MDS-NT1

SERVICE MANUAL

AEP Model
UK Model
E Model

Ver 1.0 2002.02

Self Diagnosis Supported model

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Model Name Using Similar Mechanism	NEW
MD Mechanism Type	MDM-7S2B
Optical Pick-up Name	KMS-262E

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser (λ = 780 nm) Emission duration: continuous
Revolutions (CLV)	800 rpm to 1800 rpm
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Coding	Adaptive Transform Acoustic Coding (ATRAC)/ATRAC 3
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ±0.8 dB
Signal-to-noise ratio	Over 96 dB during playback
Wow and flutter	Below measurable limit

Outputs

LINE (ANALOG) OUT	Jack type: stereo-mini Rated output: 1 Vrms (at 50 kilohms) Load impedance: Over 10 kilohms
PHONES	Jack type: stereo-mini Rated output: 5 mW Load impedance: 32 ohms

General

USB port	series B, self powerd, full speed

Where purchased	Power requirements*
Europe and other countries	220 – 230 V AC, 50/60 Hz

* Using an AC power adaptor (supplied)

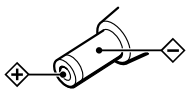
Power consumption	6 W
Dimensions (approx.)	152 × 52 × 249 mm (w/h/d) incl. projecting parts and controls
Mass (approx.)	1.0 kg

Supplied accessories

- AC power adaptor (1)
- USB cable (1)
- Audio connecting cord (stereo mini-plug ×1 ⟷ stereo mini-plug ×1) (1)
- OpenMG Jukebox CD-ROM (1)
- Operating instructions for OpenMG Jukebox (1)

- Do not connect the supplied AC power adaptor to a switched AC outlet (e.g., on an amplifier).
- Use only the supplied AC power adaptor. Do not use any other AC power adaptor.

Polarity of the plug



Design and specifications are subject to change without notice.

MINIDISC DECK

9-873-614-01
2002B0500-1
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Home Audio Company
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SONY®

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)".

The deck's self-diagnosis function automatically checks the condition of the MD deck when an error occurs, then indicates the nature of the error through the two indicators. If the indicators light up or flash, find them in the following table and perform the indicated countermeasure. Should the problem persist, consult your nearest Sony dealer.

Playback Indicator (green)	Recording Indicator (red)	Cause/Remedy
	Flashes	The recording was not made properly. (C13/Rec Error) ➡ Set the deck in a stable surface, and repeat the recording procedure.
	Flashes	The inserted MD is dirty (with smudges, fingerprints, etc.), scratched, or substandard in quality. (C13/Rec Error) ➡ Replace the disc and repeat the recording procedure.
Flashes		The deck could not read the TOC on the MD properly. (C13/Read Error) ➡ Take out the MD and insert it again.
	Lights up	The deck could not read the TOC on the MD properly. (C14/Toc Error) ➡ Insert another disc. ➡ If possible, erase all the tracks on the MD.
Lights up	Lights up	There is an error in the internal data that the deck needs in order to operate. (E0001/MEMORY NG) ➡ Consult your nearest Sony dealer.
Flashes	Flashes	There is a problem with the optical pickup. (E0101/LASER NG) ➡ Consult your nearest Sony dealer.
Both indicators flash alternately		An MD loading problem has occurred. (E0201/LOADING NG) ➡ Consult your nearest Sony dealer.

PROCEDURE FOR USING THE SELF-DIAGNOSIS FUNCTION (ERROR HISTORY DISPLAY MODE)

Note 1: The test mode and recording of this set are controlled by a personal computer, thus requiring the set to be connected to the PC. Prepare the personal computer in which necessary software is already installed.
- Attached software "OpenMG Jukebox" (necessary for recording (check in, check out)) (Part No. : 4-237-880-01)
- Software for test mode "TestMode_S.exe" ("TestMode_S.exe" and essential files "data_files.csv", "Net MDUSB.dil" are distributed together with the Service Manual. For the test mode, copy these three files in the same folder beforehand)

Note 2: In the operation in the test mode, the operational description requiring "click [xxx]" means that you have to click the button on the screen. ("xxx" indicates the button name)

Note 3: 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, click the [MENU/NO] to exit the mode.

1. Press the [▶/▶▶I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. Click the [JOG UP] or [JOG DOWN] and when "[Service]" is displayed, click the [ENTER/YES].
6. Click the [JOG UP] or [JOG DOWN] to display "Err Display".
7. Click the [ENTER/YES] to sets the error history mode and displays "op rec tm".
8. Select the contents to be displayed or executed using the [JOG UP] or [JOG DOWN].
9. Click the [PUSH] to display or execute the contents selected.
10. Click the [PUSH] another time returns to step 8.
11. Click the [MENU/NO] to display "Err Display" and release the error history mode.
12. To release the test mode, quit the software for test mode after the [REPEAT] clicked.

Note: When retrying this operation, start from step1.

ITEMS OF ERROR HISTORY MODE ITEMS AND CONTENTS

Selecting the Test Mode

Display	Details of History
op rec tm	Cumulative recording time is displayed. When cumulative recording time is over 1 minute, the hour and minute are displayed as they are. When it is under 1 minute, “Under 1 min” is displayed. The displayed time shows how long the laser is in high power state. It is about one fourth the actual recording time.
op play tm	Cumulative playing time is displayed. When cumulative playing time is over 1 minute, the hour and minute are displayed as they are. When it is under 1 minute, “Under 1 min” is displayed.
spdl rp tm	Cumulative spindle motor running time is displayed. When cumulative spindle motor run time is over 1 minute, the hour and minute are displayed as they are. When it is under 1 minute, “Under 1 min” is displayed.
retry err	Displays the total number of retries during recording and number of retry errors during play. Displayed as “r☐☐ p☐☐”. “r” indicates the retries during recording while “p” indicates the retry errors during play. The number of retries and retry errors are displayed in hexadecimal digits from 00 to FF.
total err	Displays the total number of errors. Displayed as “total ☐☐”. The number of errors is displayed in hexadecimal digits from 00 to FF.
err history	Displays the 10 latest errors. Displayed as “0☐ ErrCd@@”. ☐ indicates the history number. The smaller the number, the more recent is the error. (00 is the latest). @@ indicates the error code. Refer to the following table for the details. The error history can be switched by clicking the JOG UP or JOG DOWN.
retry adrs	Displays the past five retry addresses. Displays “☐☐ ADRS ☐☐☐☐”, ☐☐ is the history number, ☐☐☐☐ is the cluster with the retry error. Select the error history number using the JOG UP or JOG DOWN.
er refresh	Mode to clear the error history and retry address history. [Operating method] 1) Click the JOG UP or JOG DOWN when “er refresh” is displayed. 2) The display will change to “er refresh?”, and then click the ENTER/YES. The operation is over if “Complete!” is displayed. After this mode was executed, check the following: • The data have been cleared. • Perform the recording and playing to check that the mechanism operates normally.
tm refresh	Mode to clear the “op rec tm” and “op play tm” histories. These histories serve as approximate indications of when to replace the optical pick-up. If the optical pick-up has been replaced, perform this operation and clear the history. [Operating method] 1) Click the JOG UP or JOG DOWN when “tm refresh” is displayed. 2) The display will change to “tm refresh?”, and then click the ENTER/YES. The operation is over if “Complete!” is displayed. After this mode was executed, check the following: • The data have been cleared. • Perform the recording and playing to check that the mechanism operates normally.
op change	Mode to clear cumulative time of “op rec tm” and “op play tm”. These historical data are used to determine the timing when the optical pick-up is to be replaced. When the optical pick-up was replaced, perform this operation to clear historical data. [Operating method] 1) Click the JOG UP or JOG DOWN when “op change” is displayed. 2) The display will change to “op chang?”, and then click the ENTER/YES. The operation is over if “Complete!” is displayed.
spdl change	Mode to clear cumulative time of “spdl rp tm”. This historical data is used to determine the timing when the spindle motor is to be replaced. When the spindle motor was replaced, perform this operation to clear historical data. [Operating method] 1) Click the JOG UP or JOG DOWN when “spdl change” is displayed. 2) The display will change to “spdl chang?”, and then click the ENTER/YES. The operation is over if “Complete!” is displayed.

Table of Error Codes

Error Code	Details of Error
10	Loading failed
12	Loading switch combination is illegal
20	Head of PTOC could not be read within the specified time
21	Head of PTOC could be read but its content is erroneous
22	Access to UTOC could not be made within the specified time
23	UTOC could be not read within the specified 3time
24	Content of UTOC is erroneous
30	Playing could not start
31	Content of sector is erroneous
40	Cause of retry occurred during normal recording
41	D-RAM overflowed and retry was executed
42	Retry was executed during the writing to TOC
43	S.F editing was interrupted by retry
50	Address could not be read except in access processing
51	Focusing failed and it is out of control
60	Unlock retry

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The 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 bottom exterior.

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 the 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.

SECTION 1
SERVICING NOTES

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.

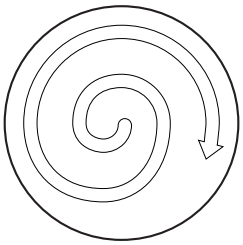
NOTES ON LASER DIODE EMISSION CHECK

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

CLEANING OBJECTIVE LENS OF OPTICAL PICK-UP

• In cleaning the objective lens of optical pick-up, be sure the following below.

1. In cleaning the lens, do not apply an excessive force.
   As the optical pick-up is vulnerable, application of excessive force could damage the lens holder.
2. In cleaning, do not use a cleaner other than exclusive cleaning liquid (KK-91 or isopropyl alcohol).
3. Wipe the objective lens spirally from center toward outside. (See Figure A)



(Figure A)

4. Eject the disc, if loaded.
5. Disconnect the power cord from the socket to shut off the power supply.

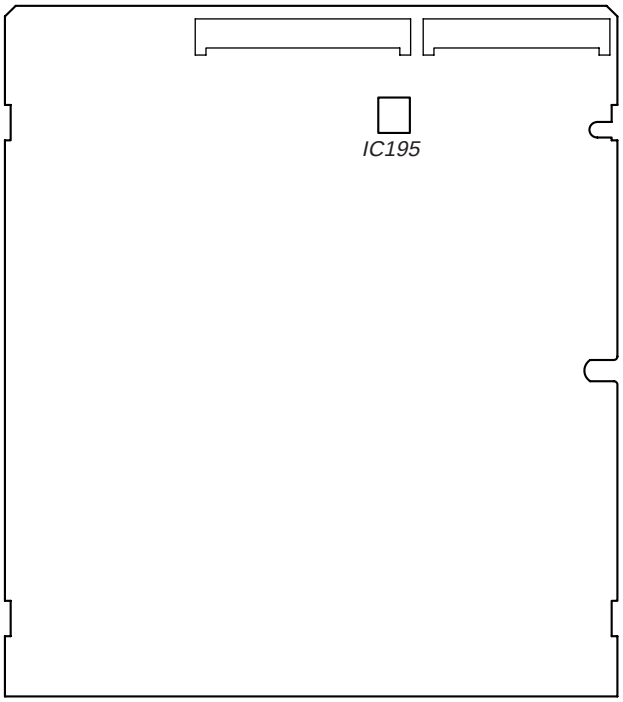
NOTES ON REPLACING BD BOARD OR MD MECHANISM DECK

In replacing the BD board or MD mechanism deck, perform the work through the steps provided below:

1. Remove the IC195 from the BD board to be replaced.
2. Remove the IC195 from new BD board.
3. Mount the IC195 on new BD board, which was removed from the BD board to be replaced.
4. Install new BD board in the set.

Note: The IC195 cannot be replaced with a new part. If IC195 is faulty, replace the entire BD board.

– BD BOARD (Conductor Side) –



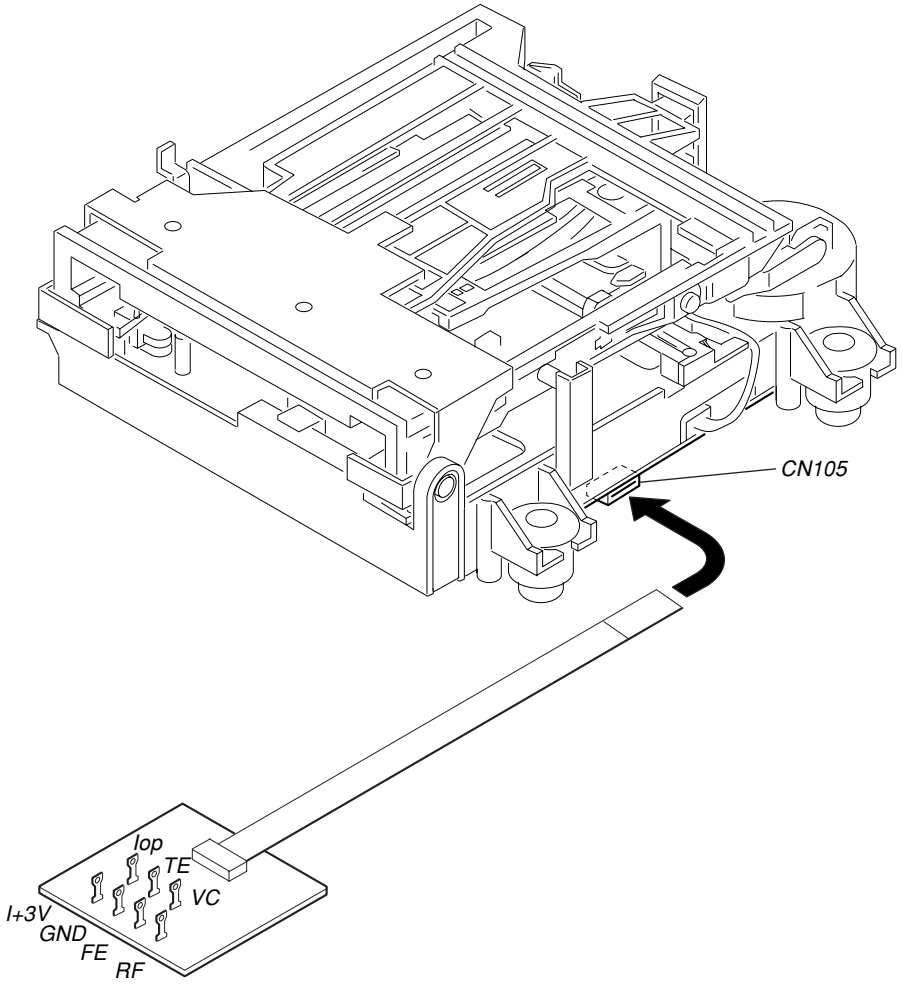
OPERATION CHECK IN NORMAL MODE

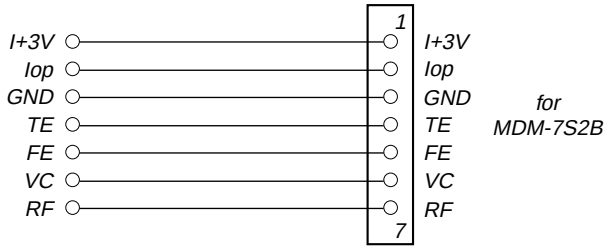
The set alone is capable of performing the play function only. In checking the recording and other functions, connect the set to the PC with a USB cable and perform the operation on the application software “OpenMG Jukebox” attached.

JIG FOR CHECKING BD BOARD WAVEFORM

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

GND : Ground
I+3V : For measuring Iop (Check the deterioration of the optical pick-up laser)
Iop : For measuring Iop (Check the deterioration of the optical pick-up laser)
TE : Tracking error signal (Traverse adjustment)
VC : Reference level for checking the signal
RF : RF signal (Check jitter)
FE : Focus error signal





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Prepare the personal computer in which necessary software is already installed.
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- Software for test mode "TestMode_S.exe" ("TestMode_S.exe" and essential files "data_files.csv", "Net MDUSB.dil" are distributed together with the Service Manual. For the test mode, copy these three files in the same folder beforehand)

Note 2: In the operation in the test mode, the operational description requiring "click [xxx]" means that you have to click the button on the screen. ("xxx" indicates the button name)

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 optical pick-up label. 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 Procedure:

1. Press the [►/►►I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. Click the [JOG UP] or [JOG DOWN] to display "[Service]", and click the [ENTER/YES].
6. Click the [JOG UP] or [JOG DOWN] to display "Iop Write" (C05), and click the [ENTER/YES].
7. The display becomes "Ref=@@@.@" (@ is an arbitrary number) and the numbers which can be changed will blink.
8. Input the Iop value written on the optical pick-up label.
   To select the number : Click the [JOG UP] or [JOG DOWN].
   To select the digit : Click the [PUSH].
9. When the [ENTER/YES] is clicked, the display becomes "Measu=@@@.@" (@ is an arbitrary number).
10. As the adjustment results are recorded for the 6 value. Leave it as it is and click the [PUSH].
11. "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write (C05)".
12. Quit the software for test mode after the [REPEAT] clicked.

Note: When retrying this operation start from step1.

Display Procedure:

1. Press the [►/►►I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. Click the [JOG UP] or [JOG DOWN] to display "[Service]", and click the [ENTER/YES].
6. Click the [JOG UP] or [JOG DOWN] to display "Iop Read" (C26), and click the [ENTER/YES].
7. "@@.@/##.#" is displayed and the recorded contents are displayed.
   @@.@ : indicates the Iop value on the optical pick-up label.
   ##.# : indicates the Iop value after adjustment
8. To end, click the [PUSH] and [MENU/NO] to display "Iop Read" (C26).
9. Quit the software for test mode after the [REPEAT] clicked.

Note: When retrying this operation start from step1.

CHECKS PRIOR TO PARTS REPLACEMENT AND ADJUSTMENTS IN MD

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”.

Note: This set uses optical pick-up KMS-262E in the production, but for the repair, only the KMS-262A is supplied. As a result, two types of optical pick-ups are used for this set, and the specified values for the check and adjustment of the laser power vary depending on the type.Details of the identify of KMS-262A/KMS-262E are described in “5-4. How to Identify Optical Pick-up KMS-262A/KMS-262E”. (See Page 26)

	Criteria for Determination (Unsatisfactory if specified value is not satisfied)	Measure if unsatisfactory:
Laser power check (5-7-2 : See page 28)	• 0.90 mW power Specified value : 0.84 to 0.92 mW (KMS-262A) 0.90 to 0.96 mW (KMS-262E) • 8.40 mW power Specified value : 8.1 to 8.7 mW (KMS-262A) 8.4 to 8.9 mW (KMS-262E)	• Clean the optical pick-up • Adjust again • Replace the optical pick-up
	• Iop (at 8.4mW) Labeled on the optical pick-up Iop value ± 10mA	• Replace the optical pick-up
Auto check (5-7-4 : See page 29)	• Unsatisfactory if displayed as “NG: XXXX” NG (XXXX is arbitrary number)	• Replace the optical pick-up
Temperature compensation offset check (5-7-1 : See page 28)	• Unsatisfactory if displayed as “T=@@ (##) [NG” NG (@@, ## are both arbitrary numbers)	• Check for disconnection of the circuits around D101 (BD board) • Check the signals around IC101, IC201, CN102, CN103 (BD board)

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.

SERVICE MODE

Microcomputer Version Display

Procedure:

1. Press the [►/►►I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. Enter the test mode, then click the [JOG UP] or [JOG DOWN] to display "<INFORMATION> ", and click the [ENTER/YES].
6. "NT1-V✱✱.✱✱✱✱" is displayed. In the event of different display, click the [ENTER/YES] until it is displayed.
   "✱✱.✱✱✱✱" indicates the microcomputer version.

Software Reset

Procedure:

1. Press the [►/►►I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. Quit the software for test mode after the [REPEAT] clicked.

Note: When retrying this operation, start from step 1.

System Requirements

- IBM PC/AT or Compatible (The software does not run on Macintosh.)
  - CPU: MMX, Pentium® 233 MHz or higher (Pentium® II 400 MHz or higher is recommended)
  - Hard disk drive space: 60 MB or more (The amount of necessary space depends on the version of the Windows OS or the size of your audio files.)
  - RAM: 64 MB or more
  - CD-ROM drive (capable of software installation and playback of an audio CD)
  - Sound Board
  - USB port (supports USB 2.0 Full Speed. (previously USB 1.1))
- Operating System: Windows® 98/Windows® 98 Second Edition/Windows® 2000 Professional/Windows® Me/Windows® XP Home Edition/Windows® XP Professional (manufacturer installed)
  The following environments are not supported.
  - Windows® 95, Windows® NT, or other versions of Windows® NT (such as Server)
  - An environment that is an upgrade of the original manufacturer-installed operating system, as in the following examples:
    Windows® 3.1/Windows® 95 → Windows® 98 (or Windows® 98 Second Edition/Windows® Me)
    Windows® Me/Windows® 2000 Professional → Windows® XP
  - Multi-boot environment with Windows® 2000 (or Windows® XP) and Windows® 98 (or Windows® 98 Second Edition/Windows® Me)
- Display: High (16 bit) Color or more (800 × 480 dot or more)
- Internet access: for Web registration and EMD services
- Windows Media Player (Version 6.4 or higher) installed for playing MP3 files.
- Windows Media Player (Version 7.0 or higher) installed for playing WMA files.
- We do not assure the operation of MusicClip on the computer other than VAIO series computer.

Notes

- We do not assure trouble-free operation for all computers satisfying the system requirements.
- Trouble-free operation is not guaranteed following the self-conducted upgrade of home-built PCs oroperating systems.

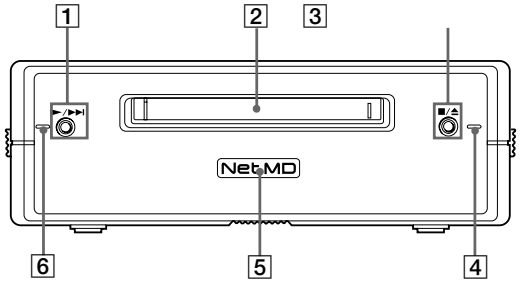
SECTION 2
GENERAL

This section is extracted from instruction manual.

• LOCATION OF CONTROLS

– Front View –

This chapter tells you about the location and function of the various buttons, controls on the MD deck.

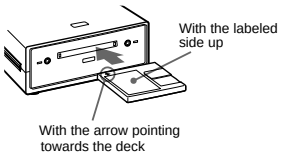


1 ►/►►I button

Press while the unit is stopped to start playback.
Press while the unit is playing to locate the beginning of the next track.

2 MD insertion slot

Insert the MD as illustrated below.



3 ■/⏏ button

Press while the unit is playing to stop playback.
Press while the unit is stopped to eject the MD.

4 Recording indicator

Lights up in the following cases:
While an audio file is being transferred from the connected computer to the MD deck (check-out).
While an audio file is being transferred from the MD deck to the connected computer (check-in).
When TOC information (such as track information) has not been recorded to the MD.
Flashes when overwriting of the MD's TOC by the MD deck is started by pressing ■/⏏ .

5 Net MD lamp

Indicates the USB connection status between the unit and the computer.
Lights dimly when the unit is connected only to a wall outlet with the supplied AC adaptor.
Lights brightly when the unit is connected to a computer with its operating system running.

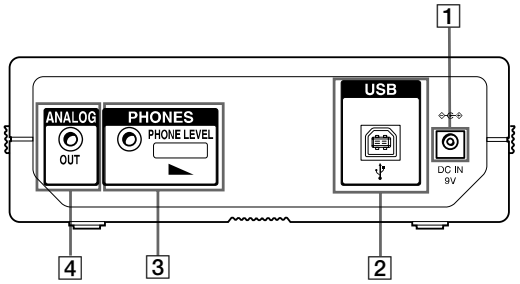
6 Playback indicator

Lights during playback.
Flashes while the MD's TOC is being loaded by the MD deck.

Notes

- Except for operation of the ■/⏏ button for ejecting the MD, all other operations on the MD deck are disabled while the Net MD is connected through the supplied USB cable to a computer with its operating system running.
  Under these conditions, the Net MD lamp flashes (the other indicators remain off) whenever you attempt to do an operation that is disabled.
- The flashing of the Net MD lamp and flashing or lighting up of the other indicators are indications that the MD deck's self-diagnosis function is active. For details, see page 12.

– Rear View –



1 DC IN 9V jack

Connect this jack to a wall outlet via the supplied AC power adaptor to power the MD deck.

2 USB port

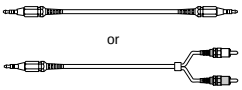
Connect this port to a USB port on your computer with the supplied USB cable.

3 Headphones jack and PHONE LEVEL control

Connect a headphones plug to this jack.
Turn the PHONE LEVEL control to adjust the volume of the connected headphones.

4 ANALOG OUT jack

Connect active speakers, etc. to this jack with the supplied audio connecting cord (stereo mini-plug ×1 ⟷ stereo mini-plug ×1) or optional audio connecting cord (stereo mini-plug ×1 ⟷ phono plug ×2).



