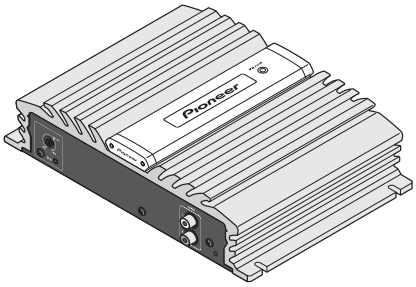
Service Manual

Pioneer

GM-232/X1H/UC



ORDER NO.
CRT2360

BRIDGEABLE POWER AMPLIFIER

GM-232

X1H/UC,EW,ES

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1. SAFETY INFORMATION

● **GM-232/X1H/UC**

CAUTION

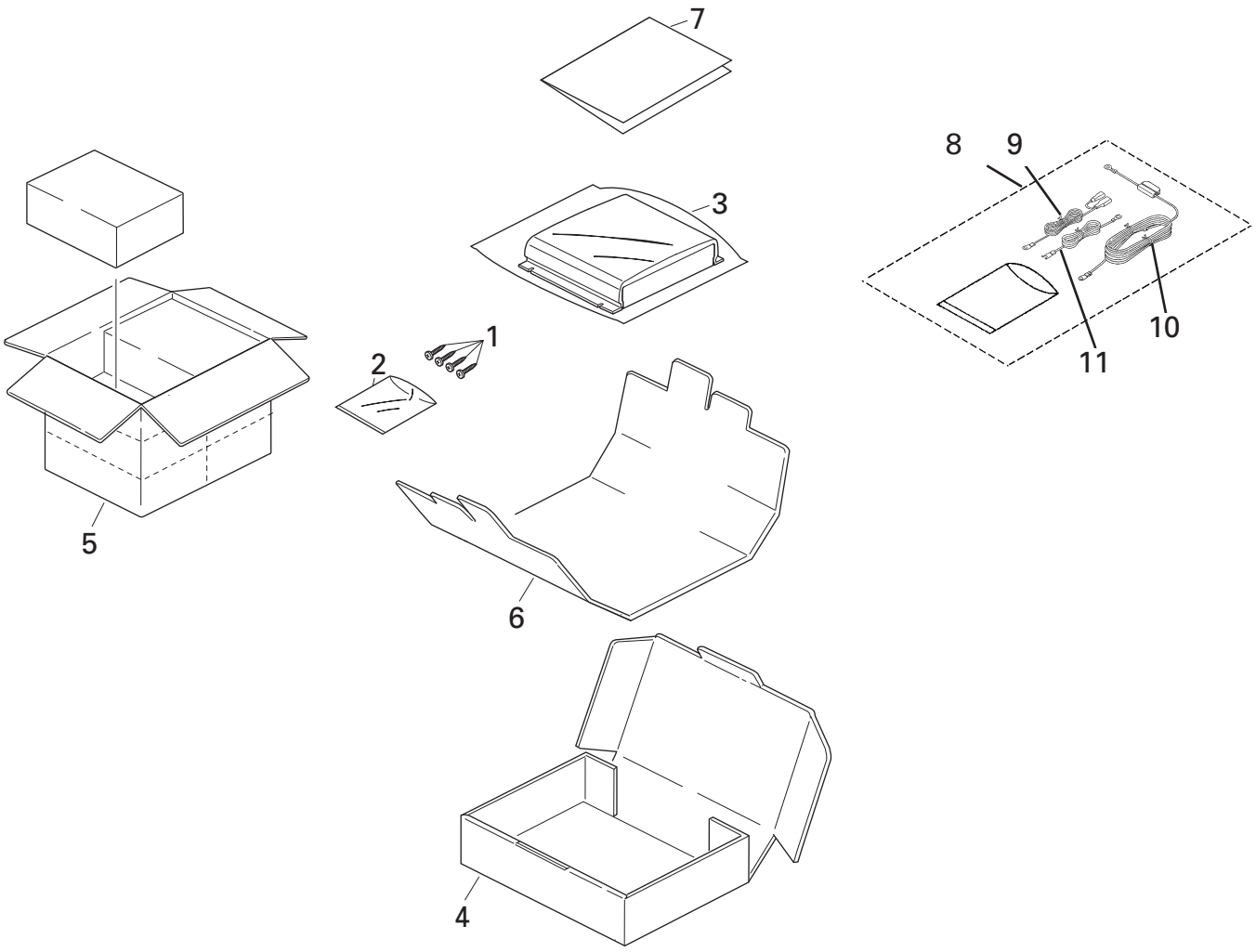
This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.
Health & Safety Code Section 25249.6 - Proposition 65

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



NOTE:

● Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.

● Screws adjacent to ∇ mark on the product are used for disassembly.

(1) PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BYC40P180FZK
	2	Polyethylene Bag	HEG0011
	3	Polyethylene Bag	HEG0010
	4	Carton	See Contrast table(2)
	5	Contain Box	See Contrast table(2)
	6	Protector	HHP0048
	7-1	Owner's Manual	See Contrast table(2)
	7-2	Owner's Manual	See Contrast table(2)
*	7-3	Warranty Card	See Contrast table(2)
*	7-4	Card	See Contrast table(2)
*	7-5	PRC	See Contrast table(2)
	8	Cord Assy	See Contrast table(2)
	9	Cord(Remote)	See Contrast table(2)
	10	Cord(Power)	See Contrast table(2)
	11	Cord(Ground)	See Contrast table(2)

