

# MDS-PC2

## SERVICE MANUAL

*Self Diagnosis*  
Supported model

US Model  
Canadian Model  
AEP Model  
UK Model  
E Model



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Model Name Using Similar Mechanism	MDS-S40
MD Mechanism Type	MDM-5A
Optical Pick-up Type	KMS-260B/J1N

### SPECIFICATIONS

<b>System</b>	MiniDisc digital audio system
<b>Disc</b>	MiniDisc
<b>Laser</b>	Semiconductor laser ( $\lambda = 780 \text{ nm}$ ) Emission duration: continuous
<b>Laser output</b>	Less than $44.6 \mu\text{W}^*$  * This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.
<b>Laser diode</b>	Material: GaAlAs
<b>Revolutions (CLV)</b>	400 rpm to 900 rpm
<b>Error correction</b>	Advanced Cross Interleave Reed Solomon Code (ACIRC)
<b>Sampling frequency</b>	44.1 kHz
<b>Coding</b>	Adaptive Transform Acoustic Coding (ATRAC)
<b>Modulation system</b>	EFM (Eight-to-Fourteen Modulation)
<b>Number of channels</b>	2 stereo channels
<b>Frequency response</b>	5 to 20,000 Hz $\pm 0.3 \text{ dB}$
<b>Signal-to-noise ratio</b>	Over 94 dB during playback
<b>Wow and flutter</b>	Below measurable limit
<b>Inputs</b>	
<b>LINE (ANALOG) IN</b>	Jack type: phono Impedance: 47 kilohms Rated input: 500 mVrms Minimum input: 125 mVrms
<b>DIGITAL (OPTICAL) IN1/2</b>	Connector type: square optical Impedance: 660 nm (optical wave length)

### Outputs

#### LINE (ANALOG) OUT (VARIABLE)

Jack type: phono  
Rated output: 2 Vrms (at 50 kilohms)  
Load impedance: Over 10 kilohms

#### DIGITAL (OPTICAL) OUT

Connector type: square optical  
Rated output:  $-18 \text{ dBm}$   
Impedance: 660 nm (optical wave length)

#### PHONES

Jack type: phono  
Rated output: 10 mW  
Load impedance: 32 ohms

### General

#### Power requirements

Where purchased	Power requirements
U.S.A. and Canada	120 V AC, 60 Hz
Other countries	230 V AC, 50/60 Hz

**Power consumption** 14 W

**Dimensions (approx.)** 150 x 65 x 275 mm  
( $6 \times 2 \frac{5}{8} \times 10 \frac{7}{8}$  inches) (w/h/d)  
incl. projecting parts and controls

**Mass (approx.)** 2.0 kg (4 lb 7 oz)

— Continued on next page —

## MINIDISC DECK



# SONY®

## Supplied accessories

This MD deck comes with the following items:

- Audio connecting cords  
(pin-plug × 2 ↔ pin-plug × 2) (2)
- Optical cable (1)
- Remote commander (remote) RM-D35M (1)
- R6 (size-AA) batteries (2)
- Connector (RS-232C ↔ monaural mini-jack)\* (1)
- Monaural (2P) mini-plug cord\* (1)

- Audio connecting cord\*  
(pin-plug × 2 ↔ stereo mini-plug) (2)
- CD-ROM\* (1)
- \* Required for operation by personal computer. For details, refer to the operating instructions supplied with the MD Editor 2 software.

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Design and specifications are subject to change without notice.

## SELF-DIAGNOSIS FUNCTION

The self-diagnosis function consists of error codes for customers which are displayed automatically when errors occur, and error codes which show the error history in the test mode during servicing. For details on how to view error codes for the customer, refer to the following box in the instruction manual. For details on how to check error codes during servicing, refer to the following "Procedure for using the Self-Diagnosis Function (Error History Display Mode)".


### Self-Diagnosis Function














The deck's self-diagnosis function automatically checks the condition of the MD deck when an error occurs, then issues a three-digit code and an error message on the display. If the code and message alternate, find them in the following table and perform the indicated countermeasure. Should the problem persist, consult your nearest Sony dealer.

Three-digit code/Message	Cause/Remedy
C11/Protected	The inserted MD is record-protected. ➔ Take out the MD and close the record-protect slot (page 15).
C13/REC Error	The recording was not made properly. ➔ Set the deck in a stable surface, and repeat the recording procedure.  The inserted MD is dirty (with smudges, fingerprints, etc.), scratched, or substandard in quality. ➔ Replace the disc and repeat the recording procedure.
C13/Read Error	The deck could not read the TOC on the MD properly. ➔ Take out the MD and insert it again.
C14/TOC Error	The deck could not read the TOC on the MD properly. ➔ Insert another disc. ➔ If possible, erase all the tracks on the MD (page 31).
C71/Din Unlock	The sporadic appearance of this message is caused by the digital signal being recorded. This will not affect the recording.  While recording from a digital component connected through the DIGITAL (OPTICAL) IN1/2 connector, the digital connecting cable was unplugged or the digital component turned off. ➔ Connect the cable or turn the digital component back on.

### Procedure for using the Self-Diagnosis Function (Error History Display Mode).


#### Note:


Perform the self-diagnosis function in the "error history display mode" in the test mode. The following describes the least required procedure. Be careful not to enter other modes by mistake. If you set other modes accidentally, press the  "PROGRAM" button to exit the mode.

1. While pressing the  button and  button, connect the power plug to the outlet, and release the  button and  button.
2. Press the  button and when "[Service]" is displayed, press the  "PROGRAM" button.
3. Press the  button and display "ERR DP MODE".
4. Pressing the  "PROGRAM" button sets the error history mode and displays "total rec".
5. Select the contents to be displayed or executed using the  button.
6. Pressing the  "PROGRAM" button will display or execute the contents selected.
7. Pressing the  "PROGRAM" button another time returns to step 4.
8. Pressing the  "PROGRAM" button displays "ERROR DP MODE" and exits the error history mode.
9. To exit the test mode, press the  "1" button. The unit sets into the STANDBY state, the disc is ejected, and the test mode ends.


#### \*Note:

As this unit has only a few buttons, one button is assigned with several functions in the test mode.

Press the  button to switch the functions.

Each time the  button is pressed, the display switches in the following order; "PROGRAM" → "1" → blank → "PROGRAM". The functions of each button change with the display.






For simplicity, operations of the  button will not be described here.

Instead, symbols are added to the names of buttons. Press the  button as required to switch the display.

Example)  "PROGRAM" : Display "PROGRAM" and press the  button.  "1" : Display "1" and press the  button.

## ITEMS OF ERROR HISTORY MODE ITEMS AND CONTENTS

### Selecting the Test Mode

Display	Details of History
total rec	Displays the recording time. Displayed as “r□□□□□h”. The displayed time is the total time the laser is set to the high power state. This is about 1/4 of the actual recording time. The time is displayed in decimal digits from 0h to 65535h.
total play	Displays the play time. Displayed as “p□□□□□h”. The time displayed is the total actual play time. Pauses are not counted. The time is displayed in decimal digits from 0h to 65535h.
retry err	Displays the total number of retries during recording and number of retry errors during play. Displayed as “r□□ p□□”. “r” indicates the retries during recording while “p” indicates the retry errors during play. The number of retries and retry errors are displayed in hexadecimal digits from 00 to FF.
total err	Displays the total number of errors. Displayed as “total □□”. The number of errors is displayed in hexadecimal digits from 00 to FF.
err history	Displays the 10 latest errors. Displayed as “0□ E@@”. □ indicates the history number. The smaller the number, the more recent is the error. (00 is the latest). @@ indicates the error code. Refer to the following table for the details. The error history can be switched by pressing the  button.
er refresh	Mode which erases the “retry err”, “total err”, and “err history” histories. When returning the unit to the customer after completing repairs, perform this to erase the past error history, After pressing the  button and “er refresh?” is displayed, press the  button to erase the history. “Complete!” will be displayed momentarily. Be sure to check the following when this mode has been executed. <ul style="list-style-type: none"> <li>• The data has been erased.</li> <li>• The mechanism operates normally when recording and play are performed.</li> </ul>
tm refresh	Mode which erases the “total rec” and “total play” histories. These histories serve as approximate indications of when to replace the optical pickup. If the optical pickup has been replaced, perform this operation and erase the history. After pressing the  button and “tm refresh?” is displayed, press the  button to erase the history. “Complete!” will be displayed momentarily. Be sure to check the following when this mode has been executed. <ul style="list-style-type: none"> <li>• The data has been erased.</li> <li>• The mechanism operates normally when recording and play are performed.</li> </ul>

**Table of Error Codes**

Error Code	Details of Error	Error Code	Details of Error
E00	No error	E05	FOK has deviated
E01	Read error. PTOC cannot be read (DISC ejected)	E06	Cannot focus (Servo has deviated)
		E07	Recording retry
E02	TOC error. UTOC error (DISC not ejected)	E08	Recording retry error
		E09	Playback retry error (Access error)
E03	Loading error		
E04	Address cannot be read (Servo has deviated)	E0A	Play retry error (C2 error)

## CAUTION

Danger of explosion if battery is incorrectly replaced.  
Replace only with the same or equivalent type recommended by the equipment manufacturer.  
Discard used batteries according to manufacture's instructions.

## ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.  
Udskiftning må kun ske med batteri af samme fabrikat og type.  
Levér det brugte batteri tilbage til leverandøren.

## ADVARSEL

Ekspløsjonsfare ved feilaktig skifte av batteri.  
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.  
Brukte batterier katterier kasseres i henhold til fabrikantens

## VARNIG

Explosionsfara vid felaktigt batteribyte.  
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.  
Kassera använt batteri enligt gällande föreskrifter.

## VAROITUS

Parist voi räjähtää, jos se on virheellisesti asennettu.  
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.  
Hävittä käytetty paristo valmistajan ohjeiden mukaisesti.

## SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK  $\triangle$  OR DOTTED LINE WITH MARK  $\triangle$  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

## ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  $\triangle$  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

CLASS 1 LASER PRODUCT  
LUOKAN 1 LASERLAITE  
KLASS 1 LASERAPPARAT

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.  
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.  
VORSICHT : UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHL AUSSETZEN.  
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE, ÄLÄ KATSO SÄTEESEEN.  
WARNING : OSYNLIG LASERSTRÅLING NÅR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRakta EJ STRÅLEN.  
ADVERSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.  
VIGYAZAT! : A BURKOLAT NYITÁSAKOR LÁTHATATLAN LÉZERSUGÁRVESZÉLY! KERÜLJE A BESUGÁRZÁST!

This caution label is located inside the unit.

## CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Notes on chip component replacement

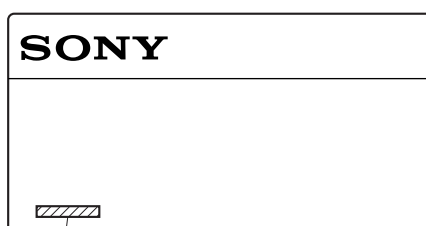
- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

## Flexible Circuit Board Repairing

- Keep the temperature of soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

## MODEL IDENTIFICATION

### — MODEL NUMBER LABEL —



Parts No.

PARTS No.	MODEL
4-220-576-0□	US model
4-220-577-0□	Canadian model
4-220-578-0□	AEP, UK model
4-220-579-0□	Singapore model

## SAFETY CHECK-OUT

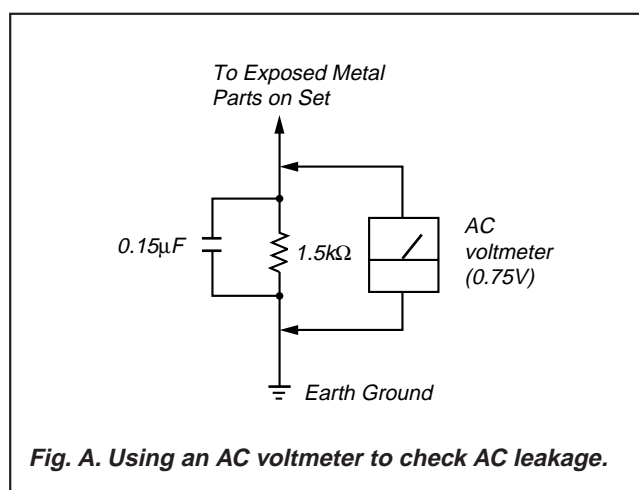
After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

Check the antenna terminals, metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

### LEAKAGE

The AC leakage from any exposed metal part to earth Ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)



**Fig. A. Using an AC voltmeter to check AC leakage.**

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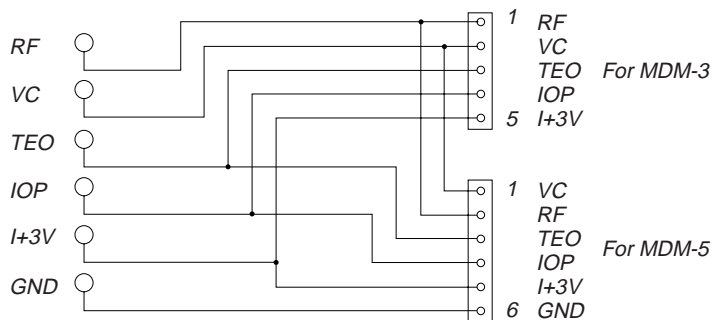
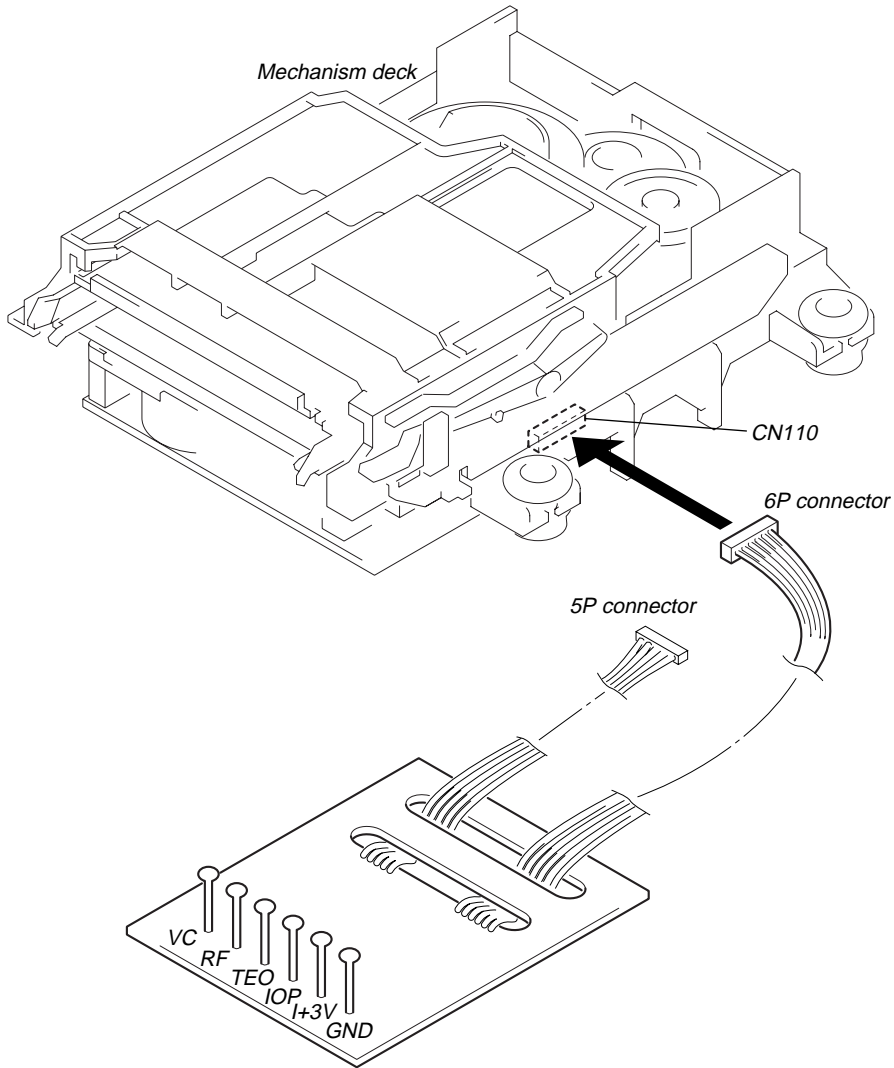
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# SECTION 1 SERVICING NOTE

## JIG FOR CHECKING BD BOARD WAVEFORM

The special jig (J-2501-149-A) is useful for checking the waveform of the BD board. The names of terminals and the checking items to be performed are shown as follows.

- GND : Ground
- I+3V : For measuring IOP (Check the deterioration of the optical pick-up laser)
- IOP : For measuring IOP (Check the deterioration of the optical pick-up laser)
- TEO : TRK error signal (Traverse adjustment)
- VC : Reference level for checking the signal
- RF : RF signal (Check jitter)



## IOP DATA RECORDING AND DISPLAY WHEN OPTICAL PICK-UP AND NON-VOLATILE MEMORY (IC171 OF BD BOARD) ARE REPLACED

The IOP value labeled on the optical pick-up can be recorded in the non-volatile memory. By recording the value, it will eliminate the need to look at the value on the label of the optical pick-up. When replacing the optical pick-up or non-volatile memory (IC171 of BD board), record the IOP value on the optical pick-up according to the following procedure.

### Record Procedure:

1. While pressing the **INPUT** button and **■** button, connect the power plug to the outlet, and release the **INPUT** button and **■** button.
2. Press the **▶▶** button to display “[Service]”, and press the **▶▶ “PROGRAM”** button.
3. Press the **▶▶** button to display “Iop.Write”, and press the **▶▶ “PROGRAM”** button.
4. The display becomes “Ref=@.@.@” (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the IOP value written on the optical pick-up.  
To select the number : Press the **▶▶** button.  
To select the digit : Press the **● “PROGRAM”** button.
6. When the **▶▶ “PROGRAM”** button is pressed, the display becomes “Measu=@.@.@” (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the **▶▶ “PROGRAM”** button.
8. “Complete!” will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become “Iop Write”.
9. Press the **▲ “1”** button to complete. “Standby” will be displayed.

### Display Procedure:

1. While pressing the **INPUT** button and **■** button, connect the power plug to the outlet, and release the **INPUT** button and **■** button.
2. Press the **▶▶** button to display “[Service]”, and press the **▶▶ “PROGRAM”** button.
3. Press the **▶▶** button to display “Iop.Read”, and press the **▶▶ “PROGRAM”** button.
4. “@.@./##.#” is displayed and the recorded contents are displayed.  
@.@ : indicates the Iop value labeled on the pick-up.  
##.# : indicates the Iop value after adjustment
5. To end, press the **● “PROGRAM”** button or **■ “PROGRAM”** button to display “Iop Read”. Then press the **▲ “1”** button.

#### \*Note:

As this unit has only a few buttons, one button is assigned with several functions in the test mode.

Press the **INPUT** button to switch the functions.

Each time the **INPUT** button is pressed, the display switches in the following order; “PROGRAM” → “1” → blank → “PROGRAM”

The functions of each button change with the display.

For simplicity, operations of the **INPUT** button will not be described here.

Instead, symbols are added to the names of buttons. Press the **INPUT** button as required to switch the display.

Example) **■ “PROGRAM”** : Display “PROGRAM” and press the **■** button. **■ “1”** : Display “1” and press the **■** button.

## CHECKS PRIOR TO PARTS REPLACEMENT AND ADJUSTMENTS

Before performing repairs, perform the following checks to determine the faulty locations up to a certain extent. Details of the procedures are described in “5 Electrical Adjustments”.

	Criteria for Determination (Unsatisfactory if specified value is not satisfied)	Measure if unsatisfactory:
Laser power check (5-6-2 : See page 37)	<ul style="list-style-type: none"> <li>0.9 mW power Specified value : 0.84 to 0.92 mW</li> <li>7.0 mW power Specified value : 6.8 to 7.2 mW</li> </ul>	<ul style="list-style-type: none"> <li>Clean the optical pick-up</li> <li>Adjust again</li> <li>Replace the optical pick-up</li> </ul>
	<ul style="list-style-type: none"> <li>lop (at 7mW)</li> <li>Labeled on the optical pickup Iop value <math>\pm</math> 10mA</li> </ul>	<ul style="list-style-type: none"> <li>Replace the optical pick-up</li> </ul>
Traverse check (5-6-3 : See page 37)	<ul style="list-style-type: none"> <li>Traverse waveform Specified value : Below 10% offset</li> </ul>	<ul style="list-style-type: none"> <li>Replace the optical pick-up</li> </ul>
Focus bias check (5-6-4 : See page 38)	<ul style="list-style-type: none"> <li>Error rate check Specified value : For points a, b, and c C1 error : Below 220 AD error : Below 2</li> </ul>	<ul style="list-style-type: none"> <li>Replace the optical pick-up</li> </ul>
C PLAY check (5-6-5 : See page 38)	<ul style="list-style-type: none"> <li>Error rate check Specified value: a. When using test disc (MDW-74/AU-1) C1 error : Below 80 AD error : Below 2 b. When using check disc (TDYS-1) C1 error : Below 50</li> </ul>	<ul style="list-style-type: none"> <li>Replace the optical pick-up</li> </ul>
Self-recording/playback check (REC/PLAY) (5-6-6 : See page 38)	<ul style="list-style-type: none"> <li>CPLAY error rate check Specified value: C1 error : Below 80 AD error : Below 2</li> </ul>	If always unsatisfactory: <ul style="list-style-type: none"> <li>Replace the overwrite head</li> <li>Check for disconnection of the circuits around the overwrite head</li> </ul>
		If occasionally unsatisfactory: <ul style="list-style-type: none"> <li>Check if the overwrite head is distorted</li> <li>Check the mechanism around the sled</li> </ul>
TEMP check (Temperature compensation offset check) (5-6-1 : See page 37)	<ul style="list-style-type: none"> <li>Unsatisfactory if displayed as T=@@ (##) [NG” NG (@@, ## are both arbitrary numbers)</li> </ul>	<ul style="list-style-type: none"> <li>Check for disconnection of the circuits around D101 (BD board)</li> <li>Check the signals around IC101, IC121, CN102, CN103 (BD board)</li> </ul>

**Note:**  
The criteria for determination above is intended merely to determine if satisfactory or not, and does not serve as the specified value for adjustments.  
When performing adjustments, use the specified values for adjustments.



## FORCED RESET


The system microprocessor can be reset in the following procedure.

Use these procedure when the unit cannot be operated normally due to the overrunning of the microprocessor, etc.

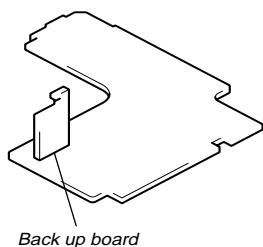
The line output level and PHONES output level can be varied in the range from 0 dB to -40 dB using the remote commander of this unit.

When forced reset is executed, these levels will be set to the initial value of -20 dB.

### Procedure :

1. Disconnect the power plug from the outlet.
2. Remove the BACK UP board.
3. Insert the power plug into the outlet.
4. Mount the back up board.
5. Press the  button. When "Initialize" is displayed, it means that forced reset has been executed.






### [POWER BOARD] (Component Side)



## FLUORESCENT DISPLAY TUBE ALL LIGHTING AND KEY CHECK MODE

In this mode, the fluorescent display tube check and key check can be performed.






### Procedure:

1. While pressing the  button and  button, insert the power plug into the outlet."
2. The fluorescent display tube displays "FL ALL 10n Key" momentarily and lights up completely."
3. The display goes off partially each time a button is pressed.
4. When all buttons are pressed, "Push INPUT" is displayed.
5. When the  button is pressed, the fluorescent display tube displays "Seg Chk" momentarily and lights up partially.
6. When the  button is pressed, it displays "Rmk Chk" momentarily followed by "Push Rmc Key".  
If not using a remote commander, end there and disconnect the power plug from the outlet. If using a remote commander, press any button."
7. The check is completed when "Chk End!" is displayed. Press the  button to end."

## RETRY CAUSE DISPLAY MODE

- In this test mode, the causes for retry of the unit during recording can be displayed on the fluorescent indicator tube. During playback, the “track mode” for obtaining track information will be set. This is useful for locating the faulty part of the unit.
- The following will be displayed :  
 During recording and stop : Retry cause, number of retries, and number of retry errors.  
 During playback : Information such as type of disc played, part played, copyright.  
 These are displayed in hexadecimal.

### Precedure:

1. Load a recordable disc whose contents can be erased into the unit.
2. For discs with no disc name, set the name display using the remote commander. (The time display is set after some time. Leave as it is if desired.)
3. Press the  button immediately. Wait for about 10 seconds while pressing the button. (The **AMS** knob can be pressed instead of the **YES** button for the same results.)
4. The fluorescent display tube displays “RTs@@c##e\*\*”.
5. Press the  button to start recording. Then press the  button and start recording.
6. To check the “track mode”, press the  button to start play.
7. To exit the test mode, press the  button. If the test mode cannot be exited, refer to “Forced Reset” on page 8.

**Fig. 1 Reading the Test Mode Display (During recording and stop)**

RTs@@c##e\*\*

Fluorescent display tube display

- @@ : Cause of retry
- ## : Number of retries
- \*\* : Number of retry errors

**Fig. 2 Reading the Test Mode Display (During playback)**

@@#####\$\$

Fluorescent display tube display

- @@ : Parts No. (name of area named on TOC)
- ## : Cluster } Address (Physical address on disc)
- \*\* : Sector }
- \$\$ : Track mode (Track information such as copyright information of each part)

### Reading the Retry Cause Display

Hexadecimal	Higher Bits				Lower Bits				Hexadecimal	Cause of Retry	Occurring conditions
	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0			
Binary	0	0	0	0	0	0	0	1	01	shock	When track jump (shock) is detected
	0	0	0	0	0	0	1	0	02	ader5	When ADER was counted more than five times continuously
	0	0	0	0	0	1	0	0	04	Discontinuous address	When ADIP address is not continuous
	0	0	0	0	1	0	0	0	08	DIN unlock	When DIN unlock is detected
	0	0	0	1	0	0	0	0	10	FCS incorrect	When not in focus
	0	0	1	0	0	0	0	0	20	IVR rec error	When ABCD signal level exceeds the specified range
	0	1	0	0	0	0	0	0	40	CLV unlock	When CLV is unlocked
	1	0	0	0	0	0	0	0	80	Access fault	When access operation is not performed normally

### Reading the Display:

Convert the hexadecimal display into binary display. If more than two causes, they will be added.

### Example

When 42 is displayed:  
 Higher bit : 4 = 0100 → b6  
 Lower bit : 2 = 0010 → b1  
 In this case, the retry cause is combined of “CLV unlock” and “ader5”.

When A2 is displayed:  
 Higher bit : A = 1010 → b7+b5  
 Lower bit : 2 = 0010 → b2  
 The retry cause in this case is combined of “access fault”, “IVR rec error”, and “ader5”.

Reading the Track Mode Display

Hexadecimal	Higher Bits				Lower Bits				Hexa- decimal	Details	
	8	4	2	1	8	4	2	1		When 0	When 1
Bit	b7	b6	b5	b4	b3	b2	b1	b0			
Binary	0	0	0	0	0	0	0	1	01	Emphasis OFF	Emphasis ON
	0	0	0	0	0	0	1	0	02	Monaural	Stereo
	0	0	0	0	0	1	0	0	04	This is 2-bit display. Normally 01.	
	0	0	0	0	1	0	0	0	08	01:Normal audio. Others:Invalid	
	0	0	0	1	0	0	0	0	10	Audio (Normal)	Invalid
	0	0	1	0	0	0	0	0	20	Original	Digital copy
	0	1	0	0	0	0	0	0	40	Copyright	No copyright
	1	0	0	0	0	0	0	0	80	Write prohibited	Write allowed

**Reading the Display:**

Convert the hexadecimal display into binary display. If more than two causes, they will be added.

Example When 84 is displayed:

Higher bit : 8 = 1000 → b7

Lower bit : 4 = 0100 → b2

In this case, as b2 and b7 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis OFF”, “monaural”, “original”, “copyright exists”, and “write allowed”.

Example When 07 is displayed:

Higher bit : 0 = 1000 → All 0

Lower bit : 7 = 0111 → b0+b1+b2

In this case, as b0, b1, and b2 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis ON”, “stereo”, “original”, “copyright exists”, and “write prohibited”.

