MDS-JE470

SERVICE MANUAL

Self Diagnosis Supported model

Ver 1.0 2001. 05

US Model
Canadian Model
AEP Model
UK Model
E Model
Australian Model

US and foreign patents licensed form Dolby Laboratories Licensing Corporation.

Model Name Using Similar Mechanism	MDS-S50
MD Mechanism Type	MDM-7A
Optical Pick-up Type	KMS-260B/260E

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser (λ =780 nm) Emission duration: continuous
Laser output	MAX 44.6 µW[1)]

1) 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.

Laser diode	Material: GaAlAs
Revolutions (CLV)	400 rpm to 900 rpm
Error correction	ACIRC (Advanced Cross Interleave Reed Solomon Code)
Sampling frequency	44.1 kHz
Coding	ATRAC (Adaptive TRansform Acoustic Coding)/ATRAC 3
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ±0.3 dB
Signal-to-noise ratio	Over 96 dB during play
Wow and flutter	Below measurable limit

Inputs

ANALOG IN	Jack type: phono Impedance: 47 kilohms Rated input: 500 mVrms Minimum input: 125 mVrms
DIGITAL OPTICAL IN	Connector type: square optical Impedance: 660 nm (optical wave length)

Outputs

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

— Continued on next page —

MINIDISC DECK

9-873-891-11
2001E0200-1

Sony Corporation
Home Audio Company
Shinagawa Tec Service Manual Production Group

SONY®

General

Power requirements

U.S.A. and Canadian models: 120 V AC, 60Hz
European model: 230 V AC, 50/60Hz
Australian model: 240 V AC, 50/60Hz
Hong Kong model: 220 – 240 V AC, 50/60Hz
Other models: 110 – 120/220 – 240 V AC, 50/60Hz Adjustable with voltage selector
Power consumption 14 W (0.5 W in standby mode)
Dimensions (approx.) 430 X 95 X285 mm (w/h/d) incl. projecting parts and controls
Mass (approx.) 3.0 kg

Supplied accessories

Audio connecting cords (2)
Optical cable (1)
Remote commander (remote) (1)
R6 (size-AA) batteries (2)

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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- or five-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- or five-digit code/ Message	Cause/Remedy
C11/Protected	The inserted MD is record-protected. ➡ Take out the MD and close the record-protect slot.
C12/Cannot Copy	You tried to record a CD with a format that the external device connected to the deck does not support, such as CD-ROM or video CD. ➡ Remove the disc and insert a music CD.
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.
C41/Cannot Copy	The sound source is a copy of commercially available music software, or you tried to record a CD-R (Recordable CD). ➡ The Serial Copy Management System prevents making a digital copy. You cannot record a CD-R.
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 IN connector, the digital connecting cable was unplugged or the digital component turned off. ➡ Connect the cable or turn the digital component back on.
E0001/ MEMORY NG	There is an error in the internal data that the deck needs in order to operate. ➡ Consult your nearest Sony dealer.
E0101/ LASER NG	There is a problem with the optical pickup. ➡ The optical pick-up may have failed. Consult your nearest Sony dealer.

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 MENU/NO button to exit the mode.

1. While pressing the [⏮◁AMS▷⏭] knob and [■] button, connect the power plug to the outlet, and release the [⏮◁AMS▷⏭] knob and [■] button.
   When the test mode is set, "[Check]" will be displayed.
2. Rotate the [⏮◁AMS▷⏭] knob and when "[Service]" is displayed, press the [YES] button.
3. Rotate the [⏮◁AMS▷⏭] knob and display "Err Display".
4. Pressing the [YES] button sets the error history mode and displays "op rec tm".
5. Select the contents to be displayed or executed using the [⏮◁AMS▷⏭] knob.
6. Pressing the [⏮◁AMS▷⏭] knob will display or execute the contents selected.
7. Pressing the [⏮◁AMS▷⏭] knob another time returns to step 4.
8. Pressing the [MENU/NO] button displays "Err Display" and exits the error history mode.
9. To exit the test mode, press the [REPEAT] button. The unit sets into the STANDBY state, the disc is ejected, and the test mode ends.

ITEMS OF ERROR HISTORY MODE ITEMS AND CONTENTS

Selecting the Test Mode

Display	History
op rec tm	Displays the total recording time. When the total recording time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min" The display time is the time the laser is set to high power, which is about 1/4 of the actual recording time.
op play tm	Displays the total playback time. When the total playback time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min"
spdl rp tm	Displays the total rotating time of the spindle motor. When the total rotating time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min"
retry err	Displays the total number of retry errors during recording and playback Displays "r xx p yy". xx is the number of errors during recording. yy is the number of errors during playback. This is displayed in hexadecimal from 00 to FF.
total err	Displays the total number of errors Displays "total xx". This is displayed in hexadecimal from 00 to FF.
err history	Displays the past ten errors. Displays "0x ErrCd@@". X is the history number. The younger the number, the more recent is the history (00 is the latest). @@ is the error code. Select the error history number using the [⏮◁AMS▷⏭] knob.
retry adrs	Displays the past five retry addresses. Displays "xx ADRS yyyy", xx is the history number, yyyy is the cluster with the retry error. Select the error history number using the [⏮◁AMS▷⏭] knob.
er refresh	Mode for erasing the error and retry address histories Procedure 1. Press the [⏮◁AMS▷⏭] knob when displayed as "er refresh". 2. Press the [YES] button when the display changes to "er refresh?". When "complete!" is displayed, it means erasure has completed. Be sure to check the following after executing this mode. *Data has been erased. *Perform recording and playback, and check that the mechanism is normal.
tm change	Mode for erasing the total time of recording and playback Procedure 1. Press the [⏮◁AMS▷⏭] knob when displayed as "tm refresh". 2. Press the [YES] button when the display changes to "tm refresh?". When "complete!" is displayed, it means erasure has completed.
op change	Mode for erasing the total time of op rec tm, op play tm. These histories are based on the time of replacement of the optical pickup. If the optical pick-up has been replaced, perform this procedure and erase the history. Procedure 1. Press the [⏮◁AMS▷⏭] knob when displayed as "op change". 2. Press the [YES] button when the display changes to "op change?". When "Complete!" is displayed, it means erasure has completed.

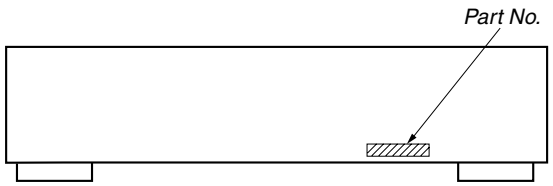
Display	History
spdl change	Mode for erasing the total spdl rp tm time These histories are based on the time of replacement of the spindle motor. If the spindle motor has been replaced, perform this procedure and erase the history. Procedure 1. Press the [⏮AMS⏭] knob when displayed as "spdl change" 2. Press the [YES] button when the display changes to "spdl change?" When "Complete!" is displayed, it means erasure has completed.

Table of Error Codes

Error Code	Description
10	Could not load
12	Loading switches combined incorrectly
20	Timed out without reading the top of PTOC
21	Could read top of PTOC, but detected error
22	Timed out without accessing UTOC
23	Timed out without reading UTOC
24	Error in UTOC
30	Could not start playback
31	Error in sector
40	Retry cause generated during normal recording
41	Retried in DRAM overflow
42	Retry occurred during TOC writing
43	Retry aborted during S.F editing
50	Other than access processing, and could not read address.
51	Focus NG occurred and overran.

MODEL IDENTIFICATION

— BACK PANEL —



MODEL	PARTS No.
AEP, UK models	4-233-025-0☐
US model	4-233-025-1☐
CND model	4-233-025-2☐
SP models	4-233-025-3☐
HK model	4-233-025-4☐
AUS model	4-233-025-5☐

• Abbreviation
CND : Canadian model
SP : Singapore model
HK : Hong Kong model
AUS : Australian model

TABLE OF CONTENTS

SECTION 1
SERVICE NOTES

SAFETY CHECK-OUT
(US model only)

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)

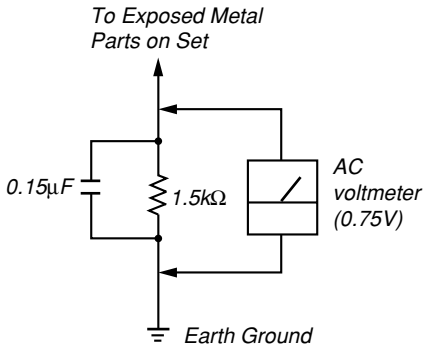


Fig. A. Using an AC voltmeter to check AC leakage.

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic break-down because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic break-down and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

Never look into the laser diode emission from right above when checking it for adjustment. It is feared that you will lose your sight.

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

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

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.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ 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.

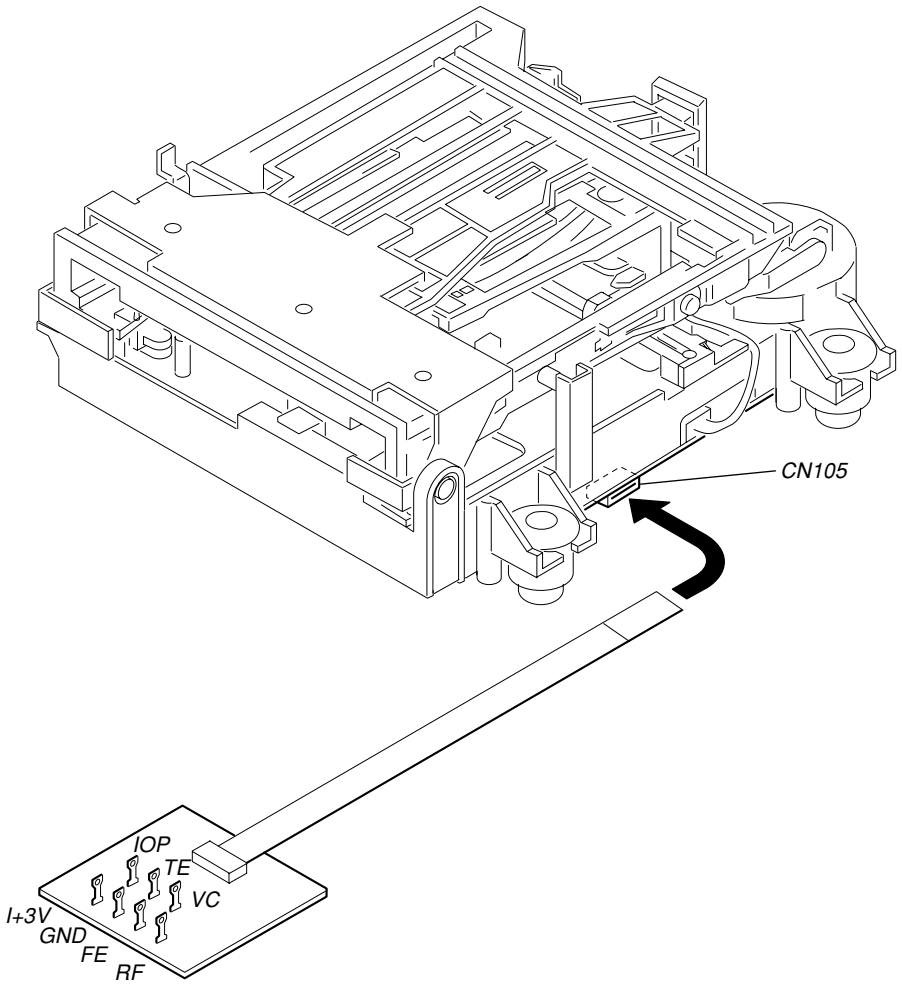
ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

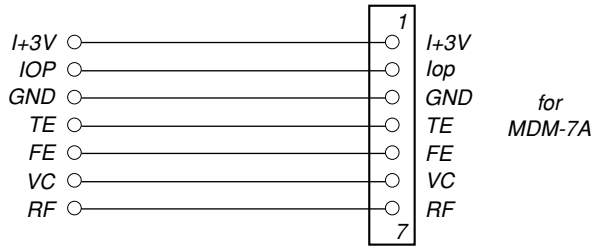
LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

JIG FOR CHECKING BD BOARD WAVEFORM

The special jig (J-2501-196-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)
TE : TRK error signal (Traverse adjustment)
VC : Reference level for checking the signal
RF : RF signal (Check jitter)
FE : Focus error signal





Iop DATA RECORDING AND DISPLAY WHEN OPTICAL PICK-UP AND NON-VOLATILE MEMORY (IC195 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 (IC195 of BD board), record the Iop value on the optical pick-up according to the following procedure.

Record Precedure:

1. While pressing the [⏮ AMS ⏭] knob and [■] button, connect the power plug to the outlet, and release the [⏮ AMS ⏭] knob and [■] button.
2. Rotate the [⏮ AMS ⏭] knob to display "[Service]", and press the [YES] button.
3. Rotate the [⏮ AMS ⏭] knob to display "Iop Write" (C05), and press the [YES] 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 : Rotate the [⏮ AMS ⏭] knob.
   To select the digit : Press the [⏮ AMS ⏭] knob.
6. When the [YES] 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 [YES] 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 [REPEAT] button to complete.

Display Precedure:

1. While pressing the [⏮ AMS ⏭] knob and [■] button, connect the power plug to the outlet, and release the [⏮ AMS ⏭] knob and [■] button.
2. Rotate the [⏮ AMS ⏭] knob to display "[Service]", and press the [YES] button.
3. Rotate the [⏮ AMS ⏭] knob to display "Iop Read" (C26).
4. "@@.@/##.#" is displayed and the recorded contents are displayed.
   @@.@ : indicates the Iop value labeled on the optical pick-up.
   ##.# : indicates the Iop value after adjustment
5. To end, press the [⏮ AMS ⏭] button or [MENU/NO] button to display "Iop Read". Then press the [REPEAT] button.

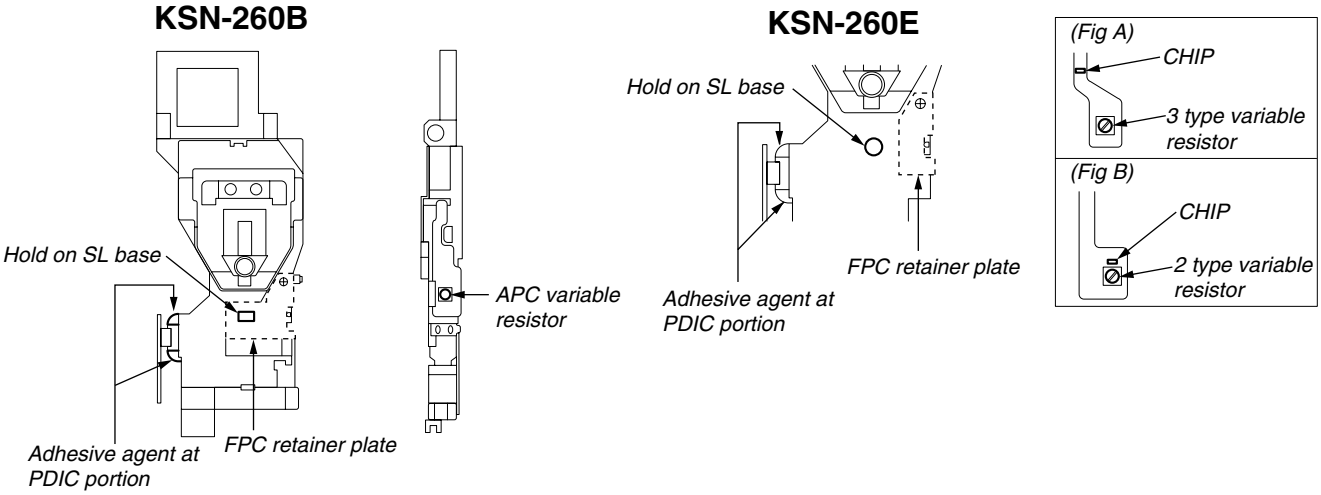
OPTICAL PICK-UP BLOCK TYPE DISCRIMINATION

There are two types of the optical pick-up block in this model.
These are compatible except for the laser power.
Check the type of the optical pick-up block before replacement.
Ajdust following items after replacing the optical pick-up block.
• 5-6-2. Laser Power Check (See page 28)
• 5-10. LASER POWER ADJUSTMENT (See page 31)

Differences

	KMS-260B	KMS-260E
Color of the adhesive agent at PDIC portion	Pink	White
Form of FPC retainer plate	Close the hole on SL base	Not close the hole on SL base
APC variable resistor	Small volume (2 type)	Big variable resistor (3 type) and chip resistor (Fig. A)
		Small variable resistor (2 type) and chip resistor (Fig. B)

Fig. B type is for repair.
• Abbreviation
260B: KMS-260B model
260E: KMS-260E model



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”.

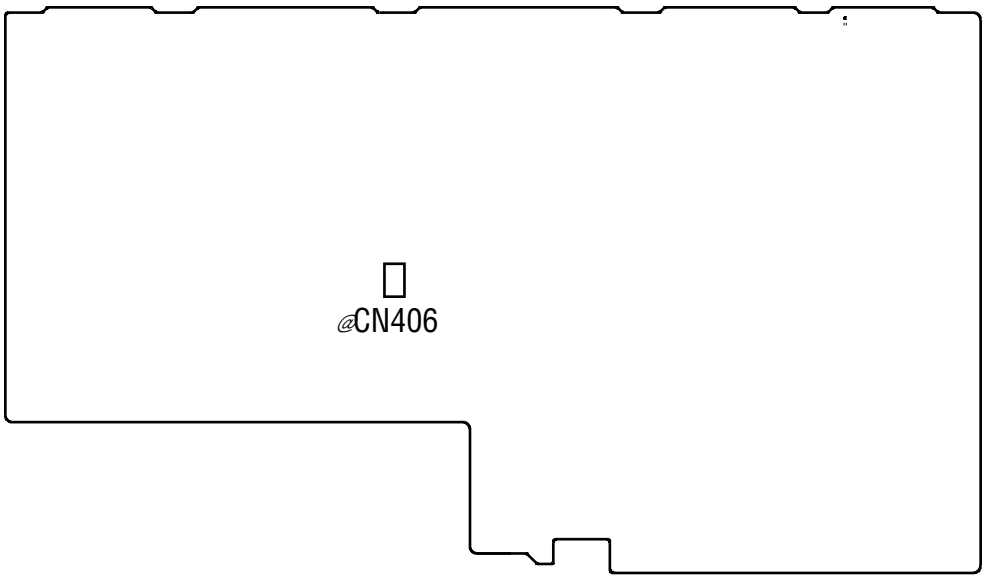
• 5-6-2. Laser power check (see page 28)
• 5-6-3. Iop Compare (see page 28)
• 5-6-4. Auto Check (see page 29)

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.
Procedure :
Remove the short-pin attached to CN406, and then attach it again.

[MAIN BOARD] (Component Side)



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.

Procedure:

1. Insert the recordable disc.
2. Press [MENU/NO] button to display "Edit Menu" on the fluorescent display.
3. Turn [⏮ AMS ⏭] button to display "All Erase?" on the fluorescent display.
4. Press [YES] button to display "All Erase??" on the fluorescent display.
5. Press [YES] button, "Complete!" is displayed on the fluorescent display and it turns off immediately.
6. Procedure 1: Press the [■] button continuously for about 10 seconds.
   Procedure 2: Press the [LEVEL/DISPLAY/CHAR] button while pressing the [■] button and [MENU/NO] button.
7. When the mode is set, "RTs 00c 00e 000" is displayed.
8. Press the [● REC] button to start recording. Then press the [❚❚] button and start recording.
9. To check the "track mode", press the [▷] button to start play.
10. To exit the test mode, press the [I/⏻] button, and turn OFF the power. When "TOC" disappears, disconnect the power plug from the outlet.
    If the test mode cannot be exited, refer to "Forced Reset" on page 9.

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

[RTs@@c##c***]
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

	Higher Bits				Lower Bits				Hexa-decimal	Cause of Retry	Occurring conditions
Hexadecimal	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

	Higher Bits				Lower Bits				Hexa-decimal	Details	
Hexadecimal	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0		When 0	When 1
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

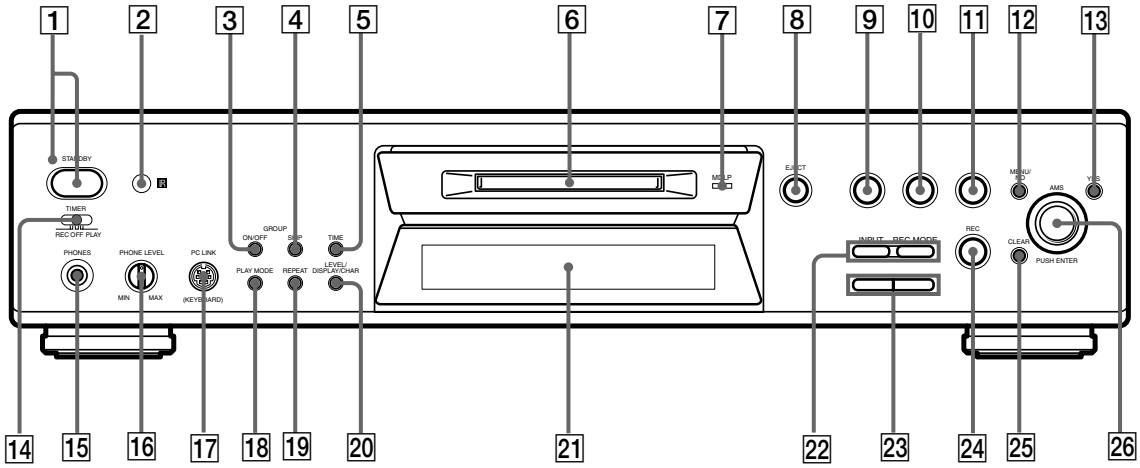
SECTION 2
GENERAL

This section is extracted from instruction manual.

Parts Identification

The items are arranged in alphabetical order.
Refer to the pages indicated in parentheses ( ) for details.

Main unit



AMS 26 (15) (20) (25) (35) (39)
CLEAR 25 (23) (30) (40)
Display window 21
EJECT ⏏ 8 (11) (20) (25)
GROUP ON/OFF[1] 3 (13) (22) (31)
GROUP SKIP[1] 4 (13) (22) (31)
INPUT 22 (11)
LEVEL/DISPLAY/CHAR 20 (11) (21) (29)
MD insertion slot 6
MDLP indicator 7 (14) (21)
MENU/NO 12 (15) (22) (25) (35) (39)
PC LINK (KEYBOARD)[1] 17 (39)
PHONE LEVEL[1] 16 (21)
PHONES jack[1] 15 (17) (21) (36)
PLAY MODE 18 (20) (37)
REC MODE 22 (14) (22)
REC ● 24 (11)
Remote sensor[2] 2
REPEAT 19 (20)
STANDBY indicator 1 (11) (20)
TIME[1] 5 (17) (21)
TIMER[1] 14 (37)
YES 13 (15) (23) (25) (35) (39)

BUTTON DESCRIPTIONS

I/⏻ 1 (11) (20) (25)
▷ 9 (11) (20) (37) (40)
❚❚ 10 (11) (20) (39) (40)
■ 11 (11) (20) (25) (37) (40)
◀◀/▶▶ 23 (20) (26) (40)

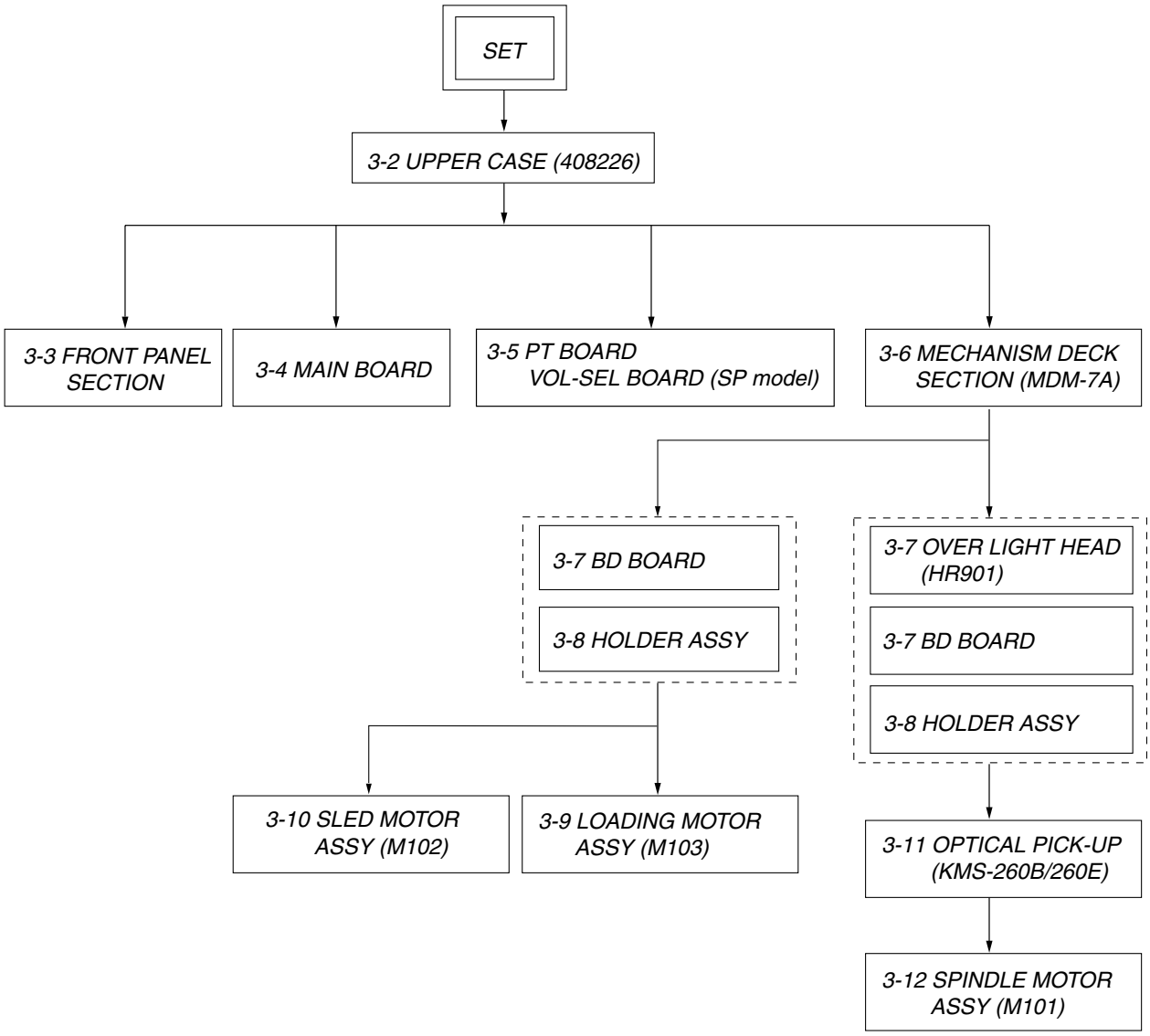
1) MDS-JE770 only.
2) MDS-JE770 only. For MDS-JE470, the remote sensor is located on the display window.

SECTION 3
DISASSEMBLY

• This set can be disassembled in the order shown below.