(2) CONTRAST TABLE

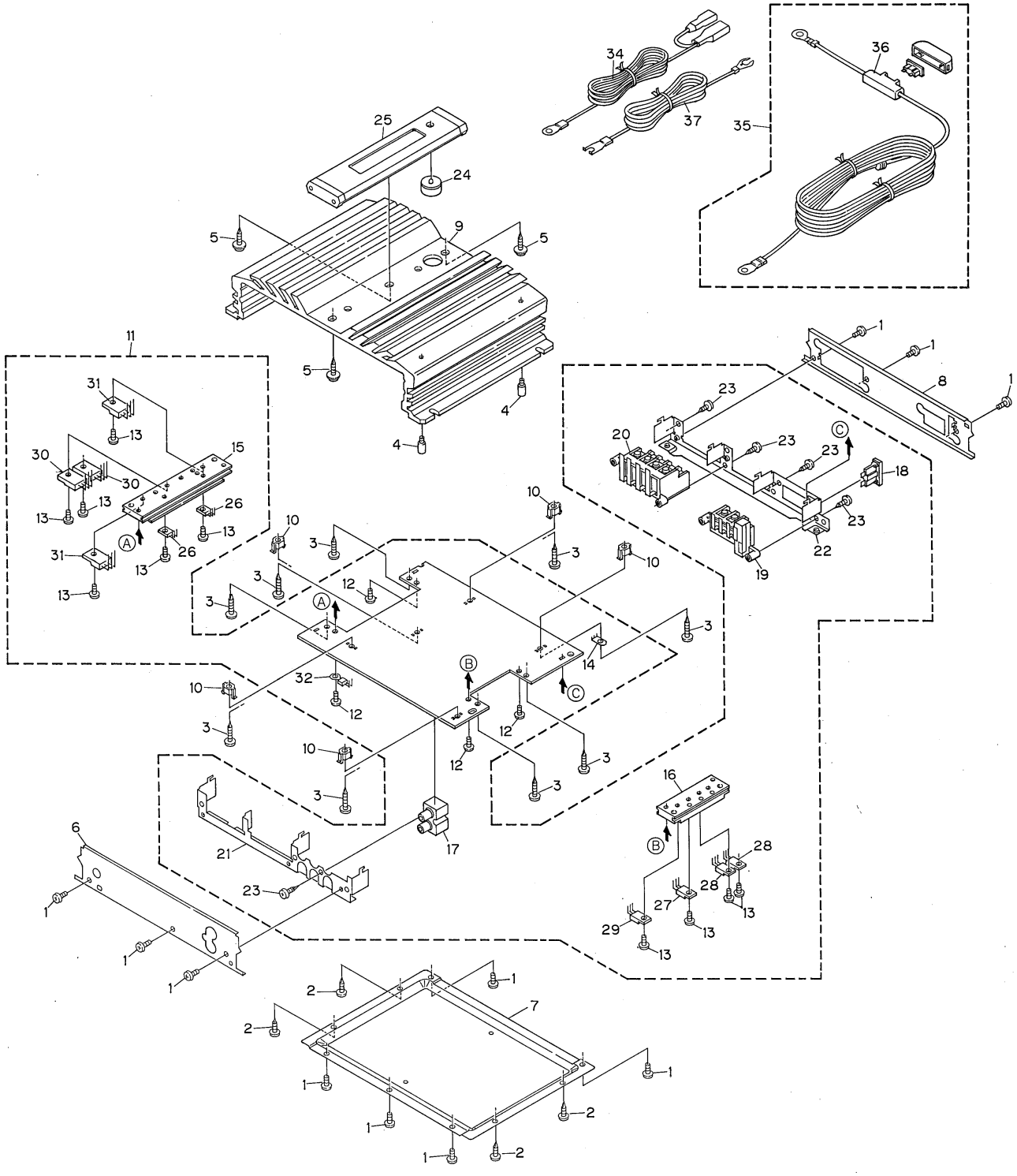
GM-232/X1H/UC, GM-232/X1H/EW and GM-232/X1H/ES are constructed the same except for the following:

			Part No.		
Mark	No.	Symbol and Description	GM-232/X1H/UC	GM-232/X1H/EW	GM-232/X1H/ES
	4	Carton	HHG0201	HHG0186	HHG0203
	5	Contain Box	HHL0201	HHL0186	HHL0203
	7-1	Owner's Manual	HRD0080	HRD0082	HRD0083
	7-2	Owner's Manual	Not used	Not used	HRD0084
*	7-3	Warranty Card	Not used	HRY1087	Not used
*	7-4	Card	ARY1048	Not used	Not used
*	7-5	PRC	HRY0007	Not used	Not used
	8	Cord Assy	Not used	HDW0004	HDW0004
	9	Cord(Remote)	Not used	HDE0007	HDE0007
	10	Cord(Power)	Not used	HDE4423	HDE4423
	11	Cord(Ground)	Not used	HDE4455	HDE4455

● **Owner's Manual**

Model	Part No.	Language
GM-232/X1H/UC	HRD0080	English, French
GM-232/X1H/EW	HRD0082	English, Spanish, German, French, Italian, Dutch
GM-232/X1H/ES	HRD0083	English, Spanish
	HRD0084	Portuguese(B), Arabic

2.2 EXTERIOR


11
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17
6
7
2

(1) EXTERIOR SECTION PARTS LIST

Mark No.	Description	Part No.
1	Screw	BSZ30P050FZK
2	Screw(M3×6)	CBA1320
3	Screw(M3×12)	CBA1323
4	Screw(M3×5)	HBA0006
5	Screw(M2.6×8)	HBA1462
6	Panel	HNB2407
7	Lower Case	HNB2417
8	Panel	See Contrast table(2)
9	Heat Sink	HNR1515
10	Spacer	HNV3975
11	Amp Unit	See Contrast table(2)
12	Screw	BMS30P060FZK
13	Screw	BMS30P080FMC
14	Terminal(CN902)	CKF1059
15	Sub Heat Sink	HNR1523
16	Sub Heat Sink	HNR1524
17	Pin Jack(CN801)	CKB1011
18	Fuse(20A)	HEK0020
19	Terminal(CN901)	HKE0001
20	Terminal(CN151)	See Contrast table(2)
21	Holder	HNC8118
22	Holder	See Contrast table(2)
23	Screw	PPZ30P060FZK
24	Light Pipe Unit	HXB3450
25	Plate Unit	HXB3554
26	Transistor(Q154, 254)	2SD2343
27	Diode(D956)	FML22S
28	FET(Q956, 957)	IRFIZ44N
29	Diode(D957)	FML22R
30	Transistor(Q156, 256)	2SB1587
31	Transistor(Q155, 255)	2SD2438
32	Thermistor(TH951)	CCX1013
33	•••••	
34	Cord	See Contrast table(2)
35	Cord	See Contrast table(2)
36	Fuse(30A)	See Contrast table(2)
37	Cord	See Contrast table(2)