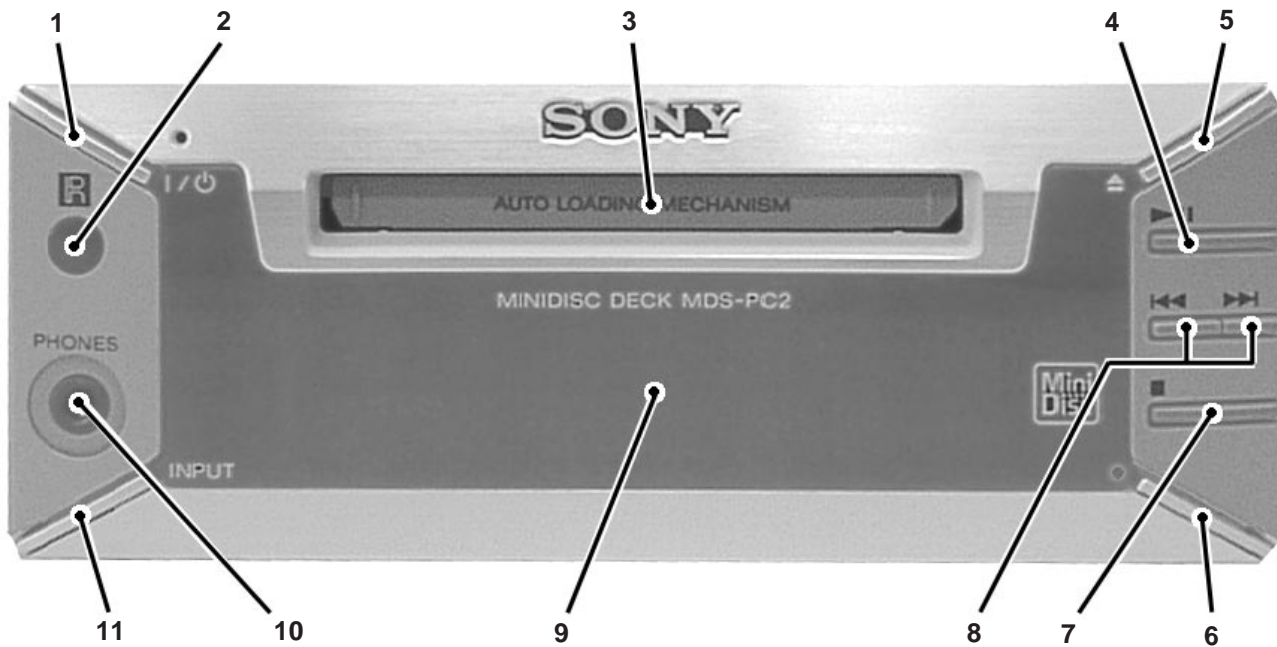
**Hexadecimal → Binary Conversion Table**

Hexadecimal	Binary	Hexadecimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111


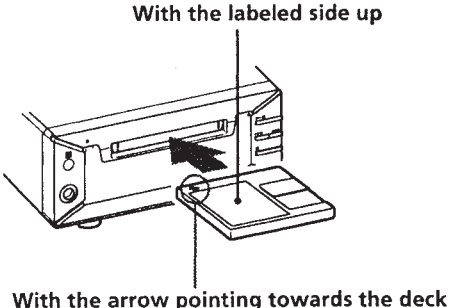
## SECTION 2 GENERAL

This section is extracted from instruction manual.

### Front Panel



### Location of Parts and Controls

- 1 I/⏻ (power) switch**  
Press to turn the deck on. When you turn the deck on, the switch indicator turns off. When you press the switch again, the deck turns off and the indicator lights up red.
- 2 Remote sensor**  
Point the remote towards this window (  ) for remote operations.
- 3 MD insertion slot**  
Insert the MD as illustrated below.  


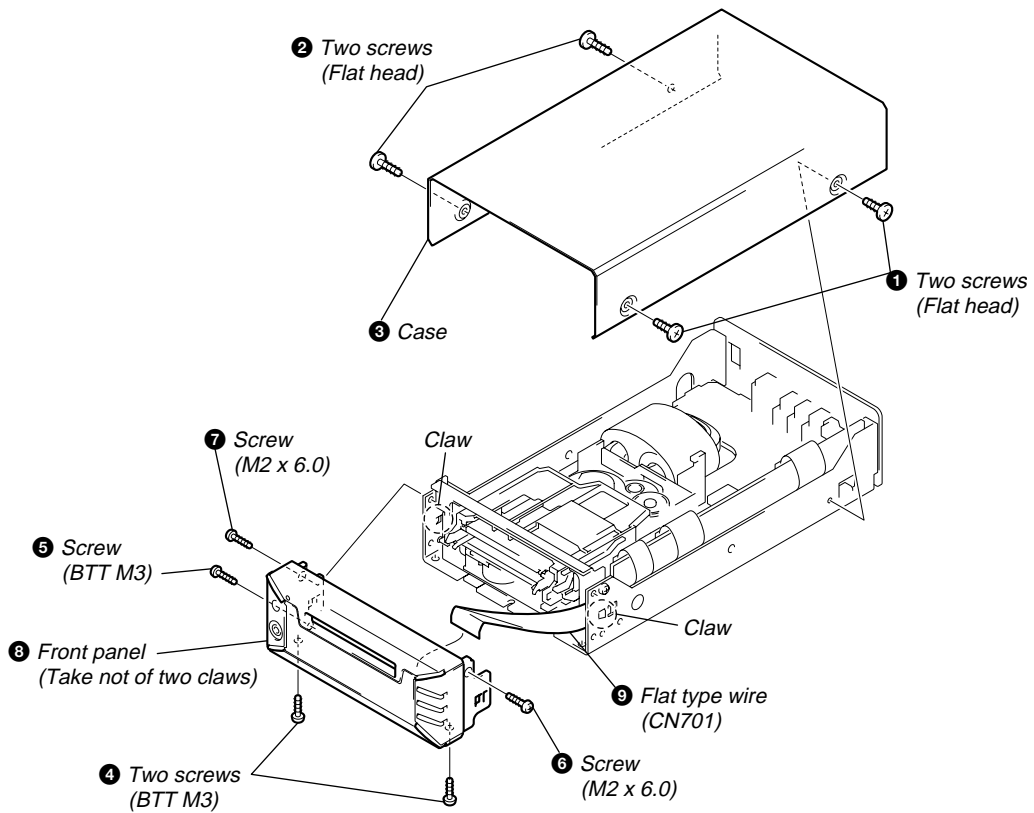
With the labeled side up

With the arrow pointing towards the deck
- 4 ►|| button**  
Press to start play, pause play, or pause recording.
- 5 ▲ button**  
Press to eject the MD.
- 6 ● button**  
Press to record on the MD, monitor the input signal, or mark track numbers.
- 7 ■ button**  
Press to stop play, stop recording, or cancel the selected operation.
- 8 ◀▶ buttons**  
Press to locate tracks or a portion within a track.
- 9 Display window**  
Shows various information.
- 10 PHONES jack**  
Connect the headphones. Press ANALOG OUT LEVEL +/- on the remote to adjust the volume.
- 11 INPUT button**  
Press to select the input jack (or connector) of the program source to be recorded.

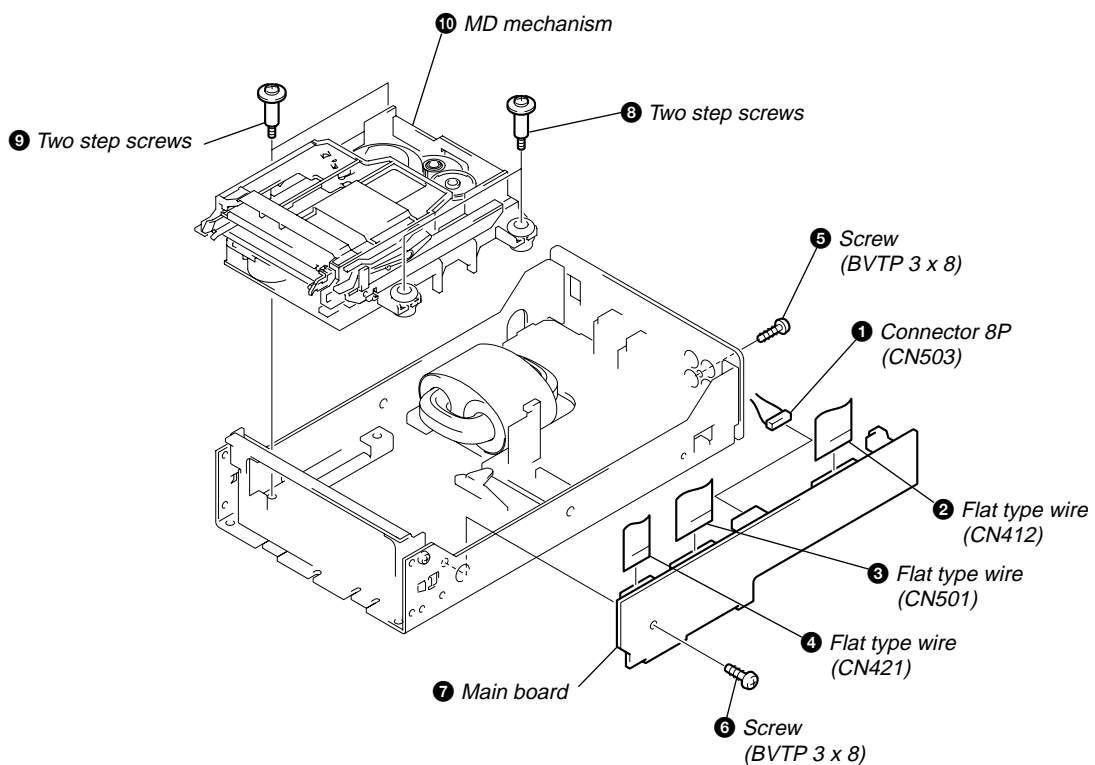
## SECTION 3 DISASSEMBLY

**Note:** Follow the disassembly procedure in the numerical order given.

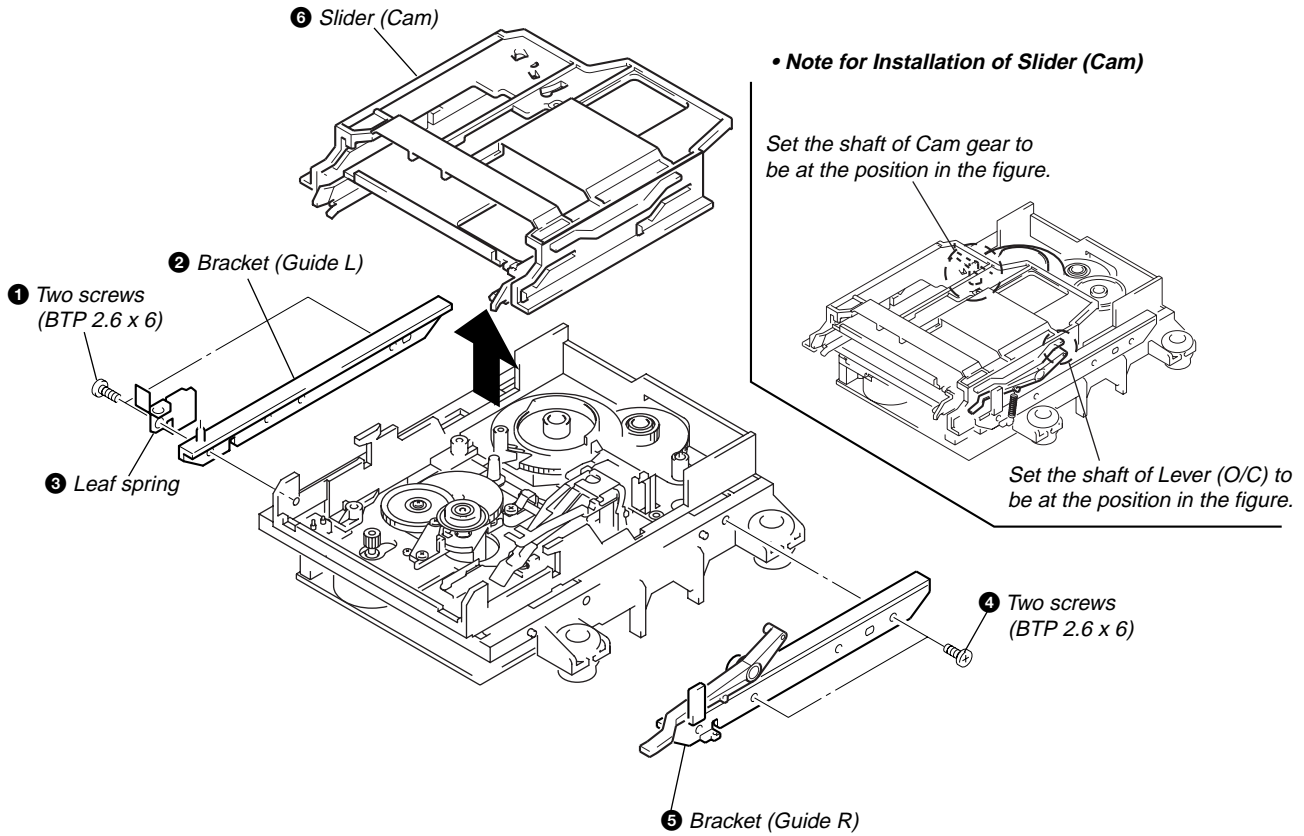
### 3-1. CASE AND FRONT PANEL



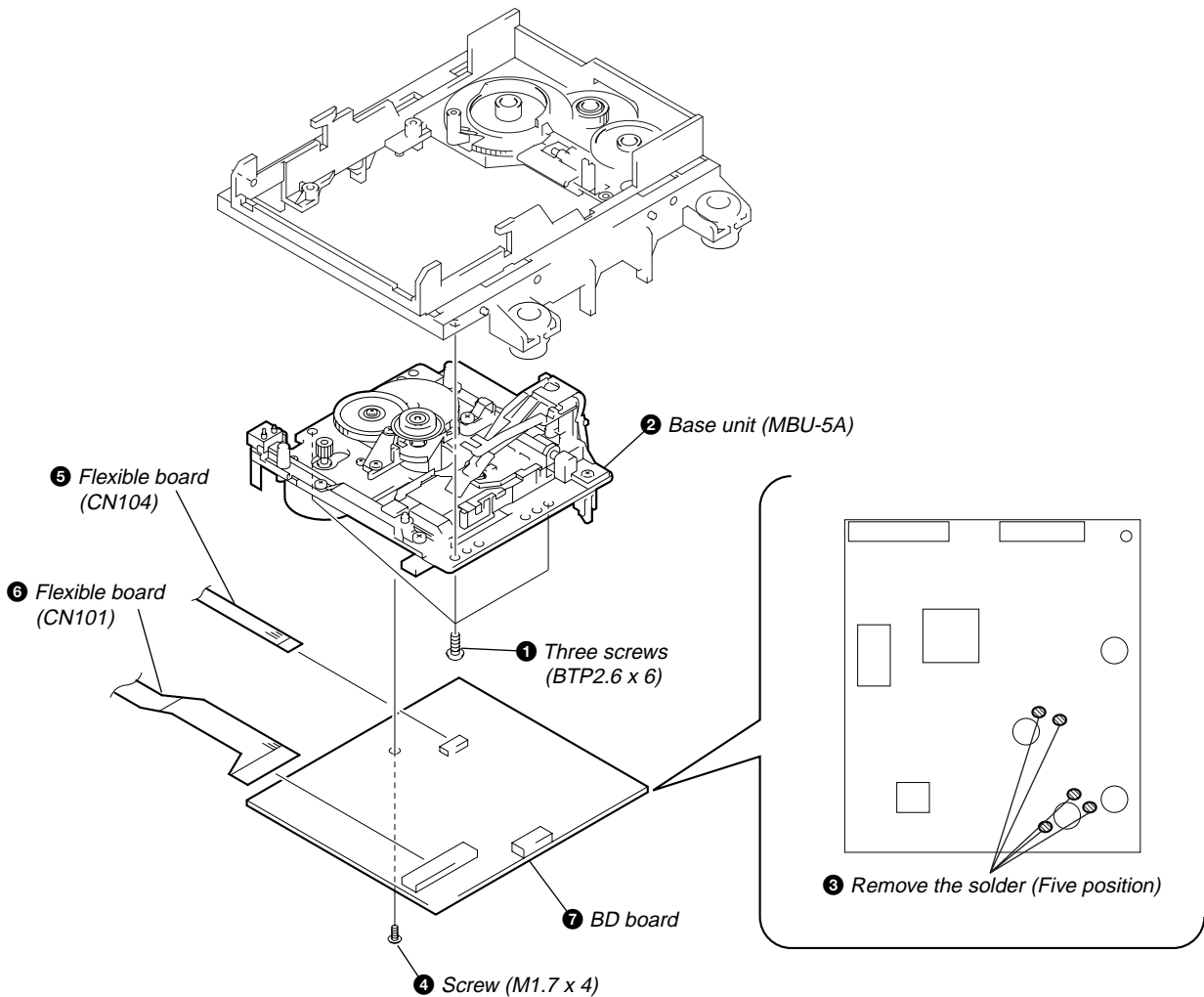
### 3-2. MD MECHANISM



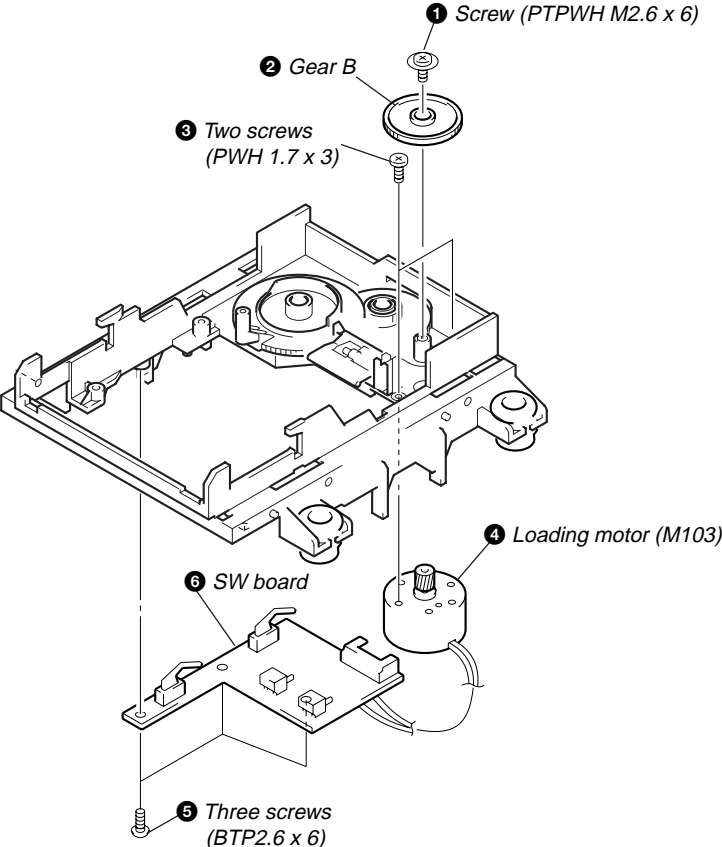
### 3-3. SLIDER (CAM)



### 3-4. BASE UNIT (MBU-5A) AND BD BOARD



**3-5. SW BOARD AND LOADING MOTOR (M103)**



## SECTION 4 TEST MODE

**\*Note:**

As this unit has only a few buttons, one button is assigned with several functions in the test mode.”

Press the **INPUT** button to switch the functions.

Each time the **INPUT** button is pressed, the display switches in the following order;”

“PROGRAM” → “1” → blank → “PROGRAM”

The functions of each button change with the display.

**Buttons and Corresponding Functions**

Buttons	Function when nothing displayed	Function when “PROGRAM” is displayed	Function when “1” is displayed
I/O	I/O	_____	TIME
▲ (EJECT)	▲ (EJECT)	CLEAR	REPEAT
▶▶	▶▶	ENTER/YES	PLAY MODE
◀◀	◀◀ (AMS)	◀◀ (FR)	_____
▶▶	▶▶ (AMS)	▶▶ (FF)	_____
■ (STOP)	■ (STOP)	EDIT/NO	DISPLAY
● (REC)	● (REC)	PUSH (AMS)	SCROLL

**4-1. PRECAUTIONS FOR USE OF TEST MODE**

- As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.

Even if the **▲ (EJECT)** button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.

Therefore, it will be ejected while rotating.

Be sure to press the **▲ (EJECT)** button after pressing the **■ “PROGRAM”** button and the rotation of disc is stopped.

**4-1-1. Recording laser emission mode and operating buttons**

- Continuous recording mode (CREC MODE)
- Laser power check mode (LDPWR CHECK)
- Laser power adjustment mode (LDPWR ADJUST)
- Traverse (MO) check (EF MO CHECK)
- Traverse (MO) adjustment (EF MO ADJUST)
- When pressing the **● (REC)** button.

**4-2. SETTING THE TEST MODE**

The following are two methods of entering the test mode.

**Procedure 1:** While pressing the **INPUT** button and **■** button, connect the power plug to an outlet, and release the **INPUT** button and **■** button.

When the test mode is set, “[Check]” will be displayed. Rotating the **INPUT** button switches between the following four groups; ...↔ Check ↔ Adjust ↔ Service ↔ Develop ↔ ...

**Procedure 2:** While pressing the **INPUT** button, connect the power plug to the outlet and release the **INPUT** button.

When the test mode is set, “TEMP CHECK” will be displayed. By setting the test mode using this procedure, only the “Check” group of procedure 1 can be executed.

**4-3. EXITING THE TEST MODE**

Press the **■ “1”** button. The disc is ejected when loaded, and “Standby” display blinks, and the STANDBY state is set.

**4-4. BASIC OPERATIONS OF THE TEST MODE**






All operations are performed using the **◀◀**, **▶▶** button, **▶▶ “PROGRAM”** button, and **■ “PROGRAM”** button.

The functions of these buttons are as follows.

Function name	Function
<b>◀◀</b> , <b>▶▶</b> button	Changes parameters and modes
<b>▶▶ “PROGRAM”</b> button	Proceeds onto the next step. Finalizes input.
<b>■ “PROGRAM”</b> button	Returns to previous step. Stops operations.



#### 4-5. SELECTING THE TEST MODE

There are 27 types of test modes as shown below. The groups can be switched by pressing the  and  buttons. After selecting the group to be used, press the  button. After setting a certain group, pressing the  and  buttons switches between these modes.


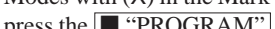
Refer to “Group” in the table for details selected.

All items used for servicing can be treated using group S. So be carefully not to enter other groups by mistake.

Display	Contents	Mark	Group (*)
TEMP CHECK	Temperature compensation offset check		C S
LDPWR CHECK	Laser power check		C S
EF MO CHECK	Traverse (MO) check		C S
EF CD CHECK	Traverse (CD) check		C S
FBIAS CHECK	Focus bias check		C S
S curve CHECK	S letter check	(X)	C
VERIFY MODE	Non-volatile memory check	(X)	C
DETRK CHECK	Detrack check	(X)	C
TEMP ADJUST	Temperature compensation offset adjustment		A S
LDPWR ADJUST	Laser power adjustment		A S
EF MO ADJUST	Traverse (MO) adjustment		A S
EF CD ADJUST	Traverse (CD) adjustment		A S
FBIAS ADJUST	Focus bias adjustment		A S
EEP MODE	Non-volatile memory control	(X) (!)	D
MANUAL CMD	Command transmission	(X)	D
SVDATA READ	Status display	(X)	D
ERR DP MODE	Error history display, clear		S
SLED MOVE	Sled check	(X)	D
Impossible	No function	(X)	D
ADJ CLEAR	Initialization of non-volatile memory of adjustment value		A S
AG Set (MO)	Auto gain output level adjustment (MO)		A S
AG Set (CD)	Auto gain output level adjustment (CD)		A S
Iop Read	IOP data display		C S
Iop Write	IOP data write		A S
INFORMATION	Microprocessing version display		C S
CPLAY MODE	Continuous play mode		C A S D
CREC MODE	Continuous recording mode		C A S D





#### Group (\*)


C: Check      A: Adjust  
S: Service    D: Develop

- For details of each adjustment mode, refer to “5. Electrical Adjustments”.
- For details of “ERR DP MODE”, refer to “Self-Diagnosis Function” on page 2.
- If a different mode has been selected by mistake, press the  button to exit that mode.
- Modes with (X) in the Mark column are not used for servicing and therefore are not described in detail. If these modes are set accidentally, press the  button to exit the mode immediately. Be especially careful not to set the modes with (!) as they will overwrite the non-volatile memory and reset it, and as a result, the unit will not operate normally.

#### 4-5-1. Operating the Continuous Playback Mode

##### 1. Entering the continuous playback mode

- ① Set the disc in the unit. (Whichever recordable discs or discs for playback only are available.)
- ② Press the  button and display "CPLAY MODE".
- ③ Press the  "PROGRAM" button to change the display to "CPLAY MID".
- ④ When access completes, the display changes to "C1 =  AD = .

**Note :** The numbers "" displayed show you error rates and ADER.

##### 2. Changing the parts to be played back


- ① Press the  "PROGRAM" button during continuous playback to change the display as below.

"CPLAY MID" → "CPLAY OUT" → "CPLAY IN"





When pressed another time, the parts to be played back can be moved.

- ② When access completes, the display changes to "C1 =  AD = .

**Note :** The numbers "" displayed show you error rates and ADER.

##### 3. Ending the continuous playback mode




- ① Press the  "PROGRAM" button. The display will change to "CPLAY MODE".
- ② Press the  (EJECT) button to remove the disc.


**Note :** The playback start addresses for IN, MID, and OUT are as follows.

IN 40h cluster  
MID 300h cluster  
OUT 700h cluster


#### 4-5-2. Operating the Continuous Recording Mode (Use only when performing self-recording/palyback check.)

##### 1. Entering the continuous recording mode

- ① Set a recordable disc in the unit.
- ② Press the  button and display "CREC MODE".
- ③ Press the  "PROGRAM" button to change the display to "CREC MID".
- ④ When access completes, the display changes to "CREC ()" and **REC** lights up.

**Note :** The numbers "" displayed shows you the recording position addresses.


##### 2. Changing the parts to be recorded


- ① When the  "PROGRAM" button is pressed during continuous recording, the display changes as below.

"REC MID" → "REC OUT" → "REC IN"





When pressed another time, the parts to be recorded can be changed. **REC** goes off.

- ② When access completes, the display changes to "CREC ()" and **REC** lights up.


**Note :** The numbers "" displayed shows you the recording position addresses.

##### 3. Ending the continuous recording mode

- ① Press the  "PROGRAM" button. The display changes to "CREC MODE" and **REC** goes off.
- ② Press the  (EJECT) button to remove the disc.

**Note 1 :** The recording start addresses for IN, MID, and OUT are as follows.

IN 40h cluster  
MID 300h cluster  
OUT 700h cluster


**Note 2 :** The  "PROGRAM" button can be used to stop recording anytime.

**Note 3 :** Do not perform continuous recording for long periods of time above 5 minutes.

**Note 4 :** During continuous recording, be careful not to apply vibration.

#### 4-5-3. Non-Volatile Memory Mode (EEP MODE)

This mode reads and writes the contents of the non-volatile memory.

It is not used in servicing. If set accidentally, press the  "PROGRAM" button immediately to exit it.

## 4-6. FUNCTIONS OF OTHER BUTTONS

Function	Contents
▶▶	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶▶ "PROGRAM" *	The sled moves to the outer circumference only when this is pressed.
◀◀◀ "PROGRAM" *	The sled moves to the inner circumference only when this is pressed.
● "1"	Switches between the pit and groove modes when pressed.
▶▶ "1"	Switches the spindle servo mode (CLV S ↔ CLV A).
■ "1"	Switches the displayed contents each time the button is pressed
▲ (EJECT)	Ejects the disc
▲ "1"	Exits the test mode

### \*Note:

As this unit has only a few buttons, one button is assigned with several functions in the test mode."

Press the **INPUT** button to switch the functions.

Each time the **INPUT** button is pressed, the display switches in the following order;"

"PROGRAM" → "1" → blank → "PROGRAM"

The functions of each button change with the display.

## 4-7. TEST MODE DISPLAYS

Each time the **■ "1"** button is pressed, the display changes in the following order.

### 1. Mode display

Displays "TEMP ADJUST", "CPLAYMODE", etc.

### 2. Error rate display

Displays the error rate in the following way.

C1 = □□□□ AD = □□

C1 = Indicates the C1 error.

AD = Indicates ADER.

### 3. Address display

The address is displayed as follows. (MO:recordable disc, CD:playback only disc)

Pressing the **● "1"** button switches between the groove display and pit display.

h = □□□□ s = □□□□ (MO pit and CD)

h = □□□□ a = □□□□ (MO groove)

h = Indicates the header address.

s = Indicates the SUBQ address.

a = Indicates the ADIP address.

**Note :** "—" is displayed when servo is not imposed.

### 4. Auto gain display (Not used in servicing)

The auto gain is displayed as follows.

