

GUITAR AMPLIFIER

F-20

SERVICE MANUAL



■ CONTENTS

SPECIFICATIONS	3
PANEL LAYOUT	3
CIRCUIT BOARD LAYOUT	4
BLOCK DIAGRAM	4
DISASSEMBLY PROCEDURE	5
CIRCUIT BOARDS	7
IC BLOCK DIAGRAM	8
INSPECTIONS	8
PARTS LIST	
OVERALL CIRCUIT DIAGRAM	

This document is printed on chlorine free (ECF) paper with soy ink.

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 all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: This presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principal-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 changes in specification 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 parts replacement. Recheck all work before you apply power to the unit.

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 WHAT SO EVER!

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.

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

WARNING: THIS APPARATUS MUST BE EARTHED

IMPORTANT: The wires in this main lead are coloured in accordance with the following code:
 GREEN-AND-YELLOW: EARTH
 BLUE: NEUTRAL
 BROWN: LIVE

As the colours of the wires in the main lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:


The GREEN-and-YELLOW wire must be connected to the terminal in the plug that is marked with the letter E or the safety earth symbol (or coloured GREEN or GREEN-and-YELLOW).

The BLUE wire must be connected to the terminal that is marked with the letter N (or coloured BLACK).

The BROWN wire must be connected to the terminal that is marked with the letter L (or coloured RED).

This applies only to products distributed by Yamaha Kemble Music (U. K.) Ltd.

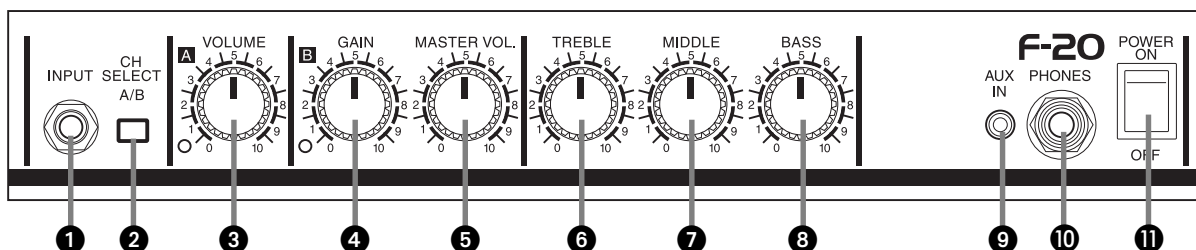
■ WARNING

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

■ SPECIFICATIONS

Rated Output Power:	20W
Speaker:	20cm x 1
Controls:	VOLUME, GAIN, MASTER VOL., TREBLE, MIDDLE, BASS, CH SELECT switch (A/B)
Input/Output Terminals:	INPUT, AUX IN, PHONES
Output Impedance:	100Ω (PHONES)
Power Consumption:	30W/100V (J) 25W/120V (UL,CSA) 25W/230V (E,BS)
Power Requirements:	U.S. and Canadian models: 120V, 60Hz General model: 230V, 50Hz
Dimensions (W x H x D):	357 x 330 x 197mm (14.1" x 13" x 7.8")
Weight:	6.5kg (14 lbs 5 oz)

■ PANEL LAYOUT



① INPUT

② CH SELECT A/B (Channel Select Switch A/B)

A Channel

③ VOLUME

** No sound is produced when the VOLUME knob is set to "0".*

B Channel

④ GAIN

⑤ MASTER VOL.

