

# SHARP SERVICE MANUAL

No. S6943MDMT20//

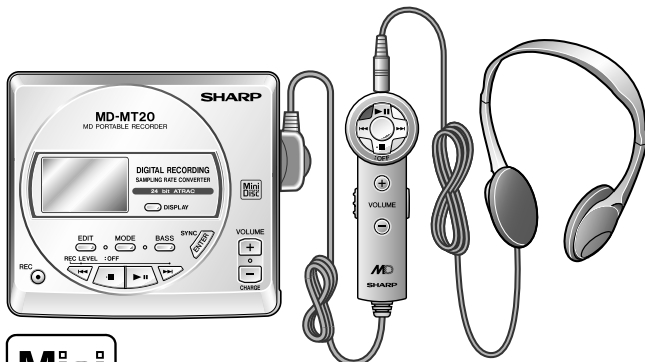


Illustration: MD-MT20/20C

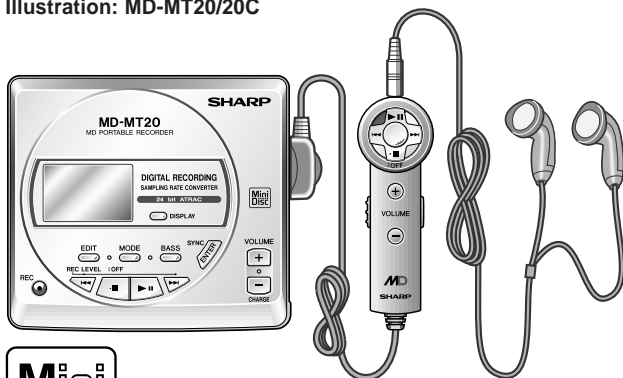


Illustration: MD-MT20W

## MD-MT20(S) MD-MT20C(S) MD-MT20W(BL) MD-MT20W(GL) MD-MT20W(S)

- In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

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## SAFETY PRECAUTION FOR SERVICE MANUAL (MD-MT20W ONLY)

### Precaution to be taken when replacing and servicing the Laser Pickup.

The AEL (Accessible Emission Level) of Laser Power Output for this model is specified to be lower than Class I Requirements. However, the following precautions must be observed during servicing to protect your eyes against exposure to the laser beam.

- (1) When the cabinet has been removed, the power is turned on without a compact disc, and the Pickup is on a position outer than the lead-in position, the Laser will light for several seconds to detect a disc. Do not look into the Pickup Lens.
- (2) The Laser Power Output of the Pickup inside the unit and replacement service parts have already been adjusted prior to shipping.
- (3) No adjustment to the Laser Power should be attempted when replacing or servicing the Pickup.
- (4) Under no circumstances look directly into the Pickup Lens at any time.
- (5) CAUTION - Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

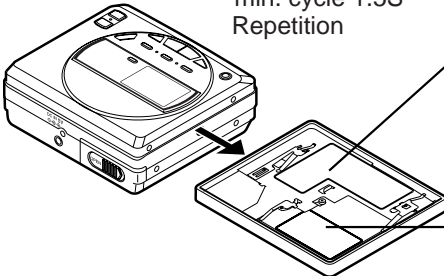
**CAUTION**

**CLASS 1 LASER PRODUCT**  
**APPAREIL À LASER DE CLASSE 1**  
**PRODUCTO LASER DE CLASE 1**


- This Portable MiniDisc Recorder is classified as a CLASS 1 LASER product.
- The CLASS 1 LASER PRODUCT label is located on the bottom.
- Use the Portable MiniDisc Recorder only in accordance with the instructions given in this manual and do not attempt to interfere with the interlock switch or make any other adjustment as this may result in exposure to hazardous radiation.

**Laser Diode Properties**

- Material: GaAlAs
- Wavelength: 785 nm
- Pulse time:  
 Read mode; 0.8 mW Continuous  
 Write mode; max. 10 mW 0.5S  
                   min. cycle 1.5S  
 Repetition



CAUTION-INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED.  
 AVOID EXPOSURE TO BEAM.  
 VARNING-OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG.  
 ADVARSEL-OSYNLIG LASERSTRÅLNING NÄR DEKSEL ÖPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.

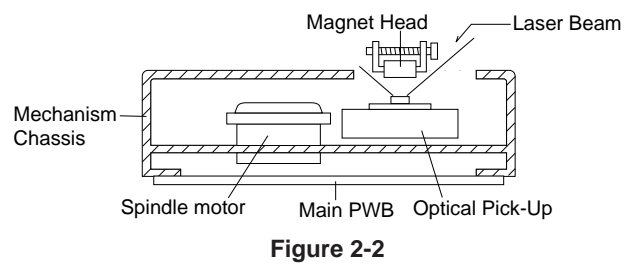
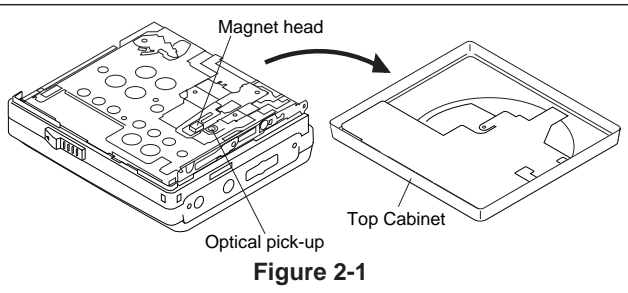


VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.  
 VARNING-OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRÄKTA EJ STRÅLEN.  
 ADVARSEL-OSYNLIG LASERSTRÅLNING VED ÅBNING NÄR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

**VARO !** Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.  
**VARNING!** Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Beträkta ej strålen.

Precaution to be taken when replacing and servicing the laser pickup.  
 The following precautions must be observed during servicing to protect your eyes against exposure to the laser.

Warning of possible eye damage when repairing:  
 If the AC adaptor or batteries are connected when the top housing (disc cover) of the unit is removed, and the PLAY key is pressed, the laser will light up during focus access (2-3 seconds). (Fig. 2-1) During the operation, the laser will leak from the opening between the magnetic head and the mechanical chassis (Fig. 2-2). In order to protect your eyes, you must not look at the laser during repair. Before repairing be sure to disconnect the AC adaptor and remove the batteries.



FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS UNIT, PLEASE REFER TO THE OPERATION MANUAL.

## SPECIFICATIONS

### MD-MT20/20C

**General**

**Power source:** DC 2.4V: Rechargeable Nickel-Metal Hydride battery (AD-T20BT) x 1  
 DC 5V: AC adaptor (AC 120V, 60 Hz)  
 DC 3.0V: Commercially available, "AA" size (LR6), alkaline battery x 2  
 DC 4.5V: Separately available car adaptor, AD-CA20X (for cars with a 12-24V DC negative ground electrical system)

**Power consumption:** 7.5W(AC adaptor)

**Output power:** RMS; 20 mW (10 mW + 10 mW) (0.2% T.H.D.)

**Charging time:** Approx. 4 hours (90 %)  
 Approx. 6 hours (fully charged)  
 (When using the AC adaptor included with the unit)

**Battery life:**

When using the rechargeable battery (fully charged) included with the unit	When using two, commercially available, high capacity, "AA" size (LR6), alkaline batteries
Continuous recording: Approx. 7.5 hours	Continuous recording: Approx. 7.5 hours
Continuous play: Approx. 12 hours	Continuous play: Approx. 15 hours

- The continuous recording time is for analog inputs when the volume level is set to "VOL 0".
- The continuous play time shows the value when the volume level is set to "VOL 15".
- The above values are the standard values when the unit is charged and used at an ambient temperature of 68°F (20°C).
- The operating time when using an alkaline battery may be different, depending on the type and manufacturer of the battery, and on the operating temperature.

**Input sensitivity:**

Recording level	Reference input level	Input impedance
MIC H	0.25 mV	10 k ohms
MIC L	2.5 mV	10 k ohms
LINE	100 mV	20 k ohms

**Output level:**

	Specified output	Maximum output level	Load impedance
Headphones	—	10 mW + 10 mW	16 ohms
LINE	250 mV (-12dB)	—	10 k ohms

**Dimensions:**

Width: 3-7/16" (87.9 mm)  
 Height: 1-3/16" (29.8 mm)  
 Depth: 3-1/8" (79.7 mm)

**Weight:**

0.52 lbs. (235 g) with rechargeable battery

**Input jack:**

Line/optical digital, microphone (powered by the main unit)

**Output jack:**

Headphones (impedance: 19 ohms)/remote control unit

**MiniDisc Recorder**

**Type:**

Portable MiniDisc recorder

**Signal readout:**

Non-contact, 3-beam semi-conductor laser pick-up

**Audio channels:**

Stereo 2 channels/monaural (long-play mode) 1 channel

**Frequency response:**

20 – 20,000 Hz (± 3 dB)

**Rotation speed:**

Approx. 400 – 900 rpm

**Error correction:**

ACIRC (Advanced Cross Interleave Reed-Solomon Code)

**Coding:**

ATRAC (Adaptive Transform Acoustic Coding), 24-bit computed type

**Recording method:**

Magnetic modulation overwrite method

**Sampling frequency:**

44.1 kHz (32 kHz and 48 kHz signals are converted to 44.1 kHz, and then recorded.)

**Wow and flutter:**

Unmeasurable (less than ±0.001% W. peak)

### MD-MT20W

**General**

**Power source:** DC 2.4V: Rechargeable Nickel-Metal Hydride battery (AD-T20BT) x 1  
 DC 5V: AC adaptor (AC 110 - 240V, 50/60 Hz)  
 DC 3.0V: Commercially available, "AA" size (LR6), alkaline battery x 2  
 DC 4.5V: Separately available car adaptor, AD-CA20X (for cars with a 12-24V DC negative earth electrical system)

**Power consumption:** 0.15A (AC adaptor)

**Output power:** RMS; 20 mW (10 mW + 10 mW) (0.2% T.H.D.)

**Charging time:** Approx. 4 hours (90 %)  
 Approx. 6 hours (fully charged)  
 (When using the AC adaptor included with the unit)

**Battery life:**

When using the rechargeable battery (fully charged) included with the unit	When using two, commercially available, high capacity, "AA" size (LR6), alkaline batteries
Continuous recording: Approx. 7.5 hours	Continuous recording: Approx. 7.5 hours
Continuous play: Approx. 12 hours	Continuous play: Approx. 15 hours

- The continuous recording time is for analogue inputs when the volume level is set to "VOL 0".
- The continuous play time shows the value when the volume level is set to "VOL 15".
- The above values are the standard values when the unit is charged and used at an ambient temperature of 20°C (68°F).
- The operating time when using an alkaline batteries may be different, depending on the type and manufacturer of the battery, and on the operating temperature.

**Input sensitivity:**

Recording level	Reference input level	Input impedance
MIC H	0.25 mV	10 k ohms
MIC L	2.5 mV	10 k ohms
LINE	100 mV	20 k ohms

**Output level:**

	Specified output	Maximum output level	Load impedance
Earphones	—	10 mW + 10 mW	32 ohms
LINE	250 mV (-12dB)	—	10 k ohms

**Dimensions:**

Width: 87.9 mm (3-7/16")  
 Height: 29.8 mm (1-3/16")  
 Depth: 79.7 mm (3-1/8")

**Weight:**

235 g (0.52 lbs.) with rechargeable battery

**Input socket:**

Line/optical digital, microphone (powered by the main unit)

**Output socket:**

Earphones (impedance: 32 ohms)/remote control unit

**MiniDisc Recorder**

**Type:**

Portable MiniDisc recorder

**Signal readout:**

Non-contact, 3-beam semi-conductor laser pick-up

**Audio channels:**

Stereo 2 channels/monaural (long-play mode) 1 channel

**Frequency response:**

20 – 20,000 Hz (± 3 dB)

**Rotation speed:**

Approx. 400 – 900 rpm

**Error correction:**

ACIRC (Advanced Cross Interleave Reed-Solomon Code)

**Coding:**

ATRAC (Adaptive Transform Acoustic Coding), 24-bit computed type

**Recording method:**

Magnetic modulation overwrite method

**Sampling frequency:**

44.1 kHz (32 kHz and 48 kHz signals are converted to 44.1 kHz, and then recorded.)

**Wow and flutter:**

Unmeasurable (less than ±0.001% W. peak)

Specifications for this model are subject to change without prior notice

## NAMES OF PARTS

Illustration: MD-MT20/20C

### ■ Main unit

1. Monaural Long-Play Mode Indicator
2. Record Indicator
3. Level Meter
4. Fast Play Indicator
5. Repeat Indicator
6. TOC Indicator
7. Battery Indicator
8. Random Indicator
9. Track Number Indicator
10. Character/Time Information Indicator
11. Synchro Recording Indicator
12. Disc Mode Indicator
13. Disc Name Indicator
14. Track Name Indicator
15. Remaining Recording Time Indicator
16. Total Track Number Indicator

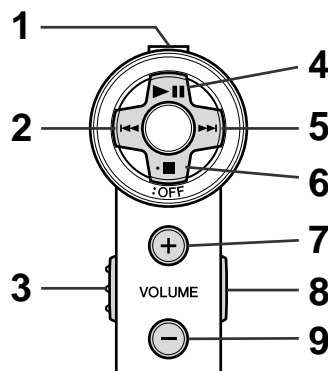
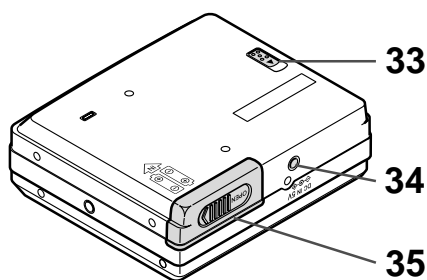
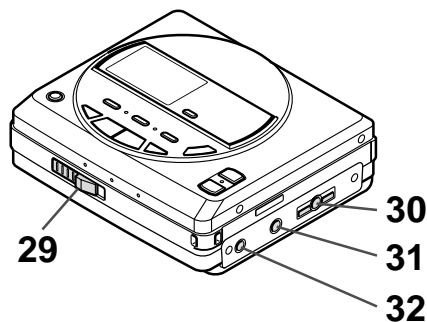
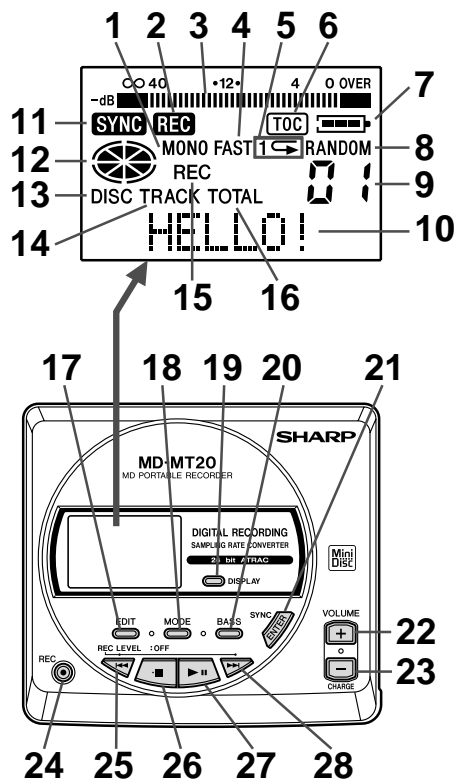
17. Edit/Auto Mark/Time Mark Button
18. Mode Button
19. Display/Character Select Button
20. Bass/Delete Button
21. Enter/Fast Play/Synchro Button
22. Volume Up/Cursor Button
23. Volume Down/Cursor/Charge Button
24. Record/Track Mark Button
25. Fast Reverse/Recording Level Down/Name Select Button
26. Stop/Power Off Button
27. Play/Pause Button
28. Fast Forward/Recording Level Up/Name Select Button

29. Open Lever
30. Remote Control/Earphones Socket
31. Optical/Line Input Socket
32. Microphone Input Socket

33. Hold Switch
34. 5V DC Input Socket
35. Battery Cover

### ■ Remote control unit

1. Headphones Jack (MD-MT20/20C)
1. Earphones Socket (MD-MT20W)
2. Fast Reverse/Recording Level Down/Name Select Button
3. Hold Switch
4. Play/Pause Button
5. Fast Forward/Recording Level Up/Name Select Button
6. Stop/Power Off Button
7. Volume Up/Cursor Button
8. Bass/Delete/Track Mark Button
9. Volume Down/Cursor Button



# OPERATION MANUAL

## RECORDING USING THE OPTICAL DIGITAL CABLE

This is the method used for recording digital signals from CDs or MDs exactly as they are stored on the original. Compared to recordings made from analogue inputs, digital recordings have extremely high-quality sound.

**1** Connect the external equipment.

**2** Start recording.

### Synchro recording:

Before starting a synchro recording, perform the following steps on the equipment connected to this unit.

- (1) First, put it in the playback mode.
- (2) Next, put it in the pause mode.
- (3) Finally, position it at the beginning of the track you want to record.

- (1) Insert a recordable MiniDisc, and then press the REC button.
- (2) Press the ENTER/SYNC button.
- (3) Start the playback on the equipment connected to this unit.

### Manual recording:



- (1) Insert a recordable MiniDisc, and then press the REC button.
- (2) Press the **▶||** button.

- When recording from digital inputs, it is not necessary to adjust the recording level.


This unit can be used with the following power sources: a rechargeable battery, an AC adaptor, commercially available alkaline batteries, and a separately available car adaptor (AD-CA20X).

### ■ Rechargeable battery power

When the rechargeable battery is used for the first time or when you want to use it after a long period of disuse, be sure to charge it fully.

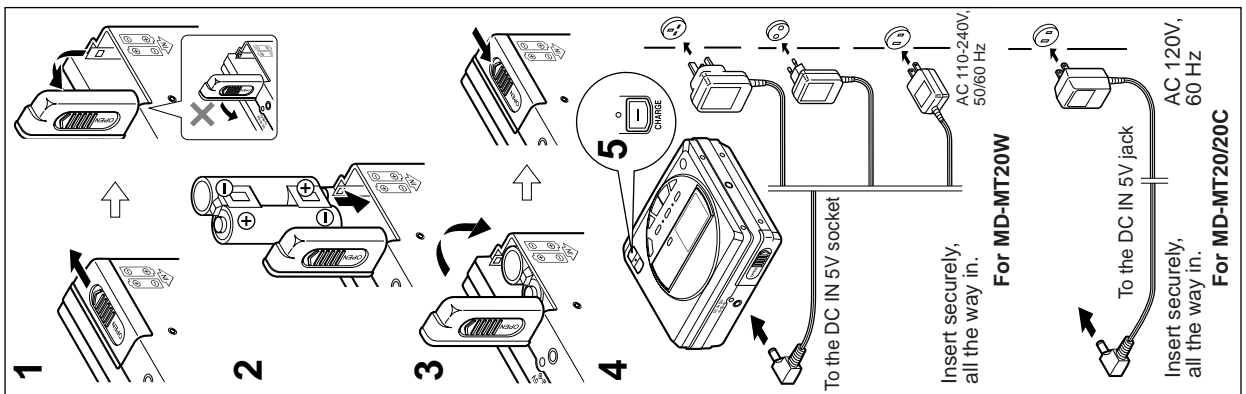
- 1** Open the battery cover.
  - Slide the battery cover as far as it will go to the outside and then lift to open it. If the battery cover is lifted without being slid all the way out, it may break.
- 2** Insert the rechargeable battery according to the polarity marked on the bottom of the unit.
- 3** Close the battery cover.
- 4** Plug the AC adaptor into the AC socket, and then insert the plug on the AC adaptor lead into the DC IN 5V socket.
- 5** Press the CHARGE (VOLUME down) button of the main unit to begin charging.
  - "  " will appear, and the battery will begin charging.
  - After about 4 hours have passed, "  " will go out.

This indicates that the battery charging is about 90% complete.

  - To charge the battery fully, continue charging for about 2 more hours. (In this case, you do not need to press the CHARGE button. Even if the CHARGE button is pressed, "  " will not appear.)

