JVC

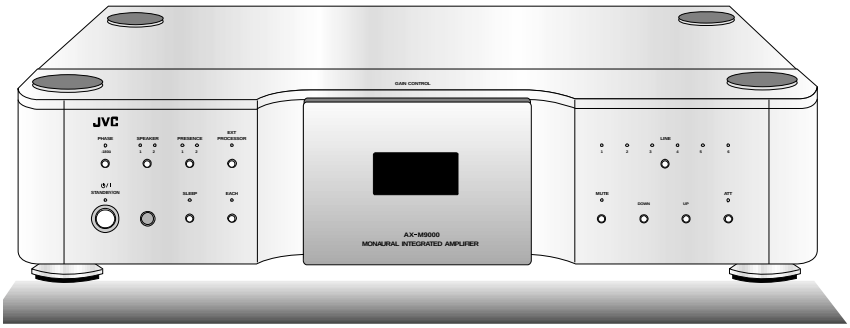
SERVICE MANUAL

MONAURAL INTEGRATED AMPLIFIER

AX-M9000

Area Suffix

E ------- Continental Europe

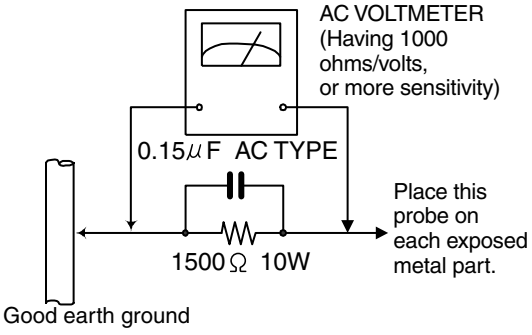


Contents

No.20933
Apr.2001

Safety Precautions

1. This design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Services should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations of the product should not be made. Any design alterations or additions will void the manufacturer`s warranty and will further relieve the manufacture of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement parts shown in the Parts List of Service Manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage currnet check (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal parts of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having, 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to eachexposed metal part, particularly any exposed metal part having a return path to the chassis, and meausre the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. voltage measured Any must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).



Warning

1. This equipment has been designed and manufactured to meet international safety standards.
2. It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
3. Repairs must be made in accordance with the relevant safety standards.
4. It is essential that safety critical components are replaced by approved parts.
5. If mains voltage selector is provided, check setting for local voltage.

⚠ CAUTION

Burrs formed during molding may be left over on some parts of the chassis. Therefore, pay attention to such burrs in the case of preforming repair of this system.

In regard with component parts appearing on the silk-screen printed side (parts side) of the PWB diagrams, the parts that are printed over with black such as the resistor (▬), diode (▮) and ICP (●) or identified by the "⚠" mark nearby are critical for safety.
When replacing them, be sure to use the parts of the same type and rating as specified by the manufacturer. (Except the JC version)

Disassembly method

■ Removing the metal cover (See Fig. 1)

1. Remove the three screws A attaching the metal cover on the back of the body.

2. Remove the four screws B attaching the metal cover on both sides of the body using a hexagon wrench.

3. Draw the metal cover upward from the behind while pulling the both sides of the lower part of the metal cover outward.

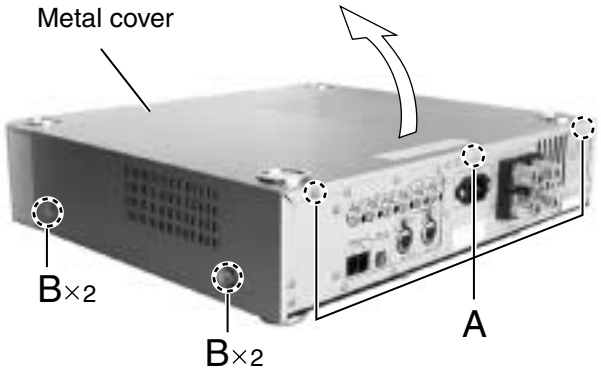


Fig.1

■ Removing the front panel assembly (See Fig. 2 to 5)

・ Prior to performing the following procedure, remove the metal cover.

1. Remove the six screws C attaching the top plate using a hexagon wrench.

2. Remove the six screws D and tow screws D' attaching the front panel assembly from the back of the body.

3. Remove the four screws E attaching the front panel assembly from the upper part of the body.

4. Remove the four screws F attaching the front panel assembly on both sides of the body.

5. Disconnect the harness from the connectors CN601, CN602, CN603, CN604 and CN605 of the system control board assembly.

6. Remove the screw G attaching the earth wire.

* The front panel assembly of this machine comprises the three sets - the front panel (left), front panel (right) and sub-panel (center).

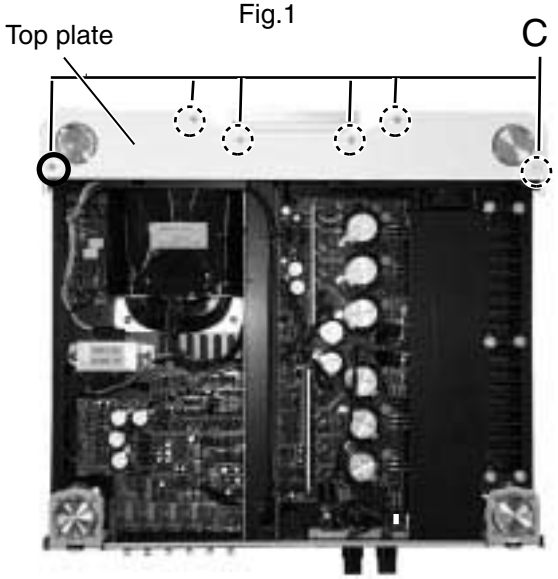


Fig.2

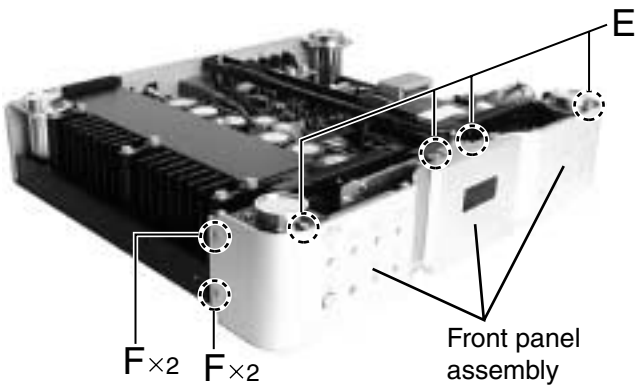


Fig.4

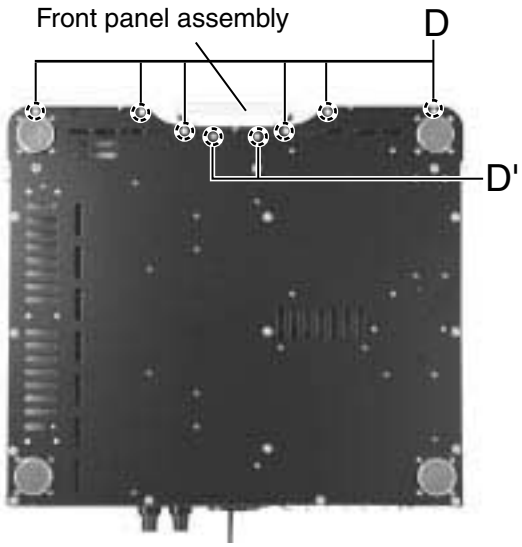


Fig.3

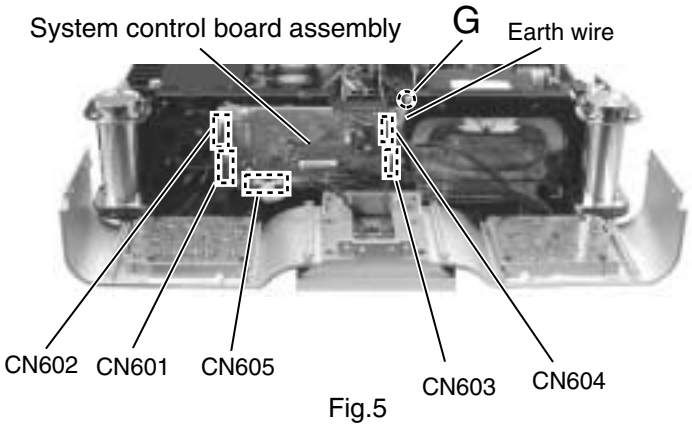


Fig.5

■ Removing the rear panel (See Fig.6 to 9)

- Prior to performing the following procedure, remove the metal cover and front panel assembly.