AG = □□/□□ [□□]

### 5. Detrack check display (Not used in servicing)

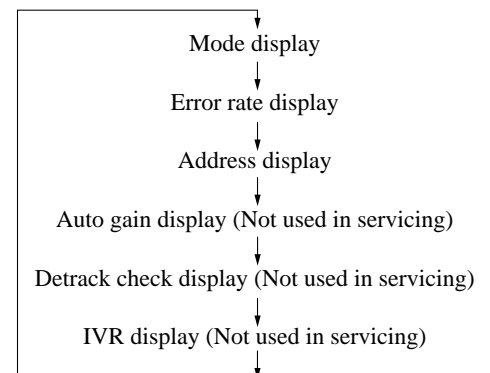
The detrack is displayed as follows.

ADR = □□□□□□□□

### 6. IVR display (Not used in servicing)

The IVR is displayed as follows.

[□□][□□][□□]



## MEANINGS OF OTHER DISPLAYS

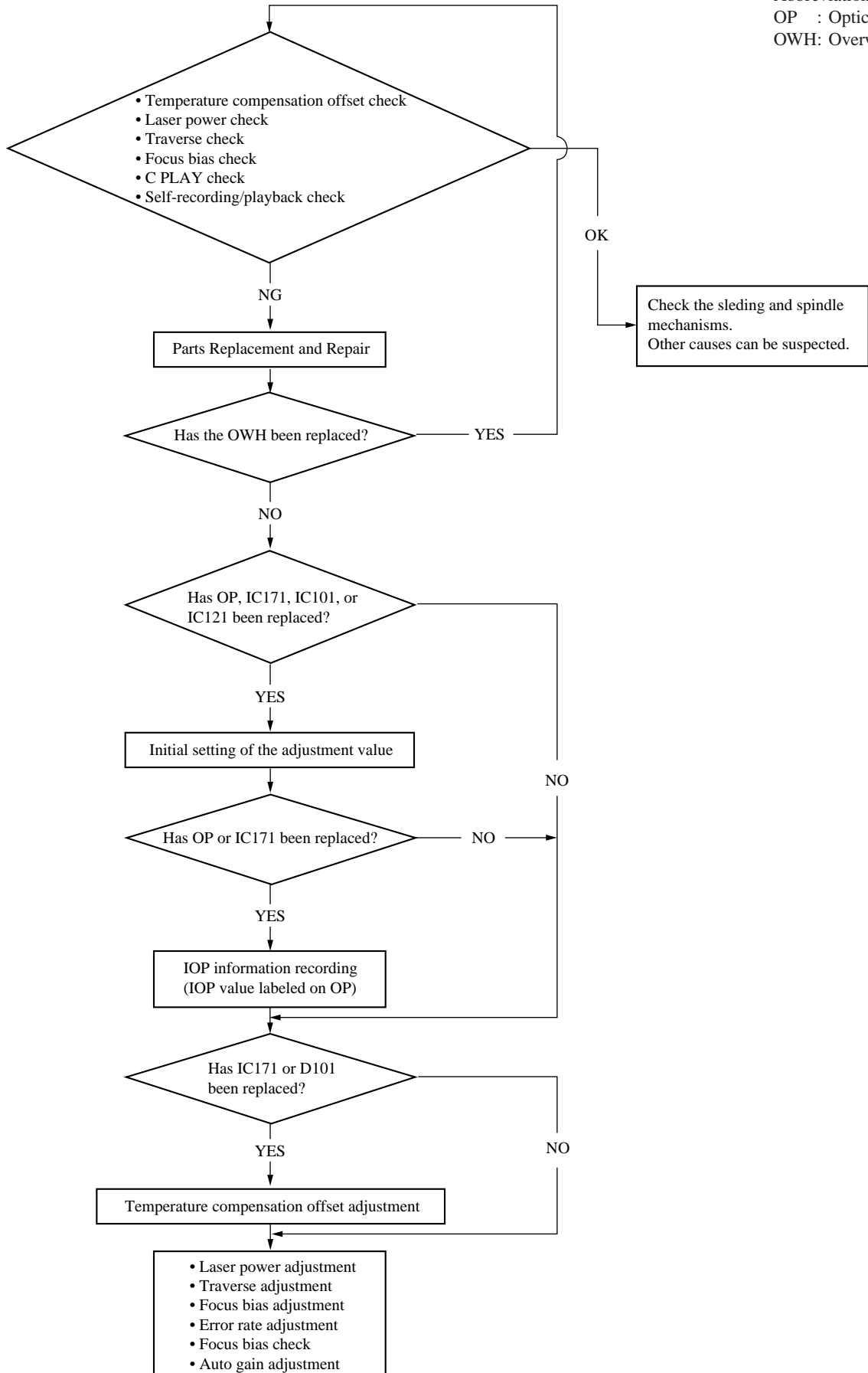
Display	Contents	
	When Lit	When Off
▶	During continuous playback (CLV: ON)	STOP (CLV: OFF)
	Tracking servo OFF	Tracking servo ON
REC	Recording mode ON	Recording mode OFF
SYNC	CLV low speed mode	CLV normal mode
L.SYNC	ABCD adjustment completed	
OVER	Tracking offset cancel ON	Tracking offset cancel OFF
B	Tracking auto gain OK	
A-	Focus auto gain OK	
TRACK	Pit	Groove
DISC	High reflection	Low reflection
SLEEP	CLV S	CLV A
MONO	CLV LOCK	CLV UNLOCK

## SECTION 5 ELECTRICAL ADJUSTMENTS

### 5-1. PARTS REPLACEMENT AND ADJUSTMENT

- Check and adjust the MDM and MBU as follows.  
The procedure changes according to the part replaced

- Abbreviation  
OP : Optical pick-up  
OWH: Overwrite head

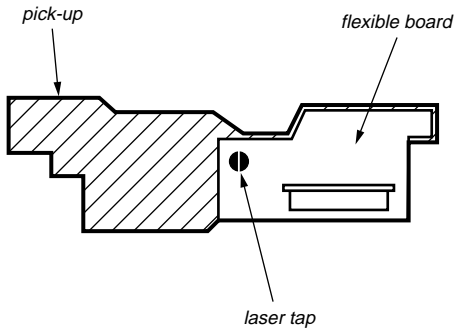


## 5-2. PRECAUTIONS FOR CHECKING LASER DIODE EMISSION

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

## 5-3. PRECAUTIONS FOR USE OF OPTICAL PICK-UP (KMS-260A)

As the laser diode in the optical pick-up is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



**Optical pick-up flexible board**

## 5-4. PRECAUTIONS FOR ADJUSTMENTS

1) When replacing the following parts, perform the adjustments and checks with ○ in the order shown in the following table.

	Optical Pick-up	BD Board			
		IC171	D101	IC101, IC121	IC192
1. Initial setting of adjustment value	○	○	×	○	×
2. Recording of IOP information (Value written in the pick-up)	○	○	×	×	×
3. Temperature compensation offset adjustment	×	○	○	×	×
4. Laser power adjustment	○	○	×	○	○
5. Traverse adjustment	○	○	×	○	×
6. Focus bias adjustment	○	○	×	○	×
7. Error rate check	○	○	×	○	×
8. Auto gain output level adjustment	○	○	×	○	×

- 2) Set the test mode when performing adjustments.  
After completing the adjustments, exit the test mode.  
Perform the adjustments and checks in "group S" of the test mode.
- 3) Perform the adjustments to be needed in the order shown.

- 4) Use the following tools and measuring devices.
  - Check Disc (MD) TDYS-1 (Parts No. 4-963-646-01)
  - Test Disk (MDW-74/AU-1) (Parts No. 8-892-341-41)
  - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
or
  - MD Laser power meter 8010S (Parts No. J-2501-145-A)
  - Oscilloscope (Measure after performing CAL of prove.)
  - Digital voltmeter
  - Thermometer
  - Jig for checking BD board waveform (Parts No. : J-2501-149-A)
- 5) When observing several signals on the oscilloscope, etc., make sure that VC and ground do not connect inside the oscilloscope.  
(VC and ground will become short-circuited.)
- 6) Using the above jig enables the waveform to be checked without the need to solder.  
(Refer to Servicing Note on page 6.)
- 7) As the disc used will affect the adjustment results, make sure that no dusts nor fingerprints are attached to it.

### Note:

When performing laser power checks and adjustment (electrical adjustment), use of the new MD laser power meter 8010S (J-2501-145-A) instead of the conventional laser power meter is convenient. It sharply reduces the time and trouble to set the laser power meter sensor onto the objective lens of the optical pick-up.

## 5-5. CREATING CONTINUOUSLY RECORDED DISC

- \* This disc is used in focus bias adjustment and error rate check.  
The following describes how to create a continuous recording disc.
1. Insert a disc (blank disc) commercially available.
  2. Press the **▶▶▶** button and display "CREC MODE".
  3. Press the **▶|| "PROGRAM"** button again to display "CREC MID".  
Display "CREC (0300)" and start to recording.
  4. Complete recording within 5 minutes.
  5. Press the **■ "PROGRAM"** button and stop recording .
  6. Press the **▲ (EJECT)** button and remove the disc.

The above has been how to create a continuous recorded data for the focus bias adjustment and error rate check.

**Note :** Be careful not to apply vibration during continuous recording.

## 5-6. CHECKS PRIOR TO REPAIRS

These checks are performed before replacing parts according to “approximate specifications” to determine the faulty locations. For details, refer to “Checks Prior to Parts Replacement and Adjustments” (See page 8).

### 5-6-1. Temperature Compensation Offset Check

When performing adjustments, set the internal temperature and room temperature to 22 to 28°C.

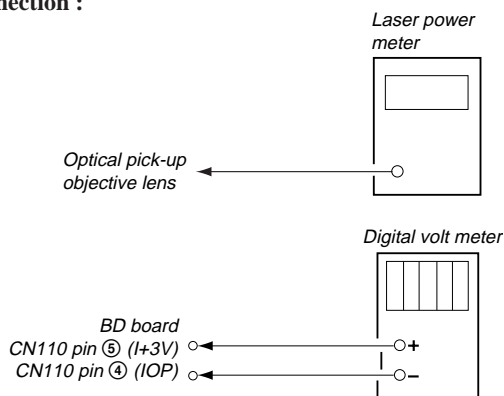
#### Checking Procedure:

1. Press the button to display “TEMP CHECK”.
2. Press the button.
3. “T=@@ (##) [OK]” should be displayed. If “T=@@ (##) [NG]” is displayed, it means that the results are bad.  
(@@ indicates the current value set, and ## indicates the value written in the non-volatile memory.)

### 5-6-2. Laser Power Check

Before checking, check the IOP value of the optical pick-up.  
(Refer to 5-8. Recording and Displaying IOP Information.)

#### Connection :



#### Checking Procedure:

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the “PROGRAM” button or “PROGRAM” button to move the optical pick-up.)  
Connect the digital volt meter to CN110 pin ⑤ (I+3V) and CN110 pin ④ (IOP).
2. Then, press the button and display “LDPWR CHECK”.
3. Press the button once and display “0.9 mW\*\*\* \$ ”. Check that the reading of the laser power meter become 0.84 to 0.92 mW. (\*\*\*) means IOP value)
4. Press the button once more and display “7.0 mW\*\*\* \$ ”. Check that the reading the laser power meter and digital volt meter satisfy the specified value.

#### Specified Value :

Laser power meter reading : 7.0 ± 0.2 mW

Digital voltmeter reading : Optical pick-up displayed value ± 10%

(Optical pick-up label)

KMS260A  
27X40  
B0825

(For details of the method for checking this value, refer to “5-8. Recording and Displaying IOP Information”.)

$lop = 82.5 \text{ mA}$  in this case

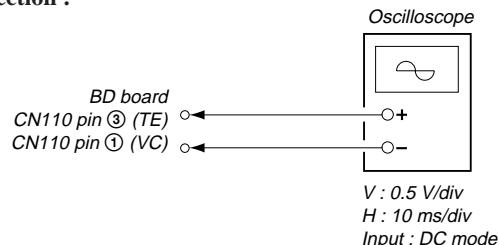
$lop \text{ (mA)} = \text{Digital voltmeter reading (mV)} / 1 \text{ (}\Omega\text{)}$

5. Press the button and display “LDPWR CHECK” and stop the laser emission.  
(The button is effective at all times to stop the laser emission.)

**Note 1:** After step 4, each time the button is pressed, the display will be switched between “0.7 mW\*\*\* \$ ”, “6.2 mW\*\*\* \$ ”, and “WP ホセイ \*\*\* \$ ”. Nothing needs to be performed here.

### 5-6-3. Traverse Check

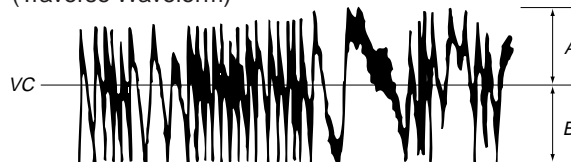
#### Connection :



#### Checking Procedure:

1. Connect an oscilloscope to CN110 pin ③ (TE) and CN110 pin ① (VC) of the BD board.
2. Load a disc (any available on the market). (Refer to Note 1.)
3. Press the button and move the optical pick-up outside the pit.
4. Press the button and display “EF MO CHECK”.
5. Press the button and display “EFB = MO-R”.  
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not press the , buttons.  
(Read power traverse checking)

(Traverse Waveform)

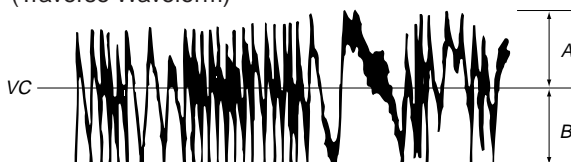


Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

7. Press the button and display “EFB = MO-W”.
8. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not press the , buttons.  
(Write power traverse checking)



(Traverse Waveform)



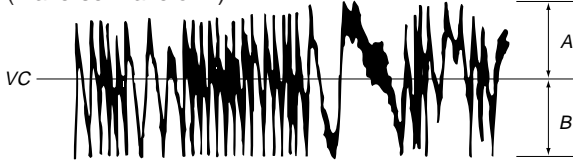
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

9. Press the button display “EFB = MO-P”.  
Then, the optical pick-up moves to the pit area automatically and servo is imposed.








10. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not press the ,  buttons.

(Traverse Waveform)

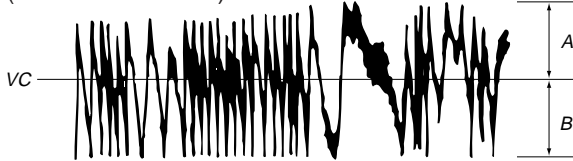


Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$



11. Press the  button display “EF MO CHECK”. The disc stops rotating automatically.
12. Press the  button and remove the disc.
13. Load the check disc (MD) TDYS-1.
14. Press the  button and display “EF CD CHECK”.
15. Press the  button and display “EFB =  CD”. Servo is imposed automatically.
16. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not press the ,  buttons.

(Traverse Waveform)



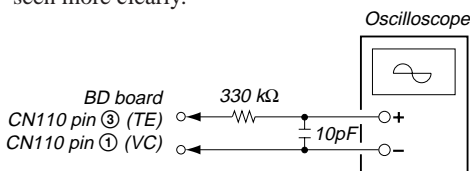
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

17. Press the  button and display “EF CD CHECK”.
18. Press the  button and remove the check disc (MD) TDYS-1.

**Note 1 :** MO reading data will be erased during if a recorded disc is used in this adjustment.











**Note 2 :** If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



#### 5-6-4. Focus Bias Check





Change the focus bias and check the focus tolerance amount.

**Checking Procedure :**





1. Load a test disk (MDW-74/AU-1).
2. Rotate the  button and display “CPLAY MODE”.
3. Press the  button twice and display “CPLAY MID”.
4. Press the  button when “C1 =  AD =  is displayed.
5. Press the  button and display “FBIAS CHECK”.
6. Press the  button and display “ /  c = .

The first four digits indicate the C1 error rate, the two digits after “/” indicate ADER, and the 2 digits after “c =” indicate the focus bias value.



Check that the C1 error is below 220 and ADER is below 2.

7. Press the  button and display “ /  b = .

Check that the C1 error is below 220 and ADER is below 2.

8. Press the  button and display “ /  a = .







Check that the C1 error is below 220 and ADER is below 2.

9. Press the  button, next press the  button, and remove the test disc.

#### 5-6-5. C PLAY Checking







##### MO Error Rate Check

**Checking Procedure :**

1. Press a test disk (MDW-74/AU-1).
2. Rotate the  button knob and display “CPLAY MODE” .
3. Press the  button and display “CPLAY MID”.
4. The display changes to “C1 =  AD = .
5. If the C1 error rate is below 80, check that ADER is below 2.
6. Press the  button, stop playback, press the  button, and test disc.

##### CD Error Rate Check










**Checking Procedure :**

1. Load a check disc (MD) TDYS-1.
2. Press the  button knob and display “CPLAY MODE”.
3. Press the  button and display “CPLAY MID”.
4. The display changes to “C1 =  AD = .
5. Check that the C1 error rate is below 50.
6. Press the  button, stop playback, press the  button, and the test disc.

#### 5-6-6. Self-Recording/playback Check

Prepare a continuous recording disc using the unit to be repaired and check the error rate.

**Checking Procedure :**

1. Insert a recordable disc (blank disc) into the unit.
2. Press the  button knob to display “CREC MODE”.
3. Press the  button to display the “CREC MID”.
4. When recording starts, “REC” is displayed, this becomes “CREC (#####)” (##### is the address), and recording starts.
5. About 1 minute later, press the  button to stop continuous recording.
6. Press the  button to display “C PLAY MODE”.
7. Press the  button to display “C PLAY MID”.
8. “C1 =  AD =  will be displayed.
9. Check that the C1 error becomes below 80 and the AD error below 2.
10. Press the  button to stop playback, and press the  button and remove the disc.



## 5-7. INITIAL SETTING OF ADJUSTMENT VALUE

### Note:

Mode which sets the adjustment results recorded in the non-volatile memory to the initial setting value. However the results of the temperature compensation offset adjustment will not change to the initial setting value.

If initial setting is performed, perform all adjustments again excluding the temperature compensation offset adjustment.

For details of the initial setting, refer to "5-4. Precautions on Adjustments" and execute the initial setting before the adjustment as required.

### Setting Procedure :

1. Press the **▶▶▶** button to display "ADJ CLEAR".
2. Press the **▶▶▶ "PROGRAM"** button. "Complete!" will be displayed momentarily and initial setting will be executed, after which "ADJ CLEAR" will be displayed.

## 5-8. RECORDING AND DISPLAYING THE IOP INFORMATION

The IOP data can be recorded in the non-volatile memory. The IOP value on the label of the optical pickup and the IOP value after the adjustment will be recorded. Recording these data eliminates the need to read the label on the optical pick-up.

### Recording Procedure :

1. While pressing the **INPUT** button and **■** button, connect the power plug to the outlet, and release the **INPUT** button and **■** button.
2. Press the **▶▶▶** button to display "[Service]", and press the **▶▶▶ "PROGRAM"** button.
3. Rotate the **▶▶▶** button to display "Top.Write", and press the **▶▶▶ "PROGRAM"** button.
4. The display becomes Ref=@@.@ (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the IOP value written on the optical pick-up.  
To select the number : Press the **◀◀◀**, **▶▶▶** buttons.  
To select the digit : Press the **● "PROGRAM"** knob
6. When the **▶▶▶ "PROGRAM"** button is pressed, the display becomes "Measu=@@.@." (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the **▶▶▶ "PROGRAM"** button.
8. "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write".

### Display Procedure :

1. Press the **▶▶▶** button to display "Iop.Read".
2. "@@.@/##.#" is displayed and the recorded contents are displayed.  
@@.@ indicates the Iop value labeled on the pick-up.  
##.# indicates the Iop value after adjustment
3. To end, press the **● "PROGRAM"** button or **■ "PROGRAM"** button to display "Iop Read".

## 5-9. TEMPERATURE COMPENSATION OFFSET ADJUSTMENT

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

### Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature of 22 °C to 28 °C.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

### Adjusting Procedure :

1. Press the **▶▶▶** button and display "TEMP ADJUST".
2. Press the **▶▶▶ "PROGRAM"** button and select the "TEMP ADJUST" mode.
3. "TEMP = **⊞⊞⊞** [OK]" and the current temperature data will be displayed.
4. To save the data, press the **▶▶▶ "PROGRAM"** button.  
When not saving the data, press the **■ "PROGRAM"** button.
5. When the **▶▶▶ "PROGRAM"** button is pressed, "TEMP = **⊞⊞⊞** SAVE" will be displayed and turned back to "TEMP ADJUST" display then. When the **■ "PROGRAM"** button is pressed, "TEMP ADJUST" will be displayed immediately.

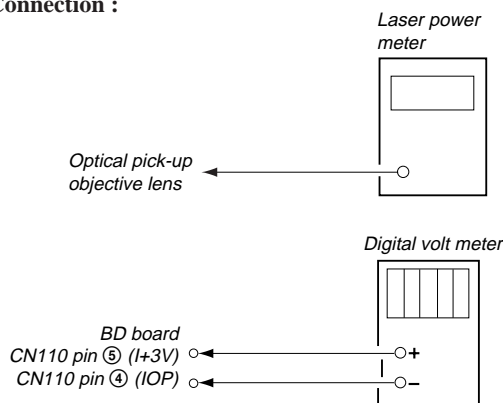
### Specified Value :

The "TEMP = **⊞⊞⊞**" should be within "E0 - EF", "F0 - FF", "00 - 0F", "10 - 1F" and "20 - 2F".

## 5-10. LASER POWER ADJUSTMENT




Check the IOP value of the optical pick-up before adjustments. (Refer to 5-8. Recording and Displaying IOP Information.)

### Connection :








### Adjusting Procedure :

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the **◀◀◀ "PROGRAM"** button or **▶▶▶ "PROGRAM"** button to move the optical pick-up.)  
Connect the digital volt meter to CN110 pin ⑤ (I+3V) and CN110 pin ④ (IOP).
2. Press the **▶▶▶** button and display "LDPWR ADJUST".  
(Laser power : For adjustment)
3. Press the **▶▶▶ "PROGRAM"** button once and display "LD 0.9 mW \$ **⊞⊞⊞**".
4. Press the **◀◀◀**, **▶▶▶** buttons so that the reading of the laser power meter becomes 0.85 to 0.91 mW. Press the **▶▶▶ "PROGRAM"** button after setting the range knob of the laser power meter, and save the adjustment results. ("LD SAVE \$ **⊞⊞⊞**" will be displayed for a moment.)
5. Then "LD 7.0 mW \$ **⊞⊞⊞**" will be displayed.

6. Press the ,  buttons so that the reading of the laser power meter becomes 6.9 to 7.1 mW, press the  "PROGRAM" button and save it.

**Note :** Do not perform the emission with 7.0 mW more than 15 seconds continuously.

7. Then, press the  button and display "PWR CHECK".  
 8. Press the  "PROGRAM" button once and display "0.9 mW\*\*\* \$ ". Check that the reading of the laser power meter become 0.85 to 0.91 mW. (\*\*\*) means IOP value)  
 9. Press the  "PROGRAM" button once more and display "7.0 mW\*\*\* \$ ". Check that the reading the laser power meter and digital volt meter satisfy the specified value.  
 Note down the digital voltmeter reading value.

### Specified Value :

Laser power meter reading :  $7.0 \pm 0.1$  mW

Digital voltmeter reading : Optical pick-up displayed value  $\pm 10\%$










(Optical pick-up label)





KMS260A  
27X40  
B0825

(For details of the method for checking this value, refer to "5-8. Recording and Displaying IOP Information".)

$I_{op} = 82.5$  mA in this case

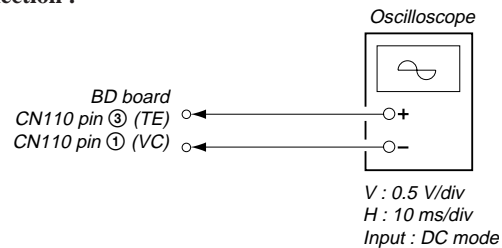
$I_{op}$  (mA) = Digital voltmeter reading (mV)/1 ( $\Omega$ )

10. Press the  "PROGRAM" button and display "LDPWR CHECK" and stop the laser emission.  
 (The  "PROGRAM" button is effective at all times to stop the laser emission.)  
 11. Press the  button to display "Iop.Write".  
 12. Press the  "PROGRAM" button. When the display becomes Ref=@@@.@ (@ is an arbitrary number), press the  "PROGRAM" button to display "Measu=@@@.@" (@ is an arbitrary number).  
 13. The numbers which can be changed will blink. Input the Iop value noted down at step 9.  
 To select the number : Press the ,  buttons.  
 To select the digit : Press the  "PROGRAM" button  
 14. When the  "PROGRAM" button is pressed, "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write".










**Note 1:** After step 4, each time the  "PROGRAM" button is pressed, the display will be switched between "0.7 mW\*\*\* \$ ", "6.2 mW\*\*\* \$ ", and "WP ホセイ \*\*\* \$ ". Nothing needs to be performed here.

## 5-11. TRAVERSE ADJUSTMENT

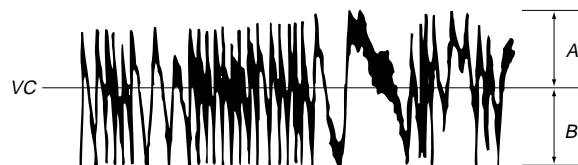
Connection :












### Adjusting Procedure :

1. Connect an oscilloscope to CN110 pin ③ (TE) and CN110 pin ① (VC) of the BD board.
2. Load a disc (any available on the market). (Refer to Note 1.)
3. Press the  "PROGRAM" button and move the optical pick-up outside the pit.
4. Press the  button and display "EF MO ADJUST".
5. Press the  button and display "EFB =  MO-R".  
 (Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Press the  button so that the waveform of the oscilloscope becomes the specified value.  
 (When the ,  buttons is pressed, the  of "EFB =  changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.  
 (Read power traverse adjustment)

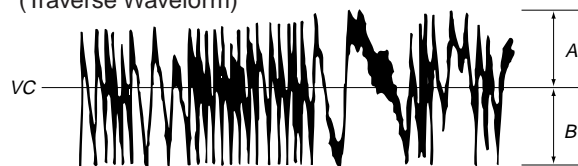
(Traverse Waveform)






Specification A = B

7. Press the  "PROGRAM" button and save the result of adjustment to the non-volatile memory ("EFB =  SAVE" will be displayed for a moment. Then "EFB =  MO-W" will be displayed).
8. Press the ,  buttons so that the waveform of the oscilloscope becomes the specified value.  
 (When the ,  buttons is pressed, the  of "EFB =  changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.  
 (Write power traverse adjustment)

(Traverse Waveform)

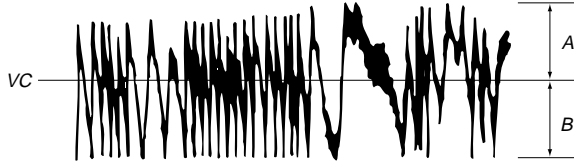


Specification A = B

9. Press the  "PROGRAM" button, and save the adjustment results in the non-volatile memory. ("EFB =  SAVE" will be displayed for a moment.)
10. "EFB =  MO-P". will be displayed.  
 The optical pick-up moves to the pit area automatically and servo is imposed.

- Press the , buttons until the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

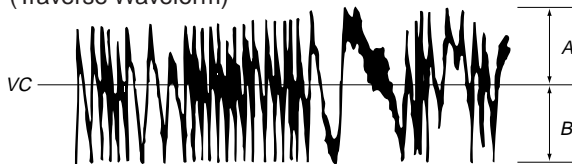
(Traverse Waveform)



Specification  $A = B$

- Press the button, and save the adjustment results in the non-volatile memory. (“EFB = SAVE” will be displayed for a moment.)  
Next “EF MO ADJUST” is displayed. The disc stops rotating automatically.
- Press the button and remove the disc.
- Load the check disc (MD) TDYS-1.
- Press button and display “EF CD ADJUST”.
- Press the button and display “EFB = CD”. Servo is imposed automatically.
- Press the , buttons so that the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)

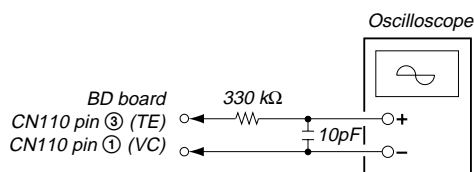


Specification  $A = B$

- Press the button, display “EFB = SAVE” for a moment and save the adjustment results in the non-volatile memory.  
Next “EF CD ADJUST” will be displayed.
- Press the button and remove the check disc (MD) TDYS-1.