** No sound is produced when the MASTER VOL. knob is set to "0".*

Tone Controls

⑥ TREBLE

⑦ MIDDLE

⑧ BASS

⑨ AUX IN

** Use the volume control on the audio device to control its volume level.*

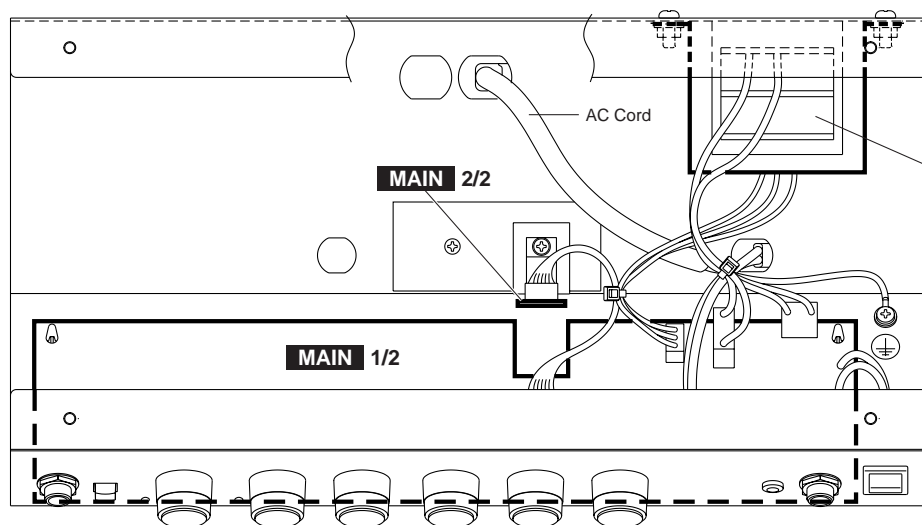
⑩ PHONES

** The speaker produces no sound when a pair of headphones is connected to this jack.*

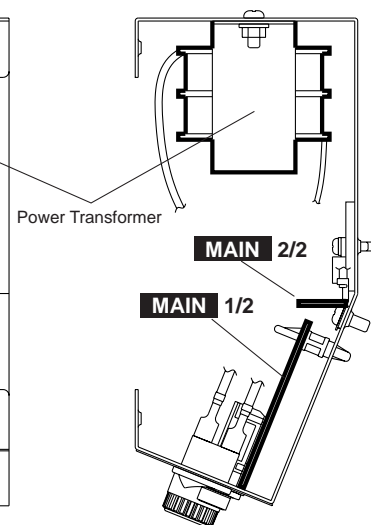
⑪ POWER

CIRCUIT BOARD LAYOUT

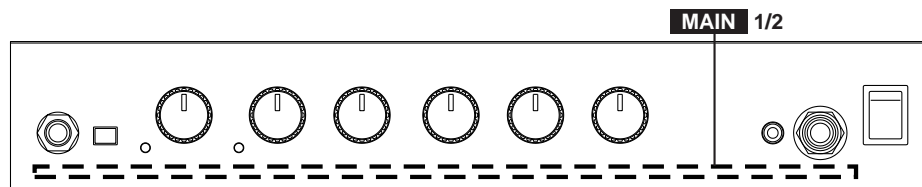
Top View



Side View

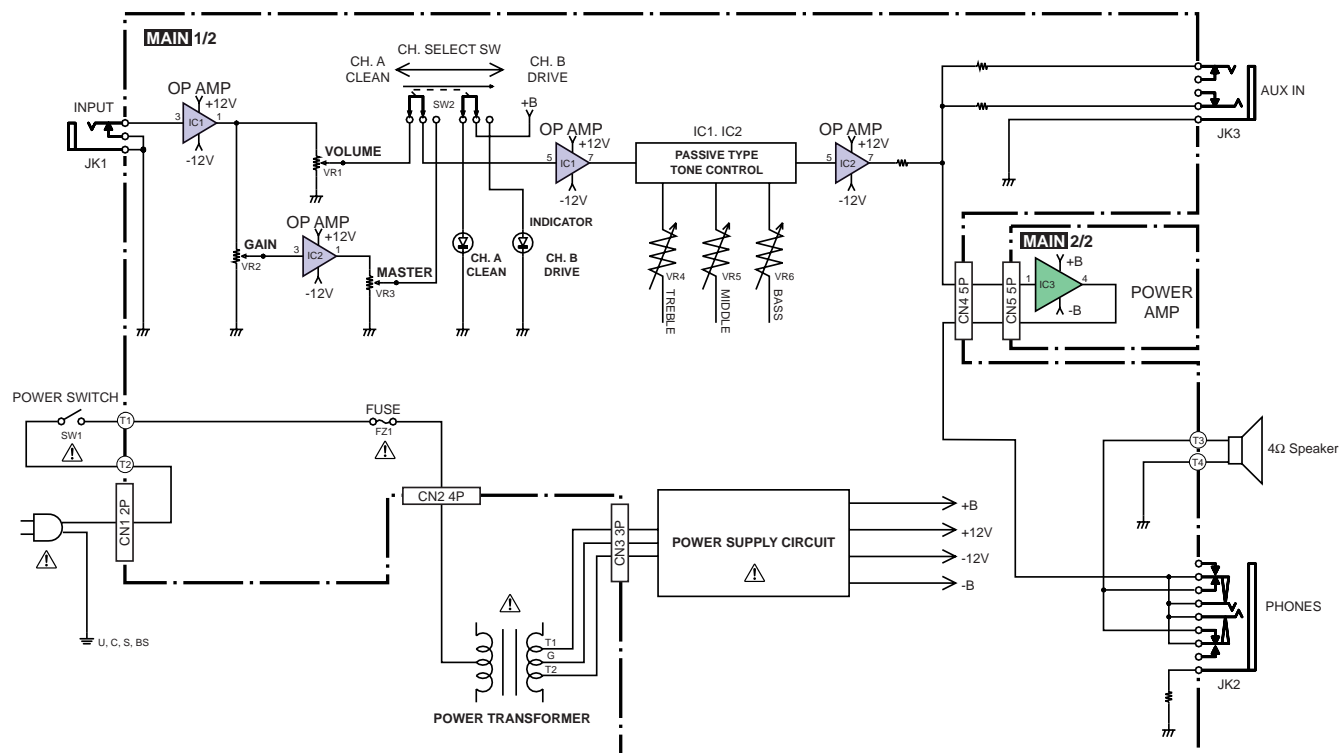


Front View



V695450

BLOCK DIAGRAM



DISASSEMBLY PROCEDURE

1. Pre-Main Unit (Time required: about 1 min)

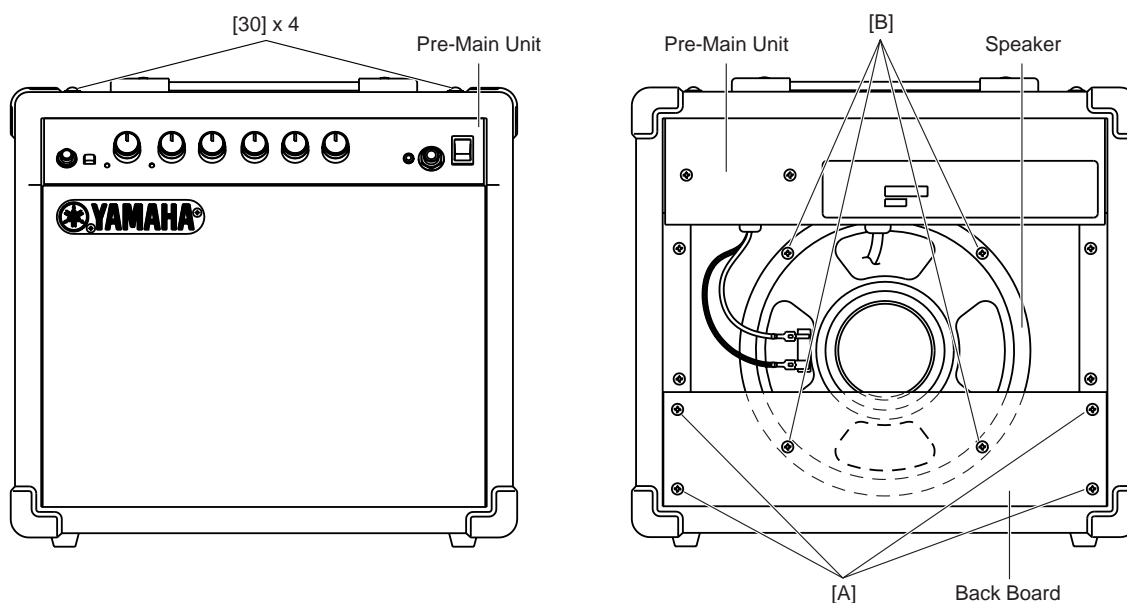
- 1-1 Remove the speaker wires.
- 1-2 Remove the four (4) screws marked [30]. The pre-main unit can then be removed by sliding it backward. (Fig.1)