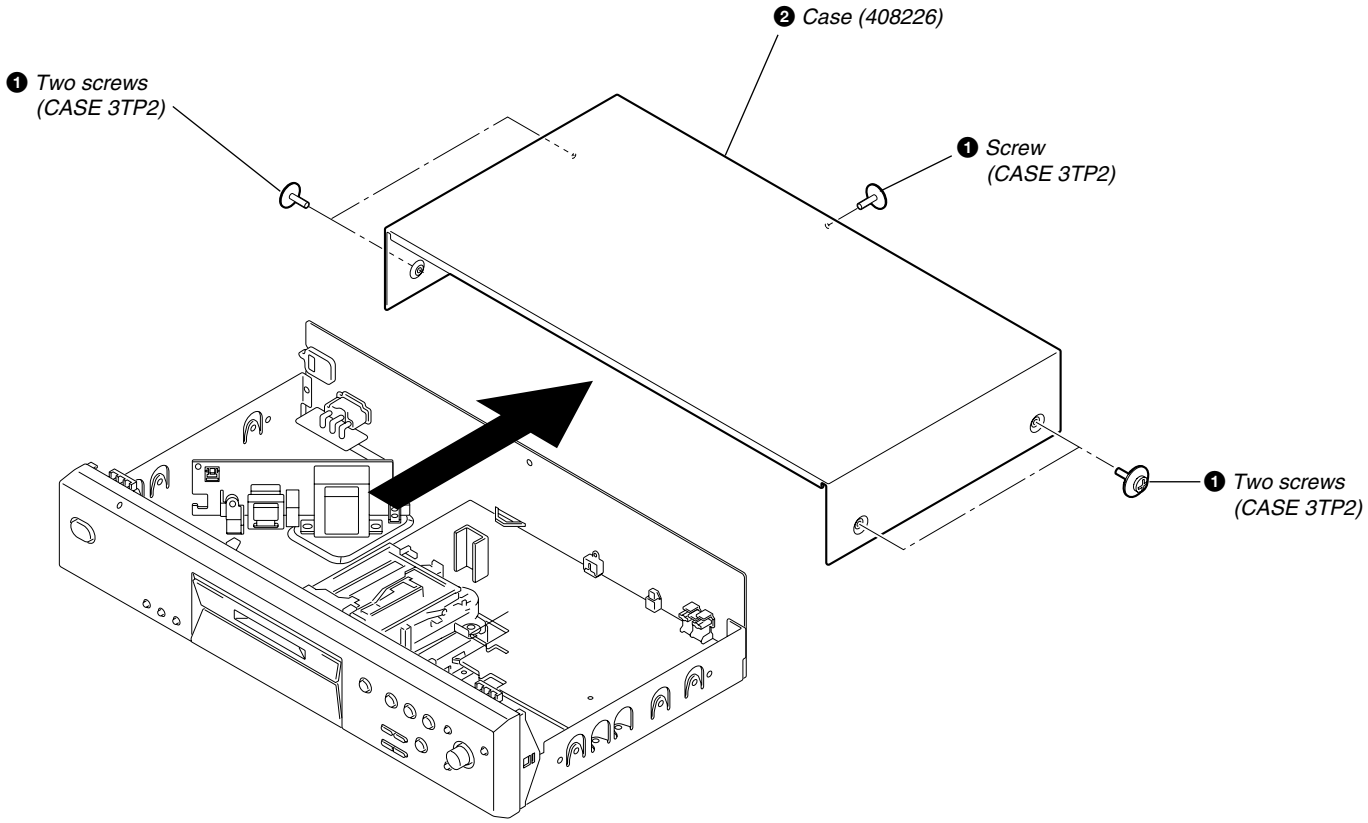
3-1. DISASSEMBLY FLOW

• Abbreviation
SP : Singapore

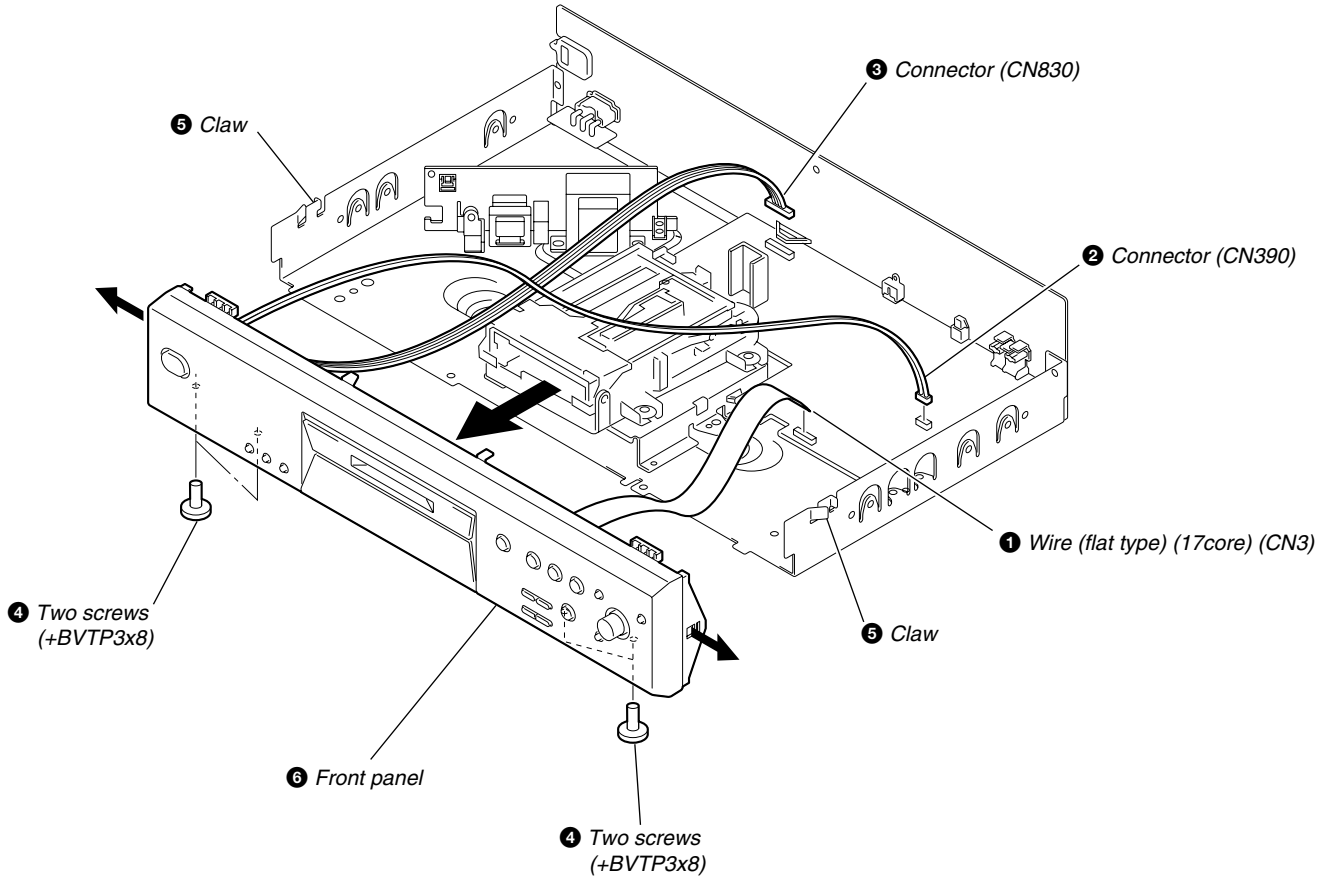


Note 1: The processes enclosed with [ ], remove in the any order.
Note 2: You cannot go to the next process until every process enclosed with [ ] has done.

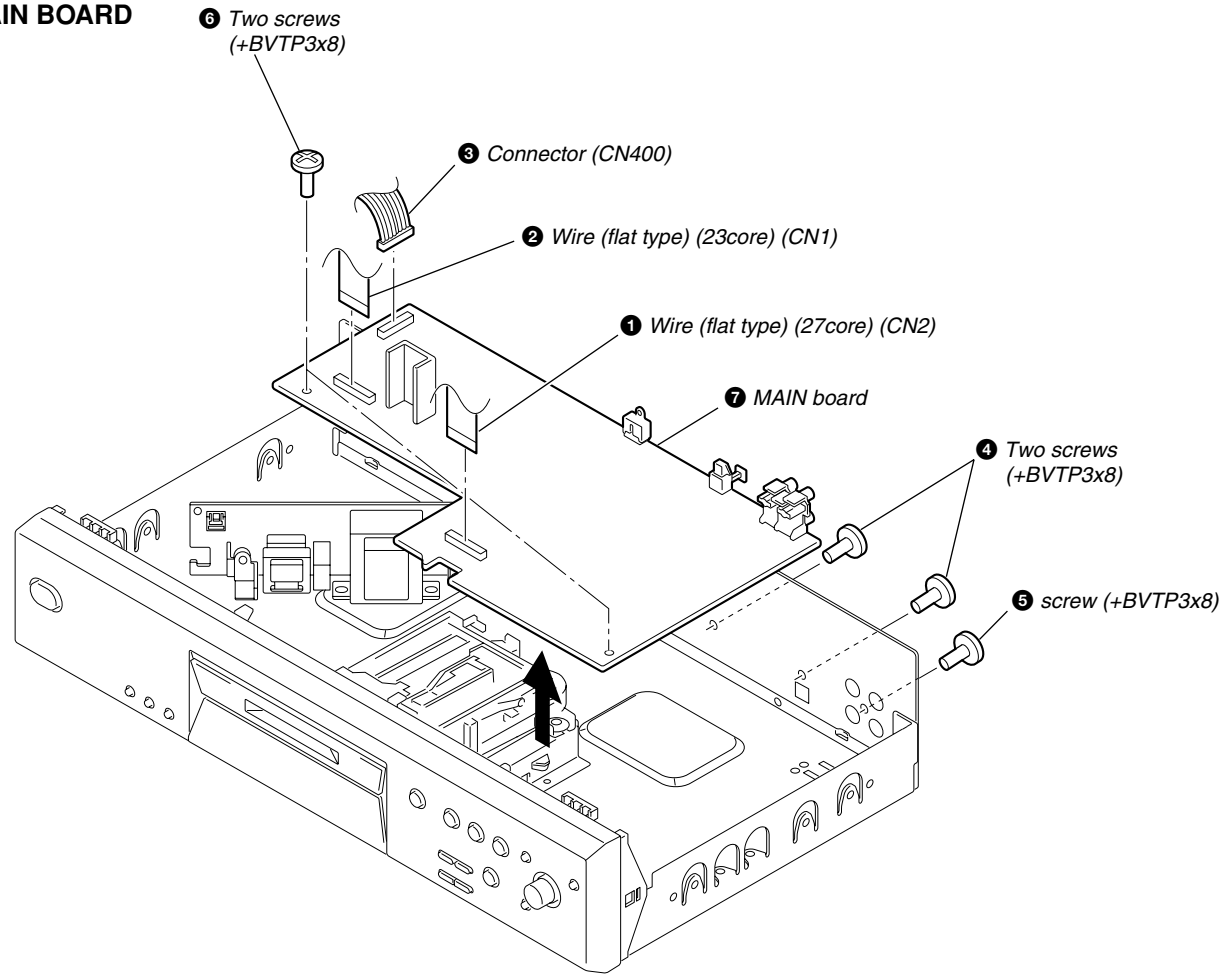
3-2. UPPER CASE (408226)



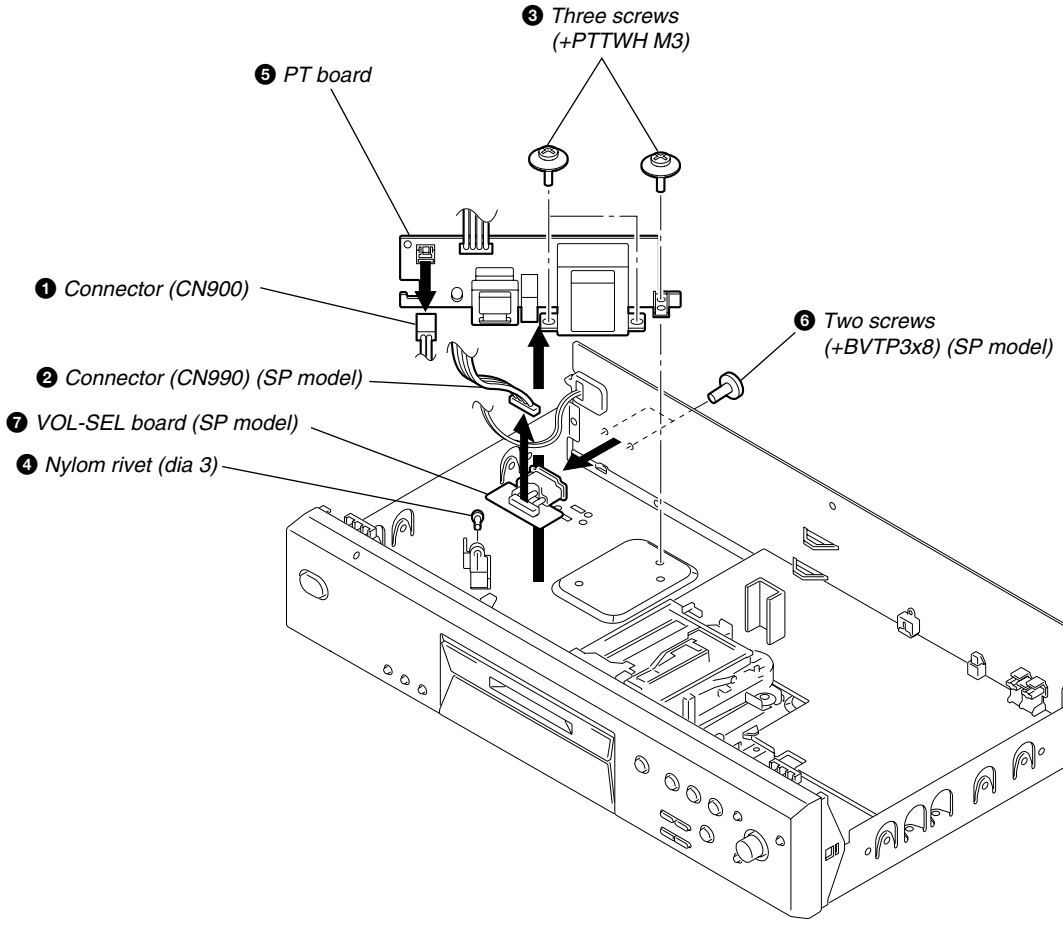
3-3. FRONT PANEL SECTION



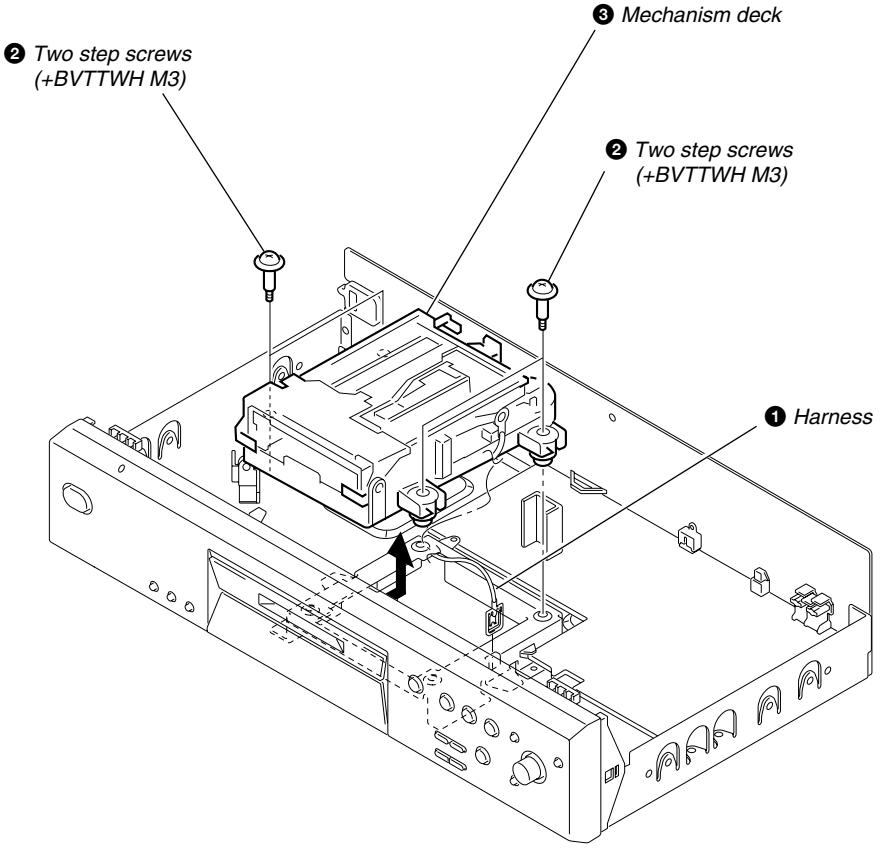
3-4. MAIN BOARD



3-5. PT BOARD, VOL-SEL BOARD (SP model)



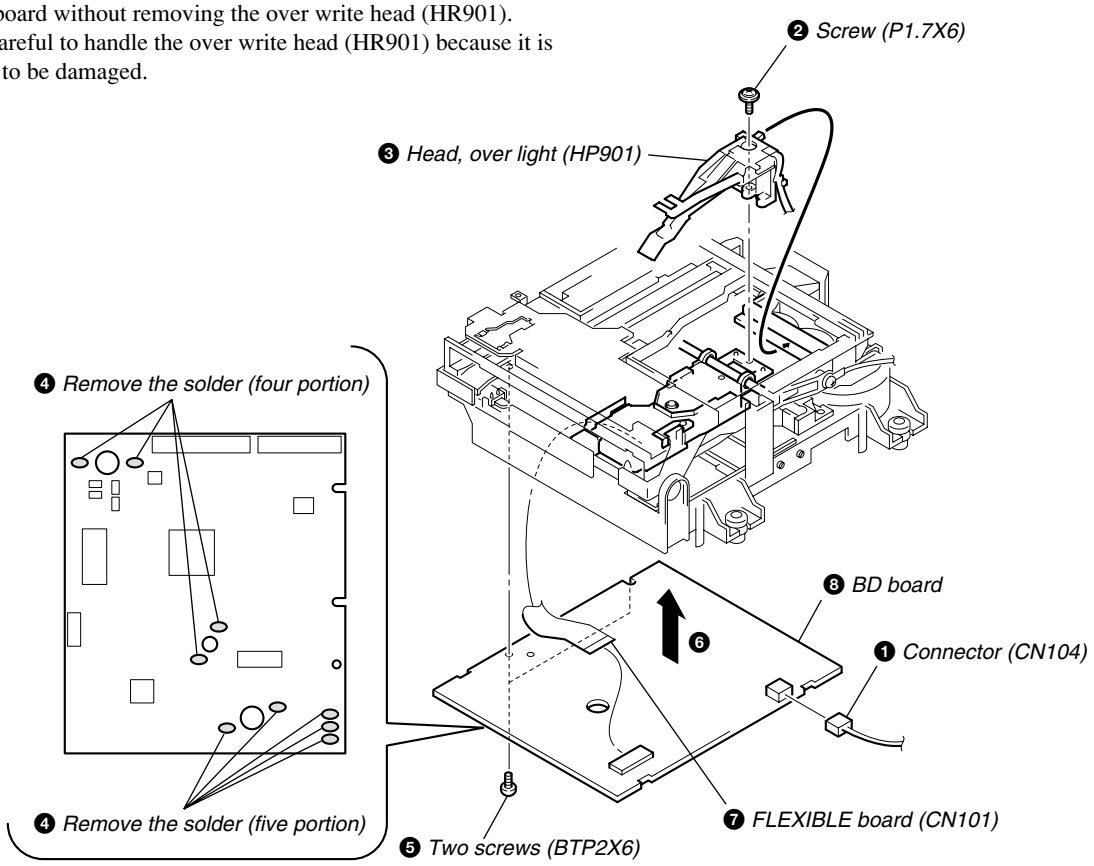
3-6. MECHANISM DECK SECTION (MDM-7A)



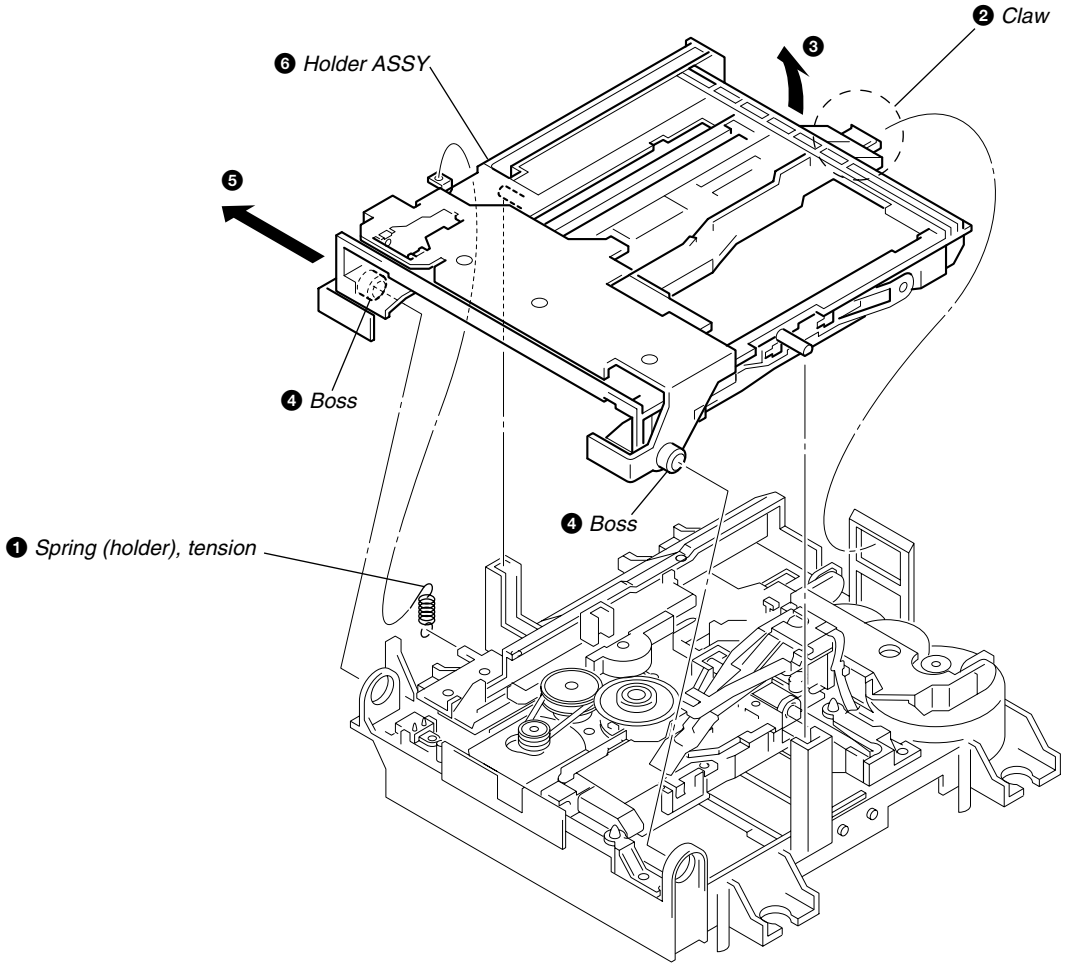
3-7. OVER LIGHT HEAD (HR901), BD BOARD

Note 1: If you disconnect the connector (CN104), you can remove the BD board without removing the over write head (HR901).

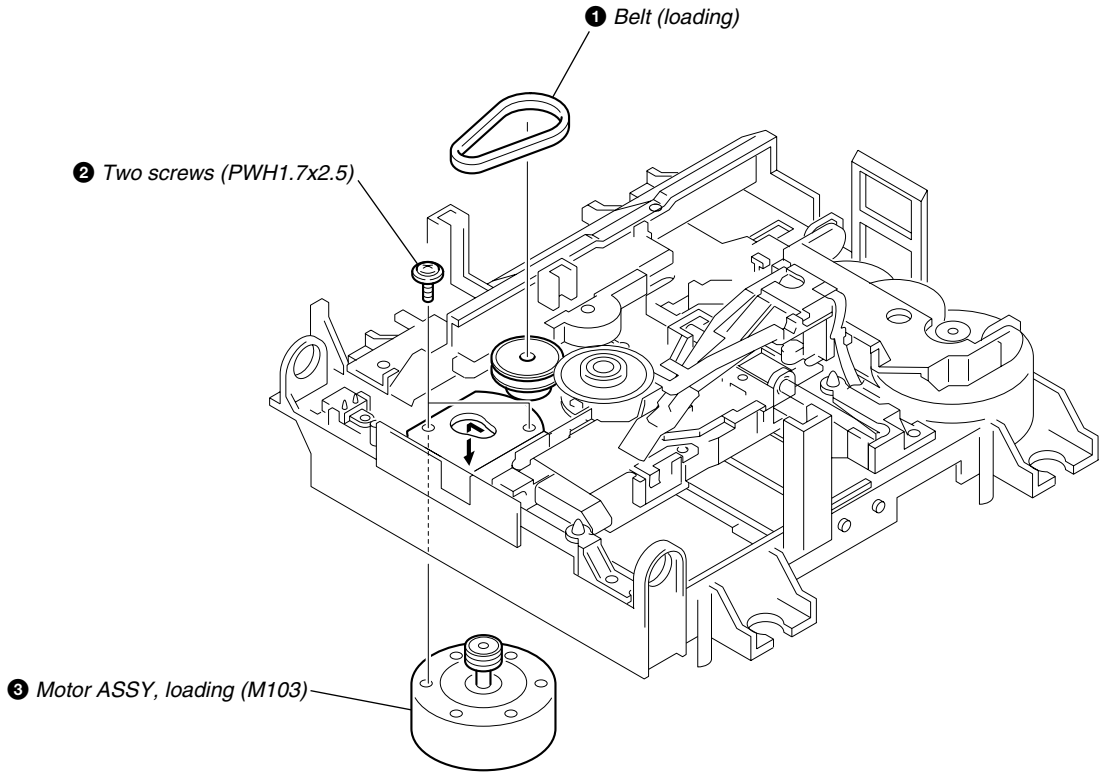
Note 2: Be careful to handle the over write head (HR901) because it is easy to be damaged.



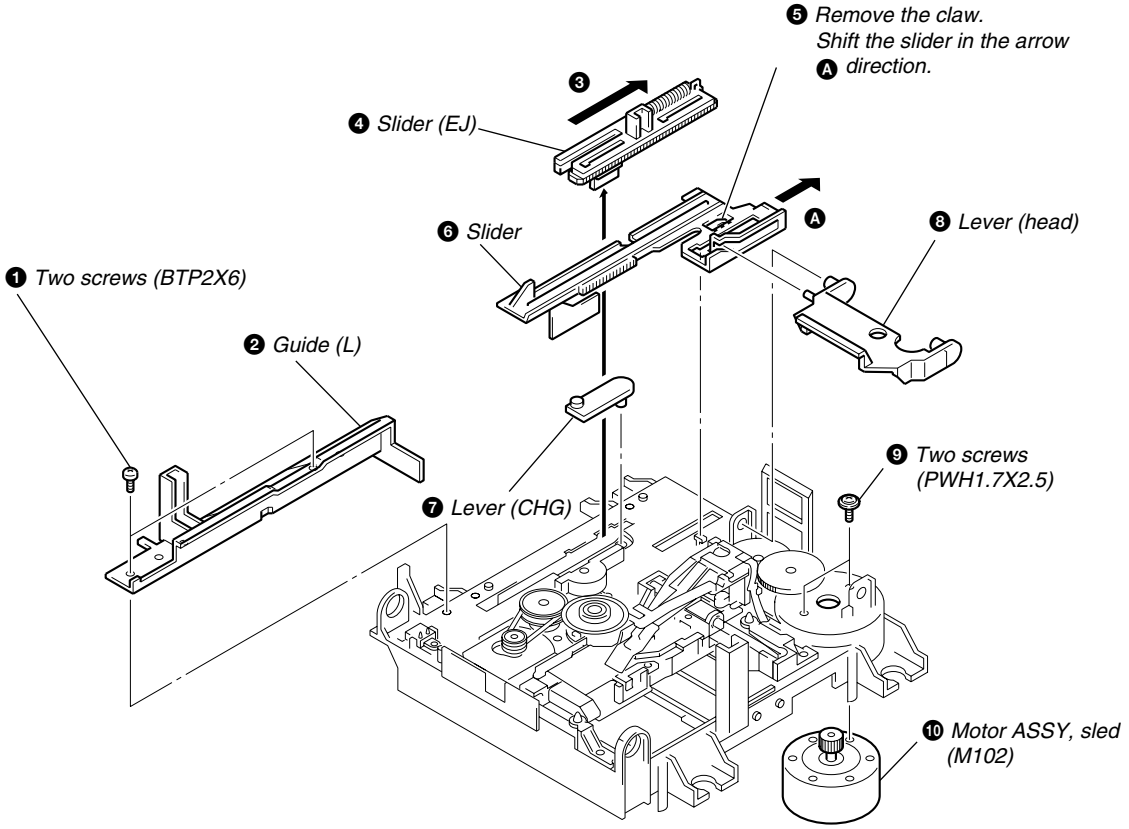
3-8. HOLDER ASSY



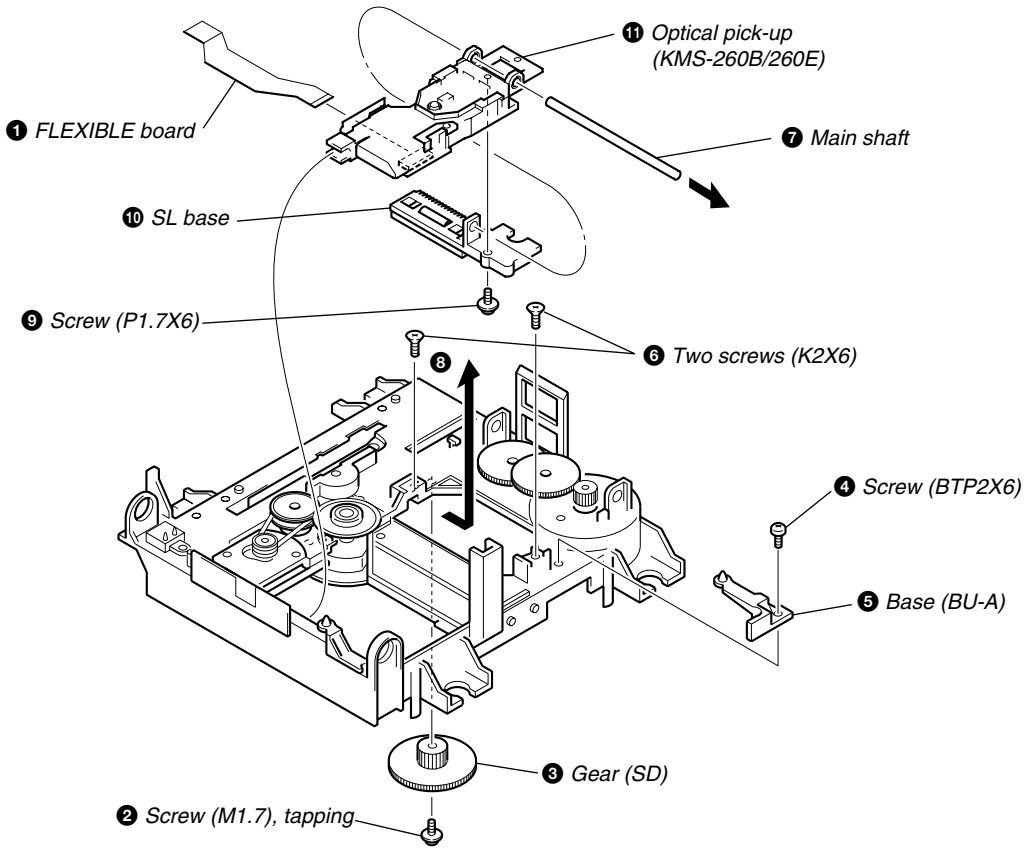
3-9. LOADING MOTOR ASSY (M103)



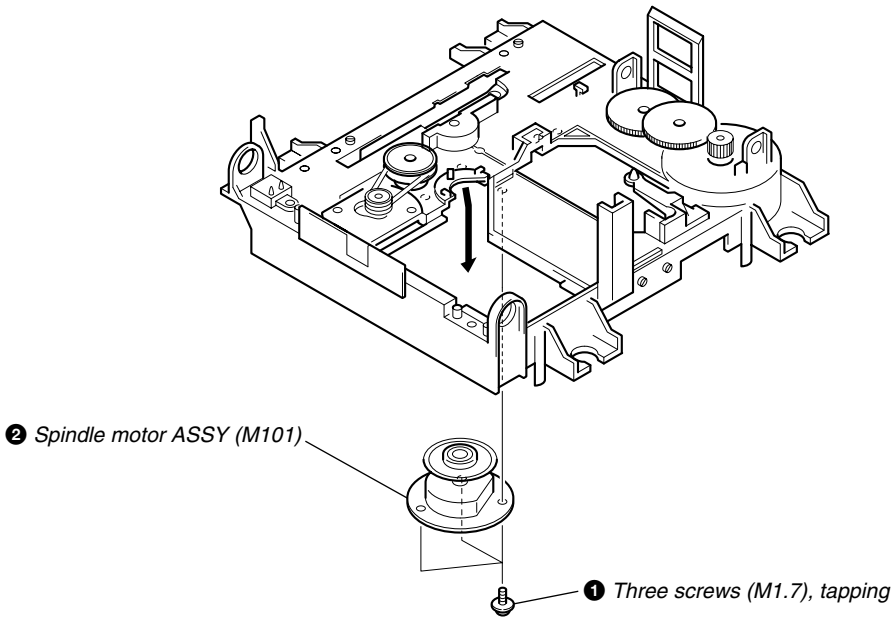
3-10. SLED MOTOR ASSY (M102), SLIDER



3-11. OPTICAL PICK-UP



3-12. SPINDLE MOTER ASSY (M101)



SECTION 4
TEST MODE

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 [MENU/NO] button and the rotation of disc is stopped.