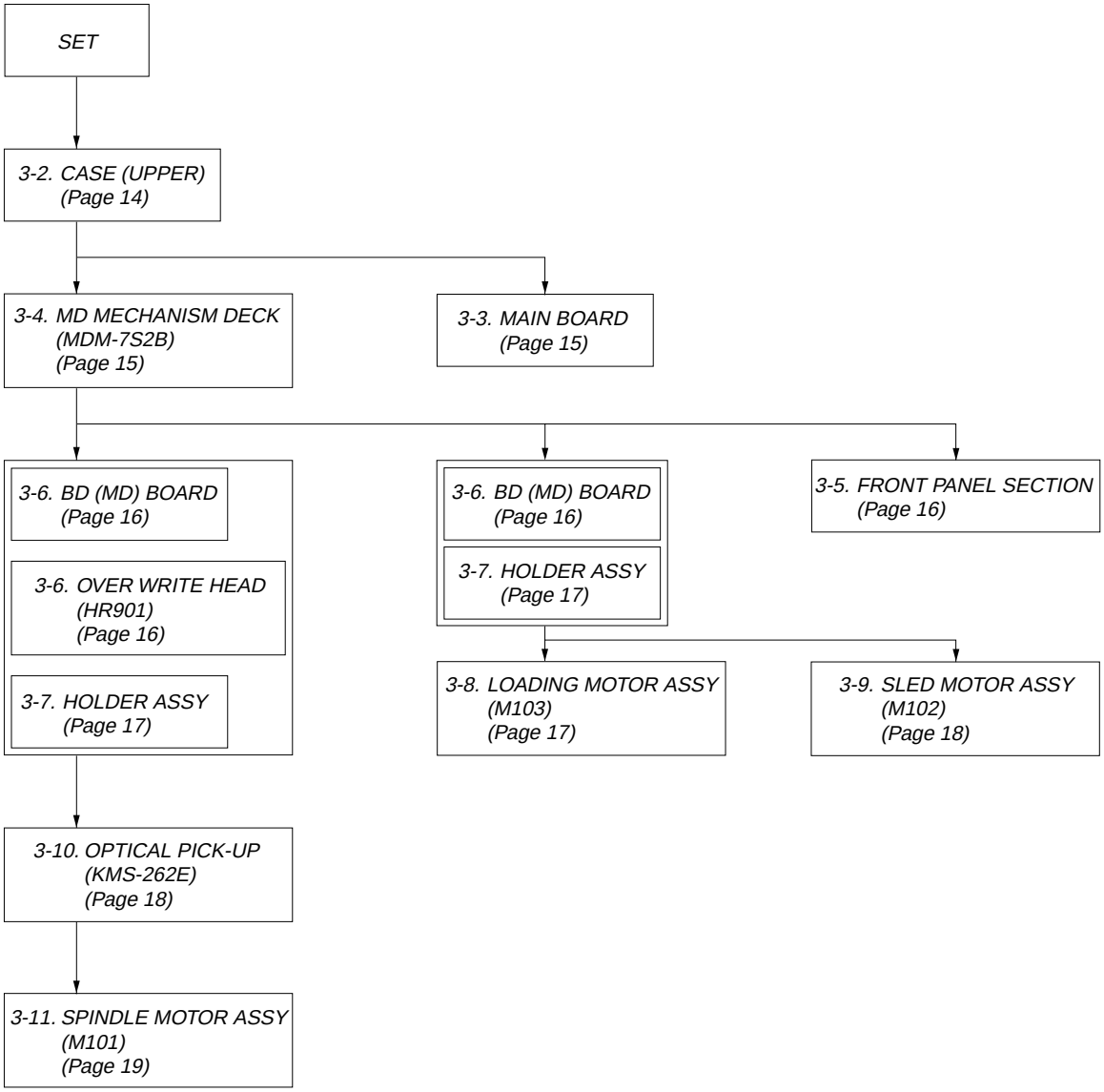
SECTION 3
DISASSEMBLY

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

3-1. DISASSEMBLY FLOW

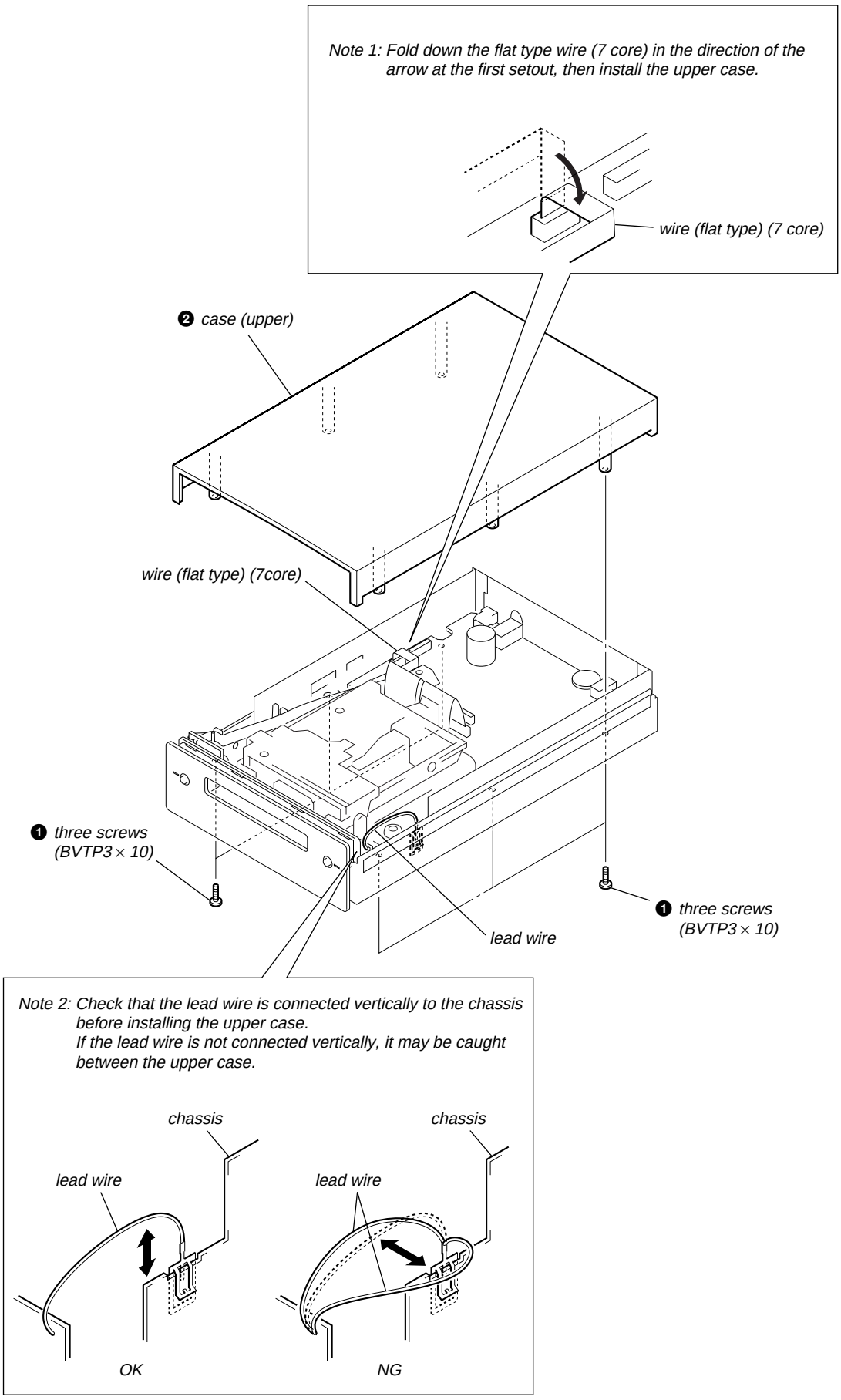
Note: *The process described in* ▣ *can be performed in any order.*

Note: *Without completing the process described in* ▣ *, the next process can not be performed.*

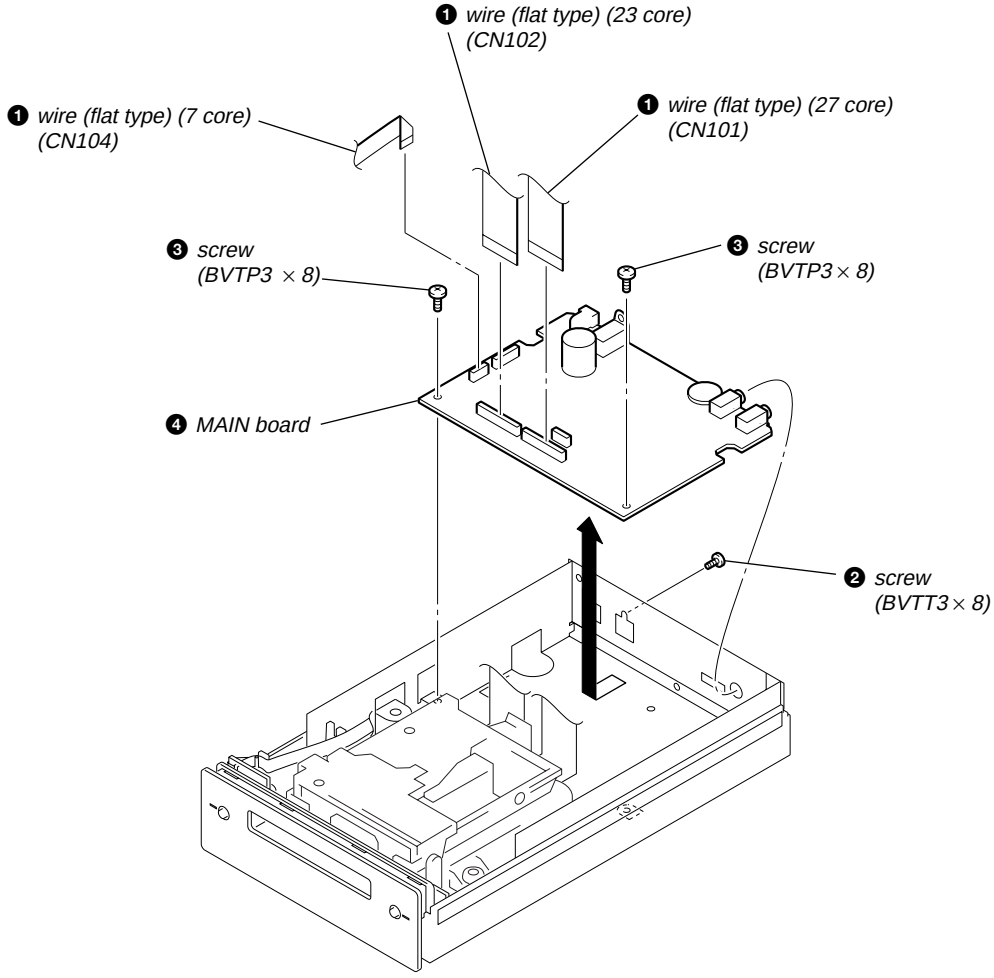


Note: Follow the disassembly procedure in the numerical order given.

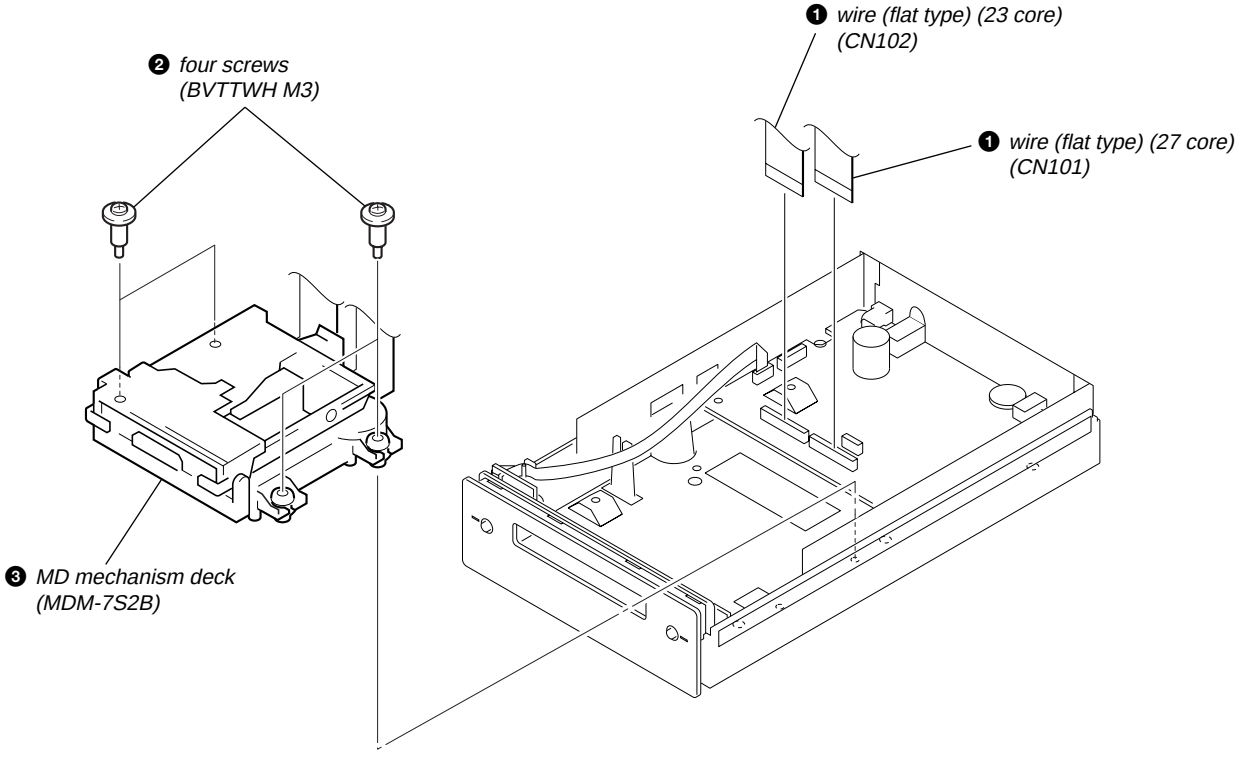
3-2. CASE (UPPER)



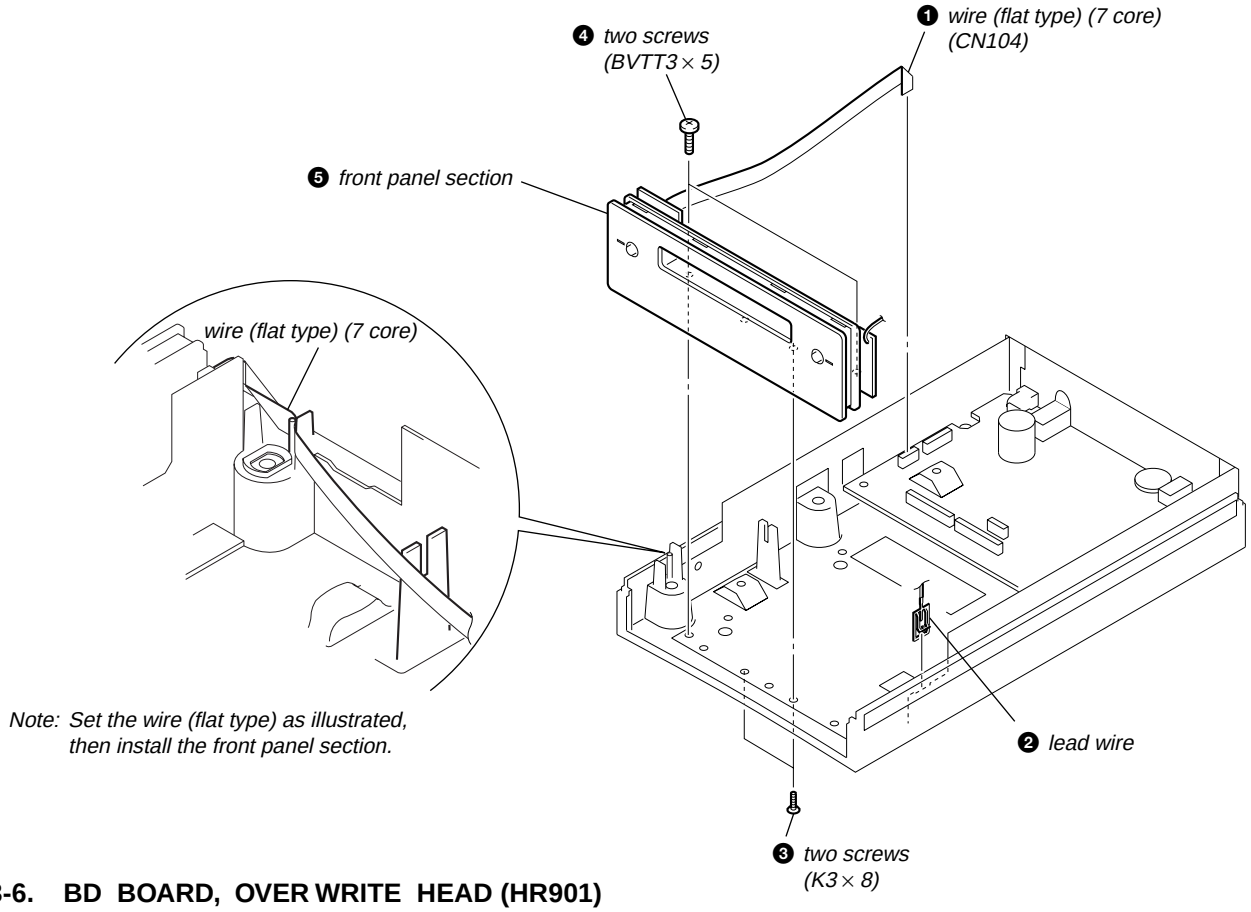
3-3. MAIN BOARD



3-4. MD MECHANISM DECK (MDM-7S2B)



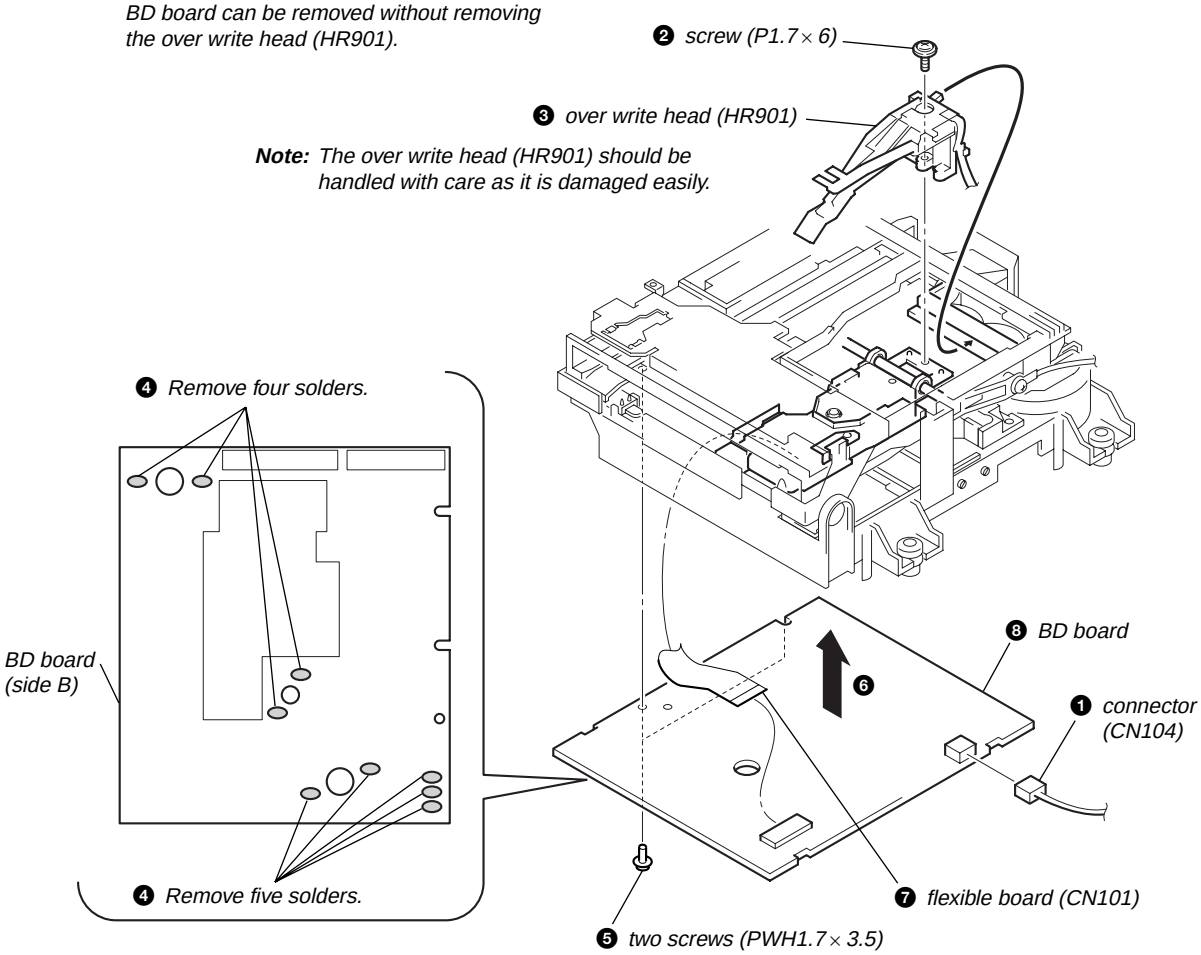
3-5. FRONT PANEL SECTION



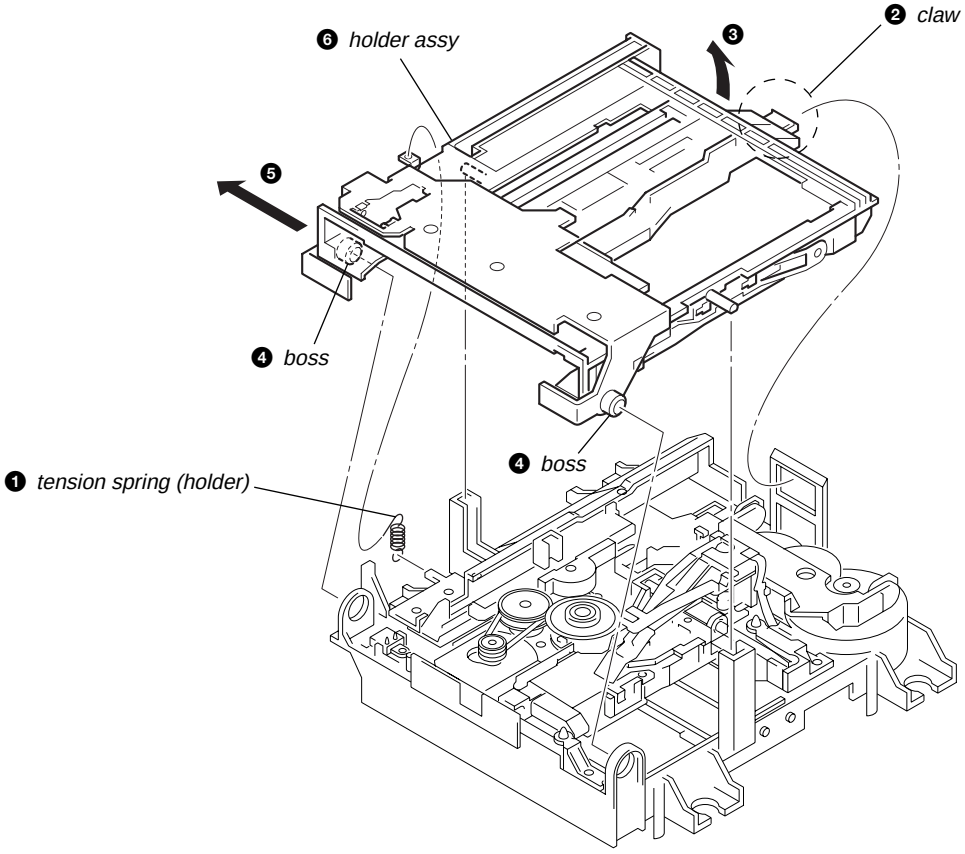
Note: Set the wire (flat type) as illustrated, then install the front panel section.

3-6. BD BOARD, OVER WRITE HEAD (HR901)

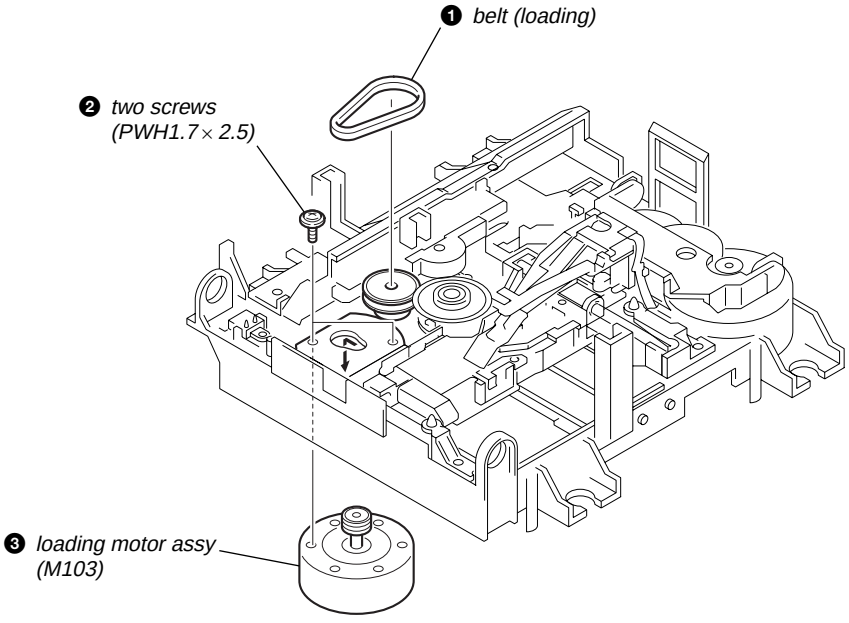
Note: By means of removing ❶ connector (CN104), BD board can be removed without removing the over write head (HR901).



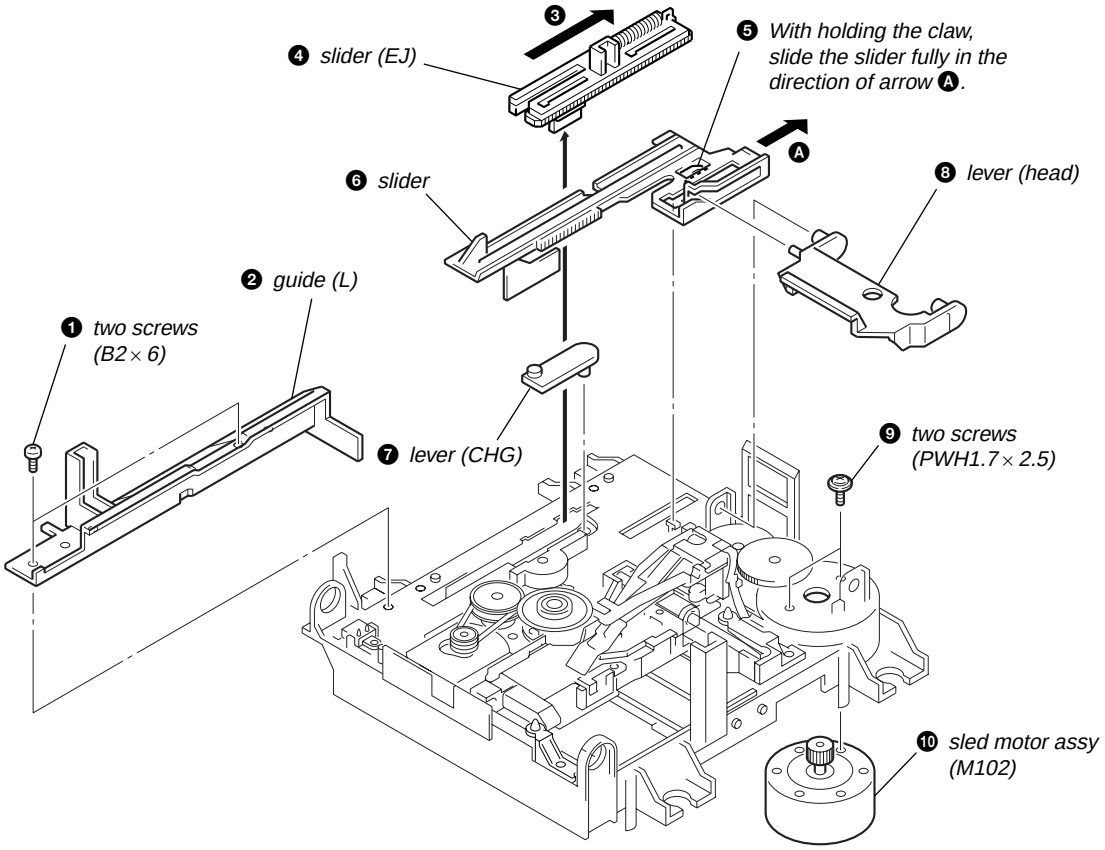
3-7. HOLDER ASSY



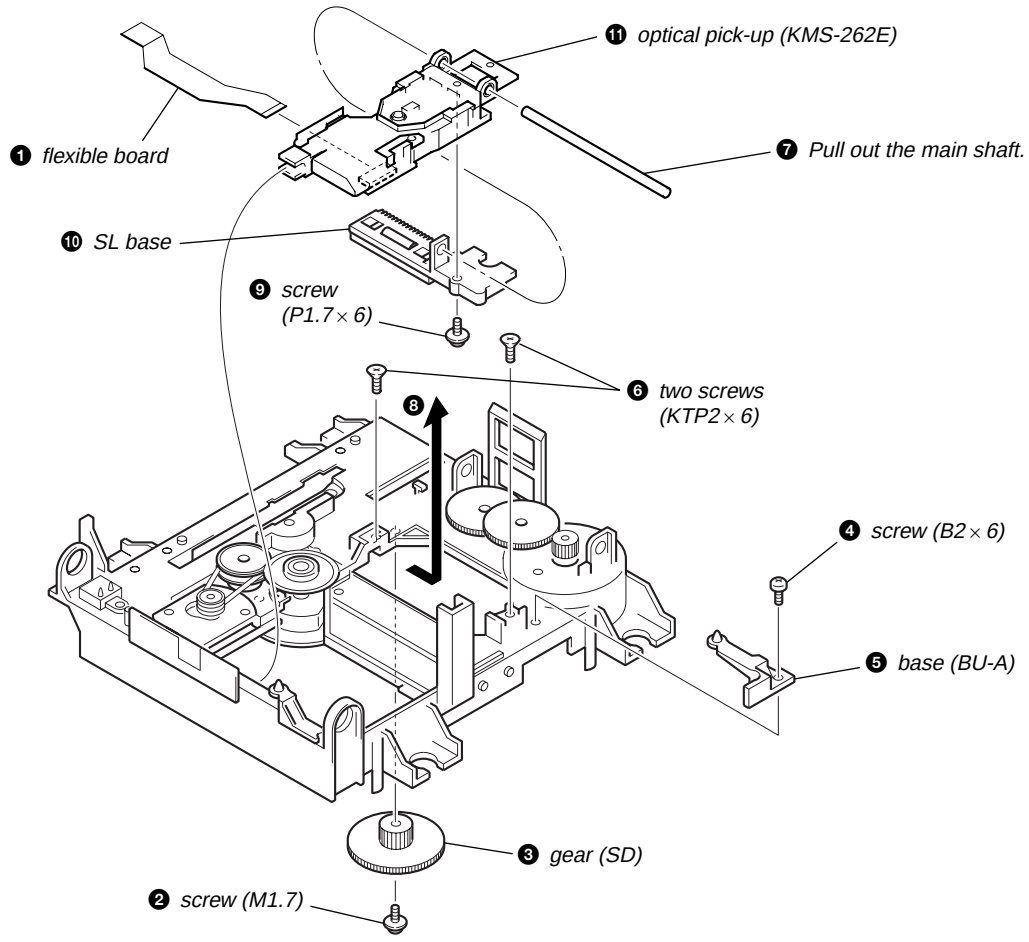
3-8. LOADING MOTOR ASSY (M103)



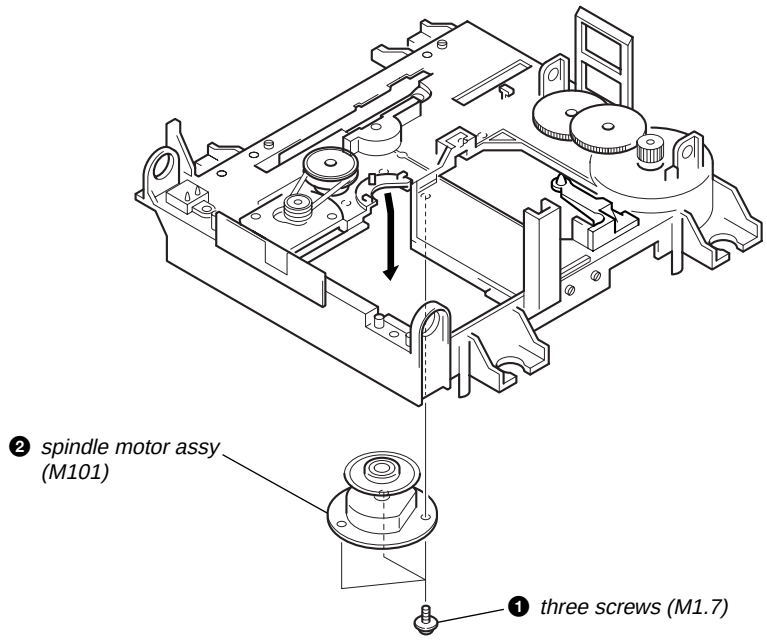
3-9. SLED MOTOR ASSY (M102)



3-10. OPTICAL PICK-UP (KMS-262E)



3-11. SPINDLE MOTOR ASSY (M101)



SECTION 4
TEST MODE

Note 1: The test mode and recording of this set are controlled by a personal computer, thus requiring the set to be connected to the PC.
Prepare the personal computer in which necessary software is already installed.
- Attached software "OpenMG Jukebox" (necessary for recording (check in, check out)) (Part No. : 4-237-880-01)
- Software for test mode "TestMode_S.exe" ("TestMode_S.exe" and essential files "data_files.csv", "Net MDUSB.dil" are distributed together with the Service Manual. For the test mode, copy these three files in the same folder beforehand)

Note 2: In the operation in the test mode, the operational description requiring "click [xxx]" means that you have to click the button on the screen. ("xxx" indicates the button name)

Note 3: MD always plays double speed.