**Note 1 :** MO reading data will be erased during if a recorded disc is used in this adjustment.

**Note 2 :** If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



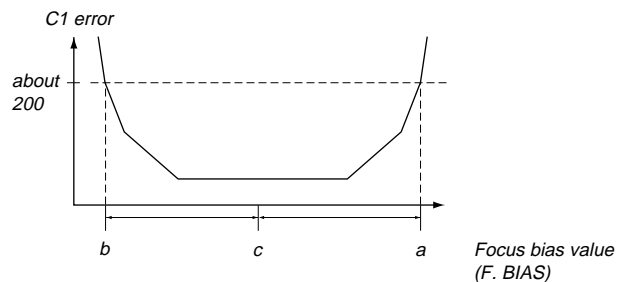
## 5-12. FOCUS BIAS ADJUSTMENT

### Adjusting Procedure :

- Load a test disk (MDW-74/AU-1).
  - Press the button and display “CPLAY MODE”.
  - Press the button and display “CPLAY MID”.
  - Press the button when “C1 = AD = ” is displayed.
  - Press the button and display “FBIAS ADJUST”.
  - Press the button and display “/ a = ”.
- The first four digits indicate the C1 error rate, the two digits after “/” indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
- Press the button and find the focus bias value at which the C1 error rate becomes about 200 (Refer to Note 2).
  - Press the button and display “/ b = ”.
  - Press the button direction and find the focus bias value at which the C1 error rate becomes about 200.
  - Press the button and display “/ c = ”.
  - Check that the C1 error rate is below 50 and ADER is 00. Then press the button.
  - If the “( )” in “ - - ( )” is above 20, press the button.  
If below 20, press the button and repeat the adjustment from step 2.
  - Press the button to remove the test disc.

**Note 1 :** The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.







**Note 2 :** As the C1 error rate changes, perform the adjustment using the average value.



## 5-13. ERROR RATE CHECK







### 5-13-1. CD Error Rate Check

#### Checking Procedure :

1. Load a check disc (MD) TDYS-1.
2. Press the  button and display "CPLAY MODE".
3. Press the  "PROGRAM" button twice and display "CPLAY MID".
4. The display changes to "C1 =  AD = .
5. Check that the C1 error rate is below 20.
6. Press the  "PROGRAM" button, stop playback, press the  (EJECT) button, and remove the test disc.

### 5-13-2. MO Error Rate Check











#### Checking Procedure :

1. Load a test disc (MDW-74/AU-1).
2. Press the  button and display "CPLAY MODE".
3. Press the  "PROGRAM" button and display "CPLAY MID".
4. The display changes to "C =  AD = .
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the  "PROGRAM" button, stop playback, press the  (EJECT) button, and remove the test disc.

## 5-14. FOCUS BIAS CHECK





Change the focus bias and check the focus tolerance amount.

#### Checking Procedure :





1. Load a test disc (MDW-74/AU-1).
2. Press the  button and display "CPLAY MODE".
3. Press the  "PROGRAM" button twice and display "CPLAY MID".
4. Press the  "PROGRAM" button when "C1 =  AD =  is displayed.
5. Press the  button and display "FBIAS CHECK".
6. Press the  "PROGRAM" button and display "/  c = .

The first four digits indicate the C1 error rate, the two digits after "/" indicate ADER, and the 2 digits after "c =" indicate the focus bias value.



Check that the C1 error is below 50 and ADER is below 2.

7. Press the  "PROGRAM" button and display "/  b = .

Check that the C1 error is below 220 and ADER is below 2.

8. Press the  "PROGRAM" button and display "/  a = .

Check that the C1 error is below 220 and ADER is below 2

9. Press the  "PROGRAM" button, next press the  (EJECT) button, and remove the continuously recorded disc.




**Note 1 :** If the C1 error and ADER are above other than the specified value at points a (step 8. in the above) or b (step 7. in the above), the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

## 5-15. AUTO GAIN CONTROL OUTPUT LEVEL ADJUSTMENT

Be sure to perform this adjustment when the pickup is replaced. If the adjustment results becomes "Adjust NG!", the pickup may be faulty or the servo system circuits may be abnormal.




### 5-15-1. CD Auto Gain Control Output Level Adjustment

#### Adjusting Procedure :

1. Insert the check disc (MD) TDYS-1.
2. Press the  button to display "AG Set (CD)".
3. When the  "PROGRAM" button is pressed, the adjustment will be performed automatically. "Complete!!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (CD)".
4. Press the  (EJECT) button to remove the disc.

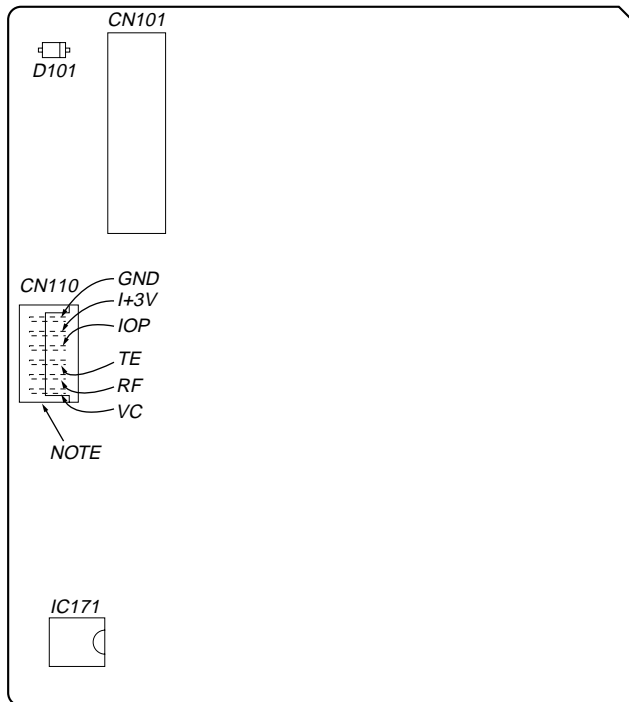
### 5-15-2. MO Auto Gain Control Output Level Adjustment

#### Adjusting Procedure :

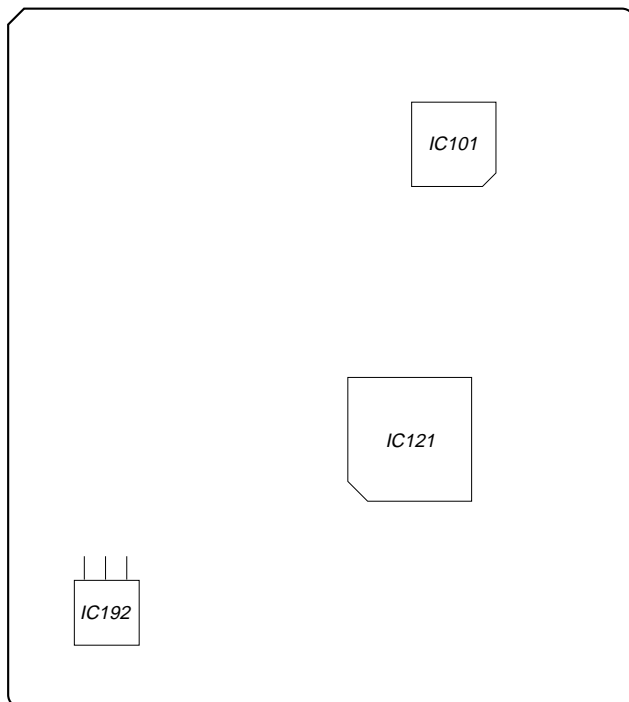
1. Insert the reference disc (MDW-74/AU-1) for recording.
2. Press the  button to display "AG Set (MO)".
3. When the  "PROGRAM" button is pressed, the adjustment will be performed automatically. "Complete!!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (MO)".
4. Press the  (EJECT) button to remove the disc.

## 5-15. ADJUSTING POINTS AND CONNECTING POINTS

### [BD BOARD] (SIDE A)



### [BD BOARD] (SIDE B)

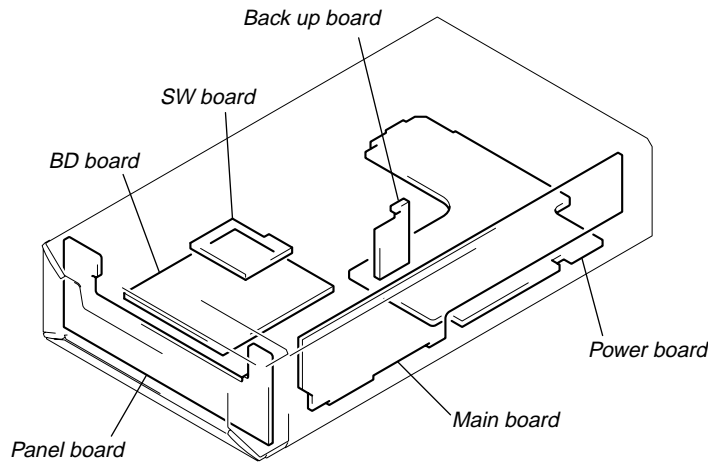


#### **NOTE:**

It is useful to use the jig. for checking the waveform. (Refer to Servicing Note on page 6.)

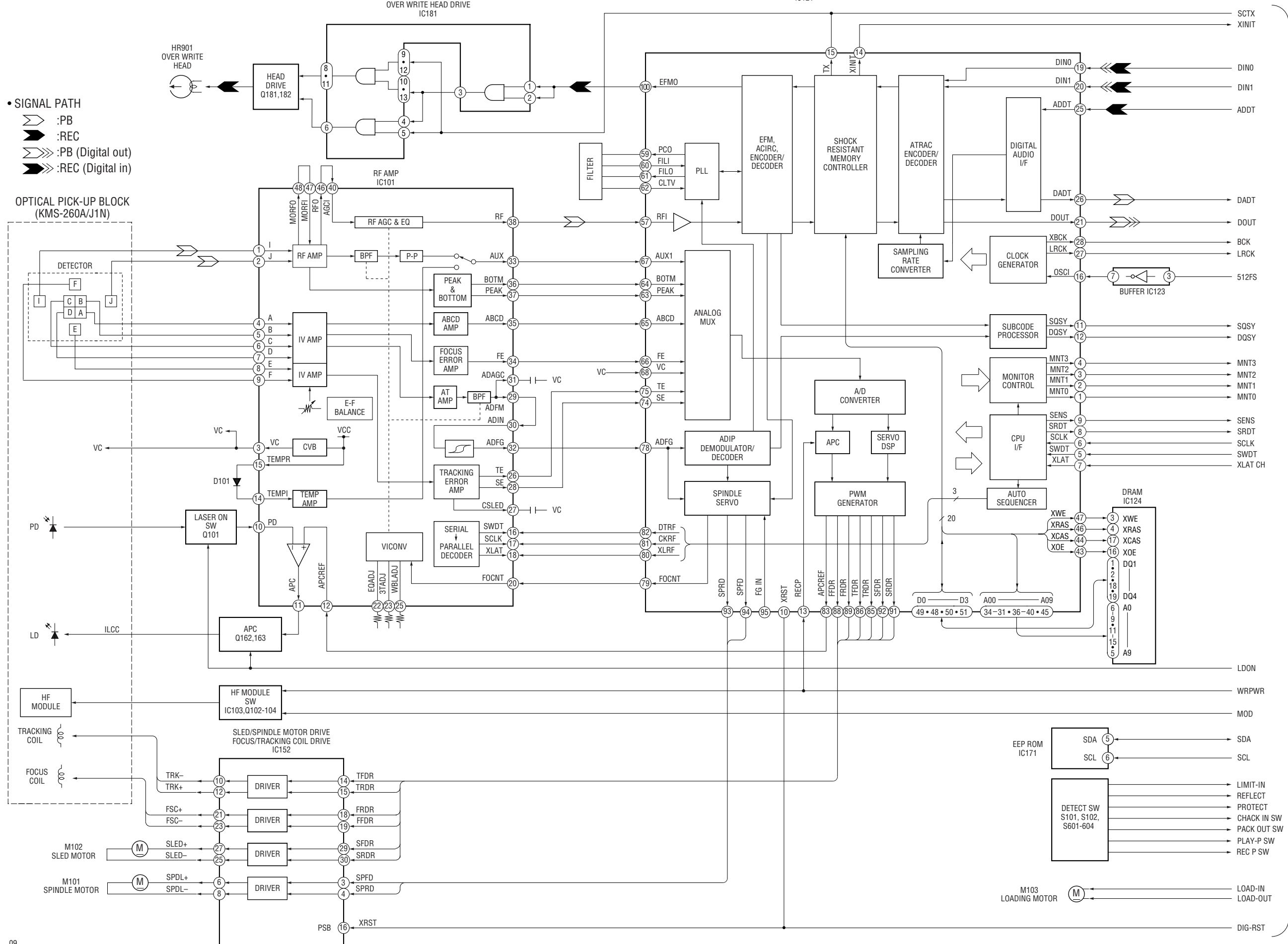
## SECTION 6 DIAGRAMS

### 6-1. CIRCUIT BOARDS LOCATION



6-2. BLOCK DIAGRAM - BD SECTION -

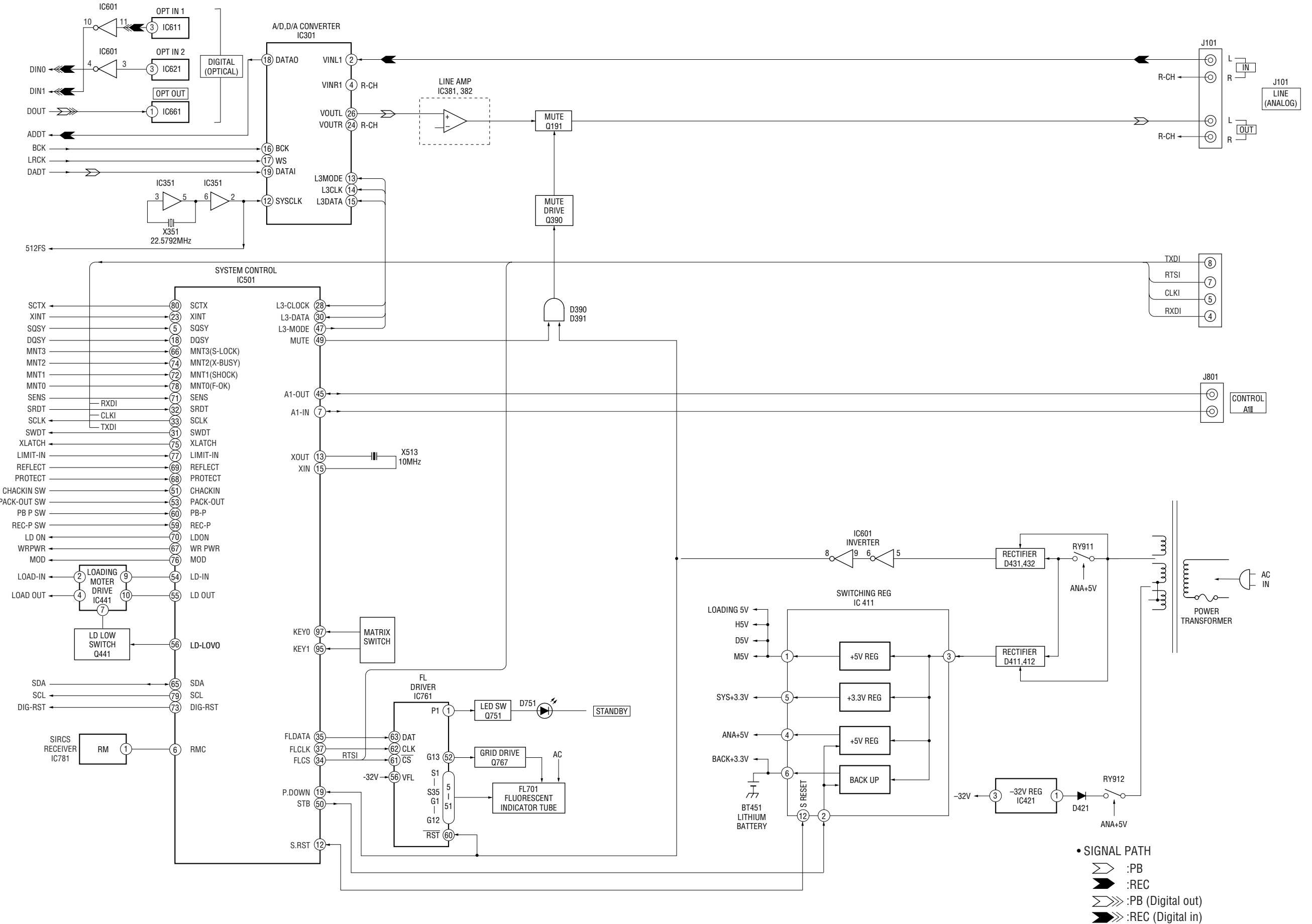
DIGITAL SERVO SIGNAL PROCESSOR, DIGITAL SIGNAL PROCESSOR, EFM/ACIRC ENCODER/DECODER, SHOCK-PROOF MEMORY CONTROLLER, ATRAC ENCODER/DECODER IC121



MAIN SECTION (Page 32)

- MAIN SECTION -

BD SECTION  
(Page 31)





**Note on Schematic Diagram:**

**Note:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{W}$  or less unless otherwise specified.
- $\Delta$  : internal component.
- $\square$  : panel designation.

**Note:**

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

**Note:**

Les composants identifiés par une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- $\text{B}+$  : B+ Line.
- $\text{B}-$  : B- Line.
- $\square$  : adjustment for repair.
- no mark : STOP
- ( ) : Play the test disk (TDYS-1)
- < > : REC
- \* : Can not be measured.
- Voltages are taken with a VOM (Input impedance 10 M $\Omega$ ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with an oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Signal path.
  - $\curvearrowright$  : PB
  - $\blacksquare$  : REC
  - $\curvearrowright$  : PB (digital out)
  - $\blacksquare$  : REC (digital in)

**Note on Printed Wiring Boards:**

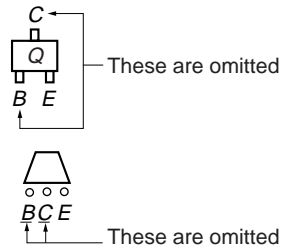
**Note:**

- $\circ$  : parts extracted from the component side.
- $\text{---}$  : parts extracted from the conductor side.
- $\blacksquare$  : parts mounted on the conductor side.
- $\circ$  : Through hole.
- $\dots$  : Pattern from the side which enables seeing. (The other layers' patterns are not indicated.)

**Caution:**

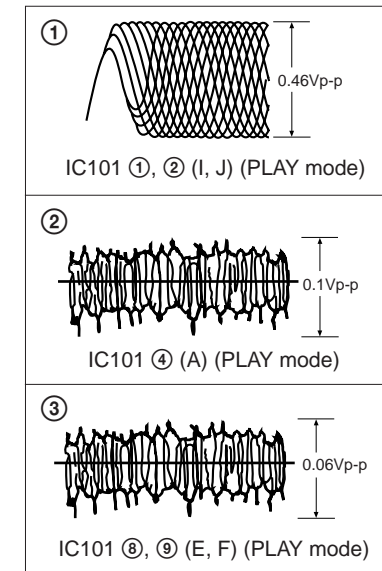
Pattern face side: Parts on the pattern face side seen from the (Side B) pattern face are indicated.  
Parts face side: Parts on the parts face side seen from the (Side A) parts face are indicated.

**Indication of transistor**

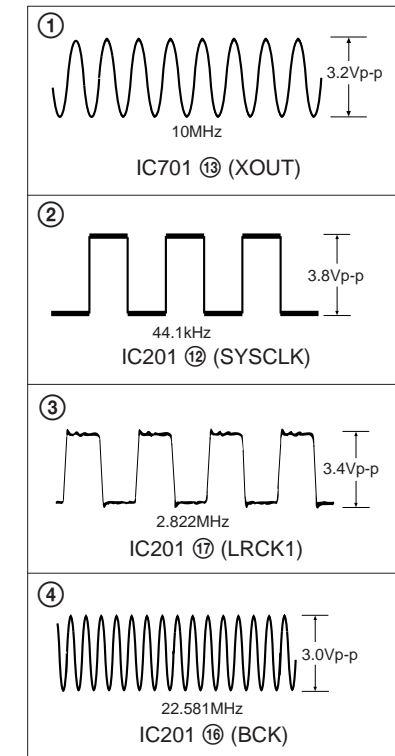


**WAVEFORMS**

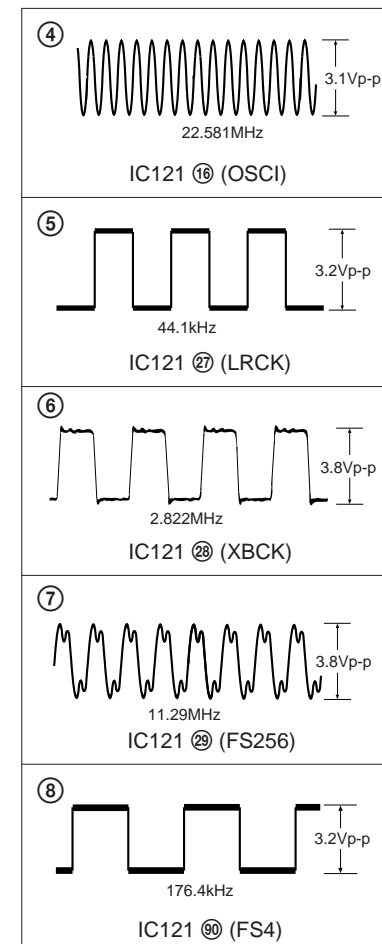
**- BD (1/2) SECTION -**



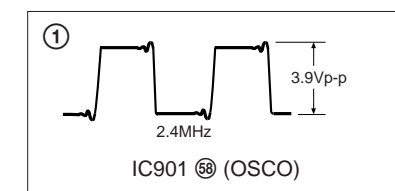
**- MAIN SECTION -**



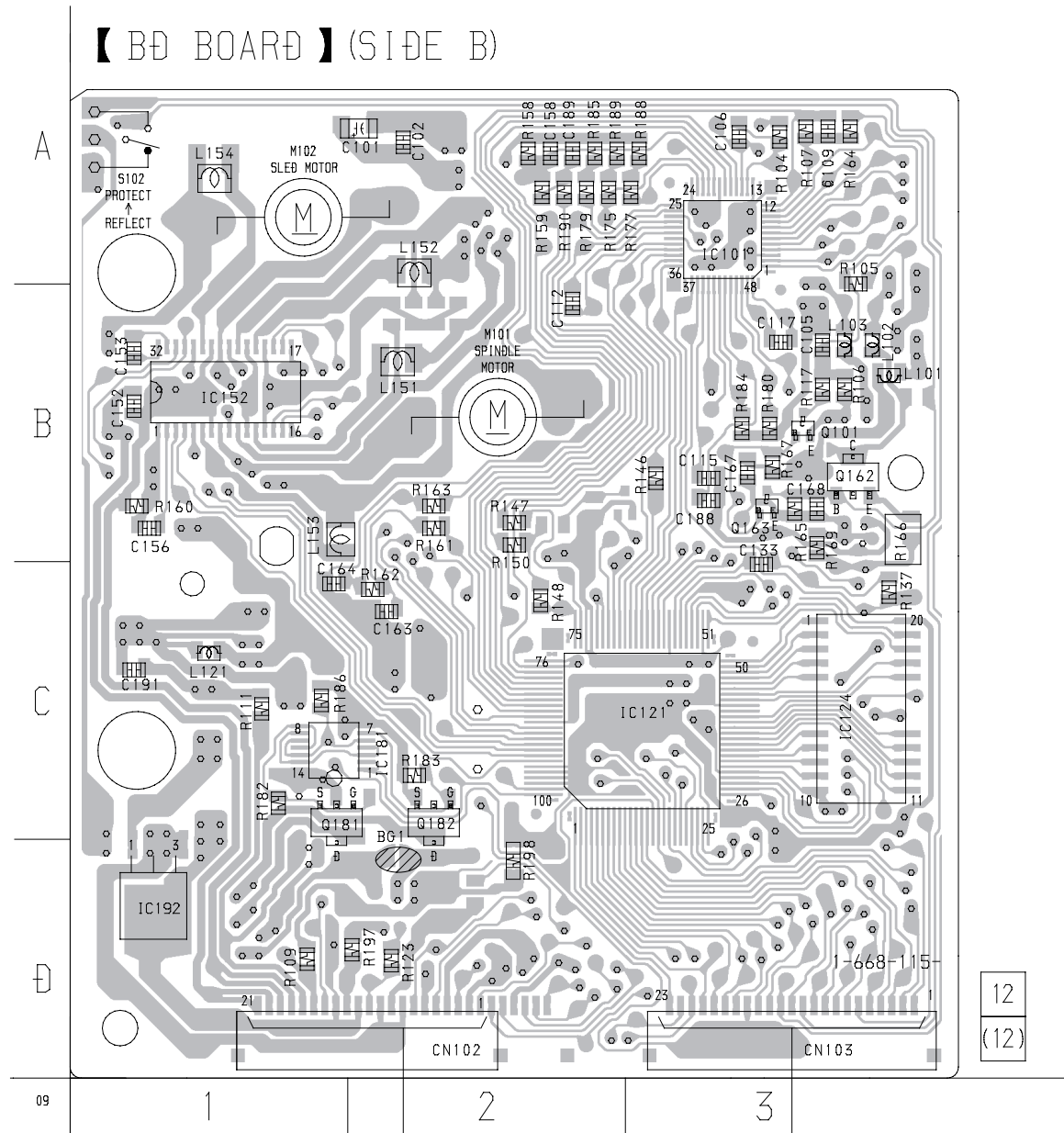
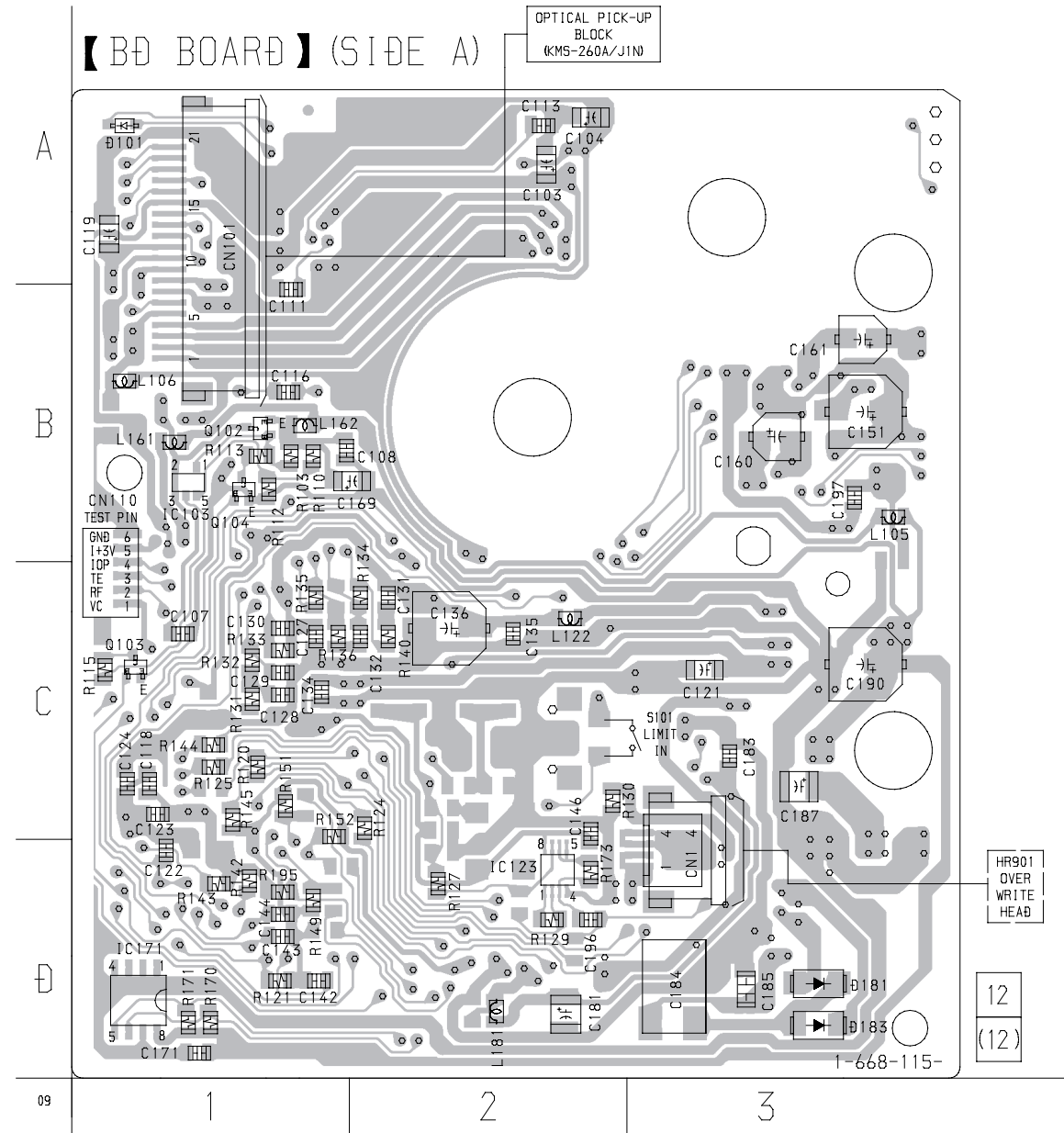
**- BD (2/2) SECTION -**



**- PANEL SECTION -**



6-3. PRINTED WIRING BOARD – BD SECTION –  
 • See page 30 for Circuit Boards Location.



