ35 5390	HF855390	1.2 MΩ	HJ35 9120	*
470 Ω	HJ35 5470	HF855470	1.5 MΩ	HJ35 9150	HF85 9150
510 Ω	*	HF855510	1.8 MΩ	HJ35 9180	HF85 9180
560 Ω	HJ35 5560	HF855560	2.2 MΩ	HJ35 9220	HF85 9220
680 Ω	HJ35 5680	HF855680	3.3 MΩ	HJ35 9330	HF85 9330
820 Ω	HJ35 5820	HF855820	3.9 MΩ	HJ35 9390	*
910 Ω	HJ35 5910	HF855910	4.7 MΩ	HJ35 9470	HF85 9470
1.0 KΩ	HJ35 6100	HF85 6100			
1.2 KΩ	HJ35 6120	HF85 6120			
1.5 KΩ	HJ35 6150	HF85 6150			
1.8 KΩ	HJ35 6180	HF85 6180			
2.0 KΩ	HJ35 6200	HF85 6200			
2.2 KΩ	HJ35 6220	HF85 6220			
2.4 KΩ	HJ35 6240	HF85 6240			
2.7 KΩ	HJ35 6270	HF85 6270			
3.0 KΩ	HJ35 6300	HF85 6300			
3.3 KΩ	HJ35 6330	HF85 6330			
3.6 KΩ	HJ35 6360	HF85 6360			
3.9 KΩ	HJ35 6390	HF85 6390			
4.7 KΩ	HJ35 6470	HF85 6470			
5.1 KΩ	HJ35 6510	HF85 6510			
5.6 KΩ	HJ35 6560	HF85 6560			
6.8 KΩ	HJ35 6680	HF85 6680			
8.2 KΩ	HJ35 6820	HF85 6820			
9.1 KΩ	HJ35 6910	HF85 6910			
10 KΩ	HJ35 7100	HF85 7100			

<p>1/4W Type</p> <p>HJ35 ○○○○</p> 	<p>1/6W Type</p> <p>HF85 ○○○○</p> 
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