4-1. PRECAUTIONS FOR USE OF TEST MODE

- The software for test mode is used.
  Be sure to start the software for test mode after quitting the application software.
- 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] is clicked 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 click the [EJECT] button after clicking the [MENU/NO] and the rotation of disc is stopped.

4-1-1. Recording laser emission mode

- Continuous recording mode (CREC MODE)
- Laser power check mode (LDPWR CHECK)
- Laser power adjustment mode (LDPWR ADJUST)
- Iop check (Iop compare)
- Iop value non-volatile writing (Iop NV save)
- Traverse (MO) check (EF MO CHECK)
- Traverse (MO) adjustment (EF MO ADJUST)

4-2. SETTING THE TEST MODE

1. Press the [▶/▶▶I] button and [■/⏏] button until the NetMD indicator turns off (for more than 3 seconds). (During this step, the USB cable must be disconnected)
2. Connect the set to the PC with the attached USB cable.
3. Start up the software for test mode.
4. Click the [TEST MODE].
5. When the test mode is set, "[Check]" will be displayed. Click the [JOG UP] or [JOG UP] switches between the following three groups; ⋯ ⟷ [Check] ⟷ [Service] ⟷ [Develop] ⟷ ⋯:

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, click the [MENU/NO] immediately to exit the [Develop] group.

4-3. RELEASING THE TEST MODE

Quit the software for test mode after [REPEAT] is clicked.

Note: When retrying test mode setting, perform the setting method from the start once again.

4-4. BASIC OPERATIONS OF THE TEST MODE

All operations are performed clicking the [JOG UP], [JOG DOWN], [PUSH], [ENTER/YES], and [MENU/NO].
The functions of these buttons are as follows.

Function name	Function
[JOG UP], [JOG DOWN]	Select
[PUSH]	Set Sub menu
[ENTER/YES]	Proceeds onto the next step. Finalizes input
[MENU/NO]	Returns to previous step. Stops operations

4-5. SELECTING THE TEST MODE

There are 26 types of test modes as shown below. The groups can be switched by clicking the JOG UP or JOG DOWN. After selecting the group to be used, click the ENTER/YES. After setting a certain group, click the JOG UP or JOG DOWN switches between these modes.

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

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

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, click the MENU/NO 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 ADJUST	C03	Temperature compensation offset adjustment			○
LDPWR ADJUST	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 ADJUST	C07	Traverse (MO) adjustment			○
EF CD ADJUST	C08	Traverse (CD) adjustment			○
FBIAS ADJUST	C09	Focus bias adjustment			○
AG Set (MO)	C10	Auto gain output level adjustment (MO)			○
AG Set (CD)	C11	Auto gain output level 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.		○	○
CPLAY2MODE	C36	Continuous playback mode		○	○
CREC 2MODE	C37	Continuous recording mode		○	○

- For details of each adjustment mode, refer to “SECTION 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, click the MENU/NO to release that mode.
- Modes with (×) in the Mark column are not used for servicing and therefore are not described in detail. If these modes are set accidentally, click the MENU/NO to release 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) Click the JOG UP or JOG DOWN and display "CPLAY2MODE" (C36).
(3) Click the ENTER/YES to change the display to "CPLAY2MID".
(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) Click the ENTER/YES during continuous playback to change the display as below.

"CREC 2MID" → "CREC 2OUT" → "CREC 2IN" (returns to "CREC 2MID")

When clicked 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) Click the MENU/NO. The display will change to "CPLAY2MODE" (C36).
(2) Click the EJECT and take out 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) Click the JOG UP or JOG DOWN and display "CREC 2MODE" (C37).
(3) Click the ENTER/YES to change the display to "CREC 2MID".
(4) When access completes, the display changes to "CREC 2 (▯▯▯▯".
Note: The numbers "▯" displayed shows you the recording position addresses.

2. Changing the parts to be recorded

(1) When the ENTER/YES is clicked during continuous recording, the display changes as below.

"CREC 2MID" → "CREC 2OUT" → "CREC 2IN" (returns to "CREC 2MID")

When clicked another time, the parts to be recorded can be changed.

(2) When access completes, the display changes to "CREC 2 (▯▯▯▯".
Note: The numbers "▯" displayed shows you the recording position addresses.

3. Ending the continuous recording mode

(1) Click the MENU/NO. The display changes to "CREC 2MODE" (C37).
(2) Click the EJECT and take out 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 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. 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. Click the [ENTER/YES]. 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.

4-7. INFORMATION

Display the software version.

Procedure:

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

SECTION 5
ELECTRICAL ADJUSTMENTS

Note 1: The test mode and recording of this set are controlled by a personal computer, thus requiring the set to be connected to the PC.
Prepare the personal computer in which necessary software is already installed.
- Attached software “OpenMG Jukebox” (necessary for recording (check in, check out)) (Part No. : 4-237-880-01)
- Software for test mode “TestMode_S.exe” (“TestMode_S.exe” and essential files “data_files.csv”, “Net MDUSB.dil” are distributed together with the Service Manual. For the test mode, copy these three files in the same folder beforehand)

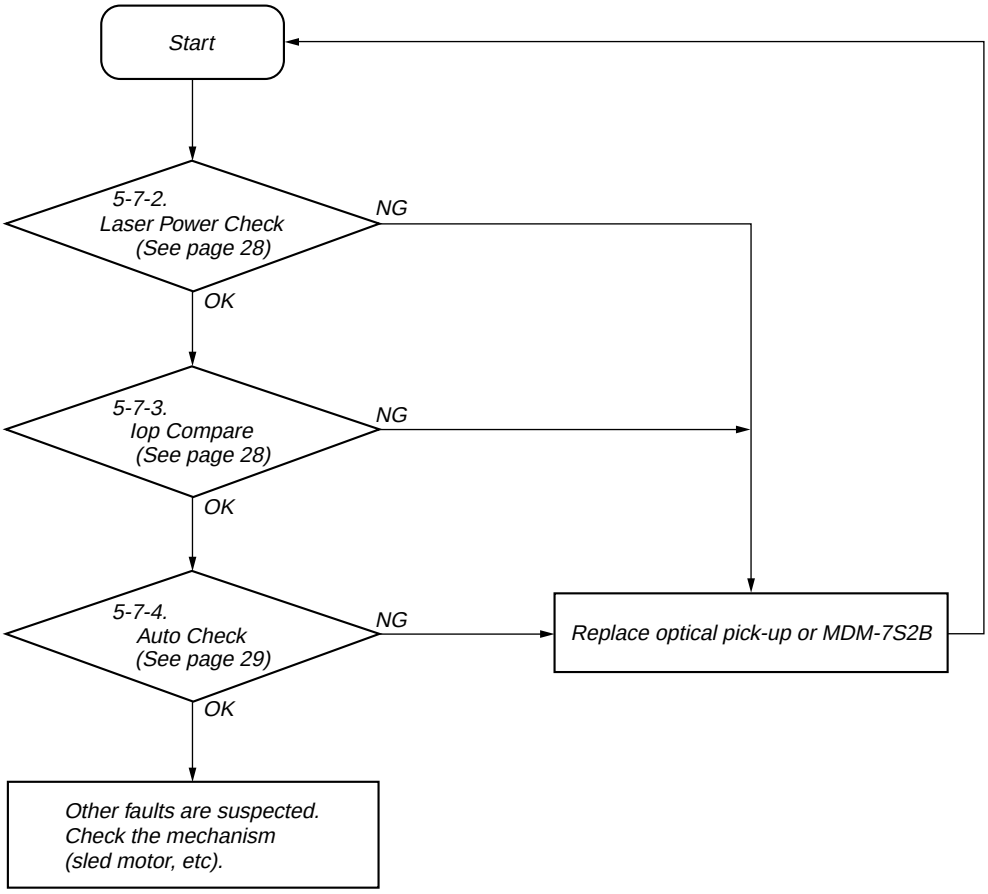
Note 2: In the operation in the test mode, the operational description requiring “click [xxx]” means that you have to click the button on the screen. (“xxx” indicates the button name)

Note 3: MD always plays double speed.

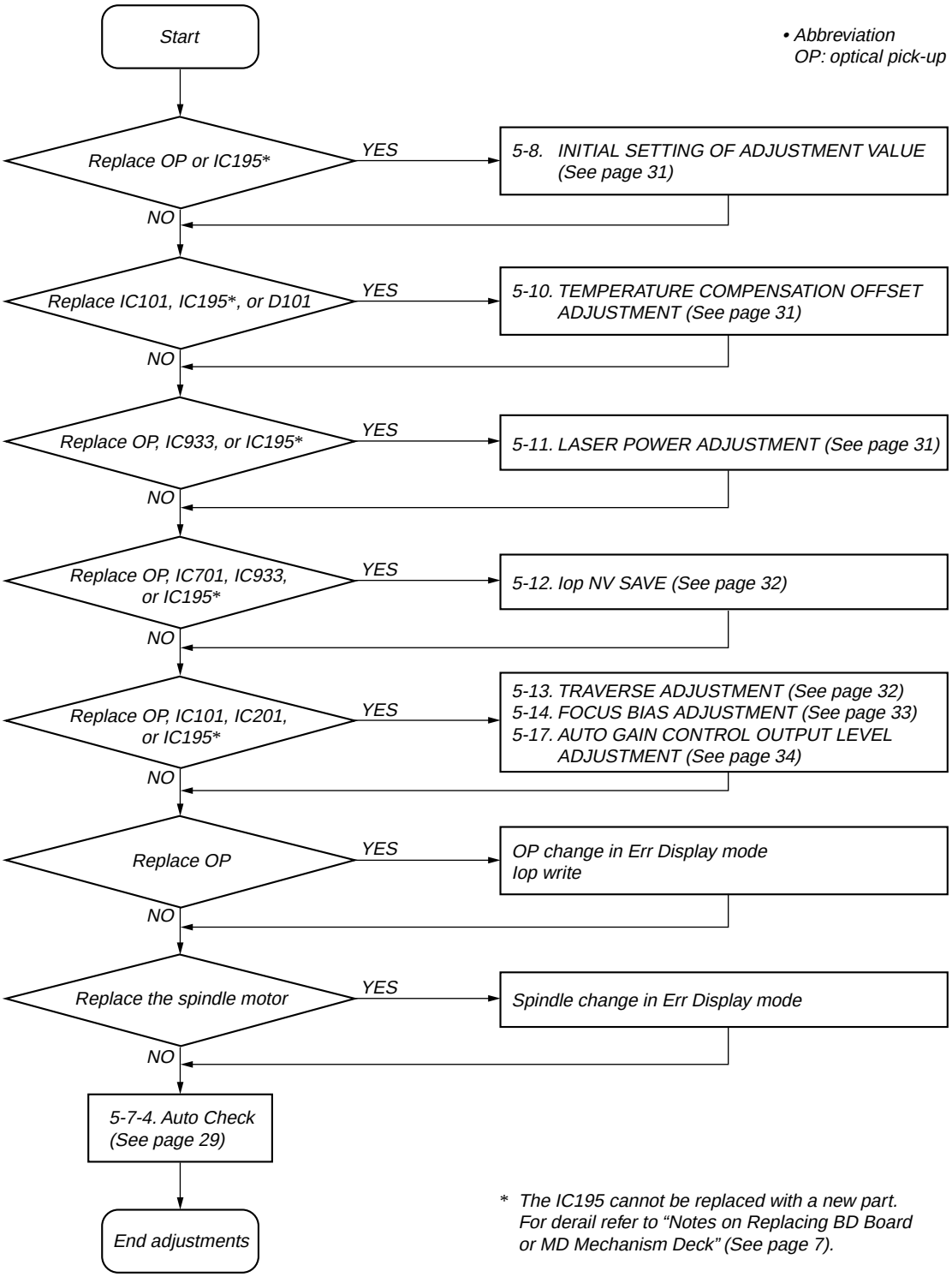
5-1. PARTS REPLACEMENT AND ADJUSTMENT

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

Check before replacement



Adjustment flow



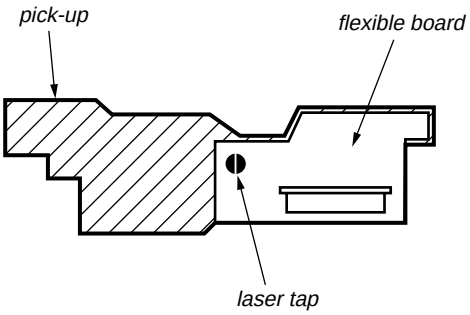
* The IC195 cannot be replaced with a new part. For derail refer to “Notes on Replacing BD Board or MD Mechanism Deck” (See page 7).

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-262A/262E)

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.



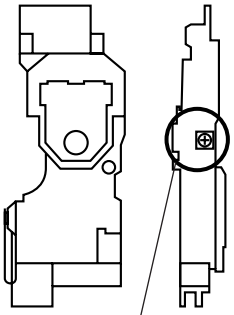
Optical pick-up flexible board

5-4. HOW TO IDENTIFY OPTICAL PICK-UP KMS-262A/KMS-262E

This set uses optical pick-up KMS-262E in the production, but for the repair, only the KMS-262A is supplied. As a result, two types of optical pick-ups are used for this set, and the specified values for the check and adjustment of the laser power vary depending on the type. Therefore, in performing the check and adjustment of the laser power, first make sure the type of optical pick-up. The type of optical pick-up can be identified as follows.

– KMS-262A –

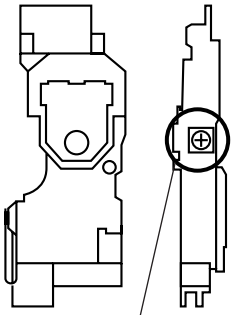
[Top view] *[Side view]*



TYPE2 VR (small)

– KMS-262E –

[Top view] *[Side view]*



TYPE3 VR (large)

5-5. 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 Service” 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 (Part No. : 4-963-646-01)
   - Test Disk (MDW-74/GA-1) (Part No. : 4-229-747-01)
   - Laser power meter LPM-8001 (Part No. : J-2501-046-A)
     or
     MD Laser power meter 8010S (Part No. : J-2501-145-A)*1
   - Oscilloscope (Measure after performing CAL of prove)
   - Digital voltmeter
   - Thermometer
   - Jig for checking BD board waveform
     (Part No. : J-2501-149-A)
   - Attached software “OpenMG Jukebox”
     (Part No. : 4-237-880-01)
   - Software for test mode
     (Distributed together with the Service Manual)
   - Attached USB cable (Part No. : 1-757-471-11)
   - Personal computer (Refer to Servicing Notes)
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 8)
7. As the disc used will affect the adjustment results, make sure that no dusts nor fingerprints are attached to it.
8. In normal operation check after the completion of adjustment, be sure to perform the recording check (check in, check out) using the software “OpenMG Jukebox” attached.

*1 **Laser power meter**

When performing laser power checks and adjustment (electrical adjustment), use of the new MD laser power meter 8010S (Part No. : J-2501-145-A) instead of the conventional laser power meter is convenient.

It sharply reduces the time and trouble to set the laser power meter sensor onto the objective lens of optical pick-up.

Adjustment	Parts to be replaced						
	Optical Pick-up	IC101	IC701	IC201	IC933	IC195*	D101
7. Initial setting of adjustment value	◯	×	×	×	×	◯	×
8. Recording of Iop information	◯	×	×	×	×	◯	×
9. Temperature compensation offset adjustment	×	◯	×	×	×	◯	◯
10. Laser power adjustment	◯	×	×	×	◯	◯	×
11. Iop NV Save	◯	×	◯	×	◯	◯	×
12. Traverse adjustment	◯	◯	×	◯	×	◯	×
13. Focus bias adjustment	◯	◯	×	◯	×	◯	×
16. Auto gain adjustment	◯	◯	×	◯	×	◯	×
6-4. AUTO CHECK	◯	◯	×	◯	◯	◯	×

* The IC195 cannot be replaced with a new part.
For detail refer to “Notes on Replacing BD Board or MD Mechanism Deck” (See page 7).

5-6. 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. Check the JOG UP or JOG DOWN and display "CREC 2MODE" (C37).
3. Click the ENTER/YES again to display "CREC 2MID". Display "CREC 2 (0300)" and start to recording.
4. Complete recording within 5 minutes.
5. Click the MENU/NO and stop recording .
6. Click the EJECT 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.

5-7. 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 10).

5-7-1. Temperature Compensation Offset Check

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

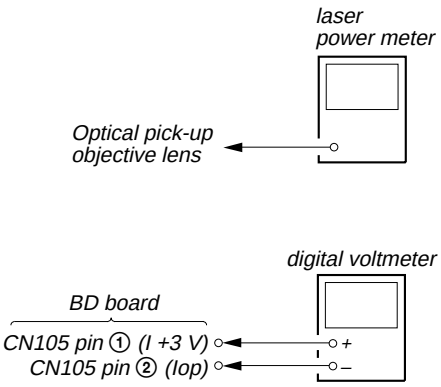
Checking Procedure:

1. Click the JOG UP or JOG DOWN to display "TEMP CHECK" (C12).
2. Click the ENTER/YES.
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)

5-7-2. Laser Power Check

Before checking, check the Iop value of the optical pick-up. (Refer to 5-9. Recording and Displaying the Iop Information (see page 31)

Connection:



Checking Procedure:

1. Set the laser power meter on the objective lens of the optical pick-up.
   Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (Iop).
2. Then, click the JOG UP or JOG DOWN and display "LDPWR CHECK" (C13).
3. Click the ENTER/YES once and display "L 0.90 mW $ ". Check that the reading of the laser power meter become specified value.

Specified Value:

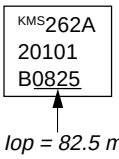
Laser power meter reading : 0.84 to 0.92 mW (KMS-262A)
0.90 to 0.96 mW (KMS-262E)

4. Click the ENTER/YES once more and display "L 8.40 mW $ " (KMS-262A) or "L 8.65 mW $ " (KMS-262E). Check that the reading the laser power meter and digital volt meter satisfy the specified value.

Specified Value:

Laser power meter reading : 8.4 ± 0.3 mW (KMS-262A)
8.65 ± 0.25 mW (KMS-262E)
Digital voltmeter reading : Optical pick-up displayed value ± 10%

(Optical pick-up label)



(For details of the method for checking this value, refer to "6-9. Recording and Displaying the Iop Information")

Iop = 82.5 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

5. Click the MENU/NO and display "LDPWR CHECK" (C13) and stop the laser emission.
   (The MENU/NO is effective at all times to stop the laser emission)

Note: After step 4, each time the ENTER/YES is clicked, the display will be switched between "L 0.70 mW $ " and "L 7.50 mW $ ", Nothing needs to be performed here.

Checking Location: BD board (see page 35)

5-7-3. Iop Compare

The current Iop value at laser power 8.4 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. Click the JOG UP or JOGDOWN to display "Iop Compare" (C27).
2. Click the ENTER/YES 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. Click the MENU/NO to end this mode.

5-7-4. Auto Check

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 compare.

Procedure:

1. Click the ENTER/YES. 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, the check will automatically be resumed from "07 CHECK".
6. After completing to test item "12 check", 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, sled motor, etc.
When displayed as "NG:xxxx", it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

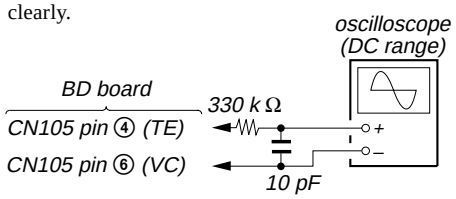
5-7-5. Other Checks

All the following checks are performed by the Auto Check mode. They therefore need not be performed in normal operation.
5-7-6. Traverse Check
5-7-7. Focus Bias Check
5-7-8. C PLAY Check
5-7-9. Self-Recording/Playback Check

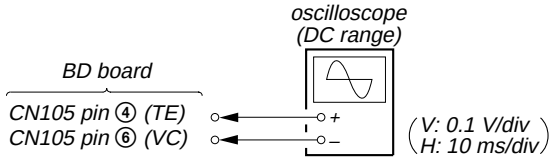
5-7-6. Traverse Check

Note 1: Data will be erased during MO reading 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.



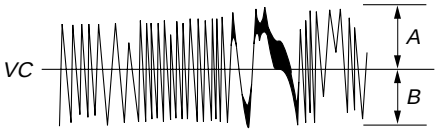
Connection:



Checking Procedure:

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) on the BD (MD) board.
2. Load a disc (any available on the market). (Refer to Note 1)
3. Click the FF to move the optical pick-up outside the pit and click the STOP to stop.
4. Click the JOG UP or JOG DOWN to display "EF MO CHECK"(C14).
5. Click the ENTER/YES to 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 click the JOG UP or JOG DOWN.
   (Read power traverse checking)

Traverse Waveform

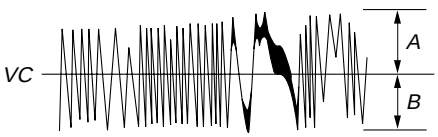


Specified value : Below 10% offset value

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

7. Click the ENTER/YES to display "EFB = ⬚ MO-W".
8. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not click the JOG UP or JOG DOWN.
   (Write power traverse checking)

Traverse Waveform

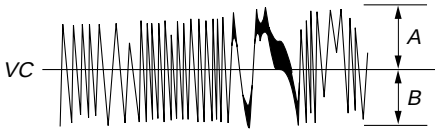


Specified value : Below 10% offset value

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

9. Click the [ENTER/YES] to 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 click the [JOG UP] or [JOG DOWN].

Traverse Waveform

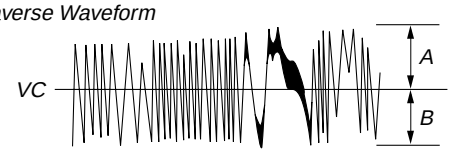


Specified value : Below 10% offset value

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

11. Click the [ENTER/YES] to display "EF MO CHECK (C14)". The disc stops rotating automatically.
12. Click the [EJECT] button and take out the disc.
13. Load the check disc (MD) TDYS-1.
14. Click the [JOG UP] or [JOG DOWN] and display "EF CD CHECK" (C15).
15. Click the [ENTER/YES] to display "EFB = □□ CD". Servo is imposed automatically.
16. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not click the [JOG UP] or [JOG DOWN].

Traverse Waveform



Specified value : Below 10% offset value

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

17. Click the [ENTER/YES] to display "EF CD CHECK" (C15).
18. Click the [EJECT] and take out the check disc (MD) TDYS-1.

Check Location: BD board (see page 35)

5-7-7. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

Checking Procedure:

1. Load the test disk (MDW-74/GA-1).
2. Click the [JOG UP] or [JOG DOWN] to display "CPLAY2 MODE" (C36).
3. Click the [ENTER/YES] to display "CPLAY2MID".
4. Click the [MENU/NO] when "C = □□□□ AD = □□" is displayed.
5. Click the [JOG UP] or [JOG DOWN] to display "FBIAS CHECK" (C16).
6. Click the [ENTER/YES] to display "□□□□/□□ c = □□". The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value. Check that the C1 error is below 20 and ADER is below 2.
7. Click the [ENTER/YES] to display "□□□□/□□ b = □□". Check that the C1 error is about 100 and ADER is below 2.
8. Click the [ENTER/YES] to display "□□□□/□□ a = □□". Check that the C1 error is about 100 and ADER is below 2.
9. Click the [MENU/NO], then click the [EJECT] and take out the test disc.

5-7-8. C PLAY Check

MO Error Rate Check

Checking Procedure:

1. Load the test disk (MDW-74/GA-1).
2. Click the [JOG UP] or [JOG DOWN] to display "CPLAY2 MODE" (C36).
3. Click the [ENTER/YES] to display "CPLAY2MID".
4. The display changes to "C = □□□□ AD = □□".
5. If the C1 error rate is below 20, check that ADER is 00.
6. Click the [MENU/NO] to stop playback, then Click the [EJECT] and take out the test disc.

CD Error Rate Check

Checking Procedure:

1. Load the check disc (MD) TDYS-1.
2. Click the [JOG UP] or [JOG DOWN] to display "CPLAY2 MODE" (C36).
3. Click the [ENTER/YES] to display "CPLAY2MID".
4. The display changes to "C = □□□□ AD = □□".
5. Check that the C1 error rate is below 20.
6. Click the [MENU/NO] to stop playback, then click the [EJECT] and take out the check disc.

5-7-9. Self-Recording/playback Check

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

Checking Procedure:

1. Load a recordable disc (blank disc).
2. Click the [JOG UP] or [JOG DOWN] to display "CREC 2MODE" (C37).
3. Click the [ENTER/YES] to display "CREC 2MID".
4. When recording starts and display "CREC 2 @@@@" (@@@@ is the address).
5. About 1 minute later, click the [MENU/NO] to stop continuous recording.
6. Click the [JOG UP] or [JOG DOWN] to display "CPLAY2 MODE" (C36).
7. Click the [ENTER/YES] to display "CPLAY2MID".
8. "C = □□□□ AD = □□" will be displayed.
9. Check that the C1 error becomes below 20 and the AD error below 2.
10. Click the [MENU/NO] to stop playback, then click the [EJECT] and take out the disc.

5-8. 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 "5-5. Precautions for Adjustments" and execute the initial setting before the adjustment as required.

Setting Procedure:
1. Click the JOG UP or JOG DOWN to display "ADJ CLEAR" (C28).
2. Click the ENTER/YES. "Complete!" will be displayed momentarily and initial setting will be executed, after which "ADJ CLEAR" (C28) will be displayed.

5-9. RECORDING AND DISPLAYING THE Iop INFORMATION

The Iop data can be recorded in the non-volatile memory. The Iop value on the optical pick-up label 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. Click the JOG UP or JOG DOWN to display "Iop Write" (C05), and click the ENTER/YES.
2. The display becomes "Ref=@@@.@" (@ is an arbitrary number) and the numbers which can be changed will blink.
3. Input the Iop value on the optical pick-up label.
   To select the number : Click the JOG UP or JOG DOWN.
   To select the digit : Click the PUSH.
4. When the ENTER/YES is clicked, the display becomes "Measu=@@@.@" (@ is an arbitrary number).
5. As the adjustment results are recorded for the 4 value. Leave it as it is and click the ENTER/YES.
6. "Complete!!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write" (C05).

Display Procedure:
1. Click the JOG UP or JOG DOWN to display "Iop Read" (C26), and click the ENTER/YES.
2. "@@.@/##.#" is displayed and the recorded contents are displayed.
   @@.@ indicates the Iop value on the optical pick-up label.
   ##.# indicates the Iop value after adjustment
3. To end, click the PUSH or MENU/NO to display "Iop Read" (C26).