(Page 43)



(Page 39)



: SOLDER BRIDGE

• SEMICONDUCTOR LOCATION

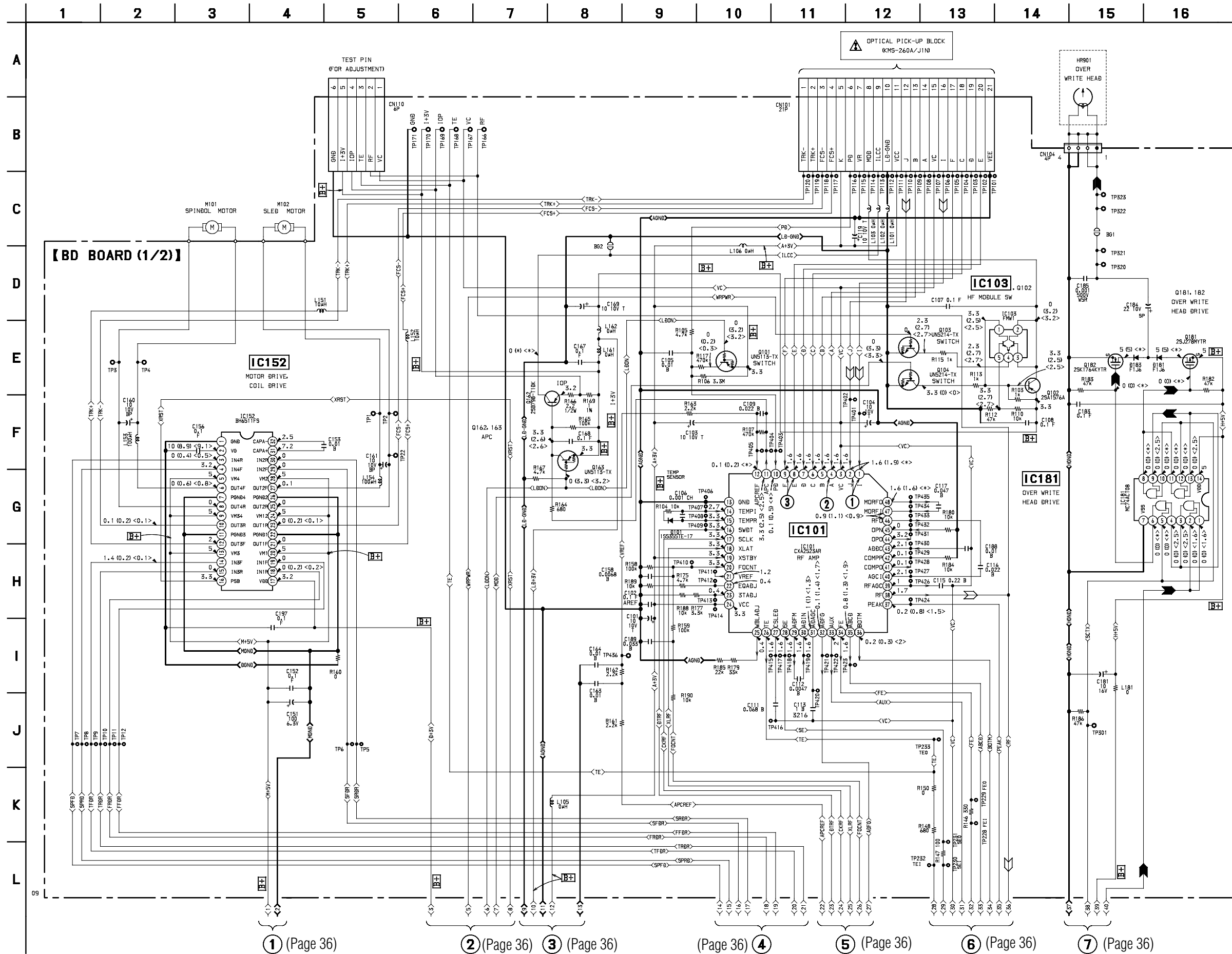
Ref. No.	Location
D101	A-1
D181	D-3
D183	D-3
IC103	B-1
IC123	D-2
IC171	D-1
Q102	B-1
Q103	B-1
Q104	B-1

• SEMICONDUCTOR LOCATION

Ref. No.	Location
IC101	A-3
IC121	C-3
IC124	C-3
IC152	B-1
IC181	C-1
IC192	D-1
Q101	B-3
Q162	B-3
Q163	B-3
Q181	C-1
Q182	C-2

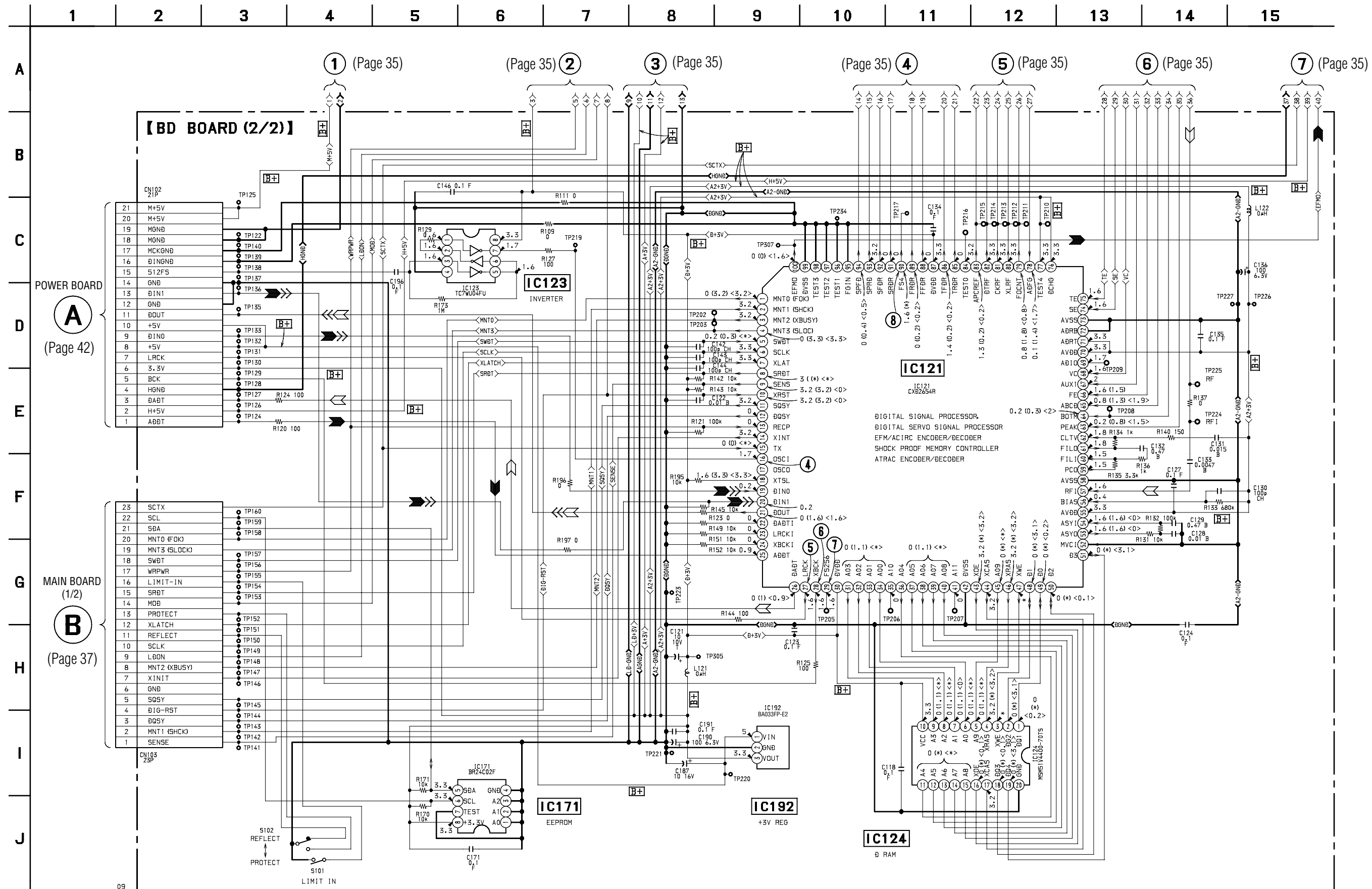
6-4. SCHEMATIC DIAGRAM – BD (1/2) SECTION –

- See page 33 for Waveform.
- See page 45 for IC Block Diagrams.
- See page 48 for IC Pin Function.



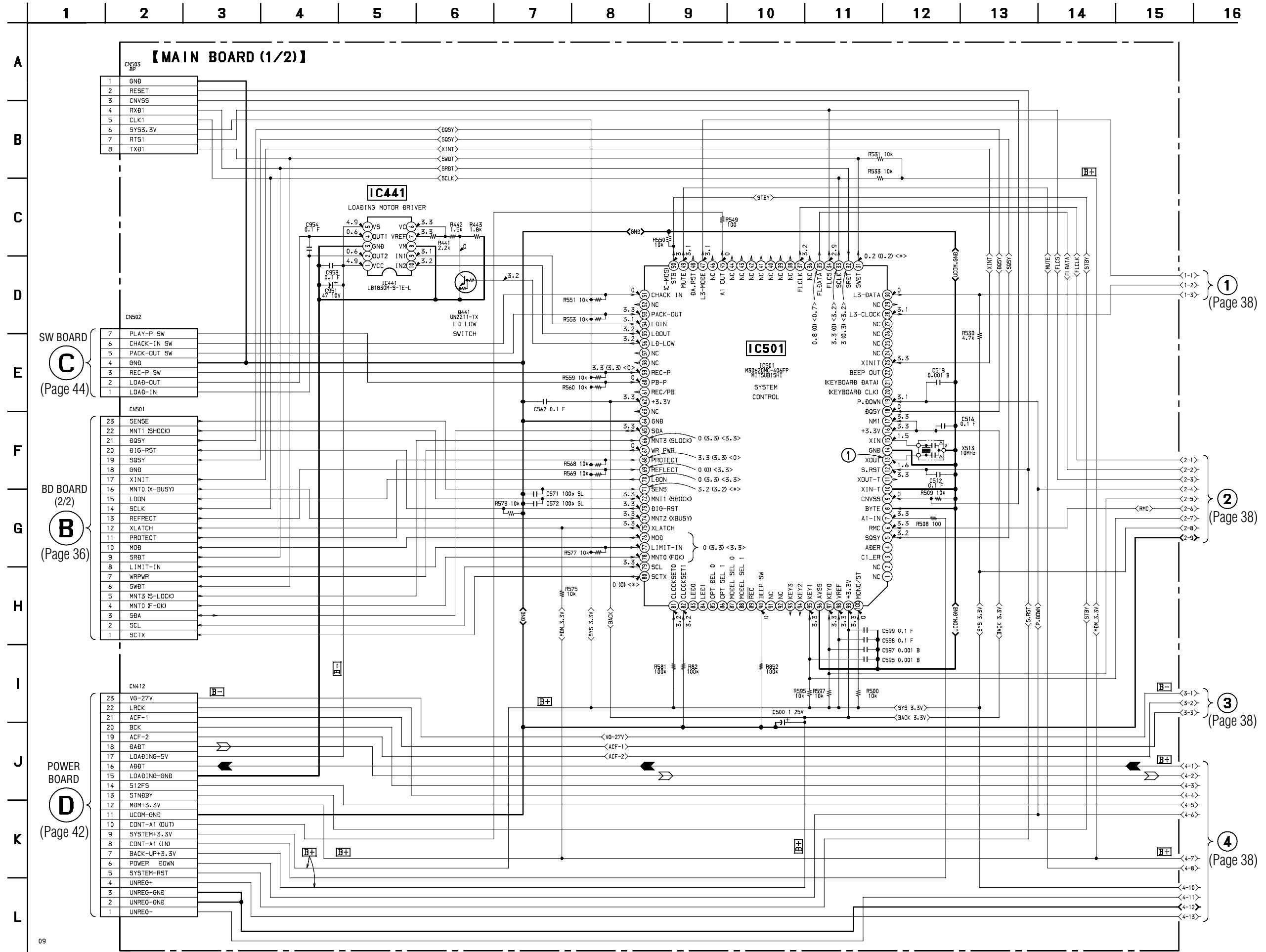
6-5. SCHEMATIC DIAGRAM – BD (2/2) SECTION –

- See page 33 for Waveform.
- See page 34 for Printed Wiring Board.



6-6. SCHEMATIC DIAGRAM – MAIN (1/2) SECTION –

- See page 33 for Waveform.
- See page 51 for IC Pin Function.
- See page 39 for Printed Wiring Board.



1 (Page 38)

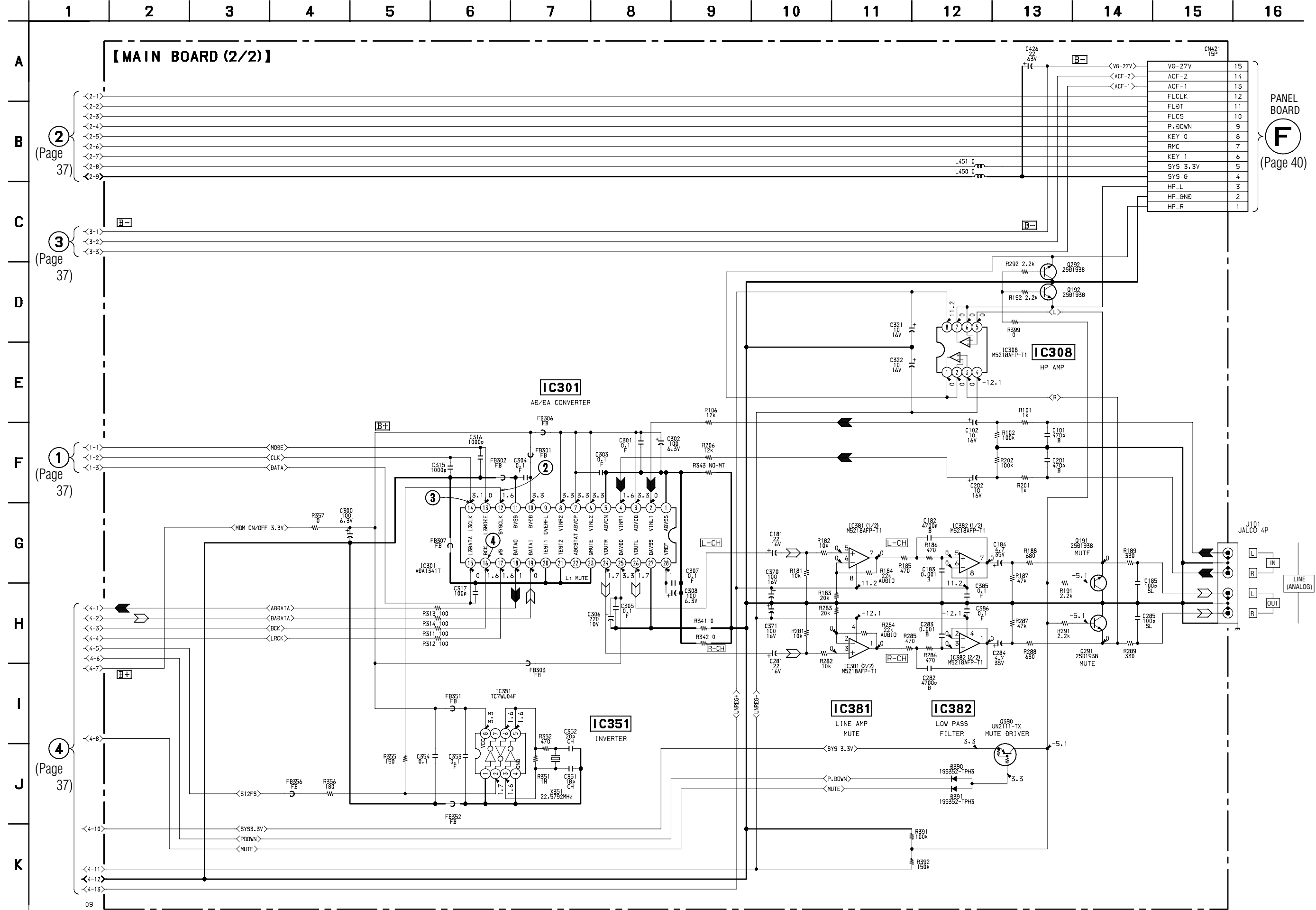
2 (Page 38)

3 (Page 38)

4 (Page 38)

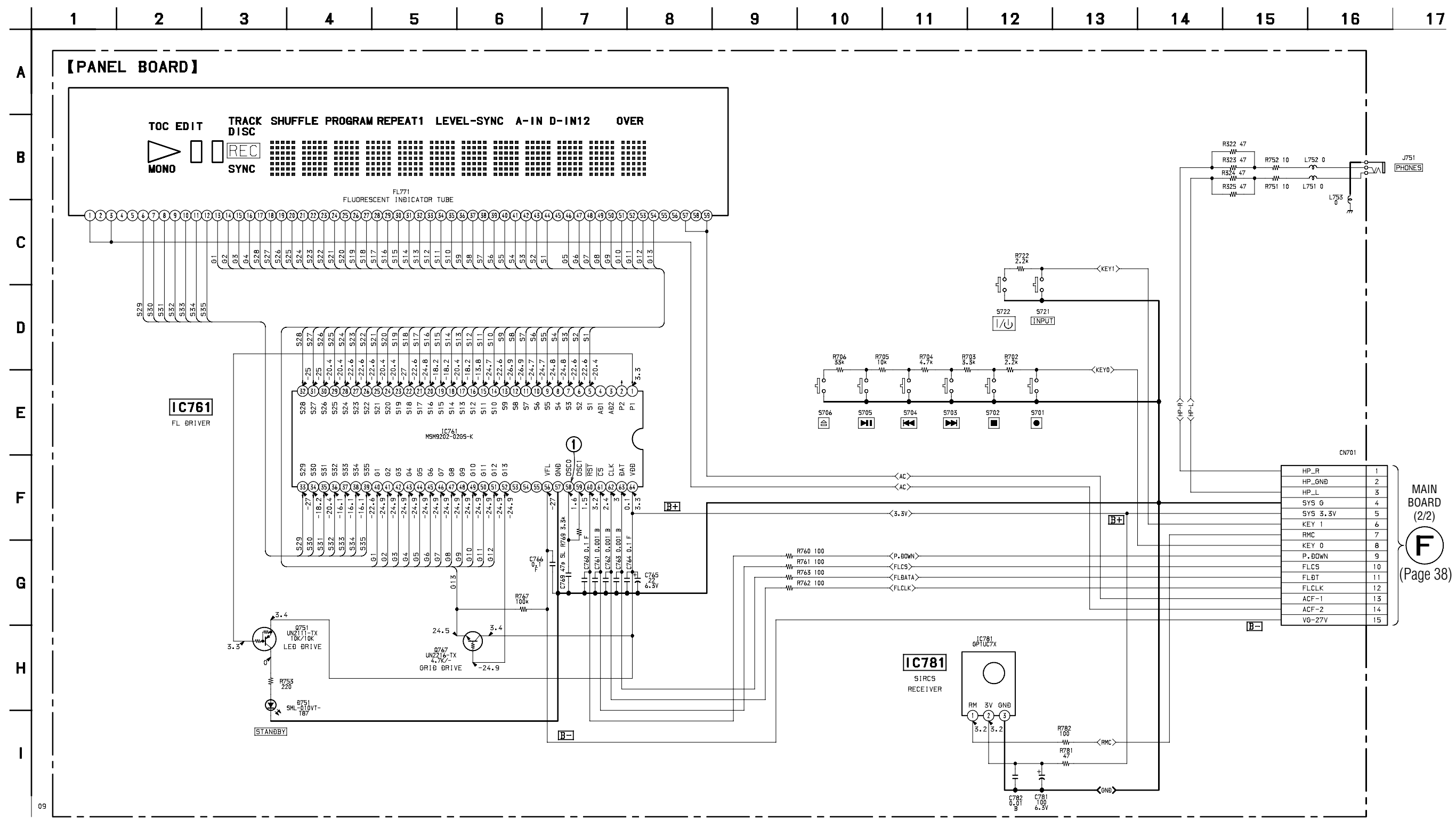
6-7. SCHEMATIC DIAGRAM – MAIN (2/2) SECTION –

- See page 33 for Waveform.
- See page 47 for IC Block Diagrams.





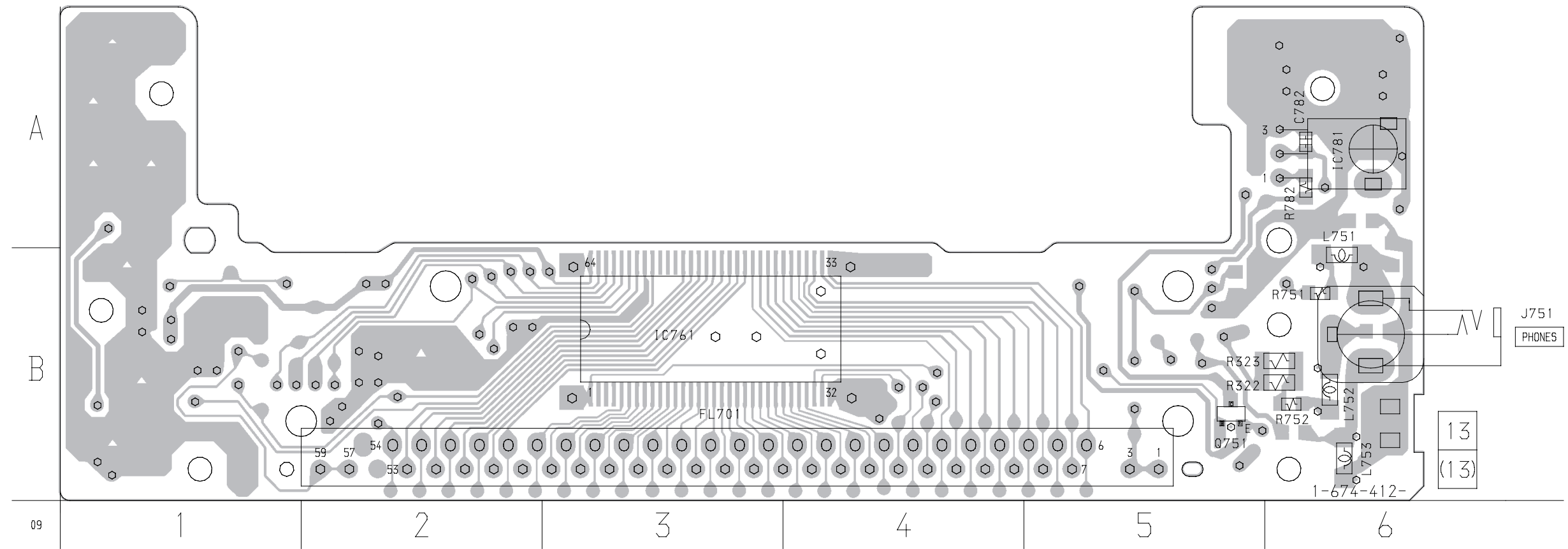
6-9. SCHEMATIC DIAGRAM – PANEL SECTION –  
• See page 33 for Waveform.



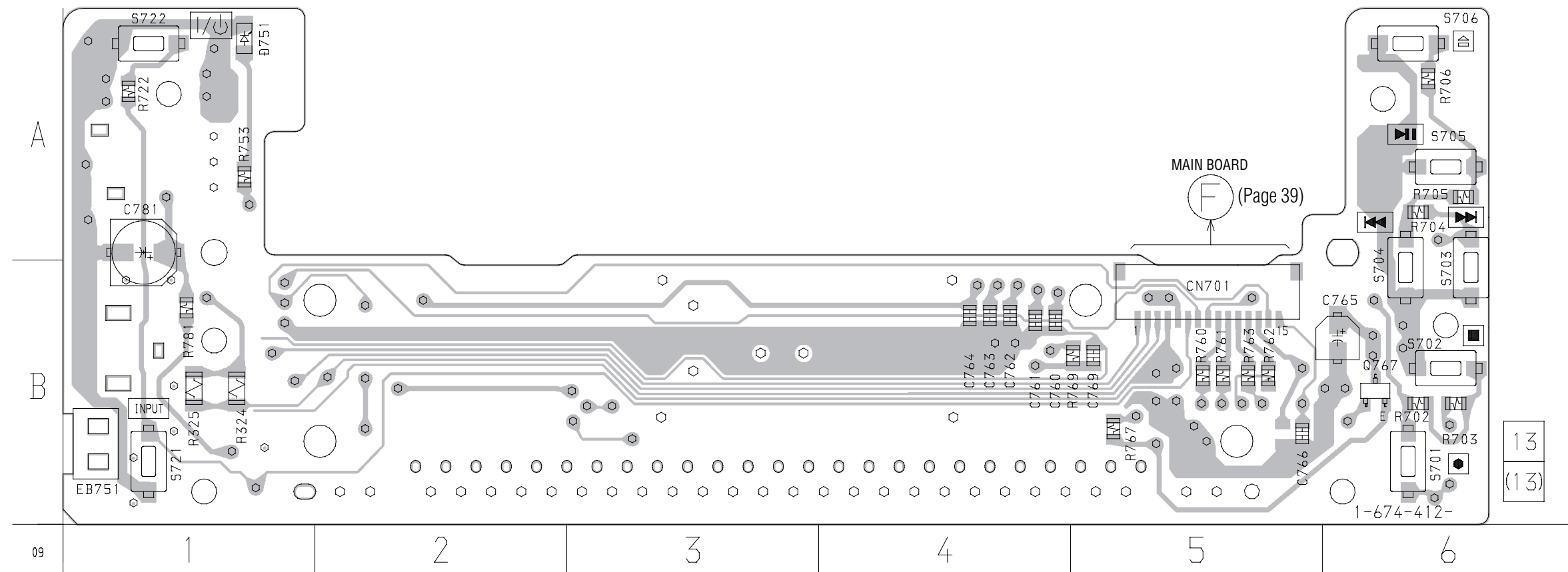


6-10. PRINTED WIRING BOARD – PANEL SECTION –  
• See page 30 for Circuit Boards Location.