### Notes:

- After charging has been completed, the AC adaptor may be left connected. (For example, when charging at night) The battery will not be charged when the power to the main unit is turned on.
- Do not force open the battery cover too wide.
- Do not use a rechargeable battery or an AC adaptor other than those specified (ACCESSORIES).
- The charging time will vary, depending on the condition of the battery.
- When the battery is charged for the first time or is charged after not being used for a long period, the operating time may be shorter than normal. The battery life will recover with normal use i.e. charging and discharging.
- To avoid shortening the service life of the battery only recharge the battery after it has been completely discharged.

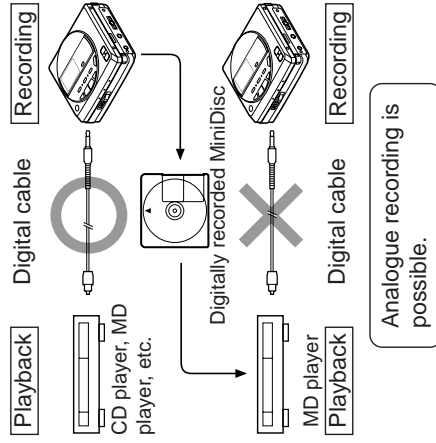


**There are cases where digital recording may be impossible.**

In the following cases digital recording is impossible, even if you are using digital cables.

When you attempt to make a new digital recording from a track that was digitally recorded on a MiniDisc.

- MiniDiscs are designed so that only first generation digital copies can be made. Further digital copies are prevented by the SCMS (Serial Copy Management System).



### Notes:

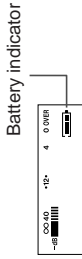
- This unit incorporates a sampling rate converter. When this unit is connected to digital equipment such as CS/BS tuners or DAT tape recorders that use a different sampling frequency (32 kHz or 48 kHz), recordings can still be made. (The sampling frequency of this unit is 44.1 kHz.)
- When making a digital recording from a portable CD player (if the player has a sound skip prevention function and this function is turned on) the optical output will drop out and digital recording will not be possible. Be sure to turn the sound skip prevention function off.



## CONVENIENT OPERATION OF THE UNIT

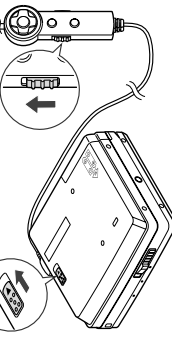
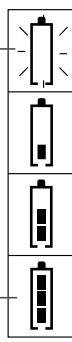
### ■ Checking the remaining amount of battery level

The remaining amount of battery level is shown by the battery indicator (  ) during operation.



### < How to read the battery indicator >

When the battery level is high



Since the battery level is very low, you cannot start recording or editing.

- When the battery is completely discharged, the battery indicator will flash. Recharge the battery or replace the alkaline batteries with a new one.
- When the battery has run completely out, "BATT EMPTY" will appear. Then, the power will be disconnected automatically.

### Notes:

- When using the unit with alkaline batteries or a rechargeable battery, the battery indicator will not correctly display the remaining capacity for approximately 10 seconds after the power has been turned on.
- When the AC adaptor included with this unit or a separately available car adaptor is used, the battery indicator will not be shown.
- The number of bars shown in the battery indicator may increase or decrease, depending on the operation being performed. This is normal.

## TROUBLESHOOTING

### ■ Moisture condensation

In the following cases, condensation may form inside the unit.

- Shortly after turning on a heater.
- When the unit is placed in a room where there is excessive steam or moisture.
- When the unit is moved from a cool place to a warm place.

When the unit has condensation inside, the disc signals cannot be read, and the unit may not function properly.

- If this happens, remove the disc. The condensation should evaporate in approximately 1 hour. The unit will then function properly.

### ■ To prevent the unit from being operated by mistake

To avoid accidental operation of the unit, use the hold function.

- Move the HOLD switch to the safety position (direction indicated by the arrow).
- When the unit is in the hold mode, pressing the buttons will have no effect.

- To cancel the hold mode, move the HOLD switch away from the safety position (the opposite direction of the arrow).

	Remote control unit	Main unit
Can be operated from either the remote control unit or the main unit.	Cancel	Cancel
Can only be operated from the remote control unit.	Cancel	Hold
Can only be operated from the main unit.	Hold	Cancel
Cannot be operated from either the remote control unit or the main unit.	Hold	Hold

If the hold function is active whilst the power is turned off, the power cannot be turned on by mistake and the battery will not be accidentally drained.

Many potential "problems" can be resolved by the owner without calling a service technician. If something seems to be wrong with this product, check the following before calling your authorised SHARP dealer or service centre.

PROBLEM	CAUSE
<b>The unit does not turn on.</b>	<ul style="list-style-type: none"> <li>● Is the AC adaptor disconnected?</li> <li>● Is the battery exhausted?</li> <li>● Is the unit in the hold mode?</li> <li>● Has condensation formed inside the unit?</li> <li>● Is the unit being influenced by mechanical shock or by static electricity?</li> </ul>
<b>No sound is heard from the earphones.</b>	<ul style="list-style-type: none"> <li>● Is the volume set too low?</li> <li>● Is the remote control unit or the earphones plugged in?</li> <li>● Are you trying to play a MiniDisc with data on it instead of a MiniDisc containing music?</li> </ul>
<b>When the operation buttons are pressed, the unit does not respond.</b>	<ul style="list-style-type: none"> <li>● Is the unit in the hold mode?</li> <li>● Is the battery exhausted?</li> <li>● Is the remote control unit plug or the earphone plug inserted firmly?</li> </ul>
<b>Some sounds are skipped.</b>	<ul style="list-style-type: none"> <li>● Is the battery exhausted?</li> <li>● Is the unit being subjected to excessive vibration?</li> </ul>
<b>The MiniDisc cannot be ejected.</b>	<ul style="list-style-type: none"> <li>● Has the track number or character information been written on the disc yet?</li> <li>● Is the unit in the recording or editing mode?</li> </ul>
<b>Recording and editing are impossible.</b>	<ul style="list-style-type: none"> <li>● Is the MiniDisc protected against accidental erasure?</li> <li>● Is the unit connected properly to the other equipment?</li> <li>● Is the AC adaptor unplugged or did a power failure occur whilst recording or editing?</li> <li>● Is the unit in the hold mode?</li> <li>● Is an optical signal being output from the external equipment?</li> </ul> <p>Read the operation manual for the external equipment.</p>

### ■ If trouble occurs

When this product is subjected to strong external interference (mechanical shock, excessive static electricity, abnormal supply voltage due to lightning, etc.) or if it is operated incorrectly, it may malfunction. If such a problem occurs, do the following:

1. Unplug the AC adaptor from the AC socket.
  2. Remove the battery.
  3. Leave the unit completely unpowered for approximately 30 seconds.
4. Plug the AC adaptor back into the AC socket and retry the operation.
- If strange sounds, smell or smoke come out of the unit or an object is dropped into the unit, remove the AC adaptor from the AC socket immediately and contact an authorised SHARP service centre.

**MINIDISC SYSTEM LIMITATIONS**

MiniDiscs are recorded using a different system than is used for cassette tapes or DAT recordings. Therefore, the following conditions may be encountered, depending on how the disc has been recorded or edited. These are due to system limitations, and should be considered normal.

<p><b>Even if the maximum recording time of a MiniDisc has not been reached, "DISC FULL" or "TOC FULL" may be displayed.</b></p>	<p>When the number of tracks used reaches the limit, regardless of the remaining recording time, further recording will be impossible. (Maximum number of tracks: 255) If a MiniDisc has been recorded or edited repeatedly or if a MiniDisc has scratches on it, it may not be possible to record the maximum number of tracks on it.</p>
<p><b>Even if the number of tracks and the recording time have not reached the limit, "DISC FULL" may be displayed.</b></p>	<p>If there are scratches on a disc, the unit will automatically avoid recording in those areas. The recording time will be reduced.</p>
<p><b>Even if several short tracks are erased, the remaining recording time may not show an increase.</b></p>	<p>When the remaining recording time of a disc is displayed, short tracks less than 12 seconds long may not be included in the total.</p>
<p><b>Two tracks may not be combined in editing.</b></p>	<p>For MiniDiscs on which repeated recording and editing operations were performed, the COMBINE function may not work.</p>
<p><b>The total of the recorded time and time remaining on a disc may not add up to the maximum possible recording time.</b></p>	<p>A cluster (about 2 seconds) is normally the minimum unit of recording. So, even if a track is less than 2 seconds long, it will use about 2 seconds of space on the disc. Therefore, the time actually available for recording may be less than the remaining time displayed. If there are scratches on discs, those sections will be automatically avoided (no recording will be placed in those sections). Therefore, the recording time will be reduced.</p>
<p><b>When recorded tracks are played back using the cue and review operations, some sounds may be skipped.</b></p>	<p>For MiniDiscs on which repeated recording and editing were performed, some sounds may be skipped whilst cueing and reviewing.</p>
<p><b>A track number can be created in the middle of a track.</b></p>	<p>If there are scratches or dust on a MiniDisc, the track numbers following that track will be increased by one.</p>

**ERROR MESSAGES**

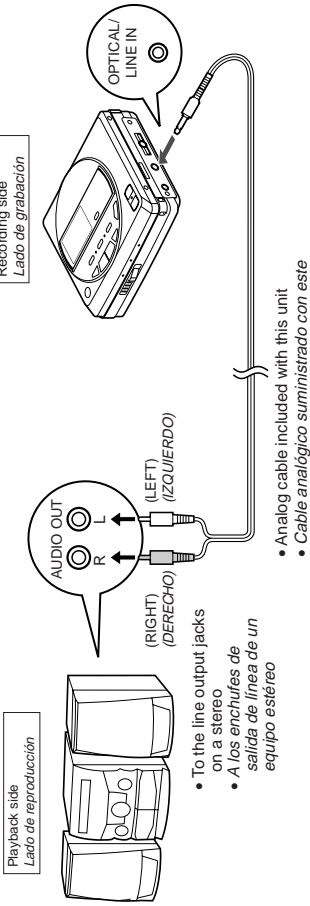
Error messages	Meaning	Remedy
<b>BATT EMPTY (Lo BATT)</b>	<ul style="list-style-type: none"> <li>The battery is run down.</li> </ul>	<ul style="list-style-type: none"> <li>Charge the rechargeable battery or replace the alkaline battery (or use the AC adaptor for power).</li> </ul>
<b>BLANK DISC (BLANK)</b>	<ul style="list-style-type: none"> <li>Nothing is recorded.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the disc with a recorded disc.</li> </ul>
<b>Can't COPY (Not REC)</b>	<ul style="list-style-type: none"> <li>No copy can be made because of the SCMS copyright system.</li> </ul>	<ul style="list-style-type: none"> <li>Record using the analog cable.</li> </ul>
<b>Can't EDIT</b>	<ul style="list-style-type: none"> <li>A track cannot be edited.</li> </ul>	<ul style="list-style-type: none"> <li>Change the stop position of the track and then try editing it.</li> </ul>
<b>Can't REC (Not REC)</b>	<ul style="list-style-type: none"> <li>Recording cannot be performed correctly due to vibration or shock in the unit.</li> </ul>	<ul style="list-style-type: none"> <li>Re-record or replace it with another recordable disc.</li> </ul>
<b>Can't WRITE</b>	<ul style="list-style-type: none"> <li>Editing is impossible.</li> </ul>	<ul style="list-style-type: none"> <li>Check the number of tracks.</li> </ul>
<b>DEFECT (DEFECT)</b>	<ul style="list-style-type: none"> <li>The disc is scratched.</li> </ul>	<ul style="list-style-type: none"> <li>If the sound you hear is not right, try recording again.</li> <li>Replace the disc with another recordable disc.</li> </ul>
<b>Din UNLOCK (UNLOCK)</b>	<ul style="list-style-type: none"> <li>Poor connection of the digital cable.</li> </ul>	<ul style="list-style-type: none"> <li>Connect the digital cable securely.</li> </ul>
<b>DISC FULL</b>	<ul style="list-style-type: none"> <li>The disc is out of recording space.</li> </ul>	<ul style="list-style-type: none"> <li>Replace it with another recordable disc.</li> </ul>
<b>HOLD (HOLD)</b>	<ul style="list-style-type: none"> <li>The unit is in the hold mode.</li> </ul>	<ul style="list-style-type: none"> <li>Return the HOLD switch to its original position.</li> </ul>
<b>LOCKED LOCK ERROR</b>	<ul style="list-style-type: none"> <li>The EJECT lever was moved during recording or editing.</li> </ul>	<ul style="list-style-type: none"> <li>Turn off the power and remove the MiniDisc.</li> </ul>
<b>NO DISC</b>	<ul style="list-style-type: none"> <li>A disc has not been loaded.</li> </ul>	<ul style="list-style-type: none"> <li>Load a disc.</li> </ul>
<b>PB DISC</b>	<ul style="list-style-type: none"> <li>You tried to record on a playback-only disc.</li> </ul>	<ul style="list-style-type: none"> <li>Replace it with a recordable disc.</li> </ul>
<b>POWER ?</b>	<ul style="list-style-type: none"> <li>Improper power is being supplied.</li> </ul>	<ul style="list-style-type: none"> <li>Use one of the specified power sources.</li> </ul>
<b>PROTECTED</b>	<ul style="list-style-type: none"> <li>The MD is write protected.</li> <li>You tried to record without loading an MD.</li> <li>A playback-only MD was loaded and the REC button was pressed when the power was off.</li> </ul>	<ul style="list-style-type: none"> <li>Move the write protection knob back to its original position.</li> <li>Load a recordable MD.</li> <li>Replace it with a recordable MD.</li> </ul>
<b>READ ERROR (E-READ)</b>	<ul style="list-style-type: none"> <li>The disc is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>Reload the disc or replace it.</li> <li>Replace it with another recorded disc.</li> </ul>
<b>SORRY (SORRY)</b>	<ul style="list-style-type: none"> <li>Since a track number is currently being located or written to, the unit cannot accept your command.</li> </ul>	<ul style="list-style-type: none"> <li>Wait for a while and try the operation again.</li> </ul>
<b>SYSTEM ERR (E-SYS)</b>	<ul style="list-style-type: none"> <li>You have come to the conclusion that the unit is out of order.</li> </ul>	<ul style="list-style-type: none"> <li>To have it repaired, go to the distributor where you purchased the unit.</li> </ul>
<b>TEMP OVER (E-TEMP)</b>	<ul style="list-style-type: none"> <li>The temperature is too high.</li> </ul>	<ul style="list-style-type: none"> <li>Turn off the power, and wait for a while.</li> </ul>
<b>TOC ERROR (E-TOC)</b>	<ul style="list-style-type: none"> <li>A large portion of the disc has been damaged.</li> </ul>	<ul style="list-style-type: none"> <li>Replace it with another recorded disc.</li> </ul>
<b>TOC FULL</b>	<ul style="list-style-type: none"> <li>There is no space left for recording character information (track names, disc names, etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Replace it with another recordable disc.</li> </ul>
<b>Tr. Protect</b>	<ul style="list-style-type: none"> <li>The track has been protected from being erased.</li> </ul>	<ul style="list-style-type: none"> <li>Edit the track with the device on which it was recorded.</li> </ul>
<b>U TOC ERROR (E-UTOC)</b>	<ul style="list-style-type: none"> <li>A large portion of the disc has been damaged.</li> <li>There is an error in the recorded signal.</li> </ul>	<ul style="list-style-type: none"> <li>Replace it with another recorded disc.</li> <li>Erase all of the signal errors, and then try recording again.</li> </ul>
<b>? DISC (?DISC)</b>	<ul style="list-style-type: none"> <li>A disc which contains data other than music was played.</li> <li>There is an error in the signal from the disc.</li> </ul>	<ul style="list-style-type: none"> <li>A disc which contains non-music data cannot be played.</li> <li>Replace it with another recorded disc.</li> </ul>

( ) : Error messages seen on the remote control.

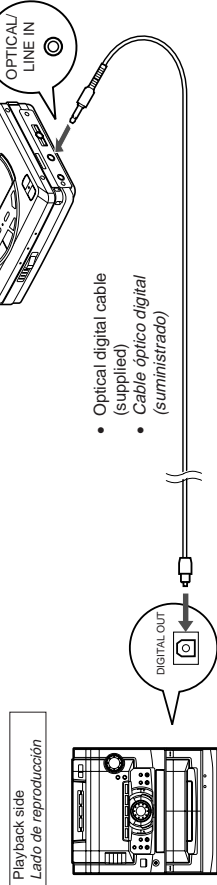
QUICK GUIDE (MD-MT20 ONLY)

3 Connection / Conexión

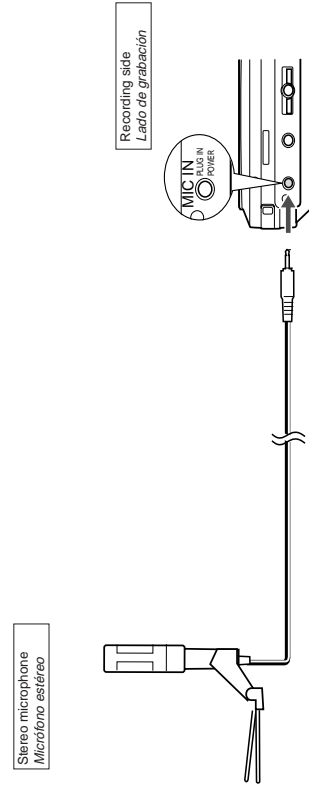
■ Analog recording  
■ Grabación analógica



■ Digital recording  
■ Grabación digital



■ Microphone  
■ Micrófono



PORTABLE MINIDISC RECORDER  
Quick Guide/Guía rápida MD-MT20

SHARP

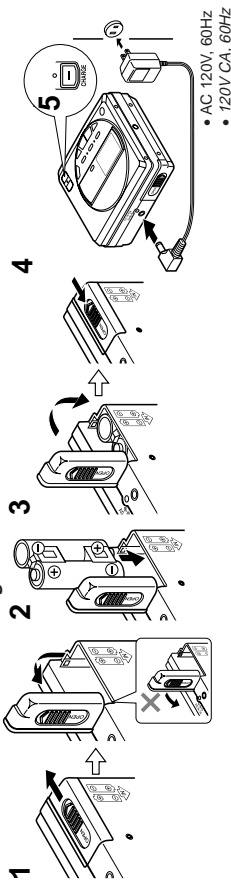
1 Check the supplied accessories / Compruebe los accesorios suministrados

<ul style="list-style-type: none"> <li>Remote Control Unit x 1</li> <li>Controlador remoto x 1</li> </ul>	<ul style="list-style-type: none"> <li>Headphones x 1</li> <li>Auriculares x 1</li> </ul>	<ul style="list-style-type: none"> <li>AC Adaptor x 1</li> <li>Adaptador de CA x 1</li> </ul>	<ul style="list-style-type: none"> <li>Rechargeable Nickel-Metal Hydride Battery x 1</li> <li>Batería recargable de litio-ion x 1</li> </ul>
<ul style="list-style-type: none"> <li>Analog Cable x 1</li> <li>Cable analógico x 1</li> </ul>	<ul style="list-style-type: none"> <li>Optical Digital Cable x 1</li> <li>Cable óptico digital x 1</li> </ul>	<ul style="list-style-type: none"> <li>Carrying Bag x 1</li> <li>Caja para el transporte x 1</li> </ul>	<ul style="list-style-type: none"> <li>Battery Carrying Case x 1</li> <li>Caja portabaterías x 1</li> </ul>

2 Power source / Alimentación

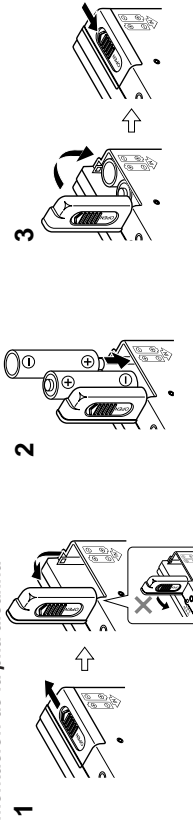
■ Rechargeable battery power

■ Alimentación de la batería recargable



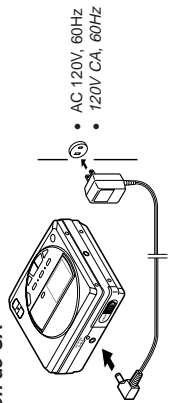
■ Alkaline battery power

■ Alimentación de la pila alcalina



■ AC power

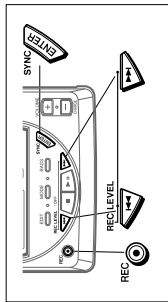
■ Alimentación de CA



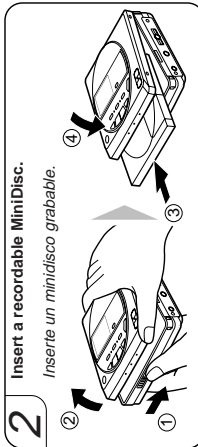


## 4 Recording / Grabación

### Recording from CDs or MDs (Synchro recording) Grabación de discos compactos o minidiscos (Grabación sincronizada)



**1** Connect the external equipment.  
Conecte el equipo externo.



**2** Insert a recordable MiniDisc.  
Inserte un minidisco grabable.

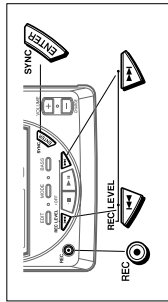
**3** Press the REC button.  
Pulse el botón REC.