(2) CONTRAST TABLE

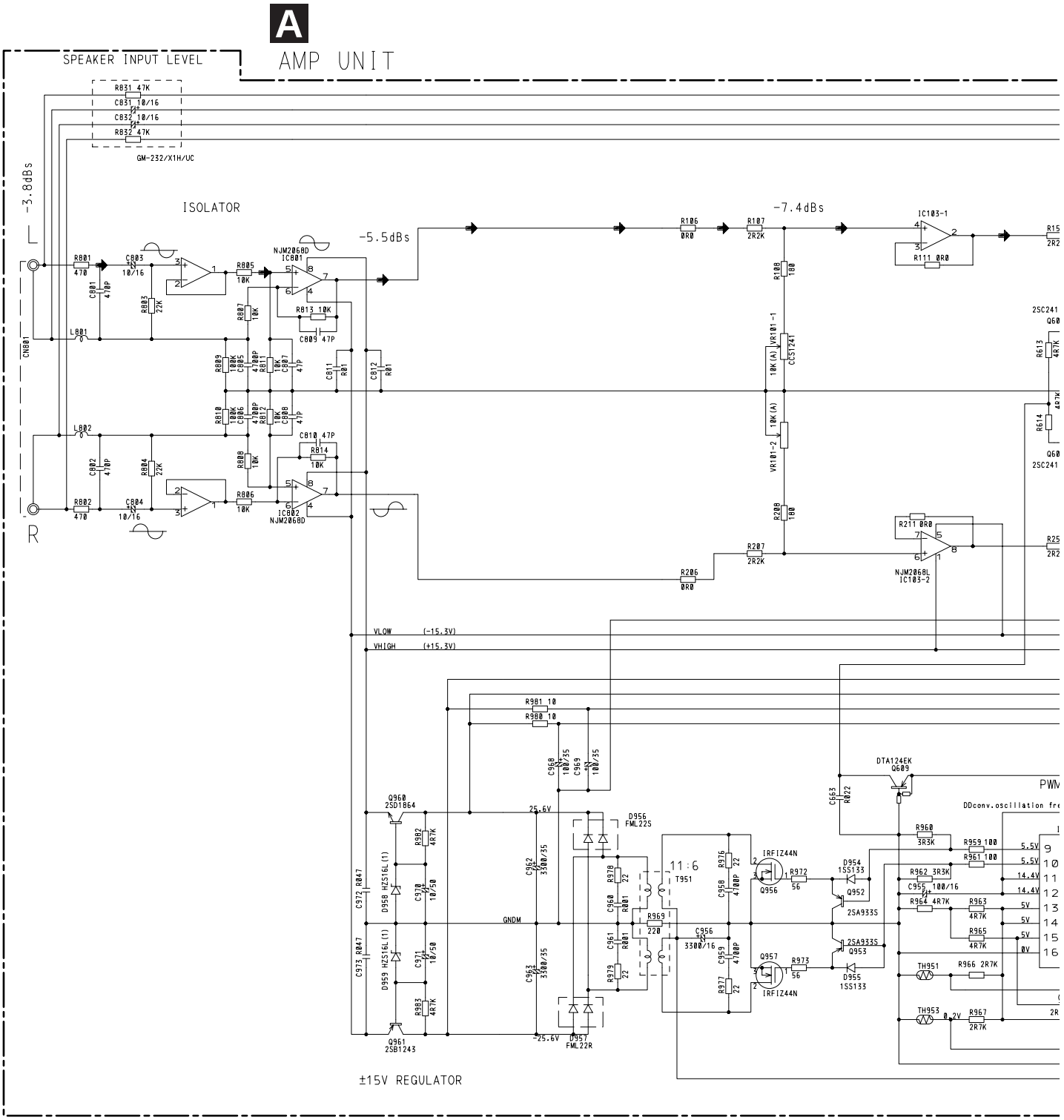
GM-232/X1H/UC, GM-232/X1H/EW and GM-232/X1H/ES are constructed the same except for the following:

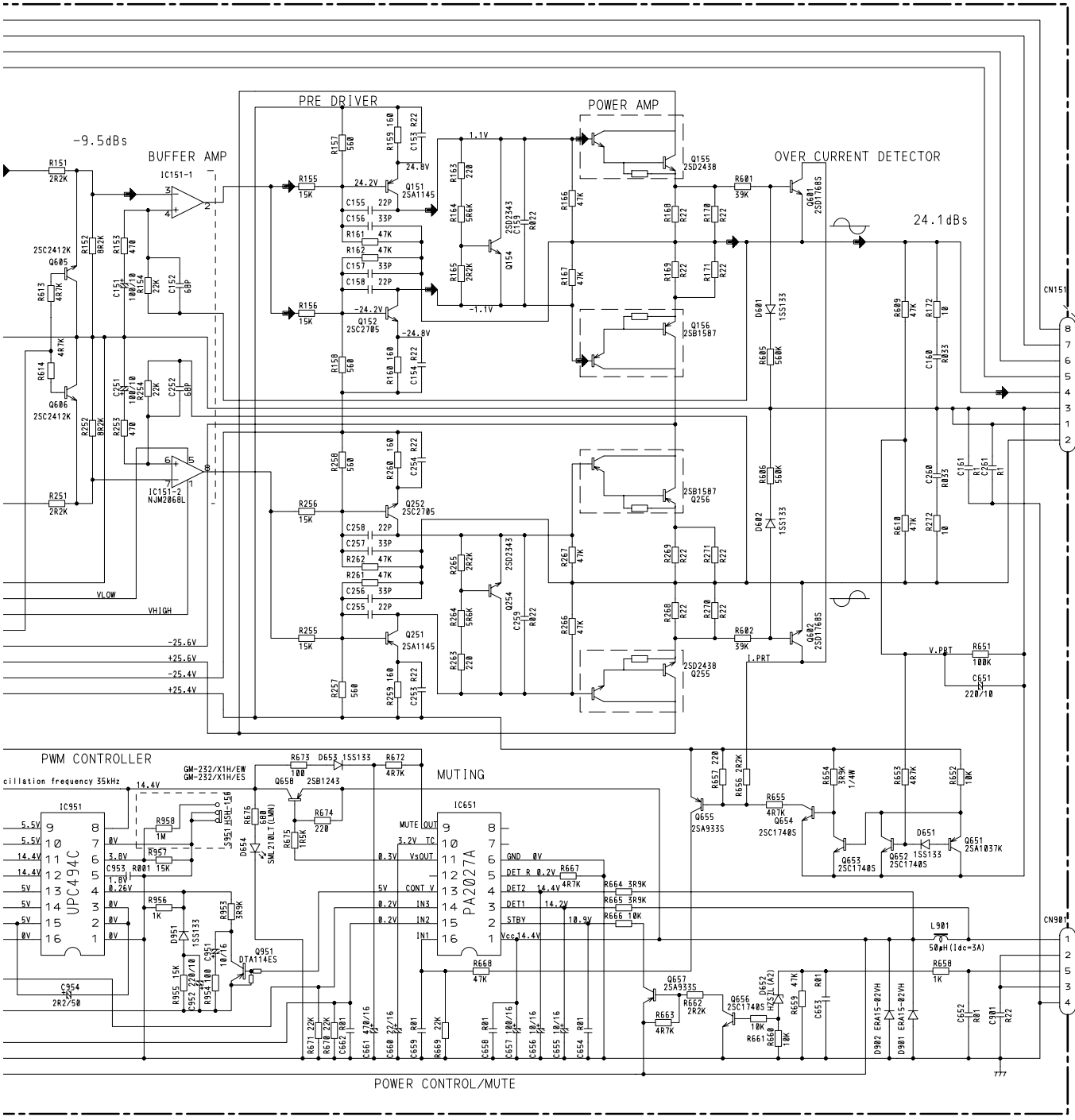
Mark No.	Symbol and Description	Part No.		
		GM-232/X1H/UC	GM-232/X1H/EW	GM-232/X1H/ES
8	Panel	HNB2498	HNB2412	HNB2412
11	Amp Unit	HWH0109	HWH0088	HWH0108
20	Terminal(CN151)	HKE0024	HKE0009	HKE0009
22	Holder	HNC8119	HNC8120	HNC8120
34	Cord	Not used	HDE0007	HDE0007
35	Cord	Not used	HDE4423	HDE4423
36	Fuse(30A)	Not used	HEK0030	HEK0030
37	Cord	Not used	HDE4455	HDE4455

3. SCHEMATIC DIAGRAM

3.1 OVERALL CONNECTION DIAGRAM

Note: When ordering service parts, be sure to refer to “EXPLODED VIEWS AND PARTS LIST” or “ELECTRICAL PARTS LIST”.