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

- Continuous recording mode (CREC 1MODE) (C35)
- Laser power check mode (LDPWR CHECK) (C13)
- Laser power adjustment mode (LDPWR ADJUS) (C04)
- Iop check (Iop Compare) (C27)
- Iop value nonvolatile writing (Iop NV Save) (C06)
- Traverse (MO) check (EF MO CHECK) (C14)
- Traverse (MO) adjustment (EF MO ADJUS) (C07)
- 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 [⏮ AMS ⏭] knob and [■] button, connect the power plug to an outlet, and release the [⏮ AMS ⏭] knob and [■] button.
When the test mode is set, "[Check]" will be displayed. Rotating the [⏮ AMS ⏭] knob switches between the following three groups; ··· ⟷ Check ⟷ Service ⟷ Develop ⟷ ···.

Procedure 2: While pressing the [⏮ AMS ⏭] knob, connect the power plug to the outlet and release the [⏮ AMS ⏭] knob.
When the test mode is set, "TEMP CHECK" will be displayed. By setting the test mode using this method, only the "Check" group of method 1 can be executed.

NOTE: Do not use the test mode in the [Develop] group.
If used, the unit may not operate normally.
If the [Develop] group is set accidentally, press the [MENU/NO] button immediately to exit the [Develop] group.

4-3. EXITING THE TEST MODE

Press the [REPEAT] 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 [⏮ AMS ⏭] knob, [YES] button, and [MENU/NO] button.
The functions of these buttons are as follows.

Function name		Function
MENU/NO button		Cancel or move to top hierarchy
YES button		Set
AMS knob	Left or Right	Select
	Push	Set submenu

4-5. SELECTING THE TEST MODE

There are 26 types of test modes as shown below. The groups can be switched by rotating the [⏮ AMS ⏭] knob. After selecting the group to be used, press the [YES] button. After setting a certain group, rotating the [⏮ AMS ⏭] knob switches between these modes. Refer to "Group" in the table for details selected.
All adjustments and checks during servicing can be performed in the test mode in the Service group.

NOTE: Do not use the test mode in the [Develop] group.
If used, the unit may not operate normally.
If the [Develop] group is set accidentally, press the [MENU/NO] button immediately to exit the [Develop] group.

Display	No.	Details	Mark	Group	
				Check	Service
AUTO CHECK	C01	Automatic self-diagnosis			○
Err Display	C02	Error history display, clear			○
TEMP ADJUS	C03	Temperature compensation offset adjustment			○
LDPWR ADJUS	C04	Laser power adjustment			○
Iop Write	C05	Iop data writing			○
Iop NV Save	C06	Writes current Iop value in read nonvolatile memory using microprocessor			○
EF MO ADJUS	C07	Traverse (MO) adjustment			○
EF CD ADJUS	C08	Traverse (CD) adjustment			○
FBIAS ADJUS	C09	Focus bias adjustment			○
AG Set (MO)	C10	Focus, tracking gain adjustment (MO)			○
AG Set (CD)	C11	Focus, tracking gain adjustment (CD)			○
TEMP CHECK	C12	Temperature compensation offset check		○	○
LDPWR CHECK	C13	Laser power check		○	○
EF MO CHECK	C14	Traverse (MO) check		○	○
EF CD CHECK	C15	Traverse (CD) check		○	○
FBIAS CHECK	C16	Focus bias check		○	○
ScurveCHECK	C17	S-curve check	×	○	
VERIFYMODE	C18	Nonvolatile memory check	×	○	
DETRK CHECK	C19	Detrack check	×	○	
0920 CHECK	C25	Most circumference check	×	○	
Iop Read	C26	Iop data display		○	○
Iop Compare	C27	Comparison with initial Iop value written in nonvolatile memory		○	○
ADJ CLEAR	C28	Initialization of nonvolatile memory for adjustment values			○
INFORMATION	C31	Display of microprocessor version, etc.		○	○
CPLAY1MODE	C34	Continuous playback mode		○	○
CREC 1MODE	C35	Continuous recording mode		○	○

- For details of each adjustment mode, refer to "5. Electrical Adjustments".
  For details of "Err Display", refer to "Self-Diagnosis Function" on page 2.
- If a different mode has been selected by mistake, press the [MENU/NO] 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 [MENU/NO] button to exit the mode immediately.

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 Rotate the [⏮◁ AMS ▷⏭] knob and display "CPLAY1 MODE"(C34).
   ③ Press the [YES] button to change the display to "CPLAY1 MID".
   ④ When access completes, the display changes to "C = □□□□ AD = □□".
   Note : The numbers "□" displayed show you error rates and ADER.
2. Changing the parts to be played back
   ① Press the [YES] button during continuous playback to change the display as below.
   "CPLAY1 MID" → "CPLAY1 OUT" → "CPLAY1 IN"
   When pressed another time, the parts to be played back can be moved.
   ② When access completes, the display changes to "C = □□□□ AD = □□".
   Note : The numbers "□" displayed show you error rates and ADER.
3. Ending the continuous playback mode
   ① Press the [MENU/NO] button. The display will change to "CPLAY1 MODE"(C34).
   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 Rotate the [⏮◁ AMS ▷⏭] knob and display "CREC1 MODE" (C35).
   ③ Press the [YES] button to change the display to "CREC1 MID".
   ④ When access completes, the display changes to "CREC 1 (□□□□)" and **REC** lights up.
   Note : The numbers "□" displayed shows you the recording position addresses.
2. Changing the parts to be recorded
   ① When the [YES] button is pressed during continuous recording, the display changes as below.
   "CREC1 MID" → "CREC1 OUT" → "CREC1 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 1 (□□□□)" and **REC** lights up.
   Note : The numbers "□" displayed shows you the recording position addresses.
3. Ending the continuous recording mode
   ① Press the [MENU/NO] button. The display changes to "CREC1 MODE" (C35) 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 [MENU/NO] 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.

4-6. 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.
►►	The sled moves to the outer circumference only when this is pressed.
◄◄	The sled moves to the inner circumference only when this is pressed.
REC MODE	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLV S ⟷ CLV A).
LEVEL/DISPLAY/CHAR	Switches the displayed contents each time the button is pressed.
⏏	Ejects the disc.
REPEAT	Exits the test mode.

4-7. TEST MODE DISPLAYS

Each time the LEVEL/DISPLAY/CHAR button is pressed, the display changes in the following order.
When CPLAY and CREC are started, the display will forcibly be switched to the error rate display as the initial mode.

1. Mode display

Displays “TEMP ADJUST”, “CPLAY1MODE”, etc.

2. Error rate display

Displays the error rate in the following way.

C = □□□□ AD = □□

C = Indicates the C error.

AD = Indicates ADER.

3. Address display

The address is displayed as follows. (MO:recordable disc, CD:playback only disc)
If the REC MODE button is pressed , the display switches from groove to pit or vice versa.

h = □□□□ s = □□□□ (MO pit and CD)

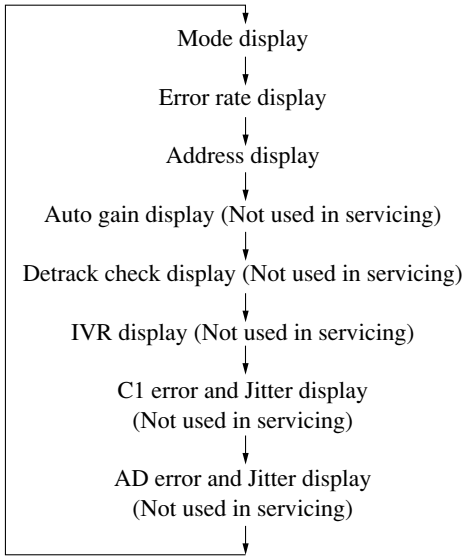
h = □□□□ a = □□□□ (MO groove)

h = Indicates the header address.

s = Indicates the SUBQ address.

a = Indicates the ADIP address.

Note: “–” is displayed when the address cannnot be read.



4-8. MEANINGS OF OTHER DISPLAYS

Display	Contents	
	When Lit	When Off
▷	Servo ON	Servo 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/1	Tracking auto gain OK	
A-/REP	Focus auto gain OK	
REC MODE	Pit	Groove
DISC/LP2	High reflection	Low reflection
SLEEP/SHUF	CLV S	CLV A
MONO	CLV LOCK	CLV UNLOCK

4-9. AUTOMATIC SELF-DIAGNOSIS FUNCTION

This test mode performs CREC and CPLAY automatically for mainly checking the characteristics of the optical pick-up.
To perform this test mode, the laser power must first be checked.
Perform AUTO CHECK after the laser power check and Iop check.

Procedure

1. Press the [YES] button. If "LDPWR ミチェック " is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disc is in the mechanical deck, it will be ejected forcibly.
   "DISC IN" will be displayed in this case. Load a test disc (MDW-74/GA-1) which can be recorded.
3. If a disk is loaded at step 2, the check will start automatically.
4. When "XX CHECK" is displayed, the item corresponding to XX will be performed.
   When "06 CHECK" completes, the disc loaded at step 2 will be ejected. "DISC IN" will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded in step 4, the check will automatically be resumed from "07 CHECK".
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, "CHECK ALL OK" will be displayed. If any item is NG, it will be displayed as "NG:xxxx".

When "CHECK ALL OK" is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.
When displayed as "NG:xxxx", it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

4-10. INFORMATION

Display the software version.

Procedure

1. If displayed as "INFORMATION", press the [YES] button.
2. The software version will be displayed.
3. Press the [MENU/NO] button to end this mode.

4-11. WHEN MEMORY NG IS DISPLAYED

If the nonvolatile memory data is abnormal, "E001"/"MEMORY NG" will be displayed so that the MD deck does not continue operations. In this case, set the test mode promptly and perform the following procedure.

Procedure

1. Set the test mode. (Refer to 4-2.)
2. Normally a message for selecting the test mode will be displayed. However if the nonvolatile memory is abnormal, the following will be displayed. "INIT EEP?"
3. Press the [STOP] button and [⏏ EJECT] button together.
4. Rotate the [⏮◁ AMS ▷⏭] knob and select MDM-7A.
5. Press the [⏮◁ AMS ▷⏭] knob. If the nonvolatile memory is successfully overwritten, the normal test mode will be set and a message to select the test mode will be displayed.

Note: When this setting is doing, readjustment is necessary.
(Adjustment it same as IC195 exchanged)

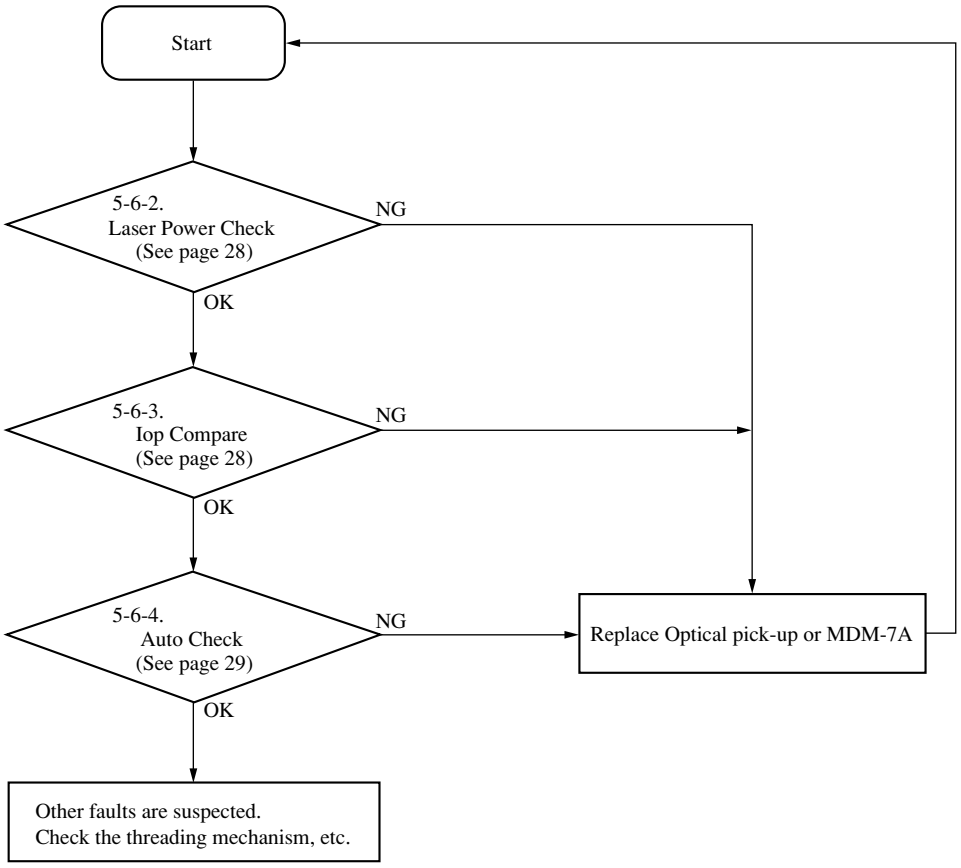
SECTION 5
ELECTRICAL ADJUSTMENTS

Note : 260B: KMS-260B
260E: KMS-260E

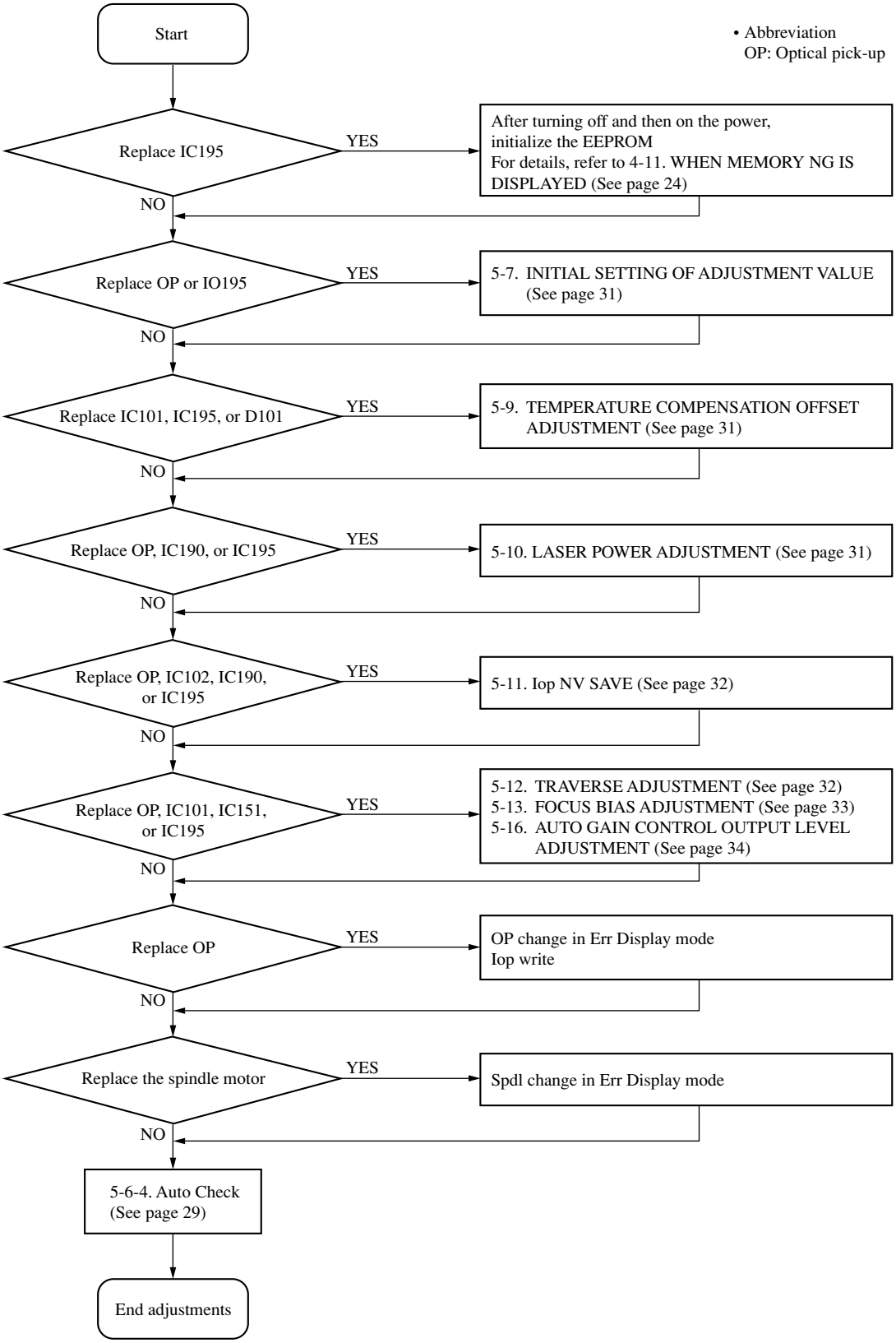
5-1. PARTS REPLACEMENT AND ADJUSTMENT

If malfunctions caused by Optical pick-up such as sound skipping are suspected, follow the following check.

Check before replacement



Adjustment flow

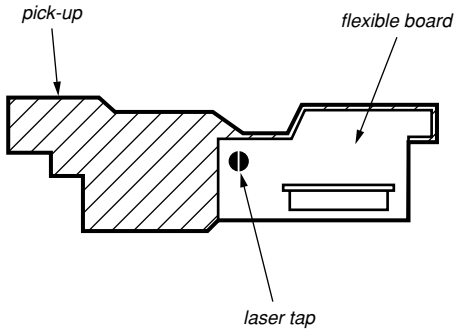


5-2. PRECAUTIONS FOR CHECKING LASER DIODE EMISSION

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-260B/260E)

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.
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/GA-1) (Parts No. 4-229-747-01)
   - 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-2501-196-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.

Adjustment	Parts to be replaced						
	Optical Pick-up	IC101	IC102	IC151	IC190	IC195	D101
5-7. Initial setting of adjustment values	◯	×	×	×	×	◯	×
5-8. Recording of Iop information	◯	×	×	×	×	◯	×
5-9. TEMP ADJUST	×	◯	×	×	×	◯	◯
5-10. Laser power adjustment	◯	×	×	×	◯	◯	×
5-11. Iop NV Save	◯	×	◯	×	◯	◯	×
5-12. Traverse adjustment	◯	◯	×	◯	×	◯	×
5-13. Focus bias adjustment	◯	◯	×	◯	×	◯	×
5-16. Auto gain adjustment	◯	◯	×	◯	×	◯	×
5-6-4. AUTO CHECK	◯	◯	×	◯	◯	◯	×

5-5. USING THE 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. Rotate the [⏮ AMS ⏭] knob and display "CREC1 MODE".
3. Press the [YES] button again to display "CREC1 MID". Display "CREC (0300)" and start to recording.
4. Complete recording within 5 minutes.
5. Press the [MENU/NO] 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 9).

5-6-1. Temperature Compensation Offset Check

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

Checks cannot be performed properly if performed after some time from power ON due to the rise in the temperature of the IC and diode, etc. So, perform the checks again after waiting some time.

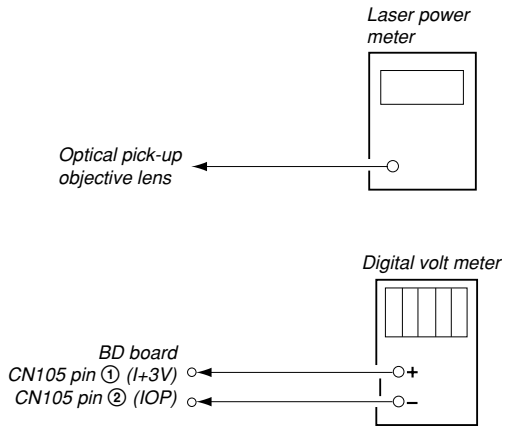
Checking Procedure:

1. Rotate the [⏮ AMS ⏭] knob to display "TEMP CHECK". (C12)
2. Press the [YES] 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 [◀◀] button or [▶▶] button to move the optical pick-up.) Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (IOP).
2. Then, rotate the [⏮ AMS ⏭] knob and display "LDPWR CHECK".
3. Press the [YES] button once and display "LD 0.9 mW $ ▯▯". Check that the reading of the laser power meter become the specified value.
4. Press the [YES] button once more and display " LD 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 : LD 0.9mW : 0.85-0.91mW (260B)
0.90-0.96mW (260E)
LD 7.0mW : 6.80-7.20mW (260B)
7.00-7.50mW (260E)

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

(Optical pick-up label)

KMS260B
20101
H0576

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

Iop = 57.6 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

5. Press the [MENU/NO] button and display "LDPWR CHECK" and stop the laser emission. (The [MENU/NO] button is effective at all times to stop the laser emission.)

Note 1: After step 4, each time the [YES] button is pressed, the display will be switched between "LD 0.7 mW $ ▯▯", "LD 6.2 mW $ ▯▯", and "LD Wp ホセイ $ ▯▯". Nothing needs to be performed here.

5-6-3. Iop Compare

The current Iop value at laser power 7 mw output and reference Iop value (set at shipment) written in the nonvolatile memory are compared, and the rate of increase/decrease will be displayed in percentage.

Note: Perform this function with the optical pick-up set at room temperature.

Procedure

1. Rotate the [⏮ AMS ⏭] knob to display "Iop Compare".
2. Press the [YES] button and start measurements.
3. When measurements complete, the display changes to "±xx%yy". xx is the percentage of increase/decrease, and OK or NG is displayed at yy to indicate whether the percentage of increase/decrease is within the allowable range.
4. Press the [MENU/NO] button to end.

5-6-4. Auto Check

This test mode performs C-REC and C-PLAY automatically for mainly checking the characteristics of the optical pick-up. To perform this test mode, the laser power must first be checked. Perform Auto Check after the laser power check and Iop compare.

Procedure

1. Press the [YES] button. If "LDPWR minicheck" is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disc is in the mechanical deck, it will be ejected forcibly. "DISC IN" will be displayed in this case. Load a test disc (MDW-74/GA-1) which can be recorded.
3. If a disk is loaded at step 2, the check will start automatically.
4. When "XX CHECK" is displayed, the item corresponding to XX will be performed.
   When "06 CHECK" completes, the disc loaded at step 2 will be ejected. "DISC IN" will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded, the check will automatically be resumed from "07 CHECK".
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, "CHECK ALL OK" will be displayed. If any item is NG, it will be displayed as "NG:xxxx".

When "CHECK ALL OK" is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.
When displayed as "NG:xxxx", it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

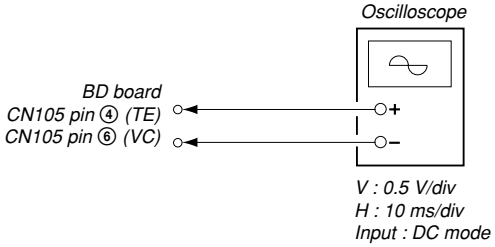
5-6-5. Other Checks

All the following checks are performed by the Auto Check mode. They therefore need not be performed in normal operation.

1. Load a continuously recorded test disc (MDW-74/GA-1). (Refer to "5-5. Using the Continuously Recorded Disc".)

5-6-6. Traverse Check

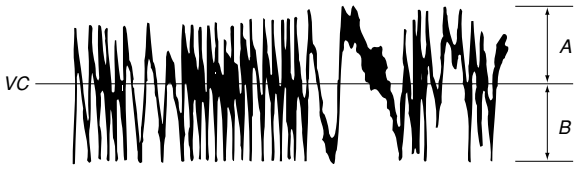
Connection :



Checking Procedure:

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA-1). (Refer to Note 1.)
3. Press the [▶▶] button and move the optical pick-up outside the pit.
4. Rotate the [I◁◁ AMS ▷▷I] knob and display "EF MO CHECK".
5. Press the [YES] 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 rotate the [AMS] knob.
   (Read power traverse checking)

(Traverse Waveform)

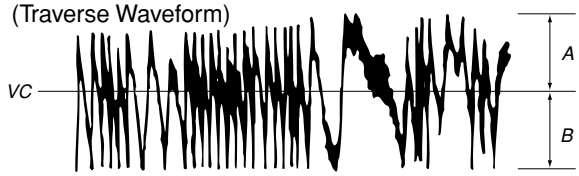


Specified value : Below 10% offset value

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

7. Press the [YES] button and display "EFB = ⁝⁝ MO-W".
8. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the [I◁◁ AMS ▷▷I] knob.
   (Write power traverse checking)

(Traverse Waveform)

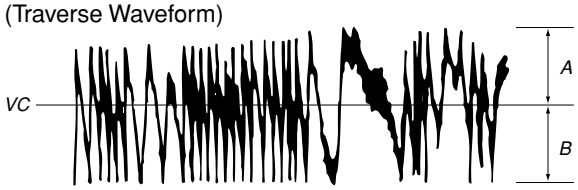


Specified value : Below 10% offset value

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

9. Press the [YES] 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 rotate the [I◁◁ AMS ▷▷I] knob.

(Traverse Waveform)



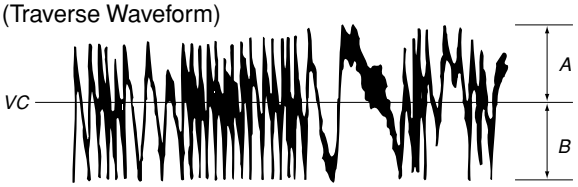
Specified value : Below 10% offset value

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

11. Press the [YES] button display "EF MO CHECK"
    The disc stops rotating automatically.
12. Press the [⏏ EJECT] button and remove the disc.
13. Load the check disc (MD) TDYS-1.
14. Roteto the [I◁◁ AMS ▷▷I] knob and display "EF CD CHECK" (C04).
15. Press the [YES] 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 rotate the [⏮ AMS ⏭] knob.

(Traverse Waveform)



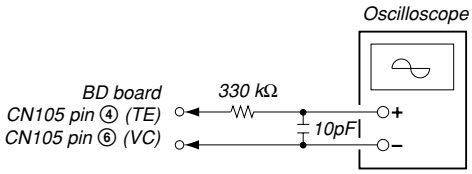
Specified value : Below 10% offset value

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

17. Press the [YES] button and display "EF CD CHECK".
18. Press the [⏏ EJECT] 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.



5-6-7. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA-1). (Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button and display "CPLAY1 MID".
4. Press the [MENU/NO] button when "C = □□□□ AD = □□" is displayed.
5. Rotate the [⏮ AMS ⏭] knob and display "FBIAS CHECK".
6. Press the [YES] button and display " □□□□/□□ c = □□".
   The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C error is below 20 and ADER is below 2.
7. Press the [YES] button and display " □□□□/□□ b = □□".
   Check that the C error is below 100 and ADER is below 2.
8. Press the [YES] button and display " □□□□/□□ a = □□".
   Check that the C error is below 100 and ADER is below 2.
9. Press the [MENU/NO] button, next press the [⏏ EJECT] button, and remove the test disc.

5-6-8. C PLAY Check

MO Error Rate Check

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA-1). (Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button and display "CPLAY1 MID".
4. The display changes to "C = □□□□ AD = □□".
5. If the C error rate is below 20, check that ADER is 00.
6. Press the [MENU/NO] button, stop playback, press the [⏏ EJECT] button, and test disc.

CD Error Rate Check

Checking Procedure :

1. Load a check disc (MD) TDYS-1.
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button twice and display "CPLAY1 MID".
4. The display changes to "C1 = □□□□ AD = □□".
5. Check that the C1 error rate is below 20.
6. Press the [MENU/NO] button, stop playback, press the [⏏ EJECT] button, and the test disc.

5-6-9. 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 test disc (MDW-74/GA-1) into the unit.
2. Rotate the [⏮ AMS ⏭] knob to display "CREC1 MODE".
3. Press the [YES] button to display the "CREC1 MID".
4. When recording starts, " **REC** " is displayed, this becomes "CREC 1 (@@@@)" (@@@@ is the address), and recording starts.
5. About 1 minute later, press the [MENU/NO] button to stop continuous recording.
6. Rotate the [⏮ AMS ⏭] knob to display "C PLAY1 MODE".
7. Press the [YES] button to display "C PLAY1 MID".
8. "C = □□□□ AD = □□" will be displayed.
9. Check that the C error becomes below 20 and the AD error below 2.
10. Press the [MENU/NO] button to stop playback, and press the [⏏ EJECT] 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. Rotate the [⏮ AMS ⏭] knob to display "ADJ CLEAR".
2. Press the [YES] 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 pick-up 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 [⏮ AMS ⏭] knob and [■] button, connect the power plug to the outlet, and release the [⏮ AMS ⏭] knob and [■] button.
2. Rotate the [⏮ AMS ⏭] knob to display "[Service]", and press the [YES] button.
3. Rotate the [⏮ AMS ⏭] knob to display "Iop.Write", and press the [YES] 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 : Rotate the [⏮ AMS ⏭] knob.
   To select the digit : Press the [⏮ AMS ⏭] knob
6. When the [YES] 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 [YES] 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. Rotate the [⏮ AMS ⏭] knob 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 [⏮ AMS ⏭] button or [MENU/NO] button to display "Iop Read".

5-9. TEMPERATURE COMPENSATION OFFSET ADJUTMENT

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.