2. Speaker (Time required: about 1 min)

- 2-1 Remove the four (4) screws marked [A]. The back board can then be removed. (Fig.1)
- 2-2 Remove the four (4) screws marked [B]. The speaker can then be removed. (Fig.1)

3. MAIN 1/2 Circuit Board (Time required: about 3 min)

- 3-1 Remove the pre-main unit. (See procedure 1)
- 3-2 Remove the six (6) knobs marked [P100] and the six (6) hexagonal nuts marked [C]. (Fig.5)
- 3-3 Remove the hexagonal nuts marked [A120] and the hexagonal nuts marked [A140]. (Fig.5)
- 3-4 Push the hooks of the spacer support (at the arrow symbol area of illustration) with a needle-nose plier to unlock. The Main 1/2 circuit board can then be removed. (Fig.2)

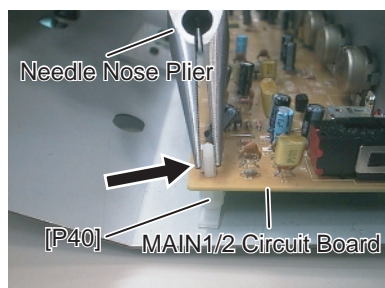


[30]: Truss Head Screw 4.0X25 MFZN2BL (VN347600)

[A]: Bind Head Tapping Screw 4.0X25 FCRM3-BL (EI340256)

[B]: Bind Head Screw 4.0X20 ZMC2BL (VB403600)

(Fig. 1)



(Fig. 2)

4. MAIN 2/2 Circuit Board (Time required: about 3 min)

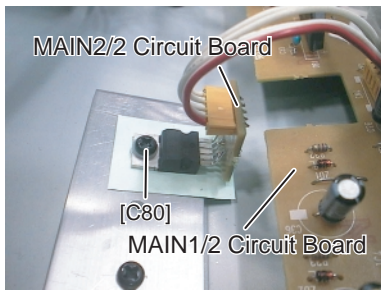
4-1 Remove the pre-main unit. (See procedure 1)

4-2 Remove the screw marked [C80]. The MAIN 2/2 circuit board can then be removed. (Fig.5)

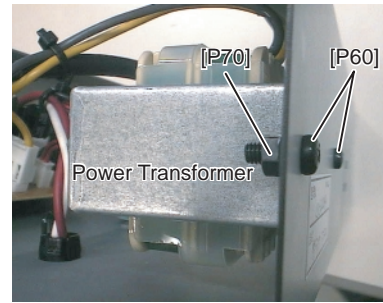
5. Power Transformer (Time required: about 4 min)

5-1 Remove the pre-main unit. (See procedure 1)

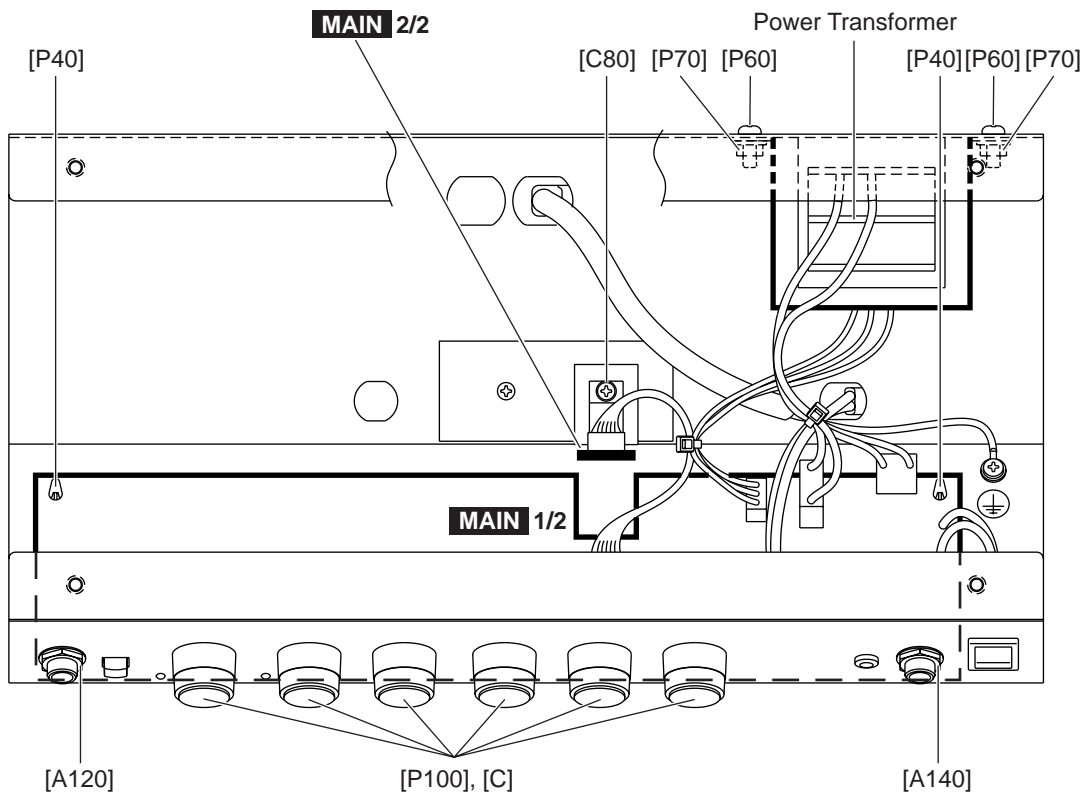
5-2 While pushing down the nut marked [P70] with a spanner, remove the two (2) screws marked [P60]. The power transformer can then be removed. (Fig.4)