5-10. TEMPERATURE COMPENSATION OFFSET ADJUSTMENT

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

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

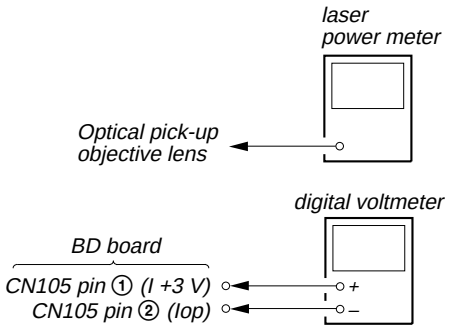
Adjusting Procedure:
1. Click the JOG UP or JOG DOWN to display "TEMP ADJUST" (C03).
2. Click the ENTER/YES to select the "TEMP ADJUST" mode.
3. "TEMP = [OK" and the current temperature data will be displayed.
4. To save the data, click the ENTER/YES.
   When not saving the data, click the MENU/NO.
5. When the ENTER/YES is clicked, "TEMP = SAVE" will be displayed and turned back to "TEMP ADJUST" (C03) display then. When the MENU/NO is clicked, "TEMP ADJUST" (C03) will be displayed immediately.

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

5-11. LASER POWER ADJUSTMENT

Check the Iop value of the optical pick-up before adjustments. (Refer to 5-9. 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, click the FF or FR to move the optical pick-up)
   Connect the digital voltmeter to CN105 pin ① (I+3V) and CN105 pin ② (Iop) on the BD (MD) board.
2. Click the JOG UP or JOG DOWN to display "LDPWR ADJUST" (C04).
   (Laser power : For adjustment)
3. Click the ENTER/YES once to display "L 0.90 mW $ ".
4. Click the JOG UP or JOG DOWN so that the reading of the laser power meter becomes specified value. Click the ENTER/YES after setting the range knob of the laser power meter, and save the adjustment results. ("LD SAVE $ " will be displayed for a moment)

Specified Value:
Laser power meter reading: 0.85 to 0.91 mW (KMS-262A)
0.90 to 0.95 mW (KMS-262E)

5. Then "L 8.40 mW $ " (KMS-262A) or "L 8.65 mW $ " (KMS-262E) will be displayed.

6. Click the JOG UP or JOG DOWN so that the reading of the laser power meter becomes specified value, click the ENTER/YES to save it.

Specified Value:
Laser power meter reading: 8.2 to 8.6 mW (KMS-262A)
8.5 to 8.8 mW (KMS-262E)

Note: Do not perform the emission with 8.4 mW more than 15 seconds continuously.

7. Then, click the JOG UP or JOG DOWN to display "LDPWR CHECK" (C13).
8. Click the ENTER/YES once to display "L 0.90 mW $ ▯▯". Check that the reading of the laser power meter become specified value.

Specified Value:
Laser power meter reading: 0.84 to 0.92 mW (KMS-262A)
0.90 to 0.96 mW (KMS-262E)

9. Click the ENTER/YES button once more to display "L 8.40 mW $ ▯▯" (KMS-262A) or "L 8.65 mW $ ▯▯" (KMS-262E). Check that the reading the laser power meter and digital voltmeter satisfy the specified value.
Note down the digital voltmeter reading value.

Specified Value:
Laser power meter reading: 8.4 ± 0.3 mW (KMS-262A)
8.65 ± 0.25 mW (KMS-262E)
Digital voltmeter reading : Value on the optical pick-up label ±10%

(Optical pick-up label)

KMS262A
20101
B0825

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

Iop = 82.5 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

10. Click the MENU/NO to display "LDPWR CHECK" (C13) and stop the laser emission.
(The MENU/NO is effective at all times to stop the laser emission.)
11. Click the JOG UP or JOG DOWN to display "Iop Write" (C05).
12. Click the ENTER/YES. When the display becomes Ref=@@@.@ (@ is an arbitrary number), click the ENTER/YES 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 : Click the JOG UP or JOG DOWN.
To select the digit : Click the PUSH.
14. When the ENTER/YES is clicked, "Complete!" will be displayed momentarily. The value will be recorded in the nonvolatile memory and the display will become "Iop Write" (C05).

Note: After step 4, each time the ENTER/YES is clicked, the display will be switched "L 0.70 mW $ ▯▯" and "LD 7.50 mW $ ▯▯". Nothing needs to be performed here.

Adjustment Location: BD board (see page 35)

5-12. 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 optical pick-up and when replacing the IC102. Otherwise the optical pick-up check may deteriorate.

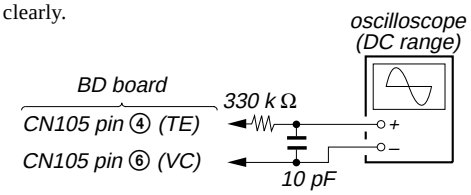
Note: Perform this function with the optical pick-up set at room temperature.

Procedure:
1. Click the JOG UP or JOG DOWN to display "Iop NV Save" (C06).
2. Click the ENTER/YES and display "Iop [stop]".
3. After the display changes to "Iop =xxsave?", click the ENTER/YES.
4. After "Complete!" is displayed momentarily, the display changes to "Iop 8.4 mW".
5. After the display changes to "Iop=yysave?", click the ENTER/YES.
6. When "Complete!" is displayed, it means that Iop NV saving has been completed.

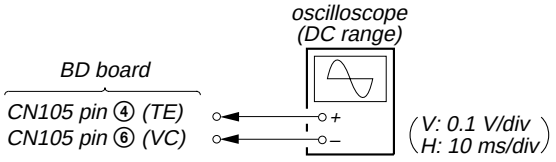
5-13. TRAVERSE ADJUSTMENT

Note 1: Data will be erased during MO reading 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.

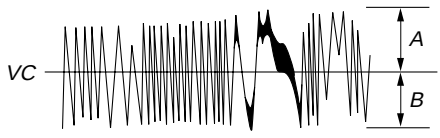


Connection:



Adjusting Procedure:
1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) on the BD board.
2. Load a disc (any available on the market). (Refer to Note 1)
3. Click the STOP after the FF clicked to move the optical pick-up outside the pit.
4. Click the JOG UP or JOG DOWN to display "EF MO ADJUST" (C07).
5. Click the ENTER/YES to display "EFB = ▯▯ MO-R".
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Click the JOG UP or JOG DOWN so that the waveform of the oscilloscope becomes the specified value.
(When the JOG UP or JOG DOWN is clicked, 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

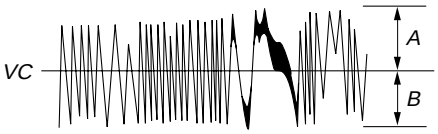


Specification A = B

7. Click the ENTER/YES 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. Click the JOG UP or JOG DOWN so that the waveform of the oscilloscope becomes the specified value.
(When the JOG UP or JOG DOWN is clicked, the □□ of "EFB= □□" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.
(Write power traverse adjustment)

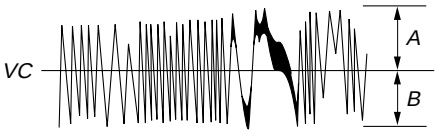
Traverse Waveform



Specification A = B

9. Click the ENTER/YES, 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. Click the JOG UP or JOG DOWN 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.

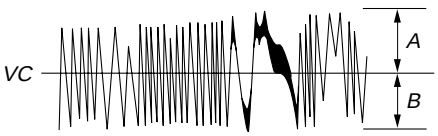
Traverse Waveform



Specification A = B

12. Click the ENTER/YES, and save the adjustment results in the non-volatile memory. ("EFB = □□ SAVE" will be displayed for a moment.)
Next "EF MO ADJUST" (C07) is displayed. The disc stops rotating automatically.
13. Click the EJECT and take out the disc.
14. Load the check disc (MD) TDYS-1.
15. Click the JOG UP or JOG DOWN to display "EF CD ADJUST" (C08).
16. Click the ENTER/YES to display "EFB = □□ CD". Servo is imposed automatically.
17. Click the JOG UP or JOG DOWN 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. Click the ENTER/YES, display "EFB = □□ SAVE" for a moment and save the adjustment results in the non-volatile memory.
Next "EF CD ADJUST" (C08) will be displayed.
19. Click the EJECT button and take out the disc (MD) TDYS-1.

Adjustment Location: BD board (see page 35)

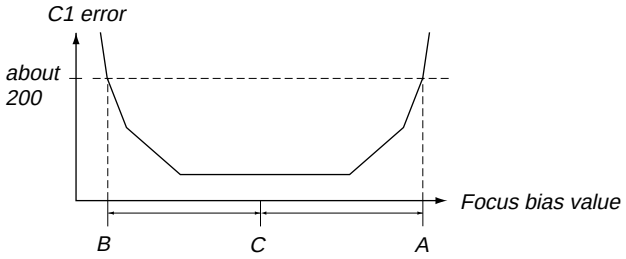
5-14. FOCUS BIAS ADJUSTMENT

Adjusting Procedure:

1. Load the continuously-recorded disc. (Refer to "5. USING THE CONTINUOUSLY RECORDED DISC")
2. Click the JOG UP or JOG DOWN to display "CPLAY2 MODE" (C36).
3. Click the ENTER/YES to display "CPLAY2MID".
4. Click the MENU/NO when "C = □□□□ AD = □□" is displayed.
5. Click the JOG UP or JOG DOWN to display "FBIAS ADJUST" (C09).
6. Click the ENTER/YES to display "□□□□/□□ a = □□".
The first four digits indicate the C1 error rate, the two digits after "/ " indicate ADER, and the 2 digits after "a =" indicate the focus bias value.
7. Click the JOG UP and find the focus bias value at which the C1 error rate becomes about 200 (refer to Note 2).
8. Click the ENTER/YES to display "□□□□/□□ b = □□".
9. Click the JOG DOWN and find the focus bias value at which the C1 error rate becomes about 200.
10. Click the ENTER/YES to display "□□□□/□□ c = □□".
11. Check that the C1 error rate is below 20 and ADER is 00. Then click the ENTER/YES.
12. If the "(□□)" in "□□ - □□ - □□ (□□)" is above 20, click the ENTER/YES button.
If below 20, click the MENU/NO and repeat the adjustment from step 2.
13. Click the EJECT button and take out the disc.

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

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



5-15. ERROR RATE CHECK

5-15-1. CD Error Rate Check

Checking Procedure:

1. Load the check disc (MD) TDYS-1.
2. Click the JOG UP or JOG DOWN to display "CPLAY2 MODE" (C36).
3. Click the ENTER/YES twice and display "CPLAY2MID".
4. The display changes to "C = □□□□ AD = □□".
5. Check that the C1 error rate is below 20.
6. Click the MENU/NO to stop playback, then click the EJECT and take out the check disc.

5-15-2. MO Error Rate Check

Checking Procedure:

1. Load the continuously-recorded disc. (Refer to "5-6. USING THE CONTINUOUSLY RECORDED DISC")
2. Click the JOG UP or JOG DOWN to display "CPLAY2 MODE" (C36).
3. Click the ENTER/YES to display "CPLAY2MID".
4. The display changes to "C = □□□□ AD = □□".
5. If the C1 error rate is below 20, check that ADER is 00.
6. Click the MENU/NO to stop playback, then click the EJECT and take out the test disc.

5-16. FOCUS BIAS CHECK

Change the focus bias and check the focus tolerance amount.

Checking Procedure:

1. Load the continuously-recorded disc. (Refer to "5-6. USING THE CONTINUOUSLY RECORDED DISC")
2. Click the JOG UP or JOG DOWN to display "CPLAY2 MODE" (C36).
3. Click the ENTER/YES twice to display "CPLAY2MID".
4. Click the MENU/NO when "C = □□□□ AD = □□" is displayed.
5. Click the JOG UP or JOG DOWN to display "FBIAS CHECK" (C16).
6. Click the ENTER/YES to display "□□□□/□□ c = □□".
   The first four digits indicate the C1 error rate, the two digits after "/ " indicate ADER, and the 2 digits after "c =" indicate the focus bias value.
   Check that the C1 error is below 20 and ADER is below 2.
7. Click the ENTER/YES and display "□□□□/□□ b = □□".
   Check that the C1 error is about 100 and ADER is below 2.
8. Click the ENTER/YES and display "□□□□/□□ a = □□".
   Check that the C1 error is about 100 and ADER is below 2
9. Click the MENU/NO, then click the EJECT and take out the disc.

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

5-17. 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.

5-17-1. CD Auto Gain Control Output Level Adjustment

Adjusting Procedure:

1. Load the check disc (MD) TDYS-1.
2. Click the JOG UP or JOG DOWN to display "AG Set (CD)" (C11).
3. When the ENTER/YES is clicked, 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)" (C11).
4. Click the EJECT and take out the check disc.

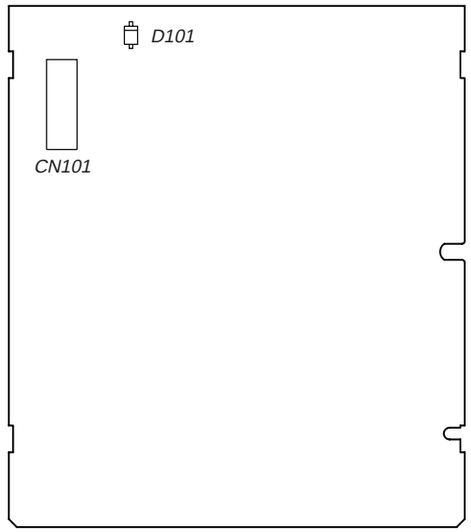
5-17-2. MO Auto Gain Control Output Level Adjustment

Adjusting Procedure:

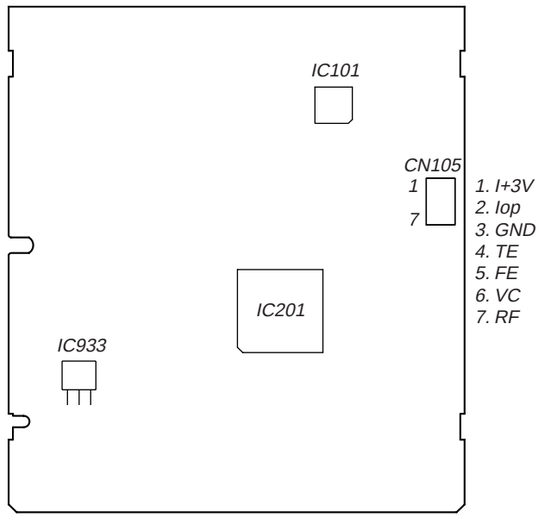
1. Load the test disc (MDW-74/GA-1).
2. Click the JOG UP or JOG DOWN to display "AG Set (MO)" (C10).
3. When the ENTER/YES is clicked, the adjustment will be performed automatically.
   "Complete!!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (MO)" (C10).
4. Click the EJECT and take out the test disc.

Adjustment and Checking Loacation:

– BD BOARD (Component Side) –



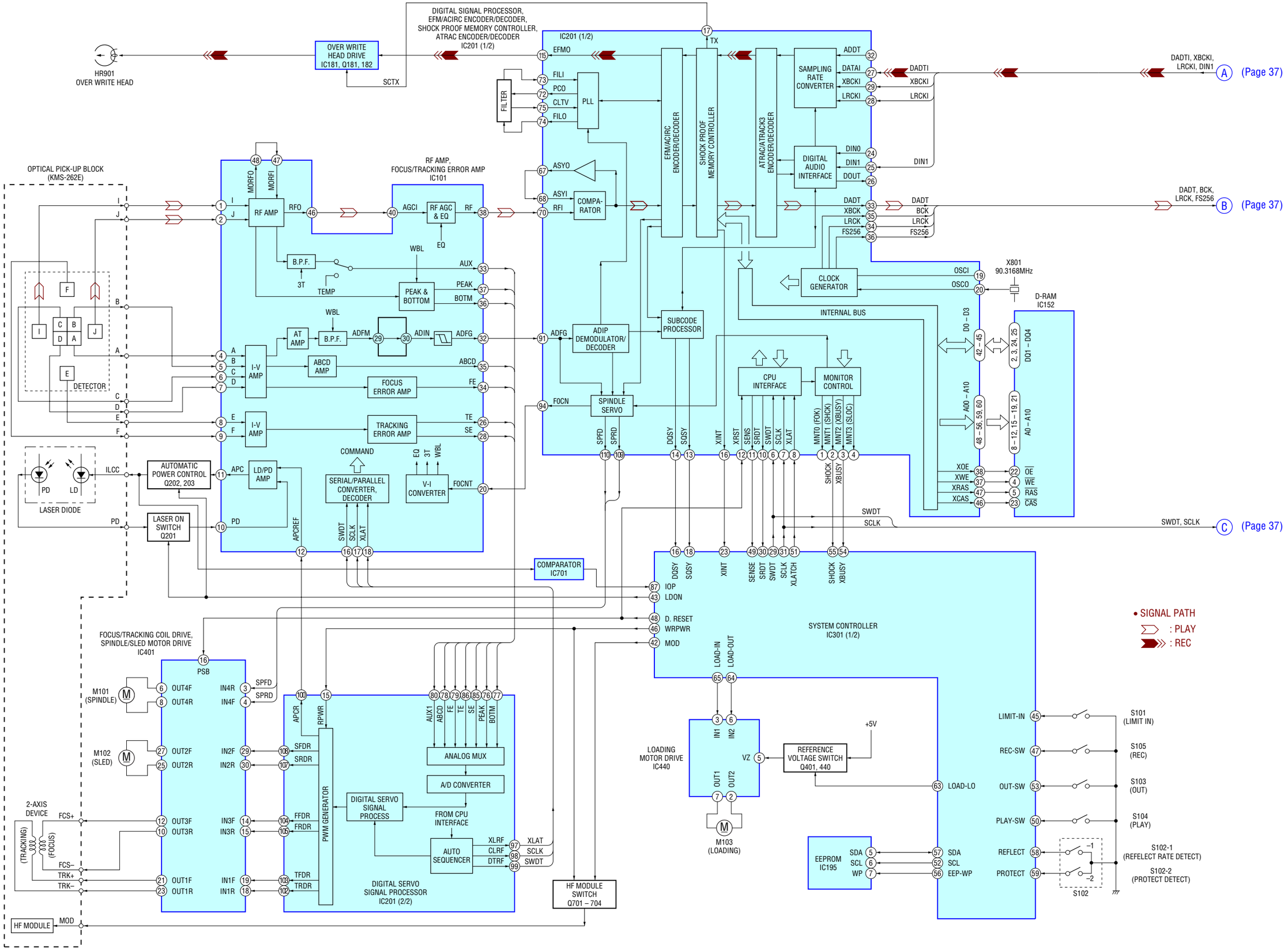
– BD BOARD (Conductor Side) –



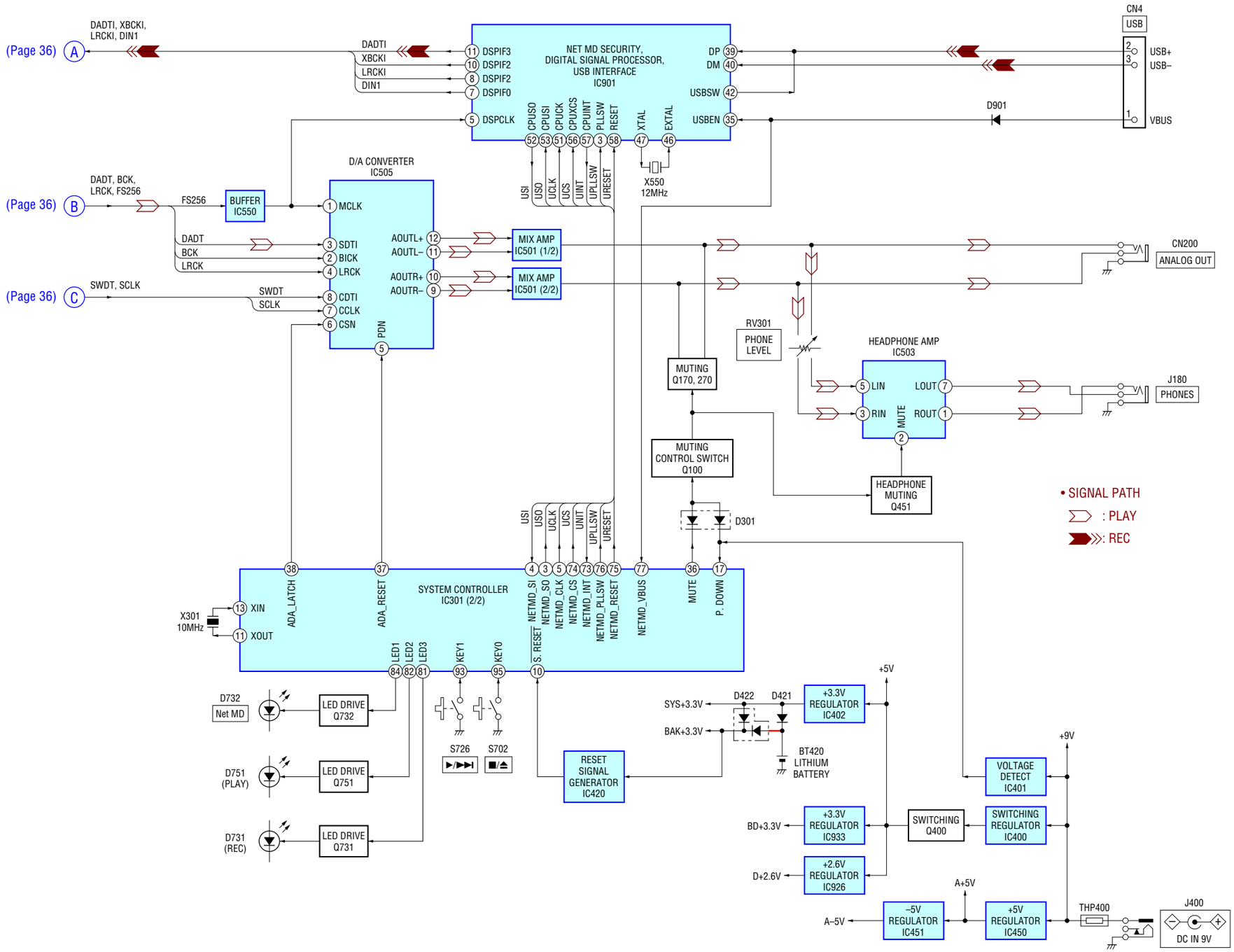
Note: It is useful to use the jig for checking the waveform. (Refer to Servicing Notes on page 8)

SECTION 6
DIAGRAMS

6-1. BLOCK DIAGRAM – SERVO Section –



6-2. BLOCK DIAGRAM – MAIN Section –



6-3. NOTE FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

Note on Schematic Diagram:

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

- ▬▬ : B+ Line.
- ▬ ▬ ▬ : B– Line.
- Power voltage is dc 9V and fed with regulated dc power supply from external power voltage jack.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : PLAYBACK
  ( ) : STOP
  ✻ : 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.
  : PLAY
  : REC

Note on Printed Wiring Boards:

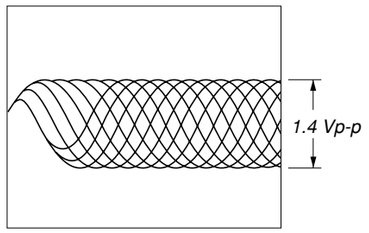
- o——— : parts extracted from the component side.
- ——— : parts extracted from the conductor side.
- △ : internal component.
- ▬ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

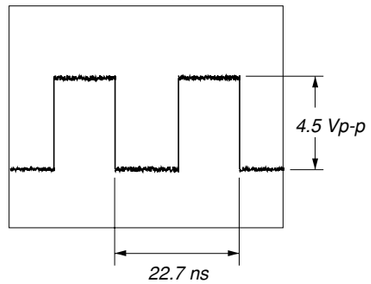
Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

• Waveforms
– BD Board –

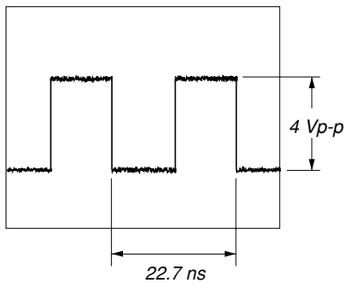
❶ IC101 ㊳ (RF) (PLAY mode)



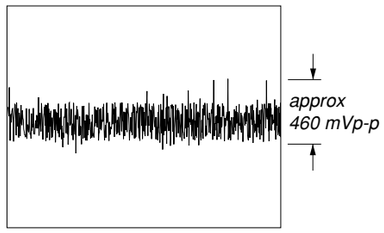
❺ IC201 ㉞ (LRCK) (PLAY mode)



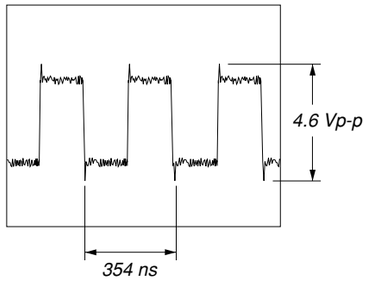
⓭ IC505 ④ (LRCK) (PLAY mode)



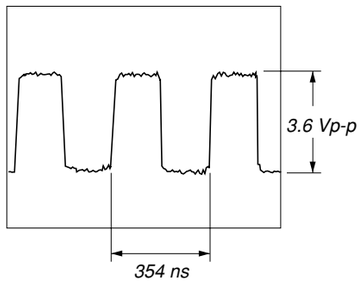
❷ IC101 ㉞ (FE) (PLAY mode)



❻ IC201 ㉟ (XBCK) (PLAY mode)

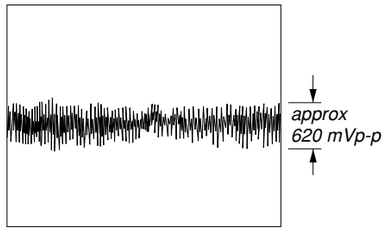


⓮ IC505 ② (BICK) (PLAY mode)

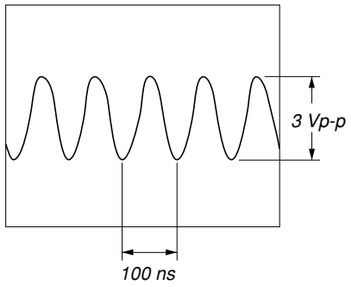


– MAIN Board –

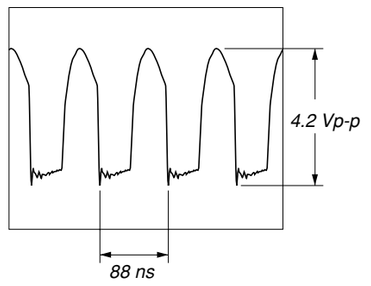
❸ IC101 ㉖ (TE) (PLAY mode)



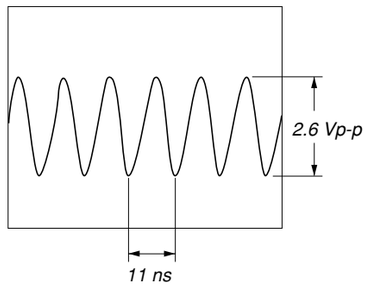
⓫ IC301 ⑪ (XOUT)



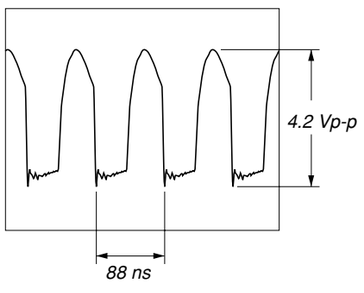
⓯ IC505 ① (MCLK)



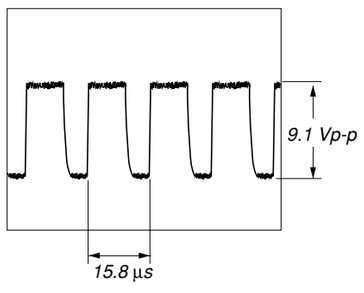
❹ IC201 ⑳ (OSCO)