**4** While playing sound from the external equipment connected to this unit, press the **REC LEVEL** or **SYNC LEVEL** button to adjust the recording level.  
Mientras se produce el sonido del equipo externo conectado a este aparato, pulse el botón **REC LEVEL** o **SYNC LEVEL** para ajustar el nivel de grabación.

**5** Press the ENTER/SYNC button.  
Pulse el botón ENTER/SYNC.

**6** Begin playback on the source equipment.  
Inicie la reproducción en el equipo fuente.

### Recording from the microphone (Mic synchro recording) Grabación de un micrófono (Grabación sincronizada con micrófono)



**1** Connect the stereo microphone to the MIC IN jack.  
Conecte el micrófono estéreo al enchufe MIC IN del aparato principal.

**2** Insert a recordable MiniDisc.  
Inserte un minidisco grabable.

**3** Press the REC button.  
Pulse el botón REC.

**4** Press the **REC LEVEL** or **SYNC LEVEL** button to adjust the recording level.  
Pulse el botón **REC LEVEL** o **SYNC LEVEL** para ajustar el nivel de grabación.

**5** Press the ENTER/SYNC button to select the synchro recording level. (This level can be changed, even while recording.)  
Pulse el botón ENTER/SYNC para seleccionar el nivel de la grabación sincronizada. (Este nivel podrá cambiarse incluso durante la grabación.)

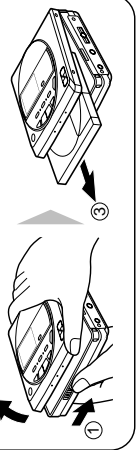
**6** When a sound, such as a person speaking, is picked up by the microphone, recording will begin automatically.  
Cuando el micrófono capte un ruido, el de una persona que hable por ejemplo, la grabación empezará automáticamente.

To stop recording:  
Para detener la grabación:  
Press the **REC** button.  
Pulse el botón **REC**.

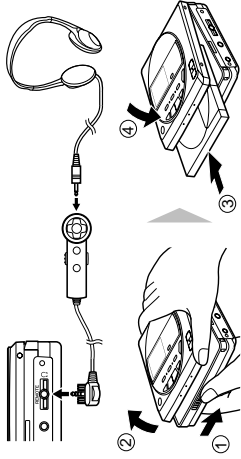
To turn off the power:  
Para desconectar la alimentación:  
Press the **OFF** button while in the stop mode.  
Pulse el botón **OFF** estando en el modo de parada.

To remove the MiniDisc:  
Para extraer el minidisco:

Turn off the power and move the OPEN lever in the direction indicated by the arrow.  
Desconecte la alimentación y mueva la palanca OPEN en el sentido indicado por la flecha.



## 5 Playing a MiniDisc / Reproducción de un minidisco



**1** Insert the headphones plug firmly into the headphones jack on the remote control unit.  
Inserte firmemente la clavija de los auriculares en el enchufe de auriculares del controlador remoto.

**2** Plug the remote control unit into the jack on the main unit. Push the plug all the way in.  
Enchufe el controlador remoto en el enchufe del aparato principal. Empuje completamente hacia adentro la clavija.

**3** Insert a MiniDisc.  
Inserte un minidisco.

The power will be turned on automatically, and playback will start from the first track.  
La alimentación se conectará automáticamente, y la reproducción empezará desde la primera pista. (Función de reproducción automática)

Playback does not start when a MiniDisc is inserted: La reproducción no empieza cuando se inserta un minidisco:  
Press the **PLAY** button.  
In the following cases, the auto-play function will not work.  
● When the recordable MiniDisc write protection tab is closed  
● When the auto-play function has been canceled

Pulse el botón **PLAY**.  
En los casos siguientes, la función de reproducción automática no se activará.  
● Cuando esté cerrada la lengüeta de protección contra escritura del minidisco grabable  
● Cuando haya sido cancelada la función de reproducción automática

To interrupt playback:  
Para interrumpir la reproducción:

Press the **STOP** button during playback.  
● To resume playback, press the **PLAY** button again.  
Pulse el botón **STOP** durante la reproducción.  
● Para reanudar la reproducción, pulse de nuevo el botón **PLAY**.

To stop playback:  
Para detener la reproducción:

Press the **OFF** button.  
Pulse el botón **OFF**.

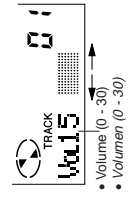
To turn off the power:  
Para desconectar la alimentación:

Press the **OFF** button while in the stop mode.  
Pulse el botón **OFF** estando en el modo de parada.

## 6 Sound control / Control del sonido

Adjust the volume.  
Each time the BASS button is pressed, the tone will be switched as follows:

Ajuste el volumen.  
Cada vez que pulse el botón BASS, el tono cambiará de la forma siguiente:



BASS 1 ..... Bass sounds are emphasized slightly  
BASS 2 ..... Bass sounds are emphasized more.  
BASS 3 ..... Bass sounds are emphasized even more.  
BASS OFF --- Bass emphasis is canceled.  
BASS 1 ..... Los sonidos graves se realizan ligeramente.  
BASS 2 ..... Los sonidos graves se realizan más.  
BASS 3 ..... Los sonidos graves se realizan aún más.  
BASS OFF --- El realce de los graves se cancela.

Adjust the bass level.  
Each time the BASS button is pressed, the tone will be switched as follows:

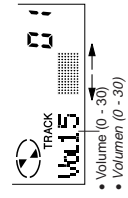
Ajuste el nivel de los graves.  
Cada vez que pulse el botón BASS, el tono cambiará de la forma siguiente:



BASS 1 ..... Bass sounds are emphasized slightly  
BASS 2 ..... Bass sounds are emphasized more.  
BASS 3 ..... Bass sounds are emphasized even more.  
BASS OFF --- Bass emphasis is canceled.  
BASS 1 ..... Los sonidos graves se realizan ligeramente.  
BASS 2 ..... Los sonidos graves se realizan más.  
BASS 3 ..... Los sonidos graves se realizan aún más.  
BASS OFF --- El realce de los graves se cancela.

Adjust the volume.  
Press the + button to increase the volume and the - button to decrease the volume.

Ajuste el volumen.  
Pulse el botón + para aumentar el volumen y el botón - para reducirlo.



• Volume (0 - 30)  
• Volumen (0 - 30)

## DISASSEMBLY

### Cares before disassembling

When assembling the machine after disassembling or repair, observe the following requirements so as to ensure safety and performance.

1. Remove the batteries from the machine, and take out the mini-disc.
2. When assembling after repair, be sure to restore the initial location of wires.  
Since the screws are small, incorrect fixing may result in malfunction.
3. When repairing, pay utmost attention to static electricity of IC.

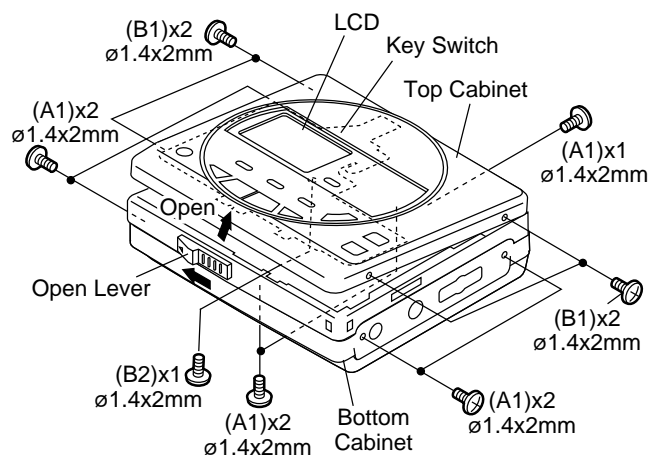
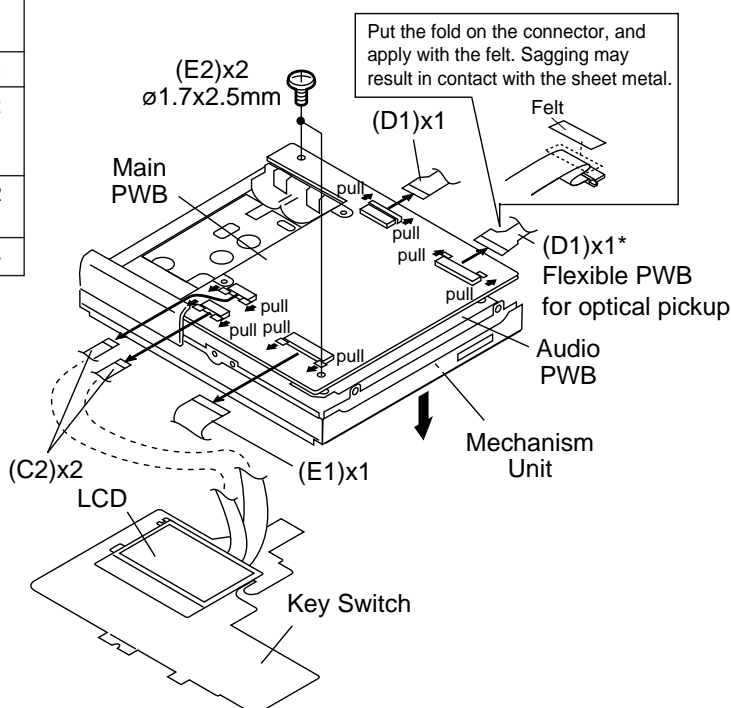


Figure 10-1

STEP	REMOVAL	PROCEDURE	FIGURE
1	Bottom Cabinet	1. Screw ..... (A1) x7	10-1
2	Top Cabinet	1. Open the Top cabinet. 2. Screw ..... (B1) x4 3. Screw ..... (B2) x1	10-1
3	Key Switch/LCD	1. Flexible PWB ..... (C1) x2	10-2
4	Mechanism Unit	1. Flexible PWB ..... (D1) x2 2. Raise the rear part, and remove in the arrow direction.	10-2 10-3
5	Main PWB	1. Flat cable ..... (E1) x1 2. Screw ..... (E2) x2	10-2
6	Audio PWB	1. Screw ..... (F1) x3	10-4



### Caution:

Carefully handle the main PWB and flexible PWB. After removing the flexible PWB (1\*) for the optical pickup from the connector, do not touch directly the front end of flexible PWB with your hand so as to prevent damage of optical pickup by static electricity.

Figure 10-2

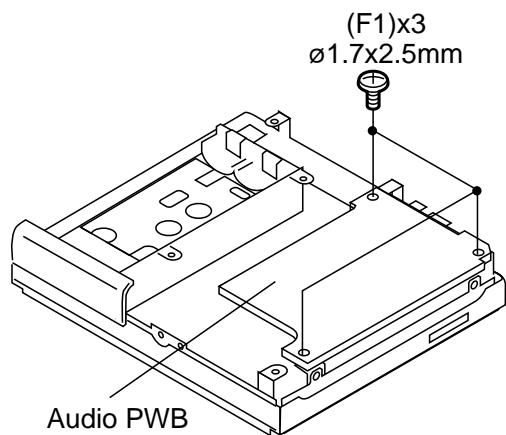


Figure 10-4

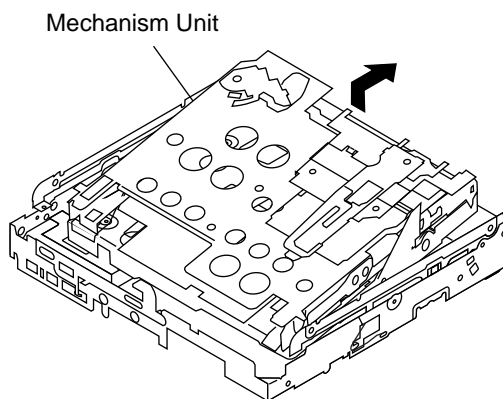


Figure 10-3

## REMOVING AND REINSTALLING THE MAIN PARTS

Remove the mechanism according to the disassembling methods 1 to 4. (See Page 10.)

### How to remove the spindle motor (See Fig. 11-1.)

1. Remove the solder joint (A1) x 1 of flexible PWB.
2. Remove the screws (A2) x 3 pcs., and remove the spindle motor.

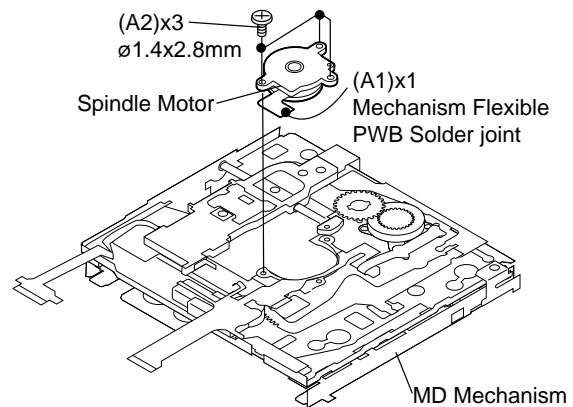


Figure 11-1

### How to remove the head up/down motor (See Fig. 11-2.)

1. Remove the solder joints (B1) x 2 of head up/down motor lead wire.
2. Remove the screw (B2) x 1 pc., and remove the flexible PWB.
3. Remove the screw (B3) x 1 pc., and remove the head up/down motor.

**Note:**

Take care so that the motor gear is not damaged. (If the gear is damaged, noise is caused.)

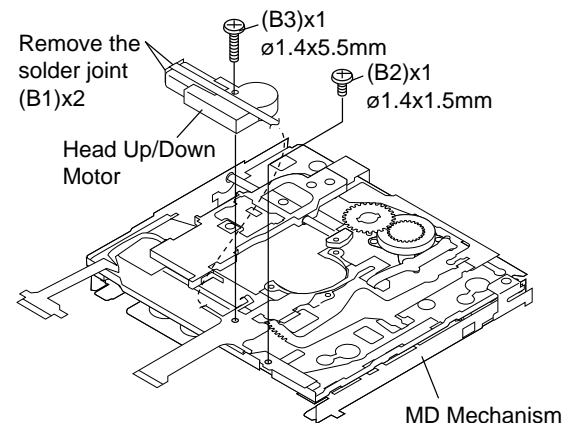


Figure 11-2

### How to remove the sled motor (See Fig. 11-3.)

1. Remove the stop washer (C1) x 1 pc., and remove the drive gear (C2) x 1 pc.
2. Remove the screws (C3) x 2 pcs., and remove the sled motor.
3. Remove the solder joints (C4) x 2 of flexible PWB.

**Note:**

Take care so that the motor gear is not damaged. (If the gear is damaged, noise is caused.)

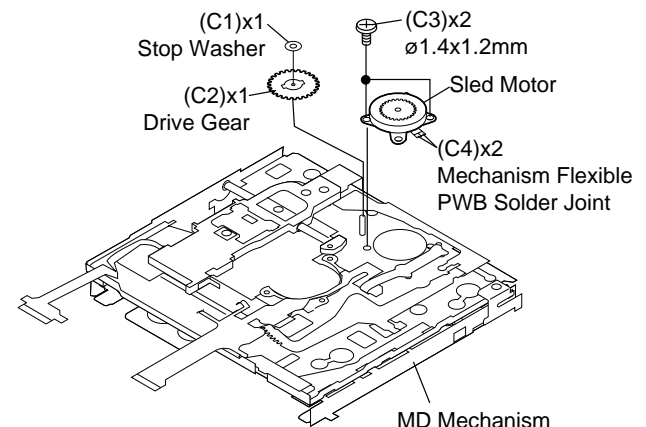


Figure 11-3

### How to remove the magnetic head (See Fig. 11-4.)

1. Remove the screws (D1) x 4 which connects the magnetic head to the head relay flexible PWB, remove the spring washers (D2) x 2 and remove the soldering joints (D3) x 2.

**Note:**

Mount carefully so as not to damage the magnetic head. (If the gear is damaged, noise is caused.)

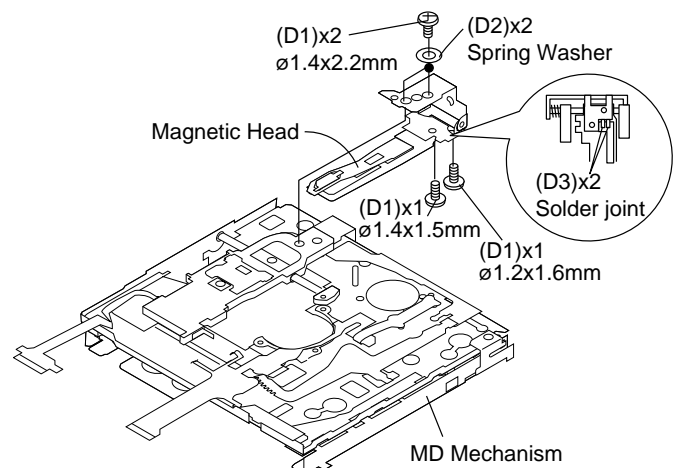


Figure 11-4

### How to reinstall the optical pickup unit (See Fig. 11-5.)

1. Remove the screw (E1) x 1 pc.
2. Slowly raise the optical pickup.

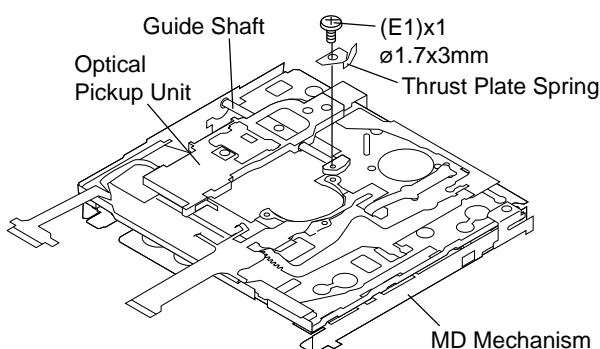


Figure 11-5

# ADJUSTMENT

## ● Test disc

MD adjustment needs two types of disc, namely recording disc (low reflection disc) and playback-only disc (high reflection disc).

	Type	Test disc	Parts No.
1	High reflection disc	MMD-110 (TEAC Test MD)	88GMMD-110
2	Low reflection disc	MMD-212 (TEAC Test MD) 74-minute disc	88GMMD-212
3	Low reflection disc	MMD-213A (TEAC Test MD) 80-minute disc	88GMMD-213A
4	Low reflection disc	Recording minidisc	UDSKM0001AFZZ

Note: Use the low reflection disc on which music has been recorded.

## ● Entering the TEST mode

### 1. Setting at port (power nonconnected state)

- (1) Set the port as follows.  
TEST1 : "Low" (TP416)  
TEST0 : "High"

- (2) Turn the Power ON.

- (3) Test Mode STOP [ T E S T \_ ]

### 2. Setting by special button operation (in standby state)

- (1) Holding down the DISP button and ENTER button, press the PLAY button.

- (2) Normal mode setting initialization (BASS setting, VOL setting, etc.)

\*Since the unit is changed to the setting for production line inspection, be sure to set it to the default setting state in the following default setting procedure before returning it to the user.

- (3) Indication of microcomputer version for one second [ 3 1 8 A ] f X



- (4) Whole LCD lighting for 2 seconds

- (5) Test Mode STOP [ T E S T \_ ]

\*When the PLAY button is pressed during indication (3) and (4), the process proceeds to (5).

