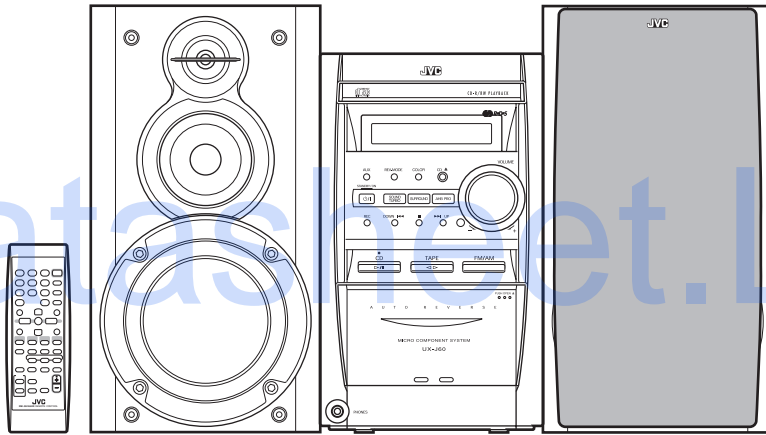


# JVC

## SERVICE MANUAL

### MICRO COMPONENT SYSTEM

## UX-J60



SP-UXJ60

CA-UXJ60

SP-UXJ60

**COMPACT**  
**disc**  
DIGITAL AUDIO

**CORDS**

#### Area Suffix

B ----- U.K.  
E ----- Continental Europe  
EN ----- Northern Europe

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## SECTION 1

### Important Safety Precautions

#### 1.1 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 manufacturers 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 ( $\triangle$ ) 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 reassembling.
- (5) Leakage shock hazard testing)
 

After reassembling 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.

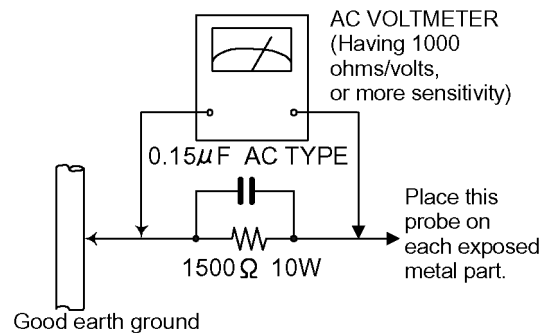
  - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal parts of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5mA 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 1,500 ohm 10W resistor paralleled by a 0.15  $\mu$ F 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 each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure 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.).



#### 1.2 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.

#### 1.3 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 pre-forming repair of this system.**

#### 1.4 Critical parts for safety

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 (  $\blacksquare$  ), diode (  $\blacksquare$  ) and ICP (  $\bullet$  ) or identified by the "  $\triangle$  " 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)

### 1.5 Safety Precautions (U.K only)

- (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.
- (2) Any unauthorised design alterations or additions will void the manufacturer's guarantee; furthermore the manufacturer cannot accept responsibility for personal injury or property damage resulting therefrom.
- (3) Essential safety critical components are identified by (  ) on the Parts List and by shading on the schematics, and must never be replaced by parts other than those listed in the manual. Please note however that many electrical and mechanical parts in the product have special safety related characteristics. These characteristics are often not evident from visual inspection. Parts other than specified by the manufacturer may not have the same safety characteristics as the recommended replacement parts shown in the Parts List of the Service Manual and 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.

#### 1.5.1 Warning

- (1) Service should be performed by qualified personnel only.
- (2) This equipment has been designed and manufactured to meet international safety standards.
- (3) It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
- (4) Repairs must be made in accordance with the relevant safety standards.
- (5) It is essential that safety critical components are replaced by approved parts.
- (6) 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.

## 1.6 Preventing static electricity

Electrostatic discharge (ESD), which occurs when static electricity stored in the body, fabric, etc. is discharged, can destroy the laser diode in the traverse unit (optical pickup). Take care to prevent this when performing repairs.

### 1.6.1 Grounding to prevent damage by static electricity

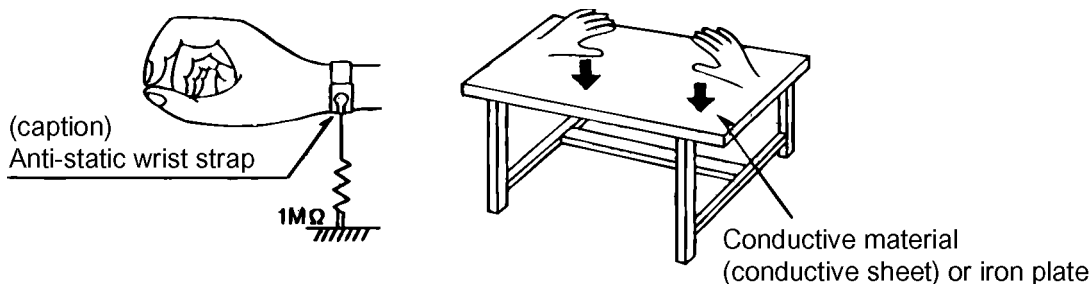
Static electricity in the work area can destroy the optical pickup (laser diode) in devices such as CD players. Be careful to use proper grounding in the area where repairs are being performed.

(1) Ground the workbench

Ground the workbench by laying conductive material (such as a conductive sheet) or an iron plate over it before placing the traverse unit (optical pickup) on it.

(2) Ground yourself

Use an anti-static wrist strap to release any static electricity built up in your body.



(3) Handling the optical pickup

- In order to maintain quality during transport and before installation, both sides of the laser diode on the replacement optical pickup are shorted. After replacement, return the shorted parts to their original condition. (Refer to the text.)
- Do not use a tester to check the condition of the laser diode in the optical pickup. The tester's internal power source can easily destroy the laser diode.

## 1.7 Handling the traverse unit (optical pickup)

(1) Do not subject the traverse unit (optical pickup) to strong shocks, as it is a sensitive, complex unit.

(2) Cut off the shorted part of the flexible cable using nippers, etc. after replacing the optical pickup. For specific details, refer to the replacement procedure in the text. Remove the anti-static pin when replacing the traverse unit. Be careful not to take too long a time when attaching it to the connector.

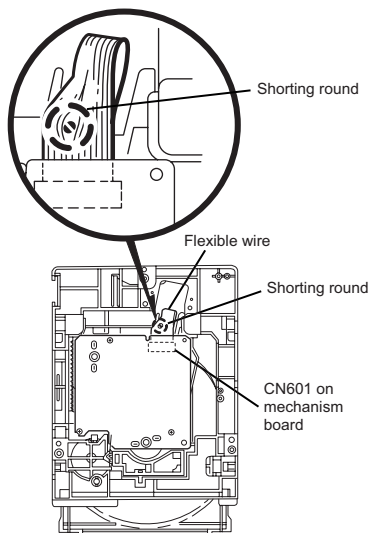
(3) Handle the flexible cable carefully as it may break when subjected to strong force.

(4) It is not possible to adjust the semi-fixed resistor that adjusts the laser power. Do not turn it.

## 1.8 Attention when traverse unit is decomposed

**\*Please refer to "Disassembly method" in the text for the CD pickup unit.**

- Apply solder to the short land sections before the flexible wire is disconnected from the connector CN101 on the CD servo board. (If the flexible wire is disconnected without applying solder, the CD pickup may be destroyed by static electricity.)
- In the assembly, be sure to remove solder from the short land sections after connecting the flexible wire.



### 1.9 Important for laser products

- (1) **CLASS 1 LASER PRODUCT**
- (2) **DANGER** : Invisible laser radiation when open and inter lock failed or defeated. Avoid direct exposure to beam.
- (3) **CAUTION** : There are no serviceable parts inside the Laser Unit. Do not disassemble the Laser Unit. Replace the complete Laser Unit if it malfunctions.
- (4) **CAUTION** : The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are de feated. It is dangerous to defeat the safety switches.

- (5) **CAUTION** : If safety switches malfunction, the laser is able to function.
- (6) **CAUTION** : Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

**⚠ CAUTION**  
**Please use enough caution not to see the beam directly or touch it in case of anadjustment or operation check.**

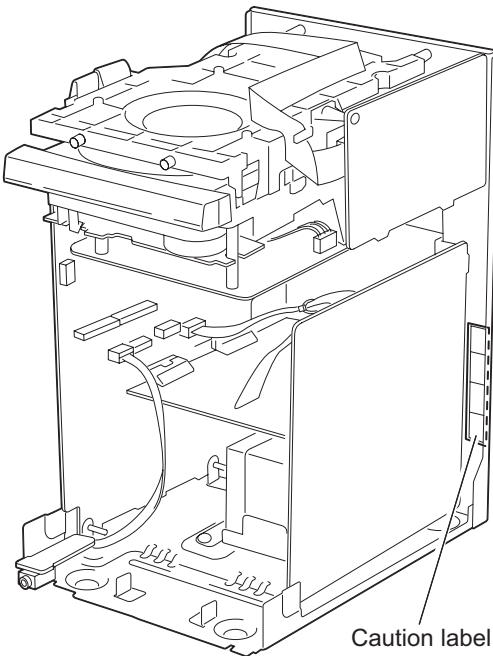
**VARNING**  
 Osynlig laserstrålning är denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.

**VARO**  
 Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymätömälle lasersäteilylle. Älä katso säteeseen.

**ADVARSEL**  
 Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

**ADVARSEL**  
 Usynlig laserstråling ved åpning, når sikkerhetsbryteren er avsløtt. unngå utsettelse for stråling.

### REPRODUCTION AND POSITION OF LABELS



## SECTION 2

### Disassembly method

#### 2.1 Main body

##### 2.1.1 Removing the metal cover (See Fig.1~3)

- (1) Remove the six screws **A** on the back of the main body.
- (2) Remove the two screws **B** on each side and remove the metal cover in the direction of the arrow.

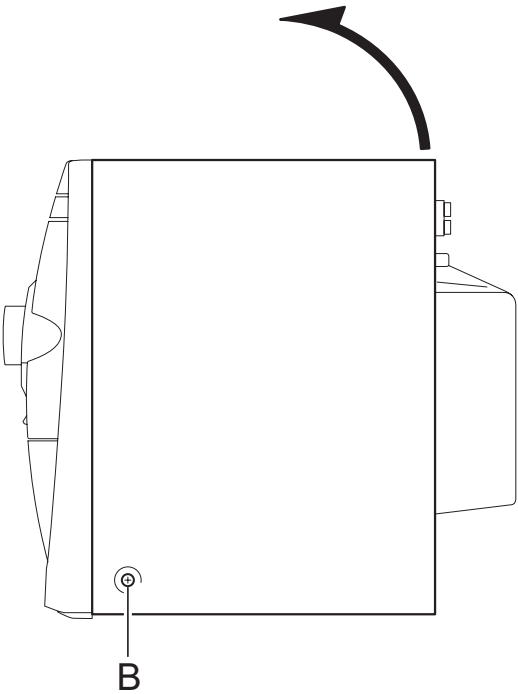
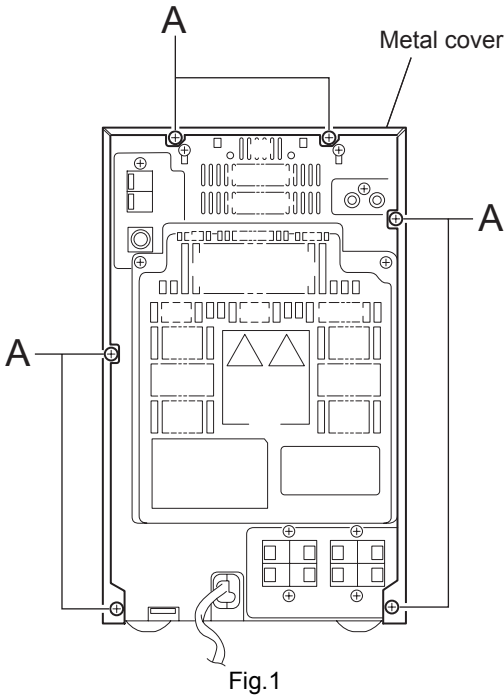


Fig.2

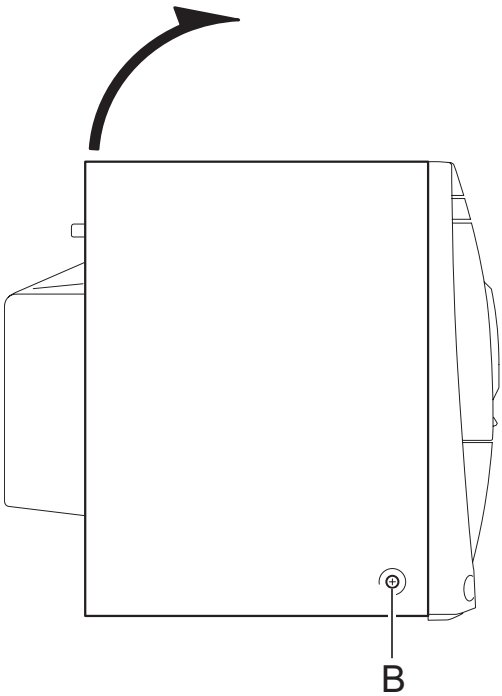


Fig.3

### 2.1.2 Removing the rear cover (See Fig.4)

- (1) Remove the two screws **C** attaching the rear cover.

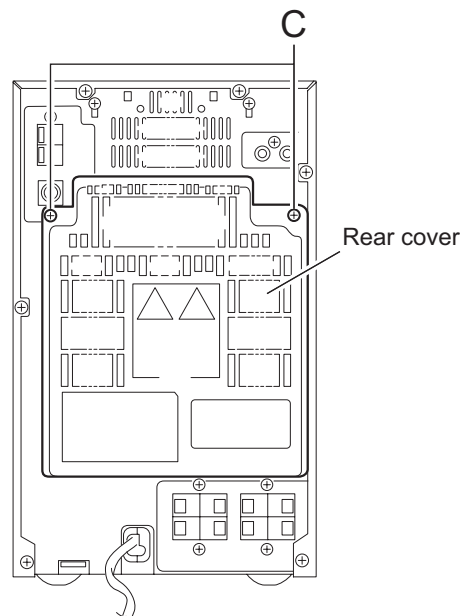


Fig.4

### 2.1.3 Removing the rear panel / fan assembly (See Fig.5, 6)

- Prior to performing the following procedure, remove the metal cover and the rear cover.
- (1) Remove the eleven screws **D** attaching the rear panel. Release the two joints **a** on the rear side and the two joints **b** on each side.
- (2) Remove the two screws **E** attaching the fan bracket and release the two joints **c** on the rear panel, and remove.
- (3) Disconnect the wire from the connector CN916 on the main board.

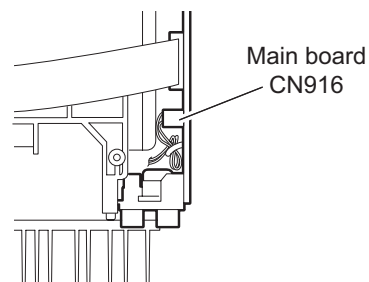


Fig.6

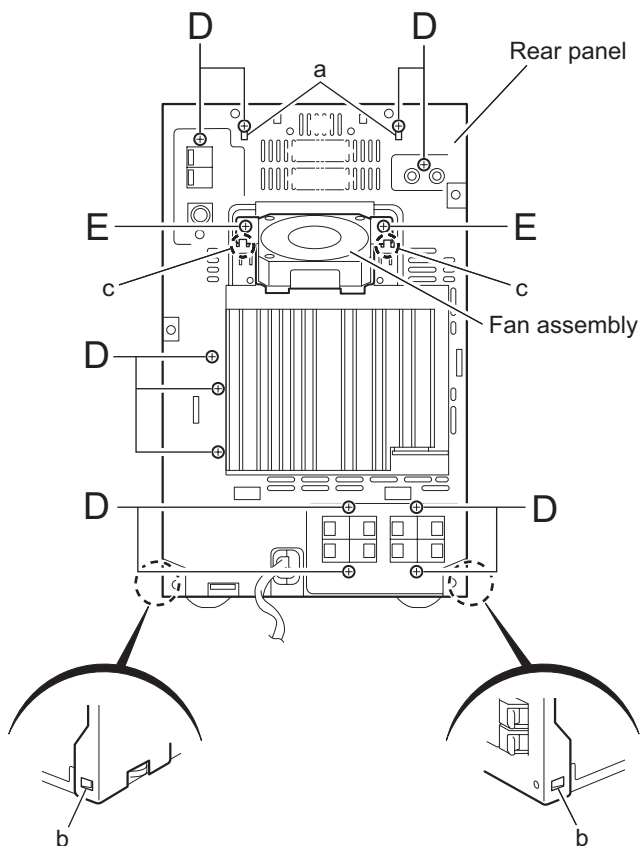


Fig.5

### 2.1.4 Removing the tuner board (See Fig.7)

- Prior to performing the following procedure, remove the metal cover.
- (1) Disconnect the card wire from the connector CN1 on the tuner board.
- (2) Remove the two screws **F** on the rear side and the screw **G** in the side.