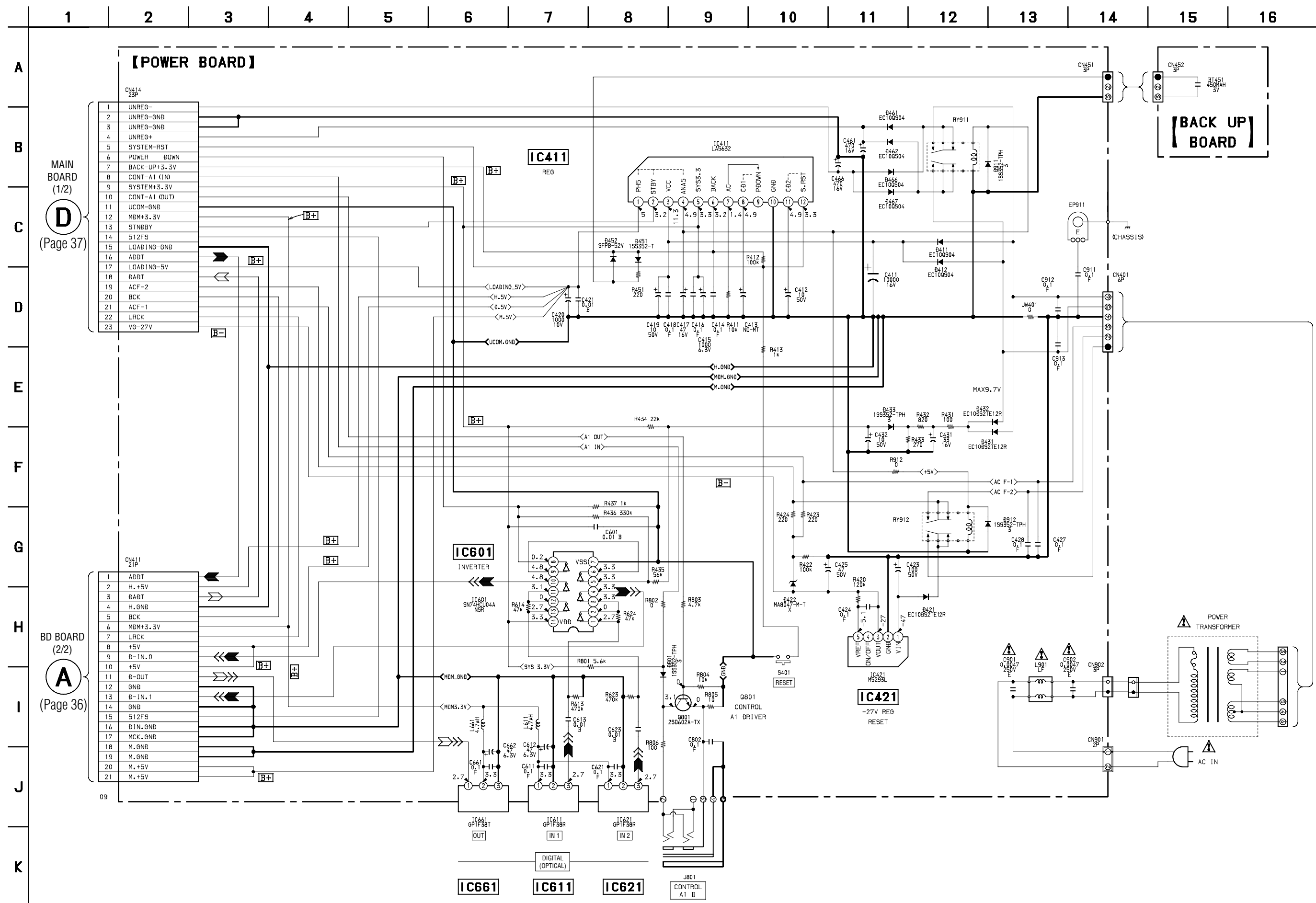
【 PANEL BOARD 】 (SIDE A)



【 PANEL BOARD 】 (SIDE B)



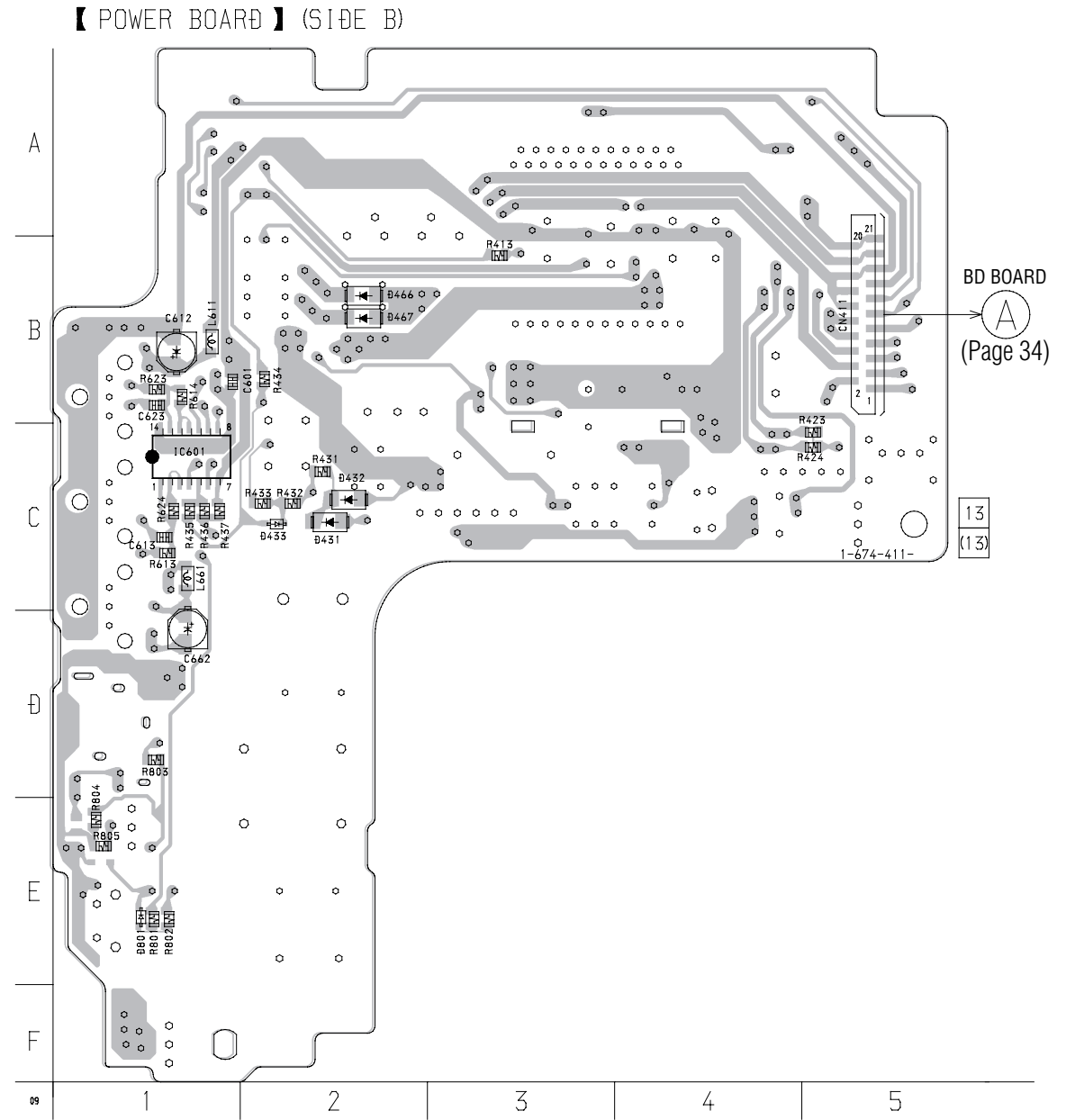
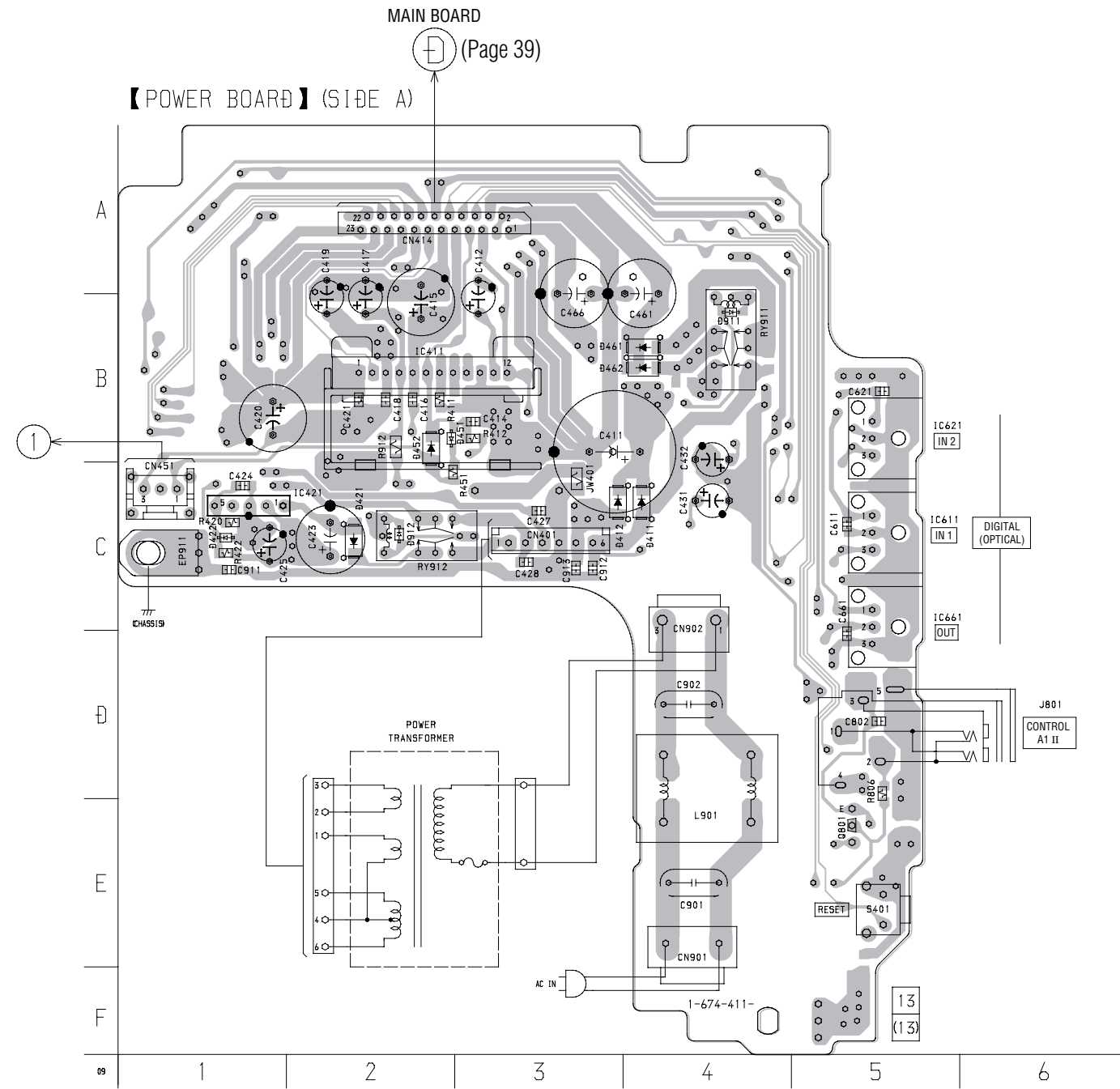
6-11. SCHEMATIC DIAGRAM - POWER SECTION -



MAIN BOARD (1/2) (Page 37)

BD BOARD (2/2) (Page 36)

6-12. PRINTED WIRING BOARD – POWER SECTION –  
 • See page 30 for Circuit Boards Location.

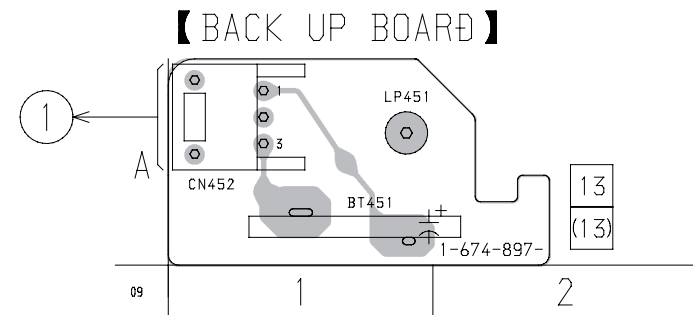


• SEMICONDUCTOR LOCATION

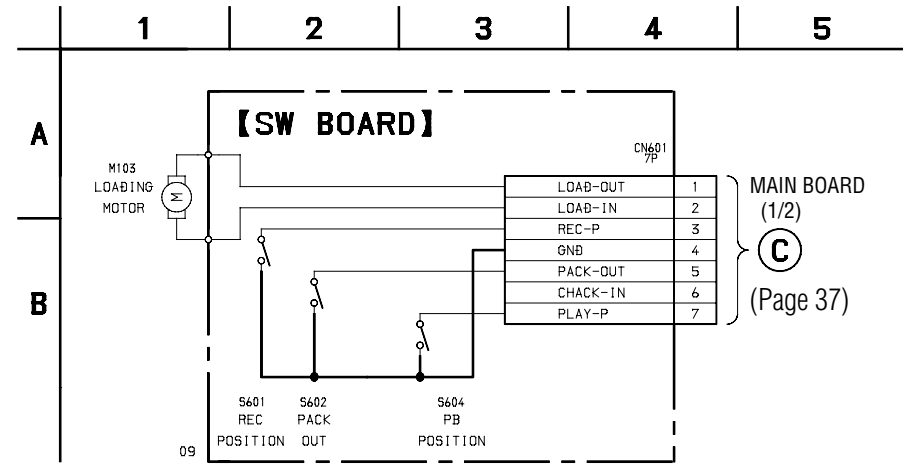
Ref. No.	Location	Ref. No.	Location
D411	C-4	IC411	B-2
D412	C-3	IC421	C-1
D421	C-2	IC611	C-5
D422	C-1	IC621	B-5
D451	B-2	IC661	D-5
D452	B-2	Q801	E-5
D461	B-4		
D462	B-4		
D911	B-4		
D912	C-2		

• SEMICONDUCTOR LOCATION

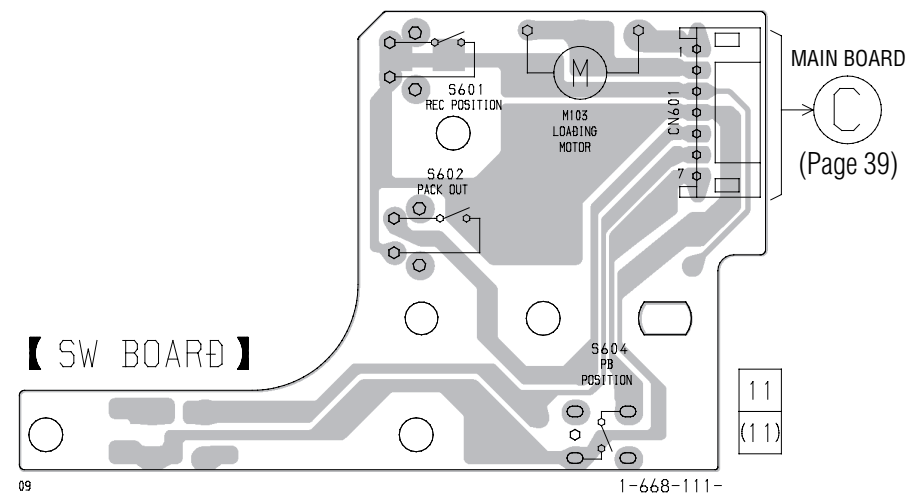
Ref. No.	Location
D431	C-2
D432	C-2
D433	C-2
D466	B-2
D467	B-2
D801	E-1
IC601	C-1



6-13. SCHEMATIC DIAGRAM – BD SWITCH SECTION –

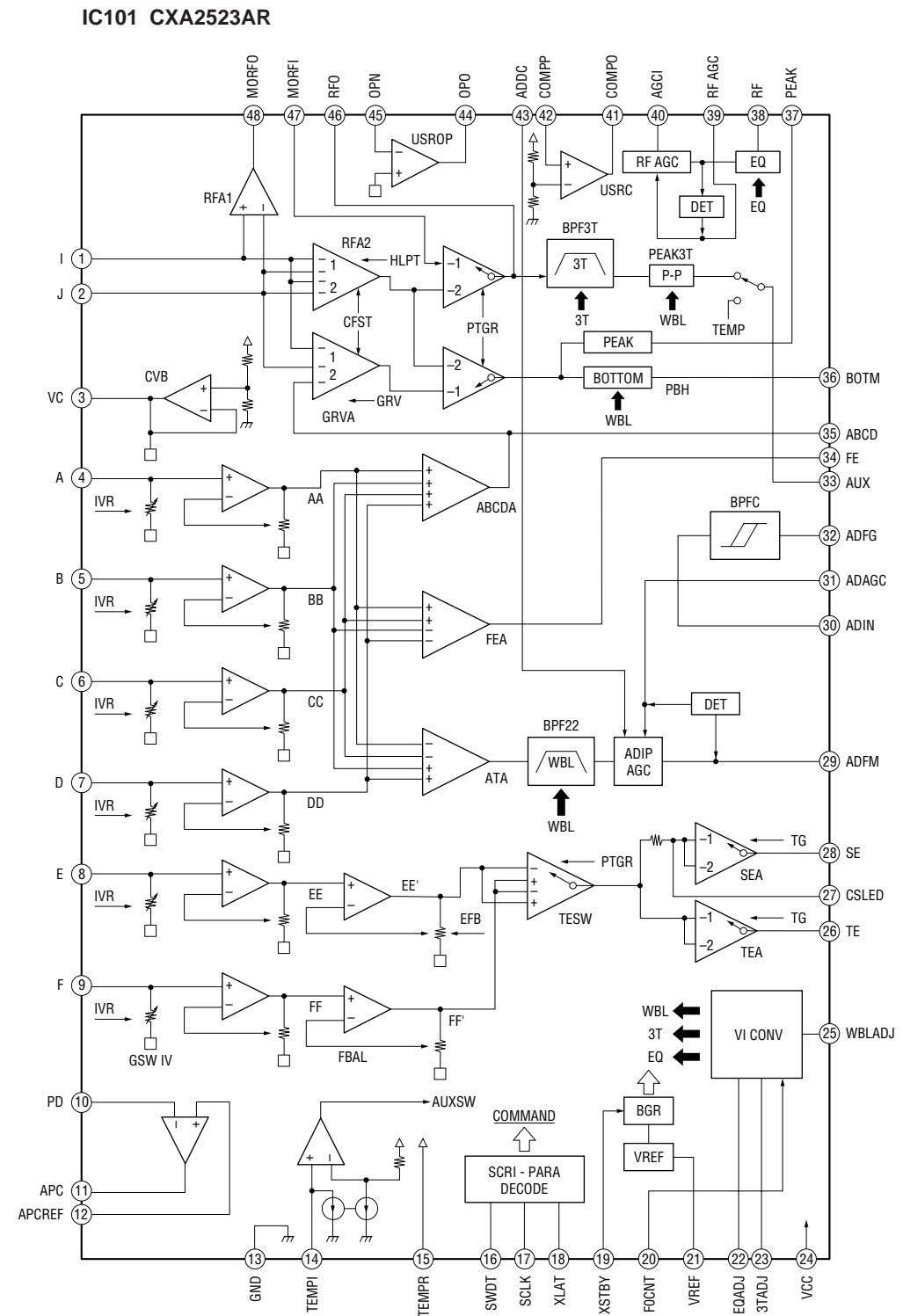


6-14. PRINTED WIRING BOARD – BD SWITCH SECTION –  
• See page 30 for Circuit Boards Location.

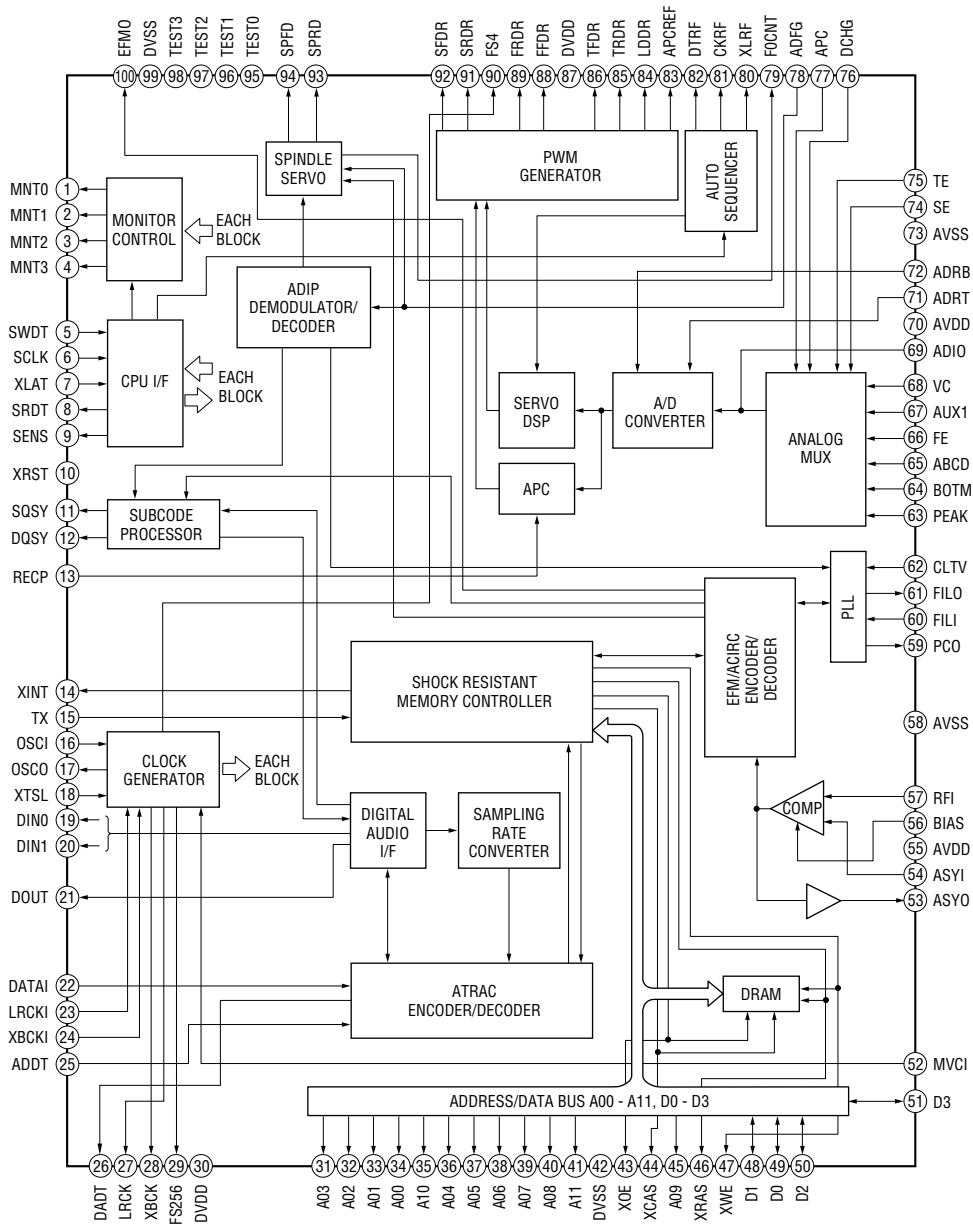


6-15. IC BLOCK DIAGRAM

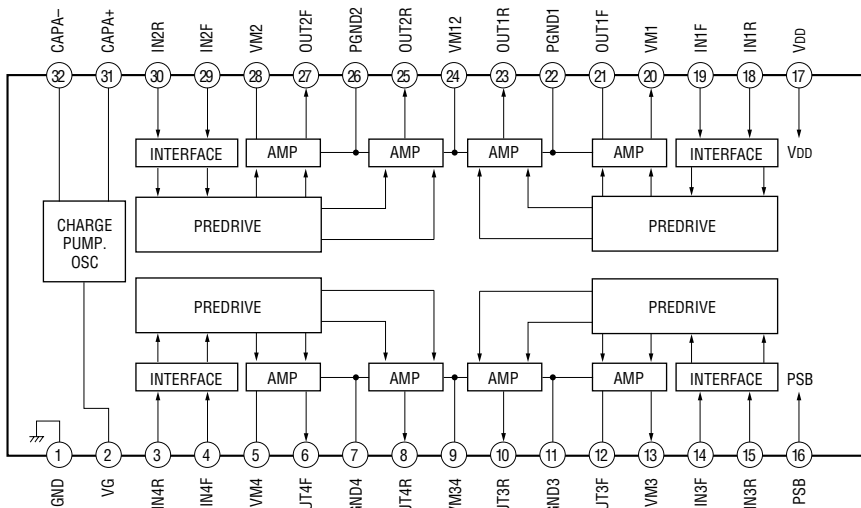
• BD section



### IC121 CXD2654R

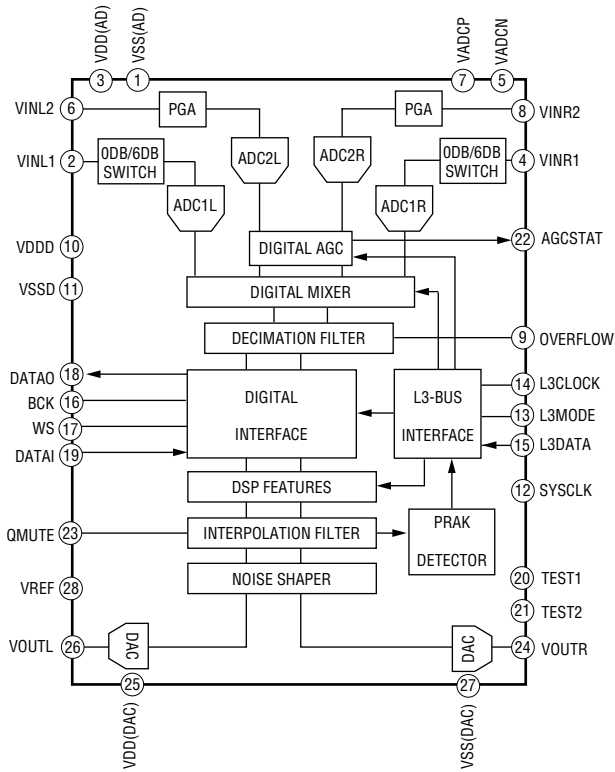


### IC152 BH6511FS-E2

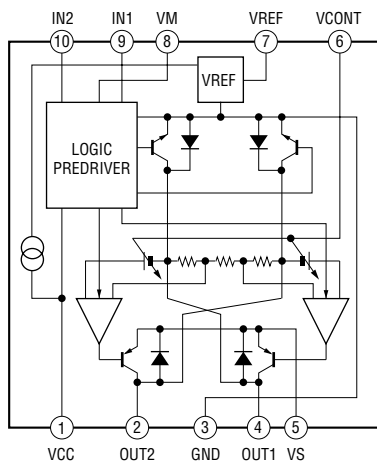


• MAIN section

**IC301 UDA1341TS/N2**



**IC441 LB1830M**



## 6-16. IC PIN FUNCTIONS

### • IC101 RF Amplifier (CXA2523AR) (BD board)

Pin No.	Pin Name	I/O	Function
1	I	I	I-V converted RF signal I input
2	J	I	I-V converted RF signal J input
3	VC	O	Middle point voltage (+1.5V) generation output
4 to 9	A to F	I	Signal input from the optical pick-up detector
10	PD	I	Light amount monitor input
11	APC	O	Laser APC output
12	APCREF	I	Reference voltage input for setting laser power
13	GND	—	Ground
14	TEMPI	I	Temperature sensor connection
15	TEMPR	O	Reference voltage output for the temperature sensor
16	SWDT	I	Serial data input from the CXD2650R or CXD2652AR
17	SCLK	I	Serial clock input from the CXD2650R or CXD2652AR
18	XLAT	I	Latch signal input from the CXD2650R or CXD2652AR “L”: Latch
19	XSTBY	I	Stand by signal input “L”: Stand by
20	F0CNT	I	Center frequency control voltage input of BPF22, BPF3T, EQ from the CXD2650R or CXD2652AR
21	VREF	O	Reference voltage output (Not used)
22	EQADJ	I/O	Center frequency setting pin for the internal circuit EQ
23	3TADJ	I/O	Center frequency setting pin for the internal circuit BPF3T
24	Vcc	—	+3V power supply
25	WBLADJ	I/O	Center frequency setting pin for the internal circuit BPF22
26	TE	O	Tracking error signal output to the CXD2650R or CXD2652AR
27	CSLED	—	External capacitor connection pin for the sled error signal LPF
28	SE	O	Sled error signal output to the CXD2650R or CXD2652AR
29	ADFM	O	FM signal output of ADIP
30	ADIN	I	ADIP signal comparator input ADFM is connected with AC coupling
31	ADAGC	—	External capacitor connection pin for AGC of ADIP
32	ADFG	O	ADIP duplex signal output to the CXD2650R or CXD2652AR
33	AUX	O	I <sub>3</sub> signal/temperature signal output to the CXD2650R or CXD2652AR (Switching with a serial command)
34	FE	O	Focus error signal output to the CXD2650R or CXD2652AR
35	ABCD	O	Light amount signal output to the CXD2650R or CXD2652AR
36	BOTM	O	RF/ABCD bottom hold signal output to the CXD2650R or CXD2652AR
37	PEAK	O	RF/ABCD peak hold signal output to the CXD2650R or CXD2652AR
38	RF	O	RF equalizer output to the CXD2650R or CXD2652AR
39	RFAGC	—	External capacitor connection pin for the RF AGC circuit
40	AGCI	I	Input to the RF AGC circuit The RF amplifier output is input with AC coupling
41	COMPO	O	User comparator output (Not used)
42	COMPP	I	User comparator input (Fixed at “L”)
43	ADDC	I/O	External capacitor pin for cutting the low band of the ADIP amplifier
44	OPO	O	User operation amplifier output (Not used)
45	OPN	I	User operation amplifier inversion input (Fixed at “L”)
46	RFO	O	RF amplifier output
47	MORFI	I	Groove RF signal is input with AC coupling
48	MORFO	O	Groove RF signal output