## ● Leaving the TEST mode

- (1) Press the STOP button in the TEST mode stop state or version indicating state or whole LCD lighting state.

## ● Shipping setting method

Holding down simultaneously the VOLUME-DOWN Button and PLAY Button of the set unit without disc, supply the power from the DC IN plug. After the indication "INIT" -> "BYE OK" disappears, release the power supply of DC IN.

## ● Test Mode

1. AUTO 1 Mode	<ul style="list-style-type: none"> <li>• Perform preliminary automatic adjustment.</li> <li>• If the combination of mechanism and pickup PWB has been changed, be sure to start from AUTO1.</li> </ul>
2. AUTO 2 Mode	<ul style="list-style-type: none"> <li>• Perform ATT (attenuator) automatic adjustment.</li> <li>• Perform continuous playback (error rate display, jump test)</li> </ul>
3. TEST-PLAY Mode	<ul style="list-style-type: none"> <li>• Continuous playback from the specified address is performed.</li> <li>• 1 line, 10 lines or 384 lines manual jump is performed.</li> <li>• C1 error rate display (pit section), ADIP error rate display (groove section)</li> <li>• The temperature correction is performed only when servo start is performed, but the posture correction is not performed during continuous playback.</li> </ul>
4. TEST-REC Mode	<ul style="list-style-type: none"> <li>• Continuous record from the specified address is performed.</li> <li>• Change of record laser output (servo gain is also changed according to laser output).</li> <li>• The temperature correction is performed only when servo start is performed, but the posture correction is not performed during continuous recording.</li> </ul>
5. MANUAL 1 Mode	<ul style="list-style-type: none"> <li>• Temperature is displayed. (Updating in real time)</li> <li>• Seeing the displayed adjustment value, perform preliminary manual adjustment. (Error rate indication, jump test)</li> </ul>
6. MANUAL 2 Mode	<ul style="list-style-type: none"> <li>• Temperature is displayed. (Updating in real time)</li> <li>• Seeing the displayed adjustment value perform manually the preliminary adjustment. (Error rate indication, jump test)</li> <li>• Continuous playback is performed (error rate display, jump test).</li> </ul>

7. RESULT 1 Mode	<ul style="list-style-type: none"> <li>• The value adjusted in AUTO1 or MANUAL1 is indicated.</li> <li>• (Execution in servo "OFF" state").</li> </ul>
8. RESULT 2 Mode	<ul style="list-style-type: none"> <li>• The value adjusted in AUTO 2 or MANUAL 2 is indicated.</li> <li>• Adjustment value is changed manually. (error rate display, jump test).</li> </ul>
9. DIGITAL INPUT Mode	<ul style="list-style-type: none"> <li>• Digital input information is displayed.</li> </ul>
10. ERROR INFORMATION Mode	<ul style="list-style-type: none"> <li>• Error information is displayed.</li> <li>• Error information is initialized</li> </ul>
11. NORMAL Mode	<ul style="list-style-type: none"> <li>• The mode is changed from the TEST mode to the normal mode without adjustment.</li> <li>• In the normal mode the internal operation mode, memory capacity, etc. are indicated.</li> <li>• In the normal mode both temperature correction and posture correction are performed.</li> </ul>
12. EEPROM Mode	<ul style="list-style-type: none"> <li>• Factors of digital servo are changed manually. (Each servo is turned on individually.)</li> <li>• Cut-off frequency of BASS1, BASS2 and BASS3 is selected manually.</li> <li>• Temperature detection terminal voltage is measured, and the reference value is set.</li> <li>• Defaults are selected and set.</li> <li>• Setting of EEPROM protect area is updated. (In case of protect releasing)</li> </ul>
13. INNER Mode	<ul style="list-style-type: none"> <li>• Determine the position where the INNER switch is turned on. (only high reflection disc).</li> <li>• The temperature correction is performed only when servo start is performed, but the posture correction is not performed.</li> </ul>



## ● Operation in each TEST mode

### 1. AUTO1 Mode

- When the STOP button is pressed while the AUTO1 menu appears or during automatic adjustment, the mode changes to the TEST mode stop state. At this time the adjustment value is not output.
- Be sure to adjust, using the specified disc MMD-213A or MMD-212.  
At this time release the EEPROM (IC402) protection. (Refer to EEPROM write procedure.)
- Adjustment NG; Adjustment item out of range, focus ON failure, and adjustment error
- When the PLAY button is pressed while ADJ. OK is displayed, AUTO2 is executed.

### 2. AUTO2 Mode

- When the STOP button is pressed while the AUTO2 menu appears or during automatic adjustment, the mode changes to the TEST mode stop state. At this time the adjustment value is not output.
- Adjustment NG; Adjustment item out of range, and adjustment error.
- When the PLAY button is pressed while ADJ. OK is displayed, TEST\_PLAY is executed.

### 3. TEST-PLAY Mode

- When the STOP button is pressed while the TEST-PLAY menu appears, or in TEST-PLAY or continuous playback mode, the mode changes to the TEST mode stop state.
- When the PLAY button is pressed while the TEST-PLAY menu appears, continuous playback is initiated from the current pickup position.
- Whenever the DISP button is pressed in the TEST-PLAY menu, the target address changes as follows.  
0032 — 03C0 — 0700 — 08A0 — 0950 — 0032 —  
When the PLAY button is pressed while a target address is displayed, continuous playback is performed after searching that address.
- Each time the MODE button is pressed while the TEST-PLAY mode target address is displayed, the digit which is changed by pressing the SKIP UP/DOWN button is changed as follows.  
0032 — 0032 — 0032 — 0032 —
- When the SKIP UP button is pressed in the TEST-PLAY mode target address is displayed, the digit of address specified by the MODE button is set to +1h. (0 to F)
- When the SKIP DOWN button is pressed in the TEST-PLAY mode target address is displayed, the digit of address specified by the MODE button is set to -1h. (0 to F)  
\* When the SKIP UP/DOWN button is held down, the setting changes continuously, one cycle being 100 ms.
- When the BASS button is pressed in the continuous playback mode, the number of jump lines changes as follows.  
1 — 10 — 384 — 1  
\* After the number of jump lines is indicated for one second, the address indication is restored. [ ▲▲▲T R \_ ]
- When the SKIP UP button is pressed in the continuous playback mode, the specified number of lines is jumped in the FWD direction.
- When the SKIP DOWN button is pressed in the continuous playback mode, the specified number of lines is jumped in the REV direction.  
\* When the SKIP UP/DOWN button is held down, jump is repeated every approx. 100 ms.

- Whenever the DISP button is pressed in the continuous playback mode, the indication changes as follows.

\* Pre-mastered disc

Continuous playback (SUBQ address indication)	[ S Q □□□□ ]
Continuous playback (C1 error indication)	[ C E ☆☆☆☆ ]
Continuous playback (SUBQ address indication)	[ S Q □□□□ ]

\* Recordable disk

Continuous playback (ADIP address indication)	[ A P □□□□ ]
Continuous playback (C1 error indication)	[ C E ☆☆☆☆ ]
Continuous playback (ADIP error indication)	[ A E ★★★★★ ]
Continuous playback (ADIP address indication)	[ A P □□□□ ]

### 4. TEST-REC Mode

- When the STOP button is pressed while the TEST-REC menu appears, or in the TEST-REC mode or continuous record mode, the mode changes to the TEST mode stop state.
- When the PLAY button is pressed while the TEST-REC menu appears, the continuous record is initiated from the current pickup position.
- Whenever the DISP button is pressed in the TEST-REC menu, the target address changes as follows.

0032 — 03C0 — 0700 — 08A0 — 0950 — 0032 —

When the PLAY button is pressed while a target address is displayed, continuous playback is performed after searching that address.

- Whenever the MODE button is pressed in the TEST-REC mode target address is displayed, the digit which is changed by the SKIP UP/DOWN button changes as follows.

0032 — 0032 — 0032 — 0320 —

- When the SKIP UP button is pressed in the TEST-REC mode target address is displayed, the digit of address specified by the BASS button is set to +1h. (0 to F)
- When the SKIP DOWN button is pressed in the TEST-REC mode target address is displayed, the digit of address specified by the BASS button is set to -1h. (0 to F)

\* When the SKIP UP/DOWN button is held down, the setting changes continuously, one cycle being 100 ms.



## MD-MT20/20C/20W

### 5. NORMAL Mode

- When the STOP button is pressed while the NORMAL menu appears, the mode changes to the TEST mode stop state.
- Indication during operation  
Indication of memory capacity on main unit LCD [ □ □ \_ \* \* \* \* \_ \* \* ] + Level meter  
□ □ : Internal mode  
\* \* \* \* : Address (Cluster section)  
\* \* : Address (Sector section)
- Selection of sound volume, BASS, etc. is possible (without indication)
- Recording is also possible.
- If the STOP button is pressed during operation in the NORMAL mode, the NORMAL mode is canceled, and the power is turned off.

### 6. Error data display Mode

- Reversing when SKIP DOWN button is pressed
- When the STOP button is pressed while the error data indication menu appears or during error data indication, the mode changes to the TEST mode stop state.
- Error data 0 is the latest error.
- Error which occurred in the TEST mode is also stored in the memory.
- When the DISP button is pressed while the error data indication menu appears, the error data is initialized. [ C L E A R \_ ]
- ◇◇: Error Code

#### ● Explanation of error history code

- 12h : RF side FG, TG, and TCRS adjustment termination failure
- 13h : Adjustment servo retraction excessive retrial
- 16h : C. IN detection time-over
- 17h : A, B, E, F, and TCRSO offset measurement value out of tolerable range
- 21h : Focus retraction completion allowable time-over
- 23h : Track search completion allowable time-over
- 24h : Disc linear speed measurement failure
- 32h : P-TOC read failure
- 42h : U-TOC read failure
- 44h : U-TOC write data write disabled/read check error
- 52h : SD write data write disabled
- 71h : Pickup position initialization time-over
- 72h : EEPROM data read check sum error
- 73h : Record head drive disabled (by EJECT lever)
- 82h : Power overvoltage detection
- 91h : Ambient temperature is higher than the allowable temperature.

### 7. INNER Mode

- when the STOP button is pressed on the INNER menu (SQ □ □ □ □ ), the state is changed to the TEST mode STOP state.
- □ □ □ □ : Address

## EEPROM (IC402) writing procedure

### 1. Procedure to replace EEPROM and write initial value of microcomputer in EEPROM

- (1) Replace EEPROM.
- (2) Deprive EEPROM of protection (connect the pins 8 and 6 of IC402).
- (3) Refer to the latest EEPROM data list.
- (4) Press the Display button, Ente button and Play button to start the test mode.
- (5) Version display



- (6) The whole LCD lights.
- (7) Test mode stop state.  
[ T E S T ]
- (8) Press the "BASS" button, and press twice the "SKIP DOWN" button.  
[ E E P R O M ]
- (9) Perform the operation to display "EEPROM SETTING MODE CHART", compare the EEPROM DATA LIST with the display, and set according to the EEPROM DATA LIST with the VOL UP or VOL DOWN key.
- (10) Set the temperature reference. (Refer to the Temperature Reference Setting Method.)
- (11) Set according to the EEPROM DATA LIST.
- (12) Press the Stop button.  
[ T E S T ]
- (13) Press the Stop button.
- (14) After data is written in EEPROM, turn off power .
- (15) Restore protection of EEPROM (Disconnect connection made in Step (2) above).

### 2. Temperature reference setting method

#### [1] Measurement, calculation and setting procedure

- (1) Set the TEST mode.
  - Set TEST 1, 0 = '01', and turn on power (or set PLAY ON in standby state).
- (2) Start the EEPROM mode 'Temp' menu.
  - Key operation in order of BASS, SKIP-DOWN x 2 times, PLAY, PLAY in the test mode STOP state.
  - 'TM\$\$\$%' is displayed. (\$\$ = Temperature code, %% = Temperature reference)
- (3) Once press SKIP-UP, and determine the displayed microcomputer TEMP input AD value.
  - 'TPin##' is displayed. (## = TEMP input AD value)
- (4) At the ambient temperature, determine the temperature corrected value from the temperature measurement value correction table.
- (5) Determine the temperature reference, using the following formula.
  - Temperature reference = Microcomputer TEMP input AD value + Temperature corrected value
- (6) Set the temperature reference value by button operation , and check whether the temperature code indication corresponds to "Temperature Code Identification Table".

#### [2] Temperature measurement value correction table

Ambient temperature	Temperature correction	Center temperature
+ 9°C ~ +11°C	- 05h	+ 10.0°C
+12°C ~ +14°C	- 04h	+ 12.7°C
+15°C ~ +16°C	- 03h	+ 15.4°C
+17°C ~ +19°C	- 02h	+ 18.2°C
+20°C ~ +22°C	- 01h	+ 20.9°C
+23°C ~ +24°C	± 00h	+ 23.6°C
+25°C ~ +27°C	+ 01h	+ 26.3°C
+28°C ~ +30°C	+ 02h	+ 29.0°C
+31°C ~ +33°C	+ 03h	+ 31.8°C

Ambient temperature	Temperature correction	Center temperature
- 9°C ~ +10°C	08h	+ 0.5°C
+ 3°C ~ +21°C	07h	+ 12.5°C
+15°C ~ +33°C	06h	+ 23.6°C
+26°C ~ +43°C	05h	+ 35.0°C

## MD-MT20/20C/20W

### ● EEPROM DATA LIST (EEPROM version f)

#### TEMP setting

Item display	Set values
T M _ _      ○○	Calculate values

#### Fucus setting

Item display	Set values
F G _ _      ○○	B 0 H
F F 1 _      ○○	7 0 H
F F 2 _      ○○	E 8 H
F Z H _      ○○	E D H
F L n _      ○○	0 A H
D J G _      ○○	1 4 H
F L V _      ○○	3 3 H
W T f _      ○○	2 0 H
F S S _      ○○	E 9 H

#### Tracking setting

Item display	Set values
T G _ _      ○○	4 8 H
T F 1 _      ○○	7 0 H
T F 2 _      ○○	E 0 H
T F S _      ○○	0 0 H
T B o _      ○○	4 4 H
T B t _      ○○	2 0 H
T K o _      ○○	4 4 H
T K t _      ○○	1 D H
T D o _      ○○	6 7 H
T D t _      ○○	3 4 H
T G R _      ○○	0 0 H
S C t _      ○○	4 0 H
S C m _      ○○	5 3 H
C L p _      ○○	1 8 H
C L r _      ○○	2 8 H
J P I _      ○○	0 1 H
K 1 0 _      ○○	6 5 H

#### Spindle setting

Item display	Set values
S P G _      ○○	1 4 H
S P i _      ○○	E 0 H
S P m _      ○○	A 0 H
S P o _      ○○	6 8 H
S P 1 _      ○○	1 0 H
S P 2 _      ○○	6 0 H
S P 3 _      ○○	F 2 H
S P 4 _      ○○	F 2 H
S P 5 _      ○○	1 0 H
S P D _      ○○	7 F H
S P K _      ○○	E B H

#### BASS setting

Item display	Set values
B S 1 _      ○○	3 F H
B S 2 _      ○○	1 F H
B S 3 _      ○○	E 2 H

#### Sled setting

Item display	Set values
S L G _      ○○	D F H
S L 2 _      ○○	2 0 H
S L M _      ○○	7 F H
S L V _      ○○	D 7 H
S K k _      ○○	7 2 H
S K t _      ○○	7 0 H
S K m _      ○○	7 8 H
W T m _      ○○	2 4 H
M V 1 _      ○○	4 F H
M V 2 _      ○○	A A H
S R V _      ○○	0 A H

#### ADJ. SET setting

Item display	Set values
C O K _      ○○	A 0 H
F A T _      ○○	C 0 H
T A T _      ○○	3 E H
C A T _      ○○	2 0 H
F A B _      ○○	E 0 H

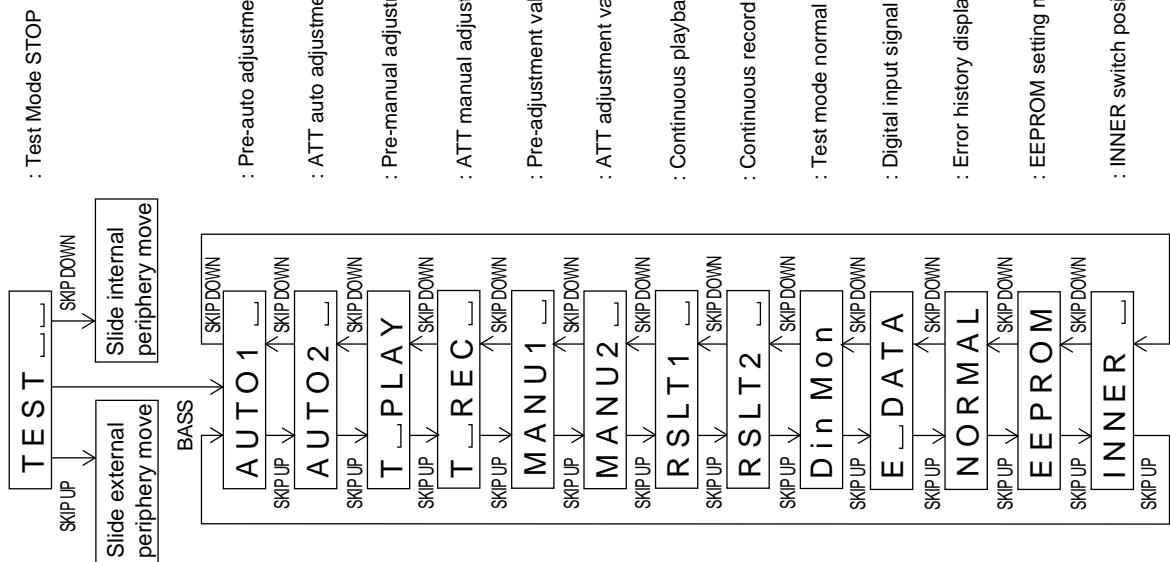
#### EQ. SET setting

Item display	Set values
H Q 1 _      ○○	9 0 H
H Q 2 _      ○○	9 0 H
H S G _      ○○	1 1 H
H S O _      ○○	F D H
L Q 1 _      ○○	9 0 H
L Q 2 _      ○○	9 0 H
L S G _      ○○	1 1 H
L S O _      ○○	0 0 H
G Q 1 _      ○○	9 8 H
G Q 2 _      ○○	8 4 H
G S G _      ○○	1 1 H
F L p _      ○○	0 8 H

#### Control setting

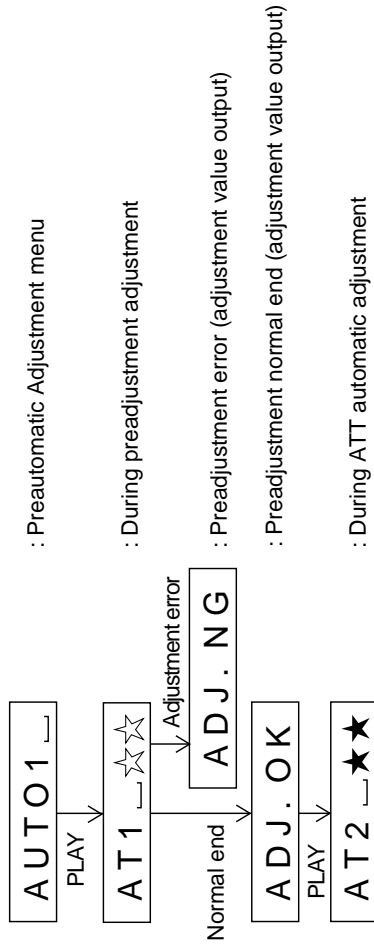
Item display	Set values
C T 0 _      ○○	0 5 H
C T 1 _      ○○	1 1 H
C T 2 _      ○○	7 F H
C T 3 _      ○○	3 0 H
R C 0 _      ○○	C 0 H
R C 1 _      ○○	F E H
S Y C _      ○○	A 6 H
P W L _      ○○	0 3 H
D R 1 _      ○○	9 2 H
D R 2 _      ○○	C 8 H
I N 1 _      ○○	D 3 H
I N 2 _      ○○	6 4 H
I N 3 _      ○○	D 2 H
I N H _      ○○	6 4 H
D R H _      ○○	C 8 H
P L E _      ○○	1 B H
R C E _      ○○	4 2 H
E L T _      ○○	7 6 H
S L T _      ○○	4 3 H
S P M _      ○○	0 0 H
M S L _      ○○	0 0 H
U S 0 _      ○○	0 0 H
U S 1 _      ○○	0 0 H
U S 2 _      ○○	0 0 H

**Test Mode Change Chart**  
**Tset Mode Menu**



- : Test Mode STOP
- : Pre-auto adjustment menu
- : ATT auto adjustment menu
- : Pre-manual adjustment menu
- : ATT manual adjustment menu
- : Pre-adjustment value check menu
- : ATT adjustment value check menu
- : Continuous playback menu
- : Continuous record menu
- : Test mode normal playback menu
- : Digital input signal monitor menu
- : Error history display menu
- : EEPROM setting menu
- : INNER switch position measurement menu

**Preadautomatic Adjustment**



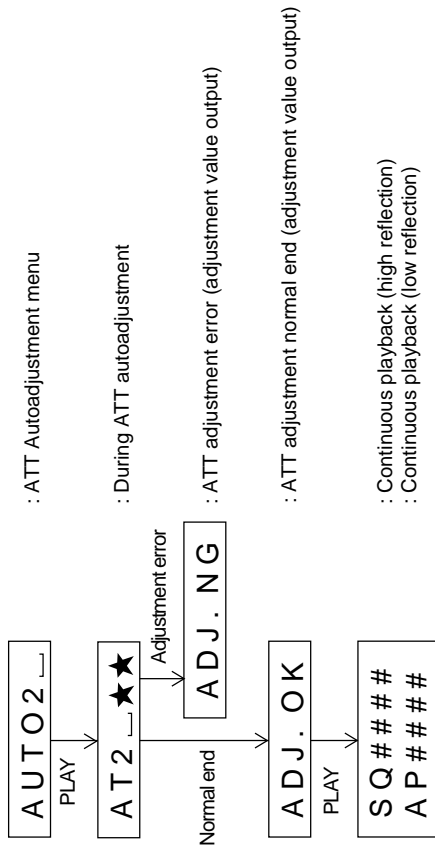
- : Preadautomatic Adjustment menu
- : During preadjustment adjustment
- : Preadjustment error (adjustment value output)
- : Preadjustment normal end (adjustment value output)
- : During ATT automatic adjustment

\* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.  
\* "☆☆☆" represent the adjustment number as follows.