1. Remove the four screws H attaching the rear panel on the back of the set.
2. Remove the eight screws I attaching the rear panel on the upper part of the set.
3. Remove the six screws J, two screws K, nine screws L and one screw M attaching the rear panel.
4. Draw the rear panel upward from the behind at the legs while pulling the rear panel outward.
5. Remove the four screws N attaching the speaker output cord.

   * If necessary, remove the power plug, connector clamp, etc.

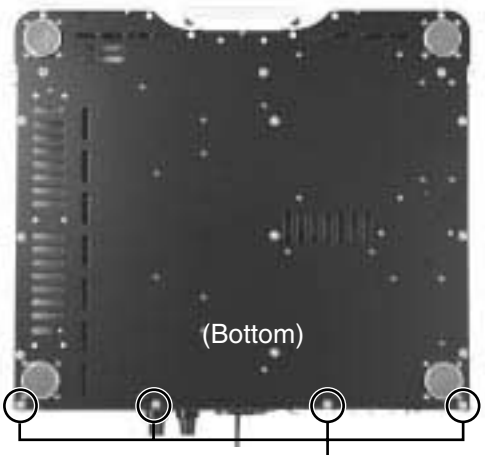


Fig.6

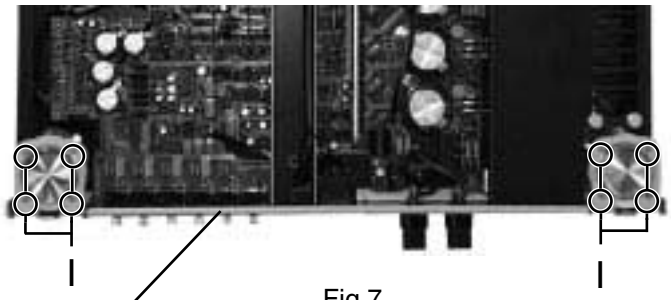


Fig.7

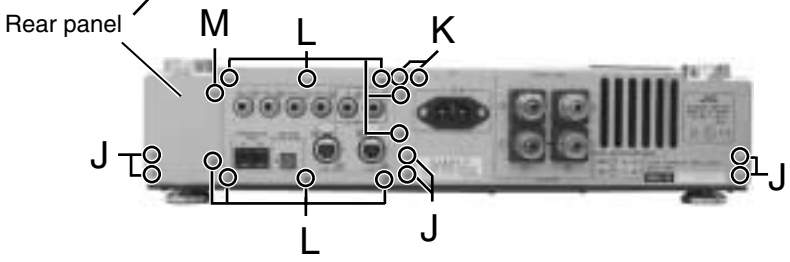


Fig.8

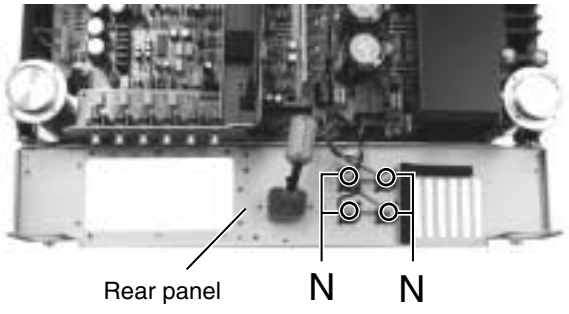


Fig.9

<Removing the front panel section>

■ Removing the control switch board assembly 1 & 2 and display board assembly (See Fig.10 to 11)

- Prior to performing the following procedure, remove the metal cover and front panel assembly.

1. Remove the ten screws O attaching the control switch board assembly 1 & 2 on the back side of the front panel assembly (left & right sides).
2. Remove the four screws P attaching the metal base on the backside of the sub-panel assembly (center).
3. Remove the four screws Q on the backside of the metal base. Then the display board assembly can be removed.

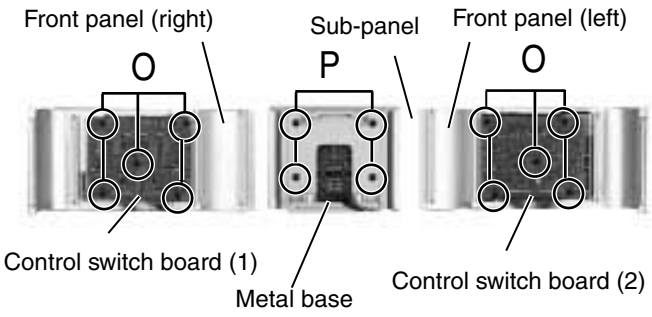


Fig.10

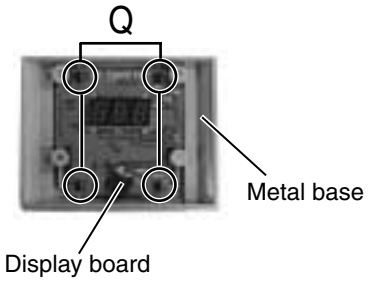


Fig.11

■ Removing the system control board assembly (See Fig. 12)

- Prior to performing the following procedure, remove the metal cover and front panel assembly.

1. Remove the four screws R attaching the system control board assembly.
2. Disconnect the connectors CN611, CN612, CN613, CN614, CN615 and CN616.

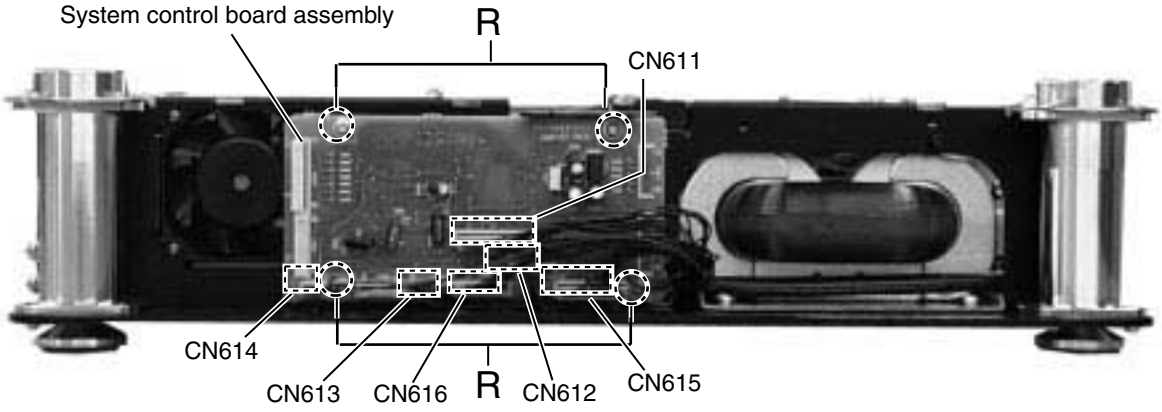


Fig.12

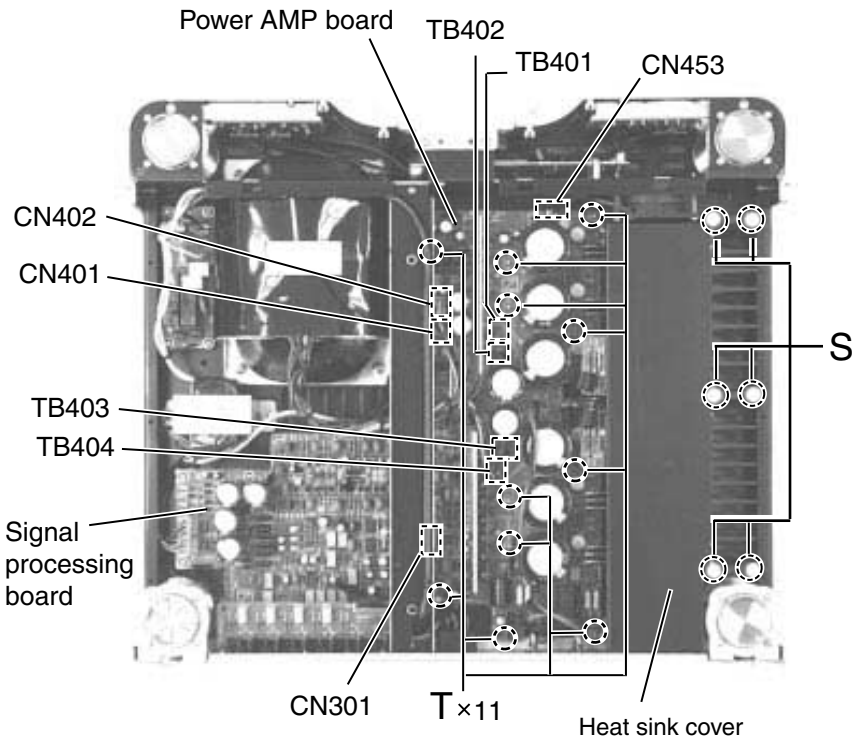


Fig.13

■ Removing the power AMP board assembly / heat sink (See Fig. 13 to 15)

- Prior to performing the following procedure, remove the metal cover, system control assembly and rear cover.