- Abbreviation  
APC: Auto Power Control  
AGC: Auto Gain Control

• IC121 Digital Signal Processor, Digital Servo Signal Processor, EFM/ACIRC Encoder/Decoder, Shock-proof Memory Controller, ATRAC Encoder/Decoder, 2M Bit DRAM (CXD2654R) (BD board)

Pin No.	Pin Name	I/O	Function
1	MNT0 (FOK)	O	FOK signal output to the system control (monitor output) “H” is output when focus is on
2	MNT1 (SHCK)	O	Track jump detection signal output to the system control (monitor output)
3	MNT2 (XBUSY)	O	Monitor 2 output to the system control (monitor output)
4	MNT3 (SLOC)	O	Monitor 3 output to the system control (monitor output)
5	SWDT	I	Writing data signal input from the system control
6	SCLK	I (S)	Serial clock signal input from the system control
7	XLAT	I (S)	Serial latch signal input from the system control
8	SRDT	O (3)	Reading data signal output to the system control
9	SENS	O (3)	Internal status (SENSE) output to the system control
10	XRST	I (S)	Reset signal input from the system control “L”: Reset
11	SQSY	O	Subcode Q sync (SCOR) output to the system control “L” is output every 13.3 msec. Almost all, “H” is output
12	DQSY	O	Digital In U-bit CD format or MD format subcode Q sync (SCOR) output to the system control
13	RECP	I	Laser power switching input from the system control “H”: Recording, “L”: Playback
14	XINT	O	Interrupt status output to the system control
15	TX	I	Recording data output enable input from the system control
16	OSCI	I	System clock input (512Fs=22.5792 MHz)
17	OSCO	O	System clock output (512Fs=22.5792 MHz) (Not used)
18	XTSL	I	System clock frequency setting “L”: 45.1584 MHz, “H”: 22.5792 MHz (Fixed at “H”)
19	DIN0	I	Digital audio input (Optical input)
20	DIN1	I	Digital audio input (Optical input)
21	DOUT	O	Digital audio output (Optical output)
22	DADTI	I	Serial data input
23	LRCKI	I	LR clock input “H” : Lch, “L” : R ch
24	XBCKI	I	Serial data clock input
25	ADDT	I	Data input from the A/D converter
26	DADT	O	Data output to the D/A converter
27	LRCK	O	LR clock output for the A/D and D/A converter (44.1 kHz)
28	XBCK	O	Bit clock output to the A/D and D/A converter (2.8224 MHz)
29	FS256	O	11.2896 MHz clock output (Not used)
30	DVDD	—	+3V power supply (Digital)
31 to 34	A03 to A00	O	DRAM address output
35	A10	O	DRAM address output (Not used)
36 to 40	A04 to A08	O	DRAM address output
41	A11	O	DRAM address output (Not used)
42	DVSS	—	Ground (Digital)
43	XOE	O	Output enable output for DRAM
44	XCAS	O	$\overline{\text{CAS}}$ signal output for DRAM
45	A09	O	Address output for DRAM
46	XRAS	O	$\overline{\text{RAS}}$ signal output for DRAM
47	XWE	O	Write enable signal output for DRAM (Used : CXD2652AR, Not used : CXD2650R)

\* I (S) stands for Schmidt input, I (A) for analog input, O (3) for 3-state output, and O (A) for analog output in the column I/O



Pin No.	Pin Name	I/O	Function
48	D1	I/O	Data input/output for DRAM
49	D0	I/O	
50, 51	D2, D3	I/O	
52	MVCI	I (S)	Clock input from an external VCO (Fixed at "L")
53	ASYO	O	Playback EFM duplex signal output
54	ASYI	I (A)	Playback EFM comparator slice level input
55	AVDD	—	+3V power supply (Analog)
56	BIAS	I (A)	Playback EFM comparator bias current input
57	RFI	I (A)	Playback EFM RF signal input
58	AVSS	—	Ground (Analog)
59	PCO	O (3)	Phase comparison output for the recording/playback EFM master PLL
60	FILI	I (A)	Filter input for the recording/playback EFM master PLL
61	FILO	O (A)	Filter output for the recording/playback EFM master PLL
62	CLTV	I (A)	Internal VCO control voltage input for the recording/playback EFM master PLL
63	PEAK	I (A)	Light amount signal peak hold input from the CXA2523R
64	BOTM	I (A)	Light amount signal bottom hold input from the CXA2523R
65	ABCD	I (A)	Light amount signal input from the CXA2523R
66	FE	I (A)	Focus error signal input from the CXA2523R
67	AUX1	I (A)	Auxiliary A/D input
68	VC	I (A)	Middle point voltage (+1.5V) input from the CXA2523R
69	ADIO	O (A)	Monitor output of the A/D converter input signal (Not used)
70	AVDD	—	+3V power supply (Analog)
71	ADRT	I (A)	A/D converter operational range upper limit voltage input (Fixed at "H")
72	ADRB	I (A)	A/D converter operational range lower limit voltage input (Fixed at "L")
73	AVSS	—	Ground (Analog)
74	SE	I (A)	Sled error signal input from the CXA2523R
75	TE	I (A)	Tracking error signal input from the CXA2523R
76	DCHG	I (A)	Connected to +3V power supply
77	APC	I (A)	Error signal input for the laser digital APC (Fixed at "L")
78	ADFG	I (S)	ADIP duplex FM signal input from the CXA2523R (22.05 ± 1 kHz)
79	FOCNT	O	Filter f <sub>0</sub> control output to the CXA2523R
80	XLRF	O	Control latch output to the CXA2523R
81	CKRF	O	Control clock output to the CXA2523R
82	DTRF	O	Control data output to the CXA2523R
83	APCREF	O	Reference PWM output for the laser APC
84	TEST0	O	PWM output for the laser digital APC (Not used)
85	TRDR	O	Tracking servo drive PWM output (-)

- Abbreviation

EFM: Eight to Fourteen Modulation

PLL : Phase Locked Loop

VCO: Voltage Controlled Oscillator

Pin No.	Pin Name	I/O	Function
86	TFDR	O	Tracking servo drive PWM output (+)
87	DVDD	—	+3V power supply (Digital)
88	FFDR	O	Focus servo drive PWM output (+)
89	FRDR	O	Focus servo drive PWM output (-)
90	FS4	O	176.4 kHz clock signal output (X'tal) (Not used)
91	SRDR	O	Sled servo drive PWM output (-)
92	SFDR	O	Sled servo drive PWM output (+)
93	SPRD	O	Spindle servo drive PWM output (-)
94	SPFD	O	Spindle servo drive PWM output (+)
95	FGIN	I (S)	Test input (Fixed at "L")
96 to 98	TEST1 to TEST3	I	
99	DVSS	—	Ground (Digital)
100	EFMO	O	EFM output when recording

- Abbreviation

EFM: Eight to Fourteen Modulation

• IC501 System Control (M30620MC-406FP) (MAIN board)

Pin No.	Pin Name	I/O	Function
1, 2	NC	O	Not used (Fixed at "L")
3	C1ER	O	C1 error rate voltage output (Fixed at "L") (Not used)
4	ADER	O	AD error rate voltage output (Fixed at "L") (Not used)
5	SQSY	I	ADIP sync or subcode Q sync input from CXD2654R
6	RMC	I	Remote controls
7	A1 IN	I	A1 Control input (Fixed at "L")
8	BYTE	I	Data bus changed input (Fixed at "L")
9	CNVSS	—	Ground
10	XIN-T	O	Not used (Fixed at "L")
11	XOUT-T	O	Not used (Fixed at "L")
12	S.RST	I	System rest input
13	XOUT	O	Main clock output (7.0MHz)
14	GND	—	Ground
15	XIN	I	Main clock input (7.0MHz)
16	+3.3V	—	+3.3V power supply
17	NMI	I	(Fixed at "H")
18	DQSY	I	Digital in sync input
19	P.DOWN	I	Power down detection input "L": Power down
20	KEYBOARD CLK	O	Not used
21	KEYBOARD DATA	O	Not used
22	BEEP OUT	—	Not used
23	XINIT	I	Interrupt status input from CXD2654R
24 to 27	NC	O	Not used
28	L3 CLOCK	O	Serial clock signal output to IC301
29	NC	O	Not used
30	LC DATA	O	Serial data signal input to IC301
31	SWDT	O	Writing data signal output to the serial bus
32	SRDT	I	Reading data signal input from the serial bus
33	SCLK	O	Clock signal output to the serial bus
34	FLCS	O	Chip select signal output to the display driver
35	FLDATA	O	Serial data signal output to the display driver
36	NC	O	Not used (Fixed at "L")
37	FLCLK	O	Serial clock signal output to the display driver
38 to 41	NC	O	Not used
42, 43	JOG1, JOG0	I	Not used
44	NC	O	Not used
45	A1 OUT	O	A1 output
46	NC	O	Not used
47	L3 MODE	O	Serial mode signal output to IC301
48	DA.RST	O	Not used Reset: "L"
49	MUTE	O	DA line out muting output Mute: "L"
50	STB	O	Strobe signal output to the power supply circuit Power supply ON: "H", stand by: "L"
51	CHACK IN	I	Detection input from the chucking-in switch "L": Chucking
52	NC	I	Not used (Fixed at "L")
53	PACK-OUT	I	Detection input from the loading out switch. Loaded out position: "L", Others: "H"
54	LDIN	I	Loading motor control input
55	LDOUT	O	Loading motor control output
56	LD-LOW	O	Loading motor voltage control output Low voltage: "H"
57, 58	NC	O	Not used (Fixed at "L")
59	REC-P	I	Detection signal input from the recording position detection switch

Pin No.	Pin Name	I/O	Function
60	PB-P	I	Detection signal input from the playback position detection switch
61	REC/PB	O	Not used Write: "H"
62	+3.3V	—	+3.3V power supply
63	NC	O	Not used (Fixed at "L")
64	GND	—	Ground
65	SDA	I/O	Data signal input/output pin with the backup memory
66	MNT3 (SLOCK)	I	In the state of spindle servo lock from the CXD2564R
67	WR PWR	O	Write power ON/OFF output
68	PROTECT	I	Recording-protection claw detection input from the protection detection switch Protect: "H"
69	REFLECT	I	Disk reflection rate detection input from the reflect detection switch Disk with low reflection rate: "H"
70	LDON	O	Laser ON/OFF control output "H": Laser ON
71	SENS	I	Internal status (SENSE) input from the CXD2654R
72	NMT1 (SHOCK)	I	Track jump signal input from the CXD2654R
73	DIG-RST	O	Digital rest signal output to the CXD2654R and motor driver Reset: "L"
74	MNT2 (XBUSY)	I	In the state of executive command from the CXD2654R
75	XLATCH	O	Latch signal output to the serial bus
76	MOD	O	Laser modulation switching signal output
77	LIMIT-IN	I	Detection input from the limit switch Sled limit-In: "L"
78	MNT0 (FOK)	I	Focus OK signal input from the CXD26504R "H" is input when focus is on
79	SCL	O	Clock signal output to the backup memory
80	SCTX	O	Writing data transmission timing output to the CXD2654R Shared with the magnetic head ON/OFF output
81	CLKSET0	I	Clock destination select pin US, Canadian: "L", Except US, Canadian: "H"
82	CLKSET1	I	Clock destination select pin US, Canadian: "H", Except US, Canadian: "L"
83	LED0	O	Not used
84	LED1	O	
85	OPT DEL	O	
86	OPT SEL	O	
87	MODE SEL 0	I	
88	MODE SEL 1	O	
89	$\overline{\text{REC}}$	O	
90	BEEP SW	O	Beep switch
91	NC	I	Not used
92	NC	I	
93	KEY 3	I	
94	KEY 2	I	
95	KEY 1	I	Key input pin (A/D input)
96	AVSS	—	Ground (Analog)
97	KEY0	I	Key input pin (A/D input)
98	VREF	—	A/D reference voltage (Fixed at "H")
99	+3.3V	—	+3.3V power supply
100	MONO/ST	I	Monaural, stereo change input Monaural: "L"

# SECTION 7 EXPLODED VIEWS

**NOTE:**

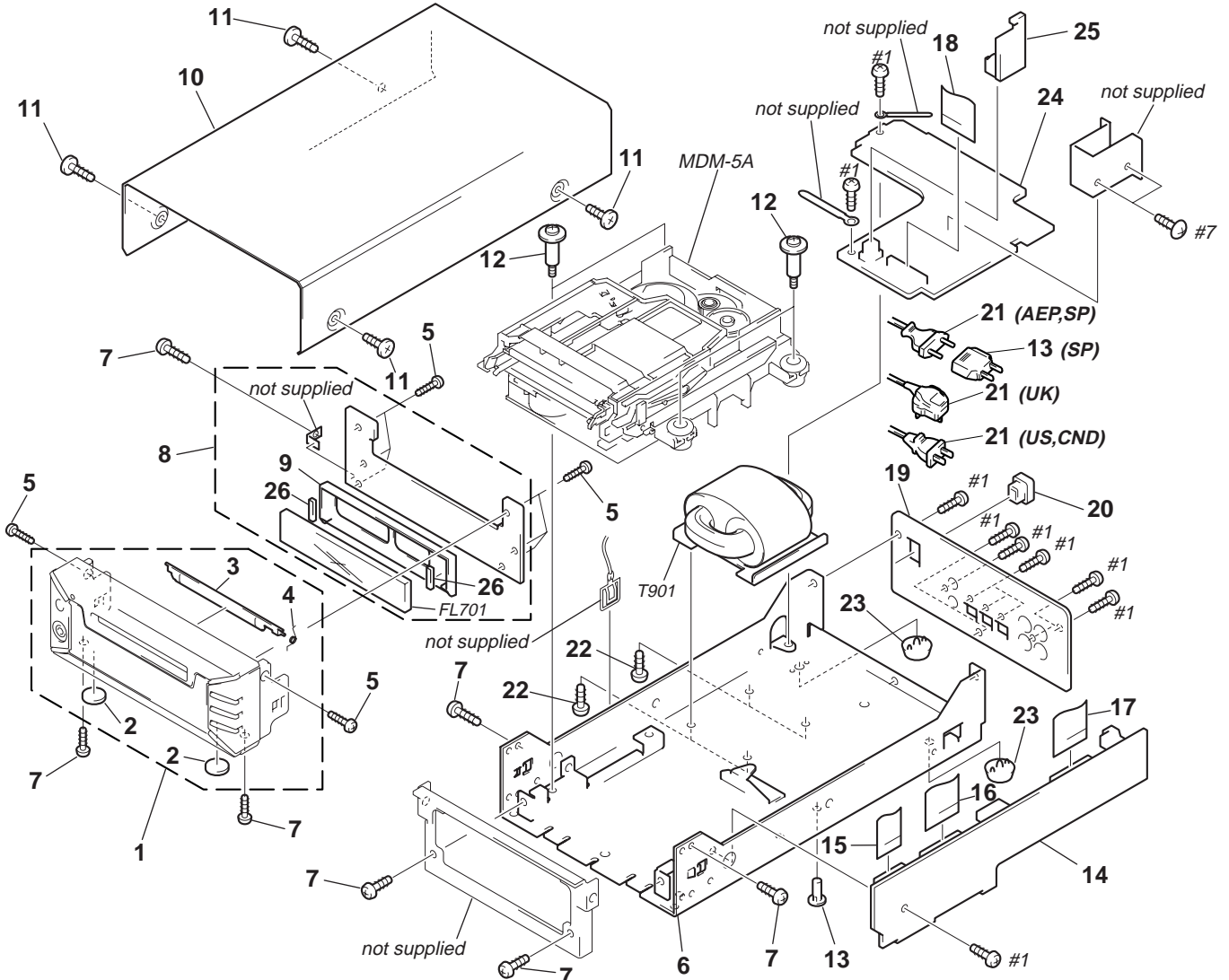
- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

- Abbreviation  
CND : Canadian model  
SP : Singapore model

The components identified by mark  $\triangle$  or dotted line with mark  $\triangle$  are critical for safety. Replace only with part number specified.

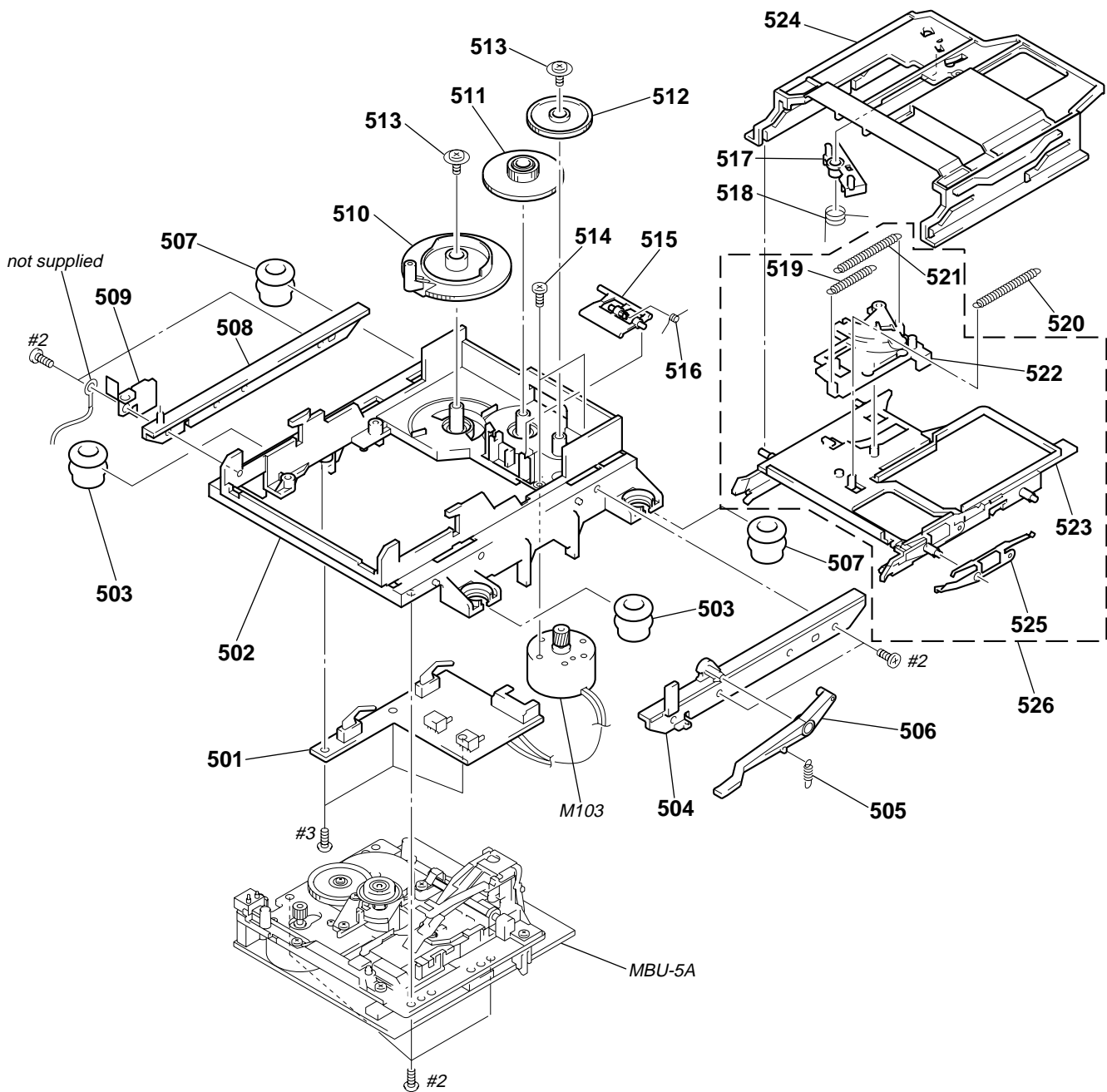
Les composants identifiés par une marque  $\triangle$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

**7-1. CABINET SECTION**



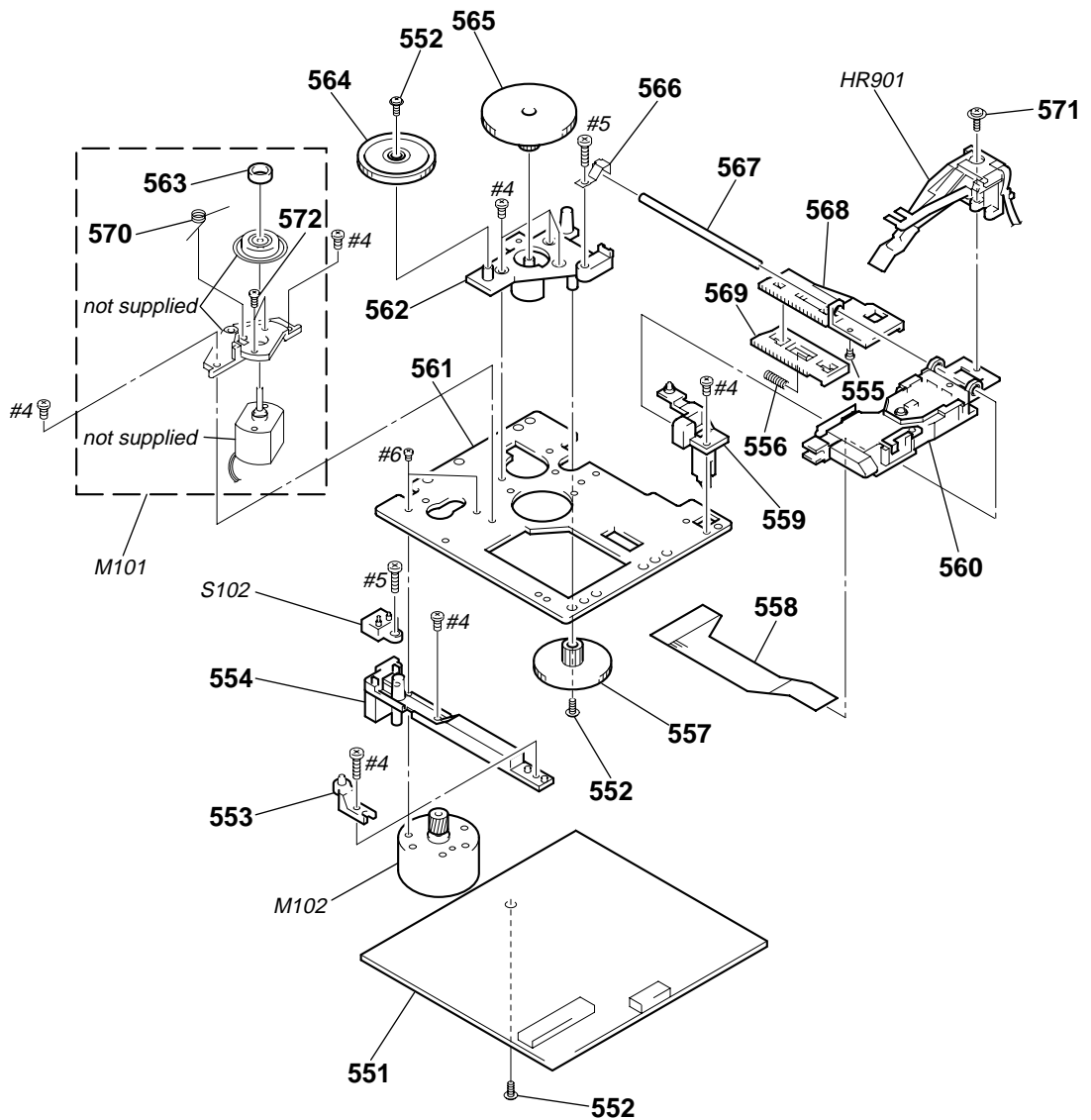
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	X-4951-678-1	PANEL ASSY, FRONT		16	1-791-160-11	WIRE(FLAT TYPE) (23 CORE)(180mm)	
2	4-220-561-01	FOOT		17	1-791-158-11	WIRE(FLAT TYPE) (23 CORE)(90mm)	
3	4-216-729-31	LID(CARTRIDGE)		18	1-791-159-11	WIRE(FLAT TYPE) (21 CORE)	
4	4-976-593-01	SPRING (LID), TORSION		19	4-220-570-11	PANEL, BACK	
5	3-348-383-01	SCREW(M2X6.0), +B TAPPING		20	3-703-244-00	BUSHING (2104), CORD	
6	X-4951-680-1	CHASSIS ASSY		$\triangle$ 21	1-696-586-21	CORD, POWER (UK)	
7	3-703-599-01	SCREW, +BTT (M3) S TITE		$\triangle$ 21	1-751-275-11	CORD, POWER (AEP,SP)	
8	A-4724-778-A	PANEL BOARD, COMPLETE (US,CND)		$\triangle$ 21	1-783-531-31	CORD, POWER (US,CND)	
8	A-4724-786-A	PANEL BOARD, COMPLETE (AEP,UK,SP)		22	3-703-249-01	SCREW, S TIGHT, +PTTWH 3X6	
9	4-220-557-01	HOLDER (FL)		23	4-965-822-01	FOOT	
10	4-220-569-01	CASE		24	A-4724-780-A	POWER BOARD, COMPLETE (US,CND)	
11	4-976-827-21	SCREW, FLAT HEAD		24	A-4724-784-A	POWER BOARD, COMPLETE (AEP,UK,SP)	
12	4-999-839-01	SCREW (+BVTTWH M3), STEP		25	1-674-897-11	BACK UP BOARD	
13	1-569-008-21	ADAPTOR, CONVERSION 2P (SP)		* 26	4-949-935-51	CUSHION (FL)	
14	A-4724-776-A	MAIN BOARD, COMPLETE (US,CND)		FL701	1-517-907-11	INDICATOR TUBE, FLUORESCENT	
14	A-4724-782-A	MAIN BOARD, COMPLETE (AEP,UK,SP)		$\triangle$ T901	1-433-910-11	TRANSFORMER, POWER (US,CND)	
15	1-791-161-11	WIRE(FLAT TYPE) (15 CORE)		$\triangle$ T901	1-433-911-11	TRANSFORMER, POWER (AEP,UK,SP)	

## 7-2. MECHANISM SECTION (MDM-5A)



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* 501	1-668-111-11	SW BOARD		515	4-996-227-01	LEVER (HEAD)	
* 502	4-996-217-01	CHASSIS		516	4-996-229-01	SPRING (HEAD LEVER), TORSION	
503	4-996-223-01	INSULATOR (F)		517	4-996-212-01	LEVER (LIMITTER)	
* 504	4-996-218-01	BRACKET (GUIDE R)		518	4-996-213-01	SPRING (LIMITTER), TORSION	
505	4-996-277-01	SPRING (O/C), TENSION		519	4-996-214-01	SPRING (SLIDER), TENSION	
506	4-996-226-01	LEVER (O/C)		520	4-996-216-01	SPRING (HOLDER), TENSION	
507	4-999-347-01	INSULATOR (R)		521	4-210-396-01	SPRING (LOCK), TENSION	
* 508	4-996-225-01	BRACKET (GUIDE L)		522	X-4951-631-1	SLIDER ASSY	
509	4-988-466-21	SPRING (ELECTROSTATIC), LEAF		* 523	X-4949-245-7	HOLDER ASSY	
510	4-996-219-01	GEAR (CAM GEAR)		* 524	4-996-211-01	SLIDER (CAM)	
511	4-996-220-01	GEAR (A)		525	4-998-763-01	SPRING (SHUTTER), LEAF	
512	4-996-221-01	GEAR (B)		526	A-4680-417-A	HOLDER COMPLETE ASSY	
513	4-933-134-01	SCREW (+PTPWH M2.6X6)		M103	X-4949-264-1	MOTOR ASSY, LOADING	
514	4-996-224-01	SCREW (1.7X3), +PWH					

### 7-3. BASE UNIT SECTION (MBU-5A)



<p>The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.</p>	<p>Les composants identifiés par une marque ▲ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.</p>
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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* 551	A-4699-893-A	BD BOARD, COMPLETE		565	4-996-261-01	GEAR (SL-B)	
552	3-372-761-01	SCREW (M1.7), TAPPING		566	4-996-264-01	SPRING (SHAFT), LEAF	
* 553	4-996-267-01	BASE (BU-D)		567	4-996-265-01	SHAFT, MAIN	
* 554	4-996-255-01	BASE (BU-C)		568	4-996-256-01	SL (BASE)	
555	4-900-590-01	SCREW, PRECISION SMALL		569	4-996-257-01	RACK (SL)	
556	4-996-258-01	SPRING, COMPRESSION		570	4-996-263-01	SPRING (CLV), TORSION	
557	4-996-262-01	GEAR (SL-C)		571	4-988-560-01	SCREW (+P 1.7X6)	
558	1-667-954-11	FLEXIBLE BOARD		572	4-211-036-01	SCREW (1.7X2.5), +PWH	
* 559	4-210-664-01	BASE (BU-A)		HR901	1-500-502-11	HEAD, OVER LIGHT	
▲ 560	A-4672-541-A	OPTICAL PICK-UP KMS-260B/J1N		M101	A-4672-475-A	MOTOR ASSY, SPINDLE	
* 561	4-996-252-01	CHASSIS, BU		M102	A-4672-474-A	MOTOR ASSY, SLED	
* 562	4-996-254-01	BASE (BU-B)		S102	1-762-148-21	SWITCH, PUSH (2 KEY)	
563	4-967-688-11	MAGNET, ABSORPTION					
564	4-996-260-01	GEAR (SL-A)					