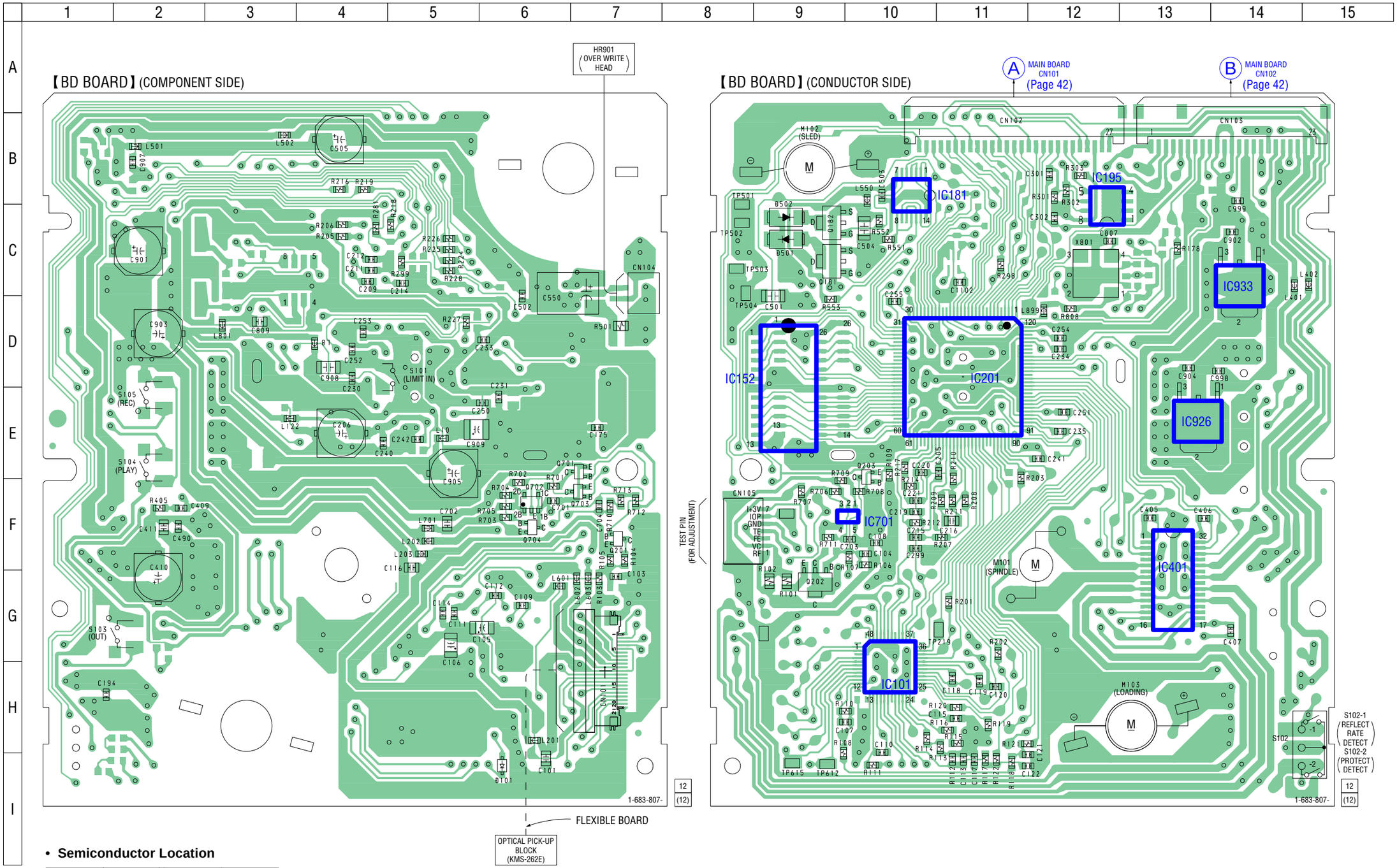
⓬ IC901 ⑤ (DSPCLK)



⓰ IC400 ⑦ (EXT)



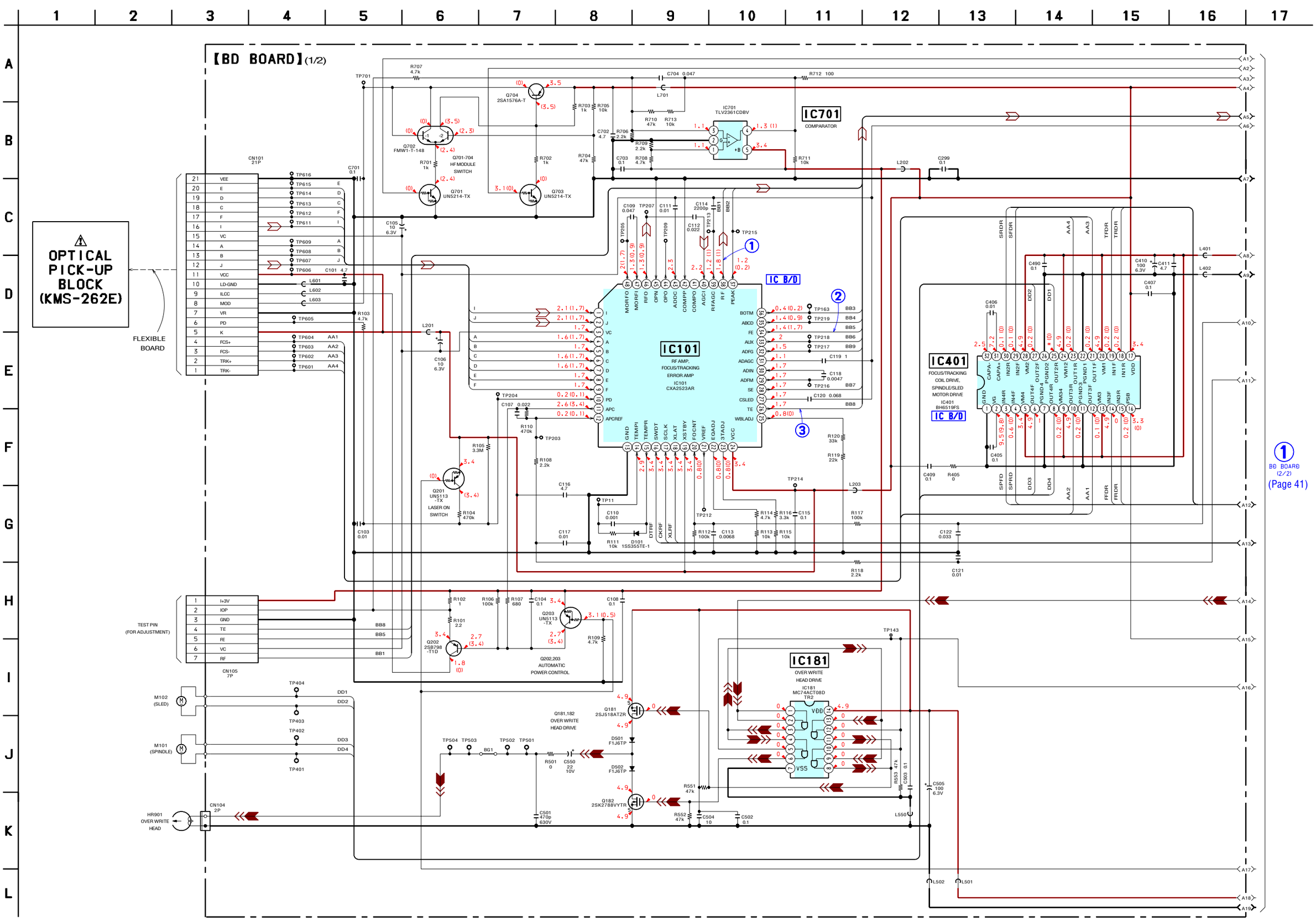
6-4. PRINTED WIRING BOARD – BD Board –



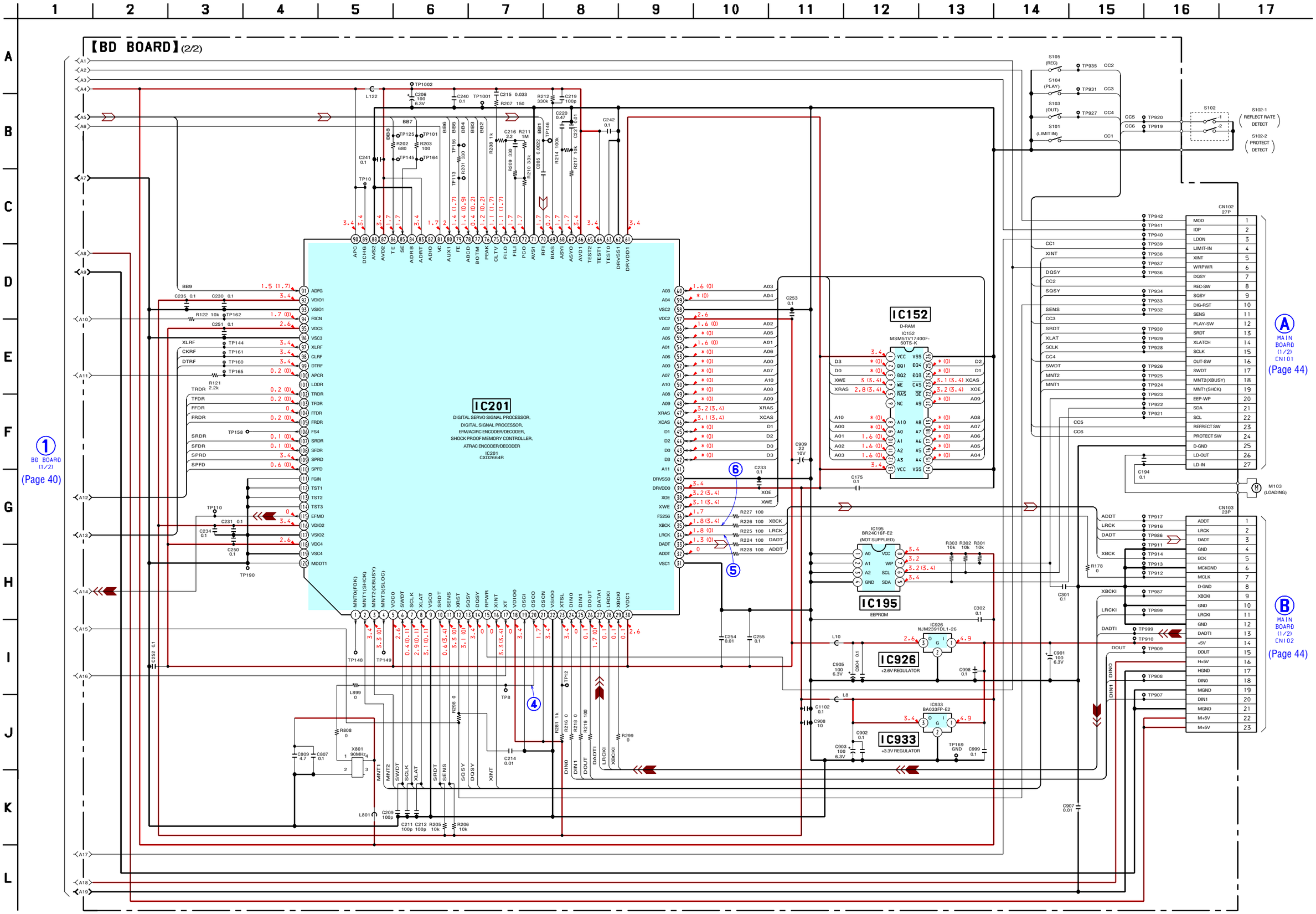
- **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location
D101	I-6	IC933	C-14
D501	C-9		
D502	C-9	Q181	C-9
		Q182	C-9
IC101	H-10	Q201	F-7
IC152	D-9	Q202	G-9
IC181	B-10	Q203	E-10
IC195	C-12	Q701	E-7
IC201	D-11	Q702	F-6
IC401	G-13	Q703	F-7
IC701	F-10	Q704	F-6
IC926	E-13		

6-5. SCHEMATIC DIAGRAM – BD Board (1/2) – • See page 38 for Waveforms. • See page 48 for IC Block Diagrams.

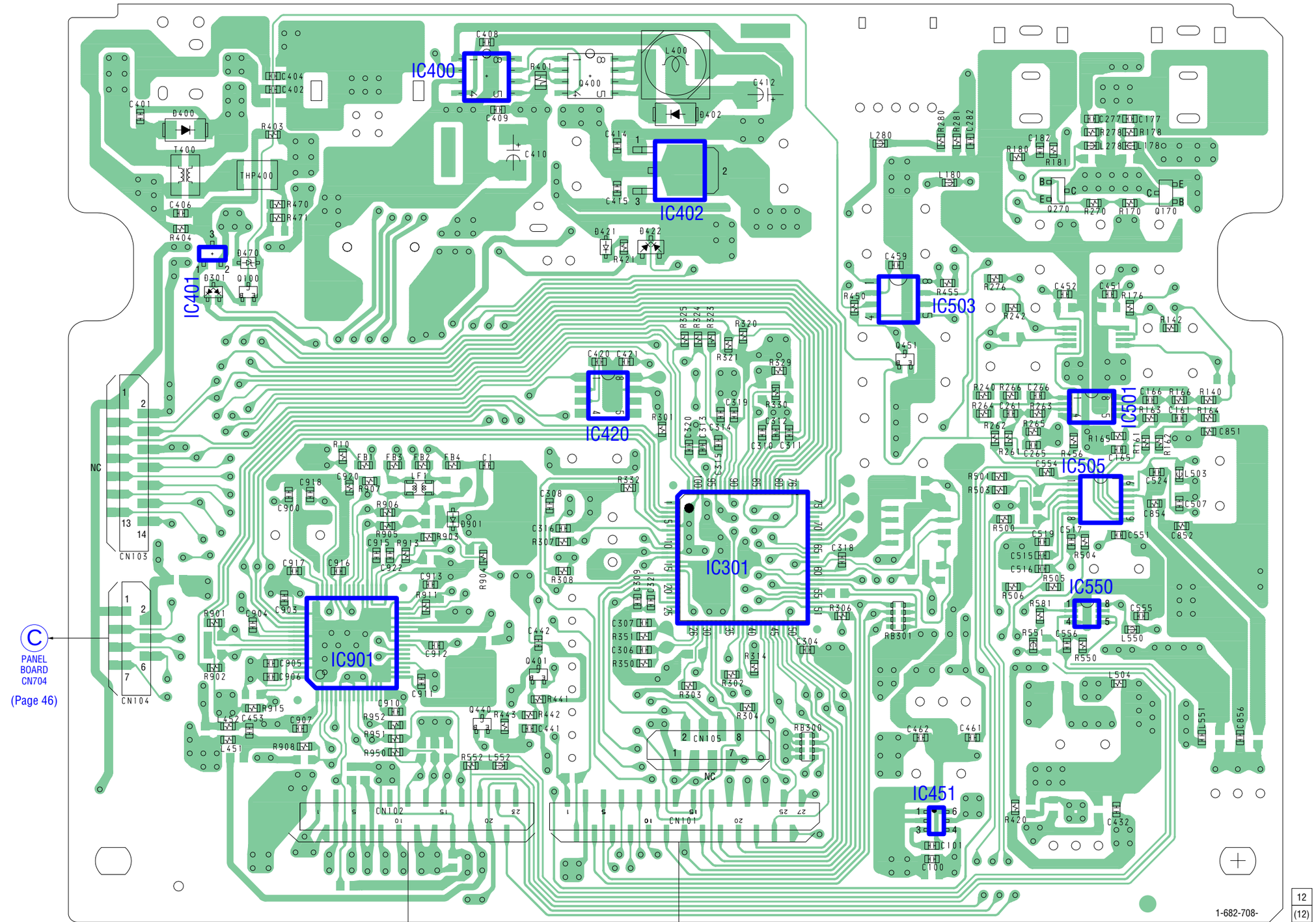


6-6. SCHEMATIC DIAGRAM – BD Board (2/2) – • See page 38 for Waveforms.



6-7. PRINTED WIRING BOARD – MAIN Board (Component Side) –

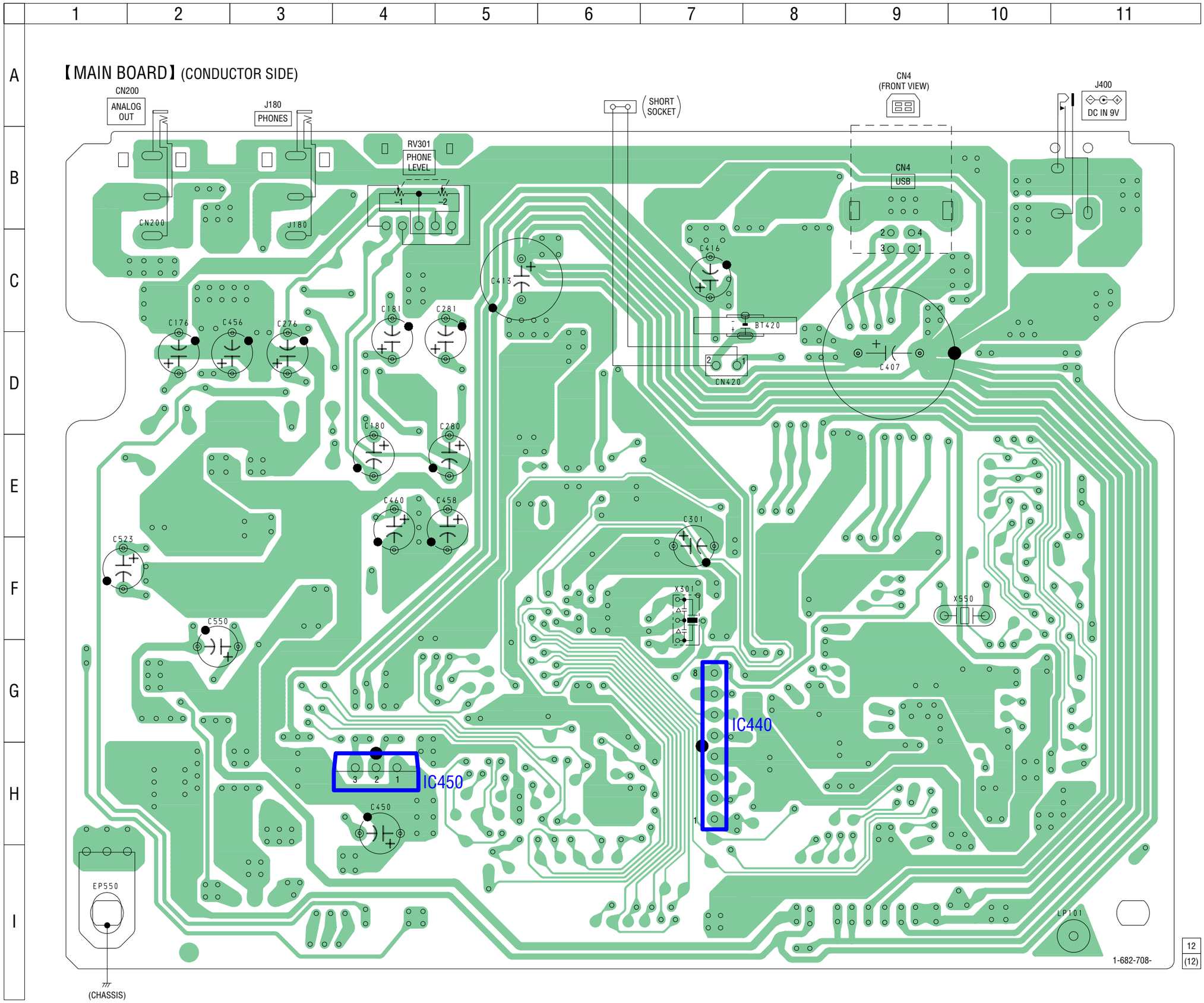
【MAIN BOARD】(COMPONENT SIDE)



- **Semiconductor Location**

Ref. No.	Location
D301	D-3
D400	C-2
D402	C-7
D421	D-6
D422	D-6
D470	D-3
D901	F-5
IC301	F-7
IC400	B-5
IC401	D-3
IC402	C-7
IC420	E-6
IC451	I-9
IC501	E-10
IC503	D-9
IC505	F-10
IC550	G-10
IC901	G-4
Q100	D-3
Q170	C-11
Q270	C-10
Q400	B-6
Q401	H-5
Q440	H-5
Q451	E-9

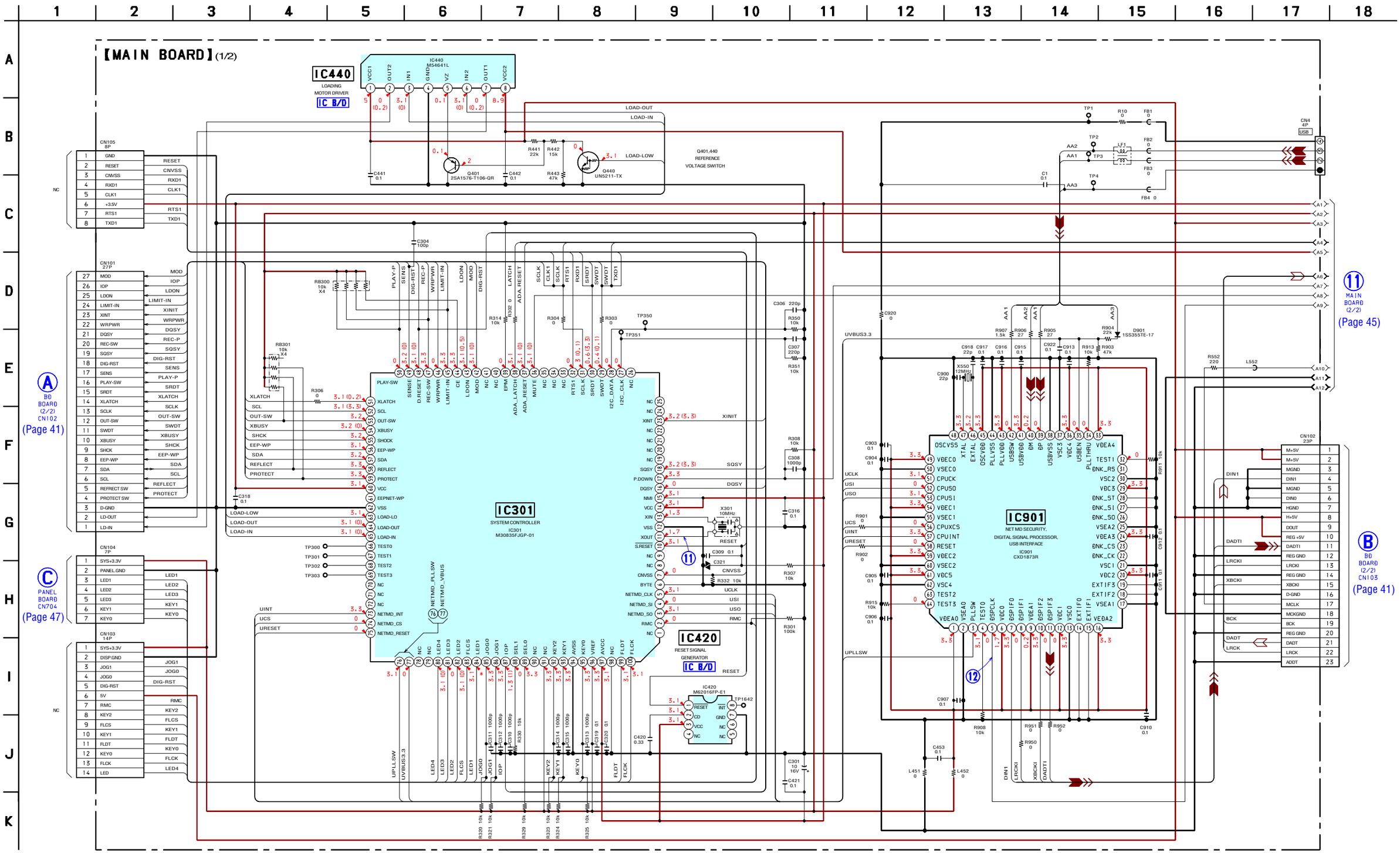
6-8. PRINTED WIRING BOARD – MAIN Board (Conductor Side) –



- **Semiconductor Location**

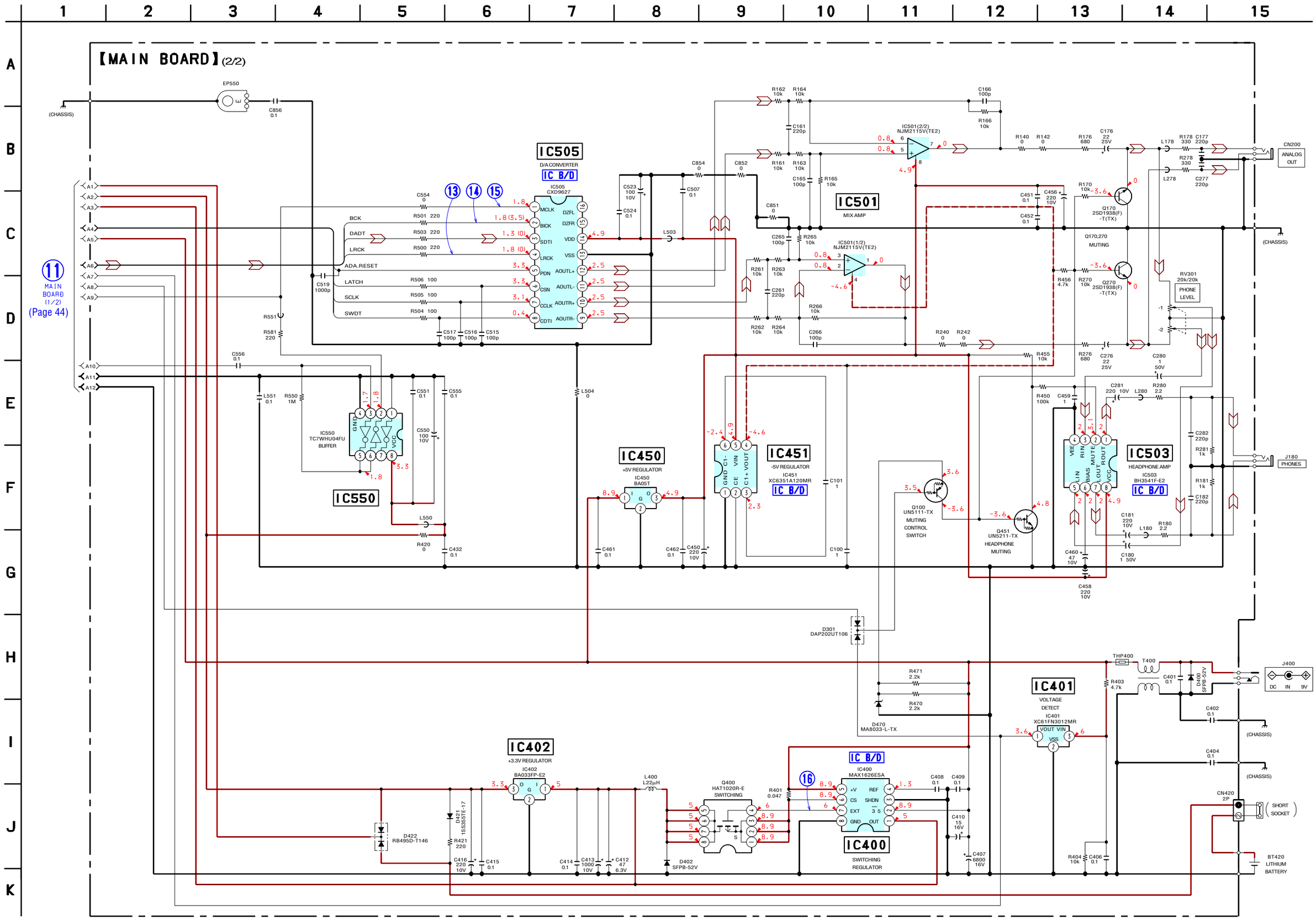
Ref. No.	Location
IC440	G-7
IC450	H-4

6-9. SCHEMATIC DIAGRAM – MAIN Board (1/2) – • See page 38 for Waveforms. • See page 48 for IC Block Diagrams.