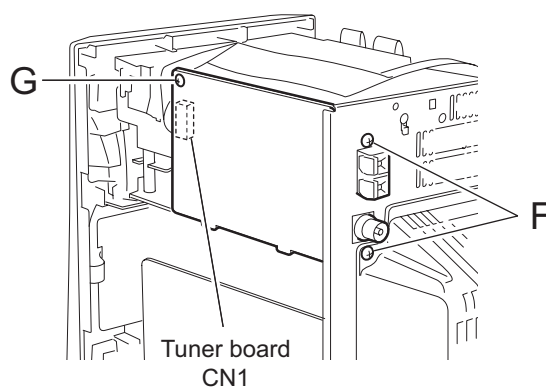


Fig.7

### 2.1.5 Removing the CD-R/RW mechanism assembly (See Fig.8)

- Prior to performing the following procedure, remove the metal cover, the rear cover, the rear panel and the tuner board.
- (1) Disconnect the card wire from the connector CN903, CN902 and CN904 on the main board.
- (2) Pull the joint **d** in the direction of the arrow and remove the CD-R/RW mechanism assembly backward while releasing the joint **e**.

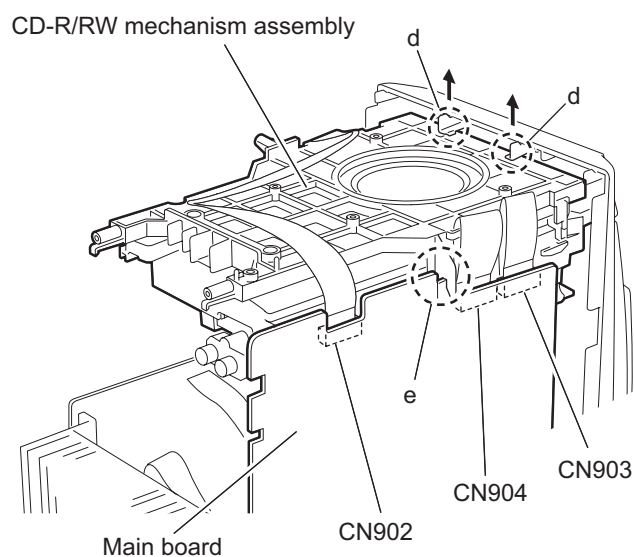


Fig.8



### 2.1.6 Removing the main board / the heat sink board / the speaker jack board

(See Fig.9~12)

- Prior to performing the following procedure, remove the metal cover, the rear cover, the rear panel, the tuner board and the CD-R/RW mechanism assembly.
- (1) Remove the two screws **H** attaching the main board.
- (2) Disconnect the card wire from the connector CN900, CN901, CN930, CN931 and CN932, and disconnect the flat wire from the connector CN913, CN917 and CN918 on the main board.
- (3) Remove the band and disconnect the flat wire from the connector CN951 on the power transformer assembly, and then remove the main board / the heat sink board / the speaker jack board from the body.
- (4) Release the two joints **f** of the main board and disconnect the connector CN944 and CN945 of the heat sink board from the connector CN912 and CN911 of the main board respectively, and disconnect the flat wire from the connector CN914 and CN915, and remove.
- (5) Remove the screw **I** attaching the speaker jack board and disconnect the flat wire from the connector CN946 and CN947 on the heat sink board, and then remove the speaker jack board.

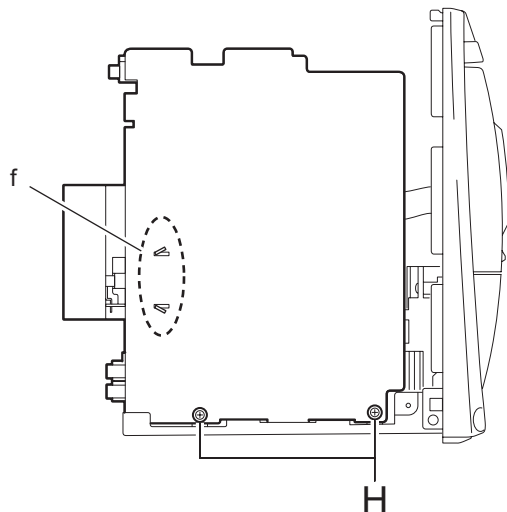


Fig.9

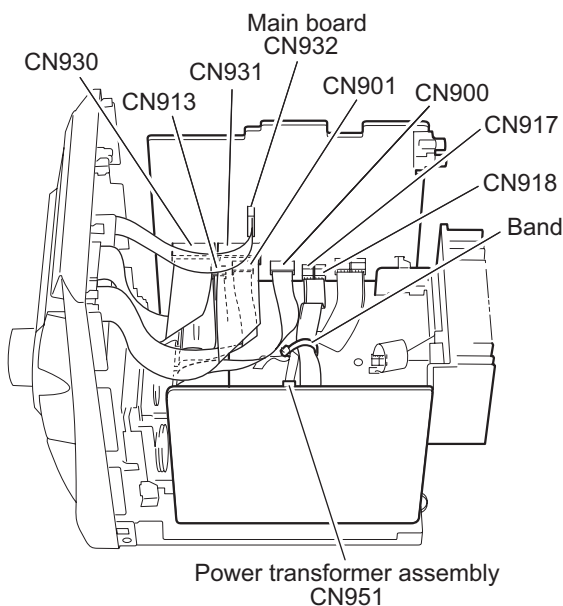


Fig.10

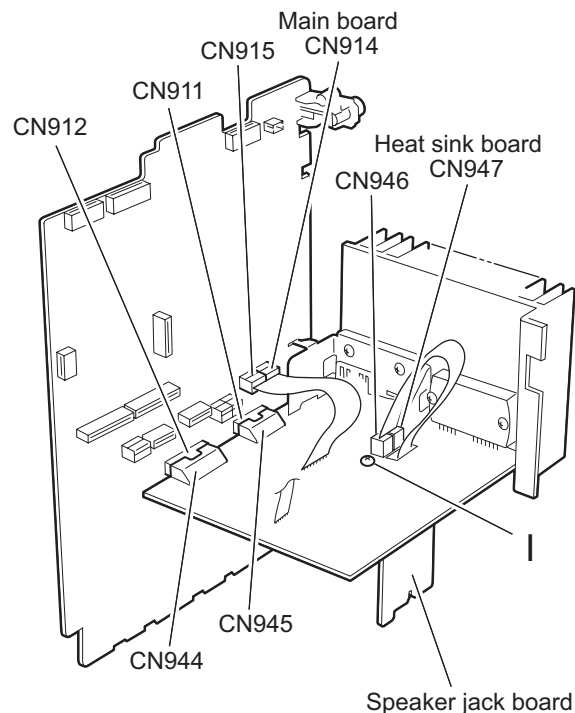


Fig.11

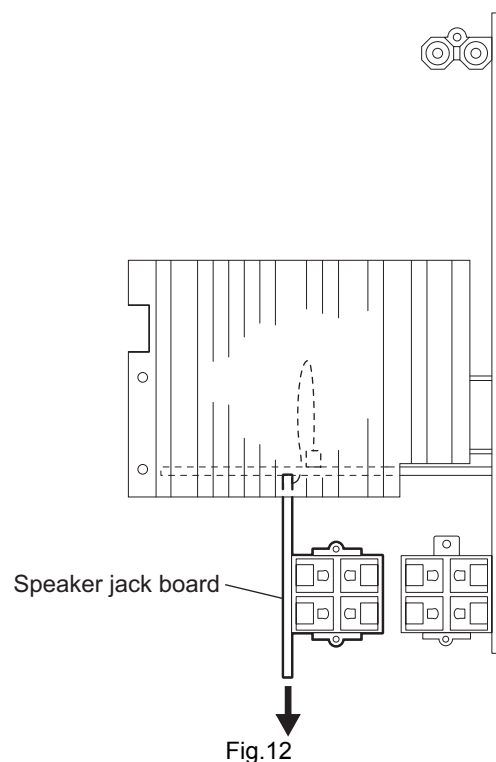


Fig.12

**2.1.7 Removing the power transformer assembly  
(See Fig.13)**

- Prior to performing the following procedure, remove the metal cover, the rear cover, the rear panel, the CD-R/RW mechanism assembly and the main board.  
(1) Disconnect the power cord from the connector J1000 on the power transformer assembly.  
(2) Remove the four screws **J** .

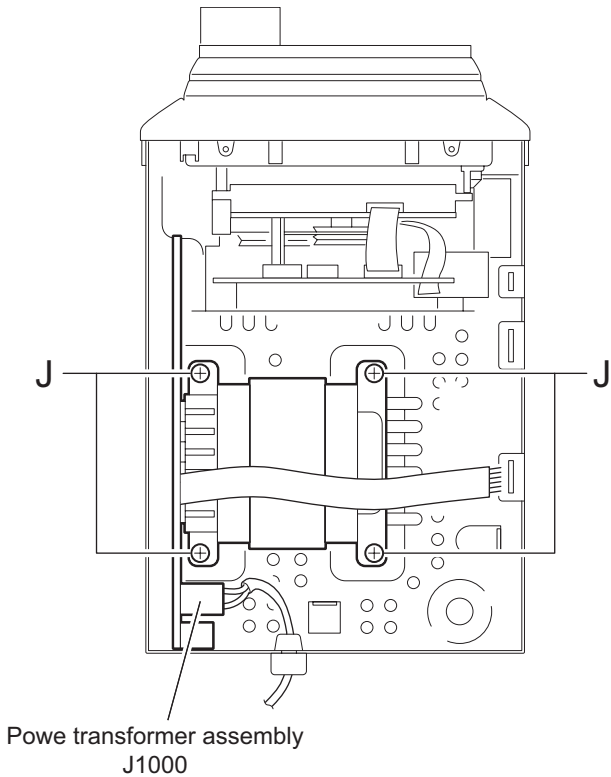


Fig.13

**2.1.8 Removing the front panel assembly  
(See Fig.14,15)**

- Prior to performing the following procedure, remove the metal cover.  
(1) Remove the two screws **K** on each side. Release the two joints **g** on the both sides and lift the front panel assembly to release the joint **h** .  
(2) Disconnect the card wire from the connector CN900, CN901, CN930, CN931 and CN932 on the main board.

Front panel assembly

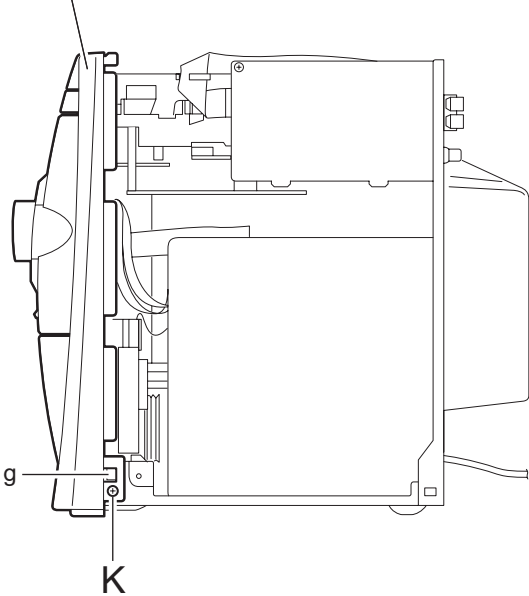


Fig.14

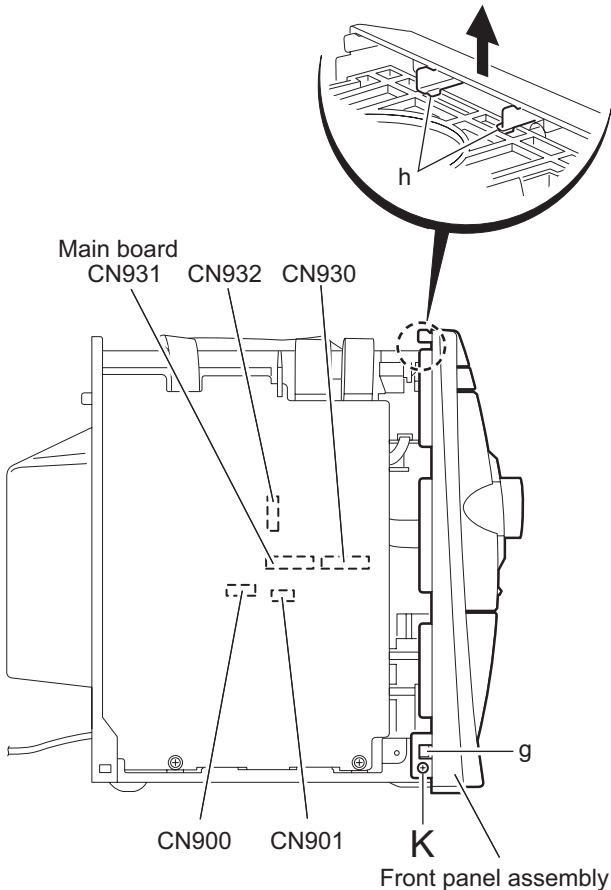


Fig.15

### 2.1.9 Removing the phones board (See Fig.16)

- Prior to performing procedure, remove the metal cover and the front panel assembly.
- (1) Disconnect the flat wire from the connector CN913 on the main board.

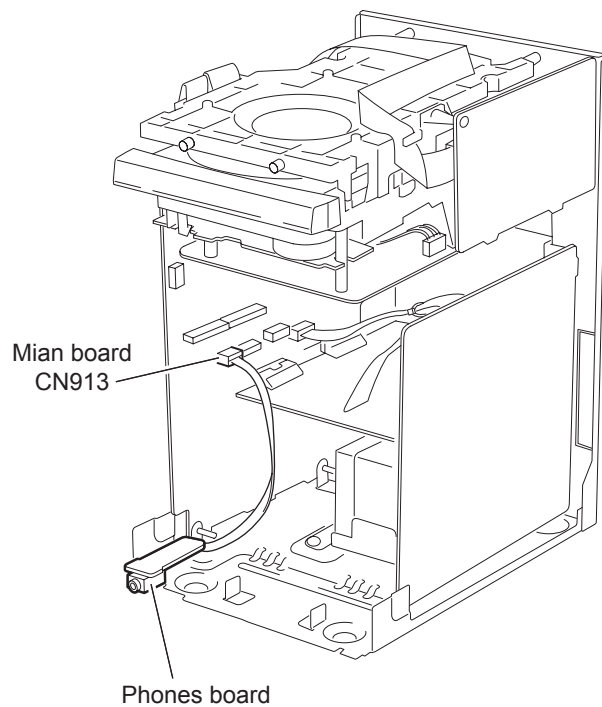
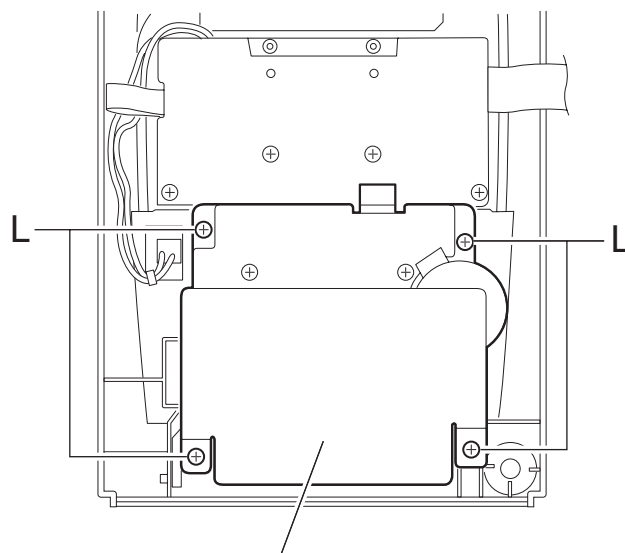


Fig.16

### 2.1.10 Removing the cassette mechanism assembly (See Fig.17)

- Prior to performing the following procedure, remove the metal cover and the front panel assembly.
- (1) Remove the four screws **L** attaching the cassette mechanism assembly.