between chip resistors and

between chip capacitors and

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

4. PCB CONNECTION DIAGRAM

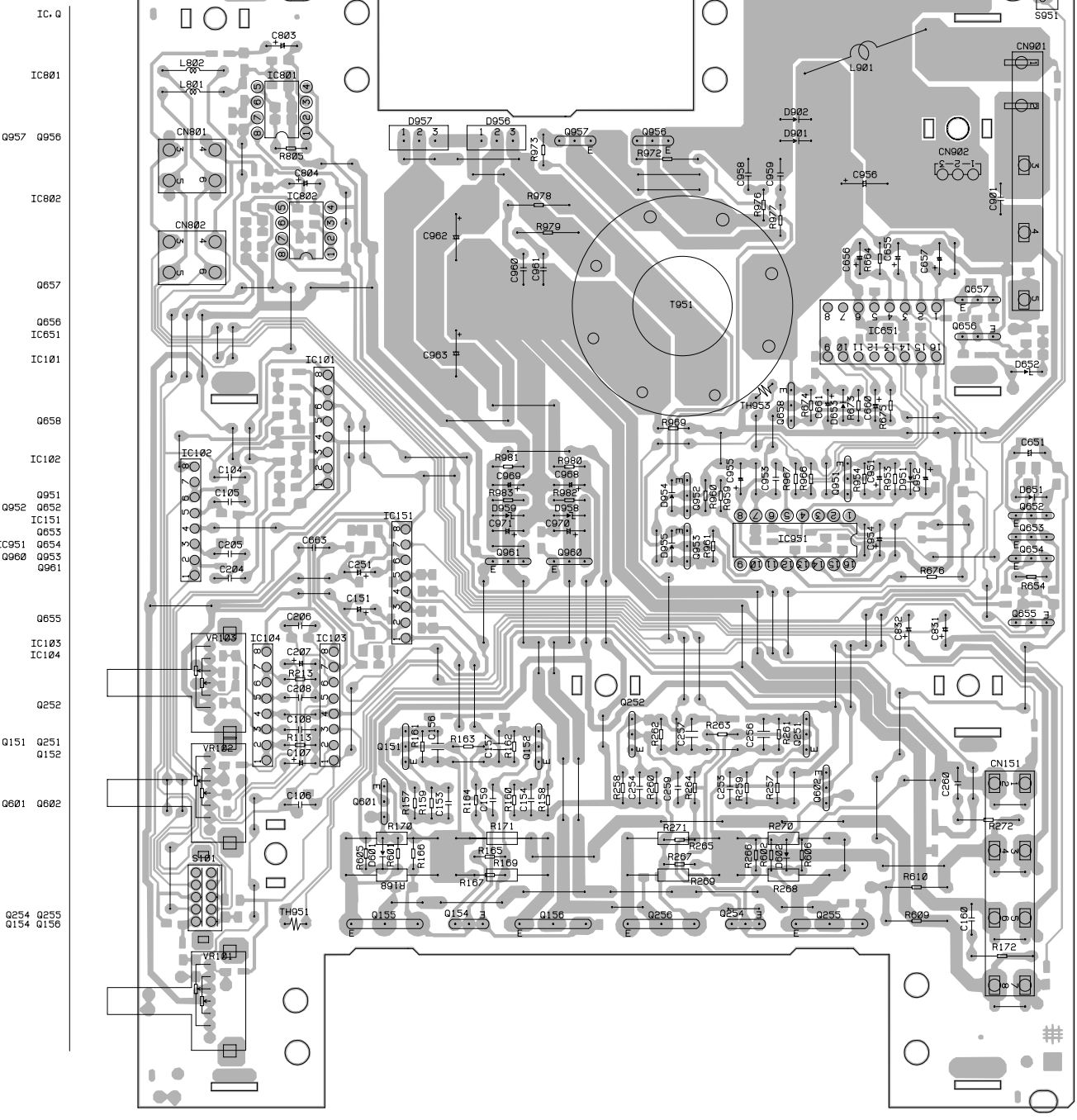
4.1 AMP UNIT

NOTE FOR PCB DIAGRAMS

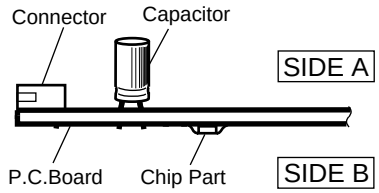
1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.