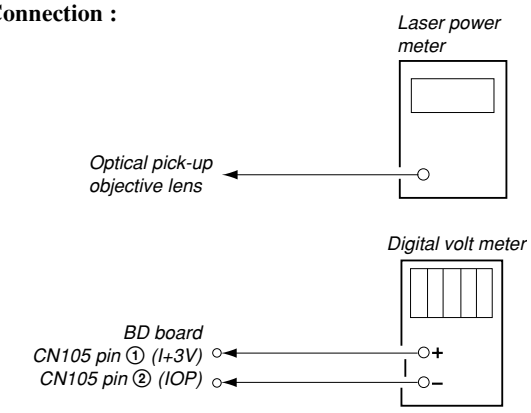
Adjusting Procedure :
1. Rotate the [⏮ AMS ⏭] knob and display "TEMP ADJUST".
2. Press the [YES] button and select the "TEMP ADJUST" mode.
3. "TEMP = ▯▯ [OK]" and the current temperature data will be displayed.
4. To save the data, press the [YES] button.
   When not saving the data, press the [MENU/NO] button.
5. When the [YES] button is pressed, "TEMP = ▯▯ SAVE" will be displayed and turned back to "TEMP ADJUST" display then. When the [MENU/NO] button is pressed, "TEMP ADJUST" will be displayed immediatelly.

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 [◀◀] button or [▶▶] button to move the optical pick-up.)
   Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (IOP).
2. Rotate the [⏮ AMS ⏭] knob and display "LDPWR ADJUST".
   (Laser power : For adjustment)
3. Press the [YES] button once and display "LD 0.9 mW $ ▯▯".
4. Rotate the [⏮ AMS ⏭] knob so that the reading of the laser power meter becomes the specified value. Press the [YES] 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. Rotate the [⏮ AMS ⏭] knob so that the reading of the laser power meter becomes the specified value, press the [YES] button and save it.

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

7. Then, rotate the [⏮ AMS ⏭] knob and display "LDPWR CHECK".
8. Press the [YES] button once and display "LD 0.9 mW $ □□". Check that the reading of the laser power meter become the specified value.
9. Press the [YES] button once more and display "LD 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 : LD 0.9mW : 0.85-0.91mW (260B)
0.90-0.96mW (260E)
LD 7.0mW : 6.90-7.10mW (260B)
7.20-7.30mW (260E)

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

(Optical pick-up label)

KMS260B
20101
H0576

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

Iop = 57.6 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

10. Press the [MENU/NO] button and display "LDPWR CHECK" and stop the laser emission.
    (The [MENU/NO] button is effective at all times to stop the laser emission.)
11. Rotate the [⏮ AMS ⏭] knob to display "Iop.Write".
12. Press the [YES] button. When the display becomes Ref = @@@ .@ (@ is an arbitrary number), press the [YES] 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 : Rotate the [⏮ AMS ⏭] knob.
    To select the digit : Press the [⏮ AMS ⏭] knob
14. When the [YES] 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 [YES] button is pressed, the display will be switched between "LD 0.7 mW $ □□", "LD 6.2 mW $ □□", and "LD Wp ホセイ $ □□". Nothing needs to be performed here.

5-11. Iop NV SAVE

Write the reference values in the nonvolatile memory to perform "Iop compare". As this involves rewriting the reference values, do not perform this procedure except when adjusting the laser power during replacement of the OP and when replacing the IC102. Otherwise the OP check may deteriorate.

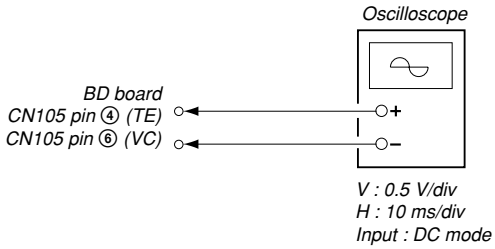
Note: Perform this function with the optical pick-up set at room temperature.

Procedure

1. Rotate the [⏮ AMS ⏭] knob to display "Iop NV Save" (C06).
2. Press the [YES] button and display "Iop [stop]".
3. After the display changes to "Iop =xxsave?", press the [YES] button.
4. After "Complete!" is displayed momentarily, the display changes to "Iop 7.0 mW".
5. After the display changes to "Iop=yysave?", press the [YES] button.
6. When "Complete!" is displayed, it means that Iop NV saving has been completed.

5-12. TRAVERSE ADJUSTMENT

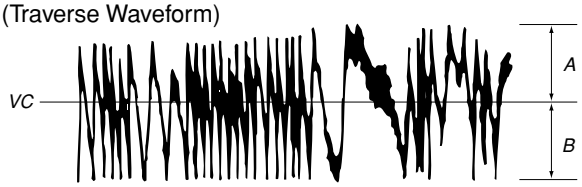
Connection :



Adjusting Procedure :

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA-1). (Refer to Note 1.)
3. Press the [▶▶] button and move the optical pick-up outside the pit.
4. Rotate the [⏮ AMS ⏭] knob and display "EF MO ADJUST".
5. Press the [YES] button and display "EFB = □□ MO-R".
   (Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Rotate the [⏮ AMS ⏭] knob so that the waveform of the oscilloscope becomes the specified value.
   (When the [⏮ AMS ⏭] knob is rotated, 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)

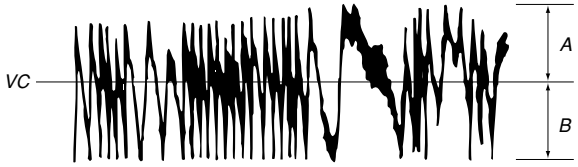
(Traverse Waveform)



Specification A = B

7. Press the [YES] 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. Rotate the [⏮ AMS ⏭] knob so that the waveform of the oscilloscope becomes the specified value.
   (When the [⏮ AMS ⏭] knob is rotated, the □□ of "EFB- □□ MO-W" 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)

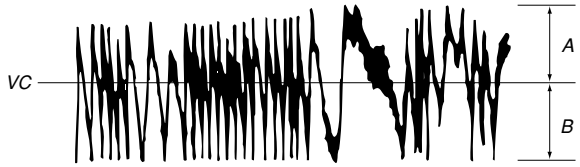


Specification A = B

9. Press the [YES] 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.

11. Rotate the [⏮ AMS ⏭] knob 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.

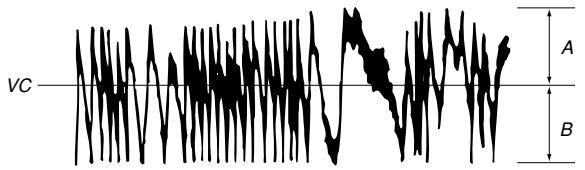
(Traverse Waveform)



Specification A = B

12. Press the [YES] button, and save the adjustment results in the non-volatile memory. ("EFB = □□ SAVE" will be displayed for a moment.)
    Next "EF MO ADJUS" is displayed. The disc stops rotating automatically.
13. Press the [⏏ EJECT] button and remove the disc.
14. Load the check disc (MD) TDYS-1.
15. Roteto [⏮ AMS ⏭] knob and display "EF CD ADJUS".
16. Press the [YES] button and display "EFB = □□ CD". Servo is imposed automatically.
17. Rotate the [⏮ AMS ⏭] knob 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)

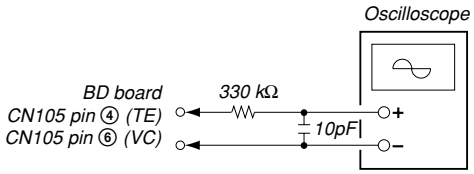


Specification A = B

18. Press the [YES] button, display "EFB = □□ SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EF CD ADJUST" will be displayed.
19. Press the [⏏ EJECT] 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.



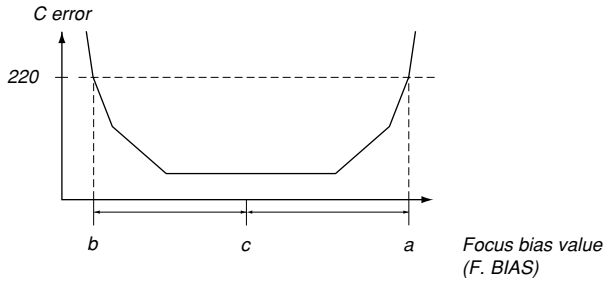
5-13. FOCUS BIAS ADJUSTMENT

Adjusting Procedure :

1. Load a test disk (MDW-74/GA-1).
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button and display "CPLAY1 MID".
4. Press the [MENU/NO] button when "C = □□□□ AD = □□" is displayed.
5. Rotate the [⏮ AMS ⏭] knob and display "FBIAS ADJUST".
6. Press the [YES] button and display " □□□□/□□ a = □□".
   The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the [⏮ AMS ⏭] knob in the clockwise direction and find the focus bias value at which the C error rate becomes 220 (Refer to Note 2).
8. Press the [YES] button and display " □□□□/□□ b = □□".
9. Rotate the [⏮ AMS ⏭] knob in the counterclockwise direction and find the focus bias value at which the C error rate becomes 220.
10. Press the [YES] button and display " □□□□/□□ c = □□".
11. Check that the C error rate is below 20 and ADER is 00. Then press the [YES] button.
12. If the "(□□" in "□□ - □□ - □□ (□□" is above 20, press the [YES] button.
    If below 20, press the [MENU/NO] button and repeat the adjustment from step 2.
13. Press the [⏏ EJECT] button to remove the test disc.

Note 1 : The relation between the C 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 C error rate changes, perform the adjustment using the average vale.



5-14. ERROR RATE CHECK

5-14-1. CD Error Rate Check

Checking Procedure :

1. Load a check disc (MD) TDYS-1.
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button twice and display "CPLAY1 MID".
4. The display changes to "C = □□□□ AD = □□".
5. Check that the C error rate is below 20.
6. Press the [MENU/NO] button, stop playback, press the [⏏ EJECT] button, and remove the test disc.

5-14-2. MO Error Rate Check

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA-1). (Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button and display "CPLAY1 MID".
4. The display changes to "C = □□□□ AD = □□".
5. If the C error rate is below 20, check that ADER is 00.
6. Press the [MENU/NO] button, stop playback, press the [⏏ EJECT] button, and remove the test disc.

5-15. FOCUS BIAS CHECK

Change the focus bias and check the focus tolerance amount.

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA-1). (Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the [⏮ AMS ⏭] knob and display "CPLAY1 MODE".
3. Press the [YES] button twice and display "CPLAY1 MID".
4. Press the [MENU/NO] button when "C = □□□□ AD = □□" is displayed.
5. Rotate the [⏮ AMS ⏭] knob and display "FBIAS CHECK".
6. Press the [YES] button and display " □□□□/□□ c = □□".
   The first four digits indicate the C error rate, the two digits after [/] indicate ADR, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C error is below 20 and ADER is below 2.
7. Press the [YES] button and display " □□□□/□□ b = □□".
   Check that the C error is below 100 and ADER is below 2.
8. Press the [YES] button and display " □□□□/□□ a = □□".
   Check that the C error is below 100 and ADER is below 2
9. Press the [MENU/NO] button, next press the [⏏ EJECT] button, and remove the continuously recorded disc.

Note 1 : If the C 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.

5-16. AUTO GAIN CONTROL OUTPUT LEVEL ADJUSTMENT

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

5-16-1. CD Auto Gain Control Output Level Adjustment

Adjusting Procedure :

1. Insert the check disc (MD) TDYS-1.
2. Rotate the [⏮ AMS ⏭] knob to display "AG Set (CD)".
3. When the [YES] 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.

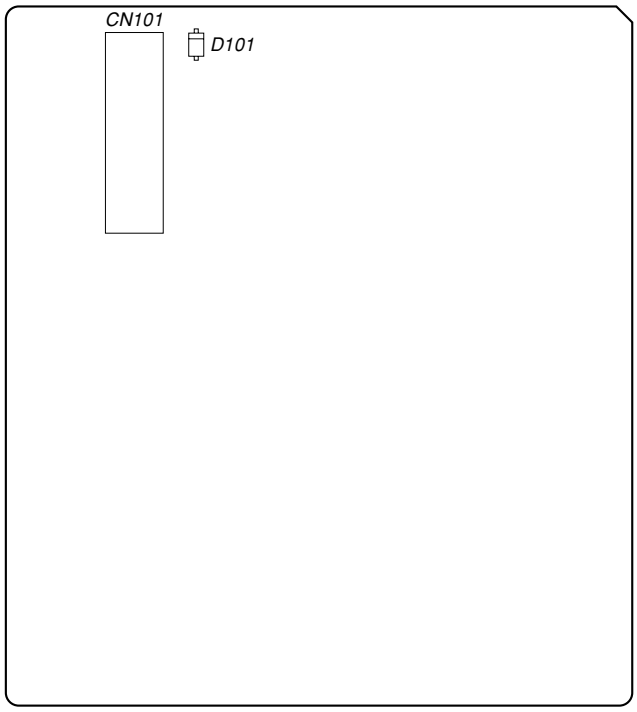
5-16-2. MO Auto Gain Control Output Level Adjustment

Adjusting Procedure :

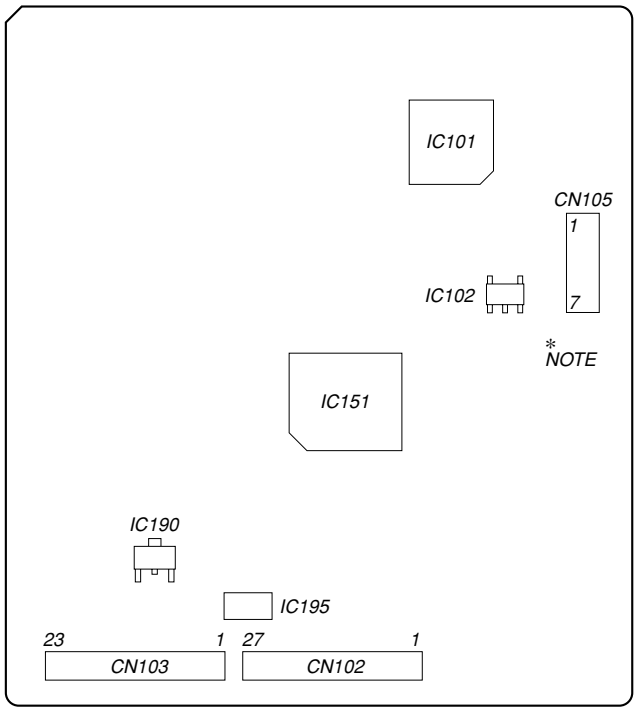
1. Insert the reference disc (MDW-74/GA-1) for recording.
2. Rotate the [⏮ AMS ⏭] knob to display "AG Set (MO)".
3. When the [YES] button is pressed, the adjustment will be performed automatically.
   "Complete!!" will then be displayed momentarily when the value is recorded in the non-volatile memory,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

5-17. ADJUSTING POINTS AND CONNECTING POINTS

[BD BOARD] (SIDE A)



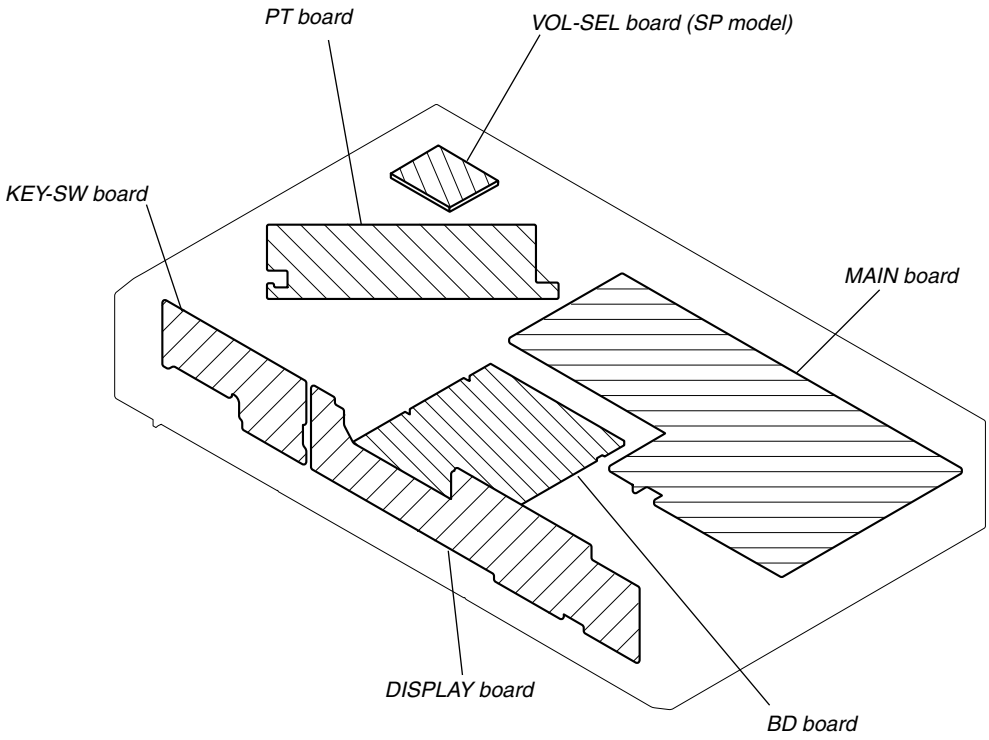
[BD BOARD] (SIDE B)



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



- Abbreviation
  SP : Singapore model

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For schematic diagrams.

Note:

- All capacitors are in µF unless otherwise noted. pF: µµF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.
- ▭ : panel designation.

Note:	**Note:**
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 piéce portant le numéro spécifié.

- ▬▬ : B+ Line.
- ▬ ▬ ▬ : B– Line.
- ▭ : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
  no mark : STOP
  ( ) : PLAY
  < > : REC
  * : Impossible to measure
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  : PB
  : REC
  : PB (DIGITAL OUT)
  : REC (DIGITAL IN)
- Abbreviation
  CND : Canadian model
  SP : Singapore model
  HK : Hong Kong model
  AUS : Australian model

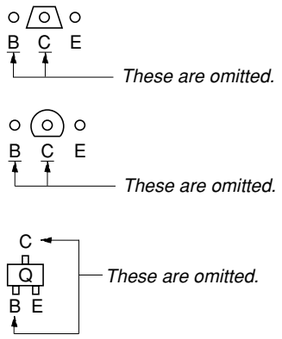
For printed wiring boards.

Note:

- o——— : parts extracted from the component side.
- ——— : parts extracted from the conductor side.
- ○ : Through hole.
- ▒▒▒ : Pattern from the side which enables seeing.

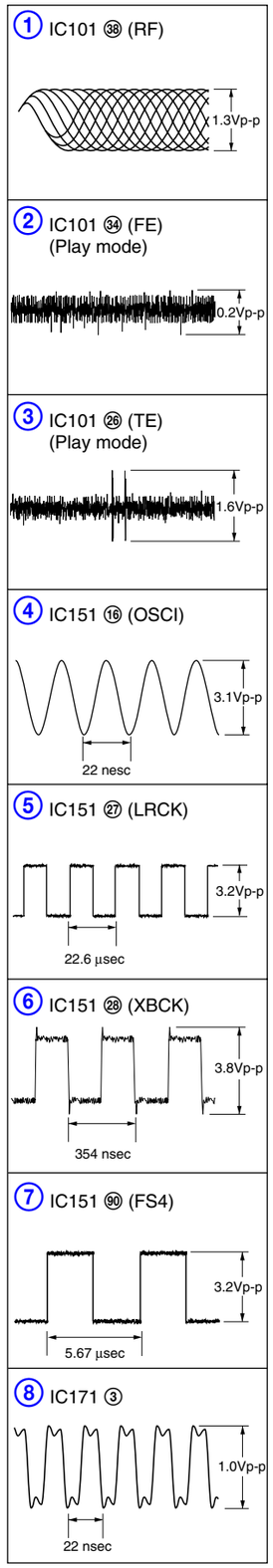
(The other layers' patterns are not indicated.)