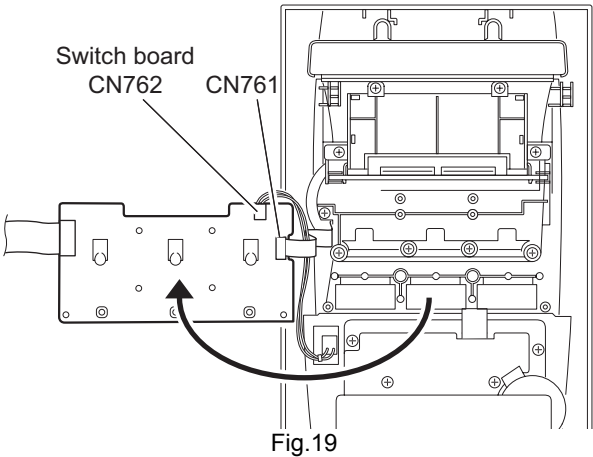
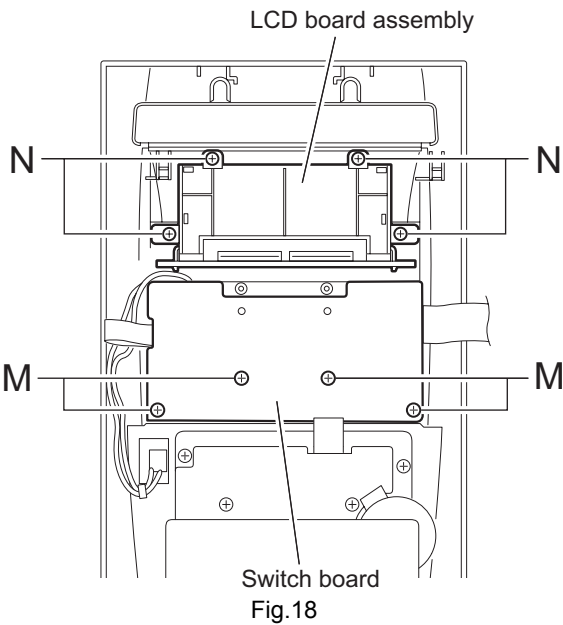
Cassette mechanism assembly  
Fig.17

**2.1.11 Removing the switch board**  
**(See Fig.18,19)**

- Prior to performing the following procedure, remove the metal cover and the front panel assembly.  
(1) Remove the four screws **M** attaching the switch board.  
(2) Move the switch board in the direction of the arrow to disconnect the wire from the connector CN762 and the card wire from the connector CN761.

**2.1.12 Remove the LCD board assembly**  
**(See Fig.18)**

- Prior to performing the following procedure, remove the metal cover and the front panel assembly.  
(1) Remove the four screws **N** attaching the LCD board assembly.



### 2.1.13 Removing the control panel assembly

(See Fig.20,21)

- Prior to performing the following procedure, remove the metal cover, the front assembly, the switch board and the LCD board assembly.
- (1) Remove the three screws **O** attaching the control panel assembly.
- (2) Release the three joints **i** and open the cassette door while pressing the cassette door, and then remove the control panel assembly in the direction of the arrow.

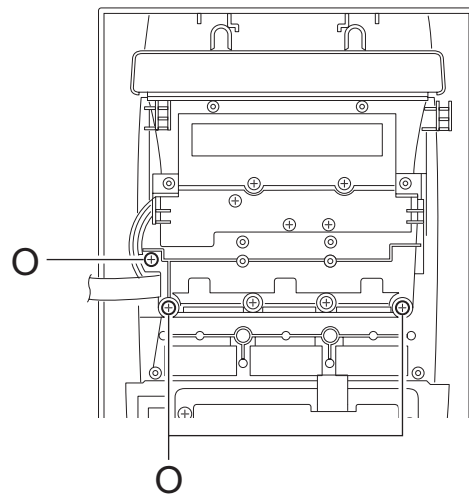


Fig.20

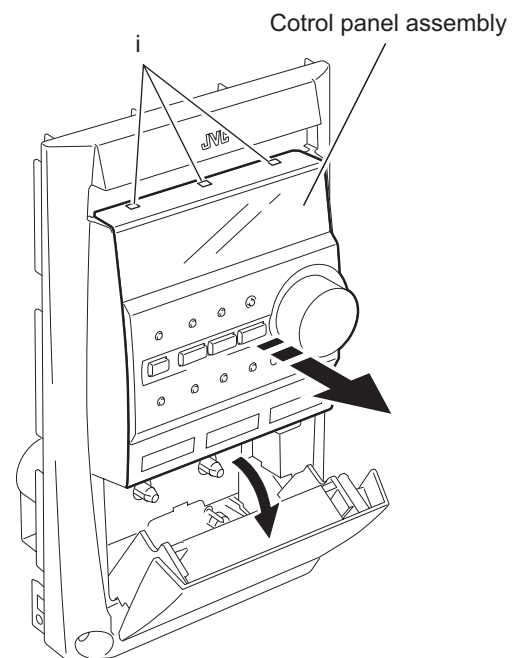
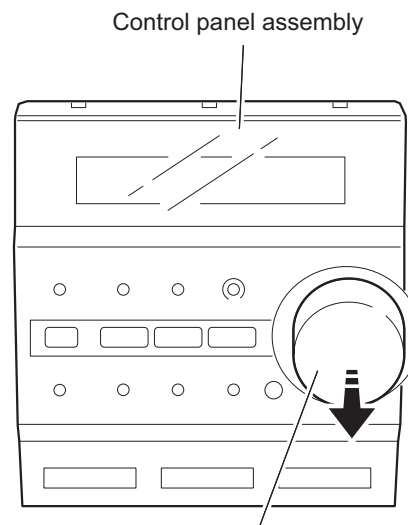


Fig.21

### 2.1.14 Removing the control board (See Fig.22,23)

- Prior to performing the following procedure, remove the metal cover, the front panel assembly, the switch board, the LCD board assembly and the control panel assembly.
  - (1) Pull out the volume knob.
  - (2) Remove the seven screws **P** attaching the control board.



Volume knob  
Fig.22

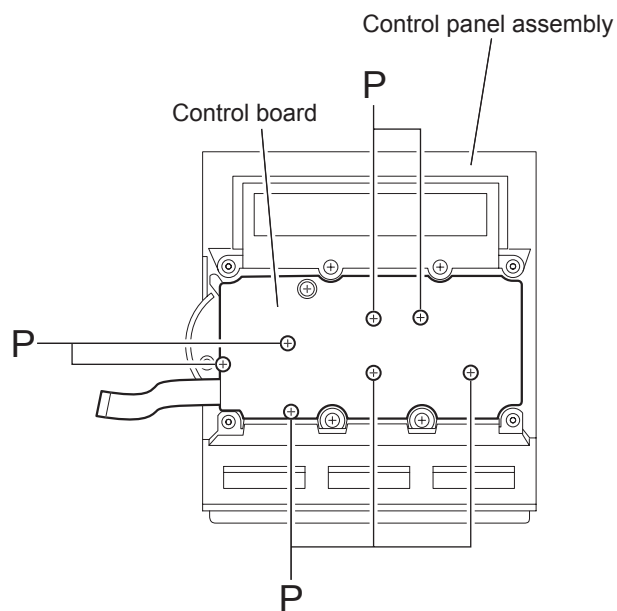


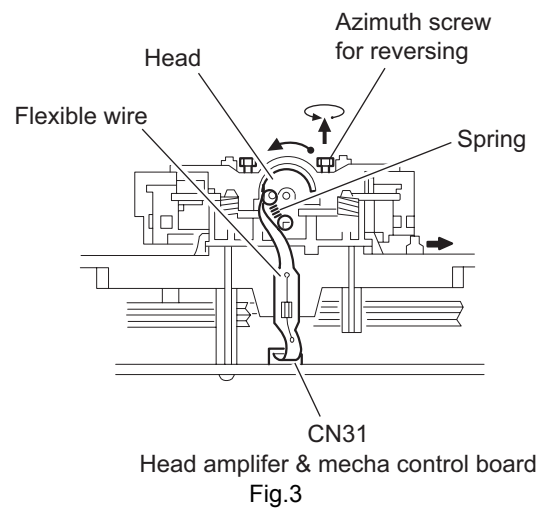
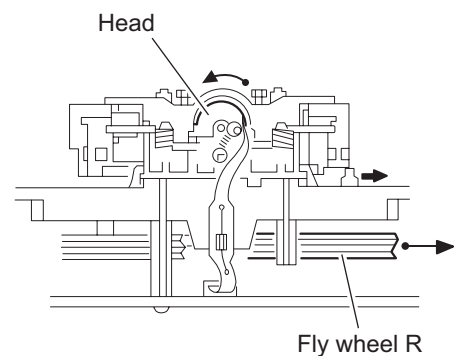
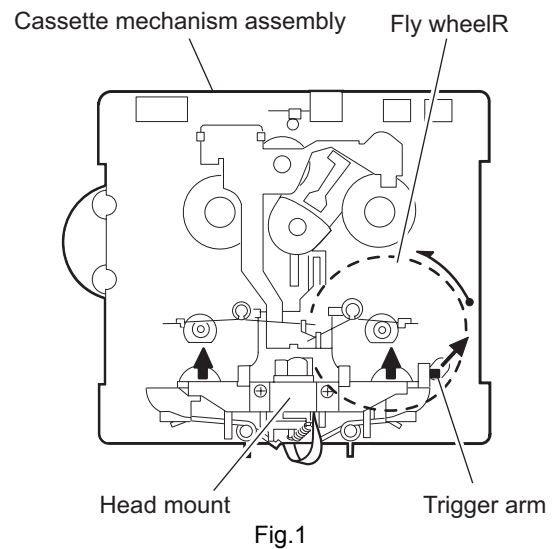
Fig.23

## 2.2 Cassette mechanism assembly

### 2.2.1 Removing the Play/Record & Clear head

(See Fig.1~3)

- (1) While moving the trigger arm on the right side of the head mount in the direction of the arrow, turn the flywheel R counterclockwise until the head mount comes ahead and clicks.
- (2) The head turns counterclockwise as you turn the flywheel R counterclockwise (See Fig.2 and 3).
- (3) Disconnect the flexible wire from connector CN31 on the head amplifier & mechanism control board.
- (4) Remove the spring from the back of the head.
- (5) Loosen the azimuth screw for reversing attaching the head.
- (6) Remove the head on the front side of the head mount.



**2.2.2 Removing the head amplifier & mechanism control board**  
(See Fig.4)

- (1) Turn over the cassette mechanism assembly and remove the three screws **A** attaching the head amplifier & mechanism control board.
- (2) Disconnect the flexible wire from connector CN31 on the head amplifier & mechanism control board.
- (3) Disconnect connector CN32 of the head amplifier & mechanism control board from connector CN1 on the reel pulse board.REFERENCE: If necessary, unsolder the 4-pin wire soldered to the main motor.

**2.2.3 Removing the main motor**  
(See Fig.4~7)

- (1) Remove the two screws **B**.
- (2) Half raise the motor and remove the capstan belt from the motor pulley.

**ATTENTION:**

Be careful to keep the capstan belt from grease. When reassembling, refer to Fig.6 and 7 for attaching the capstan belt.

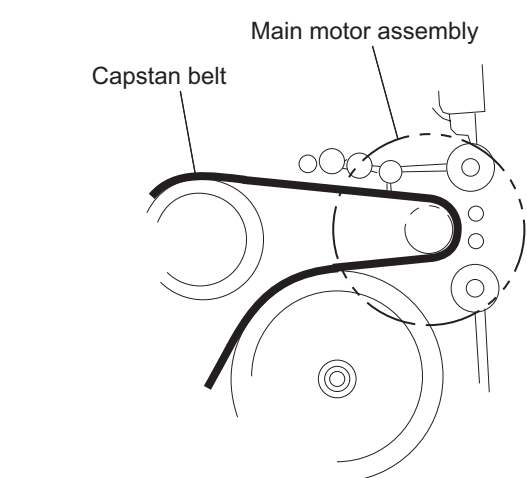


Fig.5

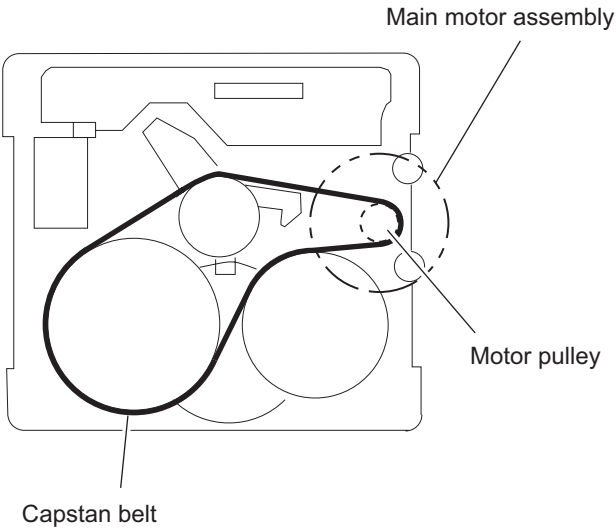


Fig.6

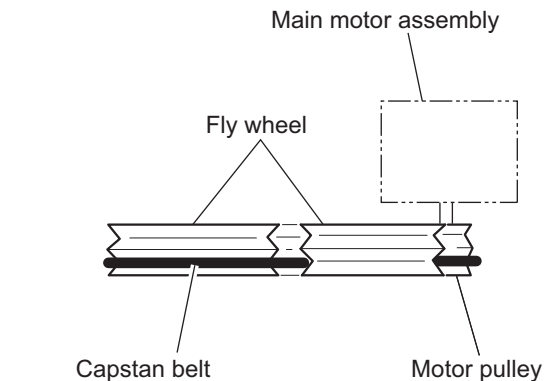


Fig.7

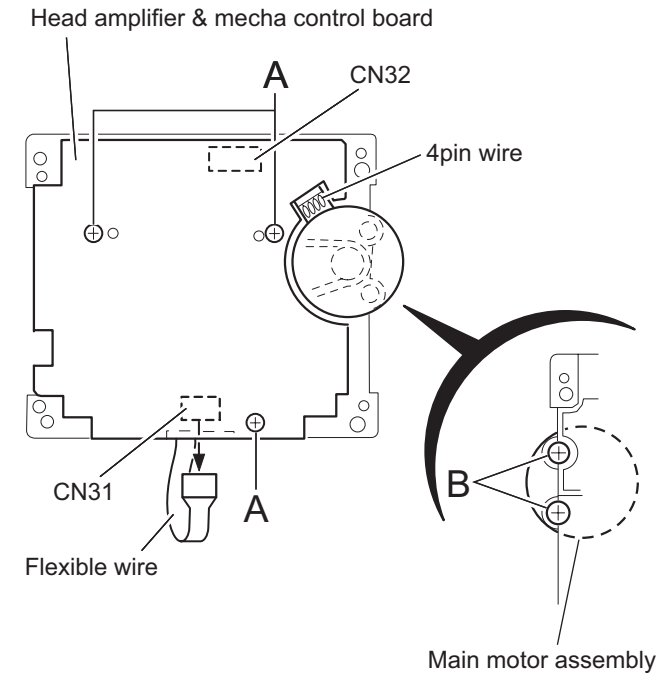
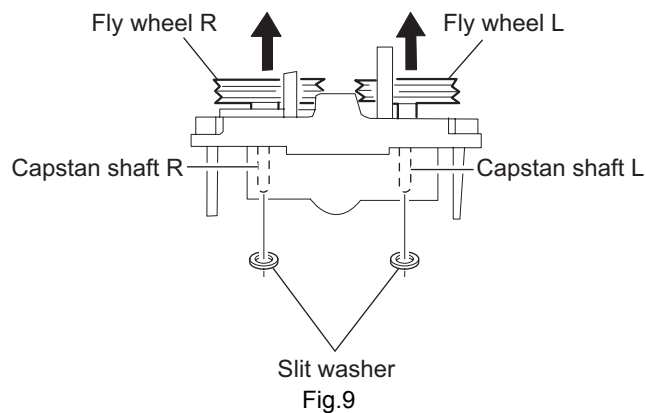
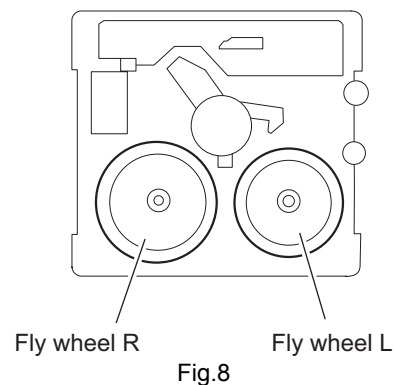


Fig.4



### 2.2.4 Removing the flywheel (See Fig.8, 9)

- Prior to performing the following procedure, remove the head amplifier & mechanism control board and the main motor assembly.
- (1) From the front side of the cassette mechanism, remove the slit washers attaching the capstan shaft **L** and **R**. Pull out the flywheels backward.