1. Remove the six through bolts S attaching the heat sink and the heat sink cover.
2. Remove the eleven screws T attaching the power AMP sub-board assembly.
3. Disconnect the harness, which is extending from power transformer, from the connectors TB401, TB402, TB403 and TB404.
4. Disconnect the harness, which is extending from the power transformer for pre-AMP, from the connectors CN401 and CN402.
5. Disconnect the harness, which is extending from the fan, from the connector CN453.
6. Disconnect the harness, which is extending from the signal processing board, from the connector CN301.
7. After removing each screw U attaching the power AMP sub-board assembly (1) & (2), take off the power AMP sub-board assembly from the heat sink.
8. Remove the seven screws V attaching transistor Q335~Q340.

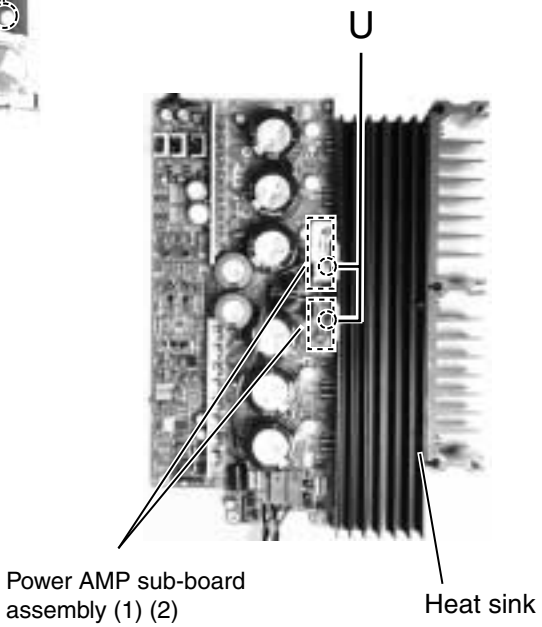


Fig.14

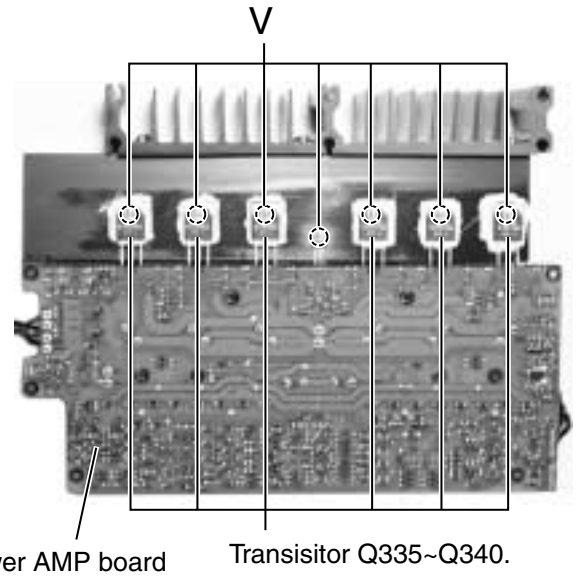


Fig.15

■ Removing the current mode source selector board assembly and rear terminal panel (See Fig. 16)

- Prior to performing the following procedure, remove the metal cover and the rear panel.

1. Remove the six screws W attaching the RCA pins on the current mode source selector board assembly. Then, the current mode source selector board can be removed.
2. Remove the four screws X attaching the cannon connector on the signal processing board.
3. Then, the rear terminal panel can be removed.

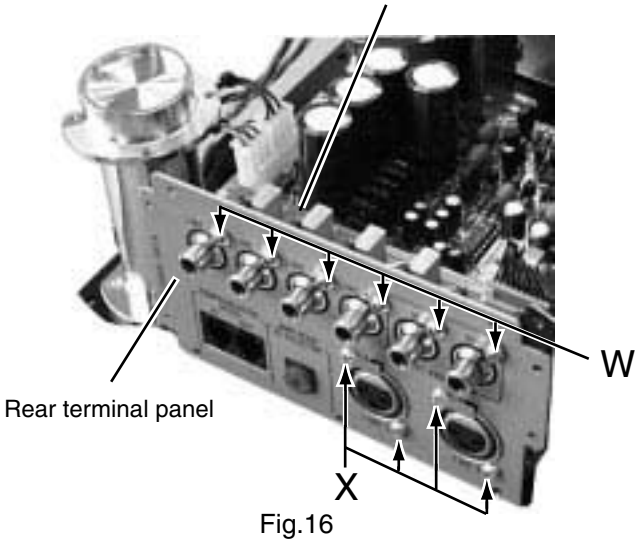


Fig.16

■ Removing the signal processing board assembly (See Fig. 17)

- Prior to performing the following procedure, remove the metal cover and the rear panel.

1. Remove the current mode source selector board assembly and the rear terminal panel.
2. Remove the five screws Y attaching the signal processing board assembly.
3. Remove the connectors CN251 and CN252.

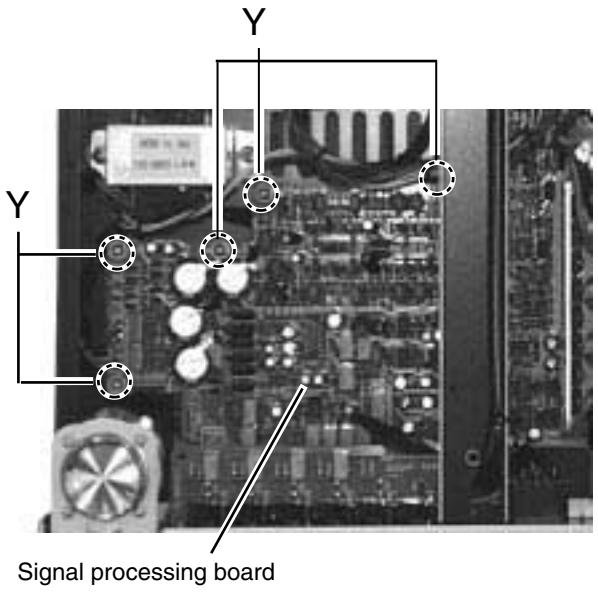


Fig.17

■ Removing the power switch board assembly (See Fig. 18)

- Prior to performing the following procedure, remove the metal cover.

1. Remove the four screws Z attaching the power switch board assembly.
2. Remove the cable connecting to the transformer.

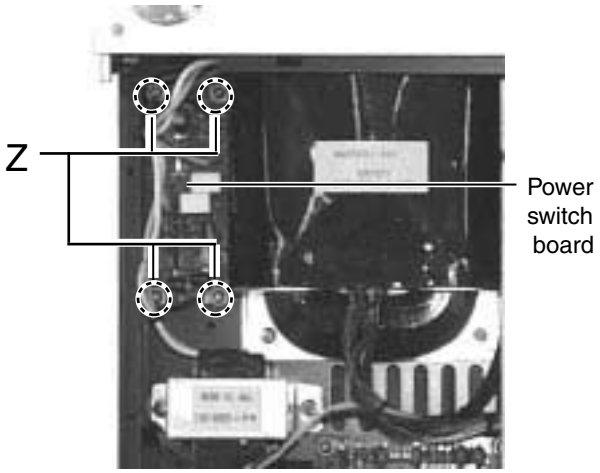


Fig.18

■ Removing the core transformer for pre-AMP (See Fig. 19)

- Prior to performing the following procedure, remove the metal cover.

1. Remove the two screws A attaching the power transformer for pre-AMP.

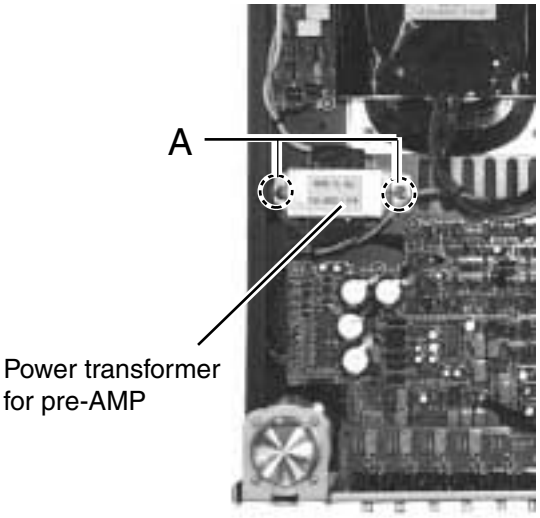


Fig.19

■ Removing the transformer for power AMP (See Fig. 20)

- Prior to performing the following procedure, remove the metal cover and the front panel assembly.