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

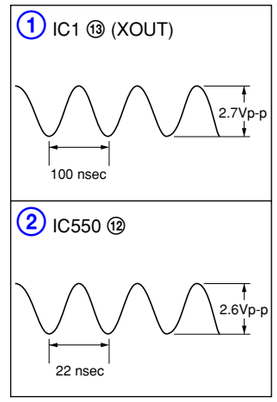


• WAVEFORMS

– BD Board –

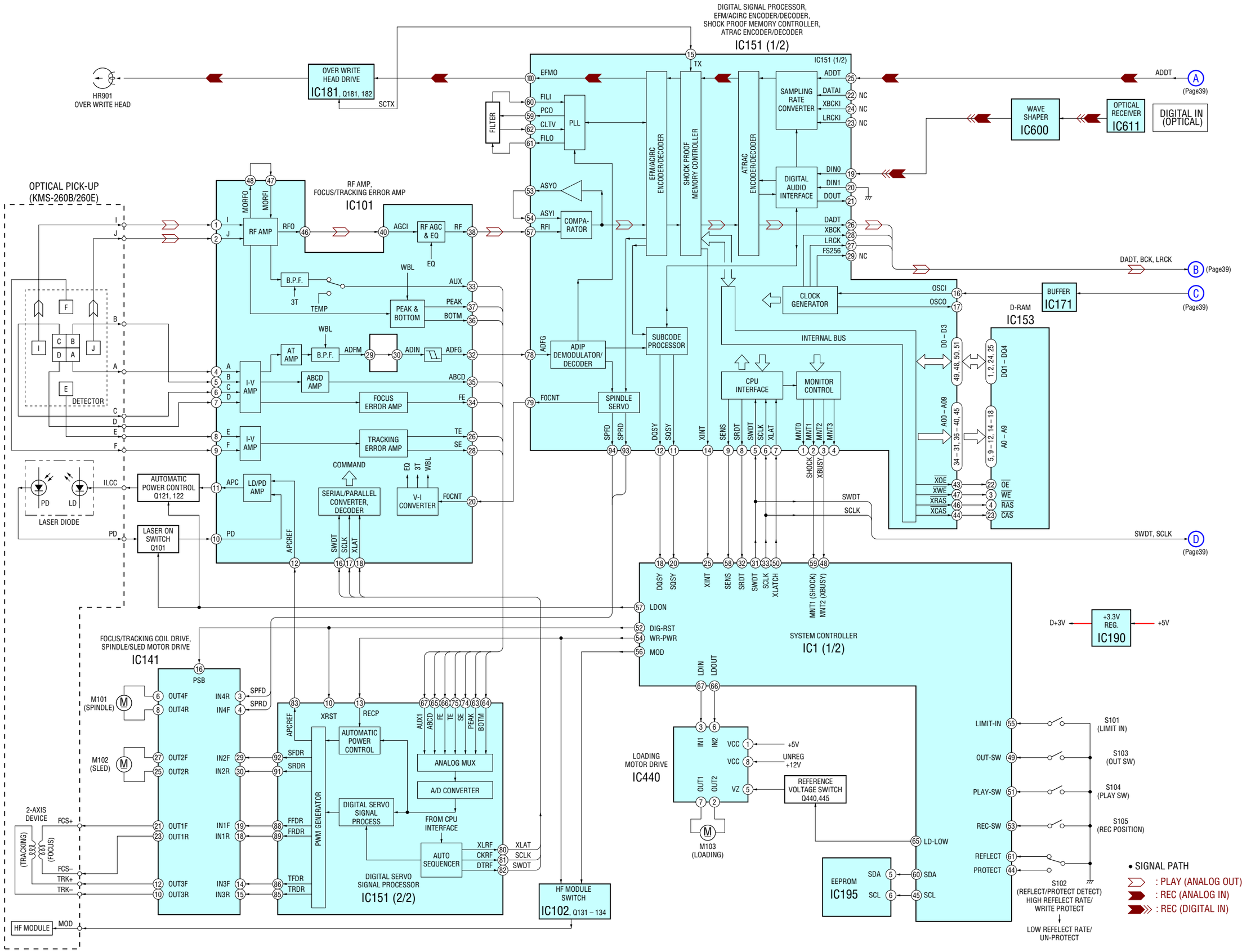


– MAIN Board –

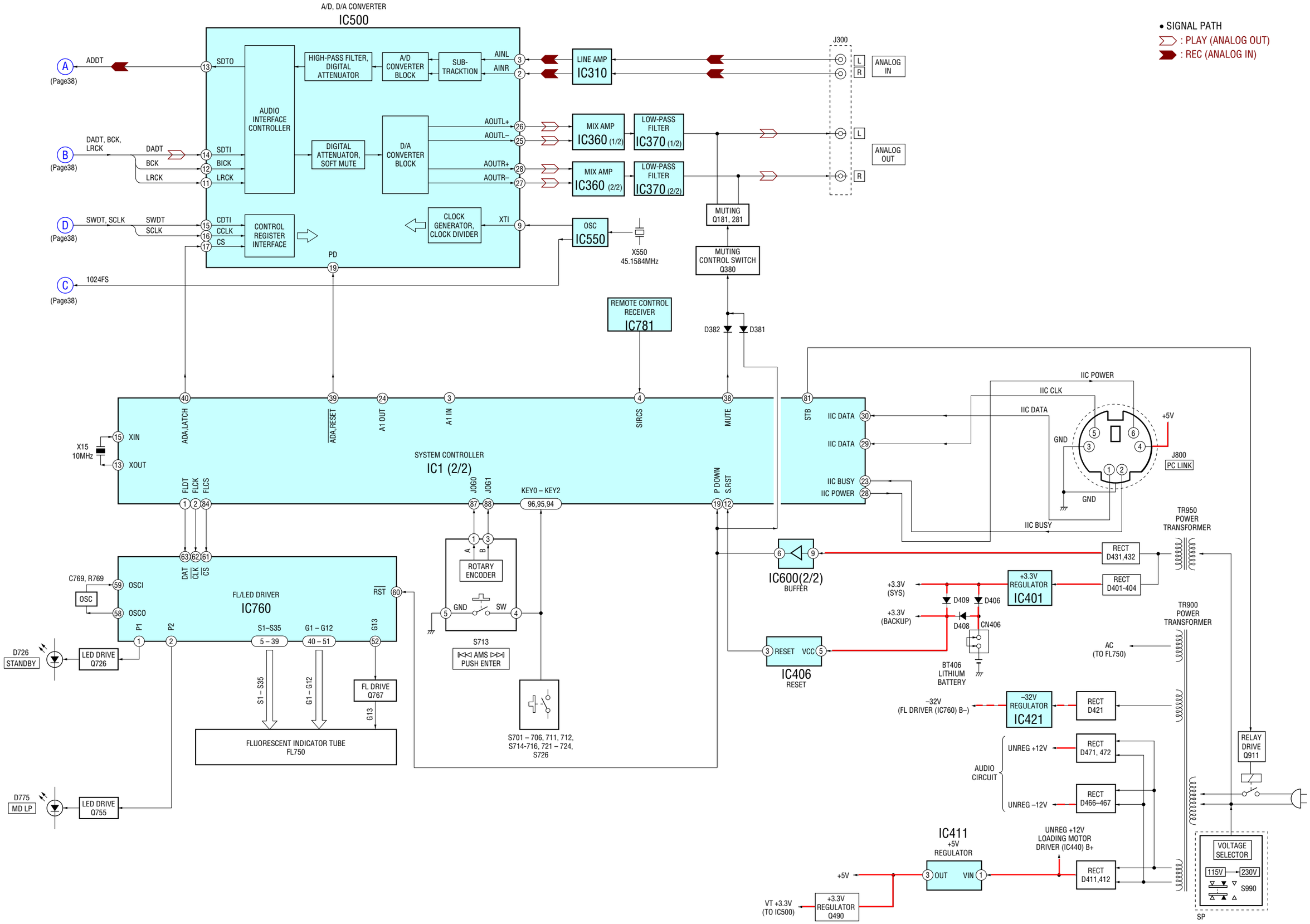


37

6-2. BLOCK DIAGRAMS – BD SECTION –



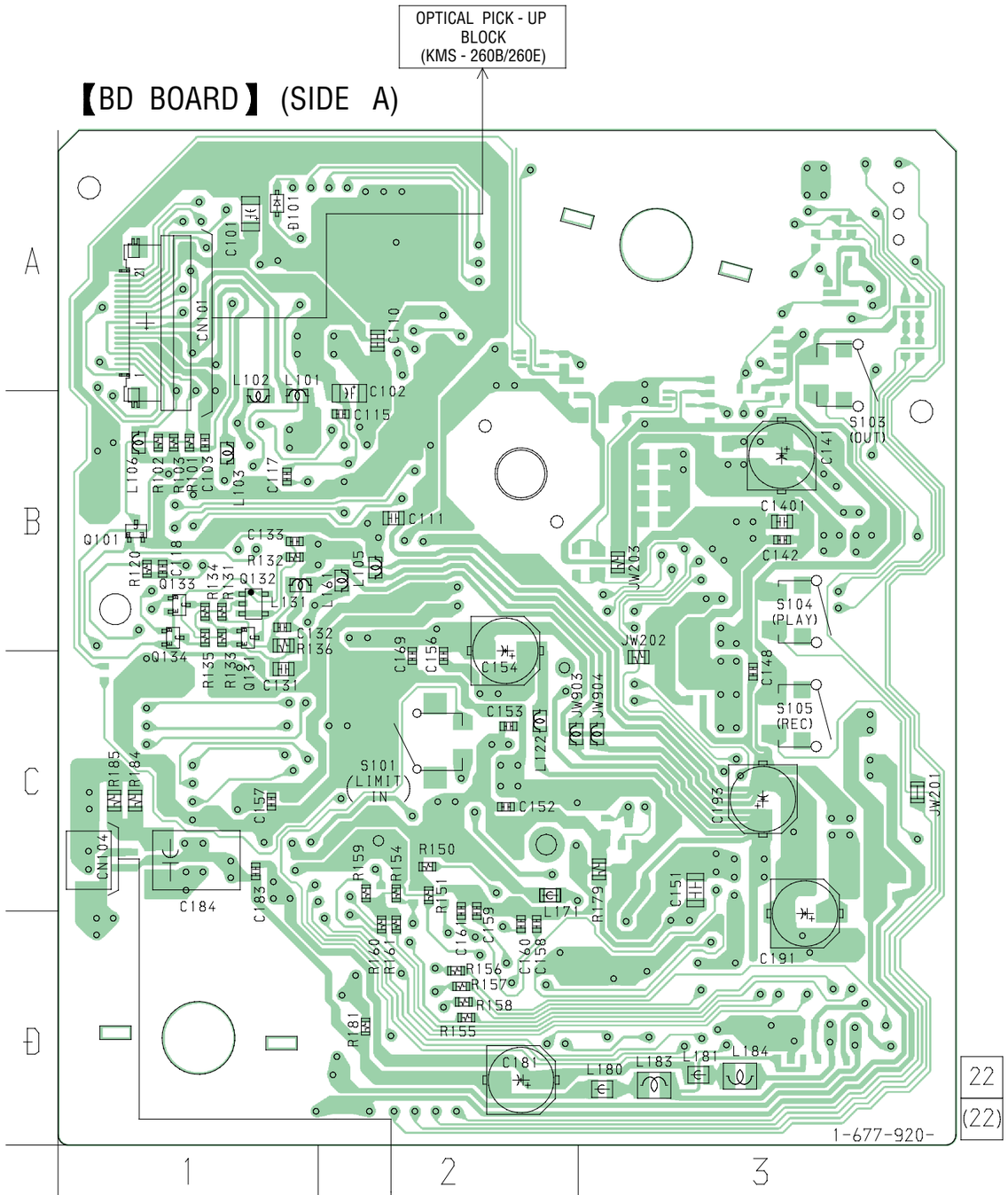
– MAIN SECTION –



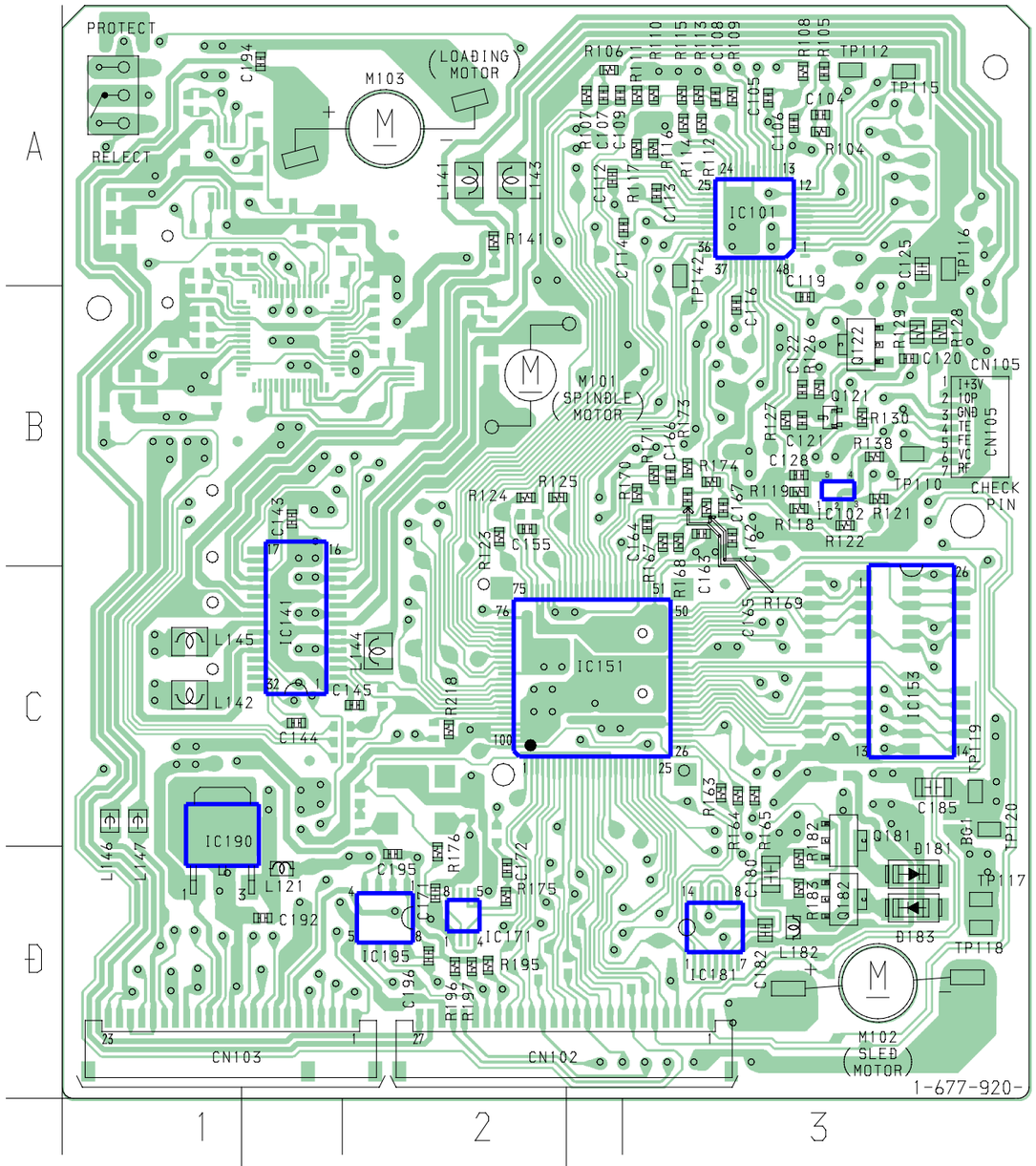
6-3. PRINTED WIRING BOARD – BD Board – • See page 36 for Circuit Board Location.

There are a few cases that the part isn't mounted in model is printed on diagram.

【BD BOARD】(SIDE A)



【BD BOARD】(SIDE B)



• **Semiconductor Location**

Ref. No.	Location
D101	A-1
Q101	B-1
Q131	C-1
Q132	B-1
Q133	B-1
Q134	B-1

Ⓑ MAIN BOARD CN1 (Page 45)

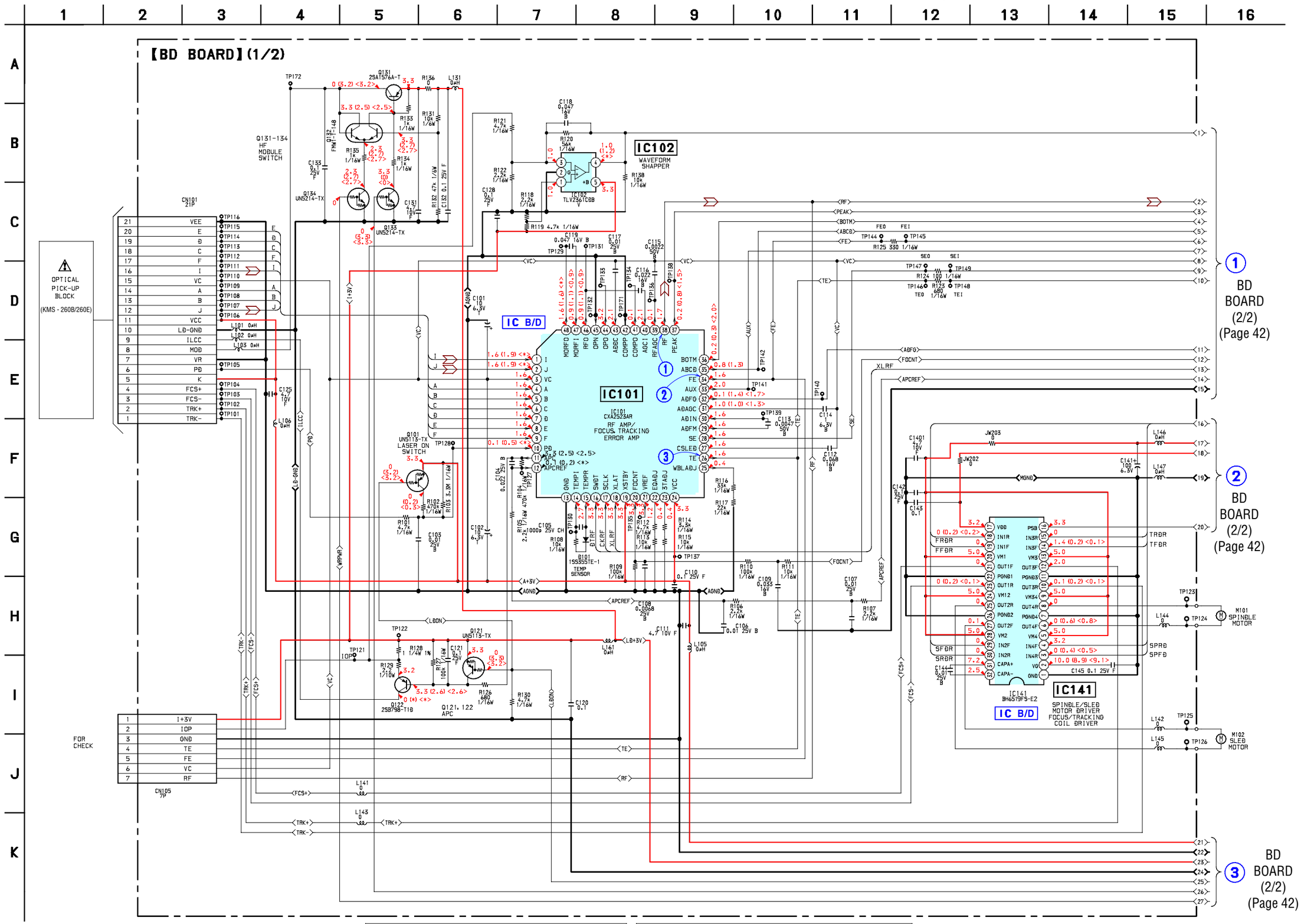
Ⓐ MAIN BOARD CN2 (Page 45)

• **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location
D181	D-3	IC181	D-3
D183	D-3	IC190	D-1
		IC195	D-2
IC101	A-3		
IC102	B-3	Q121	B-3
IC141	C-1	Q122	B-3
IC151	C-2	Q181	D-3
IC153	C-3	Q182	D-3
IC171	D-2		

40

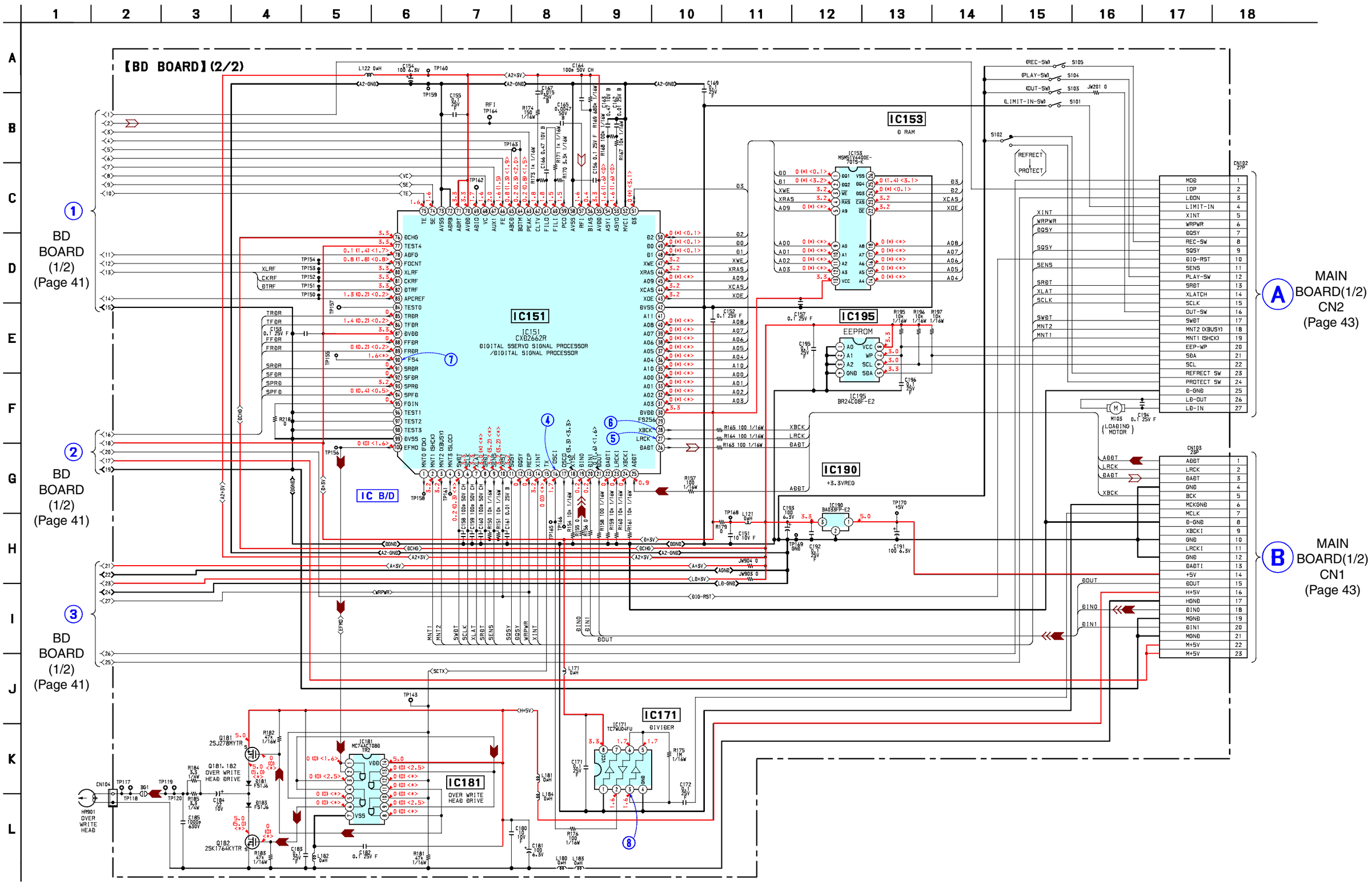
6-4. SCHEMATIC DIAGRAM – BD SECTION (1/2) – • See page 37 for Waveforms. • See page 52 for IC Pin Functions. • See page 50 for IC Block Diagrams.



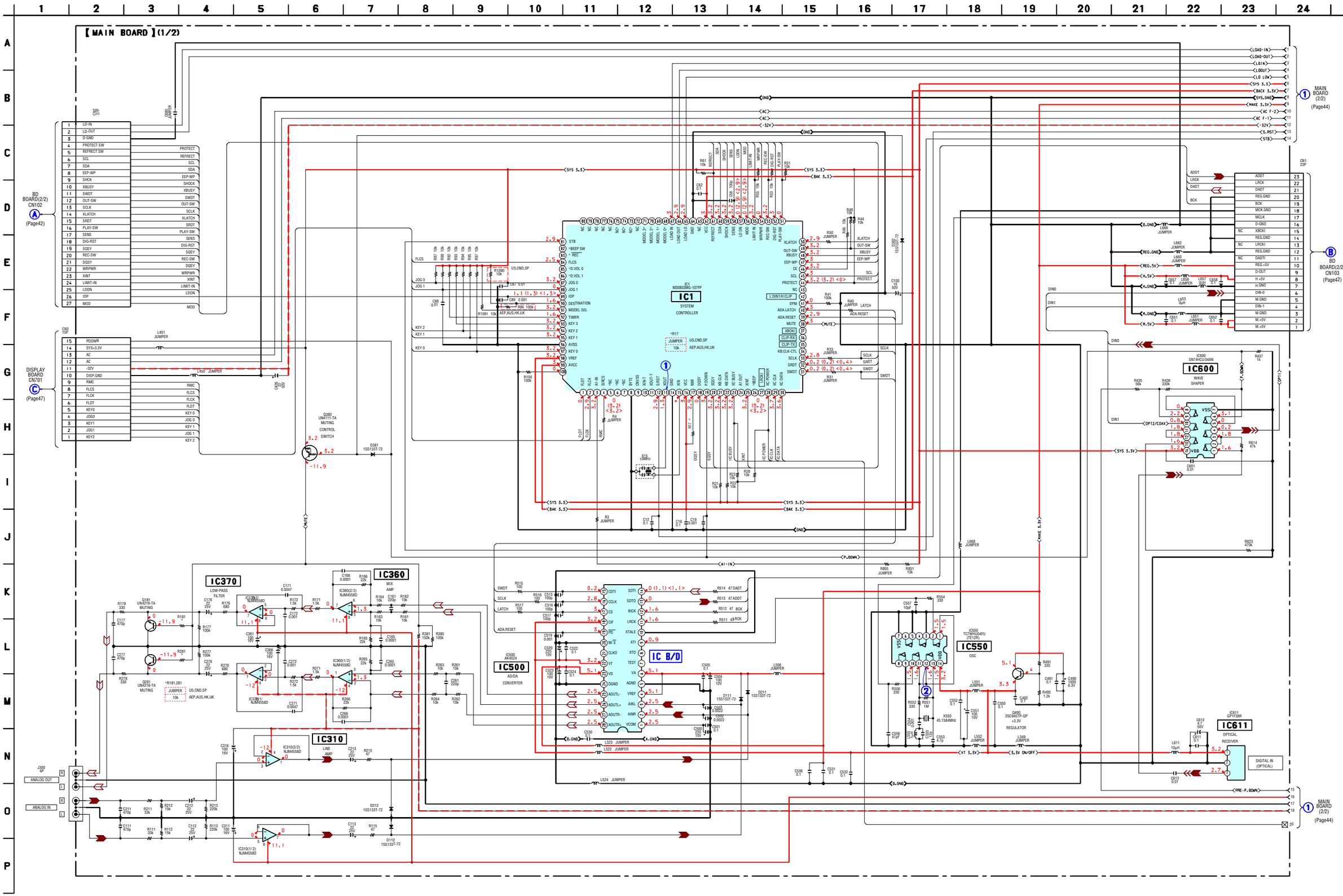
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

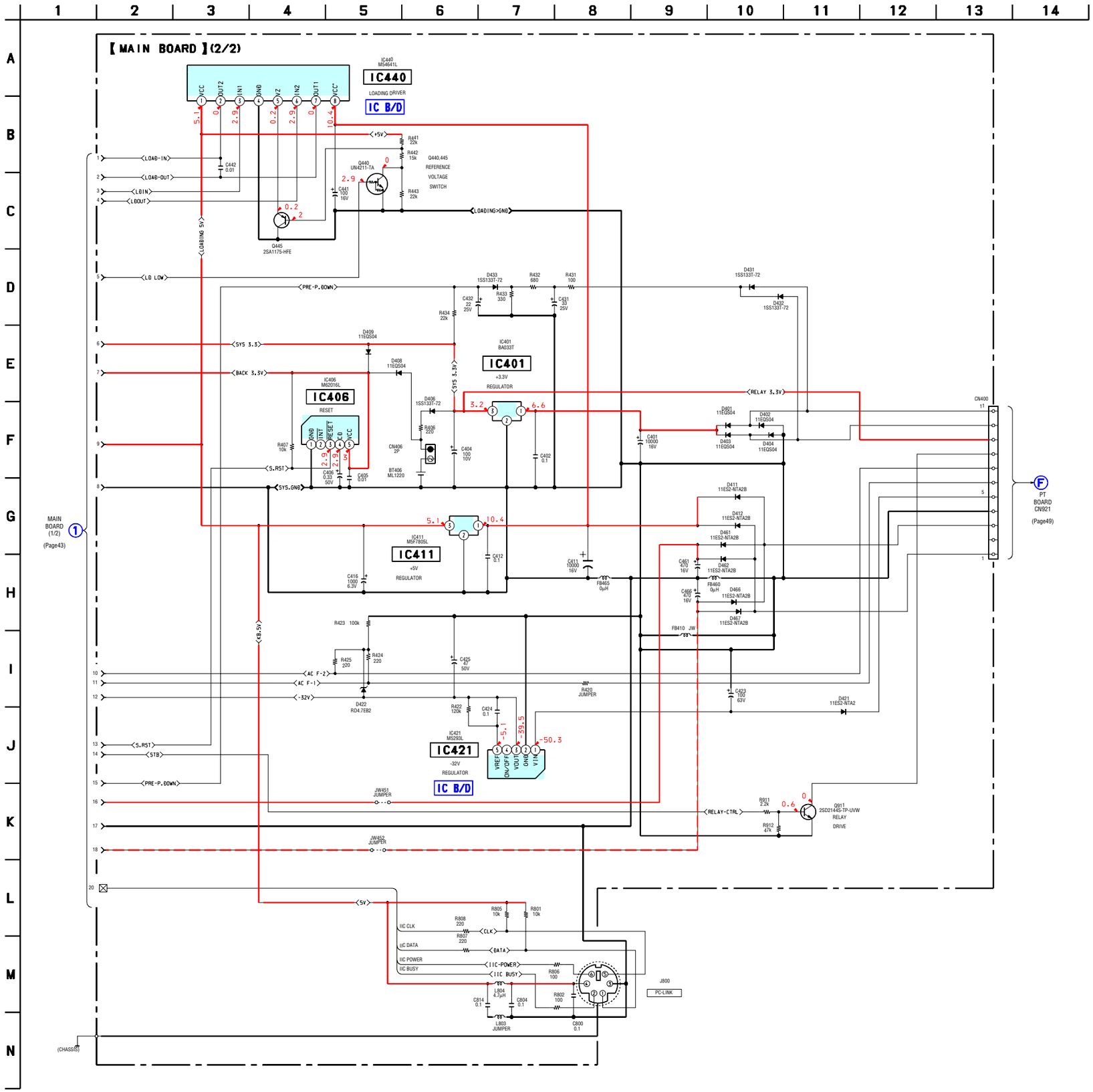
6-5. SCHEMATIC DIAGRAM – BD SECTION (2/2) – • See page 37 for Waveforms. • See page 53 for IC Pin Functions. • See page 50 for IC Block Diagrams.



6-6. SCHEMATIC DIAGRAM – MAIN SECTION (1/2) – • See page 37 for Waveforms. • See page 56 for IC Pin Functions. • See page 51 for IC Block Diagrams.

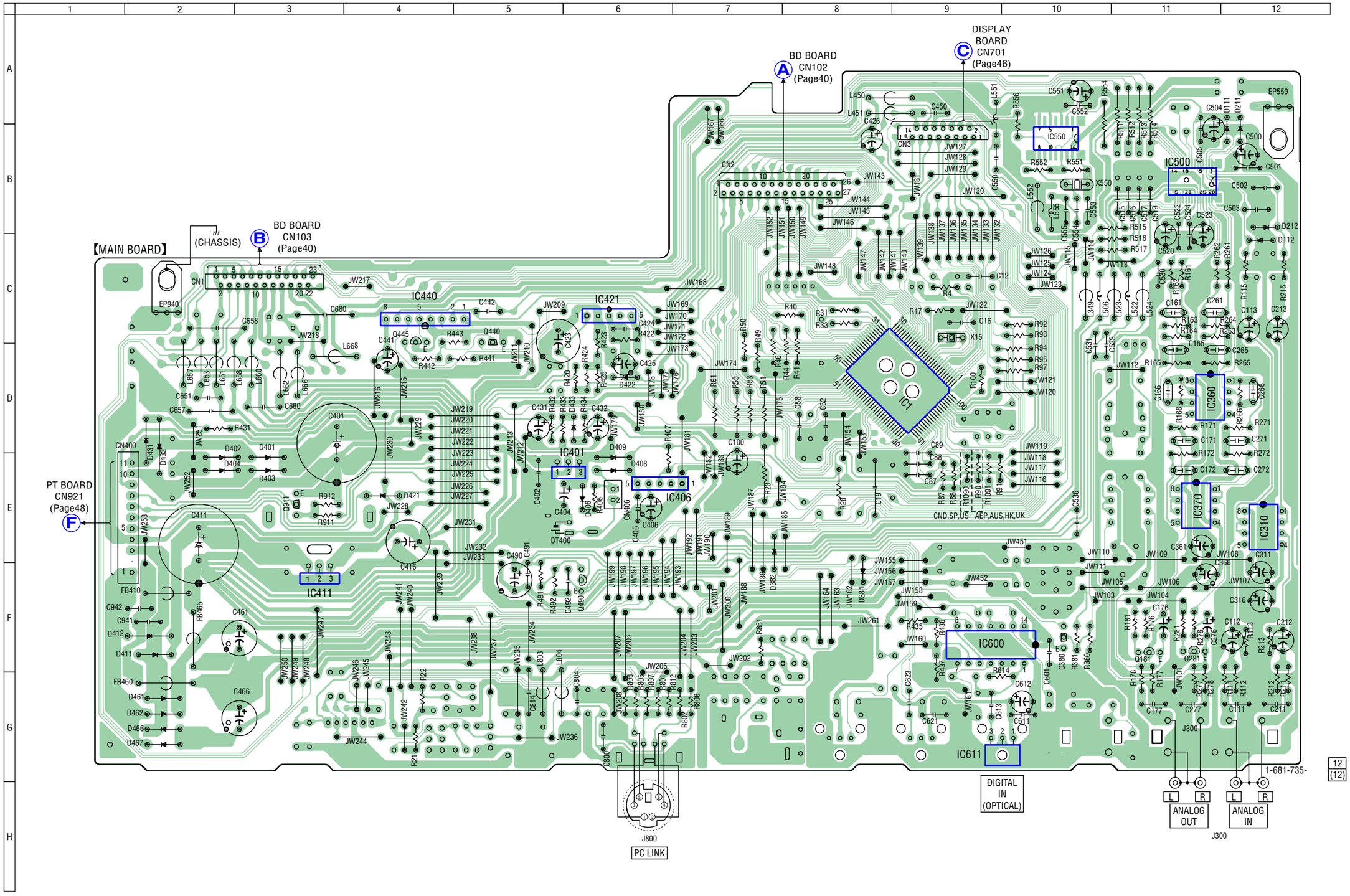


6-7. SCHEMATIC DIAGRAM – MAIN SECTION (2/2) – • See page 51 for IC Block Diagrams.



6-8. PRINTED WIRING BOARD – MAIN SECTION – • See page 36 for Circuit Board Location.

There are a few cases that the part isn't mounted in model is printed on diagram.

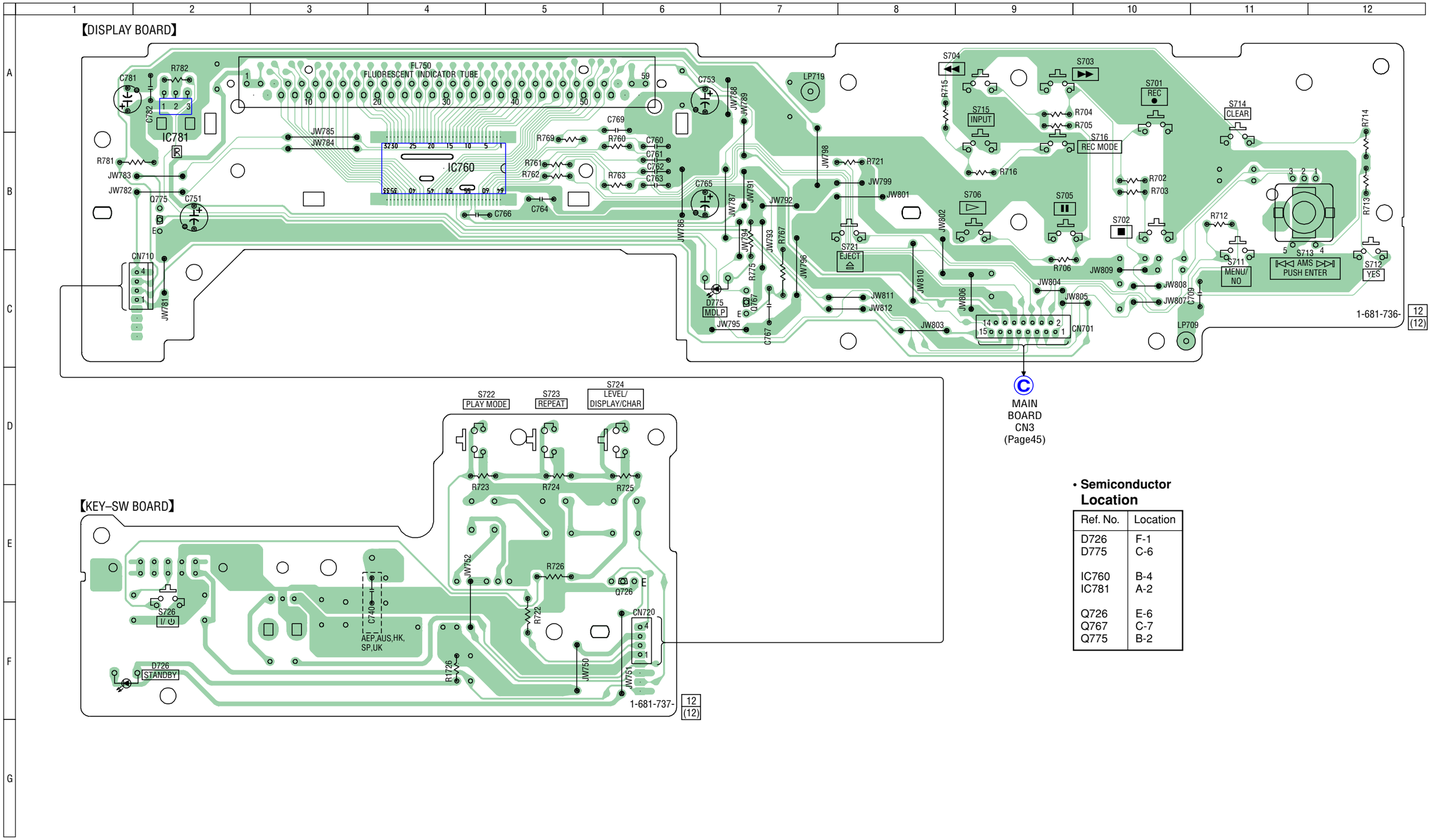


• **Semiconductor Location**

Ref. No.	Location
D111	B-12
D112	C-12
D211	B-12
D212	B-12
D381	F-8
D382	E-7
D401	E-3
D402	E-2
D403	E-3
D404	E-2
D406	E-6
D408	E-6
D409	E-6
D411	F-2
D412	F-2
D421	E-4
D422	D-6
D431	D-2
D432	D-2
D433	D-6
D461	G-2
D462	G-2
D466	G-2
D467	G-2
IC1	D-9
IC310	E-12
IC360	D-11
IC370	E-11
IC401	E-6
IC406	E-6
IC411	F-3
IC421	C-6
IC440	C-4
IC500	B-11
IC550	B-10
IC600	F-9
IC611	G-9
Q181	F-11
Q281	F-11
Q380	F-10
Q440	C-5
Q445	C-4
Q490	F-6
Q911	E-3

6-9. PRINTED WIRING BOARD – DISPLAY SECTION – • See page 36 for Circuit Board Location.