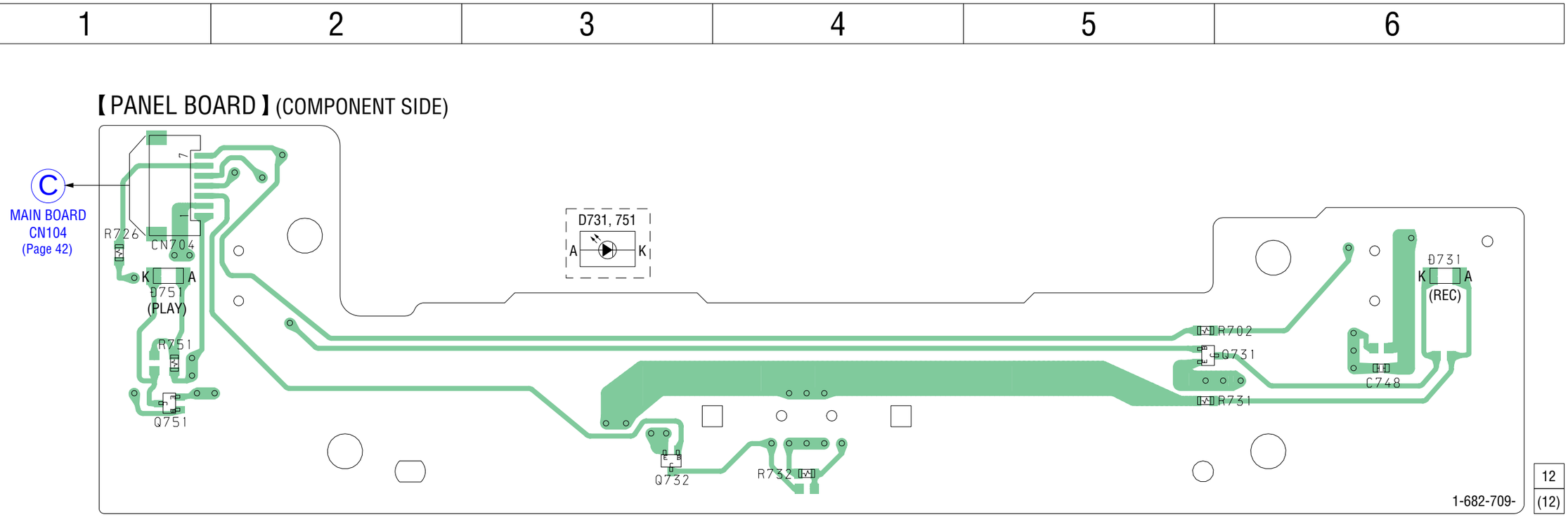
6-10. SCHEMATIC DIAGRAM – MAIN Board (2/2) –

• See page 38 for Waveforms. • See page 48 for IC Block Diagrams.

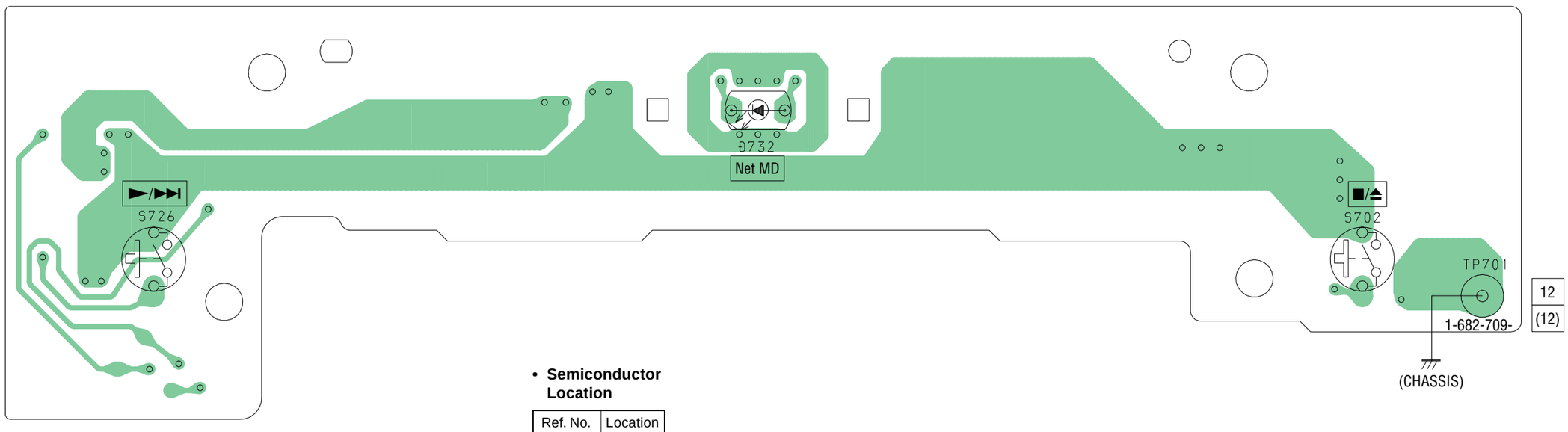


6-11. PRINTED WIRING BOARD – PANEL Board –

【PANEL BOARD】(COMPONENT SIDE)



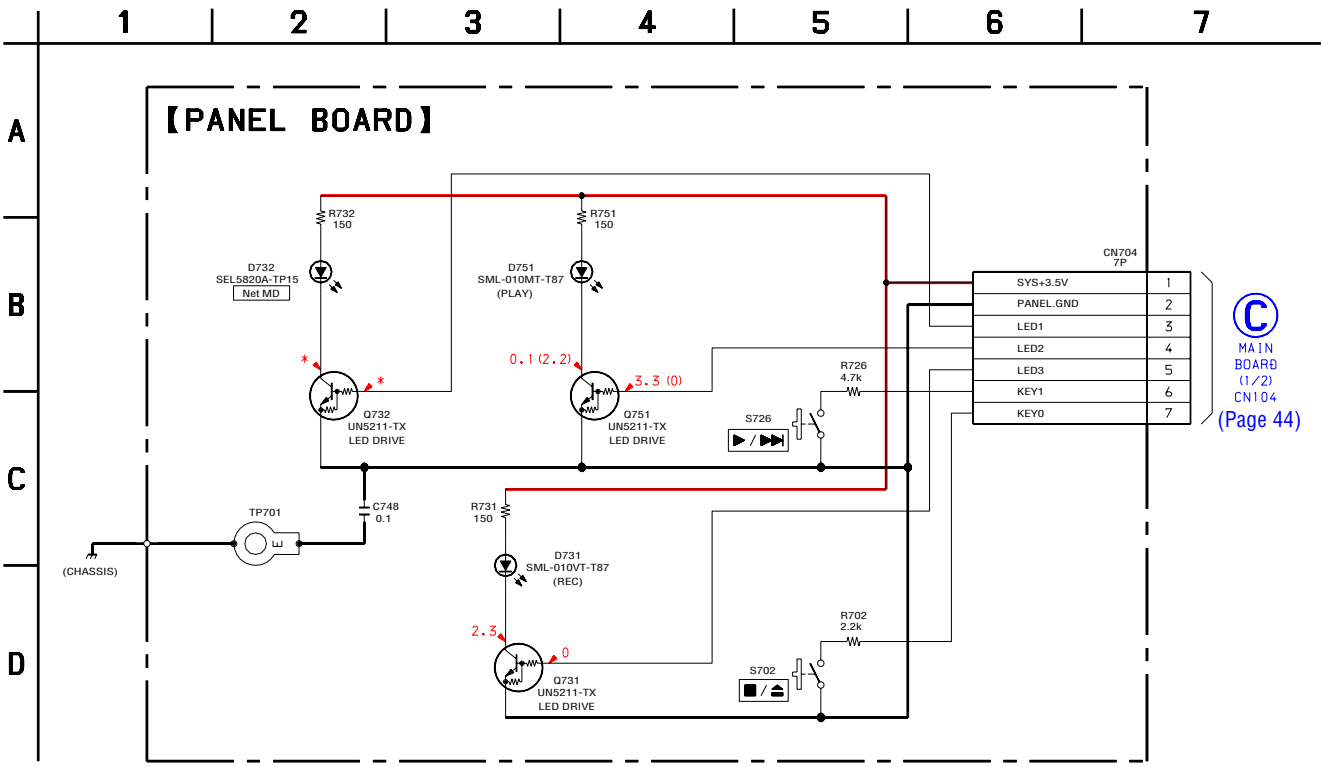
【PANEL BOARD】(CONDUCTOR SIDE)



- **Semiconductor Location**

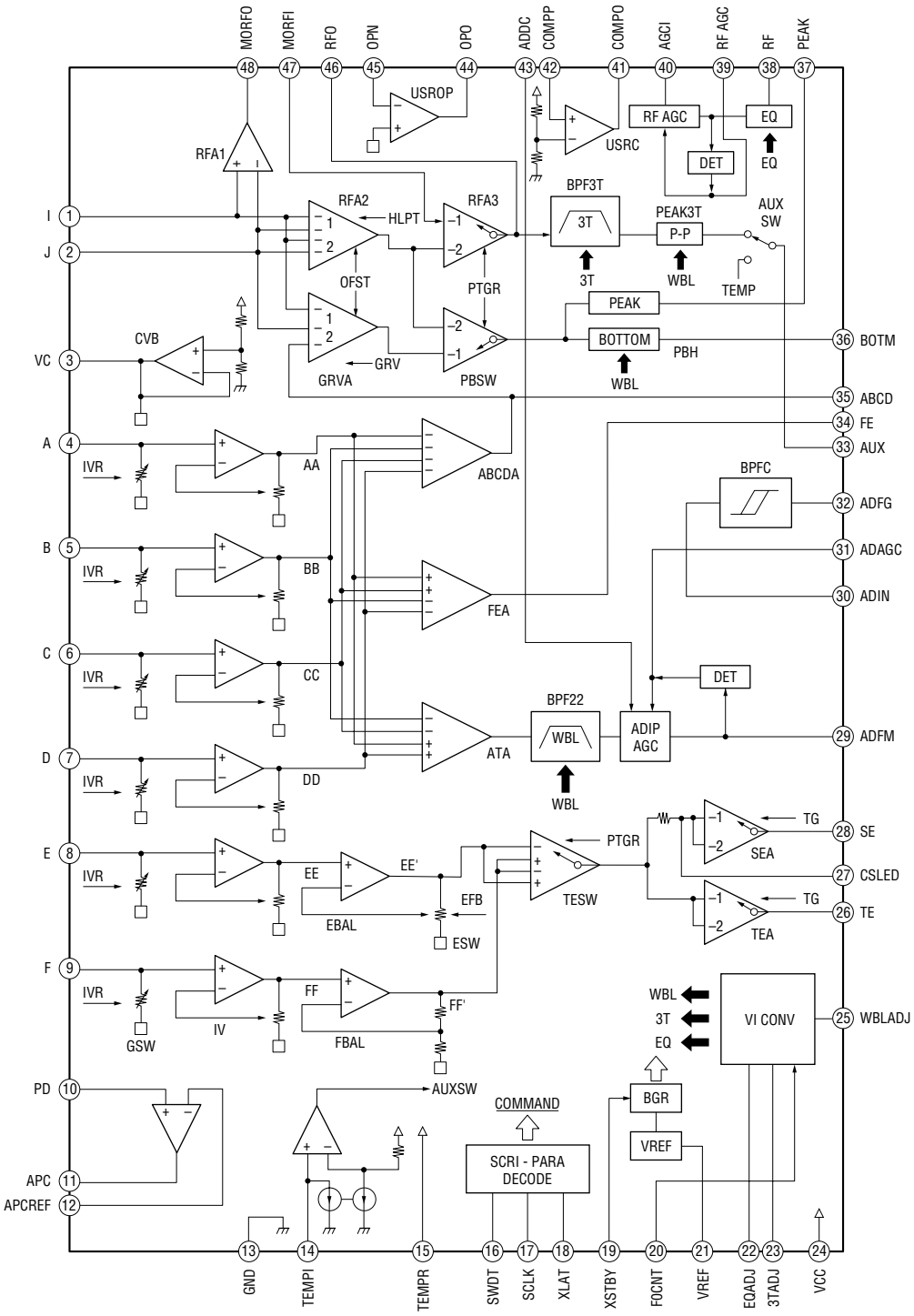
Ref. No.	Location
D731	A-6
D732	C-4
D751	A-1
Q731	B-5
Q732	B-3
Q751	B-1

6-12. SCHEMATIC DIAGRAM – PANEL Board –

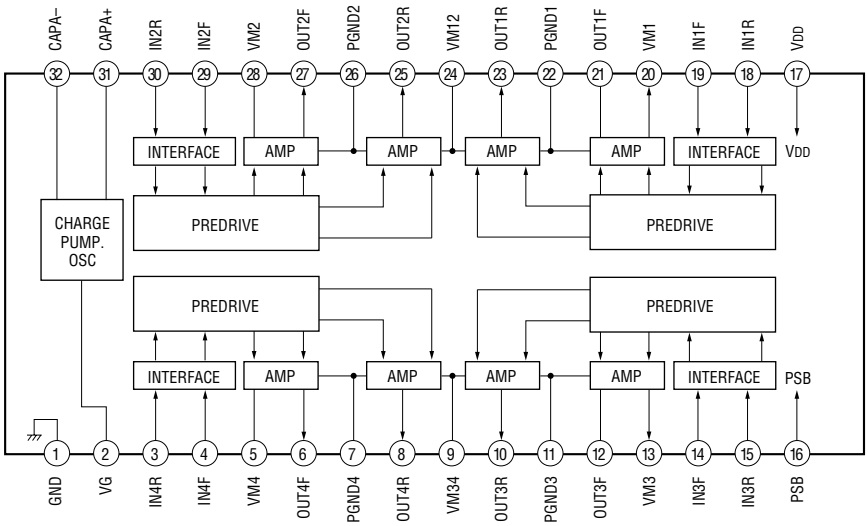


• **IC Block Diagrams**
– BD Board –

IC101 CXA2523AR

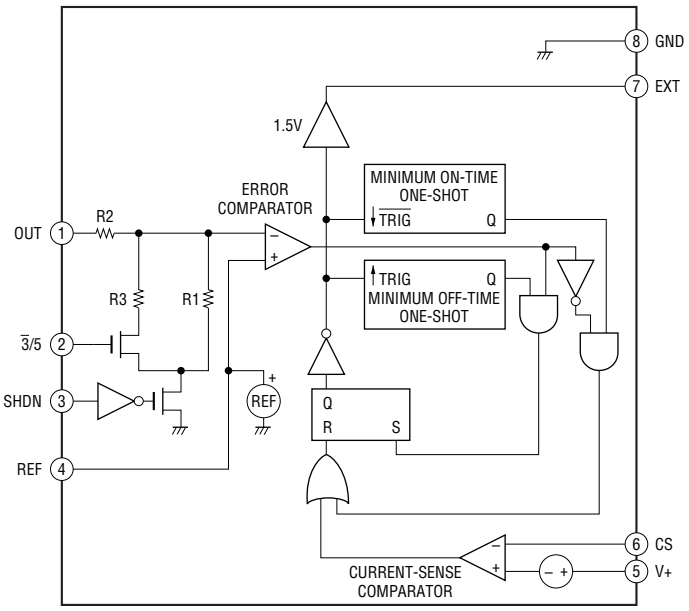


IC401 BH6519FS-E2

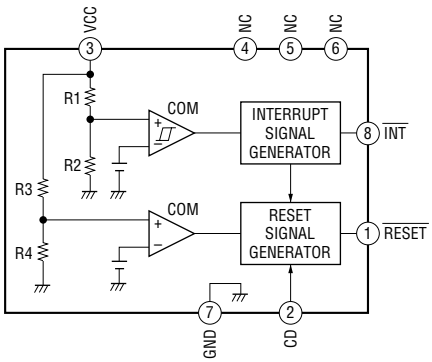


– MAIN Board –

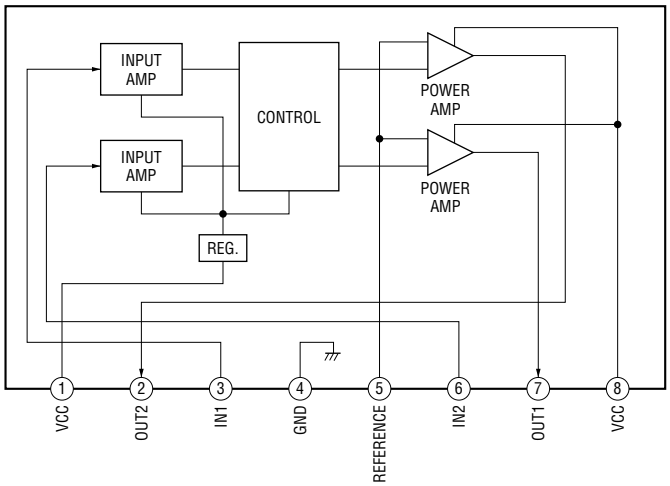
IC400 MAX1626ESA-TE2



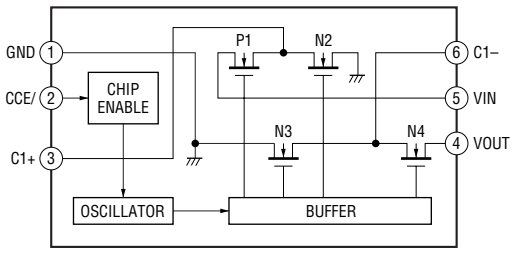
IC420 M62016FP-E1



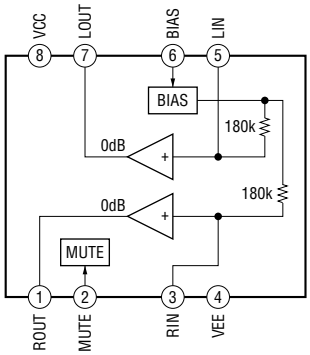
IC440 M54641L



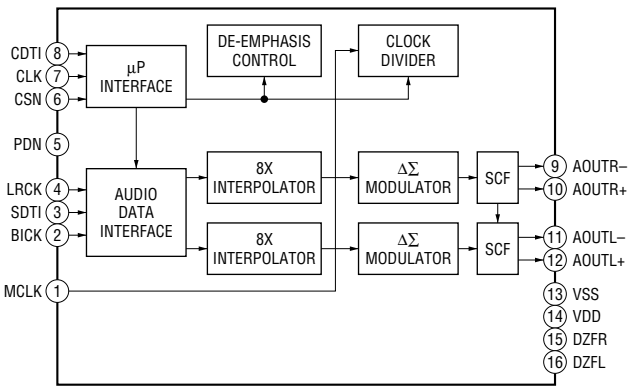
IC451 XC6351A120MR



IC503 BH3541F-E2



IC505 CXD9627A-E2



6-13. IC PIN FUNCTION DESCRIPTION

• BD BOARD IC101 CXA2523AR (RF AMP, FOCUS/TRACKING ERROR AMP)

Pin No.	Pin Name	I/O	Description
1	I	I	I-V converted RF signal I input from the optical pick-up block detector
2	J	I	I-V converted RF signal J input from the optical pick-up block detector
3	VC	O	Middle point voltage (+1.65V) generation output terminal
4 to 9	A to F	I	Signal input from the optical pick-up detector
10	PD	I	Light amount monitor input from the optical pick-up block laser diode
11	APC	O	Laser amplifier output to the automatic power control circuit
12	APCREF	I	Reference voltage input for setting laser power
13	GND	—	Ground terminal
14	TEMPI	I	Connected to the temperature sensor
15	TEMPR	O	Output terminal for a temperature sensor reference voltage
16	SWDT	I	Writing serial data input from the CXD2664R
17	SCLK	I	Serial data transfer clock signal input from the CXD2664R
18	XLAT	I	Serial data latch pulse signal input from the CXD2664R
19	XSTBY	I	Standby signal input terminal "L": standby (fixed at "H" in this set)
20	F0CNT	I	Center frequency control voltage input terminal of internal circuit (BPF22, BPF3T, EQ) input terminal
21	VREF	O	Reference voltage output terminal Not used
22	EQADJ	I	Center frequency setting terminal for the internal circuit (EQ)
23	3TADJ	I	Center frequency setting terminal for the internal circuit (BPF3T)
24	VCC	—	Power supply terminal (+3.3V)
25	WBLADJ	I	Center frequency setting terminal for the internal circuit (BPF22)
26	TE	O	Tracking error signal output terminal
27	CSLED	I	Connected to the external capacitor for low-pass filter of the sled error signal
28	SE	O	Sled error signal output terminal
29	ADFM	O	FM signal output terminal of the ADIP
30	ADIN	I	Receives a ADIP FM signal in AC coupling
31	ADAGC	I	Connected to the external capacitor for ADIP AGC
32	ADFG	O	ADIP duplex signal (22.05 kHz ± 1 kHz) output to the CXD2664R
33	AUX	O	Auxiliary signal (I_3 signal/temperature signal) output to the CXD2664R
34	FE	O	Focus error signal output terminal
35	ABCD	O	Light amount signal (ABCD) output terminal
36	BOTM	O	Light amount signal (RF/ABCD) bottom hold output terminal
37	PEAK	O	Light amount signal (RF/ABCD) peak hold output terminal
38	RF	O	Playback EFM RF signal output terminal
39	RFAGC	I	Connected to the external capacitor for RF auto gain control circuit
40	AGCI	I	Receives a RF signal in AC coupling
41	COMPO	O	User comparator output terminal Not used
42	COMPP	I	User comparator input terminal Not used
43	ADDC	I	Connected to the external capacitor for cutting the low band of the ADIP amplifier
44	OPO	O	User operational amplifier output terminal Not used
45	OPN	I	User operational amplifier inversion input terminal Not used
46	RFO	O	RF signal output terminal
47	MORFI	I	Receives a MO RF signal in AC coupling
48	MORFO	O	MO RF signal output terminal

• **BD BOARD IC201 CXD2664R**
(DIGITAL SIGNAL PROCESSOR, DIGITAL SERVO SIGNAL PROCESSOR, EFM/ACIRC ENCODER/DECODER, SHOCK PROOF MEMORY CONTROLLER, ATRAC ENCODER/DECODER)

Pin No.	Pin Name	I/O	Description
1	MNT0 (FOK)	O	Focus OK signal output terminal "H" is output when focus is on ("L": NG) Not used
2	MNT1 (SHCK)	O	Track jump detection signal output to the system controller
3	MNT2 (XBUSY)	O	Busy monitor signal output to the system controller
4	MNT3 (SLOC)	O	Spindle servo lock status monitor signal output terminal Not used
5	VDC0	—	Power supply terminal (+2.5V) (for core)
6	SWDT	I	Writing serial data signal input from the system controller
7	SCLK	I	Serial data transfer clock signal input from the system controller
8	XLAT	I	Serial data latch pulse signal input from the system controller
9	VSC0	—	Ground terminal (for core)
10	SRDT	O	Reading serial data signal output to the system controller
11	SENS	O	Internal status (SENSE) output to the system controller
12	XRST	I	Reset signal input from the system controller "L": reset
13	SQSY	O	Subcode Q sync (SCOR) output to the system controller "L" is output every 13.3 msec Almost all, "H" is output
14	DQSY	O	Digital In U-bit CD format subcode Q sync (SCOR) output to the system controller "L" is output every 13.3 msec Almost all, "H" is output
15	RPWR	I	Laser power selection signal input from the system controller "L": playback mode, "H": recording mode
16	XINT	O	Interrupt status output to the system controller
17	TX	O	Magnetic head on/off signal output to the over write head drive
18	VDIO0	—	Power supply terminal (+3.3V) (for I/O)
19	OSCI	I	System clock signal input terminal Not used
20	OSCO	I	System clock signal (2048Fs=90.3168 MHz) input terminal
21	OSCN	I	Control terminal for inverter and feedback resistor of internal oscillator circuit "L": OSCO (pin ⑳) is output terminal, "H": OSCO (pin ⑳) is input terminal (fixed at "H" in this set)
22	VSIO0	—	Ground terminal (for I/O)
23	XTSL	I	Input terminal for the system clock frequency setting "L": 180.6336 MHz, "H": 90.3168 MHz (fixed at "H" in this set)
24	DIN0	I	Digital audio signal input terminal when recording mode Not used
25	DIN1	I	Digital audio signal input terminal when recording mode
26	DOUT	O	Digital audio signal output terminal when playback mode Not used
27	DATAI	I	Recording data input from the USB interface
28	LRCKI	I	L/R sampling clock signal (44.1 kHz) input from the USB interface
29	XBCKI	I	Bit clock signal (2.8224 MHz) input from the USB interface
30	VDC1	—	Power supply terminal (+2.5V) (for core)
31	VSC1	—	Ground terminal (for core)
32	ADDT	I	Recording data input terminal Not used
33	DADT	O	Playback data output to the D/A converter
34	LRCK	O	L/R sampling clock signal (44.1 kHz) output to the D/A converter
35	XBCK	O	Bit clock signal (2.8224 MHz) output to the D/A converter
36	FS256	O	Clock signal (11.2896 MHz) output to the D/A converter
37	XWE	O	Write enable signal output to the D-RAM "L" active
38	XOE	O	Output enable signal output to the D-RAM "L" active
39	DRVDD0	—	Power supply terminal (+3.3V) (for D-RAM interface)
40	DRVSS0	—	Ground terminal (for D-RAM interface)

Pin No.	Pin Name	I/O	Description
41	A11	O	Address signal output to the external D-RAM Not used
42 to 45	D0 to D3	I/O	Two-way data bus with the D-RAM
46	XCAS	O	Column address strobe signal output to the D-RAM "L" active
47	XRAS	O	Row address strobe signal output to the D-RAM "L" active
48 to 56	A00 to A02, A05 to A10	O	Address signal output to the D-RAM
57	VDC2	—	Power supply terminal (+2.5V) (for core)
58	VSC2	—	Ground terminal (for core)
59, 60	A03, A04	O	Address signal output to the D-RAM
61	DRVDD1	—	Power supply terminal (+3.3V) (for D-RAM interface)
62	DRVSS1	—	Ground terminal (for D-RAM interface)
63, 64	TEST0, TEST1	I	Not used
65	TEST2	O	Not used
66	AVD1	—	Power supply terminal (+3.3V) (analog system)
67	ASYO	O	Playback EFM full-swing output
68	ASYI	I	Playback EFM comparator slice voltage input
69	BIAS	I	Playback EFM comparator bias current input
70	RFI	I	Playback EFM RF signal input from the RF amplifier
71	AVS1	—	Ground terminal (analog system)
72	PCO	O	Phase comparison output for master clock of the recording/playback EFM master PLL
73	FILI	I	Filter input for master clock of the recording/playback EFM master PLL
74	FILO	O	Filter output for master clock of the recording/playback EFM master PLL
75	CLTV	I	Internal VCO control voltage input of the recording/playback EFM master PLL
76	PEAK	I	Light amount signal (RF/ABCD) peak hold input from the RF amplifier
77	BOTM	I	Light amount signal (RF/ABCD) bottom hold input from the RF amplifier
78	ABCD	I	Light amount signal (ABCD) input from the RF amplifier
79	FE	I	Focus error signal input from the RF amplifier
80	AUX1	I	Auxiliary signal (I_3 signal/temperature signal) input from the RF amplifier
81	VC	I	Middle point voltage (+1.65V) input from the RF amplifier
82	ADIO	O	Output terminal for the test
83	ADRT	I	A/D converter operational range upper limit voltage input terminal (fixed at "H" in this set)
84	ADRB	I	A/D converter operational range lower limit voltage input terminal (fixed at "L" in this set)
85	SE	I	Sled error signal input from the RF amplifier
86	TE	I	Tracking error signal input from the RF amplifier
87	AVD2	—	Power supply terminal (+3.3V) (analog system)
88	AVS2	—	Ground terminal (analog system)
89	DCHG	I	Connected to the +3.3V power supply
90	APC	I	Error signal input terminal for laser digital automatic power control Not used
91	ADFG	I	ADIP duplex FM signal (22.05 kHz ± 1 kHz) input from the RF amplifier
92	VDIO1	—	Power supply terminal (+3.3V) (for I/O)
93	VSIO1	—	Ground terminal (for I/O)
94	F0CN	O	Filter f0 control signal output to the RF amplifier
95	VDC3	—	Power supply terminal (+2.5V) (for core)
96	VSC3	—	Ground terminal (for core)
97	XLRF	O	Serial data latch pulse signal output to the RF amplifier
98	CKRF	O	Serial data transfer clock signal output to the RF amplifier
99	DTRF	O	Writing serial data output to the RF amplifier

Pin No.	Pin Name	I/O	Description
100	APC	O	Reference PWM signal output to the RF amplifier for the laser automatic power control
101	LDDR	O	PWM signal output terminal for laser digital automatic power control Not used
102	TRDR	O	Tracking servo drive PWM signal (–) output
103	TFDR	O	Tracking servo drive PWM signal (+) output
104	FFDR	O	Focus servo drive PWM signal (+) output
105	FRDR	O	Focus servo drive PWM signal (–) output
106	FS4	O	Clock signal (176.4 kHz) output terminal (X'tal system) Not used
107	SRDR	O	Sled servo drive PWM signal (–) output
108	SFDR	O	Sled servo drive PWM signal (+) output
109	SPRD	O	Spindle servo drive PWM signal (–) output
110	SPFD	O	Spindle servo drive PWM signal (+) output
111	FGIN	I	FG input terminal for spindle servo Not used
112 to 114	TST1 to TST3	I	Input terminal for the test
115	EFMO	O	EFM signal output terminal when recording mode "L" is output when playback mode
116	VDIO1	—	Power supply terminal (+3.3V) (for I/O)
117	VSIO1	—	Ground terminal (for I/O)
118	VDC4	—	Power supply terminal (+2.5V) (for core)
119	VSC4	—	Ground terminal (for core)
120	MDDT1	I	MD data mode selection signal input terminal "L": normal mode, "H": MD data mode (fixed at "L" in this set)