1. Remove the four screws B attaching the power transformer for power AMP.

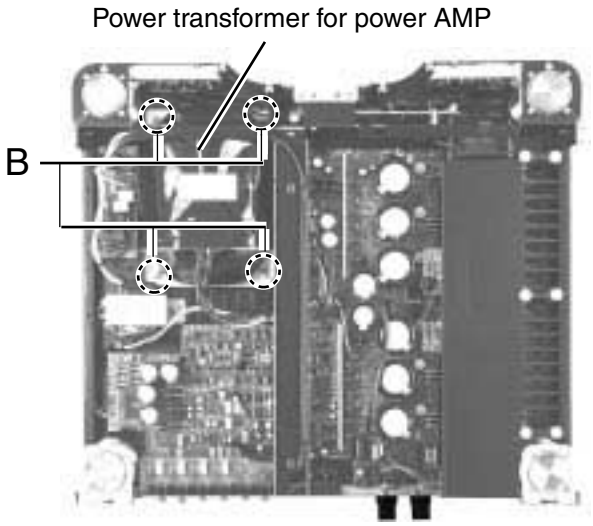


Fig.20

Arrangement drawings for the clamp binding

In order to secure the performance of the machine, refer to the following arrangement drawings when the lines are clamped.

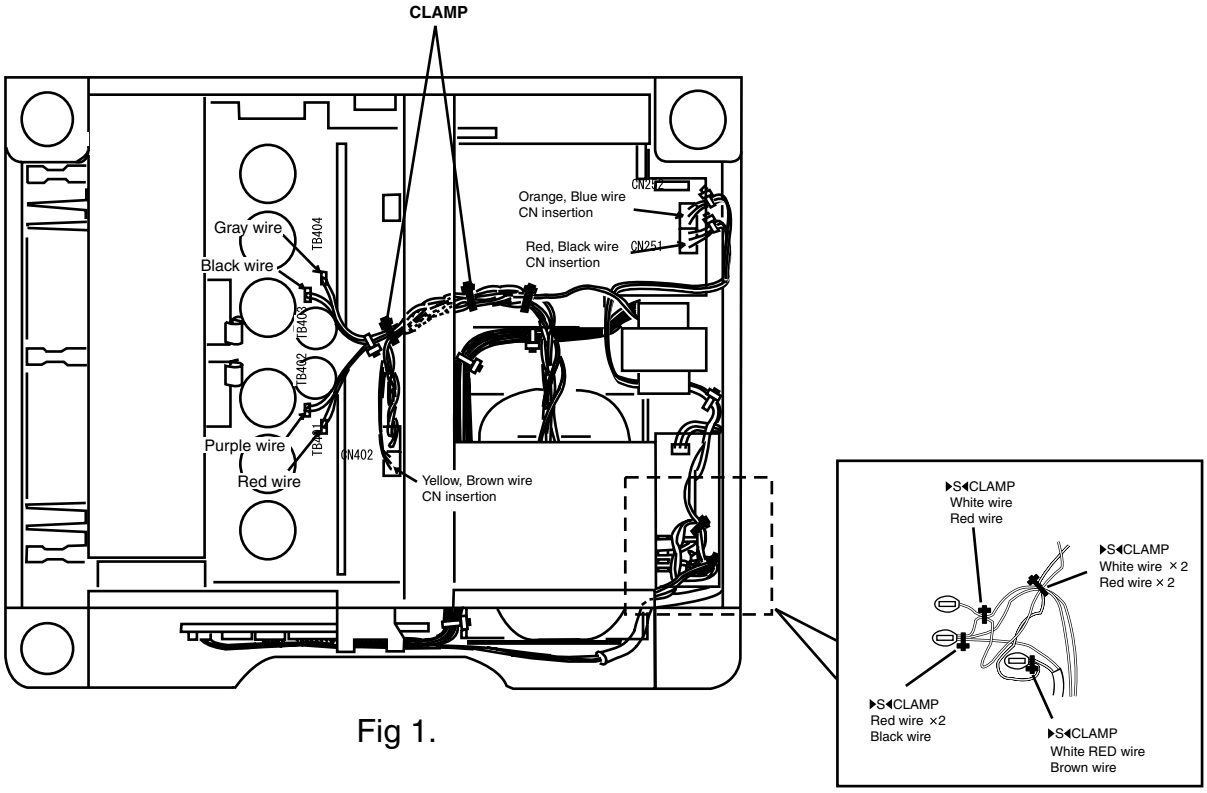


Fig 1.

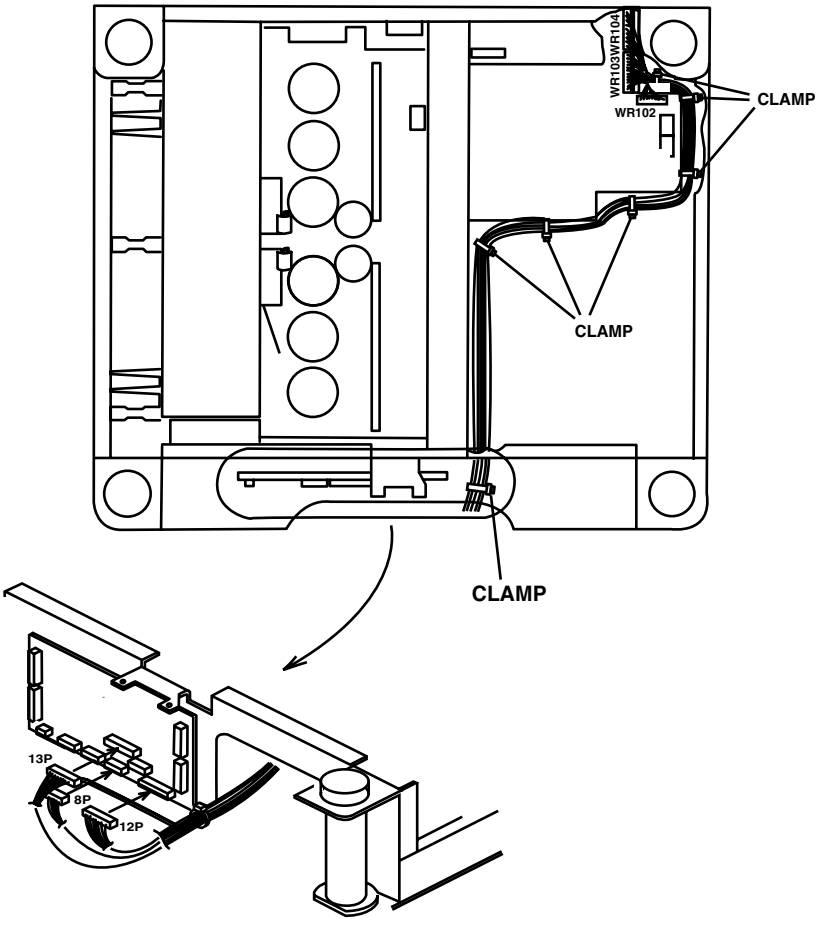


Fig 2.