(Fig. 3)



(Fig. 4)



[A120]: Hexagonal Nut 9.0 12X2 MFNI33 (LX200060)

[A140]: Hexagonal Nut 12.0 14X2 MFNI33 (ES200210)

[C80]: Bind Head Tapping Screw-1 3.0X16 MFZN2BL (EP030310)

[P70]: Hexagonal Nut #1 4.0 MFZN2Y (VB837300)

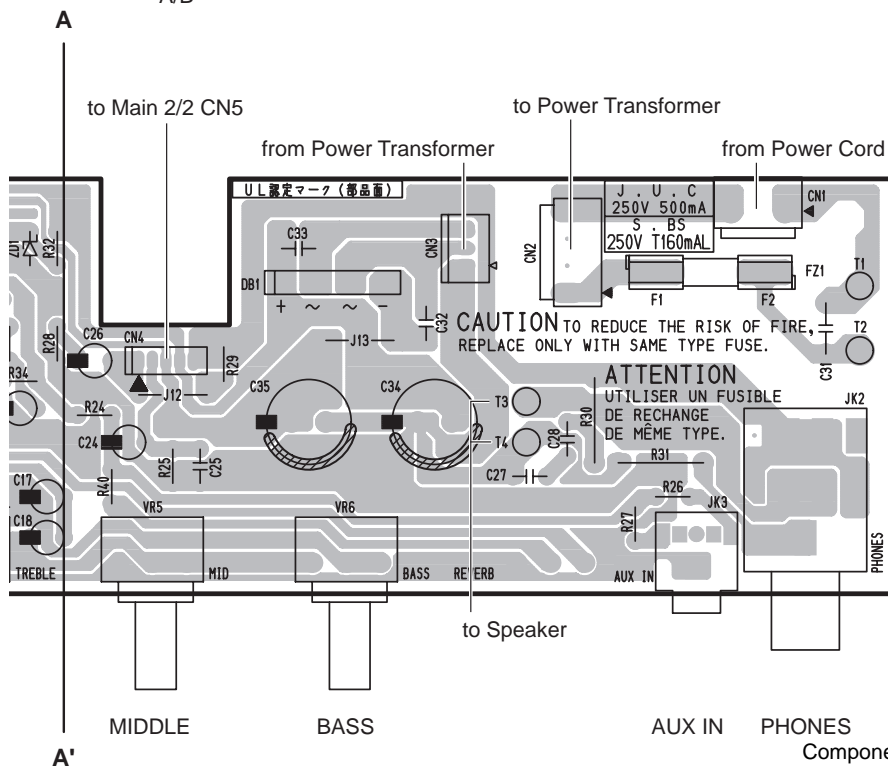
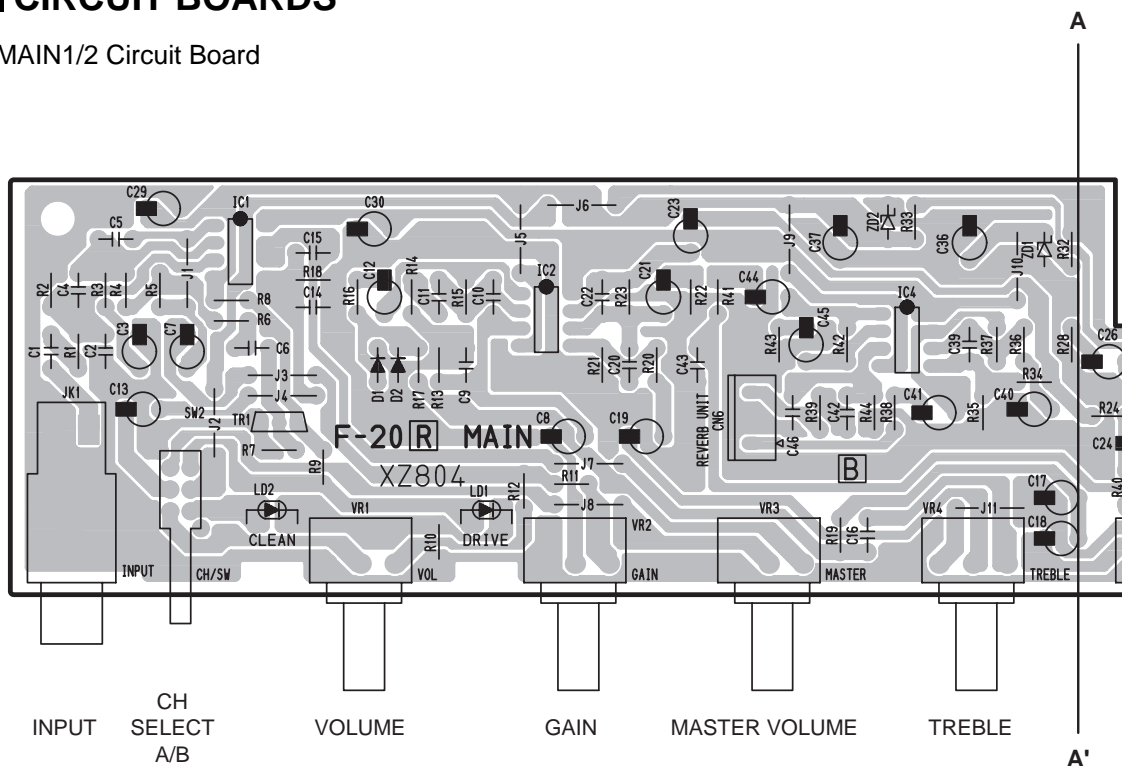
[P60]: Pan Head Screw 4.0X10 MFZN2BL (V7018000)

[P100]: Knob (V6955100)

(Fig. 5)

■ CIRCUIT BOARDS

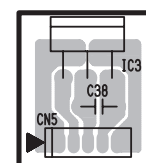
● MAIN1/2 Circuit Board



VERSION	FUSE RATE	INDICATION
J, U	250V 500mA	J . U . C 250V 500mA Must be erased
E, BS	250V T160mAL	Must be erased S . BS 250V T160mAL