A AMP UNIT

SIDE A

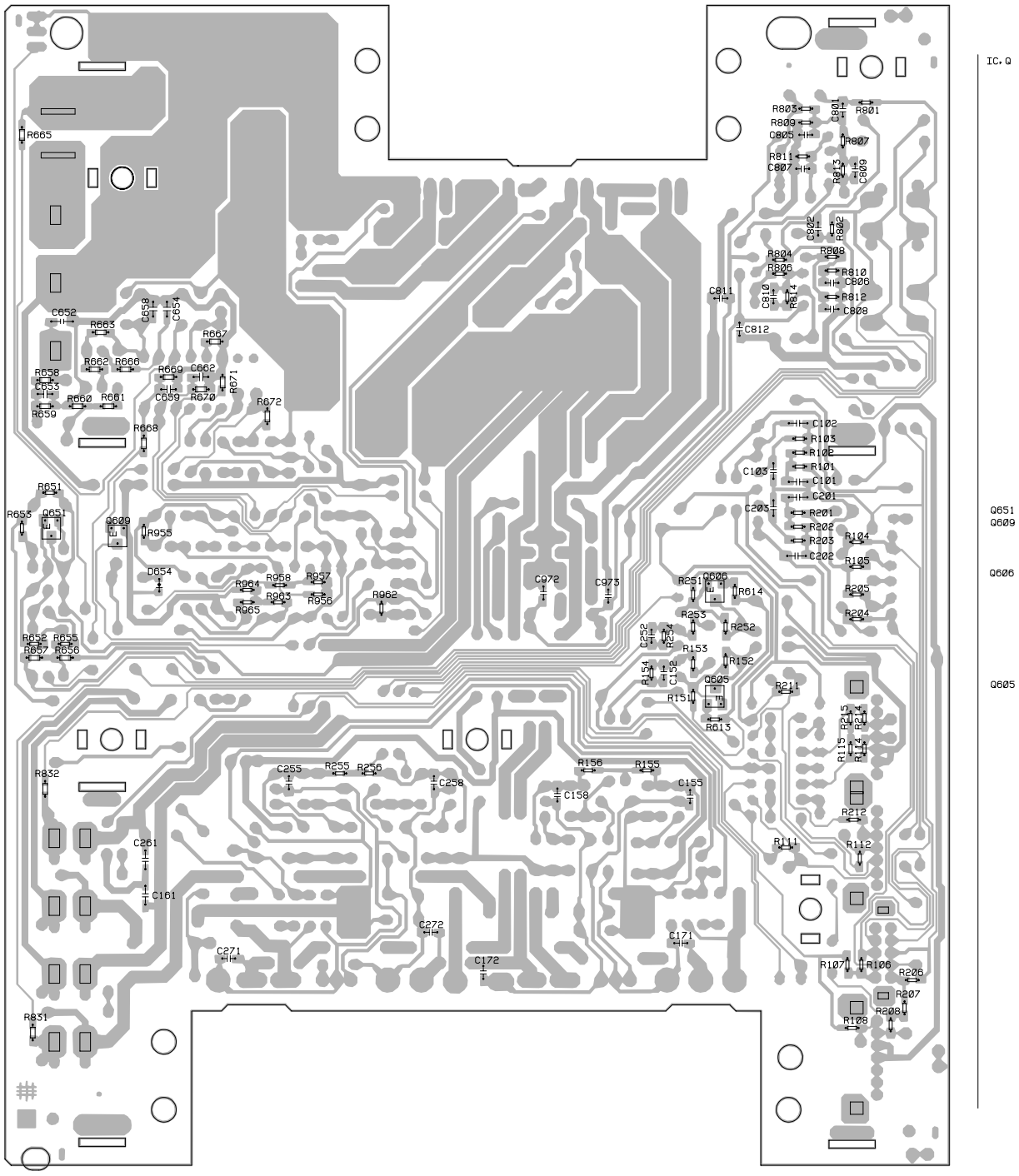


2. Viewpoint of PCB diagrams



A AMP UNIT

SIDE B



5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

=====Circuit Symbol and No.		===Part Name	Part No.
A	Unit Number	: HWH0109(GM-232/X1H/UC)	
	Unit Number	: HWH0088(GM-232/X1H/EW)	
	Unit Number	: HWH0108(GM-232/X1H/ES)	
	Unit Name	: Amp Unit	
	MISCELLANEOUS		
IC	103	IC	NJM2068L
IC	151	IC	NJM2068L
IC	651	IC	PA2027A
IC	801	IC	NJM2068D
IC	802	IC	NJM2068D
IC	951	IC	UPC494C
Q	151	Transistor	2SA1145
Q	152	Transistor	2SC2705
Q	154	Transistor	2SD2343
Q	155	Transistor	2SD2438
Q	156	Transistor	2SB1587
Q	251	Transistor	2SA1145
Q	252	Transistor	2SC2705
Q	254	Transistor	2SD2343
Q	255	Transistor	2SD2438
Q	256	Transistor	2SB1587
Q	601	Transistor	2SD1768S
Q	602	Transistor	2SD1768S
Q	605	Transistor	2SC2412K
Q	606	Transistor	2SC2412K
Q	609	Transistor	DTA124EK
Q	651	Transistor	2SA1037K
Q	652	Transistor	2SC1740S
Q	653	Transistor	2SC1740S
Q	654	Transistor	2SC1740S
Q	655	Transistor	2SA933S
Q	656	Transistor	2SC1740S
Q	657	Transistor	2SA933S
Q	658	Transistor	2SB1243
Q	951	Transistor	DTA114ES
Q	952	Transistor	2SA933S
Q	953	Transistor	2SA933S
Q	956	FET	IRFIZ44N
Q	957	FET	IRFIZ44N
Q	960	Transistor	2SD1864
Q	961	Transistor	2SB1243
D	601	Diode	1SS133
D	602	Diode	1SS133
D	651	Diode	1SS133
D	652	Diode	HZS7L(A2)
D	653	Diode	1SS133
D	654	LED	SML210LT(LMN)
D	901	Diode	ERA15-02VH
D	902	Diode	ERA15-02VH
D	951	Diode	1SS133

=====Circuit Symbol and No.		===Part Name	Part No.
D	954	Diode	1SS133
D	955	Diode	1SS133
D	956	Diode	FML22S
D	957	Diode	FML22R
D	958	Diode	HZS16L(1)
D	959	Diode	HZS16L(1)
L	801	Ferri-Inductor	CTF1007
L	802	Ferri-Inductor	CTF1007
L	901	Choke Coil 50μH(Idc=3A)	CTH1218
T	951	Transformer	CTT1091
TH	951	Thermistor	CCX1013
TH	953	Thermistor	CCX1035
S	951	Switch(BFC)	See Contrast table
VR	101	Volume 10kΩ(A)	CCS1241
		Fuse 20A	HEK0020
	RESISTORS		
R	106		RS1/10S0R0J
R	107		RS1/10S222J
R	108		RS1/10S181J
R	111		RS1/10S0R0J
R	151		RS1/10S222J
R	152		RS1/10S822J
R	153		RS1/10S471J
R	154		RS1/10S223J
R	155		RS1/10S153J
R	156		RS1/10S153J
R	157		RD1/4PU561J
R	158		RD1/4PU561J
R	159		RD1/4PU161J
R	160		RD1/4PU161J
R	161		RD1/4PU473J
R	162		RD1/4PU473J
R	163		RD1/4PU221J
R	164		RD1/4PU562J
R	165		RD1/4PU222J
R	166		RD1/4PU473J
R	167		RD1/4PU473J
R	168	0.22Ω	CCN1013
R	169	0.22Ω	CCN1013
R	170	0.22Ω	CCN1013
R	171	0.22Ω	CCN1013
R	172		RD1/2PM100J
R	206		RS1/10S0R0J
R	207		RS1/10S222J
R	208		RS1/10S181J
R	211		RS1/10S0R0J
R	251		RS1/10S222J
R	252		RS1/10S822J
R	253		RS1/10S471J
R	254		RS1/10S223J
R	255		RS1/10S153J