Adjustment method

1. List of measuring devices

Measuring devices : Electronic voltmeter
Oscilloscope
Low-frequency transmitter (50Hz-20 kHz of transmitting frequency and output of 0 dBs at the 600Ω terminal)
Distortion factor tester (with a built-in band path filter)

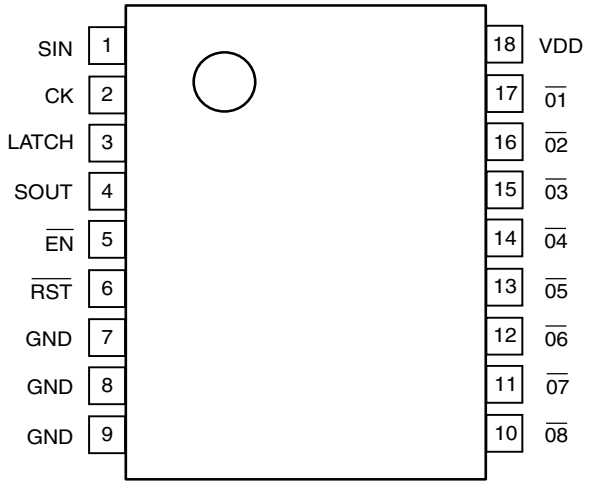
2. Adjustments and confirmation

Description	Adjusting method			Standard value	Remarks
Standard output	1) INPUT LINE1 - Output at the time of THD0.5% at f=1kHz			More than 210W/8Ω (41.0V)	
Total distortion factor	1) INPUT LINE1 - Distortion factor at the time of 200W (40.0V) at 8Ω load			20Hz Less than 0.04% 1kHz Less than 0.04% 20kHz Less than 0.06%	
Output level	1) Output level at the time when inputting 1kHz 200mV to LINE 1			192mV +/- 10mV	
Hum noise	1) Line 1	Input short		Less than 10mV	
	2) Base hum	Volume min.		Less than 0.4mV	
Frequency characteristics	1) Line 1	100Hz	Vol. 99. 5	45.6dB 1dB	
		1kHz	Vol. 99. 5	45.6dB 1dB	
				33.4dB 1dB ATT ON	
			Vol. 69. 5	31.0dB 1dB	
			Vol. 44. 0	5.8dB 1dB	
		10kHz	Vol. 99. 5	45.6dB 1dB	
AC voltage of speaker terminal	1) No signal, no load, Vol. 0.0			Less than +/- 1mV	
Adjustments of idling currency	1) Prior to turning the power on, turn the R398 counterclockwise fully 2) After connecting the 3 pin and 4 pin of the CN303 to the electronic voltmeter, adjust the voltage to 2-3mV. 3) After elapsing five minutes, adjust the voltage to 3.5+/-0.5mV. Since there is backlash, thoroughly adjust it. 4) After elapsing two minutes, make sure that the voltage falls within 3.5-7mV. In case where the voltage does not fall within the specified value, readjust it to the values specified in 3) above.				
Confirmation of idling currency	1) No signal, no load, rated power Confirm under the room temperature of 20-25℃				Five minutes later after turning the power on
Crosstalk	1) INPUT LINE 1 - The output at the input terminal side shall be +20dBm as a standard.	Line1 to Line2		100Hz More than 70dB 1kHz More than 70dB 10kHz More than 70dB	
		Line1 to Line5		100Hz More than 70dB 1kHz More than 70dB 10kHz More than 70dB	
	The CH to be measured shall be terminated at 10kΩ				

Description of major ICs

■ BU2114F-X (IC542,543,544) : LED controller

1. Pin layout

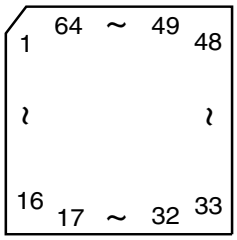


2. Pin function

Pin No.	Symbol	I/O	Function
1	SIN	I	Serial data input terminal
2	CK	I	Shift lock of the shift register
3	LATCH	I	When this terminal is set at "L", the latch output will be secured, In addition, when the output of the shift register is changed during "H", the latch output will be changed simultaneously.
4	SOUT	O	Output of the shift register at the final stage
5	$\overline{EN}$	I	Enable terminals of 01 to 08
6	$\overline{RST}$	I	Reset of the shift register and latch
7	GND	-	Ground
8	GND	-	Ground
9	GND	-	Ground
10	$\overline{08}$	O	Output of the shift register at the 8th stage
11	$\overline{07}$	O	Output of the shift register at the 7th stage
12	$\overline{06}$	O	Output of the shift register at the 6th stage
13	$\overline{05}$	O	Output of the shift register at the 5th stage
14	$\overline{04}$	O	Output of the shift register at the 4th stage
15	$\overline{03}$	O	Output of the shift register at the 3rd stage
16	$\overline{02}$	O	Output of the shift register at the 2nd stage
17	$\overline{01}$	O	Output of the shift register at the 1st stage
18	VDD	-	Power supply

■ MN101CP10A(IC521) : System controller

1.Pin layout

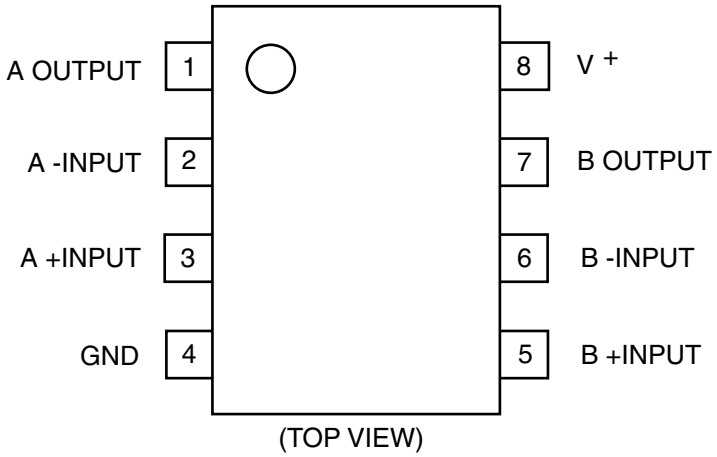


2. Pin function

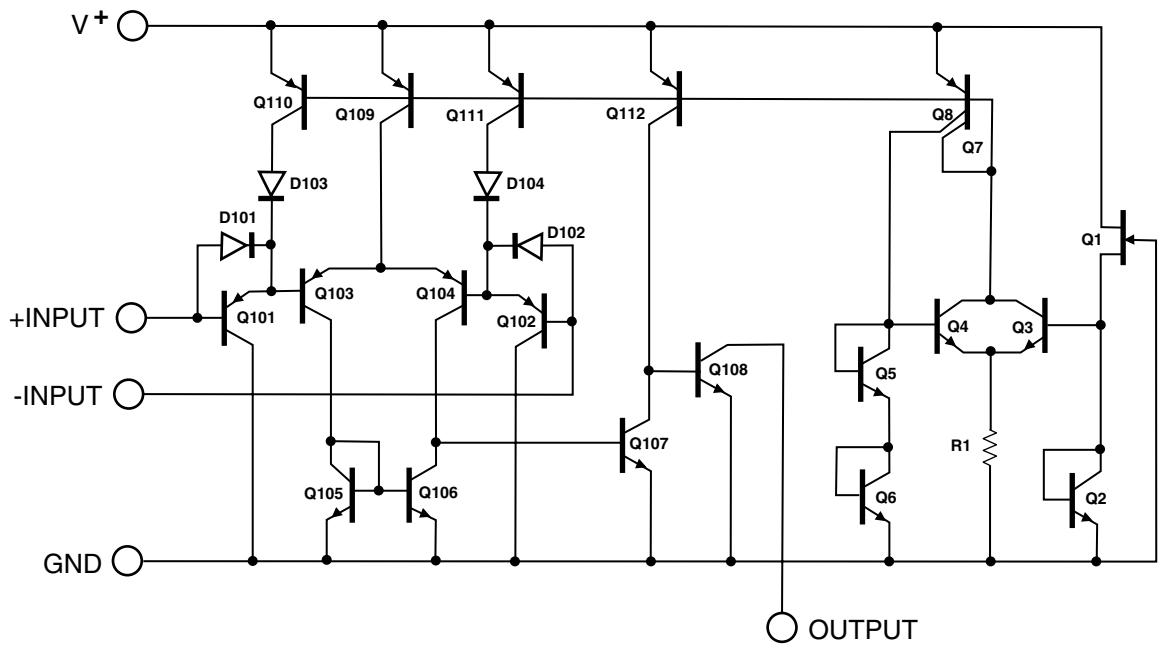
Pin No.	Symbol	I/O	Pin function	Pin No.	Symbol	I/O	Pin function
1	KY10 (DOWN)	I	Key input 10	32	ROT1	I	Rotary input 1
2	KY11 (LINE)	I	Key input 11	33	C	O	Line decoder C
3	KY12 (MUTE)	I	Key input 12	34	B	O	Line decoder B
4	TMP IN1	I	Temperature detect 1	35	A	O	Line decoder A
5	TMP IN2	I	Temperature detect 2	36	POWER	O	Power SW
6	VREF+		AD reference voltage terminal 5.0V	37	ABS	O	Absolute phase SW
				38	MONPRO	O	MON/ PRO SW
7	VDD		2.0 5.0V supply	39	ALLEACH	O	All each (LED)
8	OSC2	O	Clock out	40	PRESEN1	O	Presence SW1
9	OSC1	I	Clock in	41	PRESEN2	O	Presence SW2
10	VSS		0.0V supply	42	SPKB	O	Speaker B
11	XI	I	GND	43	SPKA	O	Speaker A
12	XO	O	Open	44	FANH	O	Fan control High
13	MMOD	I	Memory extended mode	45	GM1	O	GM volume output 1
14	SADATO	O	SA data out	46	GM2	O	GM volume output 2
15	SADATI	I	SA data in	47	HPS	O	HPS filter SW
16	SACLK	O	SA clock	48	LRST	O	Serial/ Parallel IC reset
17	SBDATO	O	SB data out	49	FANL	O	Fan control LOW
18	SBDATI	I	SB data in	50	LDATO	O	Serial/ Parallel IC out data
19	SBCLK	I	SB clock	51	LCLK	O	Serial/ Parallel IC clock
20	SREQO	O	Request for the communication output between the sets	52	LACH	O	Latch
				53	B.CON	O	Brightness control
21	RST	I	Reset terminal	54	RM	O	Remote control input
22	VOLCS	O	VOL. CS	55	KY1 (HPS)	I	Key input 1
23	VOLCLK	O	VOL. clock	56	KY2 (EACH)	I	Key input 2
24	VOLDATO	O	VOL. out	57	KY3 (PRO)	I	Key input 3
25	ATT	O	Input ATT	58	KY4 (PRE)	I	Key input 4
26	MUTE LED	O	Mute LED	59	KY5 (SP)	I	Key input 5
27	M.WAKE	I	Return form the stop mode	60	KY6 (PHASE)	I	Key input 6
28	SREQI	I	Request for the communication output between the sets	61	VSS		(GND)
				62	KY7 (POWER)	I	Key input 7
29	INH	I	INM	63	KY8 (ATT)	I	Key input 8
30	ROT3	I	Rotary input 3	64	KY9 (UP)	I	Key input 9
31	ROT2	I	Rotary input 2				