• **MAIN BOARD IC301 M30835FJGP-01 (SYSTEM CONTROLLER)**

Pin No.	Pin Name	I/O	Description
1	NC	—	Not used
2	RMC	I	Remote control signal input terminal Not used
3	NETMD_SO	O	Serial data output to the USB interface IC
4	NETMD_SI	I	Serial data input from the USB interface IC
5	NETMD_CLK	O	Serial data transfer clock output to the USB interface IC
6	BYTE	I	External data bus line byte selection signal input "L": 16 bit, "H": 8 bit (fixed at "L")
7	CNVSS	—	Not used
8, 9	NC	—	Not used
10	$\overline{\text{S.RESET}}$	I	System reset signal input terminal "L": reset For several hundreds msec. after the power supply rises, "L" is input, then it change to "H"
11	XOUT	I	System clock input terminal (10 MHz)
12	VSS	—	Ground terminal
13	XIN	O	System clock output terminal (10 MHz)
14	VCC	—	Power supply terminal (+3.3V)
15	NMI	I	Non-maskable interrupt input terminal Not used
16	DQSY	I	Digital In U-bit CD format subcode Q sync (SCOR) input terminal "L" is input every 13.3 msec Almost all, "H" is input
17	P.DOWN	I	Power down detection signal input terminal
20	SQSY	I	Subcode Q sync (SCOR) input terminal "L" is input every 13.3 msec Almost all, "H" is input
19 to 22	NC	—	Not used
23	XINT	I	Interrupt status input from the mechanism deck section
24 to 26	NC	—	Not used
27	I2C_CLK	I/O	Communication data reading clock signal output terminal Not used
28	I2C_DATA	I/O	Communication data bus input/output terminal Not used
29	SWDT	O	Writing data output to the mechanism deck section and the D/A converter
30	SRDT	I	Reading data input from the mechanism deck section
31	SCLK	O	Serial data transfer clock signal output to the mechanism deck section and the D/A converter
32	RTSI	—	Not used
33 to 35	NC	—	Not used
36	MUTE	O	Audio line muting control signal output terminal "L": line muting on
37	ADA_RESET	O	Reset signal output to the D/A converter "L": reset
38	ADA_LATCH	O	Serial data latch signal output to the D/A converter "L": reset
39	EPM	—	Not used
40, 41	NC	—	Not used
42	MOD	O	Laser modulation select signal output terminal Stop: "L" Playback power: "H" Recoding power: "H" pulse is inputted in a cycle of 2 seconds
43	LDON	O	Laser diode on/off control signal output to the automatic power control circuit "H": laser diode on
44	CE	I	Command chip enable signal output to the D-RAM
45	LIMIT-IN	I	Detection input from the sled limit-in detect switch (S101) The optical pick-up is inner position when "L"
46	WRPWR	O	Laser power select signal output terminal "L": playback mode, "H": recording mode
47	REC-SW	I	Detection input from the recording position detect switch "L": active
48	ADA_RESET	O	Reset signal output to the mechanism deck section "L": reset
49	SENSE	I	Internal status (SENSE) signal input to the mechanism deck section

Pin No.	Pin Name	I/O	Description
50	PLAY-SW	I	Detection input from the playback position detect switch "L": active
51	XLATCH	O	Serial data latch pulse signal output to the mechanism deck section
52	SCL	O	Serial clock signal output to the EEPROM
53	OUT-SW	I	Detection signal input from the loading-out detect switch (S103) "L" at a load-out position, others: "H"
54	$\overline{\text{XBUSY}}$	I	Busy monitor signal input from the mechanism deck section
55	SHOCK	I	Track jump detection signal input from the mechanism deck section
56	EEP-WP	O	Writing protect signal output to the EEPROM
57	SDA	I/O	Two-way data bus with the EEPROM
58	REFLECT	I	Detection input from the disc reflection rate detect switch "L": high reflection rate disc, "H": low reflection rate disc
59	PROTECT SW	I	REC-proof claw detection signal input from the protect detect switch "H": write protect
60	VCC	—	Power supply terminal (+3.3V)
61	EEPNET-WP	—	Not used
62	VSS	—	Ground terminal
63	LD-LOW	O	Loading motor drive voltage control signal output terminal "H" active
64	LOAD OUT	O	Loading motor control signal (load-in direction) output terminal "H" at a load-in
65	LOAD OUT	O	Loading motor control signal (eject direction) output terminal "H" at a eject
66 to 69	TEST	I	Test input terminal Not used
70 to 72	NC	—	Not used
73	NETMD_INT	I	Interrupt status input from the USB interface IC
74	NETMD_XCS	O	Chip select signal output to the USB interface IC
75	NETMD_RESET	O	Reset signal output to the USB interface IC "L": reset
76	NETMD_PLLSW	O	PLL function on/off control signal output to the USB interface IC "L": PLL on
77	NETMD_VBUS	I	USB connect detection signal input terminal "H": USB on
78, 79	NC	—	Not used
80	LED4	O	LED drive signal output terminal Not used
81, 82	LED3, 2	O	LED drive signal output terminal
83	FLCS	—	Not used
84	LED1	O	LED drive signal output terminal
85	JOG0	I	Jog dial pulse input terminal Not used
86	JOG1	I	Jog dial pulse input terminal Not used
87	IOP	—	Not used
88	SEL1	I	Destination setting terminal
89	SEL0	I	Model setting terminal
90, 91	NC	—	Not used
92	KEY2	I	key input terminal Not used
93	KEY1	I	▶/▶▶I key input terminal
94	AVSS	—	Ground terminal
95	KEY0	I	■/⏏ key input terminal
96	VREF	I	Reference voltage (+3.3V) input terminal
97	AVCC	—	Power supply terminal (+3.3V)
98	NC	—	Not used
99	FLDT	—	Not used
100	FLCK	—	Not used

• **MAIN BOARD IC301 CXD1873R (NET MD SECURITY, DIGITAL SIGNAL PROCESSOR, USB INTERFACE)**

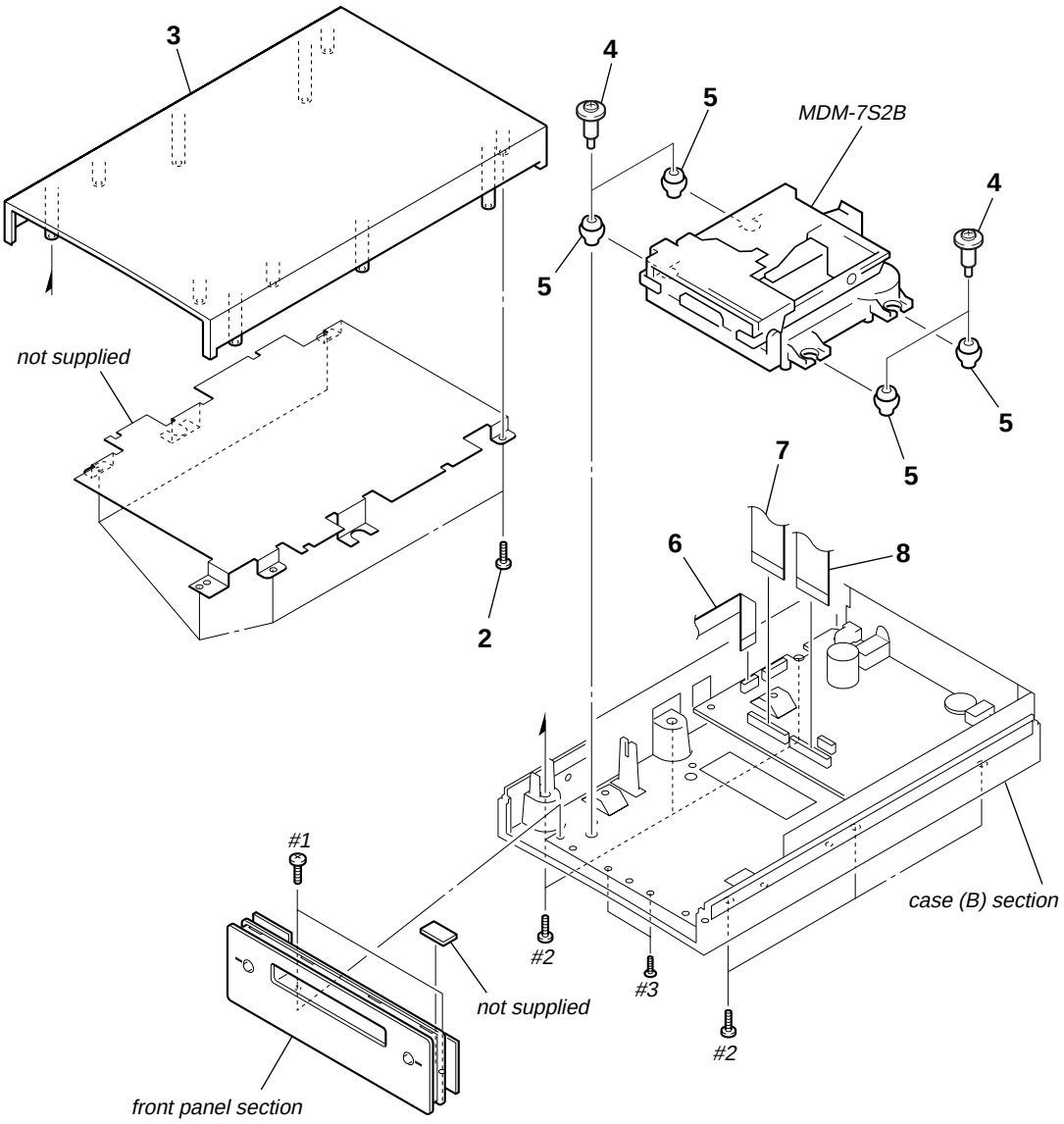
Pin No.	Pin Name	I/O	Description
1	VDEA0	—	Power supply terminal (+3.3V) (for DSP)
2	VSEA0	—	Ground terminal (for DSP)
3	PLLSW	I	PLL function on/off control signal input from the system controller "L": PLL on
4	TEST0	I	Test input terminal Normally fixed at "L"
5	DSPCLK	I	DSP transfer clock signal input terminal (256Fs: 11.2896MHz)
6	VDC0	—	Power supply terminal (+3.3V)
7	DSPIF0	O	Digital audio signal output terminal when recording mode
8	DSPIF1	O	L/R sampling clock signal (44.1 kHz) output terminal
9	VDEA1	—	Power supply terminal (+3.3V) (for DSP)
10	DSPIF2	O	Bit clock signal (2.8224 MHz) output terminal
11	DSPIF3	O	Recording data output terminal
12	VDC1	—	Power supply terminal (+3.3V)
13	VSC0	—	Ground terminal
14	EXTIF0	I/O	Not used
15	EXTIF1	I/O	Not used
16	VDEA2	—	Power supply terminal (+3.3V) (for DSP)
17	VSEA1	—	Ground terminal (for DSP)
18	EXTIF0	I/O	Not used
19	EXTIF1	I/O	Not used
20	VDC2	—	Power supply terminal (+3.3V)
21	VSC1	—	Ground terminal
22	DNKCK	O	Serial ROM clock signal output terminal Not used
23	DNKCS	O	Serial ROM chip select signal output terminal Not used
24	VDEA3	—	Power supply terminal (+3.3V) (for DSP)
25	VSEA2	—	Ground terminal (for DSP)
26	DNKSO	O	Serial ROM data output terminal Not used
27	DNKSI	I	Serial ROM data input terminal Not used
28	DNKST	I	Serial ROM status input terminal Not used
29	VDC3	—	Power supply terminal (+3.3V)
30	VSC2	—	Ground terminal
31	DNKRS	I	Serial ROM reset signal input terminal Not used
32	TEST1	I	Test input terminal Normally fixed at "L"
33	VDEA4	—	Power supply terminal (+3.3V) (for DSP)
34	PLLTHRU	I	Not used
35	USBEN	I	USB enable signal input terminal
36	VDC4	—	Power supply terminal (+3.3V)
37	VSC3	—	Ground terminal
38	USBVSS	—	Ground terminal (for USB)
39	DP	I/O	USB communication input/output
40	DM	I/O	USB communication input/output
41	USBVDD	—	Power supply terminal (+3.3V) (for USB)
42	USBSW	O	USB communication on/off control signal output "H": USB communication on
43	PLLVDD	—	Power supply terminal (+3.3V) (for USB)
44	PLLVSS	—	Ground terminal (for USB)
45	OSCVDD	—	Power supply terminal (+3.3V) (for OSC)

Pin No.	Pin Name	I/O	Description
46	EXTAL	I	System clock input terminal (12 MHz)
47	XTAL	O	System clock output terminal (12 MHz)
48	PLLVSS	—	Ground terminal (for OSC)
49	VDEC0	—	Power supply terminal (+3.3V) (for CPU)
50	VSEC0	—	Ground terminal (for CPU)
51	CPUCK	I	Serial data transfer clock input from the system controller
52	CPUSO	O	Serial data output to the system controller
53	CPUSI	I	Serial data input from the system controller
54	VDEC1	—	Power supply terminal (+3.3V) (for CPU)
55	VSEC1	—	Ground terminal (for CPU)
56	CPUXCS	I	Chip select signal input from the system controller
57	CPUINT	O	Interrupt status output to the system controller
58	RESET	I	Reset signal input from the system controller “L”: reset
59	VDEC2	—	Power supply terminal (+3.3V) (for CPU)
60	VSEC2	—	Ground terminal (for CPU)
61	VDC5	—	Power supply terminal (+3.3V)
62	VSC4	—	Ground terminal
63	TEST2	O	Test input terminal Not used
64	TEST3	I	Test input terminal Normally fixed at “L”

SECTION 7
EXPLODED VIEWS

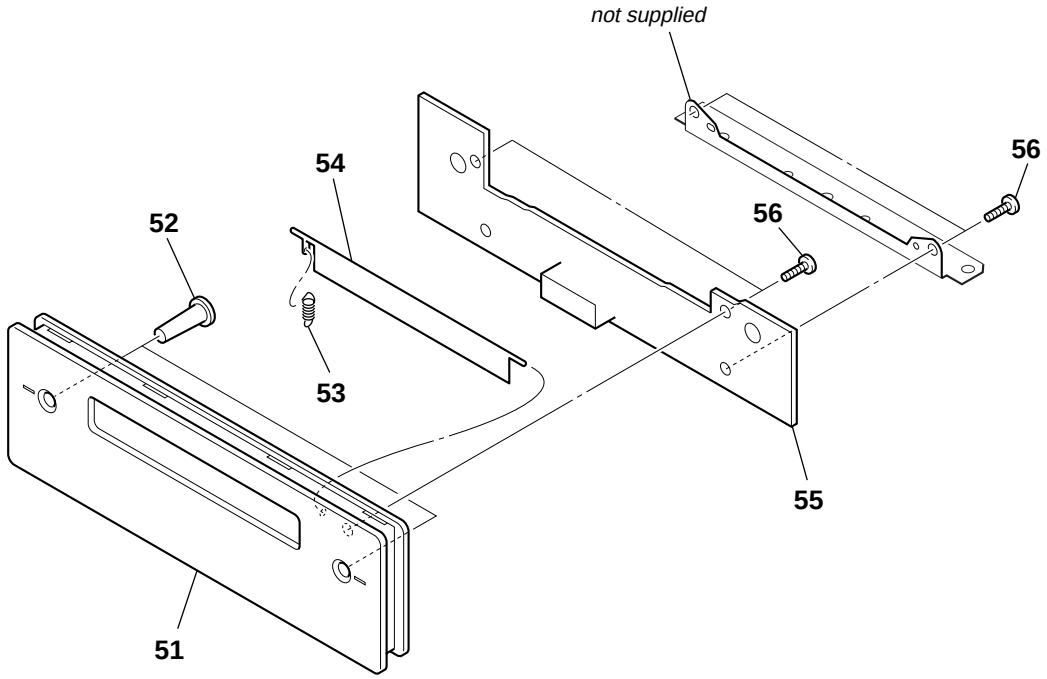
NOTE:
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. 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 the electrical parts list.
- Abbreviation
  SP : Singapore model

7-1. CASE SECTION



Ref. No.	Part No.	Description	Remark
2	4-951-620-01	SCREW (2.6X8), +BVTP	
3	4-237-133-02	CASE (UPPER)	
4	4-228-643-21	SCREW (+BVTTWH M3), STEP	
5	4-228-689-01	INSULATOR	
6	1-823-648-11	WIRE (FLAT TYPE) (7 CORE)	
7	1-792-811-21	WIRE (FLAT TYPE) (23 CORE)	
8	1-792-812-21	WIRE (FLAT TYPE) (27 CORE)	
#1	7-685-870-01	SCREW +BVTT 3X5 (S)	
#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3	
#3	7-682-248-04	SCREW +K 3X8	

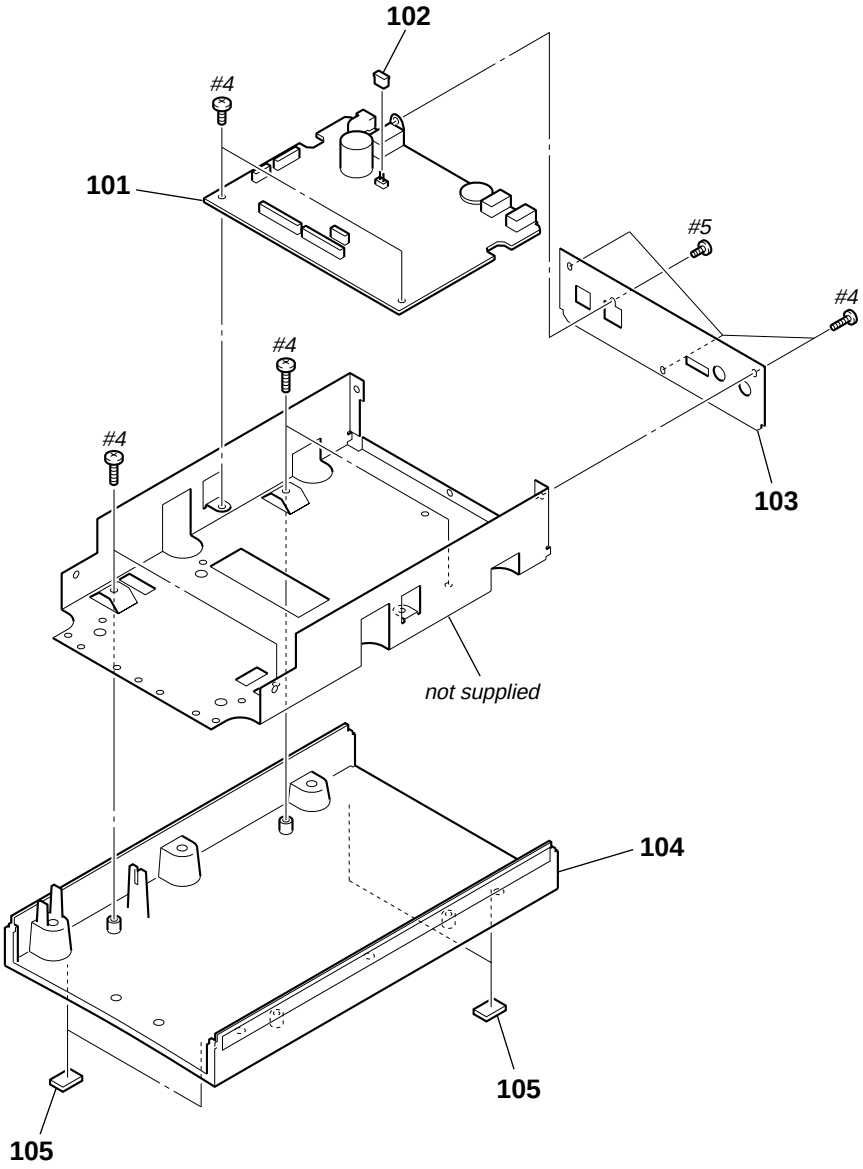
7-2. FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remark
51	X-4954-600-3	PANEL ASSY, FRONT	
52	4-236-730-01	BUTTON (A)	
53	4-228-630-01	SPRING (LID), TENSION COIL	
54	4-230-848-21	LID (MD)	

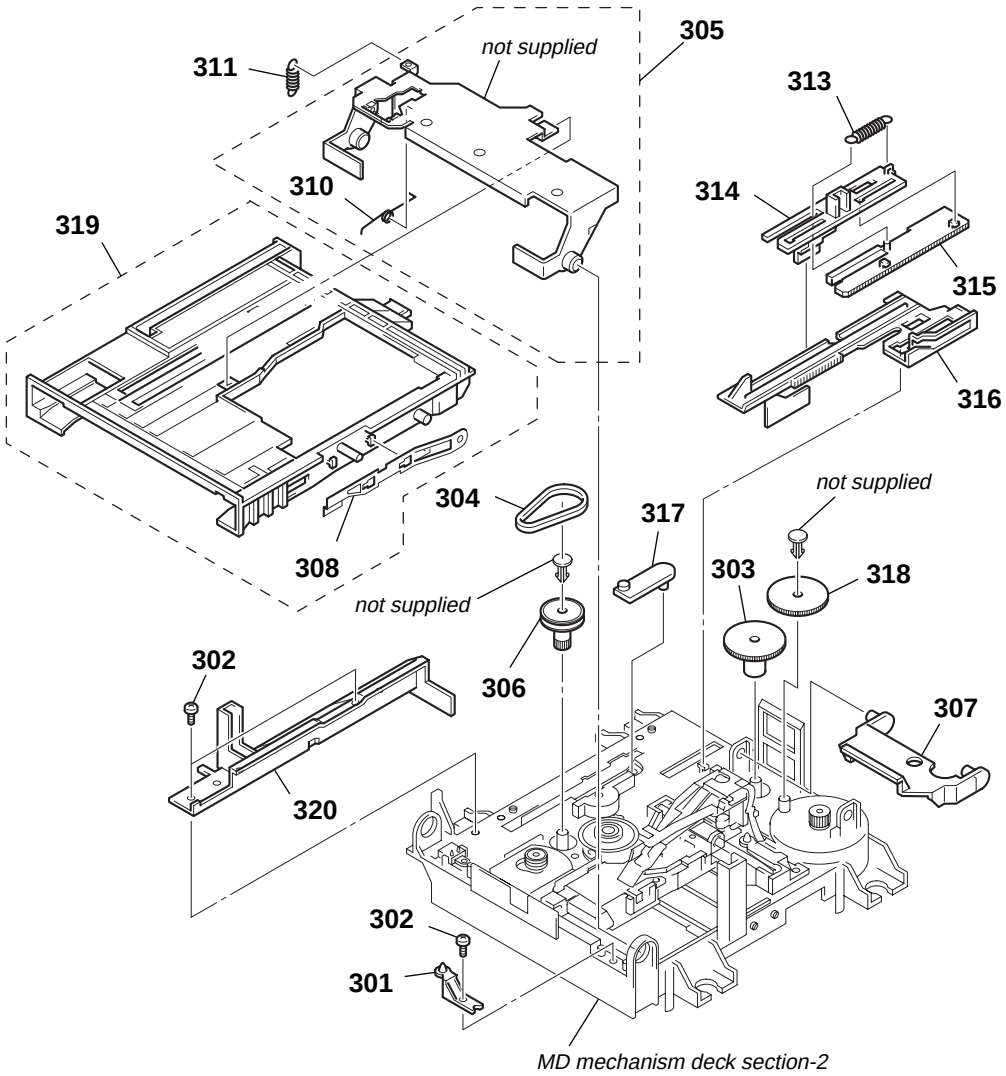
Ref. No.	Part No.	Description	Remark
55	A-4727-709-A	PANEL BOARD, COMPLETE (SP)	
55	A-4727-707-A	PANEL BOARD, COMPLETE (AEP, UK)	
56	4-951-620-01	SCREW (2.6X8), +BVTP	

7-3. CASE (B) SECTION



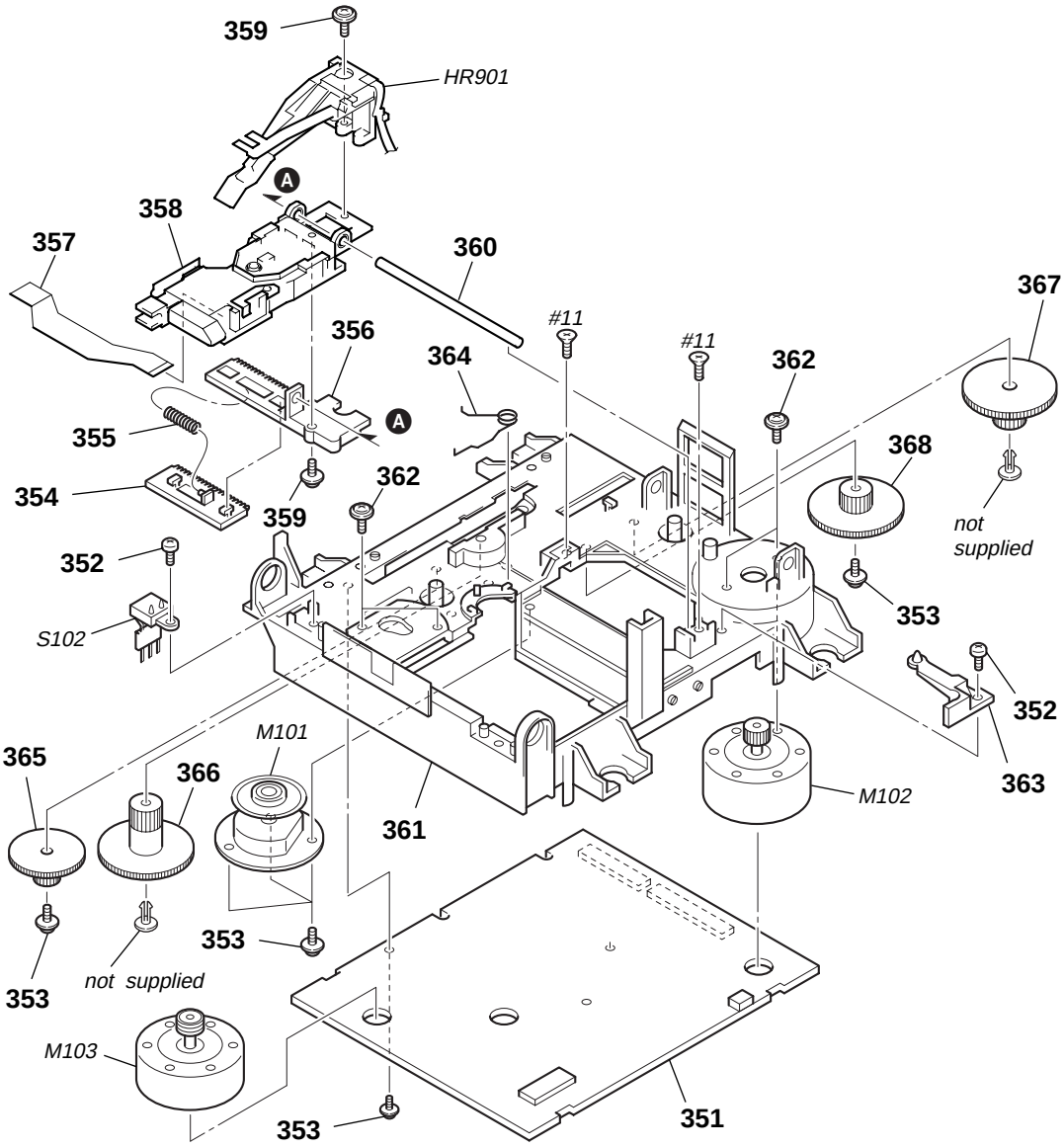
Ref. No.	Part No.	Description	Remark
101	A-4727-708-A	MAIN BOARD, COMPLETE (SP)	
101	A-4727-706-A	MAIN BOARD, COMPLETE (AEP, UK)	
* 102	1-569-972-21	SOCKET, SHORT 2P	
103	4-236-736-11	PANEL, BACK	
104	4-230-473-11	CASE (B)	
105	4-977-358-01	CUSHION	
#4	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#5	7-685-872-09	SCREW +BVTT 3X8 (S)	

7-4. MD MECHANISM DECK SECTION-1 (MDM-7S2B)