- 0 0 : Innermost periphery move
- 0 2 : ABEF offset tentative measurement
- 0 4 : RF side focus gain coarse adjustment
- 0 5 : Focus ATT tentative setting
- 0 6 : RF side bit section tracking gain adjustment
- 0 7 : COUT level setting for pit section adjustment
- 0 8 : External periphery move
- 0 9 : RF side groove section tracking gain adjustment
- 1 0 : COUT level setting for groove section adjustment
- 1 1 : RF side TCRS gain adjustment
- 1 2 : Tracking ATT initial setting
- 1 3 : RF side focus gain minor adjustment
- 1 4 : Focus ATT initial setting
- 1 5 : S gain "High" ABEF offset measurement
- 1 6 : TCRS offset measurement
- 1 7 : S gain "Low" ABEF offset measurement

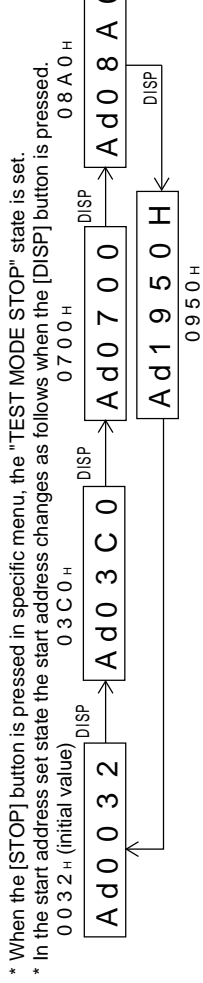
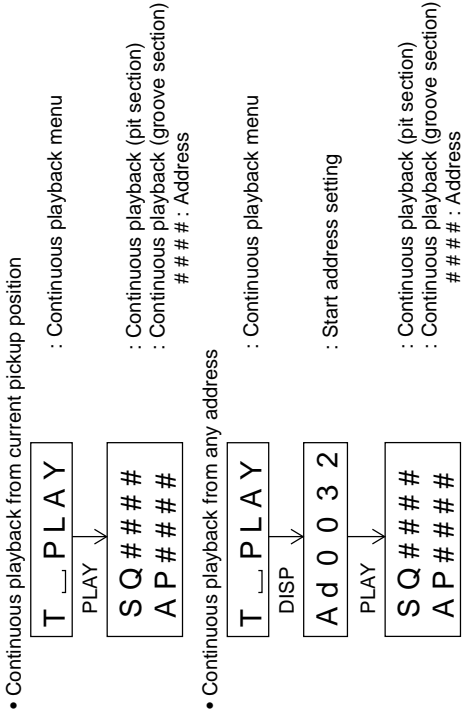
\* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.  
\* When the [PLAY] button operation is performed in the specific menu, the operation of this menu is executed.

### ATT Auto Adjustment



- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* "★★" represent the adjustment number as follows.
  - 0 0 : Innermost periphery move
  - 0 3 : Pit section tracking ATT setting
  - 0 4 : Pit section focus ATT setting
  - 0 6 : External periphery move
  - 0 7 : TCRS ATT setting
  - 0 8 : Groove section tracking ATT setting
  - 0 9 : Groove section focus ATT setting

### Continuous Playback



- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* In the start address set state the start address changes as follows when the [DISP] button is pressed.
  - 0 0 3 2 H (initial value)
  - 0 3 C 0 H
  - 0 7 0 0 H
  - 0 9 5 0 H
  - 0 8 A 0 H
- \* In the start address setting state the start address change digit changes when the [BASS] button is pressed.
  - 1st digit (initial value)
  - 2nd digit
  - 3rd digit
  - MODE
  - MODE
  - MODE
- \* In the start address set state the value of selection digit changes in the range of "0h to Fh" when the [SKIP UP/DOWN] button is pressed
- \* In the continuous playback state the number of jump lines changes as follows shown the [BASS] button is pressed.
  - 1 (initial value)
  - BASS
  - 10
  - BASS
  - 384
  - BASS
- \* When the [SKIP UP] button is pressed in the continued playback mode, jump of specified number of lines occurs in the external periphery direction.
  - If the key is held down jump occurs continuously (100 ms cycle).
- \* When the [SKIP DOWN] button is pressed in the continuous playback mode, jump of specified number of lines occurs in the internal periphery direction.
  - If the key is held down, jump occurs continuously (100 ms cycle).



### Continuous Rerecord

- Continuous record from the current pickup position  
 T\_REC → : Continuous record menu  
 PLAY →  
 AP### → : Continuous record ### #: Address
- Continuous record playback from any address  
 T\_REC → : Continuous record menu  
 PLAY →  
 Ad0032 → : Start address setting  
 PLAY →  
 AP### → : Continuous record ### #: Address

\* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.  
 \* In the start address set state the start address changes as follows when the [DISP] button is pressed.  
 0032<sub>H</sub> (initial value) → 03C0<sub>H</sub> → 0700<sub>H</sub> → 08A0<sub>H</sub>  
 Ad0032 → Ad03c0 → Ad0700 → Ad08A0  
 Ad1950 → Ad0032  
 \* In the start address setting state the start address change digit changes when the [BASS] button is pressed.  
 1st digit (initial value) → 2nd digit → 3rd digit  
 Ad0032 → Ad0032 → Ad0032

### Inner Switch Position Measurement

- INNER → : INNER switch position measurement menu  
 PLAY →
  - SQ### → : Continuous playback (pit section) ### #: Address
- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.

### Test Mode Normal Playback

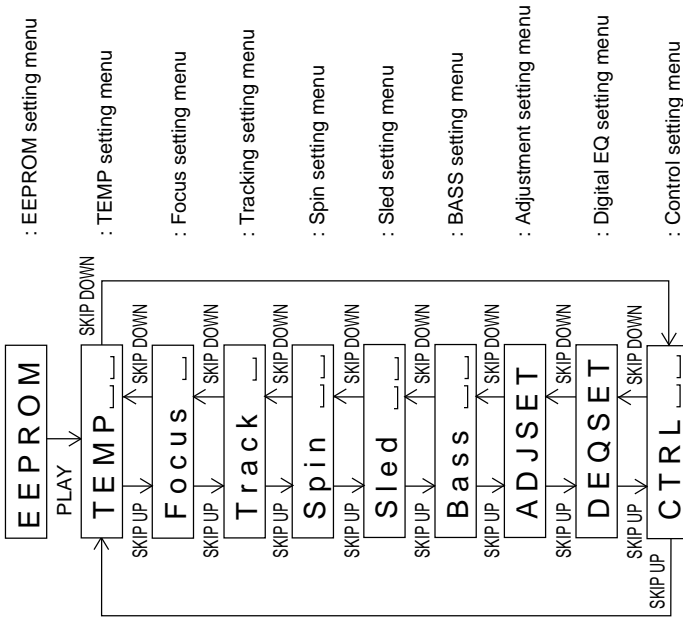
- NORMAL → : TEST mode normal playback menu  
 PLAY →  
 @@@@ → : Continuous playback @@@@: Mode and address display
- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.  
 \* When the NORMAL mode is canceled, the power is turned off.

### Error History Display

- Error history clear  
 E\_DATA → : Error history display menu  
 PLAY →  
 CLEAR → : Error history clear
- Error history display  
 E\_DATA → : Error history display menu  
 PLAY →  
 E0\$\$ → : Error history 0 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E1\$\$ → : Error history 1 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E2\$\$ → : Error history 2 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E3\$\$ → : Error history 3 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E4\$\$ → : Error history 4 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E5\$\$ → : Error history 5 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E6\$\$ → : Error history 6 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E7\$\$ → : Error history 7 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E8\$\$ → : Error history 8 display \$\$ : Error code  
 SKIP UP → SKIP DOWN  
 E9\$\$ → : Error history 9 display \$\$ : Error code

\* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.

### EEPROM Setting



: EEPROM setting menu

: TEMP setting menu

: Focus setting menu

: Tracking setting menu

: Spin setting menu

: Sled setting menu

: BASS setting menu

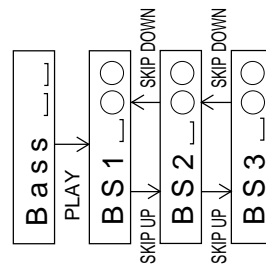
: Adjustment setting menu

: Digital EQ setting menu

: Control setting menu

- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [PLAY] button operation is performed in the specific state, the specific setting menu is set.

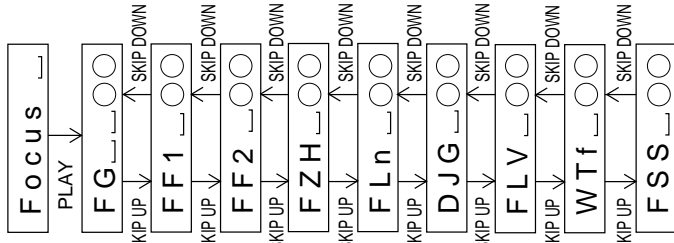
### BASS Setting



: BASS setting menu

- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific state the setting changes in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed. (The upper limit varies depending on the items)
- \* When the [MODE] button is pressed in each state, the set digit is changed.

### Focus Setting

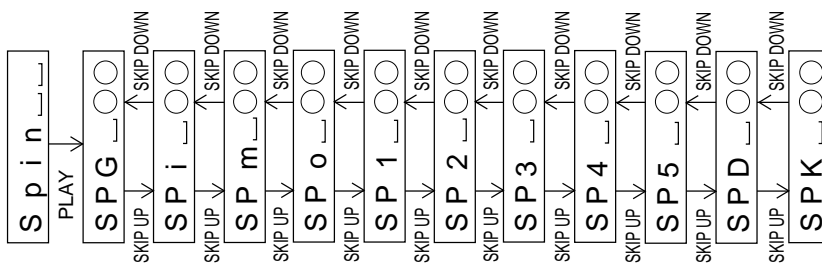


: Focus setting menu

- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In specific state the setting changed in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed. (The upper limit varies depending on the items)
- \* When the [MODE] button is pressed in each state, the set digit is changed.

Spin Setting

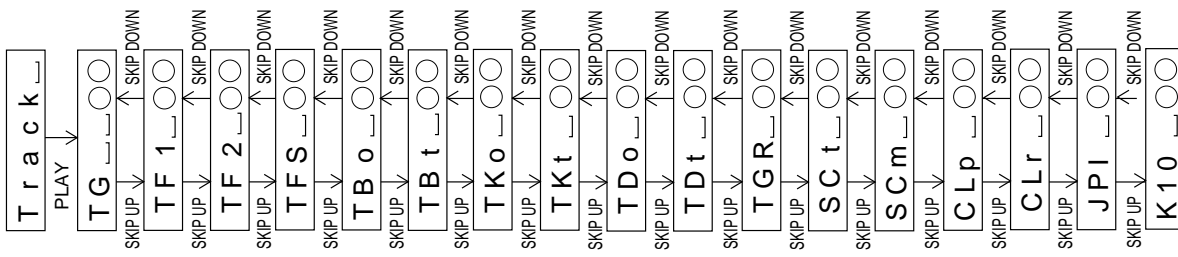
: Spin setting menu



- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In specific state the setting changed in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed. (The upper limit varies depending on the items)
- \* When the [MODE] button is pressed in each state, the set digit is changed.

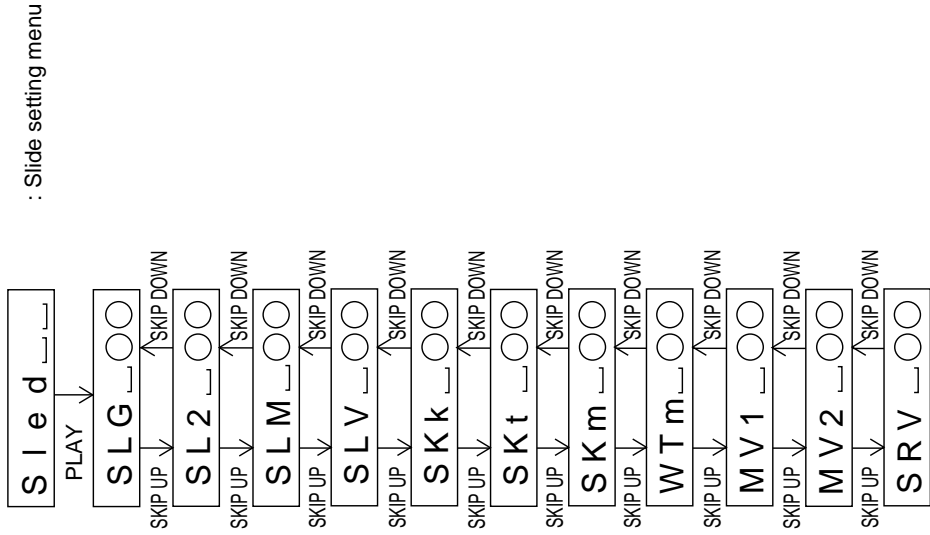
Tracking Setting

: Tracking setting menu



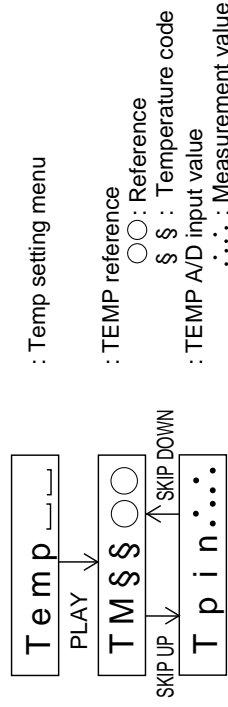
- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific state the setting changes in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed. (The upper limit varies depending on the items)
- \* When the [MODE] button is pressed in each state, the set digit is changed.

### Sled Setting



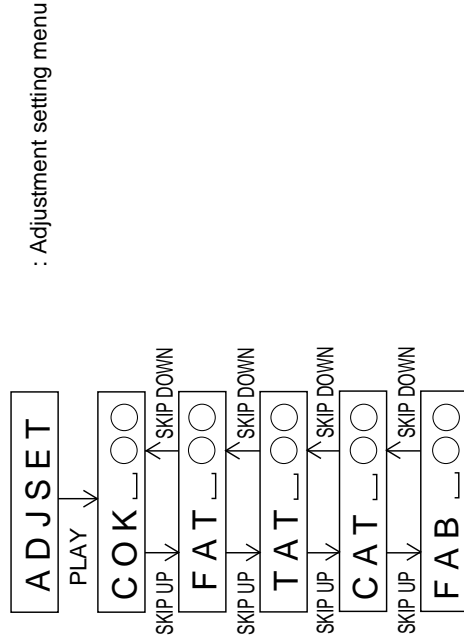
- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific state the setting changes in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed.  
(The upper limit varies depending on the items)
- \* When the [MODE] button is pressed in each state, the set digit is changed.

### TEMP Setting

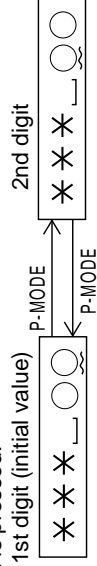


- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific state the setting changes in the range of "00h to FFh" when the [VOL UP/DOWN] button is pressed.
- \* When the [MODE] button is pressed in each state, the set digit is changed.

### Adjustment Setting

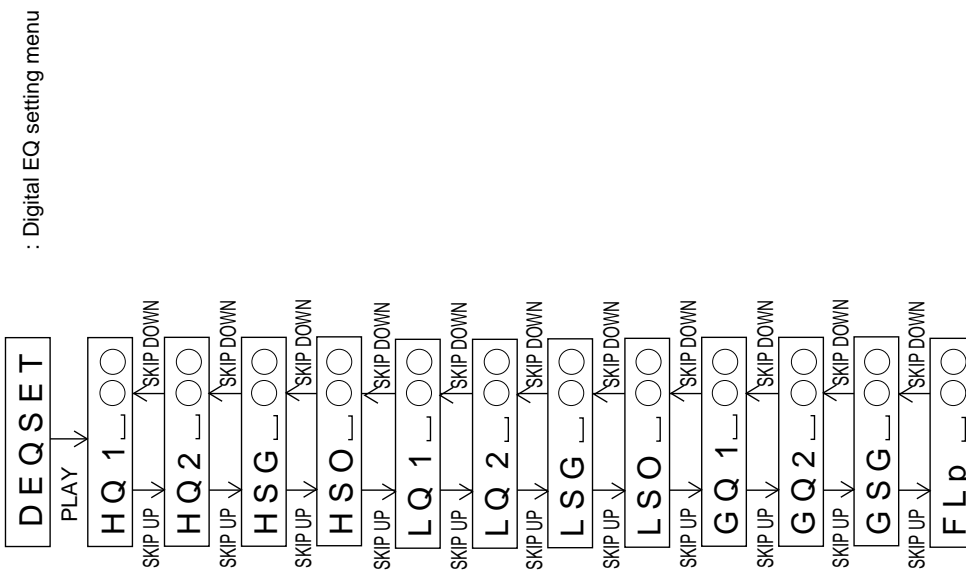


- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific setting display state the setting change digit changes when the [P-MODE] button is pressed.