### 2.2.5 Removing the reel pulse board and solenoid (See Fig.10)

- Prior to performing the following procedure, remove the head amplifier & mechanism control board.
- (1) Remove the screw **C**.
- (2) Release the tab **a**, **b**, **c**, **d** and **e** retaining the reel pulse board.
- (3) Release the tab **f** and **g** attaching the solenoid on the reel pulse board.
- (4) The reel pulse board and the solenoid come off.

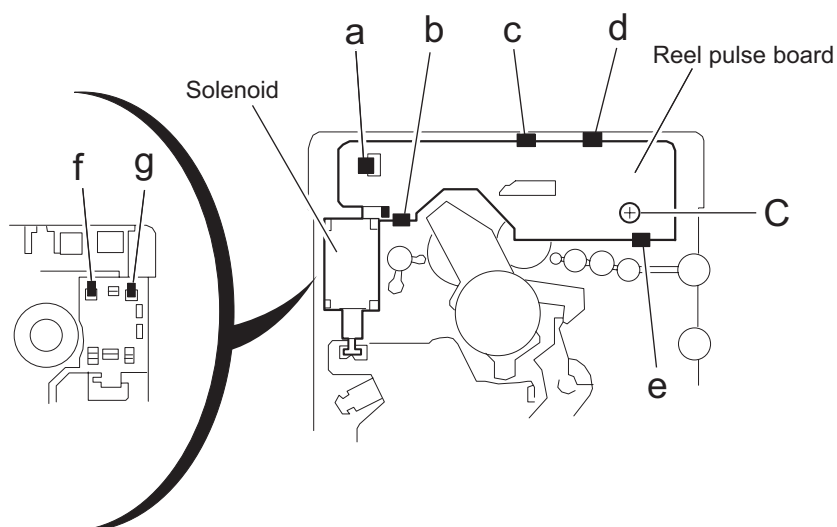


Fig.10

**2.2.6 Reattaching the Play/ Record & Clear head**  
**(See Fig.11~13)**

- (1) Reattaching the head mount assembly.
  - a) Change front of the direction cover of the head mount assembly to the left (Turn the head forward).
  - b) Fit the bosses **O'**, **P'**, **Q'**, **U'** and **V'** on the head mount assembly to the holes **P** and **V**, the slots **O**, **U** and **Q** of the mechanism sub assembly (See Fig.11 to 13).

**CAUTION:**

To remove the head mount assembly, turn the direction cover to the left to disengage the gear. If the gear can not be disengaged easily, push up the boss **Q'** slightly and raise the rear side of the head mounts slightly to return the direction lever to the reversing side.

- (2) Tighten the azimuth screw for reversing.
- (3) Reattach the spring from the back of the Play/ Record & Clear head.
- (4) Connect the flexible wire to connector CN31 on the head amplifier & mechanism control board.

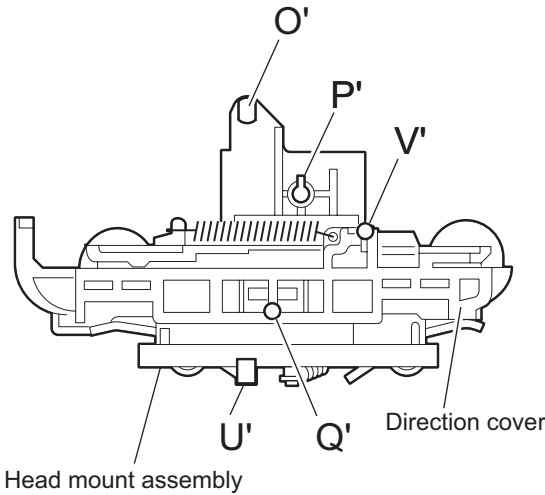


Fig.11

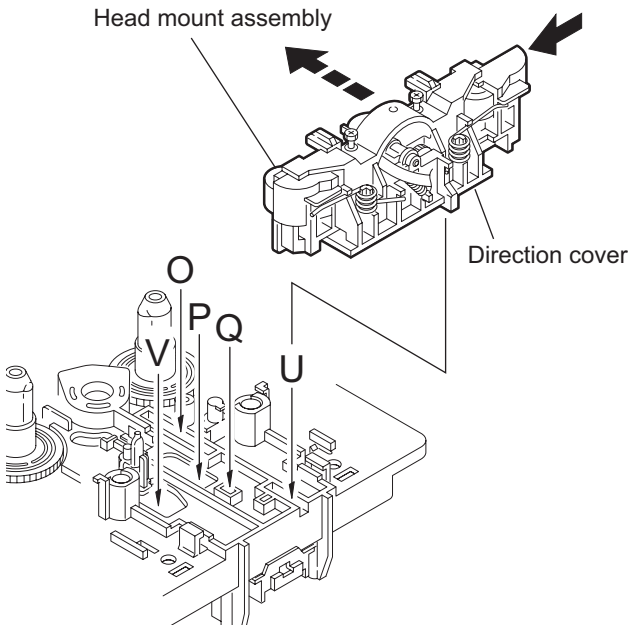


Fig.12

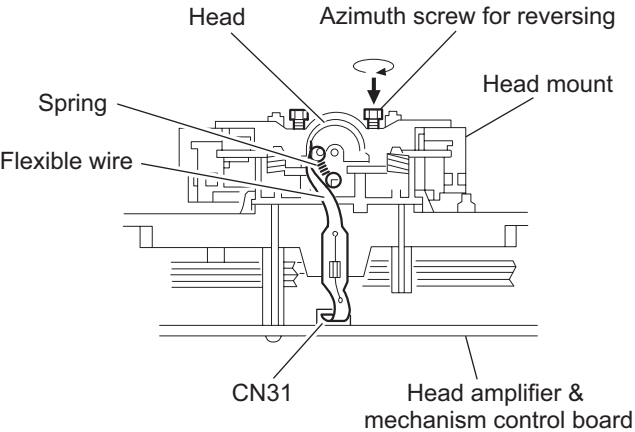
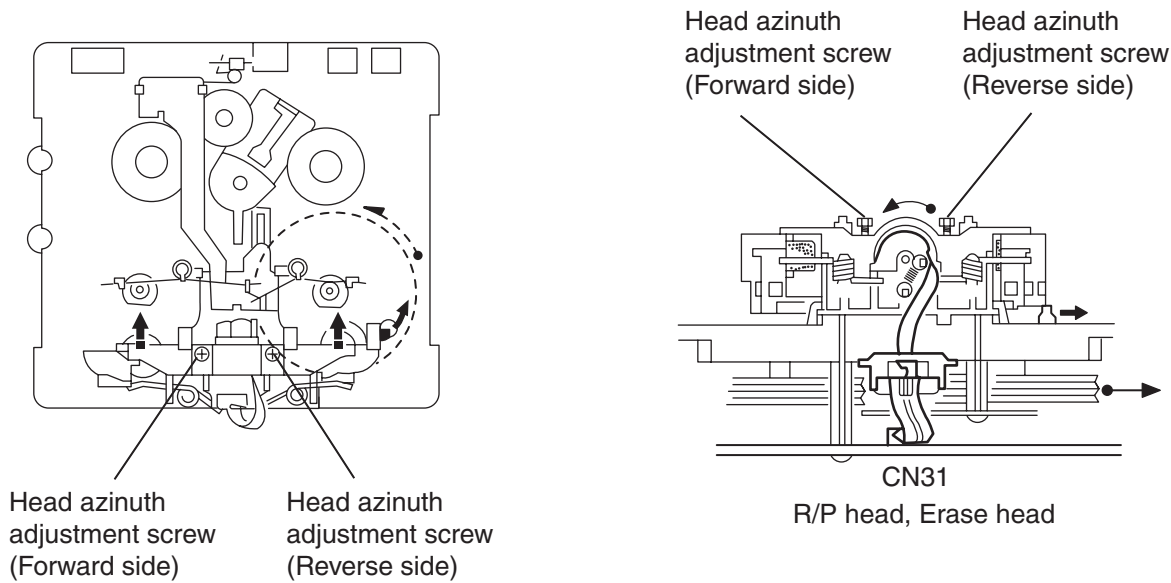


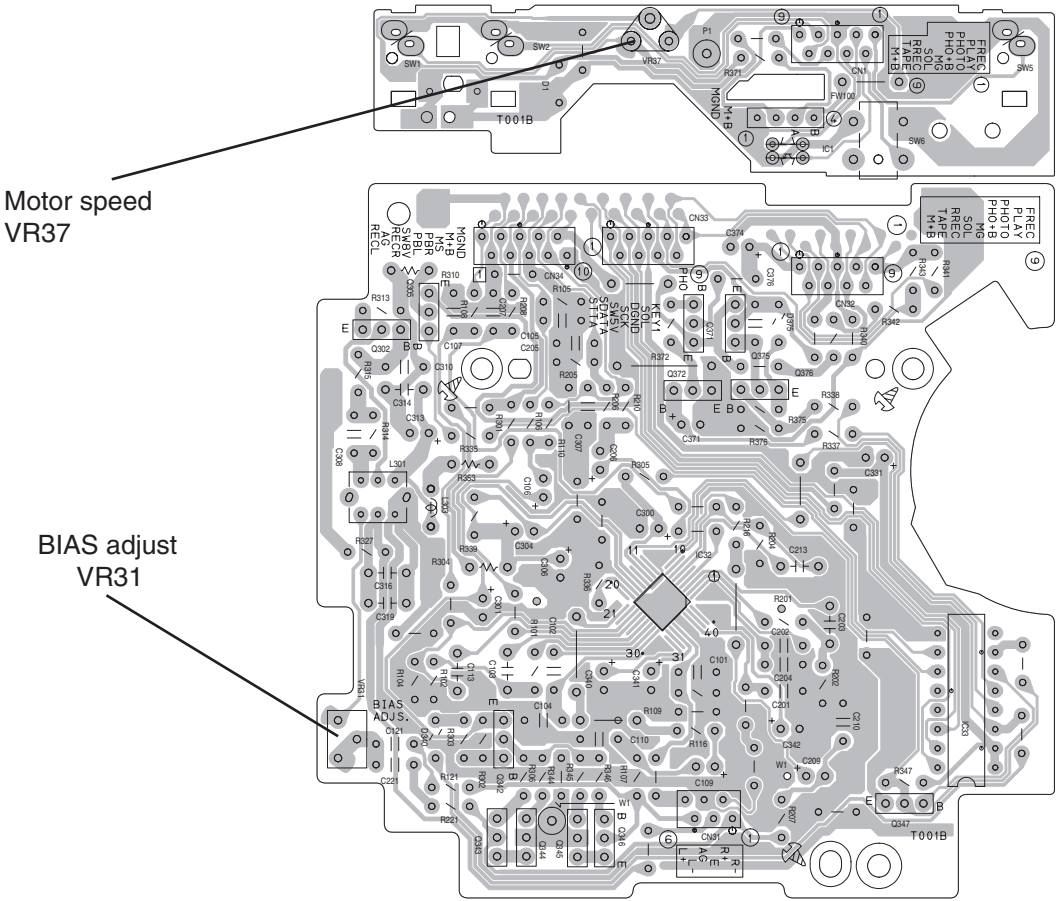
Fig.13



3.2 Cassette mechanism adjustment



Mecha control board



## 3.2.1 Mechanism section

Item	Condition	Measurement method	Ref.value	Adjustment position
Head azimuth	Test tape : VT703L (8kHz) Output terminal : Speaker out	1.Playback the test tape VT703L (8kHz). 2.Adjust to maximum output level by azimuth adjustment screw for forward side and reverse side. 3.This adjustment is adjust by adjustment screw of forward side and adjustment screw of reverse side.	Maximum output	Only adjust at changed head
Tape speed	Test tap : VT712 (3kHz) Output terminal : Speaker out or Headphone out	Playback the test tape VT712 (3kHz) at end of forward side,adjust to 2,940~3,90Hz indication of frequency counter by VR37.	2,940 ~ 3,090Hz	VR37

Item	Condition	Measurement method	Ref.value	Adjustment position
Tape speed diviation at FWD/REV	Test tape : VT712 (3kHz) Output terminal : Speaker out or Headphone out	Playback the test tape VT712 (3kHz) at end of forward and reverse, tape speed deviation should be less than 6.0Hz.	Leass than 6.0Hz	VR31
Wow & Flutter	Test tape : VT712 (3kHz) Output terminal : Speaker out or Headphone out	Playback the test tape VT712 (3kHz) at start of forward and reverse,Wow & Flutter are should be less than 0.25%(WRMS).	Less than 0.25% (WRMS)	