Circuit Symbol and No.		Part Name	Part No.
R	256		RS1/10S153J
R	257		RD1/4PU561J
R	258		RD1/4PU561J
R	259		RD1/4PU161J
R	260		RD1/4PU161J
R	261		RD1/4PU473J
R	262		RD1/4PU473J
R	263		RD1/4PU221J
R	264		RD1/4PU562J
R	265		RD1/4PU222J
R	266		RD1/4PU473J
R	267		RD1/4PU473J
R	268	0.22Ω	CCN1013
R	269	0.22Ω	CCN1013
R	270	0.22Ω	CCN1013
R	271	0.22Ω	CCN1013
R	272		RD1/2PM100J
R	601		RD1/4PU393J
R	602		RD1/4PU393J
R	605		RD1/4PU564J
R	606		RD1/4PU564J
R	609		RD1/2PM473J
R	610		RD1/2PM473J
R	613		RS1/10S472J
R	614		RS1/10S472J
R	651		RS1/10S104J
R	652		RS1/10S103J
R	653		RS1/10S472J
R	654		RD1/4PU392J
R	655		RS1/10S472J
R	656		RS1/10S222J
R	657		RS1/10S221J
R	658		RS1/10S102J
R	659		RS1/10S473J
R	660		RS1/10S103J
R	661		RS1/10S103J
R	662		RS1/10S222J
R	663		RS1/10S472J
R	664		RD1/4PU392J
R	665		RS1/10S392J
R	666		RS1/10S103J
R	667		RS1/10S472J
R	668		RS1/10S473J
R	669		RS1/10S223J
R	670		RS1/10S223J
R	671		RS1/10S223J
R	672		RS1/10S472J
R	673		RD1/4PU101J
R	674		RD1/4PU221J
R	675		RD1/4PU152J
R	676		RD1/2PM681J
R	801		RS1/10S471J
R	802		RS1/10S471J
R	803		RS1/10S223J
R	804		RS1/10S223J
R	805		RN1/4PC1002D
R	806	(RN1/10SE1002D)	GGC1320
R	807	(RN1/10SE1002D)	GGC1320
R	808	(RN1/10SE1002D)	GGC1320
R	809		RS1/10S104J
R	810		RS1/10S104J
R	811	(RN1/10SE1002D)	GGC1320
R	812	(RN1/10SE1002D)	GGC1320
R	813	(RN1/10SE1002D)	GGC1320
R	814	(RN1/10SE1002D)	GGC1320
R	831		See Contrast table
R	832		See Contrast table
R	953		RD1/4PU392J
R	954		RD1/4PU101J
R	955		RS1/10S153J
R	956		RS1/10S102J
R	957		RS1/10S153J
R	958		See Contrast table
R	959		RD1/4PU101J
R	960		RD1/4PU332J
R	961		RD1/4PU101J
R	962		RS1/10S332J
R	963		RS1/10S472J
R	964		RS1/10S472J
R	965		RS1/10S472J
R	966		RD1/4PU272J
R	967		RD1/4PU272J
R	969		RD1/4PU221J
R	972		RD1/2PM560J
R	973		RD1/4PU560J
R	976		RD1/4PU220J
R	977		RD1/4PU220J
R	978		RD1/2PM220J
R	979		RD1/2PM220J
R	980		RD1/4PU100J
R	981		RD1/4PU100J
R	982		RD1/4PU472J
R	983		RD1/4PU472J
CAPACITORS			
C	151		CEAS101M10
C	152		CCSQSL680J50
C	153		CFTLA224J50
C	154		CFTLA224J50
C	155		CCSQCH220J50
C	156		CCPUSL330J50
C	157		CCPUSL330J50
C	158		CCSQCH220J50
C	159		CFTLA223J50
C	160		CFTLA333J50
C	161		CKSYB104K50
C	251		CEAS101M10
C	252		CCSQSL680J50
C	253		CFTLA224J50
C	254		CFTLA224J50
C	255		CCSQCH220J50
C	256		CCPUSL330J50
C	257		CCPUSL330J50
C	258		CCSQCH220J50
C	259		CFTLA223J50
C	260		CFTLA333J50
C	261		CKSYB104K50
C	651	220µF/10V	CCH1036
C	652		CKSYB103K50
C	653		CKSQYB103K50
C	654		CKSQYB103K50
C	655		CEAS100M16
C	656		CEAS100M16
C	657		CEAS101M16
C	658		CKSQYB103K50
C	659		CKSQYB103K50
C	660		CEAS220M16
C	661	470µF/16V	CCH1183
C	662		CKSQYB103K50
C	663		CQMA223J50

=====Circuit Symbol and No.	===Part Name	Part No.
C 801		CKSQYB471K50
C 802		CKSQYB471K50
C 803		CEAS100M16
C 804		CEAS100M16
C 805		CKSQYB472K50
C 806		CKSQYB472K50
C 807		CCSQCH470J50
C 808		CCSQCH470J50
C 809		CCSQCH470J50
C 810		CCSQCH470J50
C 811		CKSQYB103K50
C 812		CKSQYB103K50
C 831		See Contrast table
C 832		See Contrast table
C 901		CFTLA224J50
C 951		CEAS100M16
C 952		CEAS221M10
C 953		CQMA102J50
C 954		CEAS2R2M50
C 955		CEAS101M16
C 956	3300µF/16V	CCH1130
C 958		CQMA472J50
C 959		CQMA472J50
C 960		CQMA102J50
C 961		CQMA102J50
C 962	3300µF/35V	CCH1200
C 963	3300µF/35V	CCH1200
C 968		CEAS101M35
C 969		CEAS101M35
C 970		CEAS100M50
C 971		CEAS100M50
C 972		CKSQYB473K50
C 973		CKSQYB473K50

CONTRAST TABLE of AMP UNIT

GM-232/X1H/UC, GM-232/X1H/EW and GM-232/X1H/ES are constructed the same except for the following:

Symbol and Description	Part No.		
	GM-232/X1H/UC	GM-232/X1H/EW	GM-232/X1H/ES
S 951 Switch(BFC)	Not used	HSH-156	HSH-156
R 831	RS1/10S473J	Not used	Not used
R 832	RS1/10S473J	Not used	Not used
R 958	Not used	RS1/10S105J	RS1/10S105J
C 831	CEAS100M16	Not used	Not used
C 832	CEAS100M16	Not used	Not used

6. ADJUSTMENT

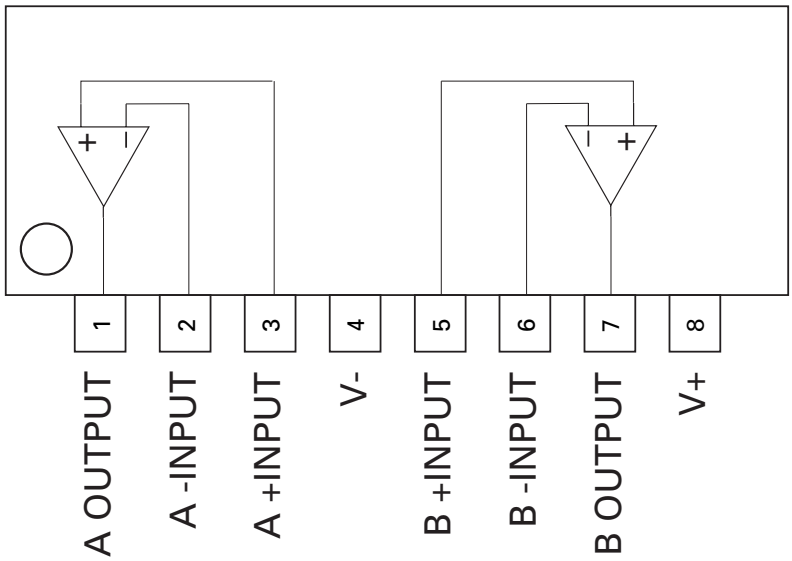
There is no information to be shown in this chapter.