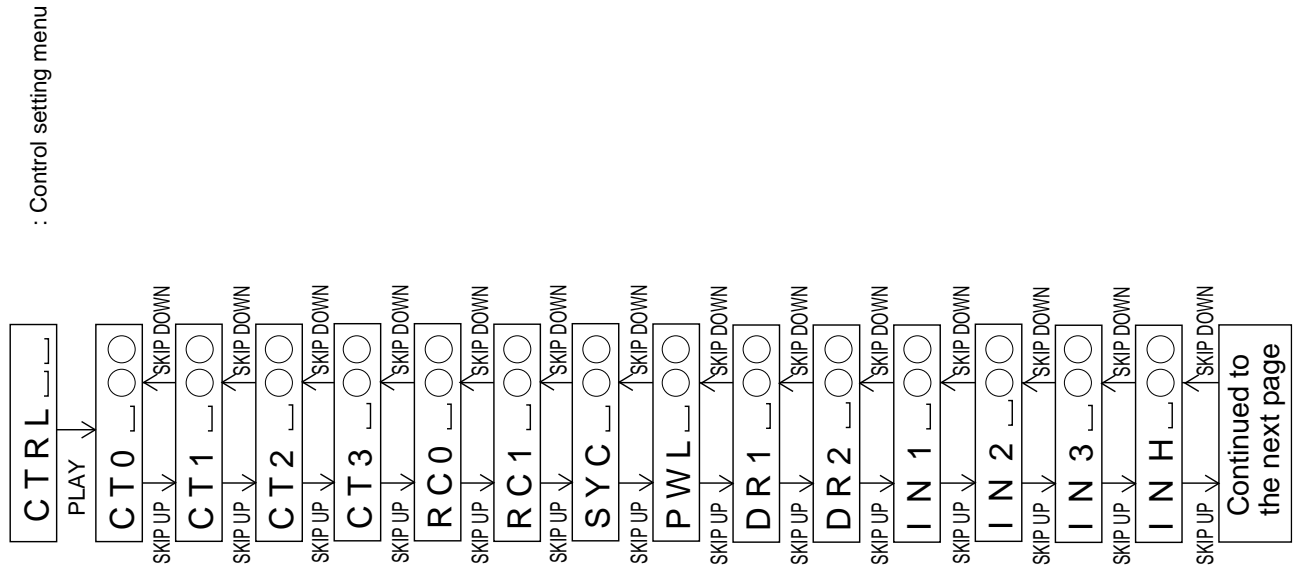
- \* In the specific state the setting changes in the range of "0h to Fh" when the [VOL UP/DOWN] button is pressed.
- \* When the [MODE] button is pressed in each state, the set digit is changed.

### Digital EQ Setting

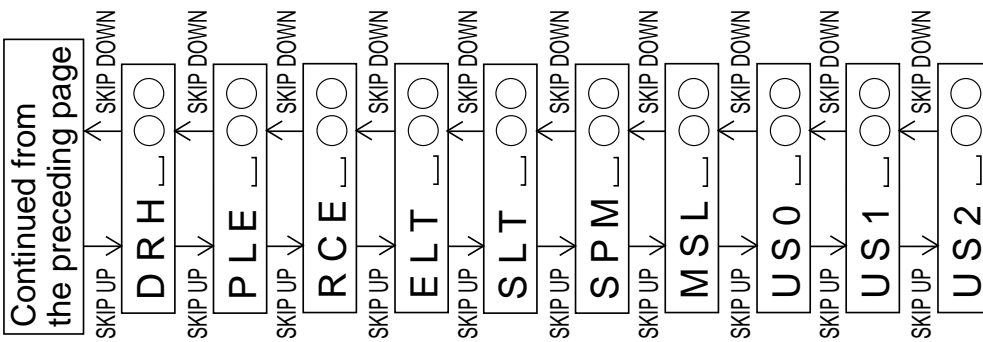


- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific setting display state the setting change digit changes when the [P-MODE] button is pressed.  
 1st digit (initial value)      P-MODE      P-MODE      2nd digit  
 \* \* \* \* \*      \* \* \* \* \*      \* \* \* \* \*
- \* In the specific state the setting changes in the range of "0h to Fh" when the [VOL UP/DOWN] button is pressed.
- \* When the [MODE] button is pressed in each state, the set digit is changed.

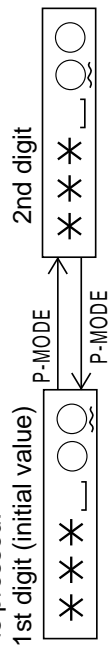
### Control Setting







- \* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
- \* When the [DISP] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
- \* In the specific setting display state the setting change digit changes when the [P-MODE] button is pressed.



- \* In the specific state the setting changes in the range of "0h to Fh" when the [VOL UP/DOWN] button is pressed.
- \* When the [MODE] button is pressed in each state, the set digit is changed.

## NOTES ON SCHEMATIC DIAGRAM

• Resistor:

To differentiate the units of resistors, such symbol as K and M are used: the symbol K means 1000 ohm and the symbol M means 1000 kohm and the resistor without any symbol is ohm-type resistor. Besides, the one with "Fusible" is a fuse type.

• Capacitor:

To indicate the unit of capacitor, a symbol P is used: this symbol P means micro-micro-farad and the unit of the capacitor without such a symbol is microfarad. As to electrolytic capacitor, the expression "capacitance/withstand voltage" is used.

(CH), (TH), (RH), (UJ): Temperature compensation  
(ML): Mylar type

• The indicated voltage in each section is the one measured by Digital Multimeter between such a section and the chassis with no signal given.

• Parts marked with "⚠" (⏏ = = = ⏏) are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

REF. NO	DESCRIPTION	POSITION
SW401	EJECT	OFF—ON
SW402	HOLD	OFF—ON
SW403	DISC LID OPEN	OFF—ON
SW902	DISC PROTECT	OFF—ON

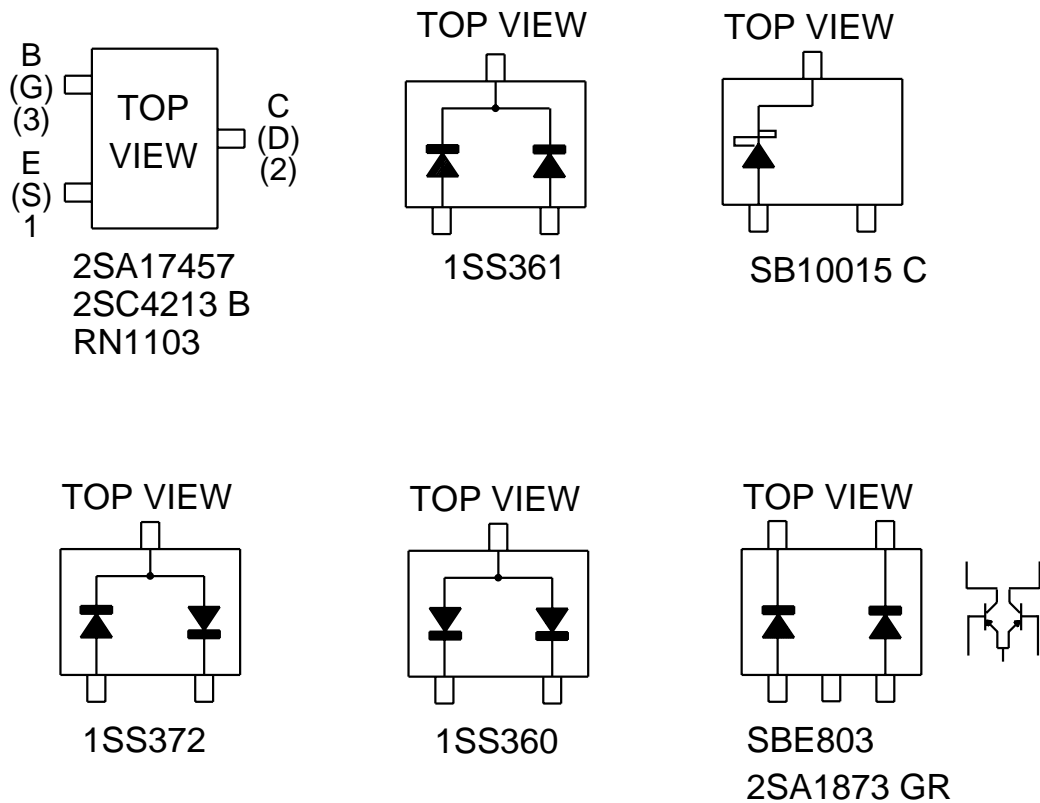


Figure 25 TYPES OF TRANSISTOR AND DIODE

VOLTAGE

IC101	
PIN NO.	VOLTAGE
1	0.72V
2	0.72V
3	0.72V
4	0.72V
5	1.24V
6	1.24V
7	0.71V
8	1.24V
9	1.24V
10	1.24V
11	1.24V
12	1.24V
13	2.5V
14	2.5V
15	0.18V
16	2.5V
17	2.5V
18	0V
19	0V
20	1.48V
21	2.35V
22	0V
23	0V
24	2.5V
25	1.24V
26	1.24V
27	1.24V
28	1.24V
29	1.24V
30	1V
31	1.24V
32	1.24V
33	1.24V
34	NC
35	1.25V
36	1.25V
37	0.17V
38	1.24V
39	1.24V
40	1.24V
41	1.24V
42	2.5V
43	0V
44	0V
45	1.24V
46	1.24V
47	1.24V
48	0V

IC201			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0.88V	51	1V
2	2.5V	52	0V
3	1.27V	53	0V
4	0V	54	0V
5	1.25V	55	0V
6	1.25V	56	2V
7	1.25V	57	0V
8	1.25V	58	0V
9	1.25V	59	0V
10	1.3V	60	0V
11	2.2V	61	0.14V
12	2V	62	2V
13	0V	63	0V
14	0V	64	0.9V
15	0V	65	0.9V
16	0V	66	1.66V
17	1V	67	1V
18	0V	68	2V
19	0V	69	0V
20	0V	70	1V
21	0V	71	1V
22	0V	72	2V
23	0V	73	0V
24	0V	74	0V
25	0V	75	0V
26	0.51V	76	0V
27	0.51V	77	0V
28	0.49V	78	2V
29	1.44V	79	0V
30	1.13V	80	2V
31	2.56V	81	1V
32	0.6V	82	2V
33	1V	83	0V
34	1V	84	0V
35	0.8V	85	1V
36	0.8V	86	2V
37	0.8V	87	2V
38	0V	88	0V
39	2.13V	89	2.36V
40	1.4V	90	0.2V
41	1.56V	91	1.65V
42	1.1V	92	0V
43	1.75V	93	0.1V
44	2.57V	94	0.7V
45	1.74V	95	1.35V
46	1.61V	96	1.76V
47	0V	97	0.32V
48	1.93V	98	2.27V
49	1V	99	2.36V
50	0.91V	100	0.2V

IC401			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0V	51	0V
2	2.5V	52	2.32V
3	0V	53	2.34V
4	2.35V	54	0V
5	NC	55	2.32V
6	0.18V	56	0V
7	0V	57	2.34V
8	0.23V	58	2.34V
9	0V	59	0.3V
10	2.23V	60	2.35V
11	2.12V	61	2.35V
12	2.04V	62	2.28V
13	2.25V	63	2.35V
14	2.35V	64	2.35V
15	0.18V	65	2.35V
16	0V	66	1.08V
17	0V	67	1.13V
18	0V	68	0V
19	2.35V	69	2.34V
20	0.2V	70	2.32V
21	2.35V	71	2.34V
22	2.26V	72	2.34V
23	0.14V	73	2.1V
24	1.6V	74	2.32V
25	0V	75	2.32V
26	0.08V	76	1.93V
27	1.6V	77	2.34V
28	1.26V	78	2.34V
29	1.7V	79	0.82V
30	0.27V	80	1.46V
31	0V	81	1.33V
32	0V	82	2.34V
33	2.1V	83	2.34V
34	2.72V	84	2.34V
35	2.72V	85	0V
36	2.35V	86	1.62V
37	0V	87	0V
38	2.34V	88	0V
39	0V	89	2.32V
40	2.35V	90	2.33V
41	0V	91	2.33V
42	2.35V	92	2.34V
43	2.35V	93	1.7V
44	0V	94	1.5V
45	0V	95	0.12V
46	2.35V	96	2.33V
47	0V	97	2.33V
48	0V	98	2.34V
49	0V	99	0.18V
50	-	100	2.33V

IC501	
PIN NO.	VOLTAGE
1	2.5V
2	2.5V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0V
9	1V
10	1V
11	1V
12	0V
13	0V
14	2.5V
15	0V
16	0V
17	0V
18	0V
19	0V
20	0V
21	0V
22	0V
23	2.5V
24	2.5V

IC701	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0V
9	0V
10	0V
11	0V
12	0V
13	0V
14	0V
15	0V
16	0V
17	-2.48V
18	0V
19	0V
20	2.72V
21	0.86V
22	0V
23	0V
24	0V

IC801	
PIN NO.	VOLTAGE
1	0V
2	0.2V
3	0V
4	0V
5	0.73V
6	0.73V

IC802	
PIN NO.	VOLTAGE
1	5V
2	5V
3	0.7V
4	5V
5	5V
6	5V

IC805	
PIN NO.	VOLTAGE
1	2.15V
2	1.38V
3	-
4	-2.86V
5	0V
6	0V
7	-1.49V
8	2.73V

IC806	
PIN NO.	VOLTAGE
1	0V
2	0V
3	4.44V
4	0V
5	0V
6	0V

IC808	
PIN NO.	VOLTAGE
1	2.15V
2	0.56V
3	0.56V
4	0V
5	0.56V
6	2.74V

IC807	
PIN NO.	VOLTAGE
1	2V
2	1.98V
3	1.98V
4	0V
5	0V
6	0.94V

IC821	
PIN NO.	VOLTAGE
1	1.25V
2	0.94V
3	1.16V
4	1.15V
5	1.13V
6	0V
7	0.54V
8	4.49V
9	0V
10	0.41V
11	1V
12	1V

IC871	
PIN NO.	VOLTAGE
1	4.64V
2	4.48V
3	NC
4	0V
5	4.63V

IC601	
PIN NO.	VOLTAGE
1	0V
2	1V
3	2.35V
4	0V
5	4.72V
6	0V
7	0V
8	0V
9	4.72V
10	4.72V
11	0V
12	0V
13	0V
14	4.72V
15	0V
16	0V
17	0V
18	0V
19	0V
20	0V
21	0V
22	0V
23	4.72V
24	0V
25	0V
26	0V
27	4.72V
28	4.72V
29	0V
30	0V
31	0V
32	4.72V
33	0V
34	0V
35	2.5V
36	9.67V

IC702	
PIN NO.	VOLTAGE
1	0V
2	9.66V
3	2.34V
4	NC
5	4.46V

IC703	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0.97V
9	0V
10	0V
11	0V
12	0V
13	2.34V
14	0V
15	0V
16	0V
17	0V
18	0V
19	0V
20	0V
21	0V
22	0V
23	0V
24	0V

IC771	
PIN NO.	VOLTAGE
1	0V
2	2.74V
3	2.74V
4	NC
5	2.5V

IC651	
PIN NO.	VOLTAGE
1	2.74V
2	NC
3	0V
4	0V
5	0V
6	0V
7	-
8	NC
9	-
10	NC

IC841	
PIN NO.	VOLTAGE
1	NC
2	4.49V
3	4.64V
4	0V
5	2.34V

IC202	
PIN NO.	VOLTAGE
1	1.28V
2	1.63V
3	2.57V
4	1.76V
5	1.44V
6	1.44V
7	0.6V
8	0.6V
9	0.6V
10	2.56V
11	0.6V
12	1V
13	1V
14	1V
15	1V
16	1.8V
17	1.9V
18	1.7V
19	1.7V
20	0V

IC351	
PIN NO.	VOLTAGE
1	0V
2	0V
3	4.42V
4	0V
5	0V
6	4.42V
7	0V
8	0.9V
9	4.42V
10	0V
11	0.9V
12	4.42V
13	0V
14	4.46V

IC901	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V
6	0V
7	-
8	2.44V
9	2V
10	0V
11	2.48V
12	0.67V
13	0V
14	2.35V
15	0V
16	2.5V
17	0V
18	0V
19	0V
20	0V

IC402	
PIN NO.	VOLTAGE
1	2.34V
2	0V
3	-
4	-
5	0V
6	0V
7	0.26V
8	2.34V

IC431	
PIN NO.	VOLTAGE
1	2.34V
2	2.34V
3	NC
4	0V

IC354	
PIN NO.	VOLTAGE
1	-
2	-
3	0V
4	0V
5	0V

IC353	
PIN NO.	VOLTAGE
1	2.74V
2	-
3	-
4	0V
5	0V
6	-

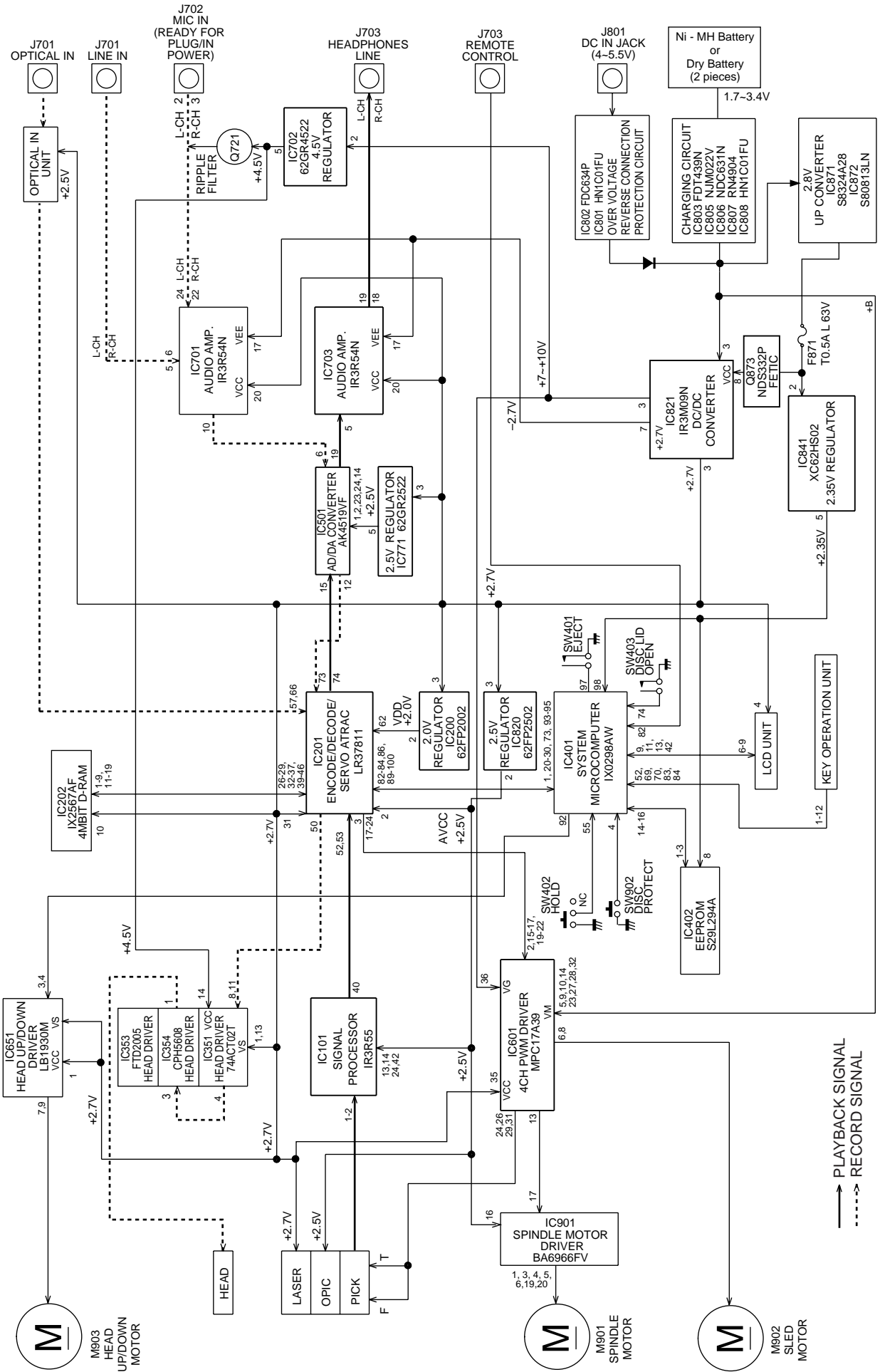
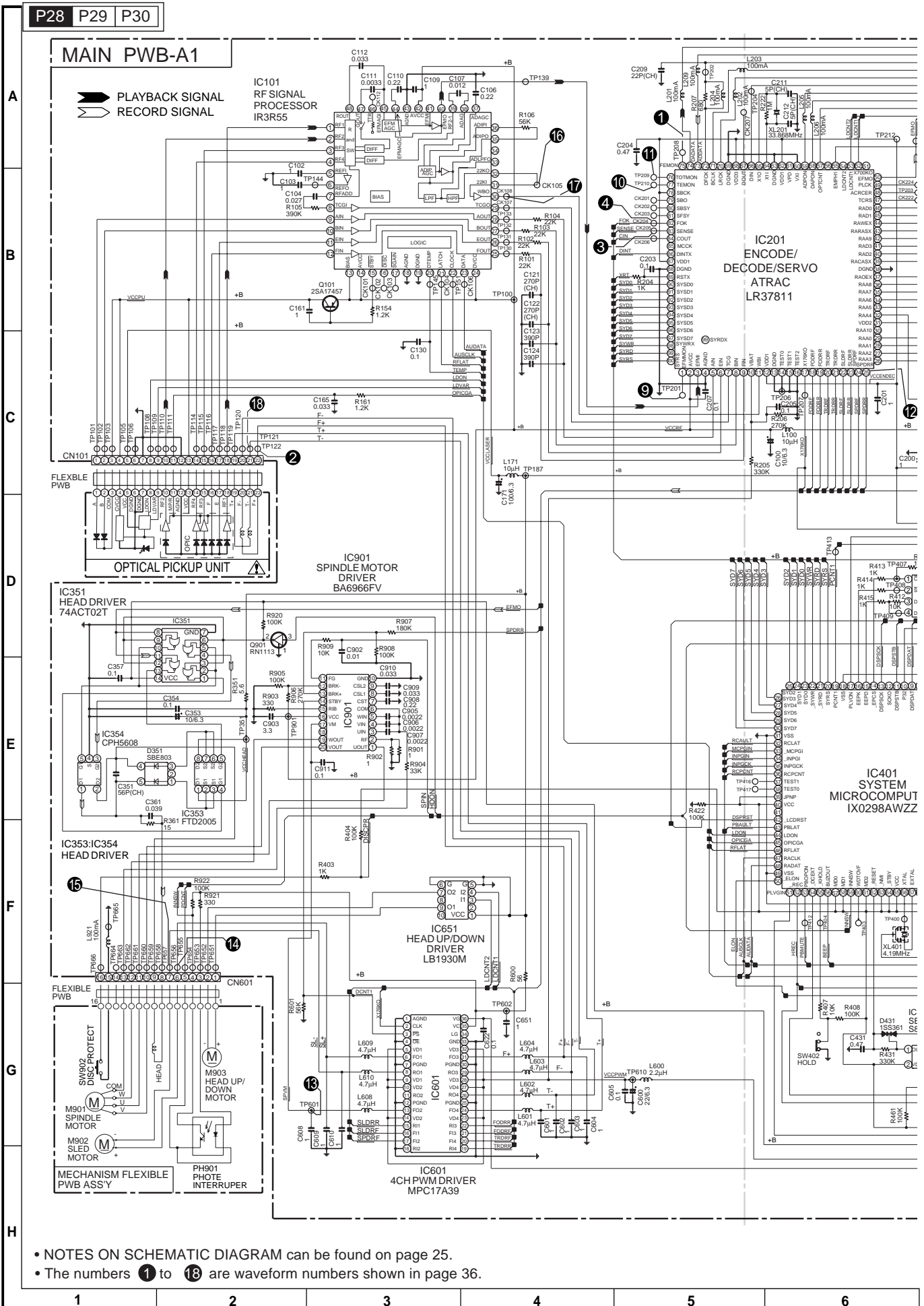