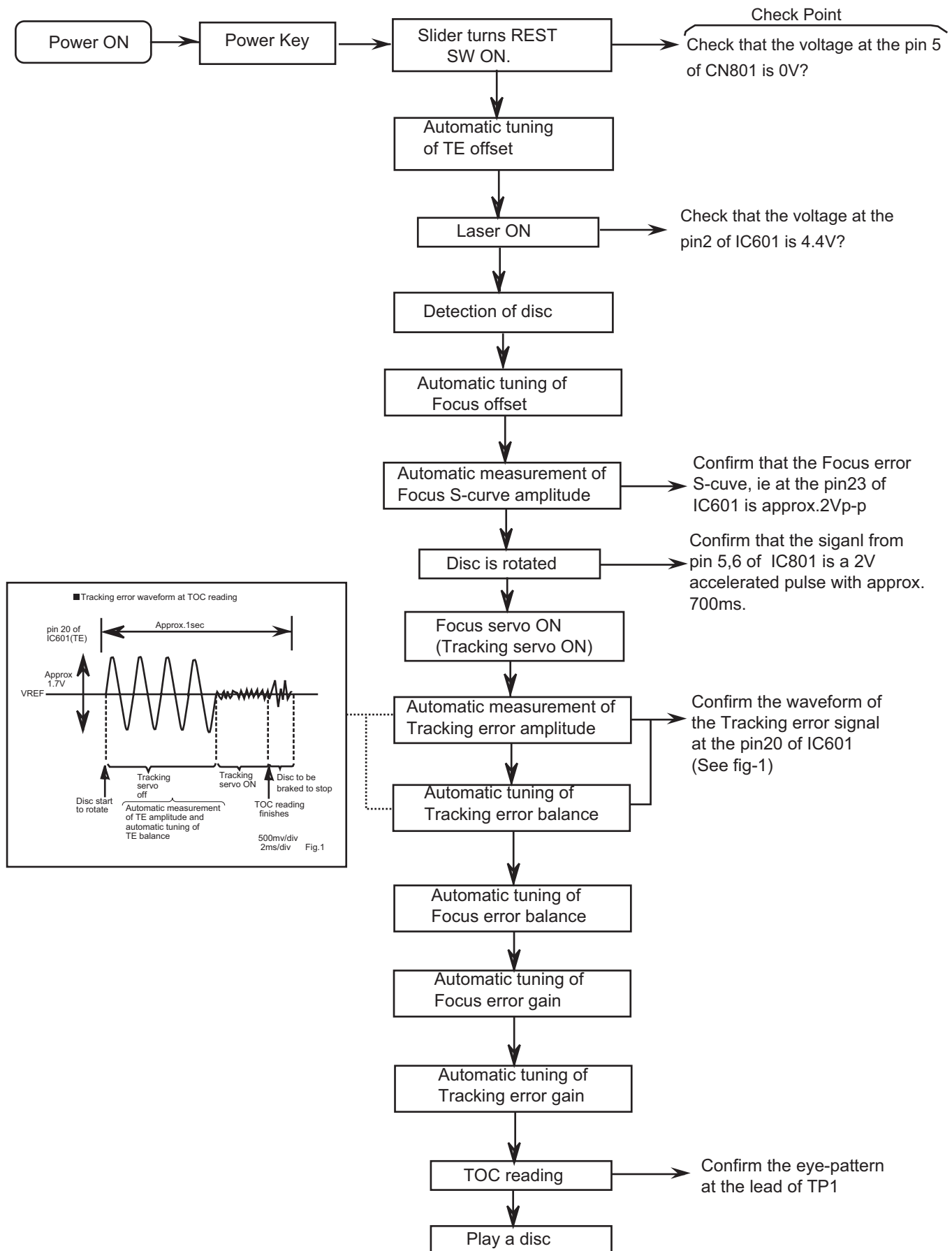
### 3.2.2 Electrical adjustment

Item	Condition	Measurement method	Ref.value	Adjustment position
Recording BIAS adjustment	<ul style="list-style-type: none"> <li>Forward or Reverse</li> <li>Test tape               <ul style="list-style-type: none"> <li>:AC-514 TYPE II</li> <li>:AC-225 TYPE I</li> </ul> </li> <li>Output terminal               <ul style="list-style-type: none"> <li>Recording head</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>Set the test tape(AC-514 TYPE II and AC-225 TYPE I), then make REC/PAUSE condition.</li> <li>Connect <math>100\ \Omega</math> to recording head by series, then connect to VTVM for measurement the current.</li> <li>After setting, start the recording by release the PAUSE, in this time bias current adjust to next fig. by VR31 for Lch and VR32 for Rch.</li> <li><math>4.0\ \mu\text{A}</math> (TYPE II ) and <math>4.20\ \mu\text{A}</math> (TYPE I).</li> </ol>	AC-225 : $4.20\ \mu\text{A}$ AC-514 : $4.0\ \mu\text{A}$	VR31
R/P playback frequency response	<ul style="list-style-type: none"> <li>Reference frequency               <ul style="list-style-type: none"> <li>: 1kHz / 10kHz</li> <li>(Reference: -20dB)</li> </ul> </li> <li>Test tape               <ul style="list-style-type: none"> <li>: AC-514 TYPE II</li> </ul> </li> <li>Input terminal               <ul style="list-style-type: none"> <li>: OSC IN</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>Set the test tape (AC-514 TYPE II), then make REC/PAUSE condition.</li> <li>Release the PAUSE, then start recording the 1kHz and 10kHz of reference frequency from oscillator.</li> <li>Playback the recorded position, 1kHz and 10kHz output deviation should <math>-1\text{dB} \pm 2\text{dB}</math> to readjust by VR31 for Lch and VR32 for Rch.</li> </ol>	Output deviation 1kHz/10kHz : $-1\text{dB} \pm 2\text{dB}$	VR31

### 3.2.3 Electrical response confirmation

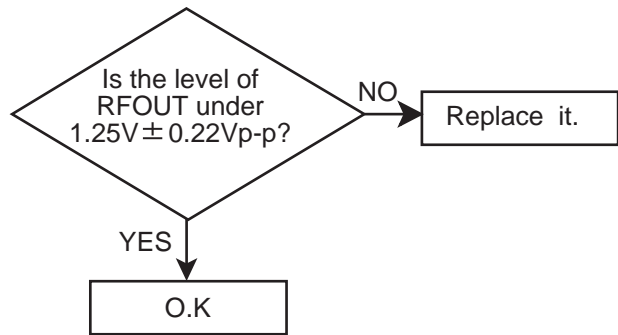
Item	Condition	Measurement method	Ref.value	Adjustment position
Recording bias current	Forward or Reverse <ul style="list-style-type: none"> <li>Test tape               <ul style="list-style-type: none"> <li>: TYPE II (AC-514)</li> </ul> </li> <li>Measurement terminal               <ul style="list-style-type: none"> <li>: BIAS test point on printed circuit board</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>Change BIAS1 and 2, confirm the frequency should be change.</li> <li>Set the test tape (AC-514 TYPE II), then make REC/PAUSE condition.</li> <li>Confirm the frequency should <math>100\text{Hz} \pm 6\text{kHz}</math> at BIAS test point on printed circuit board.</li> </ol>	100 kHz $\pm 6\text{ kHz}$	
Erase current (reference value)	Forward or Reverse <ul style="list-style-type: none"> <li>Rec condition</li> <li>Test tape               <ul style="list-style-type: none"> <li>: AC-514 TYPE II</li> <li>: AC-225 TYPE I</li> </ul> </li> <li>Measurement terminal               <ul style="list-style-type: none"> <li>: Both side of Erase head</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>Set the test tape (AC-514 TYPE II and AC-225 TYPE I ), then make REC/PAUSE condition.</li> <li>Release the PAUSE to REC condition, connect 1W to ERASE head by series, then confirm the erase current at both side of erase head.</li> </ol>	TYPE II : 120 mA TYPE I : 75 mA	

### 3.3 Flow of functional operation until TOC read (CD)



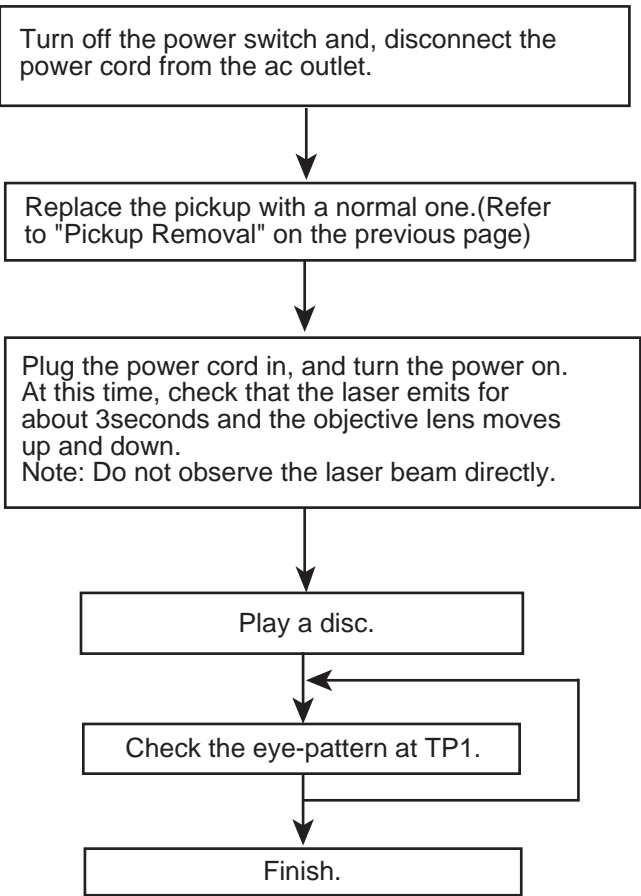
3.4 Maintenance of laser pickup (CD)

- (1) Cleaning the pick up lens  
Before you replace the pick up, please try to clean the lens with a alcohol soaked cotton swab.
- (2) Life of the laser diode  
When the life of the laser diode has expired, the following symptoms will appear.
  - The level of RF output (EFM output: amplitude of eye pattern) will be low.



- (3) Semi-fixed resistor on the APC PC board  
The semi-fixed resistor on the APC printed circuit board which is attached to the pickup is used to adjust the laser power. Since this adjustment should be performed to match the characteristics of the whole optical block, do not touch the semi-fixed resistor.  
If the laser power is lower than the specified value, the laser diode is almost worn out, and the laser pickup should be replaced. If the semi-fixed resistor is adjusted while the pick-up is functioning normally, the laser pickup may be damaged due to excessive current.

3.5 Replacement of laser pickup (CD)



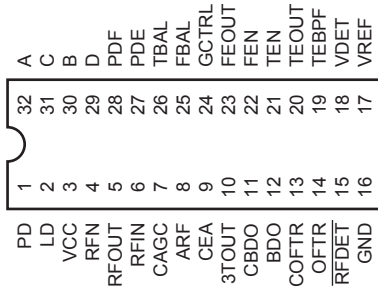


## SECTION 4

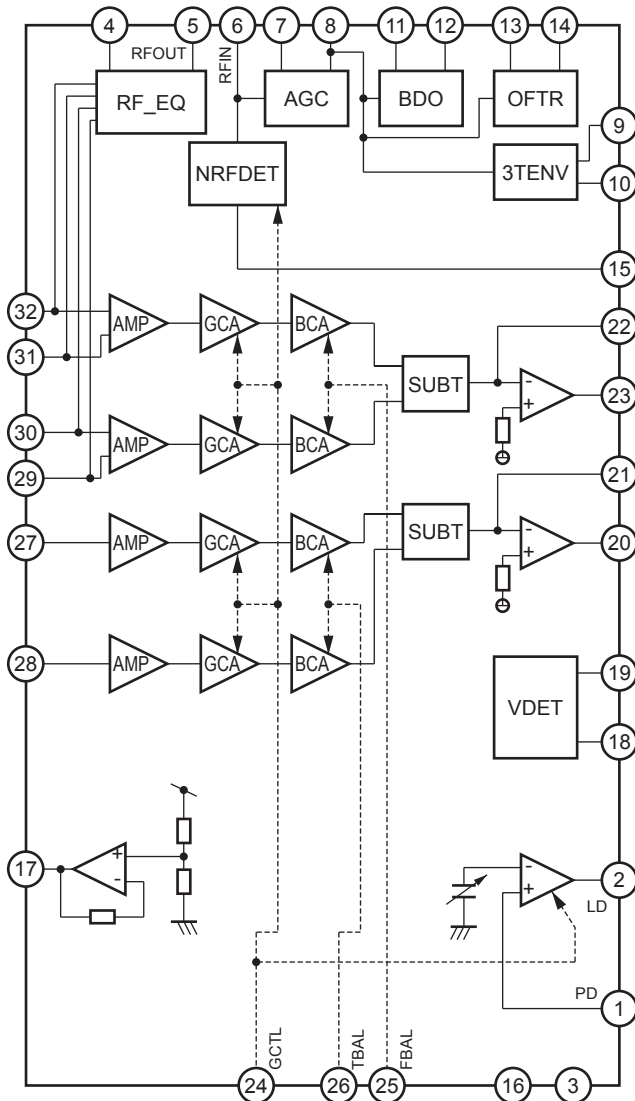
### Description of major ICs

#### 4.1 AN22000A-W (IC601) : RF & SERVO AMP

##### • Terminal layout



##### • Block diagram

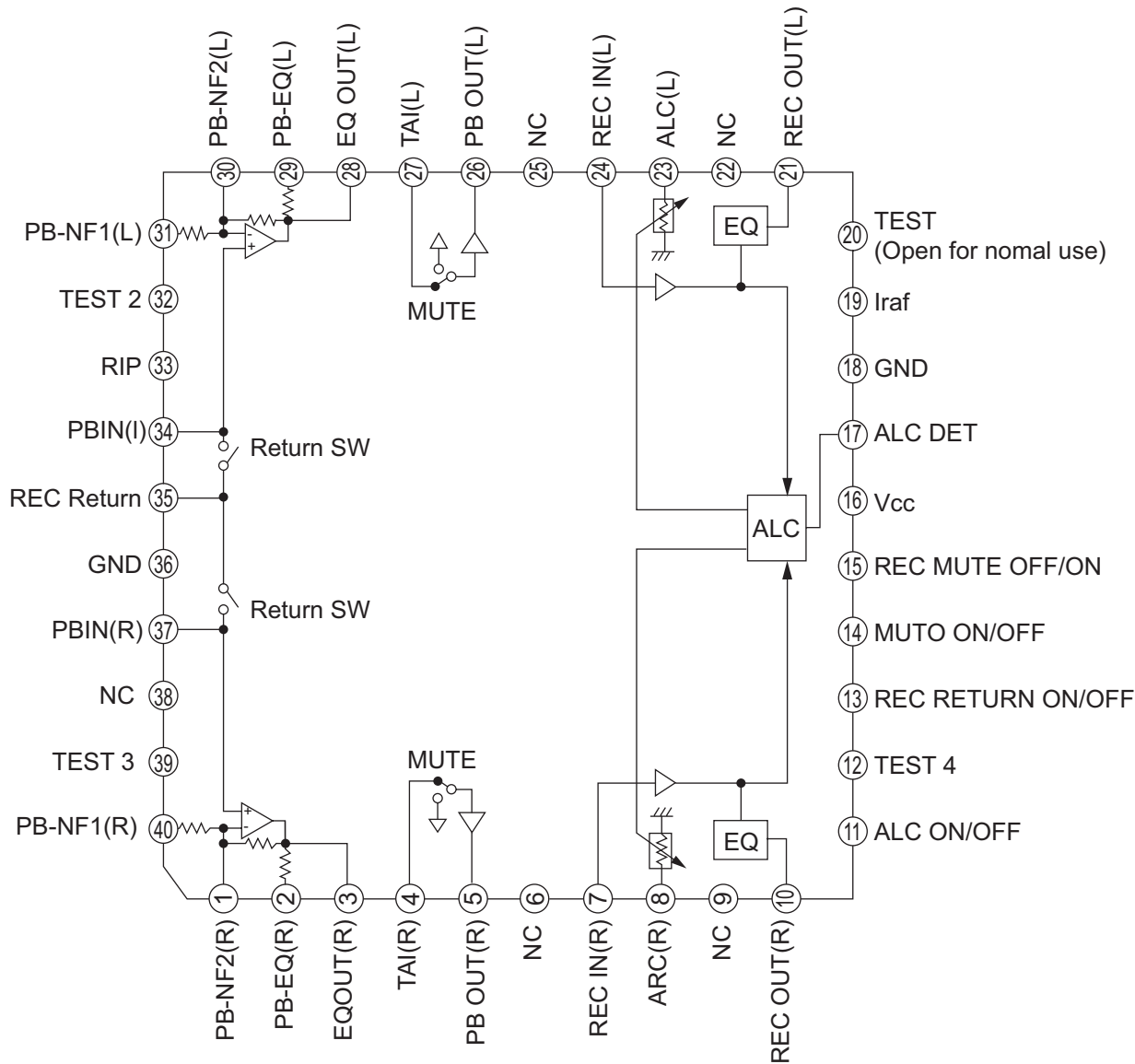


##### • Pin function

Pin No.	Symbol	I/O	Function
1	PD	I	APC Amp. input terminal
2	LD	O	APC Amp. output terminal
3	VCC	-	Power supply terminal
4	RFN	I	RF adder Amp. inverting input terminal
5	RFOUT	O	RF adder Amp. output terminal
6	RFIN	I	AGC input terminal
7	CAGC	I	Input terminal for AGC loop filter capacitor
8	ARF	O	AGC output terminal
9	CEA	I	Capacitor connecting terminal for HPF-Amp.
10	3TOUT	O	3 TENV output terminal
11	CBDO	I	Capacitor connecting terminal for envelope detection on the darkness side
12	BDO	O	BDO output terminal
13	COFTR	I	Capacitor connecting terminal for envelope detection on the light side
14	OFTR	O	OFTR output terminal
15	NRFDET	O	NRFDET output terminal
16	GND	-	Ground
17	VREF	O	VREF output terminal
18	VDET	O	VDET output terminal
19	TEBPF	I	VDET output terminal
20	TEOUT	O	TE Amp. output terminal
21	TEN	I	TE Amp. inverting input terminal
22	FEN	I	FE Amp. inverting input terminal
23	FEOUT	O	FE Amp. output terminal
24	GCTL	O	GCTL & APC terminal
25	FBAL	O	FBAL control terminal
26	TBAL	O	TBAL control terminal
27	E	I	Tracking signal input terminal 1
28	F	I	Tracking signal input terminal 2
29	D	I	Focus signal input terminal 4
30	B	I	Focus signal input terminal 3
31	C	I	Focus signal input terminal 2
32	A	I	Focus signal input terminal 1