● MAIN 2/2 Circuit Board

MAIN 1/2 (J, U): CNA-V733720 △
 MAIN 1/2 (H, B): CNA-V733730
 MAIN 2/2 (J, U): CNA-V733720
 MAIN 2/2 (H, B): CNA-V733730



to MAIN 1/2 CN4

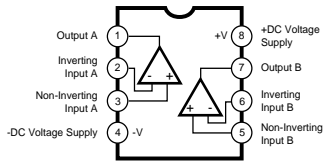
Component Side

■ IC BLOCK DIAGRAM

● BA4558 (XO078A00)

Dual Operational Amplifier

MAIN: IC2, IC3



■ INSPECTIONS

1. Preparation

To inspect the main unit, the following jigs are required.

CD player

Headphones

Before turning the power on, set all the knobs on the panel to "0".

Raise the CH SELECT switch to select channel A.

2. Power supply

Connect the power cord to the suitable power supply socket for each version.

(UC - 120V, E&BS - 220V)

3. Inspection procedure

- 3-1 Input the audio signal of CD player to the AUX-IN jack.
- 3-2 Make sure that the sound becomes gradually larger (or smaller) according as you turn the VOLUME knob to the right (or left).
- 3-3 Make sure that the high frequency is gradually emphasized (or eliminated) as you turn the TREBLE knob to the right (or left).
- 3-4 Make sure that the middle frequency is gradually emphasized (or eliminated) as you turn the MIDDLE knob to the right (or left).
- 3-5 Make sure that the low frequency is gradually emphasized (or eliminated) as you turn the BASS knob to the right (or left).
- 3-6 Make sure that the sound becomes larger when you depress the CH SELECT switch to select channel B.
Besides, make sure that the sound becomes gradually distorted according as you turn the GAIN knob to the right.
- 3-7 Make sure that the sound becomes gradually larger (or smaller) according as you turn the MASTER VOLUME knob to the right (or left).
- 3-8 Raise the CH SELECT switch to select channel A and make sure that the audio signal sounds over the speaker.
- 3-9 Connect headphones to the PHONES jack. Make sure that the speaker does not produce any sound and audio signal sounds over the headphones.
- 3-10 Set all the knobs on the panel to "0" and finish the inspection.

GUITAR AMPLIFIER


F-20

PARTS LIST

■ CONTENTS

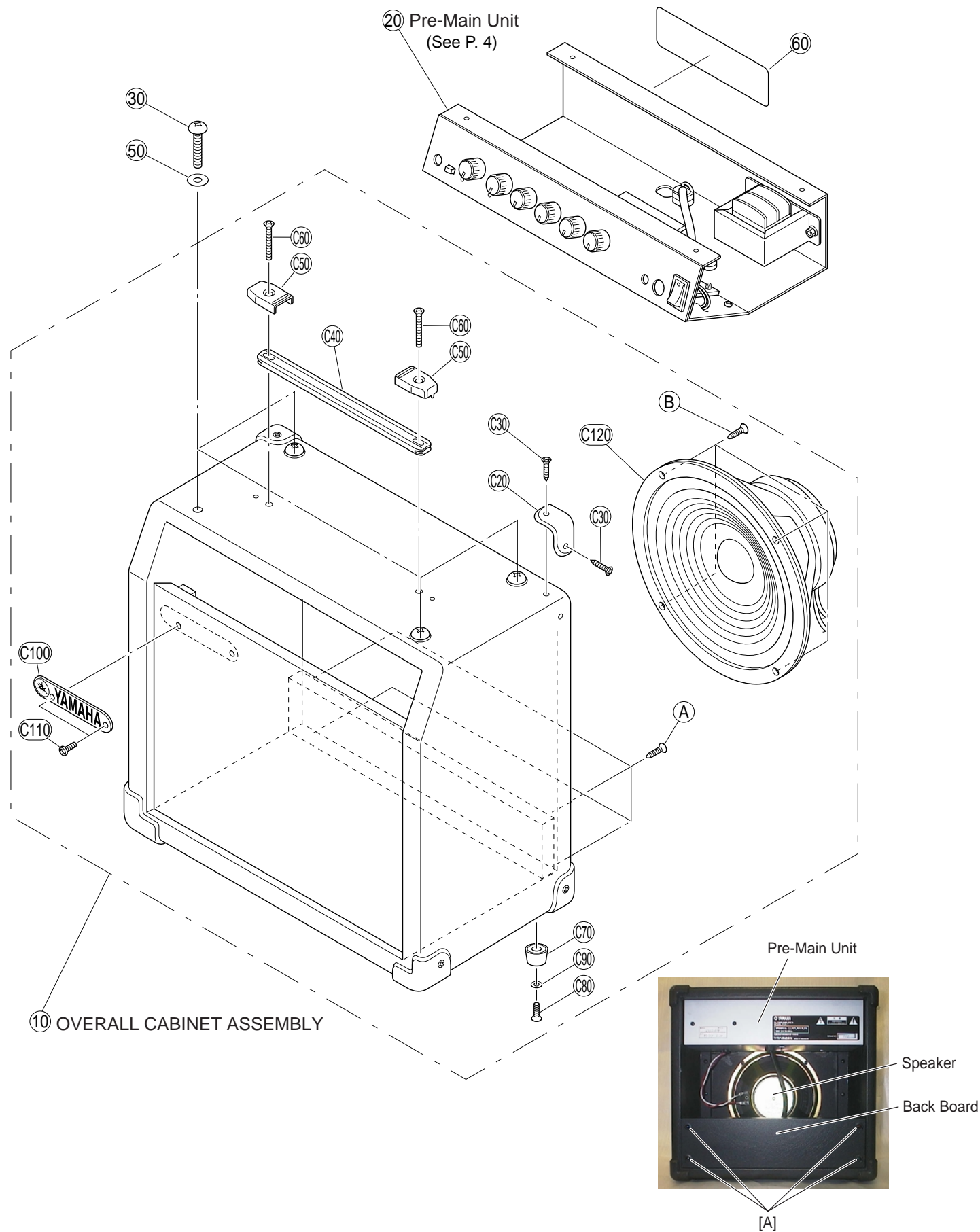
OVERALL ASSEMBLY	2
PRE-MAIN UNIT	4
ELECTRICAL PARTS	6

■ WARNING

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

- The numbers in “QTY” shows quantities for each unit.
- The parts with “--” in “Part No.” are not available as spare parts.
- The second letter of the shaded () part number is I, not one.
- The second letter of the shaded () part number is O, not zero.