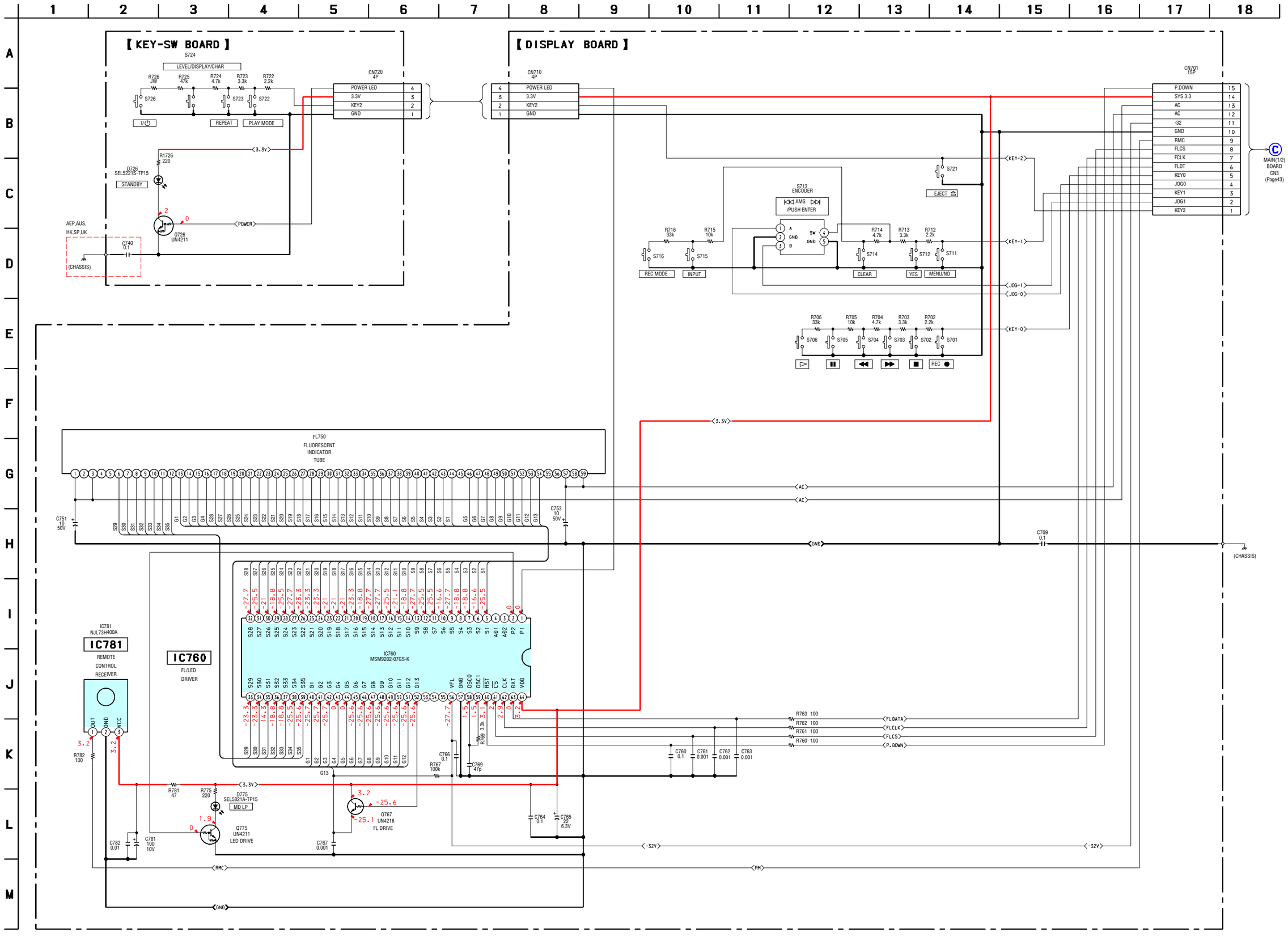
There are a few cases that the part isn't mounted in model is printed on diagram.



• **Semiconductor Location**

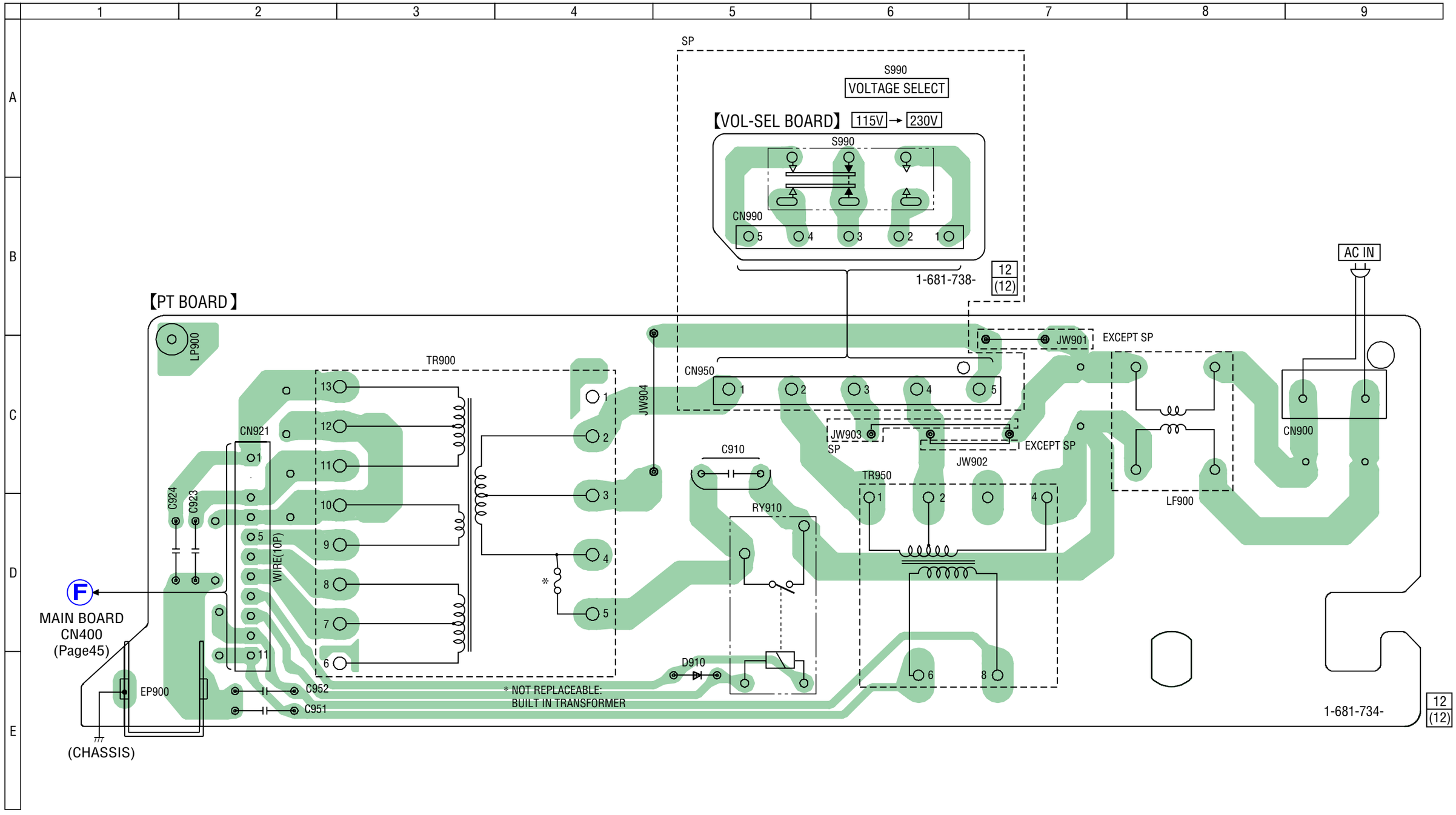
Ref. No.	Location
D726	F-1
D775	C-6
IC760	B-4
IC781	A-2
Q726	E-6
Q767	C-7
Q775	B-2

6-10. SCHEMATIC DIAGRAM – DISPLAY SECTION –

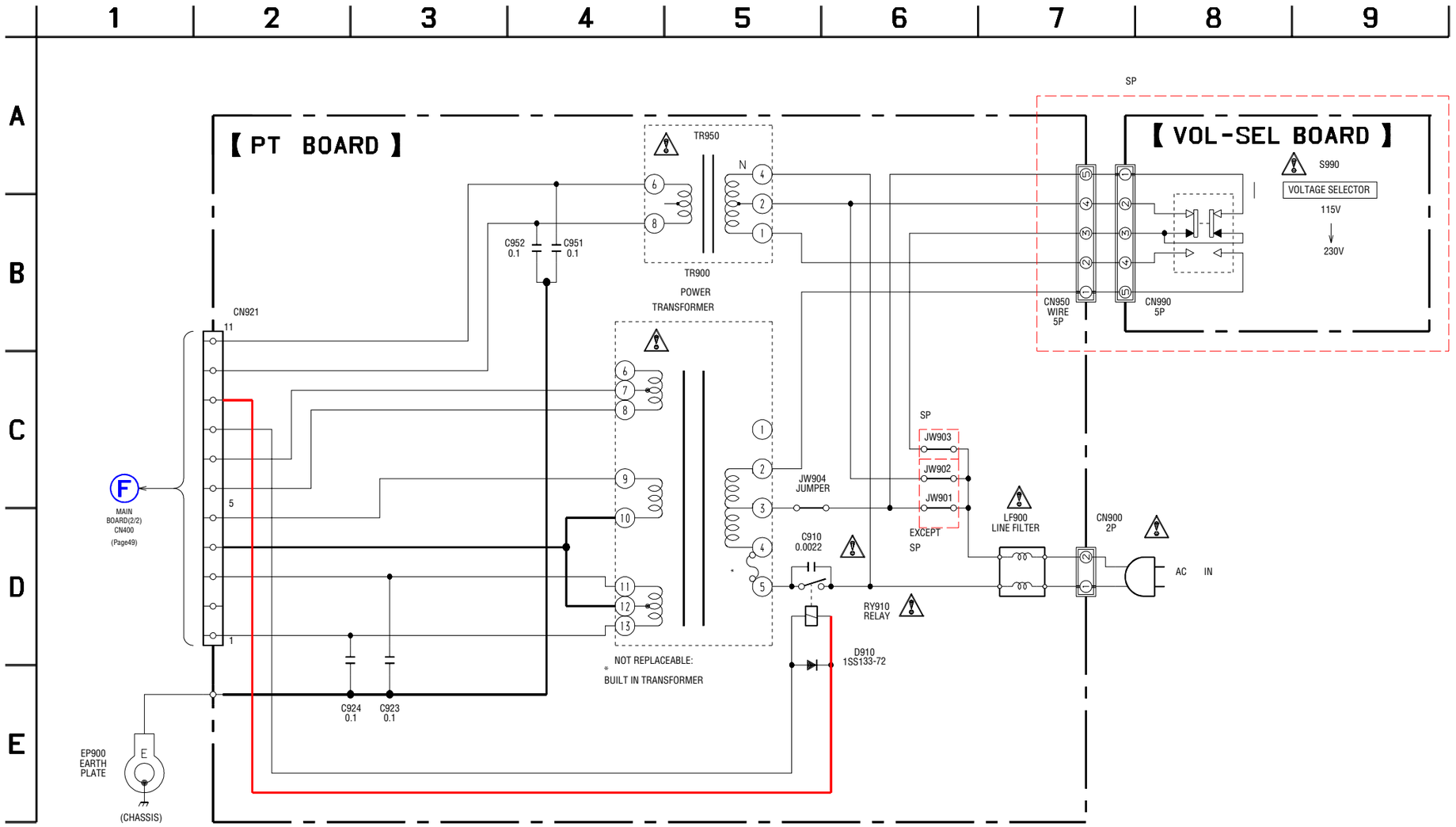


6-11. PRINTED WIRING BOARD – POWER SECTION – • See page 36 for Circuit Board Location.

There are a few cases that the part isn't mounted in model is printed on diagram.



6-12. SCHEMATIC DIAGRAM – POWER SECTION –

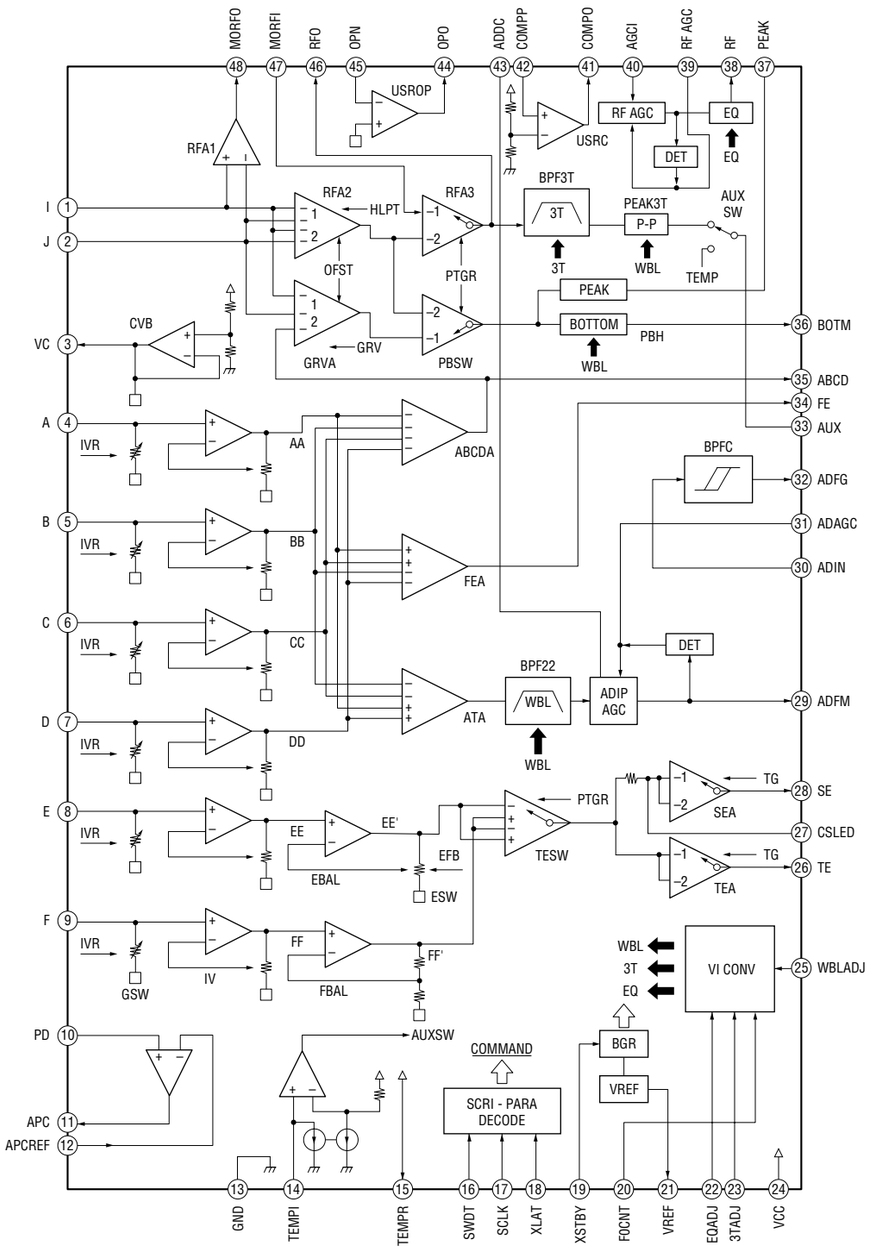


Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

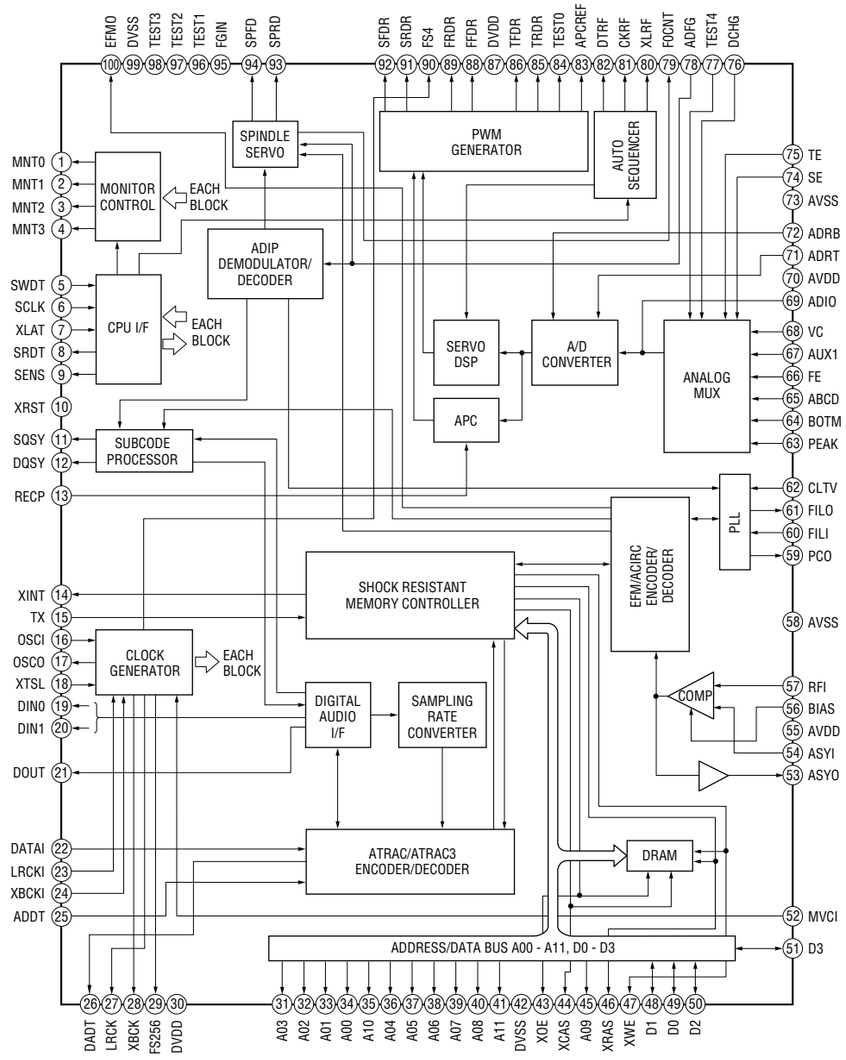
Note: Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

6-13. IC BLOCK DIAGRAMS

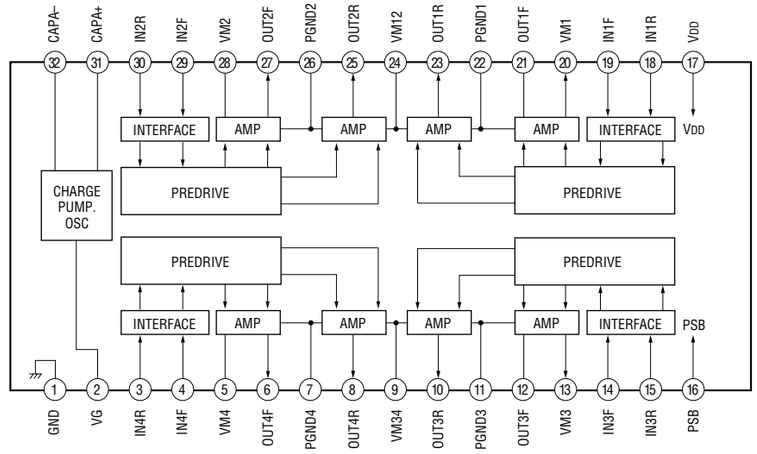
IC101 CXA2523AR (BD BOARD)



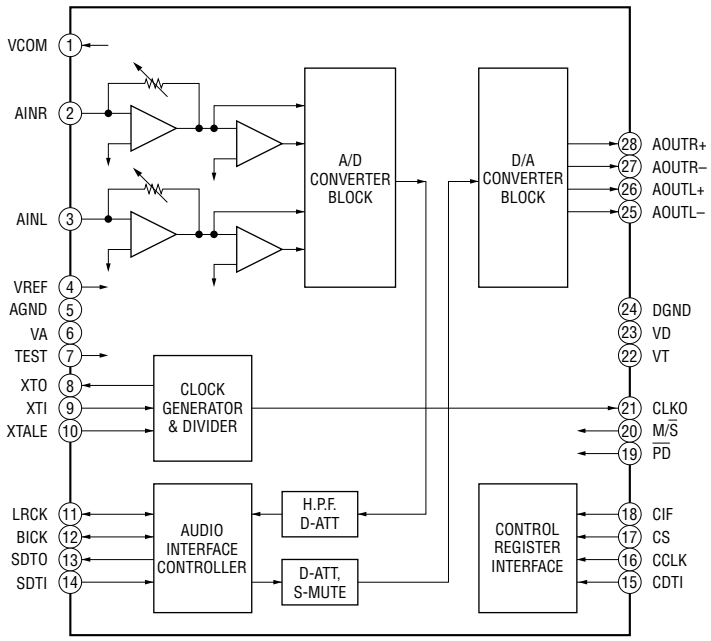
IC151 CXD2662R (BD BOARD)



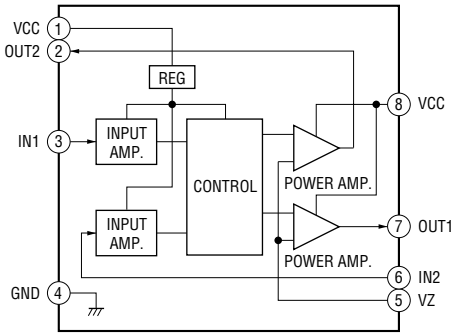
IC141 BH6511FS-E2 (BD BOARD)



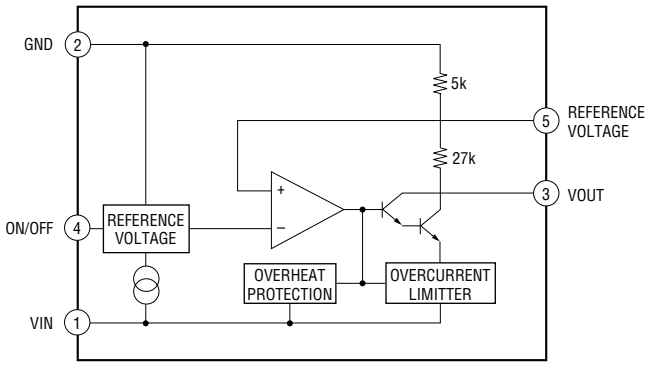
IC500 AK4524 (MAIN BOARD)



IC440 M54641L (MAIN BOARD)



IC421 M5293L (MAIN BOARD)



6-14. IC PIN FUNCTION DESCRIPTION

• IC101 CXA2523AR RF Amplifier (BD BOARD)

Pin No.	Pin Name	I/O	Description
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 - 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 CXD2662R
17	SCLK	I	Serial clock input from the CXD2662R
18	XLAT	I	Latch signal input from the CXD2662R “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 CXD2662R
21	VREF	O	Reference voltage output (Not used)
22	EQADJ	I	Center frequency setting pin for the internal circuit EQ
23	3TADJ	I	Center frequency setting pin for the internal circuit BPF3T
24	Vcc	—	+3V power supply
25	WBLADJ	I	Center frequency setting pin for the internal circuit BPF22
26	TE	O	Tracking error signal output to the CXD2662R
27	CSLED	—	External capacitor connection pin for the sled error signal LPF
28	SE	O	Sled error signal output to the CXD2662R
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 CXD2662R
33	AUX	O	I3 signal/temperature signal output to the CXD2662R
34	FE	O	Focus error signal output to the CXD2662R
35	ABCD	O	Light amount signal output to the CXD2662R
36	BOTM	O	RF/ABCD bottom hold signal output to the CXD2662R
37	PEAK	O	RF/ABCD peak hold signal output to the CXD2662R
38	RF	O	RF equalizer output to the CXD2662R
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	—	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

• **IC151 CXD2662R Digital Signal Processor, Digital Servo Signal Processor (BD BOARD)**

Pin No.	Pin Name	I/O	Desription
1	MNT0 (FOK)	O	Not used (open)
2	MNT1 (SHCK)	O	Track jump detection signal output to the system control
3	MNT2 (XBUSY)	O	In the state of executire command signal output
4	MNT3 (SLOC)	O	Not used (open)
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	O	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) (Not used)
21	DOUT	O	Digital audio output (Optical output) (Not used)
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	I	+3V power supply (Digital)
31 - 34	A03 to A00	O	DRAM address output
35	A10	O	DRAM address output (Not used)
36 - 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	CAS signal output for DRAM
45	A09	O	$\overline{\text{Address}}$ output for DRAM
46	XRAS	O	RAS signal output for DRAM
47	XWE	O	$\overline{\text{Write}}$ enable signal output for DRAM

* 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	Description
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	I	+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 CXA2523AR
64	BOTM	I (A)	Light amount signal bottom hold input from the CXA2523AR
65	ABCD	I (A)	Light amount signal input from the CXA2523AR
66	FE	I (A)	Focus error signal input from the CXA2523AR
67	AUX1	I (A)	Auxiliary A/D input
68	VC	I (A)	Middle point voltage (+1.5V) input from the CXA2523AR
69	ADIO	O (A)	Monitor output of the A/D converter input signal (Not used)
70	AVDD	I	+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 CXA2523AR
75	TE	I (A)	Tracking error signal input from the CXA2523AR
76	DCHG	I (A)	Connected to +3V power supply
77	TEST4	I	Test input (Fixed at “H”)
78	ADFG	I (S)	ADIP duplex FM signal input from the CXA2523AR (22.05 ± 1 kHz)
79	F0CNT	O	Filter f0 control output to the CXA2523AR
80	XLRF	O	Control latch output to the CXA2523AR
81	CKRF	O	Control clock output to the CXA2523AR
82	DTRF	O	Control data output to the CXA2523AR
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	Description
86	TFDR	O	Tracking servo drive PWM output (+)
87	DVDD	I	+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 - 98	TEST1 to TEST3	I	
99	DVSS	—	Ground (Digital)
100	EFMO	O	EFM output when recording

• Abbreviation
EFM: Eight to Fourteen Modulation

• **IC1 M30803MG-107FP SYSTEM CONTROL (MAIN BOARD)**

Pin No.	Pin Name	I/O	Description
1	FLDT	O	Serial data signal output to the display driver.
2	FLCK	O	Serial clock signal output to the display driver. L: Active
3	A1-IN	I	A1 Control input. (Fixed at L)
4	SIRCS	I	Remote control input.
5 - 7	NC	—	Not used.
8	BYTE	I	Data bus changed input. (Connected to ground.)
9	CNVSS	—	Ground.
10	XIN-T	I	Not used . (open)
11	XOUT-T	O	Not used . (open)
12	S.RST	I	System rest input. L : ON
13	XOUT	O	Main clock output. (10MHz)
14	GND	—	Ground.
15	XIN	I	Main clock input. (10MHz)
16	VCC	—	Power supply. (+3.3V)
17	NMI	I	Fixed at H. (Pull-up)
18	DQSY	I	Digital in sync input. (Record system)
19	P.DOWN	I	Power down detection input. L: Power down
20	SQSY	I	ADIP (MO) sync or subcode Q (PIT) sync input from CXD2662R.(Playback system)
21	KB.CLK	I	Keyboard clock input. (Fixed at H)
22	KB.DATA	I	Keyboard data input. (Fixed at H)
23	IIC BUSY	I	IIC cable connect check. L: Active
24	A1 OUT	O	Not used. (open)
25	XINIT	I	Interrupt status input from CXD2662R.
26	*BEEP	O	Not used. (open)
27	LRCKI	O	Not used. (open)
28	IIC POWER	O	Media commucator start-up check.
29	IIC CLK	O	IIC serial clock output.
30	IIC DATA	I/O	IIC serial data input/output.
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	KB.CLK-CTRL	O	Keyboard clock ON/OFF signal output. L: OFF H: ON
35	CLIP-TX	O	Not used. (open)
36	CLIP-RX	I	Not used. (open)
37	XBCK1	O	Not used. (open)
38	MUTE	O	Line out muting output. L: Mute
39	ADA.RESET	O	Reset signal output to the AK4524. L: Active

Pin No.	Pin Name	I/O	Description
40	ADA. LATCH	O	Latch signal output to the AK4524. L: Active
41	EPN	I	Not used. (Fixed at L)
42	L : DINT1/H : CLIP	—	Not used. (open)
43	NC	—	Not used.
44	PROTECT	I	Recording-protection claw detection input from the protection detection switch. H: Protect
45	SCL	O	Clock signal output to the EEP-ROM.
46	CE	O	Not used.
47	EEP-WP	O	EEP-ROM write protect signal output. L: write possibility
48	XBUSY	I	In the state of executive command from the CXD2662R
49	OUT-SW	I	Detection signal input from the loading out detection switch.
50	XLATCH	O	Latch signal output to the serial bus.
51	PLAY-SW	I	Detection signal input from the playback position detection switch. L: PLAY
52	DIG-RST	O	Digital rest signal output to the CXD2662R and motor driver. L: Reset
53	REC-SW	I	Detection signal input from the recording position detection switch. L: REC
54	WR PWR	O	Write power ON/OFF output. L: OFF H: ON
55	LIMIT-IN	I	Detection input from the limit switch. L: Sled limit-In H: Sled limit-Out
56	MOD	O	Laser modulation switching signal output. (L: STOP, H : PLAY, pluse : REC)
57	LDON	O	Laser ON/OFF control output. H: Laser ON
58	SENS	I	Internal status (SENSE) input from the CXD2662R.
59	SHCK	I	Track jump signal input from the CXD2662R.
60	SDA	I/O	Data signal input/output pin with the EEP-ROM.
61	REFLECT	I	Disk reflection rate detection input from the reflect detection switch. H: Disk with low reflection rate.
62	VCC	I	Power supply. (+3.3V)
63	NC	—	Not used.
64	GND	—	Ground.
65	LOAD LO	O	Loading motor voltage control output L: High voltage H: Low voltage
66	LOAD OUT	O	Loading motor control output. H: eject
67	LOAD IN	O	Loading motor control output. H: loading
68 - 71	MODEL SEL 0 - 3	—	Not used.
72 - 80	NC	—	Not used.