4.2 HA12238F (IC32) : R/P Equalizer

- Pin layout

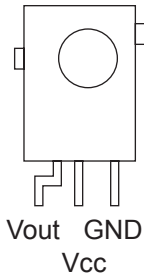


- Pin function

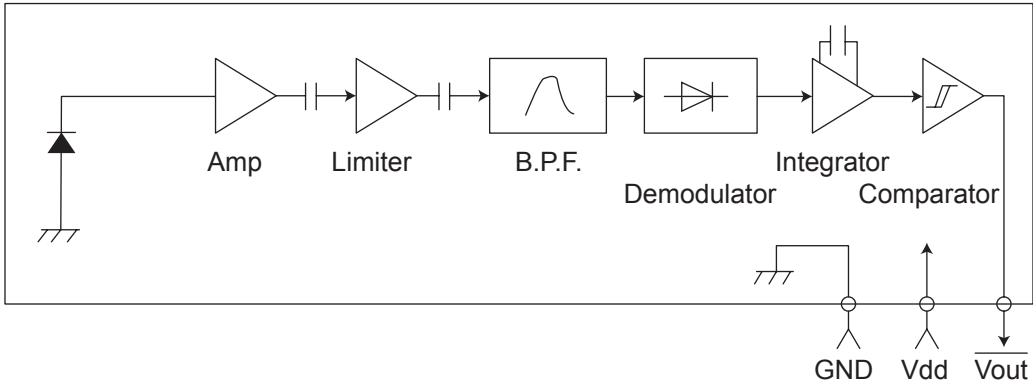
Pin No.	Symbol	Function
1	PB-NF2(R)	PB EQ feed back
2	PB-EQ(R)	NAB output
3	EQOUT(R)	EQ output
4	TAI(R)	Tape input
5	PBOUT(R)	PB output
6	NC	NC pin
7	REC IN(R)	REC-EQ input
8	ALC(R)	ALC(R) signal out put
9	NC	NC pin
10	REC OUT(R)	REC output
11	ALC ON/OFF	Mode control input
12	TEST4	TEST pin
13	REC Return ON/OFF	Mode control input
14	MUTE ON/OFF	Mode control input
15	REC Return ON/OFF	Mode control input
16	Vcc	Vcc Pin
17	ALC DET	ALC detection signal out put
18	GND	GND pin
19	I REF	Equalizer reference current input
20	Test mode	Test modepin
21	REC OUT(L)	REC output
22	NC	NC pin
23	ALC(L)	ALC(L) signal out put
24	REC IN(L)	REC-EQ input
25	NC	NC pin
26	PBOUT(L)	PB output
27	TAI(L)	Tape input
28	EQOUT(L)	EQ output
29	PB-EQ(L)	NAB output
30	PB-NF2(L)	PB EQ feed back
31	PB-NF1(L)	PB EQ feed back
32	TEST2	TEST pin
33	RIP	Ripple filter
34	PBIN(L)	PB input
35	REC-RETURN	REC Return
36	GND	GND pin
37	PBIN(R)	PB input
38	NC	NC pin
39	TEST3	TEST pin
40	PB-NF1(R)	PB EQ feed back

4.3 GP1UM261XK (IC750) : Receiver

- Pin layout

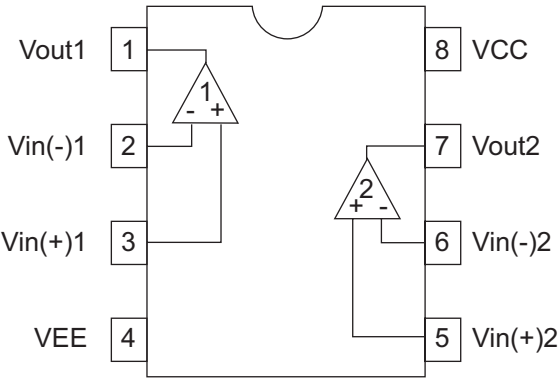


- Block diagram



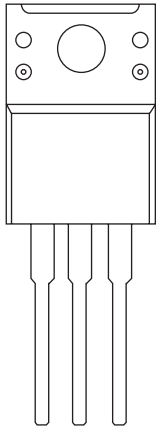
4.4 HA17758A (IC902,IC944) : Dual Operational Amp

- Pin layout

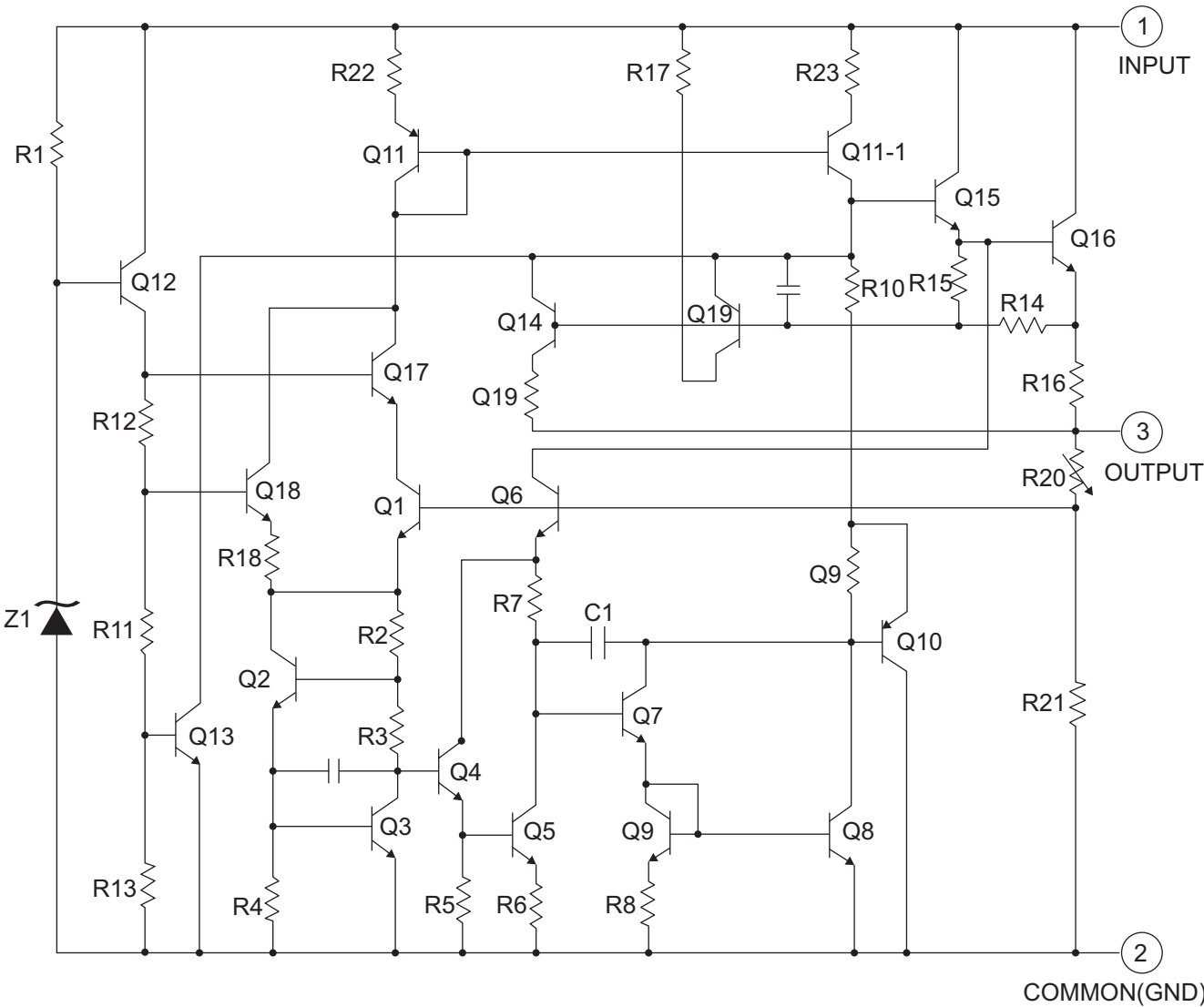


4.5 KIA7810API (IC942) : Regulator

- Pin Layout

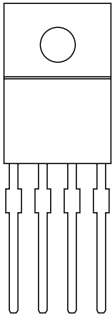


- Block Diagram

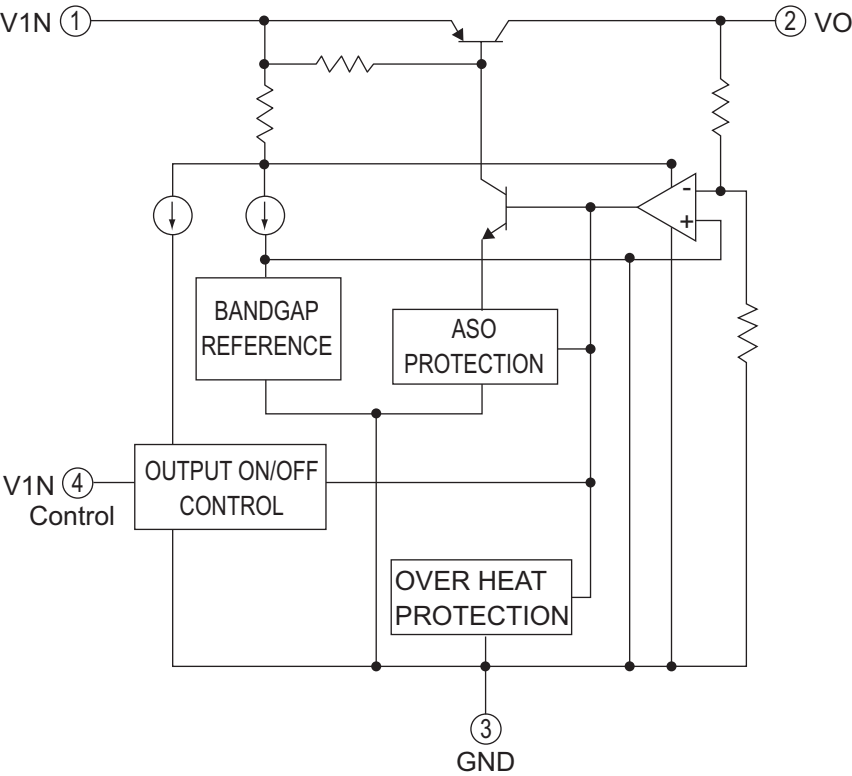


4.6 KIA78R08PI (IC943) :Regulater

- Pin Layout

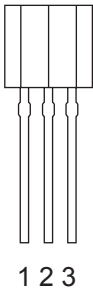


- Block Diagram

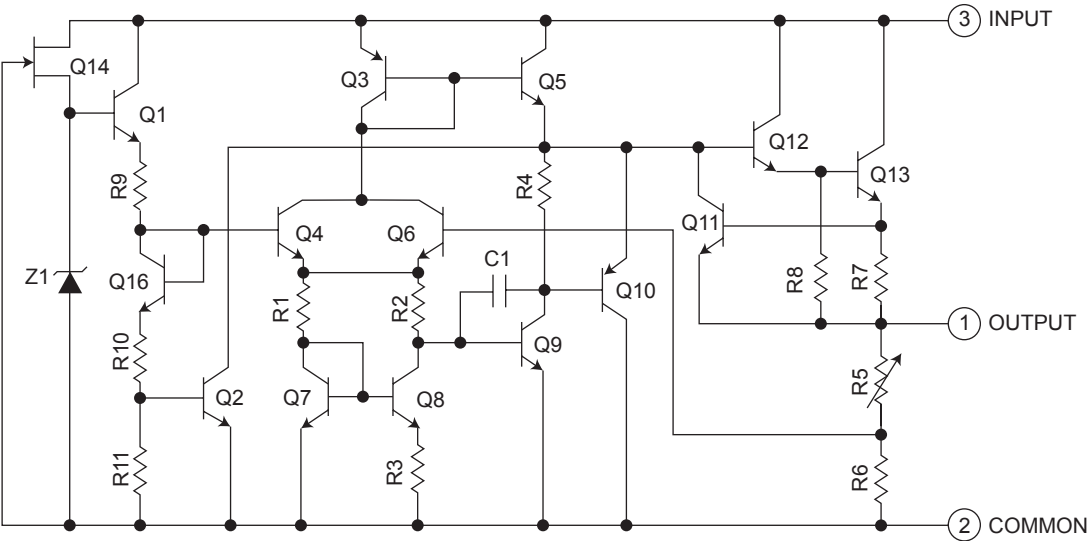


4.7 KIA78S06P-T (IC932) : Regulator

- Pin layout

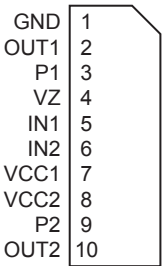


- Block diagram



4.8 LB1641 (IC802) : DC Motor driver

- Pin layout

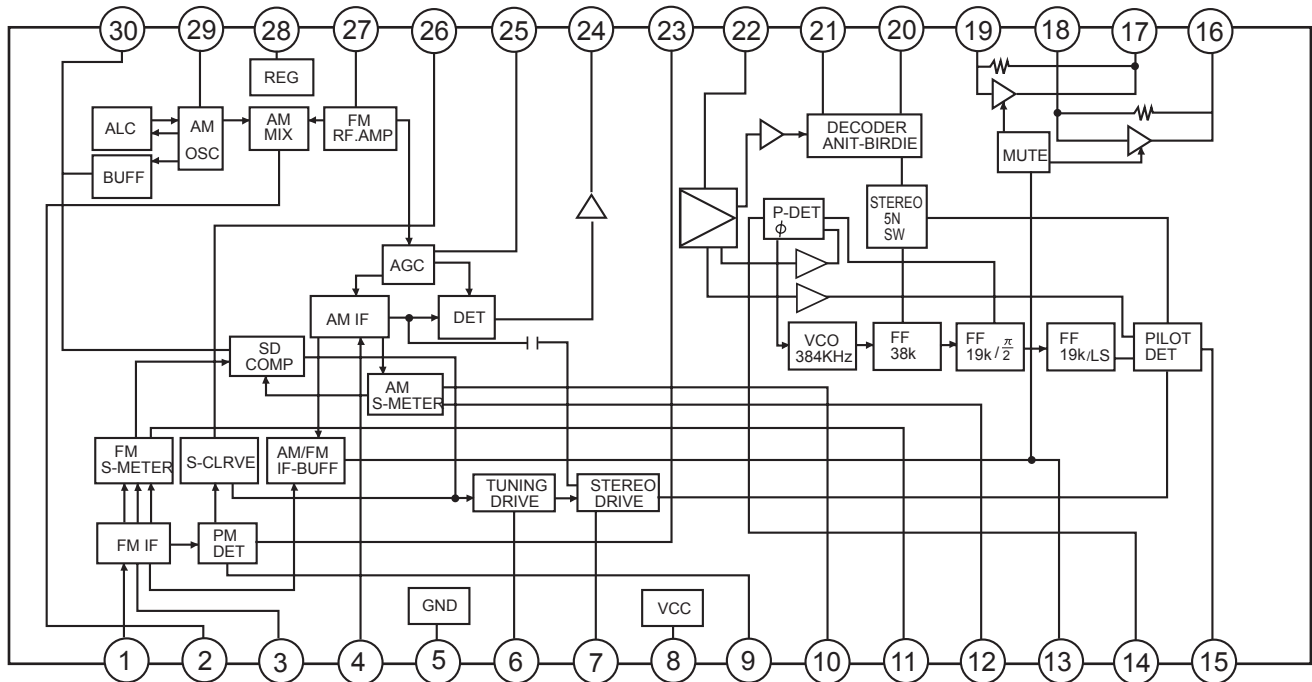


- Truth table

Input		Output		Mode
IN1	IN2	OUT1	OUT2	
0	0	0	0	Brake
1	0	1	0	CLOCKWISE
0	1	0	1	COUNTER-CLOCKWISE
1	1	0	0	Brake