## SECTION 8

# ELECTRICAL PARTS LIST

**BACK UP**

**BD**

Note:

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS  
All resistors are in ohms  
METAL: Metal-film resistor  
METAL OXIDE: Metal Oxide-film resistor  
F : nonflammable
- SEMICONDUCTORS  
In each case, u:  $\mu$ , for example:  
uA...:  $\mu$  A..., uPA...:  $\mu$  PA..., uPB...:  $\mu$  PB...,  
uPC...:  $\mu$  PC..., uPD...:  $\mu$  PD...
- CAPACITORS  
uF :  $\mu$  F
- COILS  
uH :  $\mu$  H
- Abbreviation  
CND : Canadian model  
SP : Singapore model

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
	1-674-897-11	BACK UP BOARD *****		C142	1-163-251-11	CERAMIC CHIP 100PF 5%	50V
		< BATTERY >		C143	1-163-251-11	CERAMIC CHIP 100PF 5%	50V
BT451	1-528-887-11	BATTERY, LITHIUM SECONDARY  < CONNECTOR >		C144	1-163-251-11	CERAMIC CHIP 100PF 5%	50V
* CN452	1-569-499-11	PIN, CONNECTOR 3P		C146	1-163-038-91	CERAMIC CHIP 0.1uF	25V
*****							
* A-4699-893-A	BD BOARD, COMPLETE *****			C151	1-126-206-11	ELECT CHIP 100uF 20%	6.3V
		< CAPACITOR >		C152	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C101	1-125-822-11	TANTALUM 10uF 20%	10V	C153	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V
C102	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C156	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C103	1-125-822-11	TANTALUM 10uF 20%	10V	C158	1-163-019-00	CERAMIC CHIP 0.0068uF 10%	50V
C104	1-125-822-11	TANTALUM 10uF 20%	10V	C160	1-104-601-11	ELECT CHIP 10uF 20%	10V
C105	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V	C161	1-104-601-11	ELECT CHIP 10uF 20%	10V
C106	1-163-275-11	CERAMIC CHIP 0.001uF 5%	50V	C163	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V
C107	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C164	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V
C108	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C167	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C109	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V	C168	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C111	1-164-344-11	CERAMIC CHIP 0.068uF 10%	25V	C169	1-125-822-11	TANTALUM 10uF 20%	10V
C112	1-163-017-00	CERAMIC CHIP 0.0047uF 5%	50V	C171	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C113	1-109-982-11	CERAMIC CHIP 1uF 10%	10V	C181	1-104-913-11	TANTAL. CHIP 10uF 20%	16V
C115	1-164-489-11	CERAMIC CHIP 0.22uF 10%	16V	C183	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C116	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V	C184	1-117-970-11	ELECT CHIP 22uF 20%	10V
C117	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V	C185	1-164-611-11	CERAMIC CHIP 0.001uF 10%	500V
C118	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C187	1-104-913-11	TANTAL. CHIP 10uF 20%	16V
C119	1-125-822-11	TANTALUM 10uF 20%	10V	C188	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V
C121	1-125-822-11	TANTALUM 10uF 20%	10V	C189	1-163-989-11	CERAMIC CHIP 0.033uF 10%	25V
C122	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V	C190	1-126-206-11	ELECT CHIP 100uF 20%	6.3V
C123	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C191	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C124	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C196	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C127	1-163-038-91	CERAMIC CHIP 0.1uF	25V	C197	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C128	1-163-021-91	CERAMIC CHIP 0.01uF 10%	50V			< CONNECTOR >	
C129	1-107-823-11	CERAMIC CHIP 0.47uF 10%	16V	CN101	1-569-479-21	CONNECTOR, FPC 21P	
C130	1-163-251-11	CERAMIC CHIP 100PF 5%	50V	CN102	1-784-833-21	CONNECTOR, FFC(LIF(NON-ZIF))21P	
C131	1-163-023-00	CERAMIC CHIP 0.015uF 5%	50V	CN103	1-784-834-21	CONNECTOR, FFC(LIF(NON-ZIF))23P	
C132	1-107-823-11	CERAMIC CHIP 0.47uF 10%	16V	CN104	1-770-687-11	CONNECTOR, FFC/FPC 4P	
C133	1-163-017-00	CERAMIC CHIP 0.0047uF 5%	50V	CN110	1-695-440-21	PIN, CONNECTOR (PC BOARD) 6P	
C134	1-163-038-91	CERAMIC CHIP 0.1uF	25V			< DIODE >	
C135	1-163-038-91	CERAMIC CHIP 0.1uF	25V	D101	8-719-988-61	DIODE 1SS355TE-17	
C136	1-126-206-11	ELECT CHIP 100uF 20%	6.3V	D181	8-719-046-86	DIODE F1J6TP	
				D183	8-719-046-86	DIODE F1J6TP	
						< IC >	
				IC101	8-752-080-95	IC CXA2523AR	
				IC103	8-729-903-10	TRANSISTOR FMW1-T-148	
				IC121	8-752-389-44	IC CXD2654R	
				IC123	8-759-096-87	IC TC7WU04FU(TE12R)	
				IC124	8-759-498-44	IC MSM51V4400-70TS-K	



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
IC152	8-759-430-25	IC BH6511FS-E2		R136	1-216-049-91	RES,CHIP 1K 5%	1/10W
IC171	8-759-487-04	IC BR24C02F-E2		R137	1-216-295-91	SHORT 0	
IC181	8-759-481-17	IC MC74ACT08DTR2		R140	1-216-029-00	METAL CHIP 150 5%	1/10W
IC192	8-759-460-72	IC BA033FP-E2		R142	1-216-073-00	METAL CHIP 10K 5%	1/10W
		< COIL >		R143	1-216-073-00	METAL CHIP 10K 5%	1/10W
L101	1-414-813-11	FERRITE 0uH		R144	1-216-025-91	RES,CHIP 100 5%	1/10W
L102	1-414-813-11	FERRITE 0uH		R145	1-216-073-00	METAL CHIP 10K 5%	1/10W
L103	1-414-813-11	FERRITE 0uH		R146	1-216-037-00	METAL CHIP 330 5%	1/10W
L105	1-414-813-11	FERRITE 0uH		R147	1-216-025-91	RES,CHIP 100 5%	1/10W
L106	1-414-813-11	FERRITE 0uH		R148	1-216-045-00	METAL CHIP 680 5%	1/10W
L121	1-414-813-11	FERRITE 0uH		R149	1-216-073-00	METAL CHIP 10K 5%	1/10W
L122	1-414-813-11	FERRITE 0uH		R150	1-216-295-91	SHORT 0	
L151	1-412-029-11	INDUCTOR CHIP 10uH		R151	1-216-073-00	METAL CHIP 10K 5%	1/10W
L152	1-412-029-11	INDUCTOR CHIP 10uH		R152	1-216-073-00	METAL CHIP 10K 5%	1/10W
L153	1-412-032-11	INDUCTOR CHIP 100uH		R158	1-216-097-91	RES,CHIP 100K 5%	1/10W
L154	1-412-032-11	INDUCTOR CHIP 100uH		R159	1-216-097-91	RES,CHIP 100K 5%	1/10W
L161	1-414-813-11	FERRITE 0uH		R160	1-216-295-91	SHORT 0	
L162	1-414-813-11	FERRITE 0uH		R161	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
L181	1-216-295-91	SHORT 0		R162	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
		< TRANSISTOR >		R163	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
Q101	8-729-403-35	TRANSISTOR UN5113		R164	1-216-045-00	METAL CHIP 680 5%	1/10W
Q102	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR		R165	1-216-097-91	RES,CHIP 100K 5%	1/10W
Q103	8-729-402-93	TRANSISTOR UN5214		R167	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
Q104	8-729-402-93	TRANSISTOR UN5214		R169	1-219-724-11	METAL CHIP 1 1%	1/4W
Q162	8-729-101-07	TRANSISTOR 2SB798-DL		R170	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q163	8-729-403-35	TRANSISTOR UN5113		R171	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q181	8-729-018-75	TRANSISTOR 2SJ278MYTR		R173	1-216-121-91	RES,CHIP 1M 5%	1/10W
Q182	8-729-017-65	TRANSISTOR 2SK1764KYTR		R175	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
		< RESISTOR >		R177	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R103	1-216-049-91	RES,CHIP 1K 5%	1/10W	R179	1-216-085-00	METAL CHIP 33K 5%	1/10W
R104	1-216-073-00	METAL CHIP 10K 5%	1/10W	R180	1-216-073-00	METAL CHIP 10K 5%	1/10W
R105	1-216-065-91	RES,CHIP 4.7K 5%	1/10W	R182	1-216-089-91	RES,CHIP 47K 5%	1/10W
R106	1-216-133-00	METAL CHIP 3.3M 5%	1/10W	R183	1-216-089-91	RES,CHIP 47K 5%	1/10W
R107	1-216-113-00	METAL CHIP 470K 5%	1/10W	R184	1-216-073-00	METAL CHIP 10K 5%	1/10W
R109	1-216-295-91	SHORT 0		R185	1-216-081-00	METAL CHIP 22K 5%	1/10W
R110	1-216-073-00	METAL CHIP 10K 5%	1/10W	R186	1-216-089-91	RES,CHIP 47K 5%	1/10W
R111	1-216-295-91	SHORT 0		R188	1-216-073-00	METAL CHIP 10K 5%	1/10W
R112	1-216-089-91	RES,CHIP 47K 5%	1/10W	R189	1-216-073-00	METAL CHIP 10K 5%	1/10W
R113	1-216-049-91	RES,CHIP 1K 5%	1/10W	R190	1-216-073-00	METAL CHIP 10K 5%	1/10W
R115	1-216-049-91	RES,CHIP 1K 5%	1/10W	R195	1-216-073-00	METAL CHIP 10K 5%	1/10W
R117	1-216-113-00	METAL CHIP 470K 5%	1/10W	R196	1-216-295-91	SHORT 0	
R120	1-216-025-91	RES,CHIP 100 5%	1/10W	R197	1-216-295-91	SHORT 0	
R121	1-216-097-91	RES,CHIP 100K 5%	1/10W	R198	1-216-286-00	RES,CHIP 4.7M 5%	1/8W
R123	1-216-295-91	SHORT 0		R198	1-216-296-91	SHORT 0	
R124	1-216-025-91	RES,CHIP 100 5%	1/10W			< SWITCH >	
R125	1-216-025-91	RES,CHIP 100 5%	1/10W	S101	1-762-596-21	SWITCH, PUSH (1 KEY)(LIMIT SW)	
R127	1-216-025-91	RES,CHIP 100 5%	1/10W			*****	
R129	1-216-295-91	SHORT 0			A-4724-776-A	MAIN BOARD, COMPLETE (US,CND)	
R130	1-216-295-91	SHORT 0				*****	
R131	1-216-073-00	METAL CHIP 10K 5%	1/10W		A-4724-782-A	MAIN BOARD, COMPLETE (AEP,UK,SP)	
R132	1-216-097-91	RES,CHIP 100K 5%	1/10W			*****	
R133	1-216-117-00	METAL CHIP 680K 5%	1/10W			< CAPACITOR >	
R134	1-216-049-91	RES,CHIP 1K 5%	1/10W				
R135	1-216-061-00	METAL CHIP 3.3K 5%	1/10W	C101	1-163-005-11	CERAMIC CHIP 470PF 10% 50V	

**MAIN**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
C102	1-124-779-00	ELECT CHIP	10uF 20% 16V			< DIODE >	
C181	1-126-395-11	ELECT	22uF 20% 16V				
C182	1-163-017-00	CERAMIC CHIP	0.0047uF 5% 50V	D390	8-719-016-74	DIODE 1SS352-TPH3	
C183	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	D391	8-719-016-74	DIODE 1SS352-TPH3	
C184	1-126-603-11	ELECT CHIP	4.7uF 20% 35V			< GROUND TERMINAL >	
C185	1-163-117-00	CERAMIC CHIP	100PF 5% 50V				
C201	1-163-005-11	CERAMIC CHIP	470PF 10% 50V	EP911	1-537-771-21	TERMINAL BOARD, GROUND	
C202	1-124-779-00	ELECT CHIP	10uF 20% 16V	EP912	1-537-771-21	TERMINAL BOARD, GROUND	
C281	1-126-395-11	ELECT	22uF 20% 16V			< FERRITE BEAD >	
C282	1-163-017-00	CERAMIC CHIP	0.0047uF 5% 50V				
C283	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	FB301	1-414-235-22	INDUCTOR CHIP 0UH	
C284	1-126-603-11	ELECT CHIP	4.7uF 20% 35V	FB302	1-414-235-22	INDUCTOR CHIP 0UH	
C285	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	FB303	1-414-235-22	INDUCTOR CHIP 0UH	
C300	1-126-177-11	ELECT	100uF 20% 10V	FB306	1-414-235-22	INDUCTOR CHIP 0UH	
C301	1-163-038-91	CERAMIC CHIP	0.1uF 25V	FB307	1-414-235-22	INDUCTOR CHIP 0UH	
C302	1-126-177-11	ELECT	100uF 20% 10V	FB351	1-414-235-22	INDUCTOR CHIP 0UH	
C303	1-163-038-91	CERAMIC CHIP	0.1uF 25V	FB352	1-414-235-22	INDUCTOR CHIP 0UH	
C304	1-163-038-91	CERAMIC CHIP	0.1uF 25V	FB356	1-414-235-22	INDUCTOR CHIP 0UH	
C305	1-163-038-91	CERAMIC CHIP	0.1uF 25V			< IC >	
C306	1-126-934-11	ELECT	220uF 20% 10V	IC301	8-759-553-65	IC UDA1341TS	
C307	1-163-038-91	CERAMIC CHIP	0.1uF 25V	IC308	8-759-636-55	IC M5218AFP-T1	
C308	1-126-177-11	ELECT	100uF 20% 10V	IC351	8-759-242-70	IC TC7WU04F-TE12L	
C315	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	IC381	8-759-636-55	IC M5218AFP-T1	
C316	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	IC382	8-759-636-55	IC M5218AFP-T1	
C317	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	IC441	8-759-481-19	IC LB1830M-S-TE-L	
C321	1-124-779-00	ELECT CHIP	10uF 20% 16V	IC501	8-759-599-90	IC M30620MC-406FP	
C322	1-124-779-00	ELECT CHIP	10uF 20% 16V			< JACK >	
C351	1-163-233-11	CERAMIC CHIP	18PF 5% 50V	J101	1-793-344-11	JACK, PIN 4P	
C352	1-163-234-11	CERAMIC CHIP	20PF 5% 50V			< COIL >	
C353	1-163-038-91	CERAMIC CHIP	0.1uF 25V	L450	1-216-296-91	SHORT 0	
C354	1-163-038-91	CERAMIC CHIP	0.1uF 25V	L451	1-216-296-91	SHORT 0	
C370	1-126-933-11	ELECT	100uF 20% 16V			< TRANSISTOR >	
C371	1-126-933-11	ELECT	100uF 20% 16V	Q191	8-729-046-97	TRANSISTOR 2SD1938(F)-T(TX).SO	
C385	1-163-038-91	CERAMIC CHIP	0.1uF 25V	Q192	8-729-046-97	TRANSISTOR 2SD1938(F)-T(TX).SO	
C386	1-163-038-91	CERAMIC CHIP	0.1uF 25V	Q291	8-729-046-97	TRANSISTOR 2SD1938(F)-T(TX).SO	
C426	1-128-551-11	ELECT	22uF 20% 35V	Q292	8-729-046-97	TRANSISTOR 2SD1938(F)-T(TX).SO	
C500	1-131-347-00	TANTALUM	1uF 10% 35V	Q390	8-729-424-08	TRANSISTOR UN2111-TX	
C512	1-163-038-91	CERAMIC CHIP	0.1uF 25V	Q441	8-729-421-22	TRANSISTOR UN2211-TX	
C516	1-163-038-91	CERAMIC CHIP	0.1uF 25V			< RESISTOR >	
C519	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	R82	1-216-097-91	RES,CHIP 100K 5% 1/10W	
C562	1-163-038-91	CERAMIC CHIP	0.1uF 25V	R101	1-216-049-91	RES,CHIP 1K 5% 1/10W	
C571	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	R102	1-216-097-91	RES,CHIP 100K 5% 1/10W	
C572	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	R106	1-216-075-00	METAL CHIP 12K 5% 1/10W	
C595	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	R181	1-216-073-00	METAL CHIP 10K 5% 1/10W	
C597	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	R182	1-216-073-00	METAL CHIP 10K 5% 1/10W	
C598	1-163-038-91	CERAMIC CHIP	0.1uF 25V	R183	1-216-080-00	METAL CHIP 20K 5% 1/10W	
C599	1-163-038-91	CERAMIC CHIP	0.1uF 25V	R184	1-216-683-11	METAL CHIP 22K 0.5% 1/10W	
C951	1-104-664-11	ELECT	47uF 20% 10V	R185	1-216-041-00	METAL CHIP 470 5% 1/10W	
C953	1-163-038-91	CERAMIC CHIP	0.1uF 25V	R186	1-216-041-00	METAL CHIP 470 5% 1/10W	
C954	1-163-038-91	CERAMIC CHIP	0.1uF 25V	R187	1-216-089-91	RES,CHIP 47K 5% 1/10W	
		< CONNECTOR >		R188	1-216-045-00	METAL CHIP 680 5% 1/10W	
CN412	1-784-834-21	CONNECTOR,FFC(LIF(NON-ZIF))23P					
CN421	1-793-448-11	CONNECTOR, FFC 15P					
CN501	1-784-834-21	CONNECTOR,FFC(LIF(NON-ZIF))23P					
CN502	1-770-215-11	PIN, CONNECTOR (PC BOARD) 7P					
CN503	1-784-860-21	CONNECTOR, FFC(LIF(NON-ZIF))8P					

Ref. No.	Part No.	Description	Quantity	Tolerance	Remark
R189	1-216-037-00	METAL CHIP	330	5%	1/10W
R191	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R192	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R201	1-216-049-91	RES,CHIP	1K	5%	1/10W
R202	1-216-097-91	RES,CHIP	100K	5%	1/10W
R206	1-216-075-00	METAL CHIP	12K	5%	1/10W
R281	1-216-073-00	METAL CHIP	10K	5%	1/10W
R282	1-216-073-00	METAL CHIP	10K	5%	1/10W
R283	1-216-080-00	METAL CHIP	20K	5%	1/10W
R284	1-216-683-11	METAL CHIP	22K	0.5%	1/10W
R285	1-216-041-00	METAL CHIP	470	5%	1/10W
R286	1-216-041-00	METAL CHIP	470	5%	1/10W
R287	1-216-089-91	RES,CHIP	47K	5%	1/10W
R288	1-216-045-00	METAL CHIP	680	5%	1/10W
R289	1-216-037-00	METAL CHIP	330	5%	1/10W
R291	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R292	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R311	1-216-025-91	RES,CHIP	100	5%	1/10W
R312	1-216-025-91	RES,CHIP	100	5%	1/10W
R313	1-216-025-91	RES,CHIP	100	5%	1/10W
R314	1-216-025-91	RES,CHIP	100	5%	1/10W
R339	1-216-295-91	SHORT	0		
R341	1-216-295-91	SHORT	0		
R342	1-216-295-91	SHORT	0		
R351	1-216-121-91	RES,CHIP	1M	5%	1/10W
R352	1-216-041-00	METAL CHIP	470	5%	1/10W
R355	1-216-029-00	METAL CHIP	150	5%	1/10W
R356	1-216-031-00	METAL CHIP	180	5%	1/10W
R357	1-216-296-91	SHORT	0		
R391	1-216-097-91	RES,CHIP	100K	5%	1/10W
R392	1-216-101-00	METAL CHIP	150K	5%	1/10W
R441	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R442	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R443	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R500	1-216-073-00	METAL CHIP	10K	5%	1/10W
R508	1-216-025-91	RES,CHIP	100	5%	1/10W
R509	1-216-073-00	METAL CHIP	10K	5%	1/10W
R530	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R531	1-216-073-00	METAL CHIP	10K	5%	1/10W
R533	1-216-073-00	METAL CHIP	10K	5%	1/10W
R549	1-216-025-91	RES,CHIP	100	5%	1/10W
R550	1-216-073-00	METAL CHIP	10K	5%	1/10W
R551	1-216-073-00	METAL CHIP	10K	5%	1/10W
R553	1-216-073-00	METAL CHIP	10K	5%	1/10W
R559	1-216-073-00	METAL CHIP	10K	5%	1/10W
R560	1-216-073-00	METAL CHIP	10K	5%	1/10W
R568	1-216-073-00	METAL CHIP	10K	5%	1/10W
R569	1-216-073-00	METAL CHIP	10K	5%	1/10W
R573	1-216-073-00	METAL CHIP	10K	5%	1/10W
R575	1-216-073-00	METAL CHIP	10K	5%	1/10W
R577	1-216-073-00	METAL CHIP	10K	5%	1/10W
R581	1-216-097-91	RES,CHIP	100K	5%	1/10W
R595	1-216-073-00	METAL CHIP	10K	5%	1/10W
R597	1-216-073-00	METAL CHIP	10K	5%	1/10W
R852	1-216-097-91	RES,CHIP	100K	5%	1/10W

Ref. No.	Part No.	Description	Quantity	Tolerance	Remark
< VIBRATOR >					
X351	1-579-314-11	VIBRATOR, CRYSTAL (22.5792MHZ)			
X513	1-781-174-21	VIBRATOR, CERAMIC (10MHZ)			
*****					
A-4724-778-A	PANEL BOARD, COMPLETE (US,CND) *****				
A-4724-786-A	PANEL BOARD, COMPLETE (AEP,UK,SP) *****				
4-220-557-01	HOLDER (FL)				
* 4-949-935-51	CUSHION (FL)				
7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3				
< CAPACITOR >					
C411	1-126-939-11	ELECT	10000uF	20%	16V
C412	1-126-964-11	ELECT	10uF	20%	50V
C414	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C415	1-126-916-11	ELECT	1000uF	20%	6.3V
C416	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C417	1-104-664-11	ELECT	47uF	20%	10V
C418	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C419	1-126-964-11	ELECT	10uF	20%	50V
C420	1-126-926-11	ELECT	1000uF	20%	10V
C421	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C423	1-126-968-11	ELECT	100uF	20%	50V
C424	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C425	1-126-967-11	ELECT	47uF	20%	50V
C427	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C428	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C431	1-126-966-11	ELECT	33uF	20%	16V
C432	1-126-964-11	ELECT	10uF	20%	50V
C461	1-126-935-11	ELECT	470uF	20%	16V
C466	1-126-935-11	ELECT	470uF	20%	16V
C601	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C611	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C612	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C613	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C621	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C623	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C661	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C662	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C802	1-163-038-91	CERAMIC CHIP	0.1uF		25V
△ C901	1-113-924-11	CERAMIC	0.0047uF	20%	250V
△ C902	1-113-924-11	CERAMIC	0.0047uF	20%	250V
C911	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C912	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C913	1-163-038-91	CERAMIC CHIP	0.1uF		25V
< CONNECTOR >					
* CN401	1-564-509-11	PLUG, CONNECTOR 6P			
CN411	1-778-692-11	CONNECTOR, FFC/FPC 21P			
CN414	1-770-651-11	CONNECTOR, FFC/FPC 23P			
CN451	1-569-490-11	SOCKET, CONNECTOR 3P			
* CN901	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P			
* CN902	1-566-693-11	PIN, CONNECTOR 2P			

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.
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**PANEL**

**POWER**

Ref. No.	Part No.	Description	Remark
		< DIODE >	
D411	8-719-210-39	DIODE EC10QS04-TE12L5	
D412	8-719-210-39	DIODE EC10QS04-TE12L5	
D421	8-719-210-33	DIODE EC10DS2TE12R	
D422	8-719-422-31	DIODE MA8047-M-TX	
D431	8-719-210-33	DIODE EC10DS2TE12R	
D432	8-719-210-33	DIODE EC10DS2TE12R	
D433	8-719-016-74	DIODE 1SS352-TPH3	
D451	8-719-016-74	DIODE 1SS352-TPH3	
D452	8-719-313-73	DIODE SFPB-52V	
D461	8-719-210-39	DIODE EC10QS04-TE12L5	
D462	8-719-210-39	DIODE EC10QS04-TE12L5	
D466	8-719-210-39	DIODE EC10QS04-TE12L5	
D467	8-719-210-39	DIODE EC10QS04-TE12L5	
D801	8-719-016-74	DIODE 1SS352-TPH3	
D911	8-719-016-74	DIODE 1SS352-TPH3	
D912	8-719-016-74	DIODE 1SS352-TPH3	
		< FLUORESCENT >	
FL701	1-517-907-11	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC411	8-759-525-48	IC LA5632	
IC421	8-759-633-42	IC M5293L	
IC601	8-759-269-92	IC SN74HCU04ANSR	
IC611	8-749-012-70	IC GP1F38R	
IC621	8-749-012-70	IC GP1F38R	
IC661	8-749-012-69	IC GP1F38T	
		< JACK >	
J801	1-779-655-21	JACK (SMALL TYPE) (2 GANG)	
		< JUMPER RESISTOR >	
JW401	1-216-296-91	SHORT 0	
		< COIL >	
L611	1-412-784-41	INDUCTOR 4.7uH	
L661	1-412-784-41	INDUCTOR 4.7uH	
△L901	1-424-485-11	FILTER, LINE	
		< TRANSISTOR >	
Q801	8-729-620-05	TRANSISTOR 2SC2603TP-EF	
		< RESISTOR >	
R411	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R412	1-216-097-91	RES,CHIP 100K 5% 1/10W	
R413	1-216-049-91	RES,CHIP 1K 5% 1/10W	
R420	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R422	1-216-097-91	RES,CHIP 100K 5% 1/10W	
R423	1-216-033-00	METAL CHIP 220 5% 1/10W	
R424	1-216-033-00	METAL CHIP 220 5% 1/10W	
R431	1-216-025-91	RES,CHIP 100 5% 1/10W	
R432	1-216-047-91	RES,CHIP 820 5% 1/10W	
R433	1-216-035-00	METAL CHIP 270 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R434	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R435	1-216-091-00	METAL CHIP 56K 5% 1/10W	
R436	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R437	1-216-049-91	RES,CHIP 1K 5% 1/10W	
R451	1-216-033-00	METAL CHIP 220 5% 1/10W	
R613	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R614	1-216-089-91	RES,CHIP 47K 5% 1/10W	
R623	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R624	1-216-089-91	RES,CHIP 47K 5% 1/10W	
R801	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R802	1-216-295-91	SHORT 0	
R803	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R804	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R805	1-216-001-00	METAL CHIP 10 5% 1/10W	
R806	1-216-025-91	RES,CHIP 100 5% 1/10W	
R912	1-216-296-91	SHORT 0	
		< RELAY >	
RY911	1-755-300-11	RELAY	
RY912	1-755-300-11	RELAY	
		< SWITCH >	
S401	1-571-839-11	SWITCH, KEY BOARD (RESET)	
*****			
A-4724-780-A	POWER BOARD, COMPLETE (US,CND) *****		
A-4724-784-A	POWER BOARD, COMPLETE (AEP,UK,SP) *****		
		< CAPACITOR >	
C760	1-163-038-91	CERAMIC CHIP 0.1uF 25V	
C761	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C762	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C763	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C764	1-163-038-91	CERAMIC CHIP 0.1uF 25V	
C765	1-124-778-00	ELECT CHIP 22uF 20% 6.3V	
C766	1-163-038-91	CERAMIC CHIP 0.1uF 25V	
C769	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	
C781	1-126-206-11	ELECT CHIP 100uF 20% 6.3V	
C782	1-163-021-91	CERAMIC CHIP 0.01uF 10% 50V	
		< CONNECTOR >	
CN701	1-793-448-11	CONNECTOR, FFC 15P	
		< DIODE >	
D751	8-719-051-89	DIODE SML-010VT-T87 (STANDBY)	
		< IC >	
IC761	8-759-426-98	IC MSM9202-02GS-K	
IC781	8-749-013-92	IC GP1UC7X	
		< JACK >	
J751	1-793-439-11	JACK (SMALL TYPE)	

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.
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