■ NJM2903M-XE(IC454) : Temperature detector

1. Pin layout

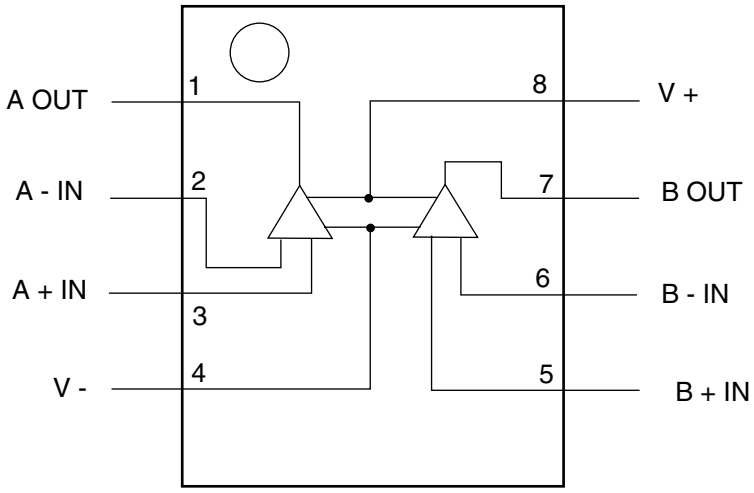


2. Block diagram

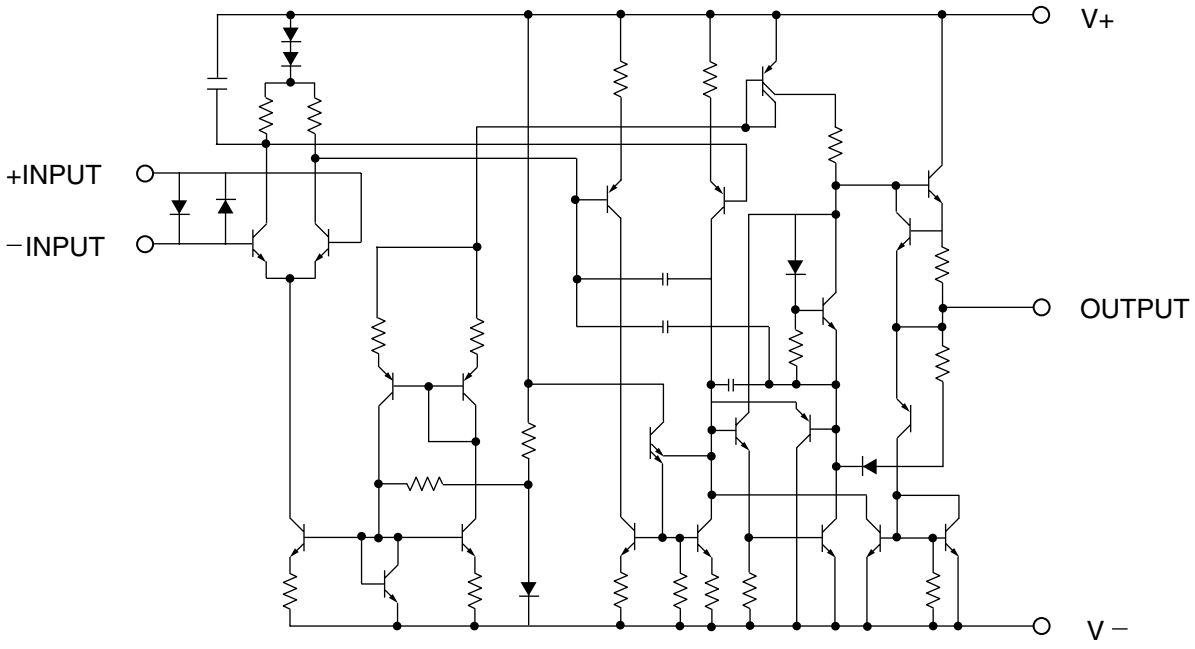


■ NJM5532M-D-W(IC152,153) : Presence circuit amp

1. Pin layout

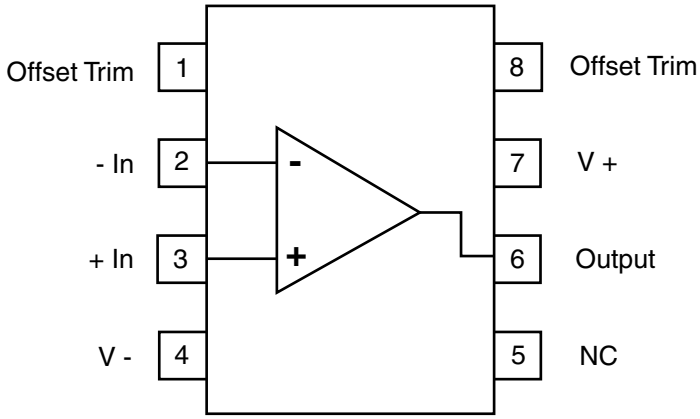


2. Block diagram



■ OPA134PA(IC108, 201, 301) : OP Amp.

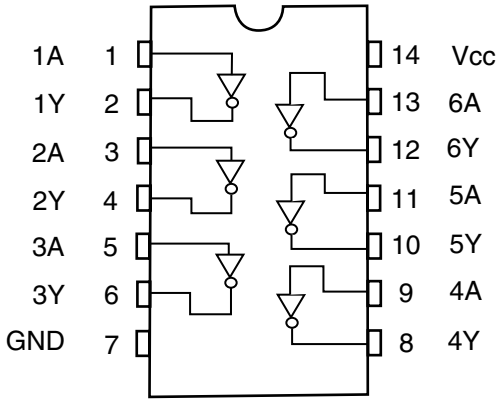
Pin layout



8-Pin DIP, SO-8

■ TC74HC04AF(IC264) : Data line buffer

Pin layout

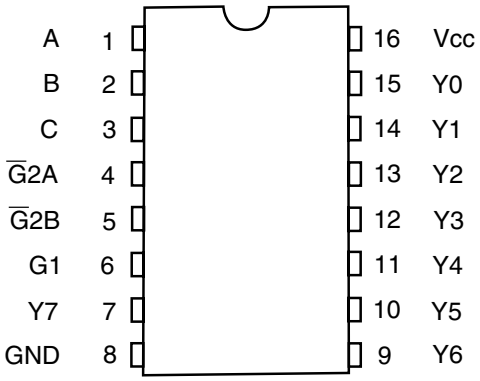


(TOP VIEW)