#### 4.9 LA1838 (IC1): FM AM IF AMP&detector, FM MPX Decoder

##### • Block Diagram



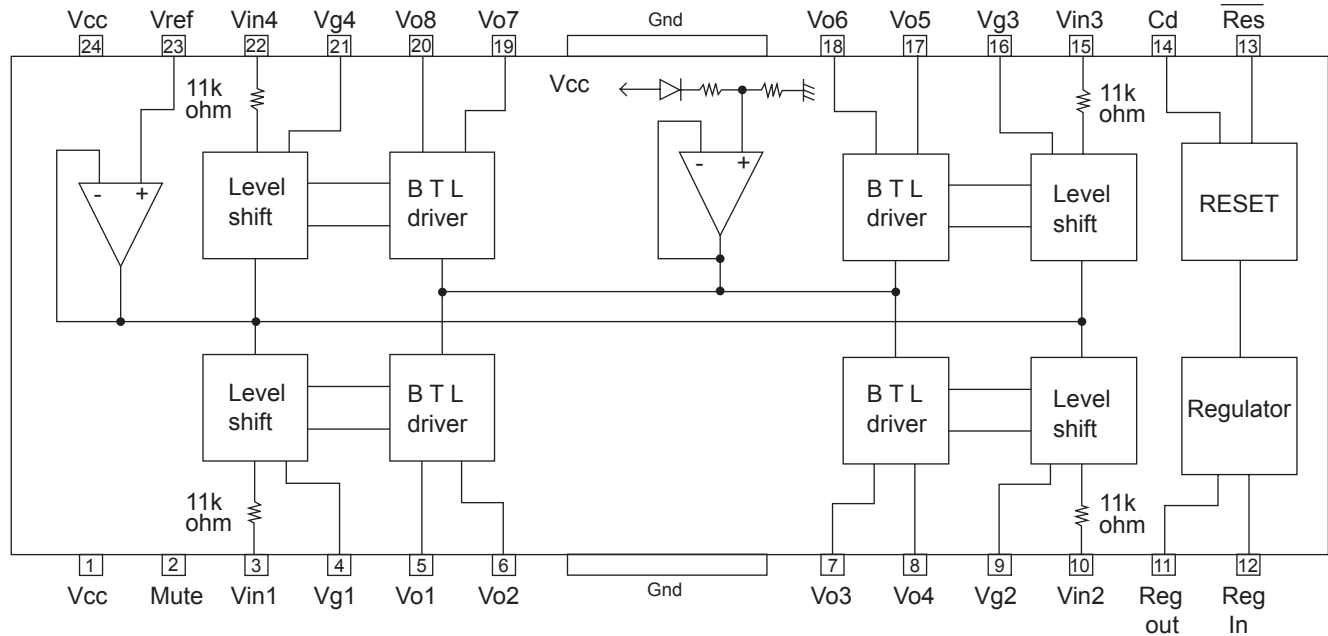
##### • Pin Function

Pin No.	Symbol	I/O	Function
1	FM IN	I	This is an input terminal of FM IF signal.
2	AM MIX	O	This is an out put terminal for AM mixer.
3	FM IF	I	Bypass of FM IF
4	AM IF	I	Input of AM IF Signal.
5	GND	-	This is the device ground terminal.
6	TUNED	O	When the set is tunning,this terminal becomes "L".
7	STEREO	O	Stereo indicator output. Stereo "L", Mono: "H"
8	VCC	-	This is the power supply terminal.
9	FM DET	-	FM detect transformer.
10	AM SD	-	This is a terminal of AM ceramic filter.
11	FM VSM	O	Adjust FM SD sensitivity.
12	AM VSM	O	Adjust AM SD sensitivity.
13	MUTE	I/O	When the signal of IF REQ of IC121(LC72131) appear, the signal of FM/AM IF output. //Muting control input.
14	FM/AM	I	Change over the FM/AM input. "H" :FM, "L" : AM
15	MONO/ST	O	Stereo : "H", Mono: "L"
16	L OUT	O	Left channel signal output.
17	R OUT	O	Right channel signal output.
18	L IN	I	Input terminal of the Left channel post AMP.
19	R IN	I	Input terminal of the Right channel post AMP.
20	RO	O	Mpx Right channel signal output.
21	LO	O	Mpx Left channel signal output.
22	MPX IN	I	Mpx input terminal
23	FM OUT	O	FM detection output.
24	AM DET	O	AM detection output.
25	AM AGC	I	This is an AGC voltage input terminal for AM
26	AFC	-	This is an output terminal of voltage for FM-AFC.
27	AM RF	I	AM RF signal input.
28	REG	O	Register value between pin 26 and pin28 besides the frequency width of the input signal.
29	AM OSC	-	This is a terminal of AM Local oscillation circuit.
30	OSC BUFFER	O	AM Local oscillation Signal output.



#### 4.10 LA6541-X (IC801) : Servo driver

##### • Pin layout & Block diagram



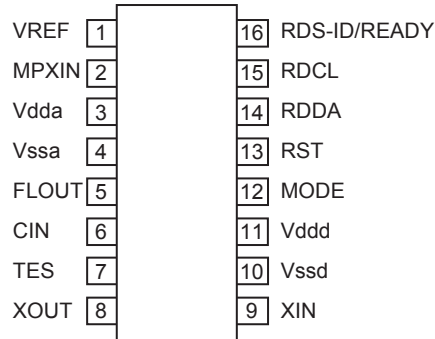
##### • Pin function

Pin No.	Symbol	Description
1	Vcc	Power supply (Shorted to pin 24)
2	Mute	All BTL amplifier outputs ON/OFF
3	Vin1	BTL AMP 1 input pin
4	Vg1	BTL AMP 1 input pin (For gain adjustment)
5	Vo1	BTL AMP 1 input pin (Non inverting side)
6	Vo2	BTL AMP 1 input pin (Inverting side)
7	Vo3	BTL AMP 2 input pin (Inverting side)
8	Vo4	BTL AMP 2 input pin (Non inverting side)
9	Vg2	BTL AMP 2 input pin (For gain adjustment)
10	Vin2	BTL AMP 2 input pin
11	Reg Out	External transistor collector (PNP) connection. 5V power supply output
12	Reg In	External transistor (PNP) base connection
13	Res	Reset output
14	Cd	Reset output delay time setting (Capacitor connected externally)
15	Vin3	BTL AMP 3 input pin
16	Vg3	BTL AMP 3 input pin (For gain adjustment)
17	Vo5	BTL AMP 3 output pin (Non inverting side)
18	Vo6	BTL AMP 3 output pin (Inverting side)
19	Vo7	BTL AMP 4 output pin (Inverting side)
20	Vo8	BTL AMP 4 output pin (Non inverting side)
21	Vg4	BTL AMP 4 output pin (For gain adjustment)
22	Vin4	BTL AMP 4 output pin
23	Vref	Level shift circuit's reference voltage application
24	Vcc	Power supply (Shorted to pin 1)

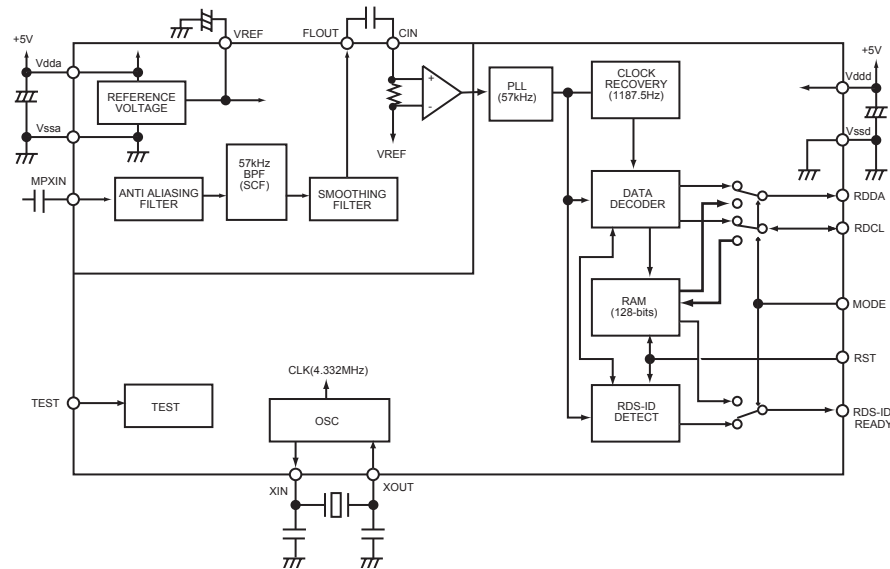


#### 4.12 LC72723(IC3): RDS demodulation

- Pin layout



- Block Diagram

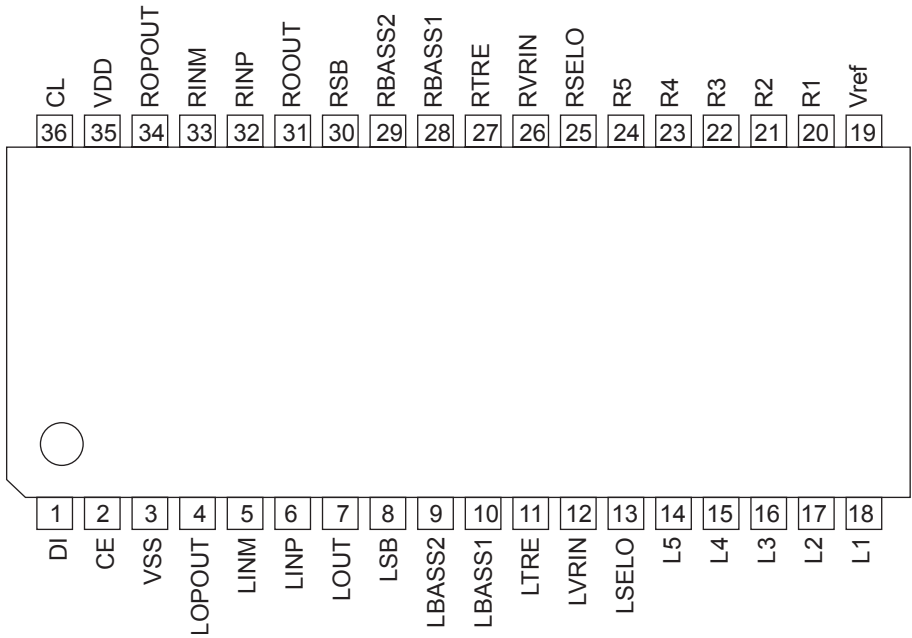


- Pin functions

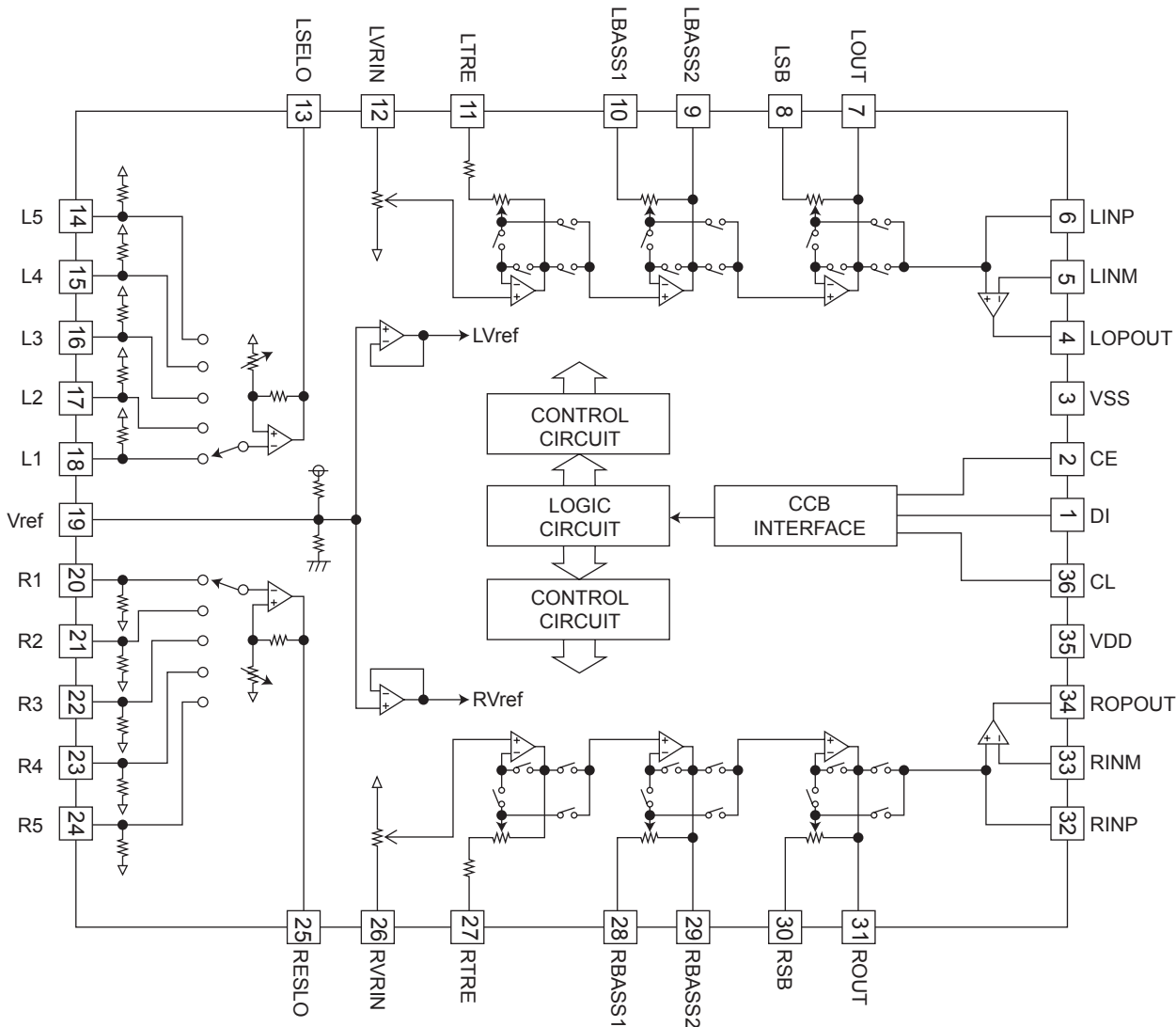
Pin No.	Symbol	I/O	Function
1	VREF	O	Reference voltage output ( $V_{dda}/2$ )
2	MPXIN	I	Baseband (multiplexed) signal input
3	Vdda	-	Analog power supply (+5V)
4	Vssa	-	Analog ground
5	FLOUT	O	Subcarrier input (filter output)
6	CIN	I	Subcarrier input (comparator input)
7	TEST	I	Test input
8	XOUT	O	Crystal oscillator output (4.332MHz)
9	XIN	I	Crystal oscillator input (external reference input)
10	Vssd	-	Digital ground
11	Vddd	-	Digital power supply
12	MODE	I	Read mode setting (0:master, 1:slave)
13	RST	I	RDS-ID/RAM reset (positive polarity)
14	RDDA	O	RDS data output
15	RDCL	I/O	RDS clock output (master mode)/RDS clock input (slave mode)
16	RDS-ID/READY	O	RDS-ID/READY output (negative polarity)

4.13 LC75345M-X (IC901) : E.volume

- Pin layout



- Block diagram

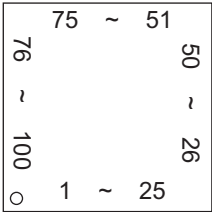


- Pin function

Pin No.	Symbol	Function
1	DI	Serial data and clock input pin for control.
2	CE	Chip enable pin.
3	VSS	Ground pin.
4	LOPOUT	Output pin of general-purpose operation amplifier.
5	LINM	Non-inverted input pin of general-purpose operation amplifier.
6	LINP	Non-inverted input pin of general-purpose operation amplifier.
7	LOUT	ATT + equalizer output pin.
8	LSB	Capacitor and resistor connection pin comprising filters for bass and super-bass band.
9	LBASS2	Capacitor and resistor connection pin comprising filters for bass and super-bass band.
10	LBASS1	Capacitor and resistor connection pin comprising filters for bass and super-bass band.
11	LTRE	Capacitor and resistor connection pin comprising treble band filter.
12	LVRIN	Volume input pin.
13	LSELO	Input selector output pin.
14	L5	Input signal pin.
15	L4	Input signal pin.
16	L3	Input signal pin.
17	L2	Input signal pin.
18	L1	Input signal pin.
19	Vref	0.5 x VDD voltage generation block for analog ground.
20	R1	Input signal pin.
21	R2	Input signal pin.
22	R3	Input signal pin.
23	R4	Input signal pin.
24	R5	Input signal pin.
25	RSELO	Input selector output pin.
26	RVRIN	Volume input pin.
27	RTRE	Capacitor connection pin comprising treble band filter.
28	RBASS1	Capacitor and resistor connection pin comprising filter for bass and super-bass band.
29	RBASS2	Capacitor and resistor connection pin comprising filter for bass and super-bass band.
30	RSB	Capacitor and resistor connection pin comprising filter for bass and super-bass band.
31	ROUT	ATT + equalizer output pin.
32	RINP	Non inverted input pin of general-purpose operation amplifier.
33	RINM	Non inverted input pin of general purpose operation amplifier.
34	ROPOUT	Output pin of general-purpose operation amplifier.
35	VDD	Supply pin.
36	CL	Serial data and clock input pin for control.