Pin No.	Pin Name	I/O	Description
81	STB	O	Strobe signal output to the power supply circuit. H: Power supply ON: L: standby
82	BEEP SW	—	Not used.
83	$\overline{\text{REC}}$	—	Not used.
84	FLCS	O	Chip select signal output to the MSM9202 (IC760)
85, 86	D.VOL0,1	—	Not used.
87, 88	JOG0, JOG1	I	Jog dial pulse input from the rotary encoder.
89	IOP	I	Optical Pick-up voltage (current) detect signal input.
90	DISTINATION	I	Model discrimination.
91	MODEL SEL	I	Model discrimination.
92	TIMER	I	Not used. (Fixed at H)
93	KEY3	I	Not used. (Fixed at H)
94, 95	KEY2, 1	I	Key input pin (A/D input)
96	AVSS	—	Ground. (Analog)
97	KEY0	I	Key input pin (A/D input)
98	VREF	I	A/D reference voltage.
99	AVCC	I	Power supply. (+3.3V)
100	NC	I	Not used. (Fixed at L)

SECTION 7
EXPLODED VIEWS

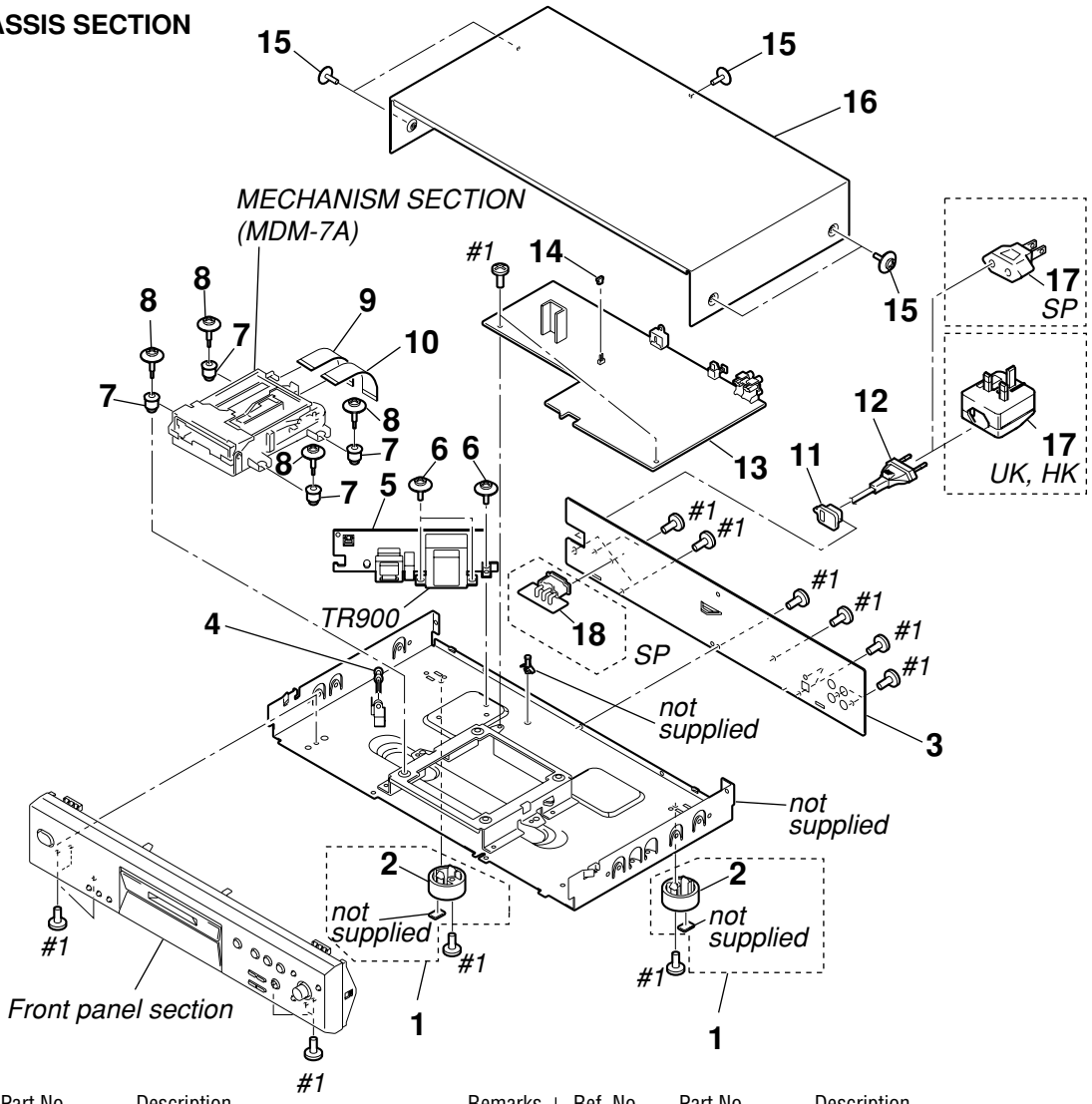
NOTE:

- -XX, -X mean standardized parts, so they may have some differences 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.
- 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.
- Color indication of Appearance Parts
  Example :
  KNOB, BALANCE (WHITE)··· (RED)
  ↑ ↑
  Parts color Cabinet's color
- Abbreviation
  CND : Canadian model
  SP : Singapore model
  HK : Hong Kong model
  AUS : Australian model

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.

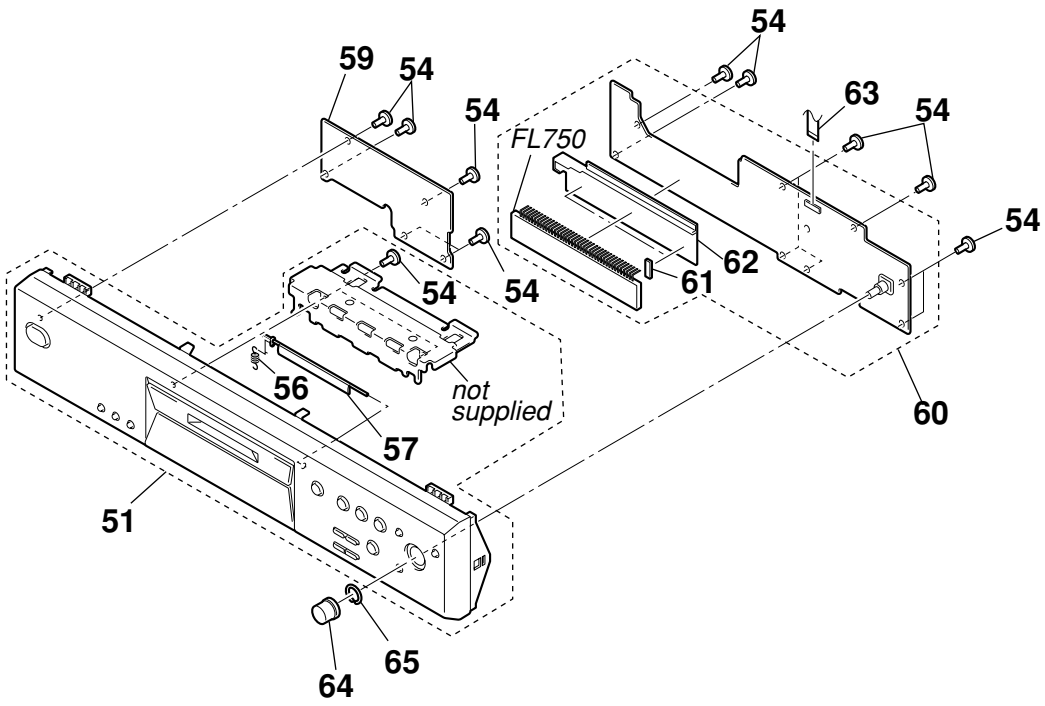
7-1. CHASSIS SECTION



Ref. No.	Part No.	Description	Remarks
1	X-4953-448-1	FOOT ASSY	
2	4-232-237-01	FOOT (DIA. 30)	
3	4-233-025-01	PANEL, BACK (AEP,UK)	
3	4-233-025-11	PANEL, BACK (US)	
3	4-233-025-21	PANEL, BACK (CND)	
3	4-233-025-31	PANEL, BACK (SP)	
3	4-233-025-41	PANEL, BACK (HK)	
3	4-233-025-51	PANEL, BACK (AUS)	
4	9-910-999-31	RIVET (DIA. 3), NYLON	
5	1-681-734-12	PT BOARD	
6	4-221-887-11	SCREW, +PTTWH (M3) (S) TITE	
7	4-228-689-01	INSULATOR	
8	4-228-643-11	SCREW (+BVTTWH M3), STEP	
9	1-792-811-11	WIRE (FLAT TYPE) (23 CORE)	
10	1-757-928-11	WIRE (FLAT TYPE) (27 CORE)	
* 11	3-703-244-00	BUSHING (2104), CORD	
⚠12	1-696-846-21	CORD, POWER (AUS)	

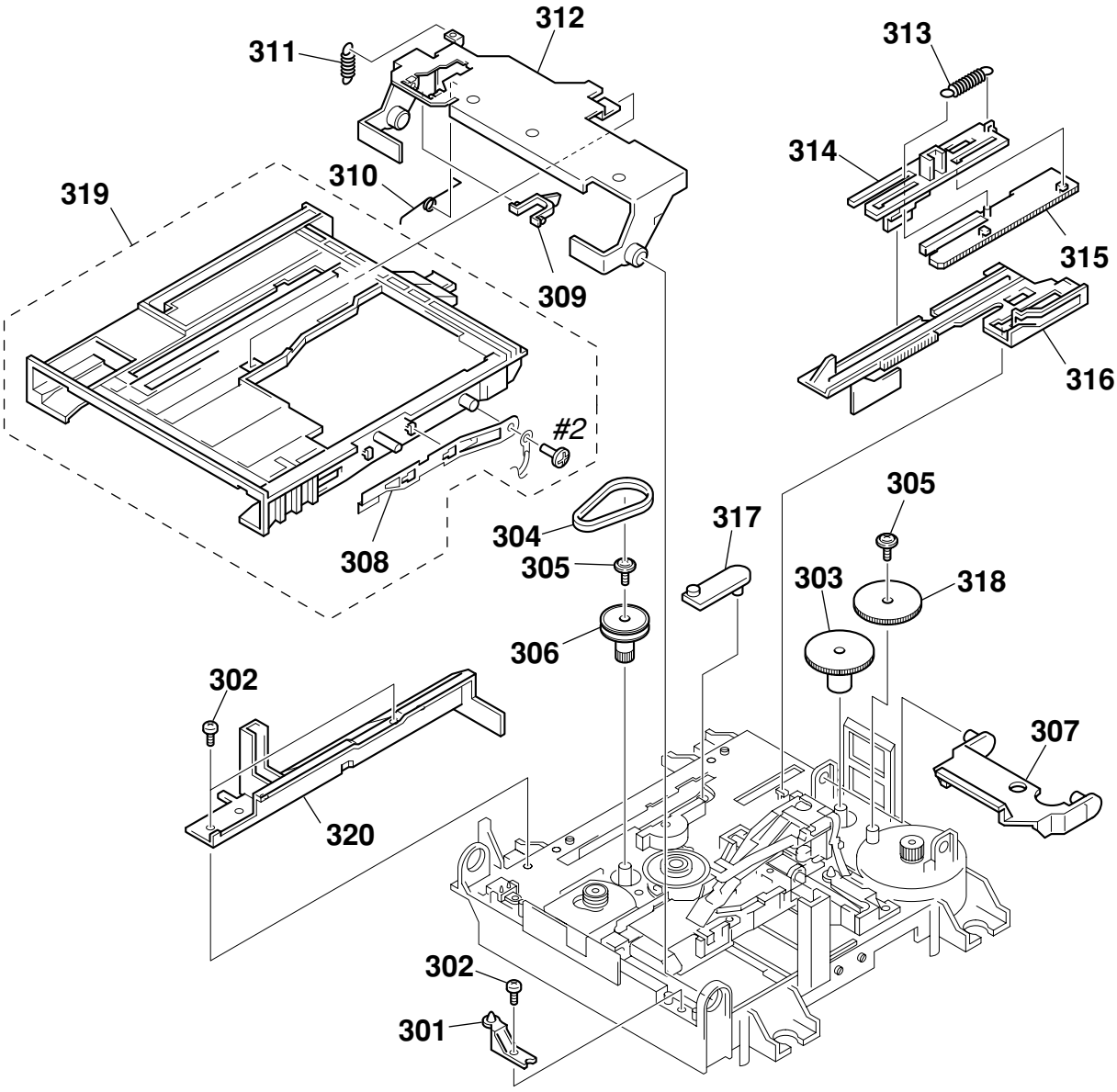
Ref. No.	Part No.	Description	Remarks
⚠12	1-777-071-61	CORD, POWER (AEP,UK,HK,SP)	
⚠12	1-783-531-31	CORD, POWER (US,CND)	
13	A-2007-906-A	MAIN BOARD, COMPLETE (US,CND)	
13	A-2007-910-A	MAIN BOARD, COMPLETE (AEP,UK,HK,AUS)	
13	A-2007-914-A	MAIN BOARD, COMPLETE (SP)	
* 14	1-569-972-21	SOCKET, SHORT 2P	
15	4-210-291-01	SCREW (CASE 3 TP2)...(BLACK)	
15	4-210-291-11	SCREW (CASE 3 TP2)...(SILVER)	
16	4-232-149-31	CASE (408226)...(BLACK)	
16	4-232-580-31	CASE (408226)...(SILVER)	
⚠17	1-569-008-21	ADAPTOR, CONVERSION (SP)	
⚠17	1-770-019-11	ADAPTOR, CONVERSION PLUG 3P (UK,HK)	
18	1-681-738-12	VOL-SEL BOARD (SP)	
⚠TR900	1-435-543-11	TRANSFORMER, POWER (US,CND)	
⚠TR900	1-435-544-11	TRANSFORMER, POWER (AEP,UK,HK,AUS)	
⚠TR900	1-435-545-11	TRANSFORMER, POWER (SP)	

7-2. FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remarks
51	X-4953-710-1	PANEL ASSY, FRONT...(BLACK) (AEP,UK,HK,SP,AUS)	
51	X-4953-711-1	PANEL ASSY, FRONT...(SILVER) (AEP,UK)	
51	X-4953-712-1	PANEL ASSY, FRONT...(BLACK) (US,CND)	
54	4-951-620-01	SCREW (2.6X8), +BVTP	
56	4-228-630-01	SPRING (LID), TENSION COIL	
57	4-228-629-81	LID (MD)...(BLACK)	
57	4-230-848-21	LID (MD)...(SILVER)	
59	1-681-737-12	KEY-SW BOARD	
60	A-2007-907-A	DISPLAY BOARD, COMPLETE (US,CND)	
60	A-2007-911-A	DISPLAY BOARD, COMPLETE (AEP,UK,HK,AUS)	
60	A-2007-915-A	DISPLAY BOARD, COMPLETE (SP)	
61	4-949-935-41	CUSHION (FL)	
62	4-212-590-01	HOLDER (FL)	
63	1-757-930-11	WIRE (FLAT TYPE) (17 CORE)	
64	4-231-928-01	KNOB (AMS)...(BLACK)	
64	4-231-928-11	KNOB (AMS)...(SILVER)	
65	3-354-981-11	SPRING (SUS), RING	
FL750	1-517-986-11	INDICATOR TUBE, FLUORESCENT	

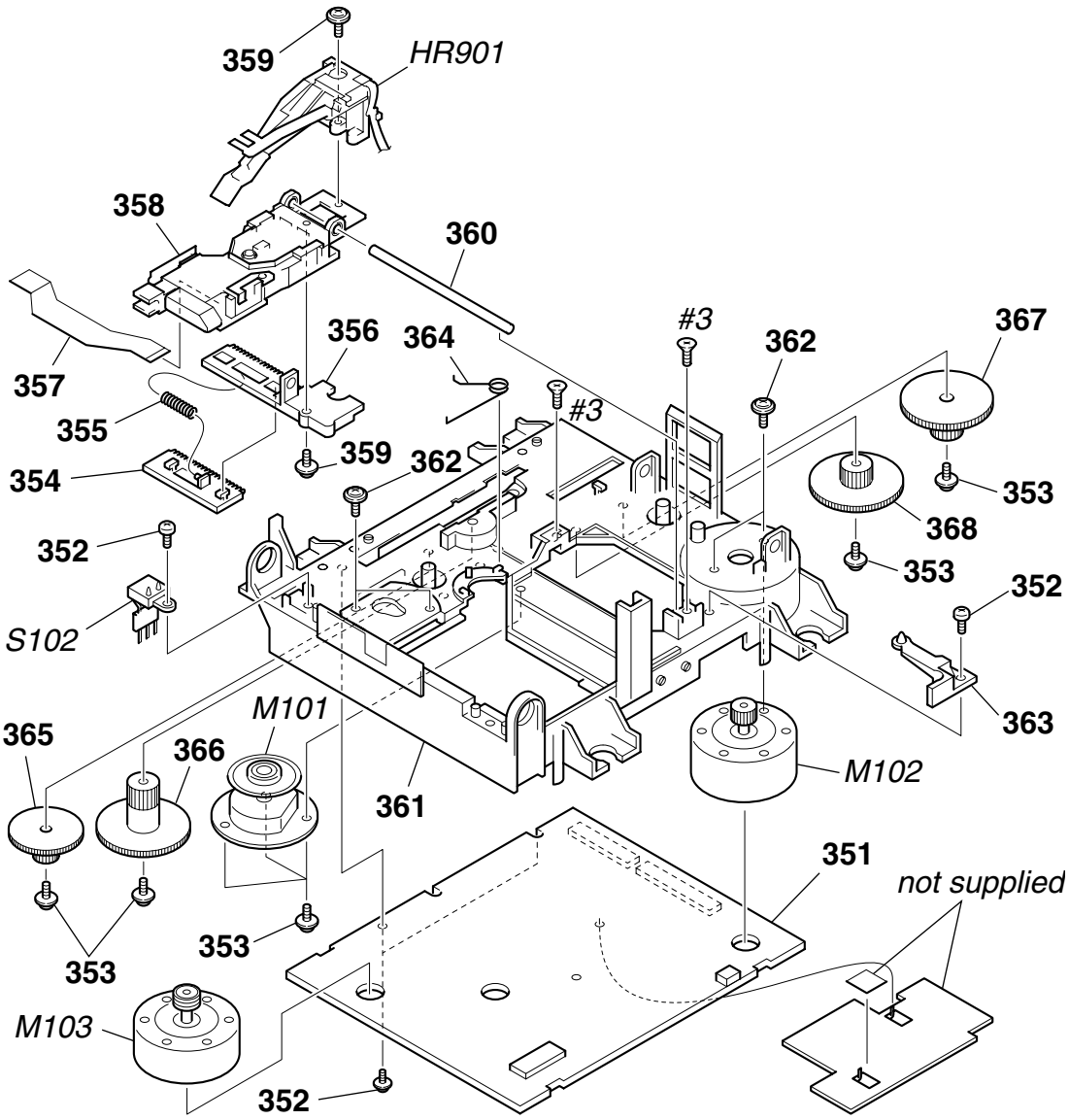
7-3. MECHANISM SECTION-1 (MDM-7A)



Ref. No.	Part No.	Description	Remarks
* 301	4-996-267-01	BASE (BU-D)	
302	4-231-319-01	SCREW (2X6) CZN, +B (P) TRI	
303	4-227-007-01	GEAR (SB)	
304	4-227-025-01	BELT (LOADING)	
305	3-372-761-01	SCREW (M1.7), TAPPING	
306	4-227-002-01	GEAR, PULLEY	
307	4-226-999-01	LEVER (HEAD)	
308	X-4952-665-1	SPRING (SHT) ASSY, LEAF	
309	A-4672-990-F	LOCK (HOLDER)	
310	4-229-533-01	SPRING (STOPPER), TORSION	

Ref. No.	Part No.	Description	Remarks
311	4-231-118-01	SPRING (HOLDER), TENSION	
312	4-227-019-02	PLATE (HOLDER) ASSY, RETAINER	
313	4-227-013-01	SPRING (EJ), TENSION	
314	4-226-995-01	SLIDER (EJ)	
315	4-226-996-01	LIMITTER (EJ)	
316	4-226-997-04	SLIDER	
317	4-226-998-01	LEVER (CHG)	
318	4-227-006-01	GEAR (SA)	
319	A-4735-075-A	HOLDER ASSY	
320	4-226-994-01	GUIDE (L)	

7-4. MECHANISM SECTION-2 (MDM-7A)



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.

Ref. No.	Part No.	Description	Remarks
351	A-4725-471-A	BD BOARD, COMPLETE	
352	4-231-319-01	SCREW (2X6) CZN, +B (P) TRI	
353	3-372-761-01	SCREW (M1.7), TAPPING	
354	4-226-993-01	RACK	
355	4-227-014-01	SPRING (RACK), COMPRESSION	
356	4-226-992-01	BASE, SL	
357	1-678-514-11	PWB, FLEXIBLE	
⚠358	A-4672-541-A	OPTICAL PICK-UP KMS-260E	
359	4-988-560-01	SCREW (+P 1.7X6)	
360	4-996-265-01	SHAFT, MAIN	
361	4-226-989-01	CHASSIS	

Ref. No.	Part No.	Description	Remarks
362	4-232-270-01	SCREW (1.7X3.5), +PWH	
363	4-226-990-01	BASE (BU-A)	
364	4-227-023-01	SPRING (SPINDLE), TORSION	
365	4-227-004-01	GEAR (LC)	
366	4-227-005-01	GEAR (LD)	
367	4-227-009-01	GEAR (SD)	
368	4-227-008-01	GEAR (SC)	
HR901	1-500-670-11	HEAD, OVER LIGHT	
M101	A-4672-898-A	MOTOR ASSY, SPINDLE	
M102	A-4735-076-A	MOTOR ASSY, SLED	
M103	A-4735-074-A	MOTOR ASSY, LOADING	
S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT SW)	

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

- 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.
- CAPACITORS:
  uF: µF
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- COILS
  uH: µH
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... , uPB... , µPB... , uPC... , µPC... , uPD..., µPD...
- Abbreviation
  CND : Canadian model
  SP : Singapore model
  HK : Hong Kong model
  AUS : Australian model

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

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.

Ref. No.	Part No.	Description			Remarks
	A-4725-471-A	BD BOARD, COMPLETE			
		**********			
		<CAPACITOR>			
C101	1-135-259-11	TANTAL.CHIP	10uF	20%	6.3V
C102	1-135-259-11	TANTAL.CHIP	10uF	20%	6.3V
C103	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C104	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C105	1-115-416-11	CERAMIC CHIP	0.001uF	5%	25V
C106	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C107	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C108	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C109	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C110	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C111	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C112	1-110-563-11	CERAMIC CHIP	0.068uF	10%	16V
C113	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C114	1-125-837-11	CERAMIC CHIP	1uF	10%	6.3V
C115	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C116	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C117	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C118	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C119	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C120	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C121	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C125	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C128	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C131	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C132	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C133	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C141	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C142	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C143	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C144	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C145	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C151	1-117-370-11	CERAMIC CHIP	10uF		10V
C152	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C153	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C154	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C155	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C156	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C157	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C158	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C159	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C160	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C161	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C162	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C163	1-125-891-11	CERAMIC CHIP	0.47uF	10%	10V
C164	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C165	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C166	1-125-891-11	CERAMIC CHIP	0.47uF	10%	10V
C167	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C169	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C171	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C172	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C180	1-117-370-11	CERAMIC CHIP	10uF		10V
C181	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C182	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C183	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C184	1-117-970-11	ELECT CHIP	22uF	20%	10V
C185	1-131-872-11	CERAMIC CHIP	1000PF	10%	630V
C191	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C192	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C193	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C194	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C195	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C196	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C1401	1-117-720-11	CERAMIC CHIP	4.7uF		10V
		<CONNECTOR>			
CN101	1-766-833-21	CONNECTOR, FFC/FPC (ZIF) 21P			
CN102	1-784-835-21	CONNECTOR, FFC(LIF(NON-ZIF))27P			
CN103	1-784-834-21	CONNECTOR, FFC(LIF(NON-ZIF))23P			
* CN104	1-580-055-21	PIN, CONNECTOR (SMD) 2P			
CN105	1-784-859-21	CONNECTOR, FFC(LIF(NON-ZIF))7P			
		<DIODE>			
D101	8-719-988-61	DIODE 1SS355TE-17			
D181	8-719-080-81	DIODE FS1J6			
D183	8-719-080-81	DIODE FS1J6			
		<IC>			
IC101	8-752-080-95	IC CXA2523AR			
IC102	8-759-473-51	IC TLV2361CDBV			
IC141	8-759-836-79	IC BH6519FS-E2			
IC151	8-752-404-64	IC CXD2662R			
IC153	8-759-671-27	IC MSM51V4400E-70TS-K			
IC171	8-759-096-87	IC TC7WU04FU(TE12R)			
IC181	8-759-481-17	IC MC74ACT08DTR2			

Ref. No.	Part No.	Description			Remarks
IC190	8-759-460-72	IC BA033FP-E2			
IC195	8-759-640-41	IC BR24C08F-E2			
		<JUMPER RESISTOR>			
JW201	1-216-295-91	SHORT	0		
JW202	1-216-295-91	SHORT	0		
JW203	1-216-295-91	SHORT	0		
JW903	1-216-295-91	SHORT	0		
JW904	1-216-295-91	SHORT	0		
		<COIL>			
L101	1-500-245-11	FERRITE	0uH		
L102	1-500-245-11	FERRITE	0uH		
L103	1-500-245-11	FERRITE	0uH		
L105	1-414-235-22	FERRITE	0uH		
L106	1-500-245-11	FERRITE	0uH		
L121	1-500-245-11	FERRITE	0uH		
L122	1-500-245-11	FERRITE	0uH		
L131	1-500-245-11	FERRITE	0uH		
L141	1-216-296-91	CONDUCTOR CHIP	0		
L142	1-216-296-91	CONDUCTOR CHIP	0		
L143	1-216-296-91	CONDUCTOR CHIP	0		
L144	1-216-296-91	CONDUCTOR CHIP	0		
L145	1-216-296-91	CONDUCTOR CHIP	0		
L146	1-469-855-21	FERRITE	0uH		
L147	1-469-855-21	FERRITE	0uH		
L161	1-500-245-11	FERRITE	0uH		
L171	1-500-245-11	FERRITE	0uH		
L180	1-469-855-21	FERRITE	0uH		
L181	1-469-855-21	FERRITE	0uH		
L182	1-500-245-11	FERRITE	0uH		
L183	1-216-296-11	SHORT	0		
L184	1-216-296-11	SHORT	0		
		<TRANSISTOR>			
Q101	8-729-403-35	TRANSISTOR	UN5113-TX		
Q121	8-729-403-35	TRANSISTOR	UN5113-TX		
Q122	8-729-101-07	TRANSISTOR	2SB798-T1DK		
Q131	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
Q132	8-729-903-10	TRANSISTOR	FMW1-T-148		
Q133	8-729-402-93	TRANSISTOR	UN5214-TX		
Q134	8-729-402-93	TRANSISTOR	UN5214-TX		
Q181	8-729-018-75	TRANSISTOR	2SJ278MYTR		
Q182	8-729-017-65	TRANSISTOR	2SK1764KYTR		
		<RESISTOR>			
R101	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R102	1-216-853-11	METAL CHIP	470K	5%	1/16W
R103	1-216-863-11	RES-CHIP	3.3M	5%	1/16W
R104	1-216-853-11	METAL CHIP	470K	5%	1/16W
R105	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R106	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R107	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R108	1-216-833-11	METAL CHIP	10K	5%	1/16W
R109	1-216-845-11	METAL CHIP	100K	5%	1/16W
R110	1-216-845-11	METAL CHIP	100K	5%	1/16W
R111	1-216-833-11	METAL CHIP	10K	5%	1/16W
R112	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R113	1-216-833-11	METAL CHIP	10K	5%	1/16W
R114	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R115	1-216-833-11	METAL CHIP	10K	5%	1/16W
R116	1-216-839-11	METAL CHIP	33K	5%	1/16W
R117	1-216-837-11	METAL CHIP	22K	5%	1/16W
R118	1-218-855-11	METAL CHIP	2.2K	0.5%	1/16W
R119	1-218-863-11	METAL CHIP	4.7K	0.5%	1/16W
R120	1-218-889-11	METAL CHIP	56K	0.5%	1/16W
R121	1-218-863-11	METAL CHIP	4.7K	0.5%	1/16W
R122	1-218-855-11	METAL CHIP	2.2K	0.5%	1/16W
R123	1-216-819-11	METAL CHIP	680	5%	1/16W
R124	1-216-809-11	METAL CHIP	100	5%	1/16W
R125	1-216-815-11	METAL CHIP	330	5%	1/16W
R126	1-216-819-11	METAL CHIP	680	5%	1/16W
R127	1-216-845-11	METAL CHIP	100K	5%	1/16W
R128	1-219-724-11	METAL CHIP	1	1%	1/4W
R129	1-216-298-00	METAL CHIP	2.2	5%	1/10W
R130	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R131	1-216-833-11	METAL CHIP	10K	5%	1/16W
R132	1-216-841-11	METAL CHIP	47K	5%	1/16W
R133	1-216-821-11	METAL CHIP	1K	5%	1/16W
R134	1-216-821-11	METAL CHIP	1K	5%	1/16W
R135	1-216-821-11	METAL CHIP	1K	5%	1/16W
R136	1-216-295-91	SHORT	0		
R138	1-216-833-11	METAL CHIP	10K	5%	1/16W
R150	1-216-833-11	METAL CHIP	10K	5%	1/16W
R151	1-216-833-11	METAL CHIP	10K	5%	1/16W
R154	1-216-833-11	METAL CHIP	10K	5%	1/16W
R155	1-216-864-11	METAL CHIP	0	5%	1/16W
R156	1-216-864-11	METAL CHIP	0	5%	1/16W
R157	1-216-809-11	METAL CHIP	100	5%	1/16W
R158	1-216-809-11	METAL CHIP	100	5%	1/16W
R159	1-216-833-11	METAL CHIP	10K	5%	1/16W
R160	1-216-833-11	METAL CHIP	10K	5%	1/16W
R161	1-216-833-11	METAL CHIP	10K	5%	1/16W
R163	1-216-809-11	METAL CHIP	100	5%	1/16W
R164	1-216-809-11	METAL CHIP	100	5%	1/16W
R165	1-216-809-11	METAL CHIP	100	5%	1/16W
R167	1-216-833-11	METAL CHIP	10K	5%	1/16W
R168	1-216-845-11	METAL CHIP	100K	5%	1/16W
R169	1-216-855-11	METAL CHIP	680K	5%	1/16W
R170	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R171	1-216-821-11	METAL CHIP	1K	5%	1/16W
R173	1-216-821-11	METAL CHIP	1K	5%	1/16W
R174	1-216-811-11	METAL CHIP	150	5%	1/16W
R175	1-216-857-11	METAL CHIP	1M	5%	1/16W
R176	1-216-809-11	METAL CHIP	100	5%	1/16W
R179	1-216-295-91	SHORT	0		
R181	1-216-841-11	METAL CHIP	47K	5%	1/16W
R182	1-216-841-11	METAL CHIP	47K	5%	1/16W
R183	1-216-841-11	METAL CHIP	47K	5%	1/16W
R184	1-220-942-11	METAL CHIP	3.3	1%	1/4W
R185	1-220-942-11	METAL CHIP	3.3	1%	1/4W
R195	1-216-833-11	METAL CHIP	10K	5%	1/16W
R196	1-216-833-11	METAL CHIP	10K	5%	1/16W
R197	1-216-833-11	METAL CHIP	10K	5%	1/16W
R218	1-216-864-11	METAL CHIP	0	5%	1/16W
		<SWITCH>			
S101	1-762-596-21	SWITCH, PUSH (1 KEY) (LIMIT IN SW)			
S103	1-771-956-21	SWITCH, PUSH (1 KEY) (OUT SW)			
S104	1-771-955-21	SWITCH, PUSH (1 KEY) (PLAY SW)			
S105	1-771-955-21	SWITCH, PUSH (1 KEY) (REC SW)			