A	Y
L	H
H	L

■ TC74HC238AF-X(IC525) : Line recorder

1. Pin layout



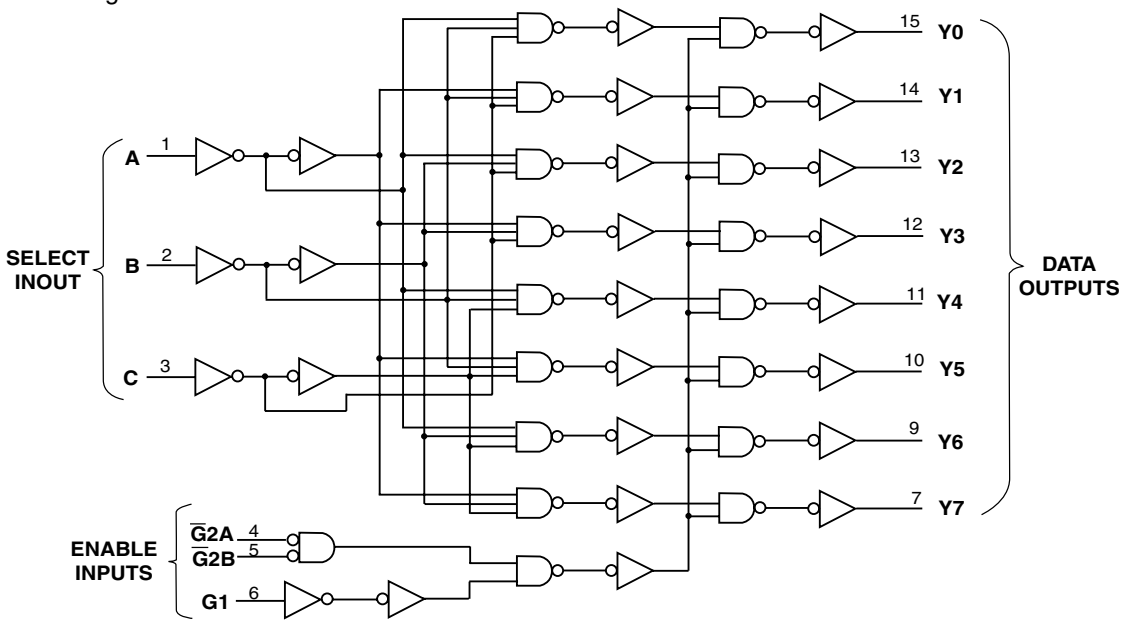
(TOP VIEW)

2. Truth table

INPUTS						OUTPUTS								SELECTED OUTPUT
ENABLE			SELECT			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	
G1	$\overline{G}$2A	$\overline{G}$2B	C	B	A									
L	X	X	X	X	X	L	L	L	L	L	L	L	L	NONE
X	H	X	X	X	X	L	L	L	L	L	L	L	L	NONE
X	X	H	X	X	X	L	L	L	L	L	L	L	L	NONE
H	L	L	L	L	L	H	L	L	L	L	L	L	L	Y0
H	L	L	L	L	H	L	H	L	L	L	L	L	L	Y1
H	L	L	L	H	L	L	L	H	L	L	L	L	L	Y2
H	L	L	L	H	H	L	L	L	H	L	L	L	L	Y3
H	L	L	H	L	L	L	L	L	L	H	L	L	L	Y4
H	L	L	H	L	H	L	L	L	L	L	H	L	L	Y5
H	L	L	H	H	L	L	L	L	L	L	L	H	L	Y6
H	L	L	H	H	H	L	L	L	L	L	L	L	H	Y7

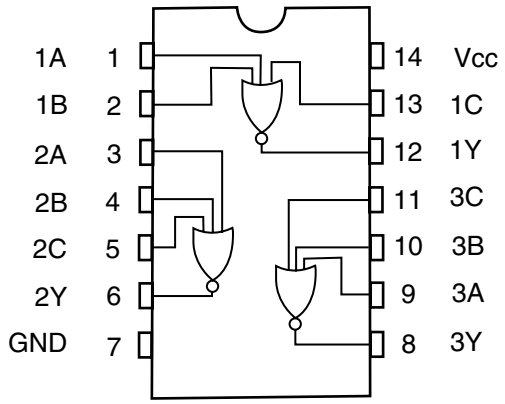
X : Don't Care

3. Block diagram



■ TC74HC27AF-W(IC531) : Noa gate

1. Pin layout



(TOP VIEW)

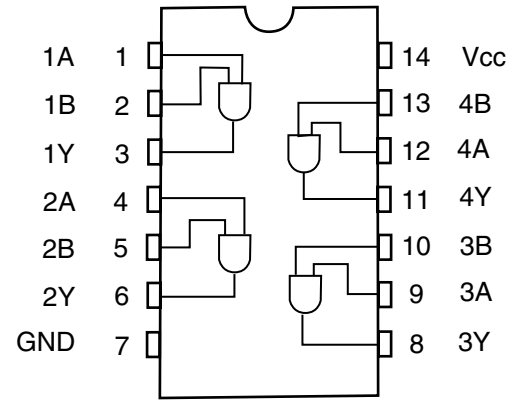
2. Truth table

A	B	C	Y
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

X : Don't Care

■ TC74VHC08F-X(IC281) : Dataline buffer

1. Terminal layout



(TOP VIEW)

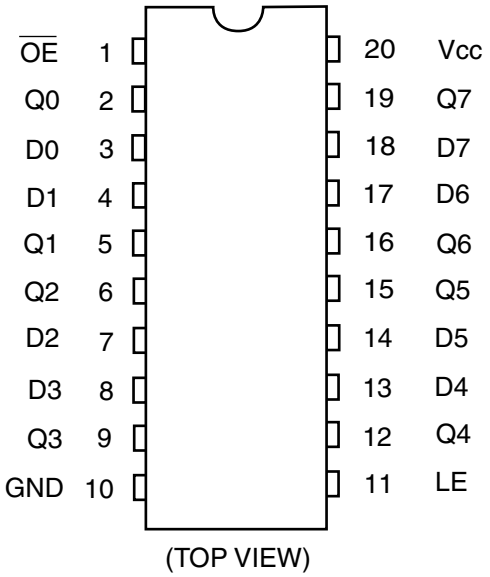
2. Truth table

A	**B**	**Y**
L	L	L
L	H	L
H	L	L
H	H	H

X : Don't Care

■ TC74HC373HF-X(IC522, IC523, IC524) : Shift register for relay control

1. Pin layout



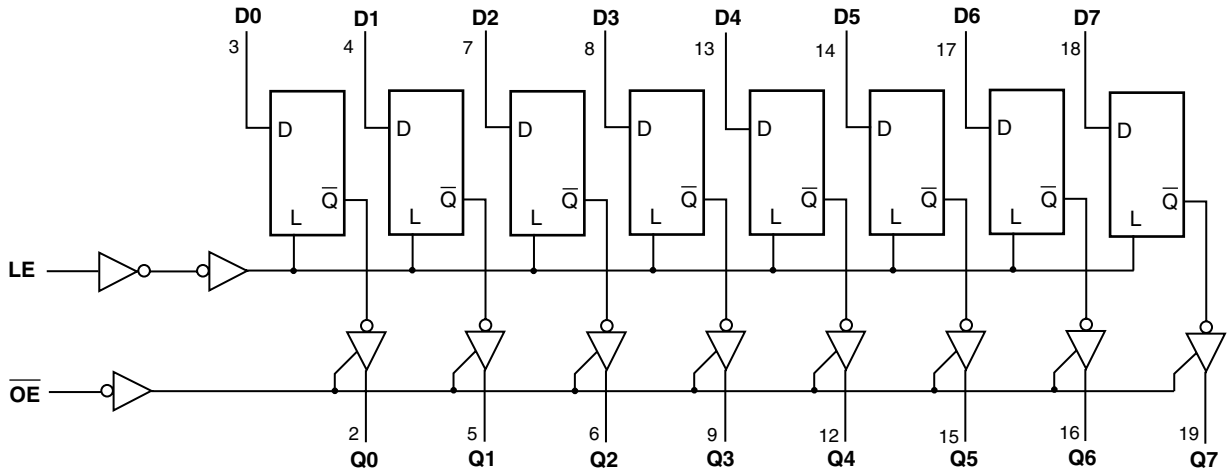
(TOP VIEW)

2. Truth table

INPUTS			OUTPUTS
$\overline{OE}$	LE	D	Q
H	X	X	Z
L	L	X	Qn
L	H	L	L
L	H	H	H

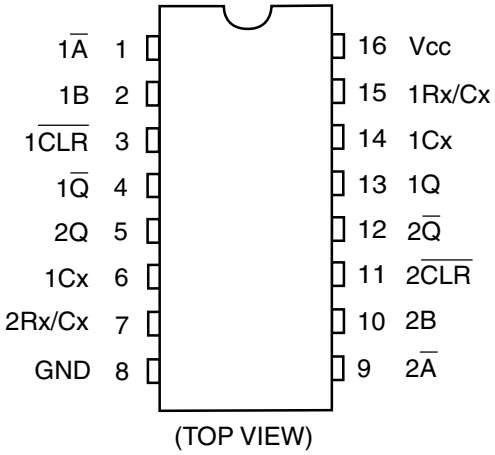
X : Don't Care
Z : High impedance
Qn: The Q output level immediately before the LE becomes to "L".