4.14 MN101C57DFB (IC931) : System micon

- Pin Layout



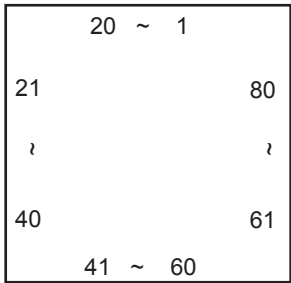
- Pin function

Pin No.	Symbol	I/O	Function
1~3	VLC1~VLC3	-	LCD BIAS VOLTAGE
4,5	NC	-	-
6	MLD	O	CD command ready signal
7	MDATA	O	CD data
8	MCLK	O	CD data clock
9	_XRST	O	CD reset
10	STAT	I	CD status input port
11	VSS	-	GROUND
12	OSC1	-	MAIN OSC
13	OSC2	-	MAIN OSC
14	MMOD	-	GROUND(10k ohm pull down)
15	XI	-	SUB OSC(Not use, connect to Vss)
16	XO	-	SUB OSC(Not use, open)
17	VDD	-	5V
18	NRST	-	RESET
19	VDD	-	5V
20	SDATA	I/O	Serial Data(Vol & Tape IC/Tuner)
21	_MPX	I	FM Stereo Detection ('L'=STEREO)
22	SCK	O	Serial Clock(Vol IC/Tape IC)
23	PERIOD	O	Tuner PLL Strobe(TUST/CE)
24	QRIN	I	Q-code/RDS data input(SUBQ/RDDA)
25	SQCK	O	Q-code serial clock
26	VOLCE	O	Volume Chip Enable
27	_AHB	O	Active Hyper Bass('L'=ON)
28	_SPKMUTE	O	Speaker mute
29	F_TU	O	Tuner Function ('H'=TUNER)
30	F_CD	O	CD Function ('H'=CD)
31	_SURR	O	SURROUND IC
32	SMUTE	O	System mute
33	RDSCK	I	RDS clock
34	BLKCK	I	Block clock input port
35	FLAG	I	Error Correction Count
36	_PROTR	I	Protector
37	_REM	I	Remote control input
38	BUP	I	Back up power detect('H'=BACKUP)
39	VDD	-	5V
40	VREF+	-	5V

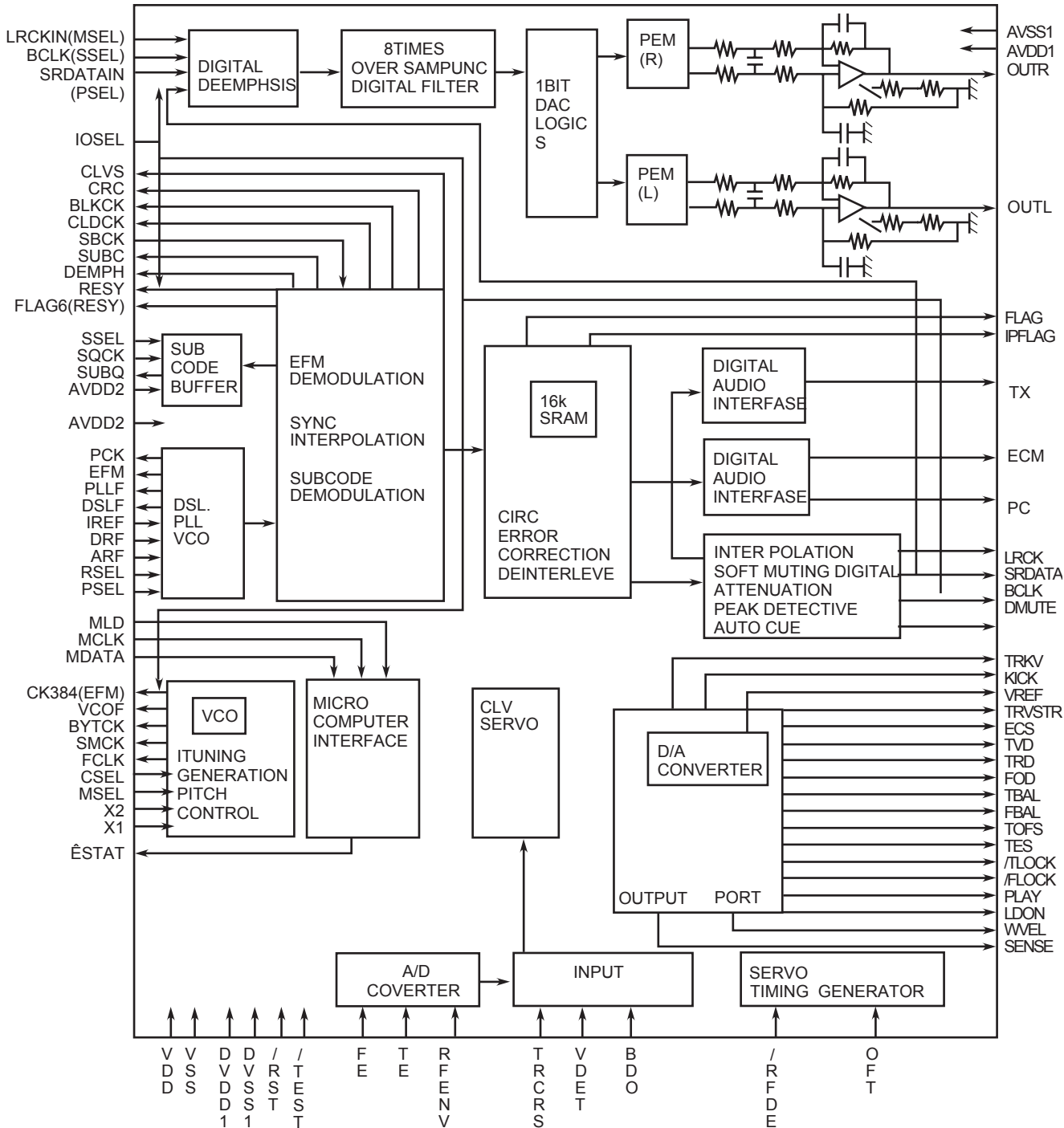
Pin No.	Symbol	I/O	Function
41	DOOR_RST	I	REST/CLOSE switch detect port
42	SAFETY0	I	Irregular voltage detection 0
43	TAPE1	I	Tape Switch 0
44	TAPE0	I	Tape Switch 1
45	SAFETY1	I	Irregular voltage detection 1
46	STTA	O	Tape IC Strobe
47	BCTL	O	Switched 5V control('H'=5V(off))
48	CDSAFTY	I	CD safety voltage detect port
49	VREF-	-	GROUND
50	REEL	I	Tape End Detection
51	LEDCTL	O	Power Standby LED control(POUT)
52	KEY1	I	Unit Key input 1
53	KEY0	I	Unit Key input 0
54	VOLM	I	Volume Minus
55	VOLP	I	Volume Plus
56~72	SEG17~SEG33	O	SEGMENT OUTPUT
73,74	LED1,LED2	O	Back light color control(DIMCTL)
75,76	SEG34,SEG0	O	SEGMENT OUTPUT
77	MODEL	I	Model detection
78	CLOSE	O	Motor driver for door close
79	OPEN	O	Motor driver for door open
80	MUTE	O	BTL mute control port
81~96	SEG1~SEG16	O	SEGMENT OUTPUT
97~100	COM3~COM0	-	LCD BIAS GROUND

4.15 MN662748RPMFA (IC651) : Digital servo & Digital signal processor

- Pin layout



- Block diagram





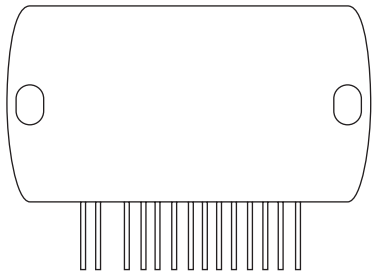
## • Pin function

Pin No.	Symbol	I/O	Function
1	BCLK	O	Not used
2	LRCK	O	Not used
3	SRDATA	O	Not used
4	DVDD1	-	Power supply (Digital)
5	DVSS1	-	Connected to GND
6	TX	O	Digital audio interface output
7	MCLK	I	CPU command clock signal input (Data is latched at signal's rising point)
8	MDATA	I	CPU command data input
9	MLD	I	CPU command load signal input
10	SENSE	O	Sense signal output
11	FLOCK	O	Focus lock signal output Active :Low
12	TLOCK	O	Tracking lock signal output Active :Low
13	BLKCK	O	sub-code/block/clock signal output
14	SQCK	I	Outside clock for sub-code Q resister input
15	SUBQ	O	Sub-code Q -code output
16	DMUTE		Connected to GND
17	STATUS	O	"Status signal (CRC,CUE,CLVS,TTSTOP,ECLV,ECLV, SQOK)"
18	RST	I	Reset signal input (L:Reset)
19	SMCK	-	Not used
20	PMCK	-	Not used
21	TRV	O	Traverse enforced output
22	TVD	O	Traverse drive output
23	PC	-	Not used
24	ECM	O	Spindle motor drive signal (Enforced mode output) 3-State
25	ECS	O	"Spindle motor drive signal (Servo error signal output)"
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output
29	VREF	I	"Reference voltage input pin for D/A output block (TVD,FOD,FBA,TBAL)"
30	FBAL	O	Focus Balance adjust signal output
31	TBAL	O	Tracking Balance adjust signal output
32	FE	I	Focus error signal input (Analog input)
33	TE	I	Tracking error signal input (Analog input)
34	RF ENV	I	RF envelope signal input (Analog input)
35	VDET	I	Vibration detect signal input (H:detect)
36	OFT	I	Off track signal input (H:off track)
37	TRCRS	I	Track cross signal input
38	RFDET	I	RF detect signal input (L:detect)
39	BDO	I	BDO input pin (L:detect)

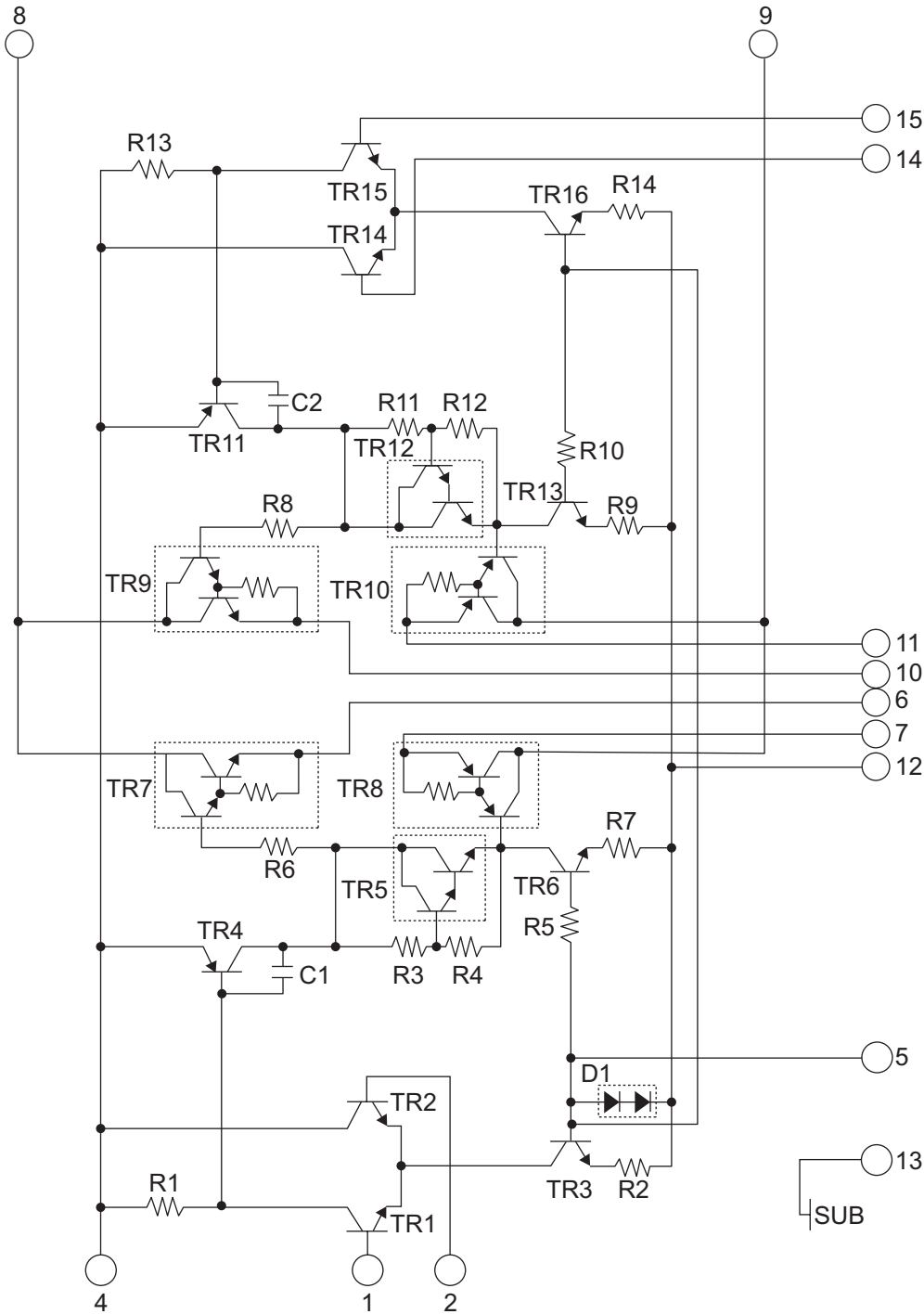
Pin No.	Symbol	I/O	Function
40	LDON	I	Laser ON signal output (H:on)
42	TES	O	Tracking error shunt signal output (H:shunt)
41	PLAY	-	Not used
43	WVEL	-	Not used
44	ARF	I	RF signal input
45	IREF	I	Reference current input pin
46	DRF	I	Bias pin for DSL
47	DSLIF	I/O	Loop filter pin for DSL
48	PLLIF	I/O	Loop filter pin for PLL
49	VCOF	-	Not used
50	AVDD2	-	Power supply (Analog)
51	AVSS2	-	Connected to GND (Analog)
52	EFM	-	Not used
53	PCK	-	Not used
54	PDO	-	Not used
55	SUBC	-	Not used
56	SBCK	-	Not used
57	VSS	-	"Connected to GND (for X'tal oscillation circuit)"
58	XI	I	Input of 16.9344MHz X'tal oscillation circuit
59	X2	O	Output of X'tal oscillation circuit
60	VDD	-	Power supply (for X'tal oscillation circuit)
61	BYTCK	-	Not used
62	CLDCK	-	Not used
63	FLAG	-	Not used
64	IPPLAG	-	Not used
65	FLAG	-	Not used
66	CLVS	-	Not used
67	CRC	-	Not used
68	DEMPH	-	Not used
69	RESY	-	Not used
70	IOSEL	-	pull up
71	TEST	-	pull up
72	AVDD1	-	Power supply (Digital)
73	OUT L	O	Lch audio output
74	AVSS1	-	Connected to GND
75	OUT R	O	Rch audio output
76	RSEL	-	pull up
77	CSEL	-	Connected to GND
78	PSEL	-	Connected to GND
79	MSEL	-	Connected to GND
80	SSEL	-	Pull up

4.16 STK432-070 (IC940) : 2ch AF power amp

- Pin Layout



- Block Diagram







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