Ref. No.	Part No.	Description	Remark
* 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	A-4680-638-B	RETAINER COMPLETE ASSY	
306	4-227-002-01	GEAR, PULLEY	
307	4-226-999-01	LEVER (HEAD)	
308	X-4952-665-1	SPRING (SHT) ASSY, LEAF	
310	4-229-533-02	SPRING (STOPPER), TORSION	
311	4-227-012-01	SPRING (HOLDER), TENSION	
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-B	HOLDER ASSY	
320	4-226-994-01	GUIDE (L)	

7-5. MD MECHANISM DECK SECTION-2 (MDM-7S2B)



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

Ref. No.	Part No.	Description	Remark
351	A-4727-982-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	FLEXIBLE BOARD	
⚠358	A-4672-976-A	OPTICAL PICK-UP KMS-262	
359	4-988-560-01	SCREW (+P 1.7X6)	
360	4-996-265-01	SHAFT, MAIN	
361	4-226-989-01	CHASSIS	
362	4-211-036-01	SCREW (1.7X2.5), +PWH	
363	4-226-990-04	BASE (BU-A)	
364	4-230-716-01	SPRING (SPDL), TORSION	
365	4-227-004-01	GEAR (LC)	
366	4-227-005-01	GEAR (LD)	
367	4-227-008-01	GEAR (SC)	
368	4-227-009-01	GEAR (SD)	
HR901	1-500-670-22	HEAD, OVER WRITE	
M101	A-4735-757-A	MOTOR ASSY, SPINDLE	
M102	A-4672-900-A	MOTOR ASSY, SLED	
M103	A-4672-975-A	MOTOR ASSY, LOADING	
S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT RATE DETECT, PROTECT DETECT)	
#11	7-685-204-19	SCREW +KTP 2X6 TYPE2 NON-SLIT	

SECTION 8
ELECTRICAL PARTS LIST

BD

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 and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Abbreviation
  SP: Singapore
- Items marked "*" are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA. . : µA. . uPA. . : µPA. .
  uPB. . : µPB. . uPC. . : µPC. .
  uPD. . : µPD. .
- CAPACITORS
  uF: µF
- COILS
  uH: µH

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

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

Ref. No.	Part No.	Description			Remark
	A-4727-982-A	BD BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C103	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C104	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C105	1-135-259-11	TANTALUM CHIP	10uF	20%	6.3V
C106	1-135-259-11	TANTALUM CHIP	10uF	20%	6.3V
C107	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C108	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C109	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C110	1-115-416-11	CERAMIC CHIP	0.001uF	5%	25V
C111	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C112	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C113	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C114	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C115	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C116	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C117	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C118	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C119	1-125-837-11	CERAMIC CHIP	1uF	10%	6.3V
C120	1-110-563-11	CERAMIC CHIP	0.068uF	10%	16V
C121	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C122	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C175	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C194	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C205	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C206	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C209	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C211	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C212	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C214	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C215	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C216	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C219	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C220	1-125-891-11	CERAMIC CHIP	0.47uF	10%	10V
C221	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C230	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C231	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C233	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C234	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C235	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C240	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C241	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C242	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C250	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C251	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C252	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C253	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C254	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C255	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C299	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C301	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C302	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C405	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C406	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C407	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C409	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C410	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C411	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C490	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C501	1-128-795-91	ELECT CHIP	470PF	10%	630V
C502	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C503	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C504	1-117-370-11	CERAMIC CHIP	10uF		10V
C505	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C550	1-117-970-11	ELECT CHIP	22uF	20%	10V
C701	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C702	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C703	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C704	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C807	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C809	1-117-720-11	CERAMIC CHIP	4.7uF		10V
C901	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C902	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C903	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C904	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C905	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C907	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C908	1-117-370-11	CERAMIC CHIP	10uF		10V
C909	1-104-852-11	TANTALUM CHIP	22uF	20%	10V
C909	1-117-370-11	CERAMIC CHIP	10uF		10V
C998	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C999	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C1102	1-164-156-11	CERAMIC CHIP	0.1uF		25V

Ref. No.	Part No.	Description			Remark
		< 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			
D501	8-719-046-86	DIODE F1J6TP			
D502	8-719-046-86	DIODE F1J6TP			
		< IC >			
IC101	8-752-080-95	IC CXA2523AR			
IC152	6-700-052-01	IC MSM51V17400F-50TS-K			
IC181	8-759-481-17	IC MC74ACT08DTR2			
IC195	(not supplied)	IC BR24C16F-E2			
IC201	8-752-414-89	IC CXD2664R			
IC401	8-759-836-79	IC BH6519FS-E2			
IC701	8-759-473-51	IC TLV2361CDBV			
IC926	8-759-835-63	IC NJM2391DL1-26 (TE1)			
IC933	8-759-460-72	IC BA033FP-E2			
		< FERRITE BEAD/RESISTOR >			
L8	1-414-760-21	FERRITE	0uH		
L10	1-469-981-21	FERRITE	0uH		
L122	1-414-760-21	FERRITE	0uH		
L201	1-414-760-21	FERRITE	0uH		
L202	1-469-981-21	FERRITE	0uH		
L203	1-414-760-21	FERRITE	0uH		
L401	1-400-050-11	FERRITE	0uH		
L402	1-400-050-11	FERRITE	0uH		
L501	1-400-050-11	FERRITE	0uH		
L502	1-400-050-11	FERRITE	0uH		
L550	1-414-760-21	FERRITE	0uH		
L601	1-469-981-21	FERRITE	0uH		
L602	1-469-981-21	FERRITE	0uH		
L603	1-414-760-21	FERRITE	0uH		
L701	1-414-760-21	FERRITE	0uH		
L801	1-414-760-21	FERRITE	0uH		
L899	1-216-864-11	METAL CHIP	0	5%	1/10W
		< TRANSISTOR >			
Q181	8-729-048-87	FET	2SJ518AZTR		
Q182	8-729-048-88	FET	2SK2788VYTR		
Q201	8-729-403-35	TRANSISTOR	UN5113-TX		
Q202	8-729-101-07	TRANSISTOR	2SB798-T1DK		
Q203	8-729-403-35	TRANSISTOR	UN5113-TX		
Q701	8-729-402-93	TRANSISTOR	UN5214-TX		
Q702	8-729-903-10	TRANSISTOR	FMW1-T-148		
Q703	8-729-402-93	TRANSISTOR	UN5214-TX		
Q704	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
		< RESISTOR >			
R101	1-216-298-00	METAL CHIP	2.2	5%	1/10W
R102	1-219-724-11	METAL CHIP	1	1%	1/4W
R103	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R104	1-216-853-11	METAL CHIP	470K	5%	1/10W
R105	1-216-863-11	RES-CHIP	3.3M	5%	1/10W
R106	1-216-845-11	METAL CHIP	100K	5%	1/10W
R107	1-216-819-11	METAL CHIP	680	5%	1/10W
R108	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R109	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R110	1-216-853-11	METAL CHIP	470K	5%	1/10W
R111	1-216-833-11	METAL CHIP	10K	5%	1/10W
R112	1-216-845-11	METAL CHIP	100K	5%	1/10W
R113	1-216-833-11	METAL CHIP	10K	5%	1/10W
R114	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R115	1-216-833-11	METAL CHIP	10K	5%	1/10W
R116	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R117	1-216-845-11	METAL CHIP	100K	5%	1/10W
R118	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R119	1-216-837-11	METAL CHIP	22K	5%	1/10W
R120	1-216-839-11	METAL CHIP	33K	5%	1/10W
R121	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R122	1-216-833-11	METAL CHIP	10K	5%	1/10W
R178	1-216-864-11	METAL CHIP	0	5%	1/10W
R201	1-216-815-11	METAL CHIP	330	5%	1/10W
R202	1-216-819-11	METAL CHIP	680	5%	1/10W
R203	1-216-809-11	METAL CHIP	100	5%	1/10W
R205	1-216-833-11	METAL CHIP	10K	5%	1/10W
R206	1-216-833-11	METAL CHIP	10K	5%	1/10W
R207	1-216-811-11	METAL CHIP	150	5%	1/10W
R208	1-216-821-11	METAL CHIP	1K	5%	1/10W
R209	1-216-815-11	METAL CHIP	330	5%	1/10W
R210	1-216-839-11	METAL CHIP	33K	5%	1/10W
R211	1-216-857-11	METAL CHIP	1M	5%	1/10W
R212	1-216-851-11	METAL CHIP	330K	5%	1/10W
R214	1-216-845-11	METAL CHIP	100K	5%	1/10W
R216	1-216-864-11	METAL CHIP	0	5%	1/10W
R217	1-216-833-11	METAL CHIP	10K	5%	1/10W
R218	1-216-864-11	METAL CHIP	0	5%	1/10W
R219	1-216-809-11	METAL CHIP	100	5%	1/10W
R224	1-216-809-11	METAL CHIP	100	5%	1/10W
R225	1-216-809-11	METAL CHIP	100	5%	1/10W
R226	1-216-809-11	METAL CHIP	100	5%	1/10W
R227	1-216-809-11	METAL CHIP	100	5%	1/10W
R228	1-216-809-11	METAL CHIP	100	5%	1/10W
R281	1-216-821-11	METAL CHIP	1K	5%	1/10W
R298	1-216-864-11	METAL CHIP	0	5%	1/10W
R299	1-216-864-11	METAL CHIP	0	5%	1/10W
R301	1-216-833-11	METAL CHIP	10K	5%	1/10W
R302	1-216-833-11	METAL CHIP	10K	5%	1/10W
R303	1-216-833-11	METAL CHIP	10K	5%	1/10W
R405	1-216-864-11	METAL CHIP	0	5%	1/10W
R501	1-216-295-00	SHORT	0		
R551	1-216-841-11	METAL CHIP	47K	5%	1/10W
R552	1-216-841-11	METAL CHIP	47K	5%	1/10W
R553	1-216-841-11	METAL CHIP	47K	5%	1/10W
R701	1-216-821-11	METAL CHIP	1K	5%	1/10W
R702	1-216-821-11	METAL CHIP	1K	5%	1/10W
R703	1-216-821-11	METAL CHIP	1K	5%	1/10W
R704	1-216-841-11	METAL CHIP	47K	5%	1/10W
R705	1-216-833-11	METAL CHIP	10K	5%	1/10W
R706	1-218-855-11	METAL CHIP	2.2K	0.5%	1/10W

BD MAIN

Ref. No.	Part No.	Description			Remark
R707	1-218-863-11	METAL CHIP	4.7K	0.5%	1/10W
R708	1-218-863-11	METAL CHIP	4.7K	0.5%	1/10W
R709	1-218-855-11	METAL CHIP	2.2K	0.5%	1/10W
R710	1-218-887-11	METAL CHIP	47K	0.5%	1/10W
R711	1-216-833-11	METAL CHIP	10K	5%	1/10W
R712	1-216-809-11	METAL CHIP	100	5%	1/10W
R713	1-216-833-11	METAL CHIP	10K	5%	1/10W
R808	1-216-864-11	METAL CHIP	0	5%	1/10W
		< SWITCH >			
S101	1-762-596-21	SWITCH, PUSH (1 KEY) (LIMIT IN)			
S103	1-771-956-21	SWITCH, PUSH (1 KEY) (OUT)			
S104	1-771-955-21	SWITCH, PUSH (1 KEY) (PLAY)			
S105	1-771-955-21	SWITCH, PUSH (1 KEY) (REC)			
		< VIBRATOR >			
X801	1-781-569-21	OSCILLATOR, CRYSTAL (90MHz)			
**********					
	A-4727-706-A	MAIN BOARD, COMPLETE (AEP, UK)			
	A-4727-708-A	MAIN BOARD, COMPLETE (SP)			
		**********			
		< CAPACITOR/VARISTOR/RESISTOR >			
C1	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C100	1-115-156-11	CERAMIC CHIP	1uF		10V
C101	1-115-156-11	CERAMIC CHIP	1uF		10V
C161	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C165	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C166	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C176	1-128-551-11	ELECT	22uF	20%	25V
C177	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C180	1-126-960-11	ELECT	1uF	20%	50V
C181	1-126-934-11	ELECT	220uF	20%	10V
C182	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C261	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C265	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C266	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C276	1-128-551-11	ELECT	22uF	20%	25V
C277	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C280	1-126-960-11	ELECT	1uF	20%	50V
C281	1-126-934-11	ELECT	220uF	20%	10V
C282	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C301	1-126-791-11	ELECT	10uF	20%	16V
C304	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C306	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C307	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C308	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C309	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C310	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C311	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C312	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C313	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C314	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C315	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C316	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C318	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C319	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C320	1-164-156-11	CERAMIC CHIP	0.1uF		25V

Ref. No.	Part No.	Description			Remark
C321	1-801-862-11	VARISTOR, CHIP			
C401	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C402	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C404	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C406	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C407	1-128-547-11	ELECT	6800uF	20%	16V
C408	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C409	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C410	1-119-879-11	ELECT	15uF		16V
C412	1-119-765-11	ELECT	47uF	20%	6.3V
C413	1-126-926-11	ELECT	1000uF	20%	10V
C414	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C415	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C416	1-126-934-11	ELECT	220uF	20%	10V
C420	1-165-112-11	CERAMIC CHIP	0.33uF		16V
C421	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C432	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C441	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C442	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C450	1-126-934-11	ELECT	220uF	20%	10V
C451	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C452	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C453	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C456	1-126-934-11	ELECT	220uF	20%	10V
C458	1-126-934-11	ELECT	220uF	20%	10V
C459	1-115-156-11	CERAMIC CHIP	1uF		10V
C460	1-126-947-11	ELECT	47uF	20%	10V
C461	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C462	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C507	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C515	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C516	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C517	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C519	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C523	1-104-665-11	ELECT	100uF	20%	10V
C524	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C550	1-104-665-11	ELECT	100uF	20%	10V
C551	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C554	1-216-864-11	METAL CHIP	0	5%	1/10W
C555	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C556	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C851	1-216-864-11	METAL CHIP	0	5%	1/10W
C852	1-216-864-11	METAL CHIP	0	5%	1/10W
C854	1-216-864-11	METAL CHIP	0	5%	1/10W
C856	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C900	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C903	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C904	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C905	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C906	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C907	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C910	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C911	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C912	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C913	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C915	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C916	1-164-156-11	CERAMIC CHIP	0.1uF		25V

MAIN

Ref. No.	Part No.	Description			Remark
C917	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C918	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C920	1-216-864-11	METAL CHIP	0	5%	1/10W
C922	1-164-156-11	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR/JACK >			
CN4	1-815-194-11	CONNECTOR, USB (B) (USB)			
CN101	1-784-384-11	CONNECTOR, FFC/FPC 27P			
CN102	1-793-991-11	CONNECTOR, FFC/FPC 23P			
CN103	1-784-373-21	CONNECTOR, FFC/FPC 14P			
CN104	1-784-366-21	CONNECTOR, FFC/FPC 7P			
CN105	1-784-367-11	CONNECTOR, FFC/FPC 8P			
CN200	1-573-798-11	JACK, MINIATURE (DIA. 3.5) (ANALOG OUT)			
* CN420	1-565-513-11	PIN, CONNECTOR 2P			
		< DIODE >			
D301	8-719-941-09	DIODE DAP202UT106			
D400	8-719-313-73	DIODE SFPB-52V			
D402	8-719-313-73	DIODE SFPB-52V			
D421	8-719-988-61	DIODE 1SS355TE-17			
D422	8-719-074-34	DIODE RB495D-T146			
D470	8-719-421-18	DIODE MA8033-L-TX			
D901	8-719-988-61	DIODE 1SS355TE-17			
		< GROUND TERMINAL >			
EP550	1-537-771-21	TERMINAL BOARD, GROUND			
		< RESISTOR >			
FB1	1-216-864-11	METAL CHIP	0	5%	1/10W
FB2	1-216-864-11	METAL CHIP	0	5%	1/10W
FB3	1-216-864-11	METAL CHIP	0	5%	1/10W
FB4	1-216-864-11	METAL CHIP	0	5%	1/10W
		< IC >			
IC301	6-801-147-01	IC M30833FJGP-01			
IC400	8-759-485-63	IC MAX1626ESA-TE2			
IC401	8-759-712-90	IC XC61FN3012MR			
IC402	8-759-460-72	IC BA033FP-E2			
IC420	8-759-565-74	IC M62016FP-E1			
IC440	8-759-633-65	IC M54641L			
IC450	8-759-450-47	IC BA05T			
IC451	8-759-712-91	IC XC6351A120MR			
IC501	8-759-358-47	IC NJM2115V (TE2)			
IC503	8-759-713-72	IC BH3541F-E2			
IC505	6-701-565-01	IC CXD9627A-E2			
IC550	8-759-591-61	IC TC7WHU04FU (TE12R)			
IC901	8-752-415-60	IC CXD1873R			
		< JACK >			
J180	1-507-678-51	JACK (PHONES)			
J400	1-691-452-11	JACK, DC (POLARITY UNIFIET TYPE) (DC IN 9V)			
		< COIL/RESISTOR/CAPACITOR >			
L178	1-414-760-21	FERRITE	0uH		
L180	1-414-760-21	FERRITE	0uH		
L278	1-414-760-21	FERRITE	0uH		
L280	1-414-760-21	FERRITE	0uH		
L400	1-424-674-11	INDUCTOR	22uH		
L451	1-216-864-11	METAL CHIP	0	5%	1/10W
L452	1-216-864-11	METAL CHIP	0	5%	1/10W
L503	1-414-760-21	FERRITE	0uH		
L504	1-216-864-11	METAL CHIP	0	5%	1/10W
L550	1-414-760-21	FERRITE	0uH		
L551	1-164-156-11	CERAMIC CHIP	0.1uF		25V
L552	1-414-760-21	FERRITE	0uH		
		< COIL >			
LF1	1-419-100-21	INDUCTOR	0uH		
		< TRANSISTOR >			
Q100	8-729-015-74	TRANSISTOR	UN5111-TX		
Q170	8-729-046-97	TRANSISTOR	2SD1938 (F) -T (TX).SO		
Q270	8-729-046-97	TRANSISTOR	2SD1938 (F) -T (TX).SO		
Q400	8-729-036-99	TRANSISTOR	HAT1020R-EL		
Q401	8-729-026-53	TRANSISTOR	2SA1576A-T106-QR		
Q440	8-729-015-76	TRANSISTOR	UN5211-TX		
Q451	8-729-015-76	TRANSISTOR	UN5211-TX		
		< RESISTOR/FERRITE BEAD >			
R10	1-216-864-11	METAL CHIP	0	5%	1/10W
R140	1-216-864-11	METAL CHIP	0	5%	1/10W
R142	1-216-864-11	METAL CHIP	0	5%	1/10W
R161	1-216-833-11	METAL CHIP	10K	5%	1/10W
R162	1-216-833-11	METAL CHIP	10K	5%	1/10W
R163	1-216-833-11	METAL CHIP	10K	5%	1/10W
R164	1-216-833-11	METAL CHIP	10K	5%	1/10W
R165	1-218-716-11	METAL CHIP	10K	0.5%	1/10W
R166	1-218-716-11	METAL CHIP	10K	0.5%	1/10W
R170	1-216-833-11	METAL CHIP	10K	5%	1/10W
R176	1-216-819-11	METAL CHIP	680	5%	1/10W
R178	1-216-815-11	METAL CHIP	330	5%	1/10W
R180	1-216-789-11	METAL CHIP	2.2	5%	1/10W
R181	1-216-821-11	METAL CHIP	1K	5%	1/10W
R240	1-216-864-11	METAL CHIP	0	5%	1/10W
R242	1-216-864-11	METAL CHIP	0	5%	1/10W
R261	1-216-833-11	METAL CHIP	10K	5%	1/10W
R262	1-216-833-11	METAL CHIP	10K	5%	1/10W
R263	1-216-833-11	METAL CHIP	10K	5%	1/10W
R264	1-216-833-11	METAL CHIP	10K	5%	1/10W
R265	1-218-716-11	METAL CHIP	10K	0.5%	1/10W
R266	1-218-716-11	METAL CHIP	10K	0.5%	1/10W
R270	1-216-833-11	METAL CHIP	10K	5%	1/10W
R276	1-216-819-11	METAL CHIP	680	5%	1/10W
R278	1-216-815-11	METAL CHIP	330	5%	1/10W
R280	1-216-789-11	METAL CHIP	2.2	5%	1/10W
R281	1-216-821-11	METAL CHIP	1K	5%	1/10W
R301	1-216-845-11	METAL CHIP	100K	5%	1/10W
R302	1-216-864-11	METAL CHIP	0	5%	1/10W
R303	1-216-864-11	METAL CHIP	0	5%	1/10W
R304	1-216-864-11	METAL CHIP	0	5%	1/10W
R306	1-216-864-11	METAL CHIP	0	5%	1/10W
R307	1-216-833-11	METAL CHIP	10K	5%	1/10W
R308	1-216-833-11	METAL CHIP	10K	5%	1/10W

MAIN | PANEL

Ref. No.	Part No.	Description			Remark
R314	1-216-833-11	METAL CHIP	10K	5%	1/10W
R320	1-216-833-11	METAL CHIP	10K	5%	1/10W
R321	1-216-833-11	METAL CHIP	10K	5%	1/10W
R323	1-216-833-11	METAL CHIP	10K	5%	1/10W
R324	1-216-833-11	METAL CHIP	10K	5%	1/10W
R325	1-216-833-11	METAL CHIP	10K	5%	1/10W
R329	1-216-833-11	METAL CHIP	10K	5%	1/10W
R330	1-216-833-11	METAL CHIP	10K	5%	1/10W
R332	1-216-833-11	METAL CHIP	10K	5%	1/10W
R350	1-216-833-11	METAL CHIP	10K	5%	1/10W
R351	1-216-833-11	METAL CHIP	10K	5%	1/10W
R401	1-240-037-11	METAL	0.05	1%	1/4W
R403	1-218-708-11	METAL CHIP	4.7K	0.5%	1/10W
R404	1-218-716-11	METAL CHIP	10K	0.5%	1/10W
R420	1-216-864-11	METAL CHIP	0	5%	1/10W
R421	1-216-813-11	METAL CHIP	220	5%	1/10W
R441	1-216-837-11	METAL CHIP	22K	5%	1/10W
R442	1-216-835-11	METAL CHIP	15K	5%	1/10W
R443	1-216-841-11	METAL CHIP	47K	5%	1/10W
R450	1-216-845-11	METAL CHIP	100K	5%	1/10W
R455	1-216-833-11	METAL CHIP	10K	5%	1/10W
R456	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R470	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R471	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R500	1-216-813-11	METAL CHIP	220	5%	1/10W
R501	1-216-813-11	METAL CHIP	220	5%	1/10W
R503	1-216-813-11	METAL CHIP	220	5%	1/10W
R504	1-216-809-11	METAL CHIP	100	5%	1/10W
R505	1-216-809-11	METAL CHIP	100	5%	1/10W
R506	1-216-809-11	METAL CHIP	100	5%	1/10W
R550	1-216-857-11	METAL CHIP	1M	5%	1/10W
R551	1-414-760-21	FERRITE	0uH		
R552	1-216-813-11	METAL CHIP	220	5%	1/10W
R581	1-216-813-11	METAL CHIP	220	5%	1/10W
R901	1-216-864-11	METAL CHIP	0	5%	1/10W
R902	1-216-864-11	METAL CHIP	0	5%	1/10W
R903	1-216-841-11	METAL CHIP	47K	5%	1/10W
R904	1-216-837-11	METAL CHIP	22K	5%	1/10W
R905	1-216-802-11	RES-CHIP	27	5%	1/10W
R906	1-216-802-11	RES-CHIP	27	5%	1/10W
R907	1-216-823-11	METAL CHIP	1.5K	5%	1/10W
R908	1-216-833-11	METAL CHIP	10K	5%	1/10W
R911	1-216-833-11	METAL CHIP	10K	5%	1/10W
R913	1-216-833-11	METAL CHIP	10K	5%	1/10W
R915	1-216-833-11	METAL CHIP	10K	5%	1/10W
R950	1-216-864-11	METAL CHIP	0	5%	1/10W
R951	1-216-864-11	METAL CHIP	0	5%	1/10W
R952	1-216-864-11	METAL CHIP	0	5%	1/10W
		< COMPOSITION CIRCUIT BLOCK >			
RB300	1-236-908-11	NETWORK RESISTOR (CHIP) 10K			
RB301	1-236-908-11	NETWORK RESISTOR (CHIP) 10K			
		< VARIABLE RESISTOR >			
RV301	1-227-450-11	RES, VAR 10K/10K (PHONE LEVEL)			

Ref. No.	Part No.	Description			Remark
		< FILTER >			
T400	1-411-312-11	FILTER, COMMON MODE			
		< THERMISTOR (POSITIVE) >			
THP400	1-771-075-21	THERMISTOR, POSITIVE			
		< VIBRATOR >			
X301	1-795-004-21	VIBRATOR, CERAMIC (10MHz)			
X550	1-567-865-21	VIBRATOR, CRYSTAL (12MHz)			
**********					
	A-4727-707-A	PANEL BOARD, COMPLETE (AEP, UK)			
	A-4727-709-A	PANEL BOARD, COMPLETE (SP)			
		**********			
		< CAPACITOR >			
C748	1-164-156-11	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
CN704	1-784-859-21	CONNECTOR, FFC (LIF (NON-ZIF)) 7P			
		< LED >			
D731	8-719-051-89	LED SML-010VT-T87 (REC)			
D732	8-719-032-98	LED SEL5820A-TP15 (NetMD)			
D751	8-719-984-33	LED SML-010MT-T87 (PLAY)			
		< TRANSISTOR >			
Q731	8-729-015-76	TRANSISTOR	UN5211-TX		
Q732	8-729-015-76	TRANSISTOR	UN5211-TX		
Q751	8-729-015-76	TRANSISTOR	UN5211-TX		
		< RESISTOR >			
R702	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R726	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R731	1-216-811-11	METAL CHIP	150	5%	1/10W
R732	1-216-811-11	METAL CHIP	150	5%	1/10W
R751	1-216-811-11	METAL CHIP	150	5%	1/10W
		< SWITCH >			
S702	1-762-875-21	SWITCH, KEYBOARD (■/⏏)			
S726	1-762-875-21	SWITCH, KEYBOARD (►/►►I)			
		< LEAD >			
TP701	1-690-880-11	LEAD (WITH CONNECTOR)			
**********					
		MISCELLANEOUS			
		**********			
6	1-823-648-11	WIRE (FLAT TYPE) (7 CORE)			
7	1-792-811-21	WIRE (FLAT TYPE) (23 CORE)			
8	1-792-812-21	WIRE (FLAT TYPE) (27 CORE)			
* 102	1-569-972-21	SOCKET, SHORT 2P			
357	1-678-514-11	FLEXIBLE BOARD			
⚠358	A-4672-976-A	OPTICAL PICK-UP KMS-262			
HR901	1-500-670-22	HEAD, OVER WRITE			
M101	A-4735-757-A	MOTOR ASSY, SPINDLE			
M102	A-4672-900-A	MOTOR ASSY, SLED			

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

Ref. No.	Part No.	Description	Remark
M103	A-4672-975-A	MOTOR ASSY, LOADING	
S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT RATE DETECT, PROTECT DETECT)	
**********			
		ACCESSORIES	
		**********	
	1-469-089-11	FILTER, CLAMP (FERRITE CORE)	(for USB CABLE)
⚠	1-476-352-12	ADAPTOR, AC (AC-96NP) (AEP, SP)	
⚠	1-476-353-12	ADAPTOR, AC (AC-96NP) (UK)	
	1-543-793-11	FILTER, CLAMP (FERRITE CORE)	(for AC ADAPTOR)
	1-757-409-11	CORD, CONNECTION	(AUDIO CONNECTING CORD)
	1-757-471-11	CABLE, CONNECTION (USB)	
	4-237-878-11	MANUAL, INSTRUCTION	(ENGLISH, FRENCH) (UK)
	4-237-878-21	MANUAL, INSTRUCTION	(ENGLISH, FRENCH, GERMAN, SPANISH, DUTCH, ITALIAN, SWEDISH, POLISH, TRADITIONAL CHINESE) (AEP, SP)
	4-237-878-31	MANUAL, INSTRUCTION (DANISH, FINNISH)	(AEP)
	4-237-880-11	CD-ROM (Open MG Jukebox)	
	4-237-881-11	MANUAL, INSTRUCTION (ENGLISH) (AEP)	
	4-237-881-21	MANUAL, INSTRUCTION	(CZECK, HUNGALIAN) (AEP)
	4-237-881-31	MANUAL, INSTRUCTION (TRUKISH) (AEP)	
	4-237-881-41	MANUAL, INSTRUCTION (SLOVAKIAN) (AEP)	

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REVISION HISTORY

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Ver.	Date	Description of Revision
1.0	2002.02	New