OVERALL ASSEMBLY

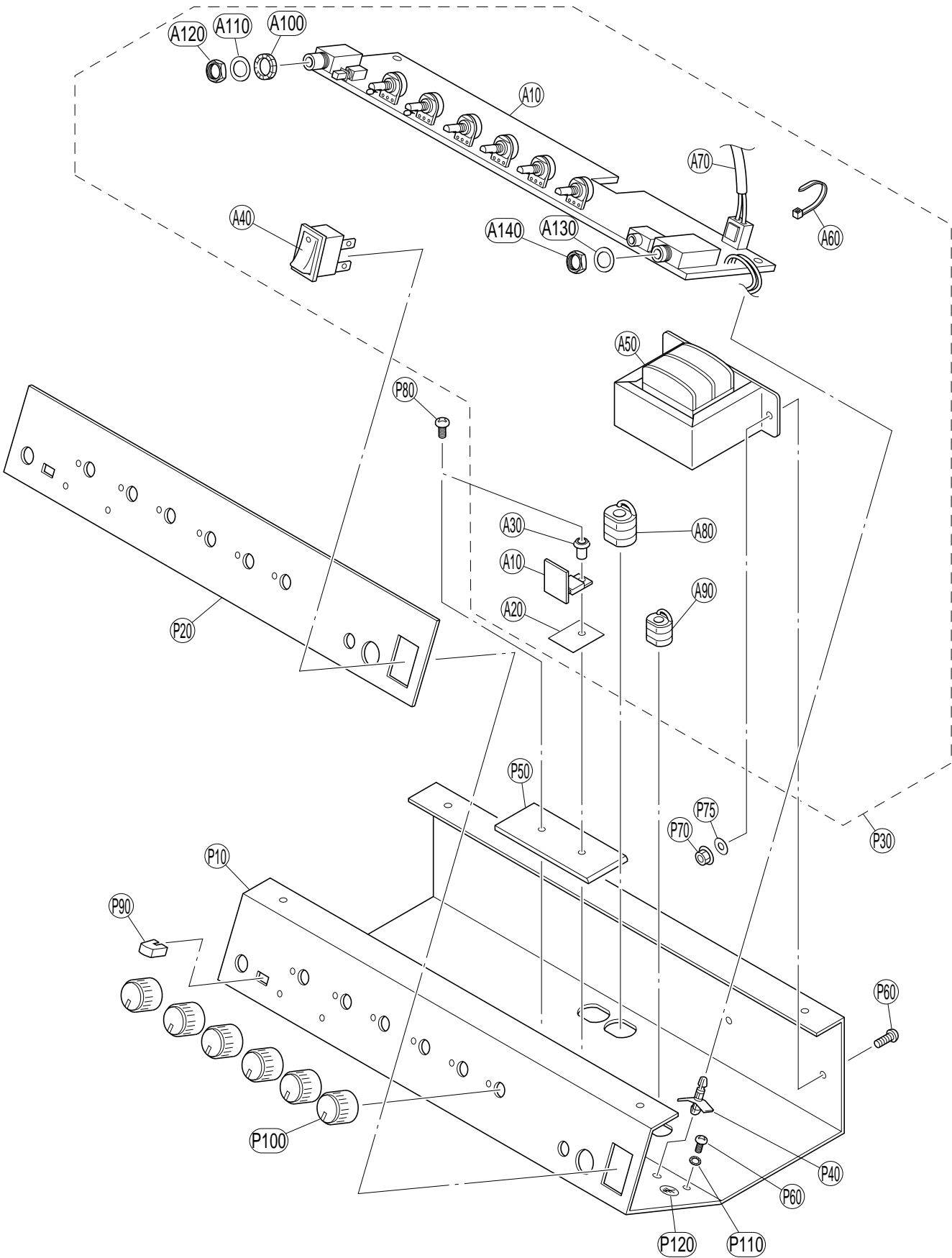


REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	--	OVERALL ASSEMBLY		F20		
	--	Overall Assembly		(V695390)		
	--	Overall Assembly		(V736090)		
	--	Overall Assembly		(V736100)		
	--	Overall Assembly		(V736110)		
* 10	V6954600	Overall Assembly				
20	--	Pre-Main unit		J (V695450)		
20	--	Pre-Main unit		U (V736130)		
20	--	Pre-Main unit		H (V736140)		
20	--	Pre-Main unit		B (V736150)		
30	VN347600	Truss Head Screw	4.0X25 MFZN2BL		4	01
50	ET500040	Flat Washer			4	01
60	--	Label		J (V695470)		
60	--	Label		U (V736160)		
60	--	Label		H,B (V736170)		
		OVERALL CABINET ASSEMBLY		F20		
* C10	V6954600	Overall Cabinet Assembly				
	--	Cabinet Assembly		(V695500)		
* C20	V5969000	Corner Protector	GA-10		6	
C30	21770200	Oval Head Screw	3.0X12 MFZN2BL		12	01
C40	V6327200	Handle	KPBO KAH1D-205			
* C50	V6327300	Handle Holder	KPBO KAH3D400-A		2	
* C60	V8480700	Oval Head Screw	4.0X30 MFZN2BL		2	
* C70	V6327400	Foot	KPBO KRRU19		4	
C80	EP030310	Bind Head Tapping Screw-1	3.0X16 MFZN2BL		4	01
C90	03765580	Flat Washer	3.0X8X0.5 MFZN2BL		4	01
* C100	V7363300	Name Plate	F-20			
C110	VN729100	Bind Head Tapping Screw-1	3.0X10 MFZN2BL		2	01
* C120	XO175A00	Speaker Unit	4ohm 30W			
A	EI340256	Bind Head Tapping Screw	4.0 X 25 FCRM3-BL		4	01
B	VB403600	Bind Head Screw	4.0 X 20 ZMC2BL		4	01