Figure 27 BLOCK DIAGRAM



- NOTES ON SCHEMATIC DIAGRAM can be found on page 25.
- The numbers 1 to 18 are waveform numbers shown in page 36.

Figure 28 SCHEMATIC DIAGRAM (1/3)

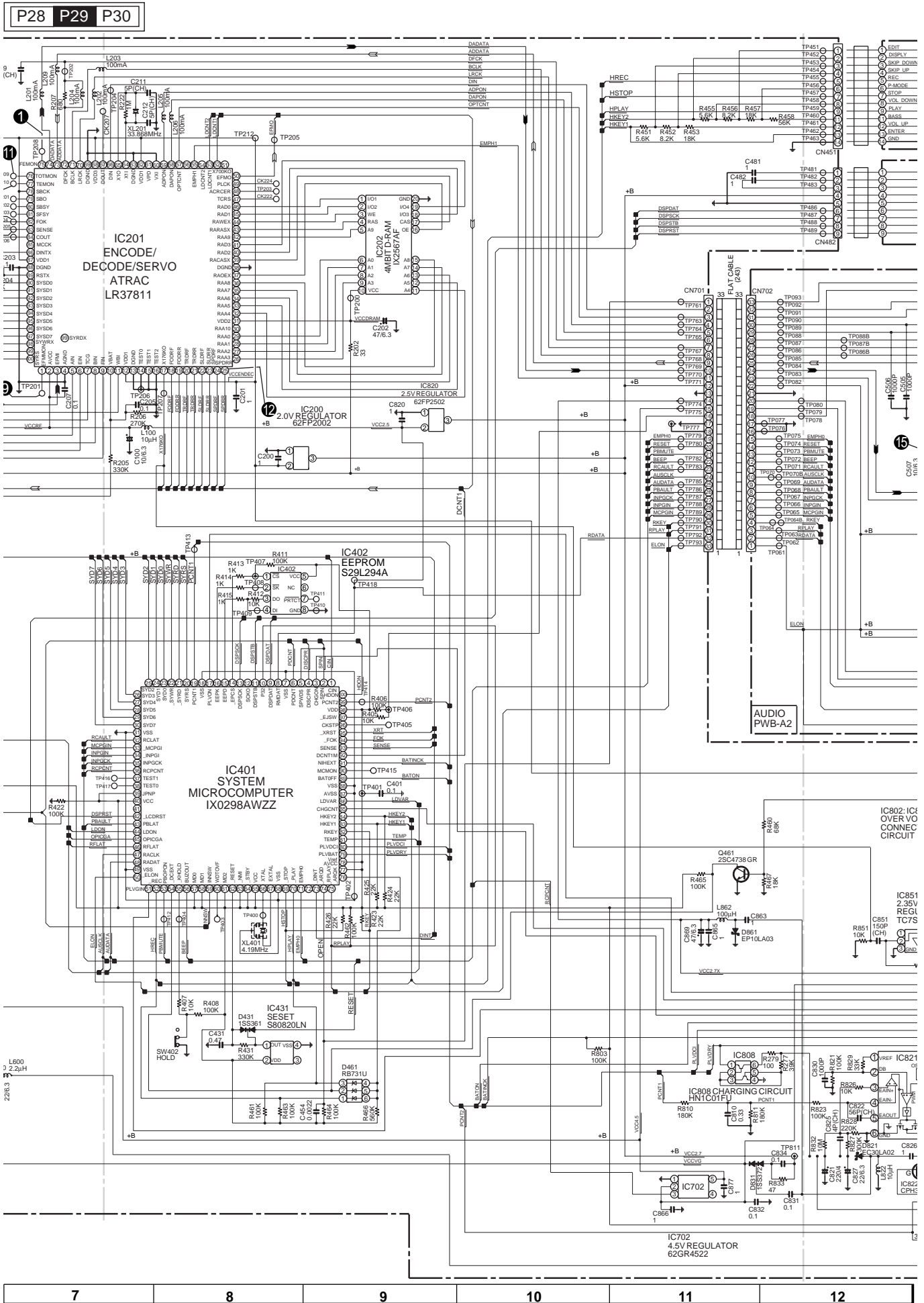
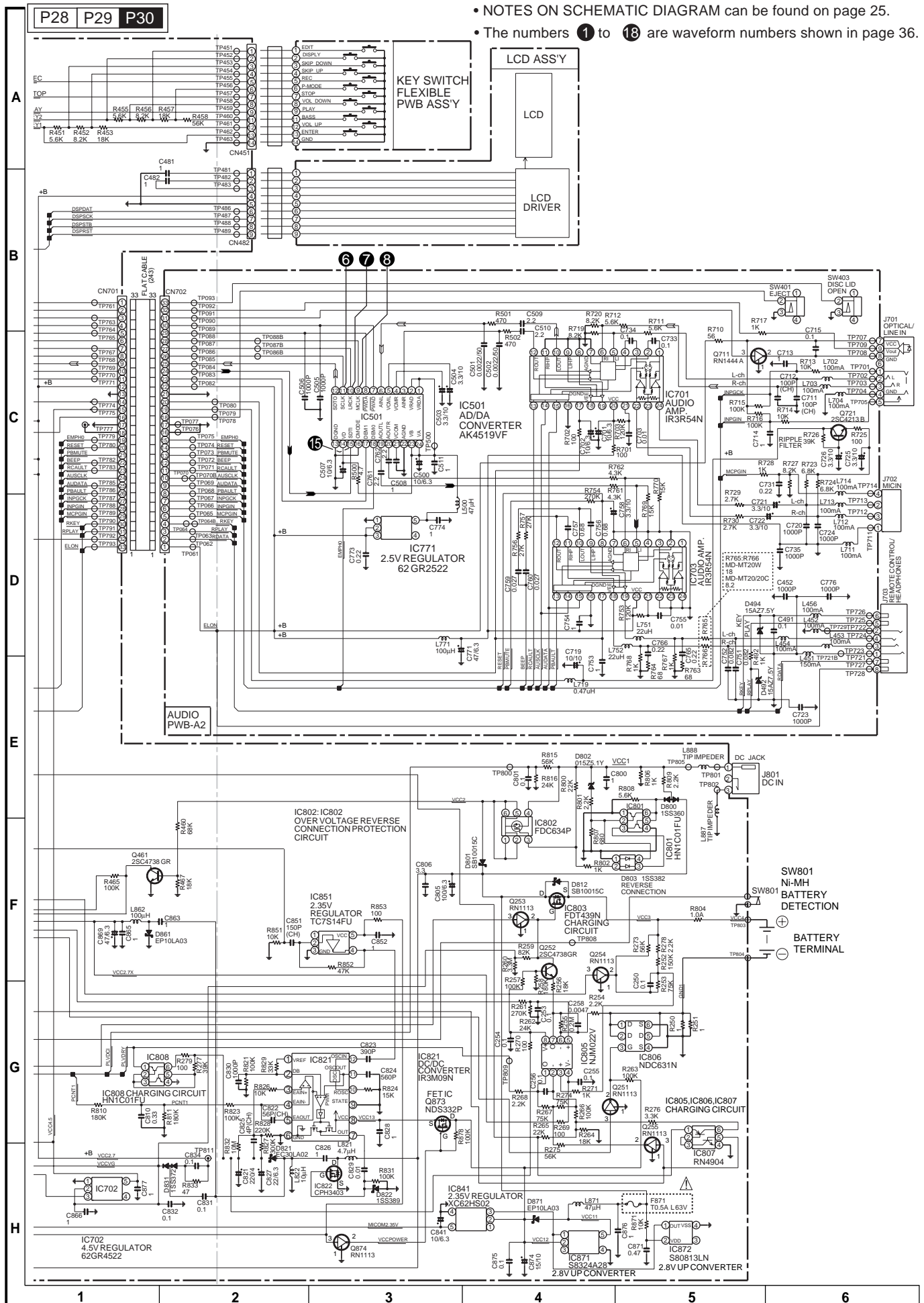


Figure 29 SCHEMATIC DIAGRAM (2/3)





• NOTES ON SCHEMATIC DIAGRAM can be found on page 25.  
 • The numbers 1 to 18 are waveform numbers shown in page 36.

Figure 30 SCHEMATIC DIAGRAM (3/3)

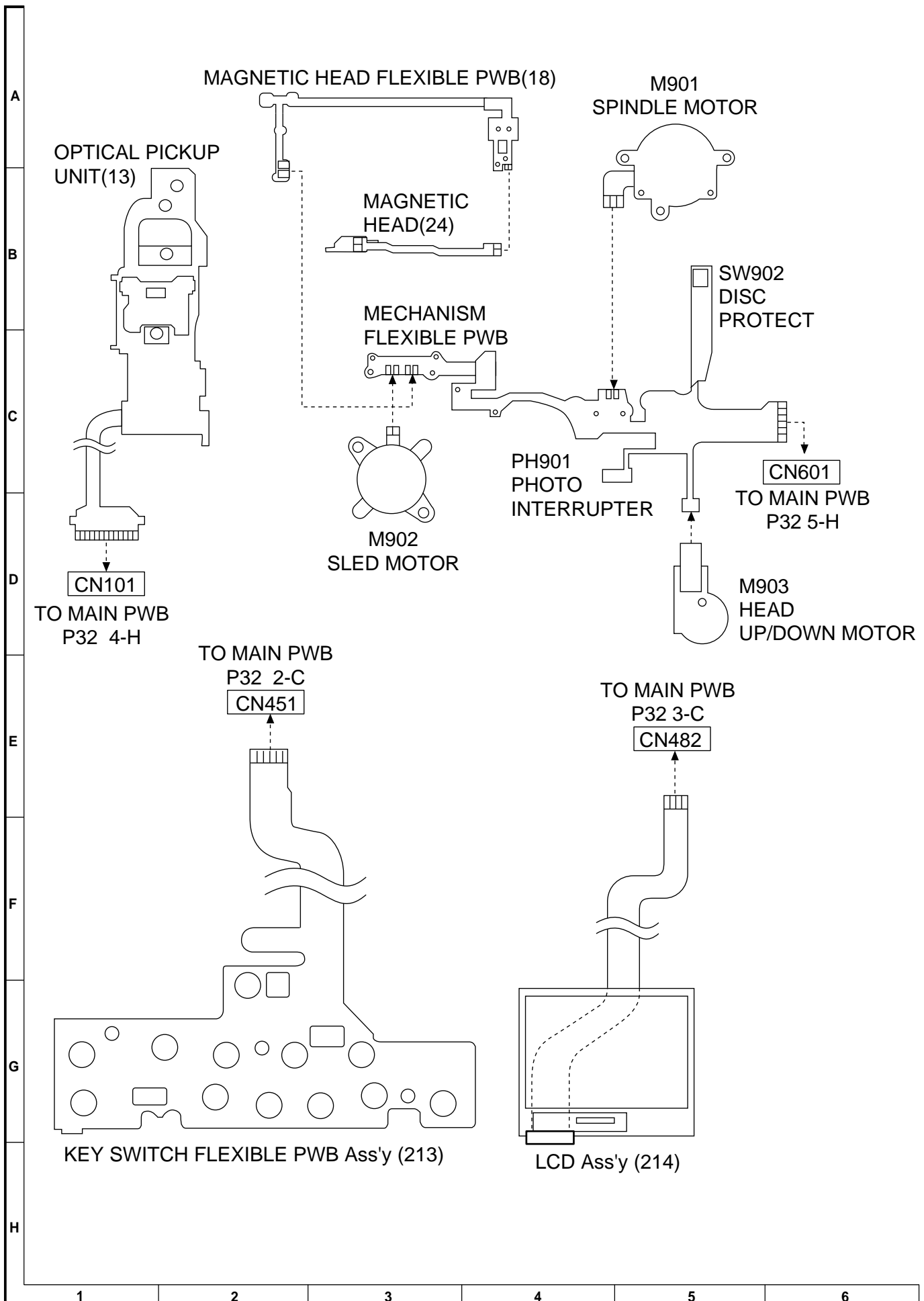


Figure 31 WIRING OF P.W.BOARD (1/5)

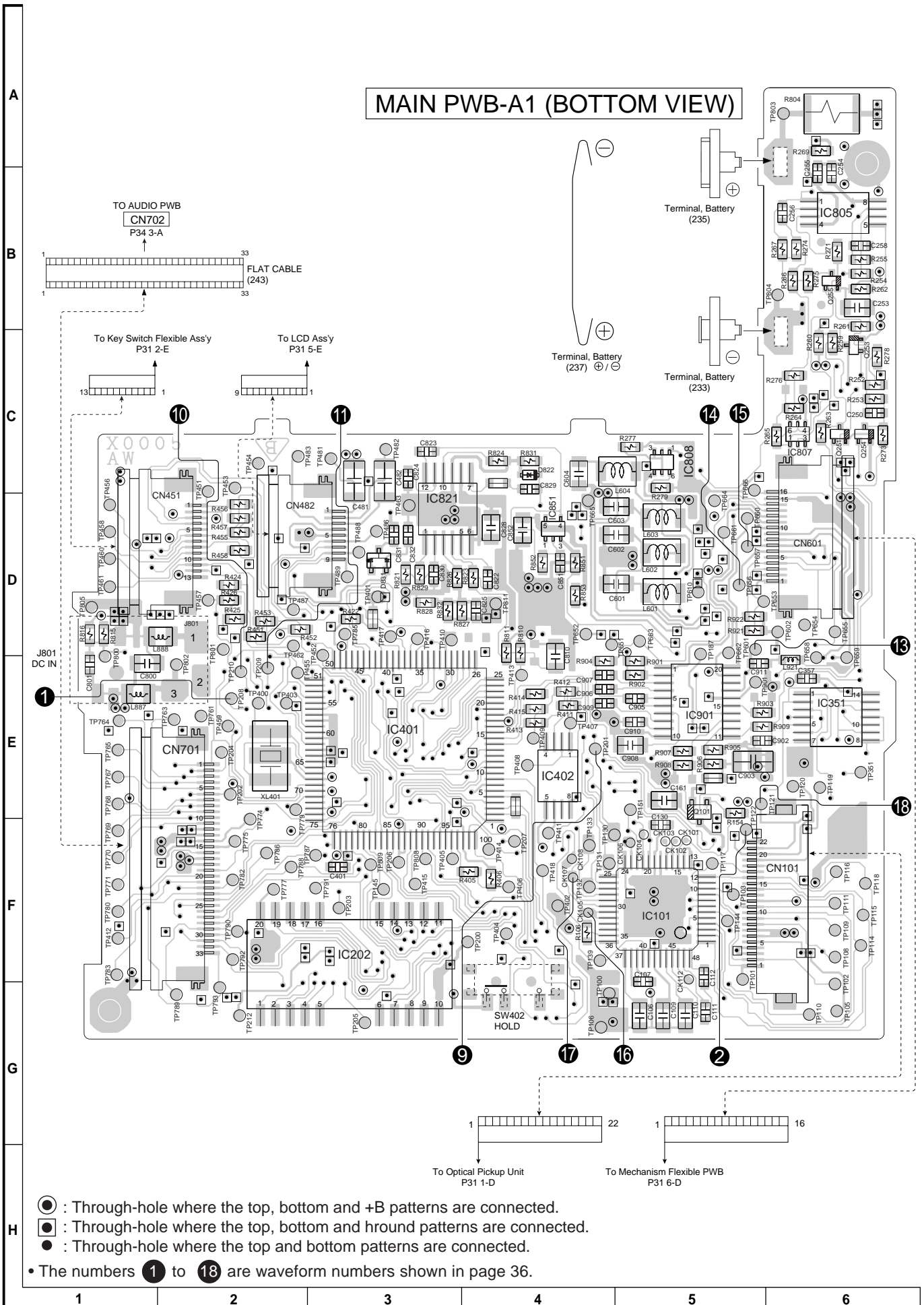
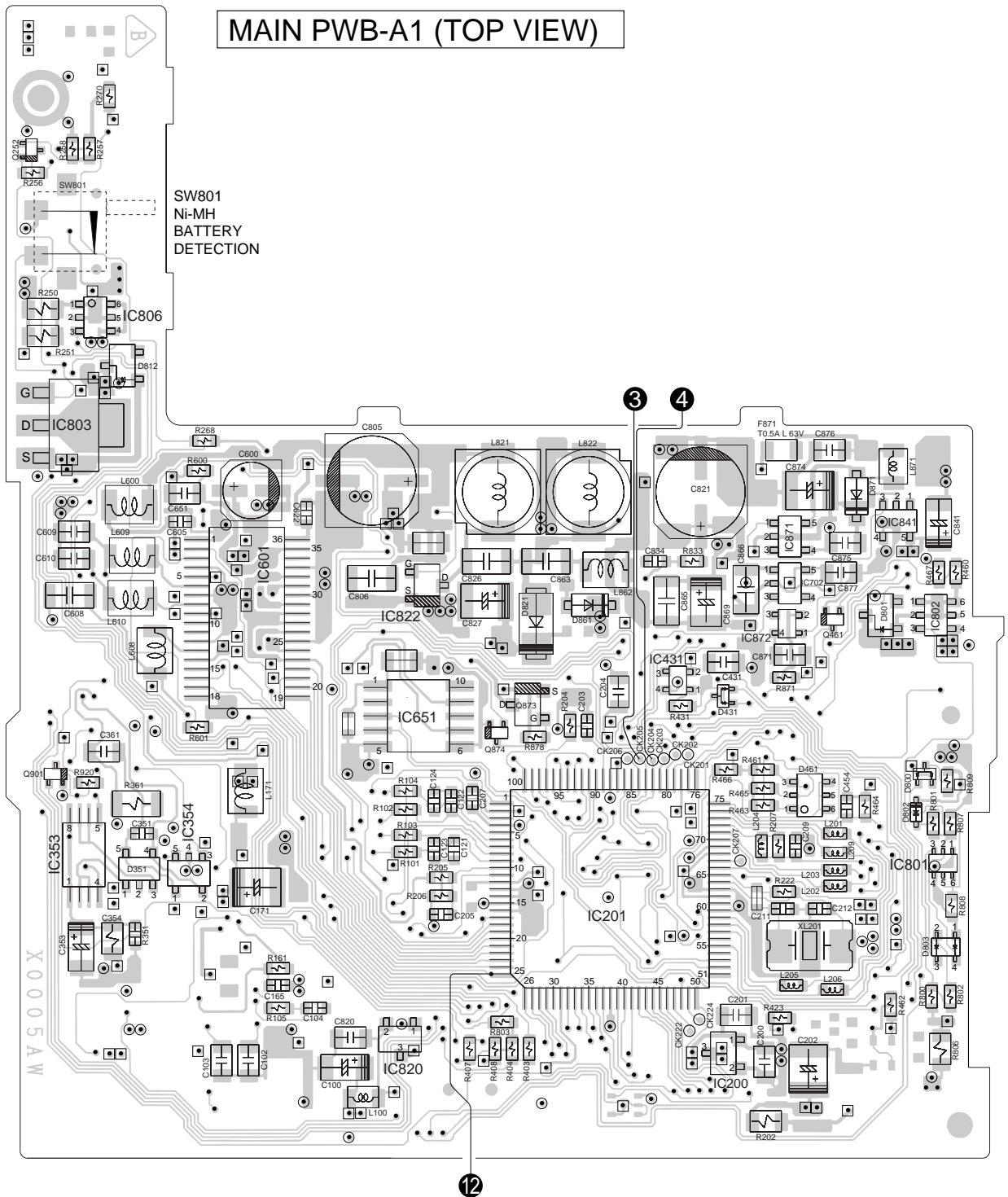