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Ref. No.	Part No.	Description			Remarks
	A-2007-907-A	DISPLAY BOARD, COMPLETE (US,CND)			
	A-2007-911-A	DISPLAY BOARD, COMPLETE (AEP,UK,HK,AUS)			
	A-2007-915-A	DISPLAY BOARD, COMPLETE (SP)			
		**********			
	4-212-590-22	HOLDER (FL)			
	4-949-935-41	CUSHION (FL)			
		<CAPACITOR>			
C709	1-164-159-11	CERAMIC	0.1uF		50V
C751	1-124-261-00	ELECT	10uF	20%	50V
C753	1-124-261-00	ELECT	10uF	20%	50V
C761	1-162-294-31	CERAMIC	0.001uF	10%	50V
C762	1-162-294-31	CERAMIC	0.001uF	10%	50V
C763	1-162-294-31	CERAMIC	0.001uF	10%	50V
C760	1-164-159-11	CERAMIC	0.1uF		50V
C764	1-164-159-11	CERAMIC	0.1uF		50V
C765	1-126-153-11	ELECT	22uF	20%	6.3V
C766	1-164-159-11	CERAMIC	0.1uF		50V
C767	1-162-294-31	CERAMIC	0.001uF	10%	50V
C769	1-162-215-31	CERAMIC	47PF	5%	50V
C781	1-124-584-00	ELECT	100uF	20%	10V
C782	1-162-306-11	CERAMIC	0.01uF	30%	16V
		<DIODE>			
D775	8-719-046-39	DIODE SEL5821A-TP15 (MDLP)			
		<CONNECTOR>			
CN701	1-779-552-21	CONNECTOR, FFC(LIF(NON-ZIF))15P			
CN710	1-785-712-11	CONNECTOR, BOARD TO BOARD 4P			
		<FLUORESCENT INDICATOR TUBE>			
FL750	1-517-986-11	INDICATOR TUBE, FLUORESCENT			
		<IC>			
IC760	8-759-659-03	IC MSM9202-07GS-K			
IC781	8-759-826-33	IC NJL73H400A			
		<TRANSISTOR>			
Q767	8-729-900-74	TRANSISTOR UN4216-TA			
Q775	8-729-900-80	TRANSISTOR UN4211-TA			
		<RESISTOR>			
R702	1-249-421-11	CARBON	2.2K	5%	1/4W F
R703	1-247-843-11	CARBON	3.3K	5%	1/4W
R704	1-249-425-11	CARBON	4.7K	5%	1/4W F
R705	1-249-429-11	CARBON	10K	5%	1/4W
R706	1-249-435-11	CARBON	33K	5%	1/4W
R712	1-249-421-11	CARBON	2.2K	5%	1/4W F
R713	1-247-843-11	CARBON	3.3K	5%	1/4W
R714	1-249-425-11	CARBON	4.7K	5%	1/4W F
R715	1-249-429-11	CARBON	10K	5%	1/4W
R716	1-249-435-11	CARBON	33K	5%	1/4W
R760	1-247-807-31	CARBON	100	5%	1/4W
R761	1-247-807-31	CARBON	100	5%	1/4W
R762	1-247-807-31	CARBON	100	5%	1/4W
R763	1-247-807-31	CARBON	100	5%	1/4W
R767	1-249-441-11	CARBON	100K	5%	1/4W
R769	1-247-843-11	CARBON	3.3K	5%	1/4W
R775	1-249-409-11	CARBON	220	5%	1/4W F

Ref. No.	Part No.	Description			Remarks
R781	1-249-401-11	CARBON	47	5%	1/4W F
R782	1-247-807-31	CARBON	100	5%	1/4W
		<SWITCH>			
S701	1-762-875-21	SWITCH, KEYBOARD (REC ●)			
S702	1-762-875-21	SWITCH, KEYBOARD (■)			
S703	1-762-875-21	SWITCH, KEYBOARD (▶▶)			
S704	1-762-875-21	SWITCH, KEYBOARD (◀◀)			
S705	1-762-875-21	SWITCH, KEYBOARD (▮▮)			
S706	1-762-875-21	SWITCH, KEYBOARD (▷)			
S711	1-762-875-21	SWITCH, KEYBOARD (MENU/NO)			
S712	1-762-875-21	SWITCH, KEYBOARD (YES)			
S713	1-475-235-21	ENCODER, ROTARY (⏮ AMS ⏭ /PUSH ENTER)			
S714	1-762-875-21	SWITCH, KEYBOARD (CLEAR)			
S715	1-762-875-21	SWITCH, KEYBOARD (INPUT)			
S716	1-762-875-21	SWITCH, KEYBOARD (REC MODE)			
S721	1-762-875-21	SWITCH, KEYBOARD (EJECT ⏏)			
		**********			
	1-681-737-12	KEY-SW BOARD			
		**********			
		<CAPACITOR>			
C740	1-164-159-11	CERAMIC	0.1uF		50V (AEP,UK,HK,SP,AUS)
		<CONNECTOR>			
CN720	1-785-713-11	CONNECTOR, BOARD TO BOARD 4P			
		<DIODE>			
D726	8-719-046-44	LED SEL5221S-TP15 (STANDBY)			
		<TRANSISTOR>			
Q726	8-729-900-80	TRANSISTOR UN4211-TA			
		<RESISTOR>			
R722	1-249-421-11	CARBON	2.2K	5%	1/4W F
R723	1-247-843-11	CARBON	3.3K	5%	1/4W
R724	1-249-425-11	CARBON	4.7K	5%	1/4W F
R725	1-249-437-11	CARBON	47K	5%	1/4W
R1726	1-249-409-11	CARBON	220	5%	1/4W F
		<SWITCH>			
S722	1-762-875-21	SWITCH, KEYBOARD (PLAY MODE)			
S723	1-762-875-21	SWITCH, KEYBOARD (REPEAT)			
S724	1-762-875-21	SWITCH, KEYBOARD (LEVEL/DISPLAY/CHAR)			
S726	1-762-875-21	SWITCH, KEYBOARD (I/⏻)			
	A-2007-906-A	MAIN BOARD, COMPLETE (US,CND)			
	A-2007-910-A	MAIN BOARD, COMPLETE (AEP,UK,HK,AUS)			
	A-2007-914-A	MAIN BOARD, COMPLETE (SP)			
		**********			
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 TT(B)			
		<CAPACITOR>			
C12	1-164-159-11	CERAMIC	0.1uF		50V
C16	1-164-159-11	CERAMIC	0.1uF		50V
C19	1-162-294-31	CERAMIC	0.001uF	10%	50V
C58	1-162-282-31	CERAMIC	100PF	10%	50V

MDS-JE470

MAIN

Ref. No.	Part No.	Description			Remarks
C62	1-164-159-11	CERAMIC	0.1uF		50V
C87	1-162-306-11	CERAMIC	0.01uF	30%	16V
C88	1-162-306-11	CERAMIC	0.01uF	30%	16V
C89	1-162-294-31	CERAMIC	0.001uF	10%	50V
C100	1-126-964-11	ELECT	10uF	20%	50V
C111	1-162-290-31	CERAMIC	470PF	10%	50V
C112	1-128-551-11	ELECT	22uF	20%	25V
C113	1-128-551-11	ELECT	22uF	20%	25V
C161	1-137-505-11	MYLAR	220PF	5%	50V
C165	1-137-503-11	MYLAR	0.0001uF	5%	50V
C166	1-137-503-11	MYLAR	0.0001uF	5%	50V
C171	1-137-368-11	MYLAR	0.0047uF	5%	50V
C172	1-130-471-00	MYLAR	0.001uF	5%	50V
C176	1-128-551-11	ELECT	22uF	20%	25V
C177	1-162-290-31	CERAMIC	470PF	10%	50V
C211	1-162-290-31	CERAMIC	470PF	10%	50V
C212	1-128-551-11	ELECT	22uF	20%	25V
C213	1-128-551-11	ELECT	22uF	20%	25V
C261	1-137-505-11	MYLAR	220PF	5%	50V
C265	1-137-503-11	MYLAR	0.0001uF	5%	50V
C266	1-137-503-11	MYLAR	0.0001uF	5%	50V
C271	1-137-368-11	MYLAR	0.0047uF	5%	50V
C272	1-130-471-00	MYLAR	0.001uF	5%	50V
C276	1-128-551-11	ELECT	22uF	20%	25V
C277	1-162-290-31	CERAMIC	470PF	10%	50V
C311	1-126-933-11	ELECT	100uF	20%	16V
C316	1-126-933-11	ELECT	100uF	20%	16V
C361	1-126-933-11	ELECT	100uF	20%	16V
C366	1-126-933-11	ELECT	100uF	20%	16V
C401	1-126-939-11	ELECT	10000uF	20%	16V
C402	1-164-159-11	CERAMIC	0.1uF		50V
C404	1-104-665-11	ELECT	100uF	20%	10V
C405	1-162-306-11	CERAMIC	0.01uF	30%	16V
C406	1-124-252-00	ELECT	0.33uF	20%	50V
C411	1-126-939-11	ELECT	10000uF	20%	16V
C412	1-164-159-11	CERAMIC	0.1uF		50V
C416	1-126-916-11	ELECT	1000uF	20%	6.3V
C423	1-128-576-11	ELECT	100uF	20%	63V
C424	1-164-159-11	CERAMIC	0.1uF		50V
C425	1-126-967-11	ELECT	47uF	20%	50V
C426	1-126-965-11	ELECT	22uF	20%	50V
C431	1-104-663-11	ELECT	33uF	20%	25V
C432	1-128-551-11	ELECT	22uF	20%	25V
C441	1-126-933-11	ELECT	100uF	20%	16V
C442	1-162-306-11	CERAMIC	0.01uF	30%	16V
C461	1-126-935-11	ELECT	470uF	20%	16V
C466	1-126-935-11	ELECT	470uF	20%	16V
C490	1-126-916-11	ELECT	1000uF	20%	6.3V
C491	1-164-159-11	CERAMIC	0.1uF		50V
C492	1-164-159-11	CERAMIC	0.1uF		50V
C500	1-126-934-11	ELECT	220uF	20%	10V
C501	1-164-159-11	CERAMIC	0.1uF		50V
C502	1-162-302-11	CERAMIC	0.0022uF	20%	16V
C503	1-162-302-11	CERAMIC	0.0022uF	20%	16V
C504	1-104-665-11	ELECT	100uF	20%	10V
C505	1-164-159-11	CERAMIC	0.1uF		50V
C515	1-162-282-31	CERAMIC	100PF	10%	50V
C516	1-162-282-31	CERAMIC	100PF	10%	50V
C517	1-162-282-31	CERAMIC	100PF	10%	50V
C519	1-162-294-31	CERAMIC	0.001uF	10%	50V
C520	1-126-934-11	ELECT	220uF	20%	10V
C522	1-164-159-11	CERAMIC	0.1uF		50V
C523	1-104-665-11	ELECT	100uF	20%	10V
C524	1-164-159-11	CERAMIC	0.1uF		50V
C530	1-164-159-11	CERAMIC	0.1uF		50V
C531	1-164-159-11	CERAMIC	0.1uF		50V
C532	1-164-159-11	CERAMIC	0.1uF		50V
C536	1-164-159-11	CERAMIC	0.1uF		50V
C550	1-164-159-11	CERAMIC	0.1uF		50V
C551	1-104-665-11	ELECT	100uF	20%	10V
C552	1-164-159-11	CERAMIC	0.1uF		50V
C553	1-162-195-31	CERAMIC	4.7PF	10%	50V
C554	1-162-294-31	CERAMIC	0.001uF	10%	50V
C555	1-162-201-31	CERAMIC	12PF	5%	50V
C556	1-162-215-31	CERAMIC	47PF	5%	50V
C557	1-162-199-31	CERAMIC	10PF	5%	50V
C601	1-162-306-11	CERAMIC	0.01uF	30%	16V
C611	1-164-159-11	CERAMIC	0.1uF		50V
C612	1-126-963-11	ELECT	4.7uF	20%	50V
C613	1-162-306-11	CERAMIC	0.01uF	30%	16V
C651	1-164-159-11	CERAMIC	0.1uF		50V
C652	1-164-159-11	CERAMIC	0.1uF		50V
C657	1-164-159-11	CERAMIC	0.1uF		50V
C658	1-164-159-11	CERAMIC	0.1uF		50V
C800	1-164-159-11	CERAMIC	0.1uF		50V
C804	1-164-159-11	CERAMIC	0.1uF		50V
C814	1-164-159-11	CERAMIC	0.1uF		50V

<CONNECTOR>

Ref. No.	Part No.	Description
CN1	1-784-417-11	CONNECTOR, FFC(LIF(NON-ZIF)23P
CN2	1-779-295-11	CONNECTOR, FFC(LIF(NON-ZIF))27P
* CN3	1-794-175-11	CONNECTOR, FFC(LIF(NON-ZIF))15P
CN400	1-691-772-11	PLUG (MICRO CONNECTOR) 10P
CN406	1-568-683-11	PIN, CONNECTOR (PC BAORD) 2P

<DIODE>

Ref. No.	Part No.	Description
D111	8-719-911-19	DIODE 1SS133T-72
D112	8-719-911-19	DIODE 1SS133T-72
D211	8-719-911-19	DIODE 1SS133T-72
D212	8-719-911-19	DIODE 1SS133T-72
D381	8-719-911-19	DIODE 1SS133T-72
D382	8-719-911-19	DIODE 1SS133T-72
D401	8-719-210-21	DIODE 11EQS04-NTA2B
D402	8-719-210-21	DIODE 11EQS04-NTA2B
D403	8-719-210-21	DIODE 11EQS04-NTA2B
D404	8-719-210-21	DIODE 11EQS04-NTA2B
D406	8-719-911-19	DIODE 1SS133T-72
D408	8-719-210-21	DIODE 11EQS04-NTA2B
D409	8-719-210-21	DIODE 11EQS04-NTA2B
D411	8-719-024-99	DIODE 11ES2-NTA2B
D412	8-719-024-99	DIODE 11ES2-NTA2B
D421	8-719-024-99	DIODE 11ES2-NTA2B
D422	8-719-109-81	DIODE RD4.7ES-T2B2
D431	8-719-911-19	DIODE 1SS133T-72
D432	8-719-911-19	DIODE 1SS133T-72
D433	8-719-911-19	DIODE 1SS133T-72
D461	8-719-024-99	DIODE 11ES2-NTA2B
D462	8-719-024-99	DIODE 11ES2-NTA2B
D466	8-719-024-99	DIODE 11ES2-NTA2B
D467	8-719-024-99	DIODE 11ES2-NTA2B

Ref. No.	Part No.	Description				Remarks
		<FERRITE BEAD>				
FB460	1-414-093-11	FERRITE	0UH			
FB465	1-414-093-11	FERRITE	0UH			
		<IC>				
IC1	6-800-020-01	IC	M30803MG-107FP			
IC310	8-759-634-51	IC	NJM4558D			
IC360	8-759-634-51	IC	NJM4558D			
IC370	8-759-634-51	IC	NJM4558D			
IC401	8-759-445-59	IC	BA033T			
IC406	8-759-481-02	IC	M62016L			
IC411	8-759-231-53	IC	M5F7805L			
IC421	8-759-633-42	IC	M5293L			
IC440	8-759-633-65	IC	M54641L			
IC500	8-759-579-68	IC	AK4524			
IC550	8-759-591-61	IC	TC7WHU04FU(TE12R)			
IC600	8-759-917-18	IC	SN74HCU04AN			
IC611	8-749-012-70	IC	GP1F38R			
		<JACK>				
J300	1-784-429-11	JACK, PIN 4P (ANALOG IN/OUT)				
J800	1-580-394-11	CONNECTOR, DIN 6P (PC LINK)				
		<COIL>				
L555	1-414-142-11	INDUCTOR	1uH			
L611	1-410-509-11	INDUCTOR	10uH			
L653	1-412-473-21	INDUCTOR	0uH			
L657	1-412-473-21	INDUCTOR	0uH			
L804	1-410-324-11	INDUCTOR	4.7uH			
		<TRANSISTOR>				
Q181	8-729-900-74	TRANSISTOR	UN4216-TA			
Q281	8-729-900-74	TRANSISTOR	UN4216-TA			
Q380	8-729-422-57	TRANSISTOR	UN4111-TA			
Q440	8-729-900-80	TRANSISTOR	UN4211-TA			
Q445	8-729-119-76	TRANSISTOR	2SA1115TP-EF			
Q490	8-729-194-57	TRANSISTOR	2SC945TP-QP			
Q911	8-729-922-37	TRANSISTOR	2SD2144S-TP-UVW			
		<RESISTOR>				
R17	1-249-429-11	CARBON	10K	5%	1/4W (AEP,UK,HK,AUS)	
R21	1-249-429-11	CARBON	10K	5%	1/4W	
R22	1-249-429-11	CARBON	10K	5%	1/4W	
R23	1-249-429-11	CARBON	10K	5%	1/4W	
R28	1-249-429-11	CARBON	10K	5%	1/4W	
R41	1-249-441-11	CARBON	100K	5%	1/4W	
R44	1-249-429-11	CARBON	10K	5%	1/4W	
R46	1-249-429-11	CARBON	10K	5%	1/4W	
R49	1-249-429-11	CARBON	10K	5%	1/4W	
R51	1-249-429-11	CARBON	10K	5%	1/4W	
R53	1-249-429-11	CARBON	10K	5%	1/4W	
R55	1-249-429-11	CARBON	10K	5%	1/4W	
R61	1-249-429-11	CARBON	10K	5%	1/4W	
R87	1-249-429-11	CARBON	10K	5%	1/4W	
R88	1-249-429-11	CARBON	10K	5%	1/4W	
R90	1-249-441-11	CARBON	100K	5%	1/4W (AEP,UK,HK,AUS)	
R92	1-249-429-11	CARBON	10K	5%	1/4W	
R93	1-249-429-11	CARBON	10K	5%	1/4W	
R94	1-249-429-11	CARBON	10K	5%	1/4W	
R95	1-249-429-11	CARBON	10K	5%	1/4W	
R97	1-249-429-11	CARBON	10K	5%	1/4W	
R100	1-249-441-11	CARBON	100K	5%	1/4W	
R111	1-249-435-11	CARBON	33K	5%	1/4W	
R112	1-249-431-11	CARBON	15K	5%	1/4W	
R113	1-247-887-00	CARBON	220K	5%	1/4W	
R115	1-249-401-11	CARBON	47	5%	1/4W	F
R161	1-215-445-00	METAL	10K	1%	1/4W	
R162	1-215-445-00	METAL	10K	1%	1/4W	
R163	1-215-445-00	METAL	10K	1%	1/4W	
R164	1-215-445-00	METAL	10K	1%	1/4W	
R165	1-215-453-00	METAL	22K	1%	1/4W	
R166	1-215-453-00	METAL	22K	1%	1/4W	
R171	1-215-425-00	METAL	1.5K	1%	1/4W	
R172	1-215-425-00	METAL	1.5K	1%	1/4W	
R176	1-249-415-11	CARBON	680	5%	1/4W	F
R177	1-249-441-11	CARBON	100K	5%	1/4W	
R178	1-249-411-11	CARBON	330	5%	1/4W	
R181	1-249-429-11	CARBON	10K	5%	1/4W (AEP,UK,HK,AUS)	
R211	1-249-435-11	CARBON	33K	5%	1/4W	
R212	1-249-431-11	CARBON	15K	5%	1/4W	
R213	1-247-887-00	CARBON	220K	5%	1/4W	
R215	1-249-401-11	CARBON	47	5%	1/4W	F
R261	1-215-445-00	METAL	10K	1%	1/4W	
R262	1-215-445-00	METAL	10K	1%	1/4W	
R263	1-215-445-00	METAL	10K	1%	1/4W	
R264	1-215-445-00	METAL	10K	1%	1/4W	
R265	1-215-453-00	METAL	22K	1%	1/4W	
R266	1-215-453-00	METAL	22K	1%	1/4W	
R271	1-215-425-00	METAL	1.5K	1%	1/4W	
R272	1-215-425-00	METAL	1.5K	1%	1/4W	
R276	1-249-415-11	CARBON	680	5%	1/4W	F
R277	1-249-441-11	CARBON	100K	5%	1/4W	
R278	1-249-411-11	CARBON	330	5%	1/4W	
R281	1-249-429-11	CARBON	10K	5%	1/4W (AEP,UK,HK,AUS)	
R380	1-249-441-11	CARBON	100K	5%	1/4W	
R381	1-247-883-00	CARBON	150K	5%	1/4W	
R406	1-249-409-11	CARBON	220	5%	1/4W	F
R407	1-249-429-11	CARBON	10K	5%	1/4W	
R422	1-247-881-00	CARBON	120K	5%	1/4W	
R423	1-249-441-11	CARBON	100K	5%	1/4W	
R424	1-249-409-11	CARBON	220	5%	1/4W	F
R425	1-249-409-11	CARBON	220	5%	1/4W	F
R431	1-247-807-31	CARBON	100	5%	1/4W	
R432	1-249-415-11	CARBON	680	5%	1/4W	F
R433	1-249-411-11	CARBON	330	5%	1/4W	
R434	1-249-433-11	CARBON	22K	5%	1/4W	
R435	1-249-438-11	CARBON	56K	5%	1/4W	
R436	1-247-891-00	CARBON	330K	5%	1/4W	
R437	1-249-417-11	CARBON	1K	5%	1/4W	F
R441	1-249-433-11	CARBON	22K	5%	1/4W	
R442	1-249-431-11	CARBON	15K	5%	1/4W	
R443	1-249-433-11	CARBON	22K	5%	1/4W	
R491	1-249-411-11	CARBON	330	5%	1/4W	
R492	1-249-418-11	CARBON	1.2K	5%	1/4W	F
R511	1-249-401-11	CARBON	47	5%	1/4W	F
R512	1-249-401-11	CARBON	47	5%	1/4W	F

MAIN **PT** **VOL-SEL**

Ref. No.	Part No.	Description			Remarks
R513	1-249-401-11	CARBON	47	5%	1/4W F
R514	1-249-401-11	CARBON	47	5%	1/4W F
R515	1-247-807-31	CARBON	100	5%	1/4W
R516	1-247-807-31	CARBON	100	5%	1/4W
R517	1-247-807-31	CARBON	100	5%	1/4W
R551	1-247-903-00	CARBON	1M	5%	1/4W
R552	1-249-411-11	CARBON	330	5%	1/4W
R554	1-249-411-11	CARBON	330	5%	1/4W
R556	1-249-411-11	CARBON	330	5%	1/4W
R614	1-249-437-11	CARBON	47K	5%	1/4W
R801	1-249-429-11	CARBON	10K	5%	1/4W
R802	1-247-807-31	CARBON	100	5%	1/4W
R805	1-249-429-11	CARBON	10K	5%	1/4W
R806	1-247-807-31	CARBON	100	5%	1/4W
R807	1-249-409-11	CARBON	220	5%	1/4W F
R808	1-249-409-11	CARBON	220	5%	1/4W F
R851	1-249-429-11	CARBON	10K	5%	1/4W
R911	1-249-421-11	CARBON	2.2K	5%	1/4W F
R912	1-249-437-11	CARBON	47K	5%	1/4W
R1090	1-249-429-11	CARBON	10K	5%	1/4W (US,CND,SP)
R1091	1-249-429-11	CARBON	10K	5%	1/4W
		<VIBRATOR>			
X15	1-795-004-21	VIBRATOR, CERAMIC (10MHz)			
X550	1-781-998-11	VIBRATOR, CRYSTAL (45.1584MHz)			
**********					
	1-681-734-12	PT BOARD			
		********			
		<CAPACITOR>			
⚠C910	1-113-920-11	CERAMIC	0.0022uF	20%	250V
C923	1-164-159-11	CERAMIC	0.1uF		50V
C924	1-164-159-11	CERAMIC	0.1uF		50V
C951	1-164-159-11	CERAMIC	0.1uF		50V
C952	1-164-159-11	CERAMIC	0.1uF		50V
		<CONNECTOR>			
* CN900	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P (AC IN)			
		<DIODE>			
D910	8-719-911-19	DIODE 1SS133T-72			
		<LINE FILTER>			
⚠LF900	1-419-625-11	COIL, LINE FILTER			
		<RELAY>			
⚠RY910	1-755-356-11	RELAY			
		<TRANSFORMER>			
⚠TR900	1-435-543-11	TRANSFORMER, POWER (US,CND)			
⚠TR900	1-435-544-11	TRANSFORMER, POWER (AEP,UK,HK,AUS)			
⚠TR900	1-435-545-11	TRANSFORMER, POWER (SP)			
⚠TR950	1-437-337-11	TRANSFORMER, POWER (SP)			
⚠TR950	1-437-335-11	TRANSFORMER, POWER (US,CND)			
⚠TR950	1-437-336-11	TRANSFORMER, POWER (AEP,UK,HK,AUS)			
**********					

Ref. No.	Part No.	Description	Remarks
	1-681-738-12	VOL-SEL BOARD (SP)	
		**********	
		<CONNECTOR>	
* CN990	1-573-565-11	PIN, CONNECTOR 5P	(SP)
		<SWITCH>	
⚠S990	1-771-474-11	SWITCH, POWER (VOLTAGE SELECTOR)(SP)	
**********			
		MISCELLANEOUS	
		**********	
9	1-792-811-11	WIRE (FLAT TYPE) (23 CORE)	
10	1-757-928-11	WIRE (FLAT TYPE) (27 CORE)	
⚠12	1-696-846-21	CORD, POWER (AUS)	
⚠12	1-777-071-61	CORD, POWER (AEP,UK,HK,SP)	
⚠12	1-783-531-31	CORD, POWER (US,CND)	
* 14	1-569-972-21	SOCKET, SHORT 2P	
⚠17	1-569-008-21	ADAPTOR, CONVERSION (SP)	
⚠17	1-770-019-11	ADAPTOR, CONVERSION PLUG 3P (UK,HK)	
63	1-757-930-11	WIRE (FLAT TYPE) (17 CORE)	
357	1-678-514-11	PWB, FLEXIBLE	
⚠358	A-4672-541-A	OPTICAL PICK-UP KMS-260E	
FL750	1-517-986-11	INDICATOR TUBE, FLUORESCENT	
HR901	1-500-670-11	HEAD, OVER LIGHT	
M101	A-4672-898-A	MOTOR ASSY, SPINDLE	
M102	A-4735-076-A	MOTOR ASSY, SLED	
M103	A-4735-074-A	MOTOR ASSY, LOADING	
S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT SW)	
⚠TR900	1-435-543-11	TRANSFORMER, POWER (US,CND)	
⚠TR900	1-435-544-11	TRANSFORMER, POWER (AEP,UK,HK,AUS)	
⚠TR900	1-435-545-11	TRANSFORMER, POWER (SP)	
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-476-057-11	REMOTE COMMANDER (RM-D47M)	
	1-558-271-11	CORD, CONNECTION (AUDIO)	
	1-574-264-11	CORD, LIGHT PLUG (OPTICAL)	
	4-233-926-11	MANUAL, INSTRUCTION (ENGLISH)	
	4-233-926-21	MANUAL, INSTRUCTION (FRENCH)	(AEP,CND,SP)
	4-233-926-31	MANUAL, INSTRUCTION (SPANISH) (AEP)	
	4-233-926-41	MANUAL, INSTRUCTION	(GERMAN,DUTCH,SWEDISH) (AEP)
	4-233-926-51	MANUAL, INSTRUCTION (ITALIAN,POLISH)	(AEP)
	4-233-926-61	MANUAL, INSTRUCTION	(TRADITIONAL CHINESE) (HK,SP)
	4-981-643-11	COVER, BATTERY (FOR RM-D47M)	
**********			
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#2	7-685-850-04	SCREW +BVTT 2X3 (S)	
#3	7-685-204-19	SCREW +KTP 2X6 TYPE2 NON-SLIT	

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.

REVISION HISTORY

Clicking the version allows you to jump to the revised page.
Also, clicking the version at the upper right on the revised page allows you to jump to the next revised page.

Ver.	Date	Description of Revision
1.0	2001.05	New