*New parts

RANK: Japan only

■ PRE-MAIN UNIT



REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	--	PRE-MAIN UNIT		F20		
	--	Pre-Main unit		J (V695450)		
	--	Pre-Main unit		U (V736130)		
	--	Pre-Main unit		H (V736140)		
	--	Pre-Main unit		B (V736150)		
* P10	V6954800	Chassis				
* P20	V6954900	Panel Sheet				
P30	--	Amp Kit		J (V733660)		
P30	--	Amp Kit		U (V733670)		
P30	--	Amp Kit		H (V733680)		
P30	--	Amp Kit		B (V733690)		
* P40	V7511400	Spacer Support	PINGOOD LCC-10		2	
* P50	V7017600	Heat Sink				
* P60	V7018000	Pan Head Screw	4.0X10 MFZN2BL		2	
* P70	VB837300	Hexagonal Nut	#1 4.0 MFZN2Y		2	
P75	VB501900	Spring Washer	4.0 MFZN2Y		2	
* P80	V7018100	Pan Head Screw	3.0X10 MFZN2BL		2	
* P90	V7554300	Button	GA-RED	CH SELECT A/B		
* P100	V6955100	Knob		VOL,GAIN,MASTER VOLUME	6	
				TREBLE,MID,BASS		
P110	ET900050	Toothed Lock Washer-B	4.0 MFZN2BL			01
P120	--	Earth Mark		(CA06069)		01
	--	Amp Kit		J (V733660)		
	--	Amp Kit		U (V733670)		
	--	Amp Kit		H (V733680)		
	--	Amp Kit		B (V733690)		
* A10	V7337200	Circuit Board		J,U		
* A10	V7337300	Circuit Board		H,B		
A20	VV849300	Insulation Sheet	BFG-20AD 19X24			01
* A30	V7356900	Sleeve	12SWS0220			
* A40	V7054700	Power SW	SDDJE1-A-2	POWER SW		
* A50	XZ805A00	Transformer		J		
* A50	XZ806A00	Transformer		U		
* A50	XZ807A00	Transformer		H,B		
A60	VV104600	Cord Holder	CV-100		2	01
* A70	V6286700	Cord	J VCTF	J		
* A70	V6286900	Cord	UC 3 SJT 18/3	U		
* A70	V6287000	Cord	E 3 HO5VV-F	H		
* A70	V6287100	Cord	UK 3 HO5VV-F	B		
* A80	V7356700	Cord Strain Relief	KR-61 KITAGAWA			
* A90	V7356800	Cord Strain Relief	KF-41 KITAGAWA			
A100	ET800150	Toothed Lock Washer-A	9.0 MFZN2Y			01
A110	VL802300	Flat Washer	9X14 0.5 FNM3			01
A120	LX200060	Hexagonal Nut	9.0 12X2 MFNI33			01
* A130	VB508700	Flat Washer	18X12.5 0.6 MFZN2			
A140	ES200210	Hexagonal Nut	12.0 14X2 MFNI33			01

*New parts

RANK: Japan only

ELECTRICAL PARTS

REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	V7337200	ELECTRICAL PARTS		F20		
	V7337300	Circuit Board		J,U (XZ804B0)		
	V7337300	Circuit Board		H,B (XZ804B0)		
	V7337200	Circuit Board		J,U (XZ804B0)		
	V7337300	Circuit Board		H,B (XZ804B0)		
	V6609900	Fuse Holder	WH-007			
	VV291400	Jumper Wire	0.60			01
C01	VV062800	Mylar Capacitor	0.1 50V J			01
C02	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C03	UR866100	Electrolytic Cap.	1.00 50.0V			01
C04	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C05	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C06	VV321100	Monolithic Mylar Capacitor	0.22 50V J			01
C07	UR847100	Electrolytic Cap.	10.00 25.0V			01
C08	UR847100	Electrolytic Cap.	10.00 25.0V			01
C09	UA654470	Mylar Capacitor	0.0470 50V J			01
C10	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C11	VV062800	Mylar Capacitor	0.1 50V J			01
C12	UR847100	Electrolytic Cap.	10.00 25.0V			01
C13	UR847100	Electrolytic Cap.	10.00 25.0V			01
C14	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C15	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C16	UA653270	Mylar Capacitor	2700P 50V J			01
C17	UR866100	Electrolytic Cap.	1.00 50.0V			01
C18	UR865470	Electrolytic Cap.	0.47 50.0V			01
C19	UR847100	Electrolytic Cap.	10.00 25.0V			01
C20	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C21	UR866100	Electrolytic Cap.	1.00 50.0V			01
C22	VZ353500	Ceramic Capacitor-SL	100P 50V J			01
C23	UR847100	Electrolytic Cap.	10.00 25.0V			01
C24	UR847100	Electrolytic Cap.	10.00 25.0V			01
C25	FG613100	Ceramic Capacitor-B	1000P 50V K			01
C26	UR837470	Electrolytic Cap.	47.00 16.0V			01
C27	VV062800	Mylar Capacitor	0.1 50V J			01
C28	VV062800	Mylar Capacitor	0.1 50V J			01
C29	UR847100	Electrolytic Cap.	10.00 25.0V			01
C30	UR847100	Electrolytic Cap.	10.00 25.0V			01
C31	V7355000	Capacitor	4700P 250V J.U.C.S			01
C32	VZ354600	Monolithic Ceramic Cap.	0.10 50V Z			01
C33	VZ354600	Monolithic Ceramic Cap.	0.10 50V Z			01
C34	UR749220	Electrolytic Cap.	2200 25.0V			03
C35	UR749220	Electrolytic Cap.	2200 25.0V			03
C36	UR847100	Electrolytic Cap.	10.00 25.0V			01
C37	UR847100	Electrolytic Cap.	10.00 25.0V			01
CN1	VG879900	Base Post Connector	VA- 2P TE			01
CN2	LB932040	Base Post Connector	VH- 4P TE			01
CN3	LB918030	Base Post Connector	XH 3P TE			01
D01	VD631600	Diode	1SS133,176,HSS104			01
D02	VD631600	Diode	1SS133,176,HSS104			01
DB1	VP344100	Diode Stack	D2SBA20 1.5A 200V			03
FZ1	V7630900	Fuse	500 mA JU			
FZ1	V7630800	Fuse	315 mA E			
IC1	X0078A00	IC	BA4558	DIP OP AMP		
IC2	X0078A00	IC	BA4558	DIP OP AMP		
IC3	XZ311A00	IC	TDA2030A	HIFI AMP		
JK1	V3633400	Phone Jack	HTJ-064-12I	INPUT		01
JK2	V6176500	Phone Jack	HTJ-064-05B	PHONES		
JK3	V7447000	Phone Jack	ST HTJ-035-09ABT	AUX IN		
LD1	VV620800	LED	LT311G-41-C13 RED	DRIVE		01
LD2	VV620800	LED	LT311G-41-C13 RED	CLEAN		01
R01	HF456220	Carbon Resistor	2.2K 1/4 J			01
R02	HF459100	Carbon Resistor	1.0M 1/4 J			01
R03	HF457100	Carbon Resistor	10.0K 1/4 J			01
R04	HF457330	Carbon Resistor	33.0K 1/4 J			01
R05	HF457330	Carbon Resistor	33.0K 1/4 J			01
R06	HF456220	Carbon Resistor	2.2K 1/4 J			01
R07	HF459100	Carbon Resistor	1.0M 1/4 J			01
R08	HF458100	Carbon Resistor	100.0K 1/4 J			01
R09	HF457100	Carbon Resistor	10.0K 1/4 J			01