3. Block diagram

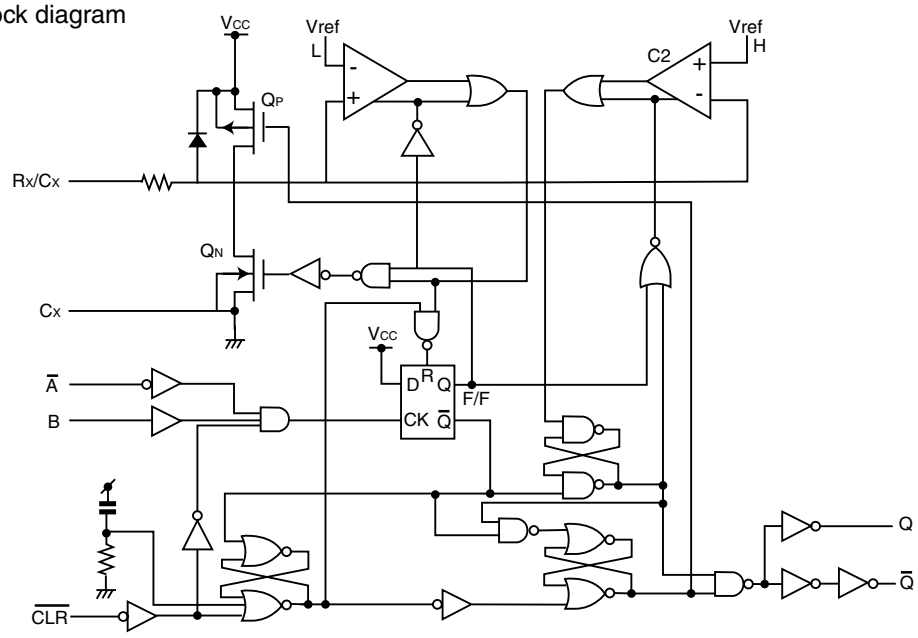


■ TC74VHC123AF-X(IC532) : Monostable multivibrator

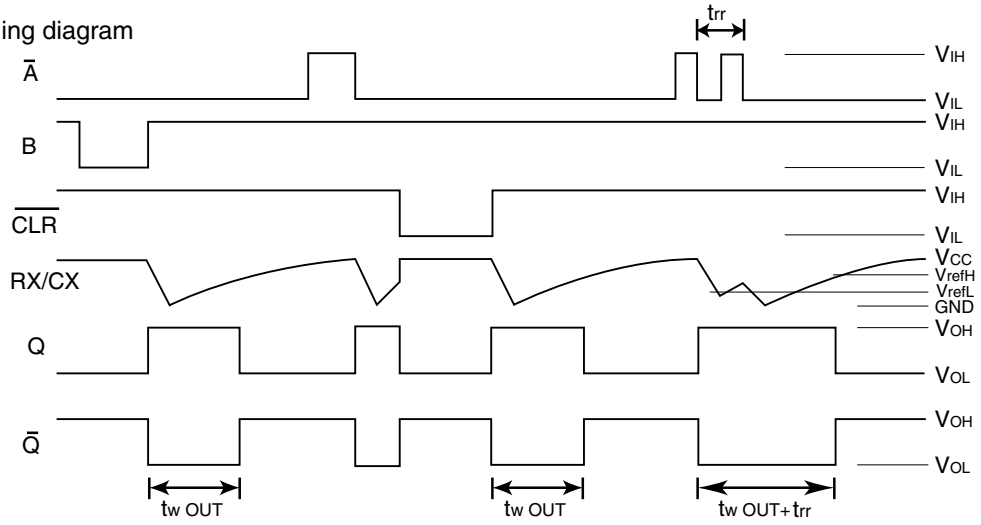
1. Pin layout



2. Block diagram

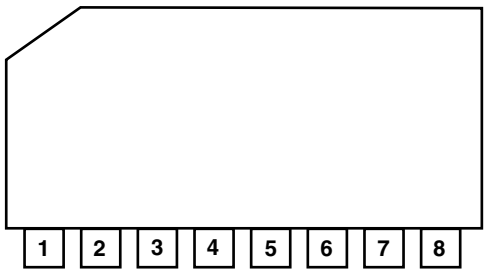


3. Timing diagram

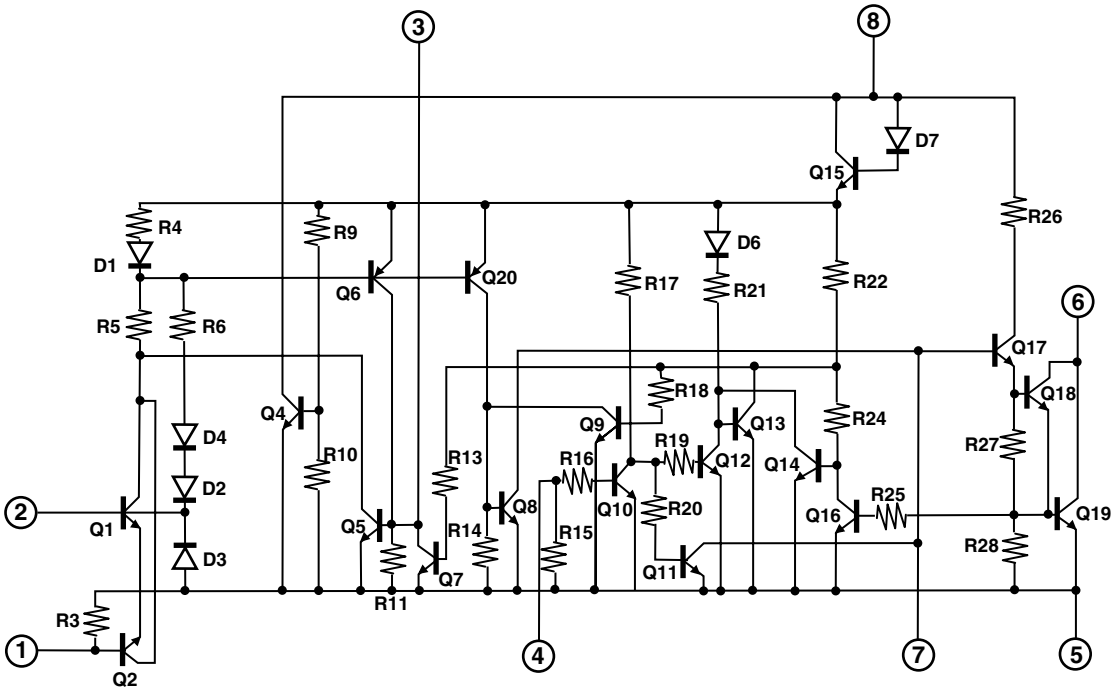


■ UPC1237HA (IC453) : Protection IC

1. Pin layout

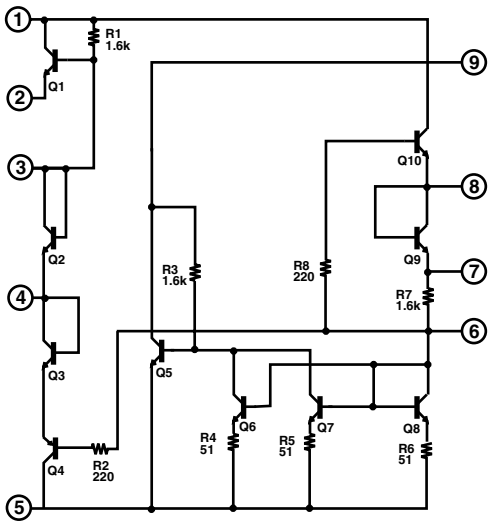


2. Block diagram



■ VC5022-2(IC302) : Advanced super A

Block diagram



AX-M9000

JVC

VICTOR COMPANY OF JAPAN, LIMITED
AUDIO & COMMUNICATION BUSINESS DIVISION
PERSONAL & MOBILE NETWORK BUSINESS UNIT. 10-1,1chome,Ohwatari-machi,Maebashi-city,371-8543,Japan

(No.20933)

Printed in Japan
200104(V)