7. GENERAL INFORMATION

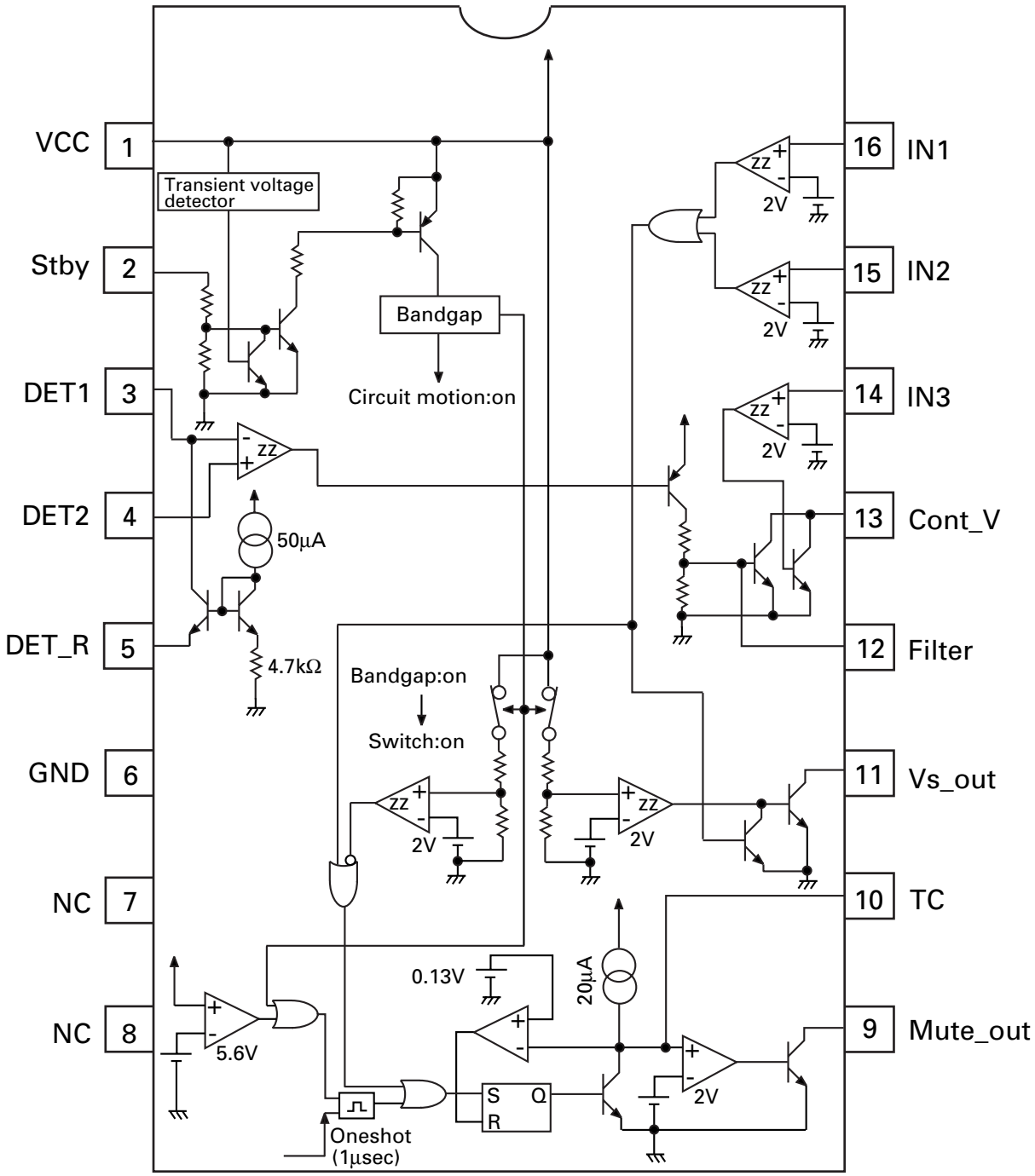
7.1 PARTS

7.1.1 IC

NJM2068L



PA2027A


VCC
1
Transient voltage detector
Stby
2
Bandgap
Circuit motion:on
DET1
3
DET2
4
50μA
DET_R
5
4.7kΩ
GND
6
NC
7
NC
8
5.6V
Bandgap:on
Switch:on
2V
0.13V
20μA
S
Q
R
Oneshot (1μsec)
16
IN1
15
IN2
14
IN3
13
Cont_V
12
Filter
11
Vs_out
10
TC
9
Mute_out

7.2 DIAGNOSIS

7.2.1 DISASSEMBLY

● **Removing the Case(not shown)**

1. Remove the nine screws.
2. Remove the Case.

● **Removing the Panel Unit(not shown)**

1. Remove the six screws.
2. Remove the two Panel Units.

● **Removing the Amp Unit(Fig.1)**

1 Remove the nine screws.

2 Use 2 pcs. of screw and insert them into the two holes marked with an arrow. Alternately tighten them little by little until the Sub Heat Sink separates from the Heat Sink.

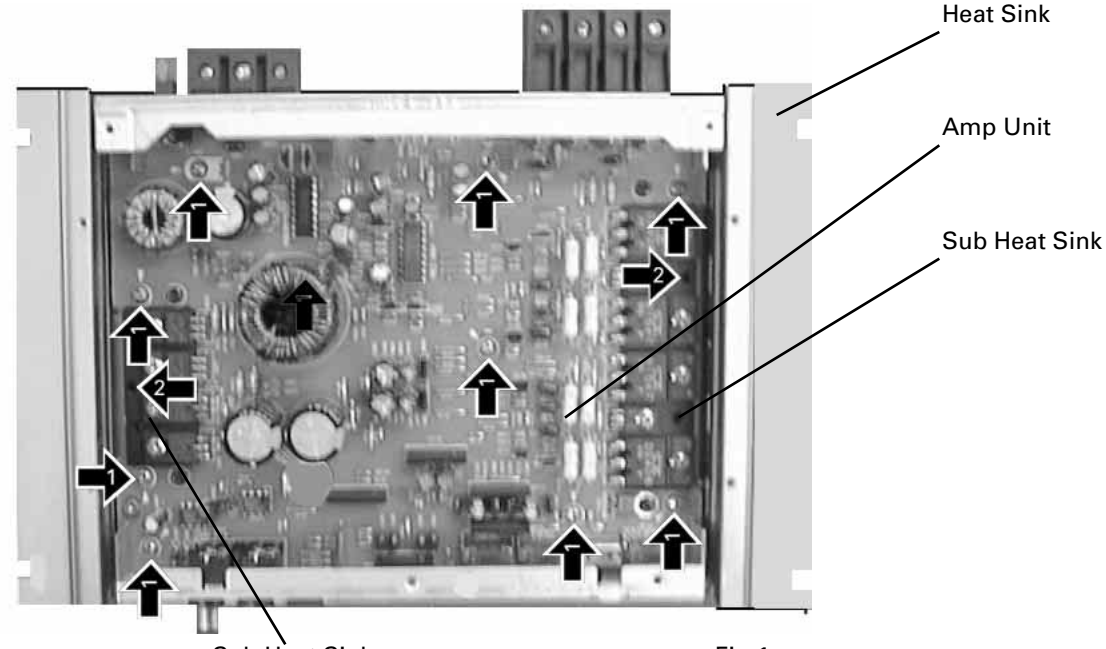


Fig.1

8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

Setting the Unit

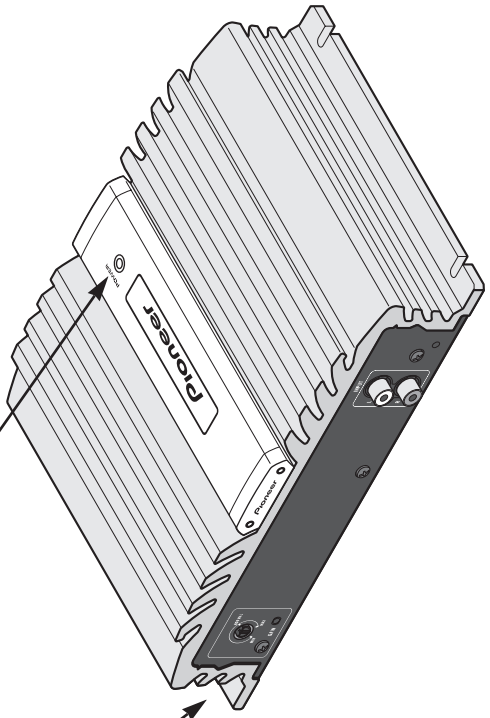
Power Indicator

The power indicator lights when the power is switched on.