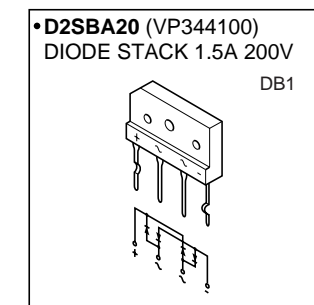
*New parts

RANK: Japan only

REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
R10	HF456330	Carbon Resistor	3.3K 1/4 J			01
R11	HF456100	Carbon Resistor	1.0K 1/4 J			01
R12	HF456100	Carbon Resistor	1.0K 1/4 J			01
R13	HF458100	Carbon Resistor	100.0K 1/4 J			01
R14	HF456100	Carbon Resistor	1.0K 1/4 J			01
R15	HF457330	Carbon Resistor	33.0K 1/4 J			01
R16	HF456220	Carbon Resistor	2.2K 1/4 J			01
R17	HF456100	Carbon Resistor	1.0K 1/4 J			01
R18	HF458100	Carbon Resistor	100.0K 1/4 J			01
R19	HF457100	Carbon Resistor	10.0K 1/4 J			01
R20	HF456100	Carbon Resistor	1.0K 1/4 J			01
R21	HF458220	Carbon Resistor	220.0K 1/4 J			01
R22	HF457100	Carbon Resistor	10.0K 1/4 J			01
R23	HF457470	Carbon Resistor	47.0K 1/4 J			01
R24	HF457100	Carbon Resistor	10.0K 1/4 J			01
R25	HF457470	Carbon Resistor	47.0K 1/4 J			01
-27	HF457470	Carbon Resistor	47.0K 1/4 J			01
R28	HF455470	Carbon Resistor	470.0 1/4 J			01
R29	HF457330	Carbon Resistor	33.0K 1/4 J			01
R30	VC740100	Metal Oxide Film Resistor	1.0 1W J			01
R31	VC745000	Metal Oxide Film Resistor	100.0 1W J			01
R32	HF455820	Carbon Resistor	820.0 1/4 J			01
R33	HF455820	Carbon Resistor	820.0 1/4 J			01
SW2	VR140800	Push Switch		CH SELECT A/B		03
TR1	IC174070	Transistor	2SC1740S R,S			01
* VR1	V7054800	Rotary Variable Resistor	16mm 10KA	VOL		
* VR2	V6607700	Rotary Variable Resistor	16mm 25KA	GAIN		
* VR3	V7054800	Rotary Variable Resistor	16mm 10KA	MASTER VOLUME		
* VR4	V6607700	Rotary Variable Resistor	16mm 25KA	TREBLE		
* VR5	V7054900	Rotary Variable Resistor	16mm 1KA	MID		
* VR6	V6607700	Rotary Variable Resistor	16mm 25KA	BASS		
ZD1	VG440200	Zener Diode	MTZ J 12.0B 12.0V			01
ZD2	VG440200	Zener Diode	MTZ J 12.0B 12.0V			01
CN45	--	Connector Assembly	B&B #26 5P L 100	(V735970)		
T1T2	--	Connector Assembly	#18 2P L 60	(V660880)		
T3T4	--	Connector Assembly	#18 2P L 300	(V744980)		
* XO175A00	Speaker Unit		4ohm 30W			
* V7054700	Power SW		SDDJE1-A-2	POWER SW		
* XZ805A00	Transformer			J		
* XZ806A00	Transformer			U		
* XZ807A00	Transformer			H,B		
* V6286700	Cord	J VCTF		J		
* V6286900	Cord	UC 3 SJT 18/3		U		
* V6287000	Cord	E 3 HO5VV-F		H		
* V6287100	Cord	UK 3 HO5VV-F		B		

*New parts

RANK: Japan only



■ WARNING
Components having special characteristics are made ⚠ and must be replaced with parts having specification equal to those originally installed.