Gain Control

If the sound is too low, even when the volume of the car stereo used along with this power amplifier is turned up, turn gain control on the back of the power amplifier clockwise. If the sound distorts when the volume is turned up, turn the gain control counter-clockwise.

- When using with an RCA equipped car stereo (standard output of 500 mV), set to the NORMAL position. When using with an RCA equipped Pioneer car stereo with max. output of 4 V or more, set to the MIN position.
- If you hear too much noise when using the speaker input terminals, turn the gain control counter-clockwise.



⚠ CAUTION

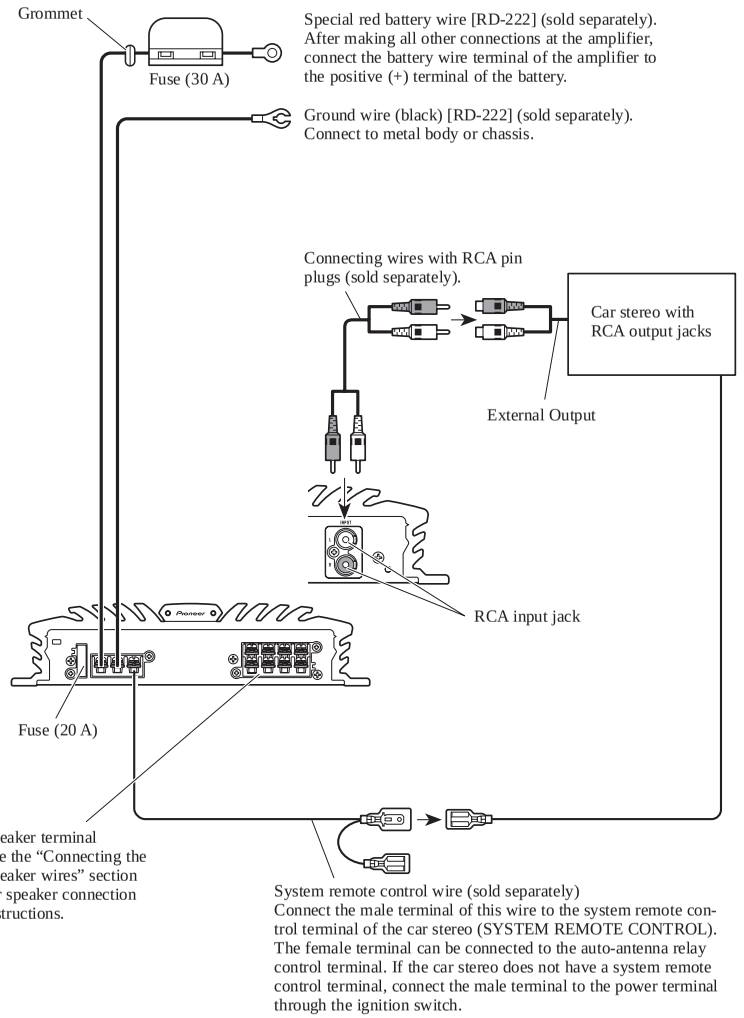
- Remove the negative (–) terminal of the battery to avoid the risk of short-circuit and damage to the unit.
- Secure the wiring with cable clamps or adhesive tape. To protect the wiring, wrap adhesive tape around them where they lie against metal parts.
- Do not route wires where they will get hot, for example where the heater will blow over them. If the insulation heats up, it may become damaged, resulting in a short-circuit through the vehicle body.
- Make sure that wires will not interfere with moving parts of the vehicle, such as the gearshift, handbrake or seat sliding mechanism.
- Do not shorten any wires. Otherwise the protection circuit may fail to work when it should.
- Never feed power to other equipment by cutting the insulation of the power supply wire to tap from the wire. The current capacity of the wire will be exceeded, causing overheating.

⊘ To prevent damage

- Do not ground the speaker wire directly or connect a negative (–) lead wire for several speakers.
- This unit is for vehicles with a 12-volt battery and negative grounding. Before installing it in a recreational vehicle, truck, or bus, check the battery voltage.
- If the car stereo is kept on for a long time while the engine is at rest or idling, the battery may go dead. Turn the car stereo off when the engine is at rest or idling.
- If the system remote control wire of the amplifier is connected to the power terminal through the ignition switch (12 V DC), the amplifier will always be on when the ignition is on— regardless of whether the car stereo is on or off. Because of this, the battery could go dead if the engine is at rest or idle.
- Install and route the sold separately battery wire as far away as possible from the speaker wires. Install and route the sold separately battery wire and ground wire, speaker wires, and the amplifier as far away as possible from the antenna, antenna cable and tuner.
- Speakers to be connected to the amplifier should conform with the standards listed below. Otherwise damage will occur to the speaker. The speaker impedance must be 1 to 8 ohms. (2 to 8 Ω for stereo, monaural and other bridge connections.)

Speaker Channel	Speaker Type	Power
Two-channel	Sub-woofer	Nominal input: Min. 35 W
	Other than sub-woofer	Max. input: Min. 70 W
One-channel	Sub-woofer	Nominal input: Min. 100 W
	Other than sub-woofer	Max. input: Min. 200 W

Connection Diagram



8.2 SPECIFICATIONS

● GM-232/X1H/UC, GM-232/X1H/EW, GM-232/X1H/ES

Specifications

Power source	14.4 V DC (10.8 — 15.1 V allowable)
Grounding system	Negative type
Current consumption	12.0 A (at continuous power, 4 Ω)
Average current drawn*	3.5 A (4 Ω for two channels)
	6.0 A (4 Ω for one channel)
Fuse	20 A
Dimensions	217 (W) × 55 (H) × 160 (D) mm
	[8-1/2 (W) × 2-1/8 (H) × 6-1/4 (D) in]
Weight	1.9 kg (4.2 lbs) (Leads for wiring not included)
Maximum power output	70 W × 2 / 200 W × 1 (EIAJ)
Continuous power output	35 W × 2 (at 14.4 V, 4 Ω, 20 — 20,000 Hz, 0.08% THD)
	100 W × 1 (at 14.4 V, 4 Ω, 20 — 20,000 Hz, 0.8% THD)
	50 W × 2 (at 14.4 V, 2 Ω, 20 — 20,000 Hz, 0.8% THD)
Load impedance	4 Ω (1 — 8 Ω allowable)
	(Bridge connection: 2 — 8 Ω allowable)
Frequency response	10 — 50,000 Hz (+0 dB, –1 dB)
Signal-to-noise ratio	103 dB (IHF–A network)
Distortion	0.004% (10 W, 1 kHz)
Separation	65 dB (1 kHz)
Input level / impedance	RCA: 0.4 — 4.5 V/22 kΩ
	Speaker: 1.6 — 18 V/40 kΩ

Note:
- Specifications and the design are subject to possible modification without notice due to improvements.

***Average current drawn**
- The average current drawn is nearly the maximum current drawn by this unit when an audio signal is input. Use this value when working out total current drawn by multiple power amplifiers.