Figure 32 WIRING OF P.W.BOARD (2/5)

MAIN PWB-A1 (TOP VIEW)



7	8	9	10	11	12
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Figure 33 WIRING OF P.W.BOARD (3/5)

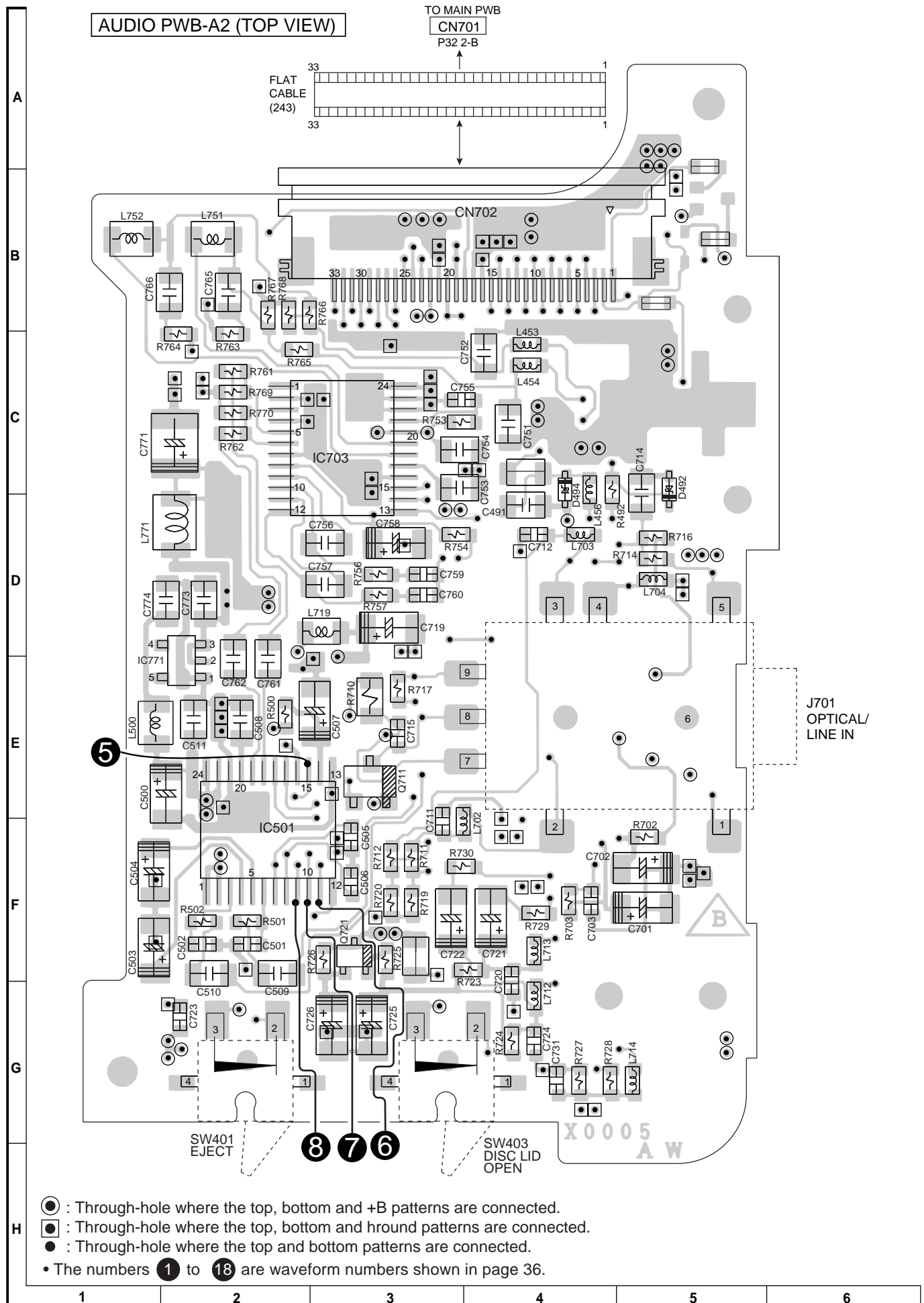
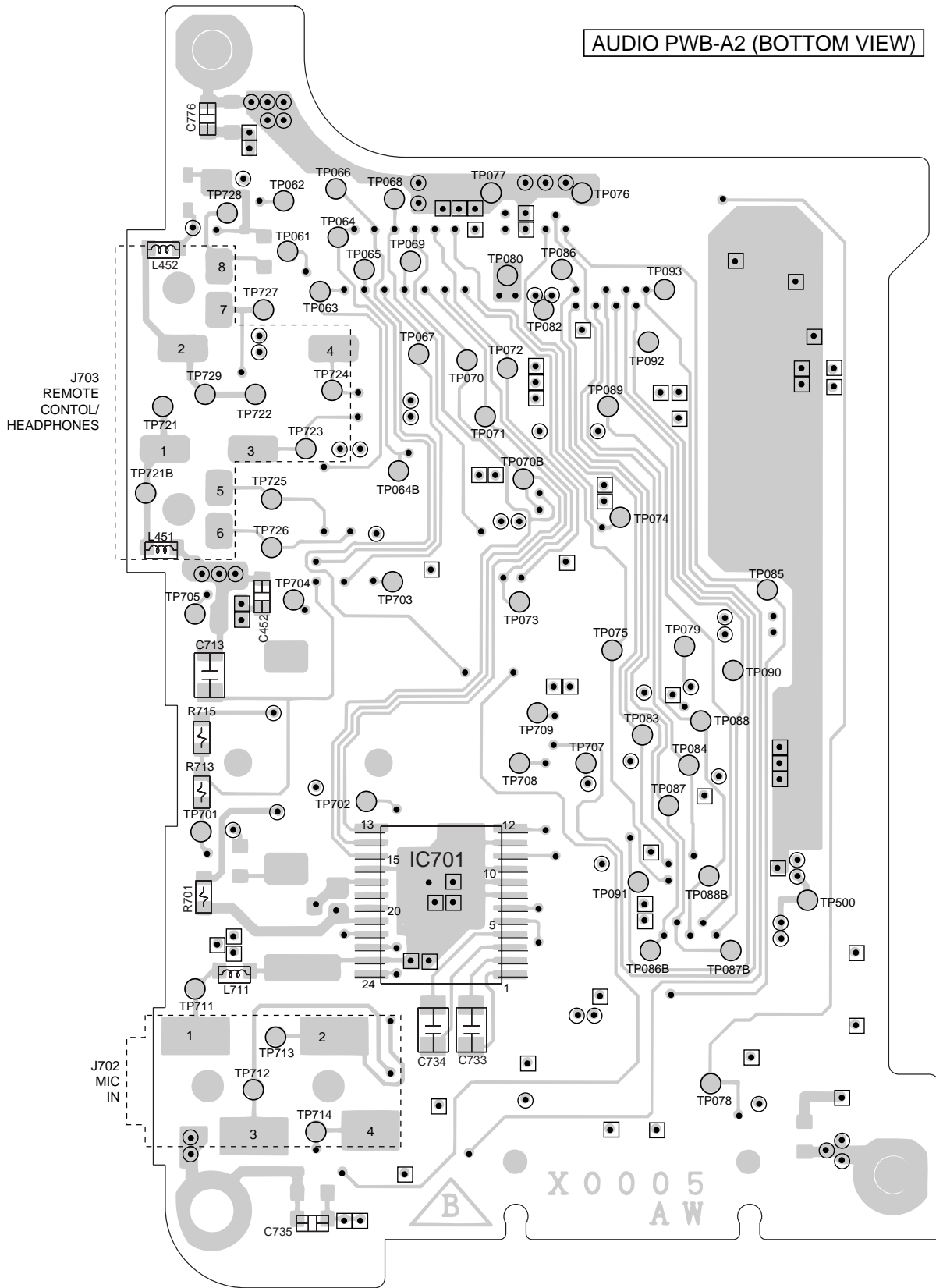


Figure 34 WIRING OF P.W.BOARD (4/5)

AUDIO PWB-A2 (BOTTOM VIEW)

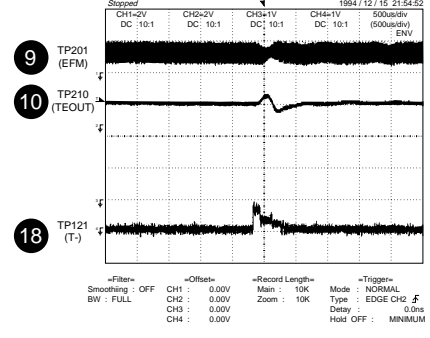
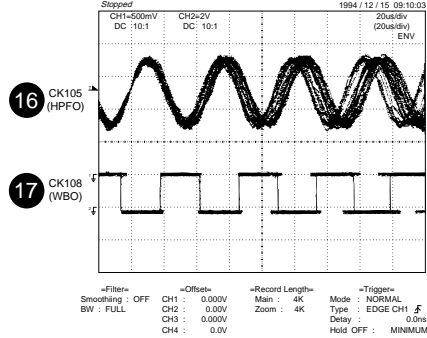
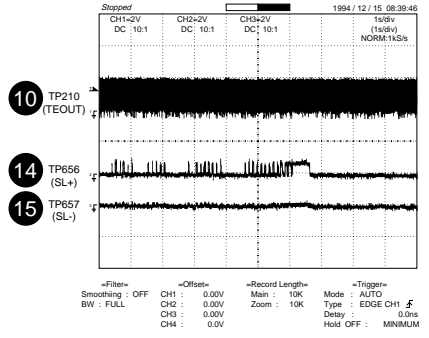
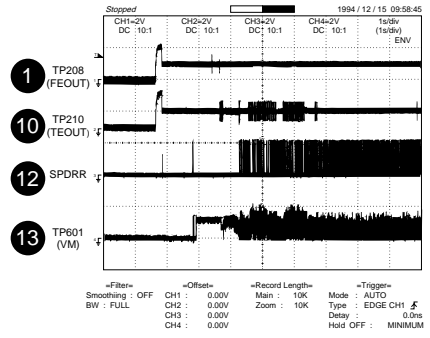
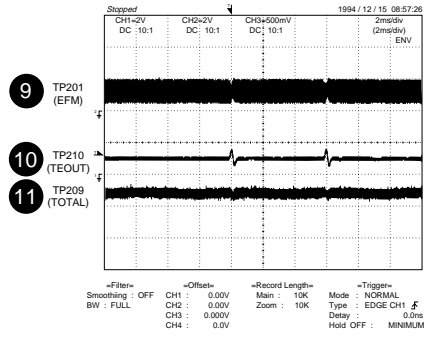
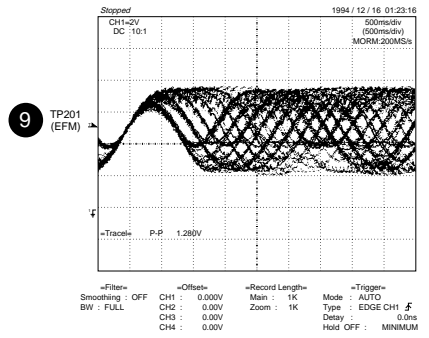
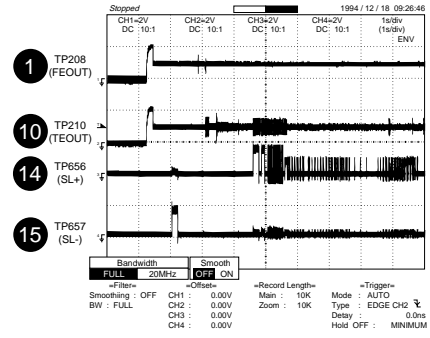
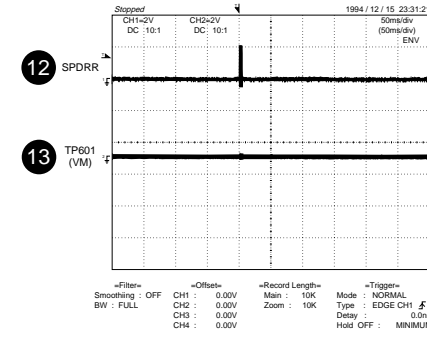
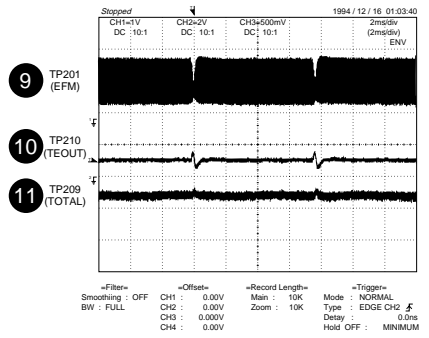
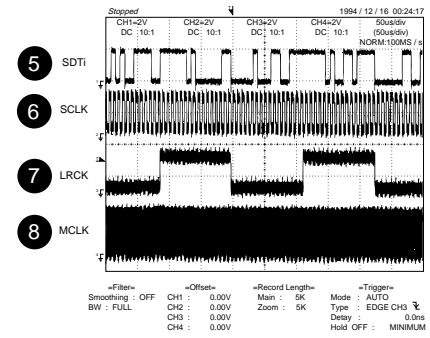
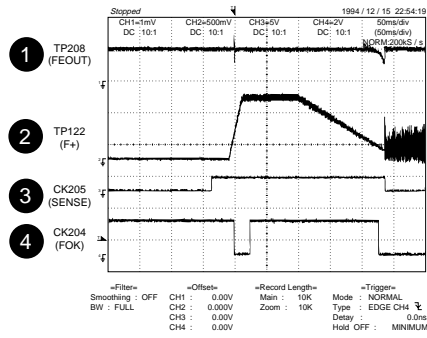


7	8	9	10	11	12
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Figure 35 WIRING OF P.W.BOARD (5/5)

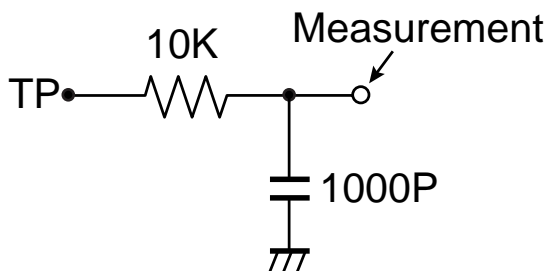


# WAVEFORMS OF MD CIRCUIT



For TP208, TP209, and TP210, use the specific LPF, and observe the waveform.

When watching the EEM monitor (TP201) Set MSL from 00H to 80H with EEPROM control setting. After completion restore 00H.



## TROUBLE SHOOTING

It is advisable to use the TEST mode (refer to Error Data Display Mode, P19) indicating the causes of troubles before starting repair. Causes of operation errors (up to 10 errors) are recorded as error codes. This information is useful for repair.

### When does not function

When the CD section does not operate When the objective lens of the optical pickup is dirty, this section may not operate. Clean the objective lens, and check the playback operation. When this section does not operate even after the above step is taken, check the following items.

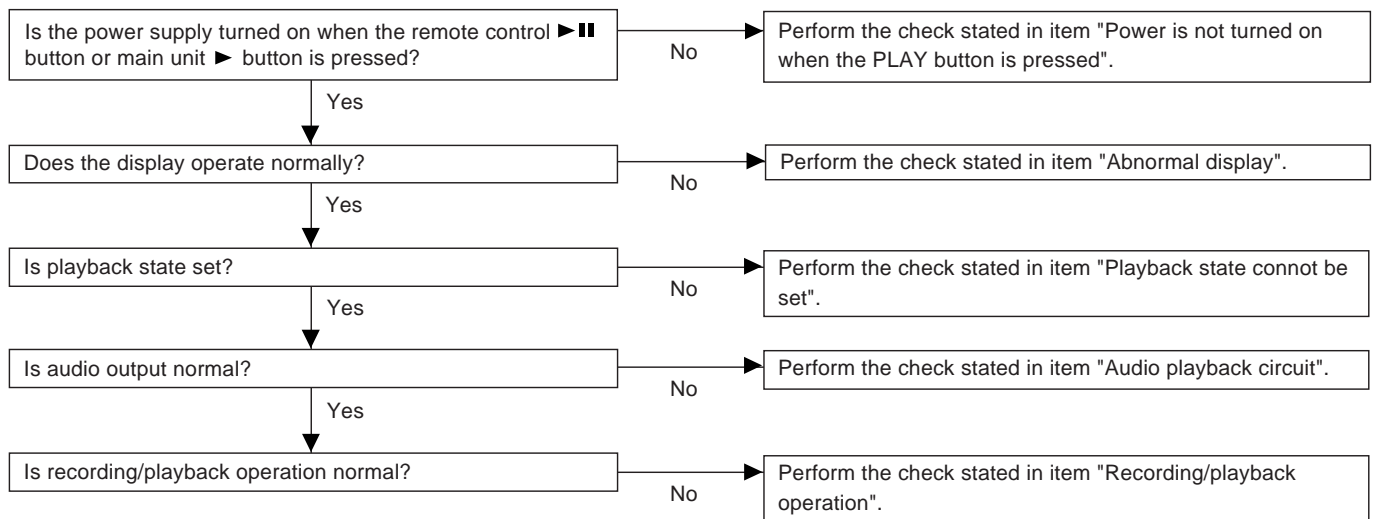
Remove the cabinet and follow the troubleshooting instructions.

"Track skipping and/or no TOC (Table Of Contents) may be caused by build up of dust or other foreign matter on the laser pickup lens. Before attempting any adjustment make certain that the lens is clean. If not, clean it as mentioned below."

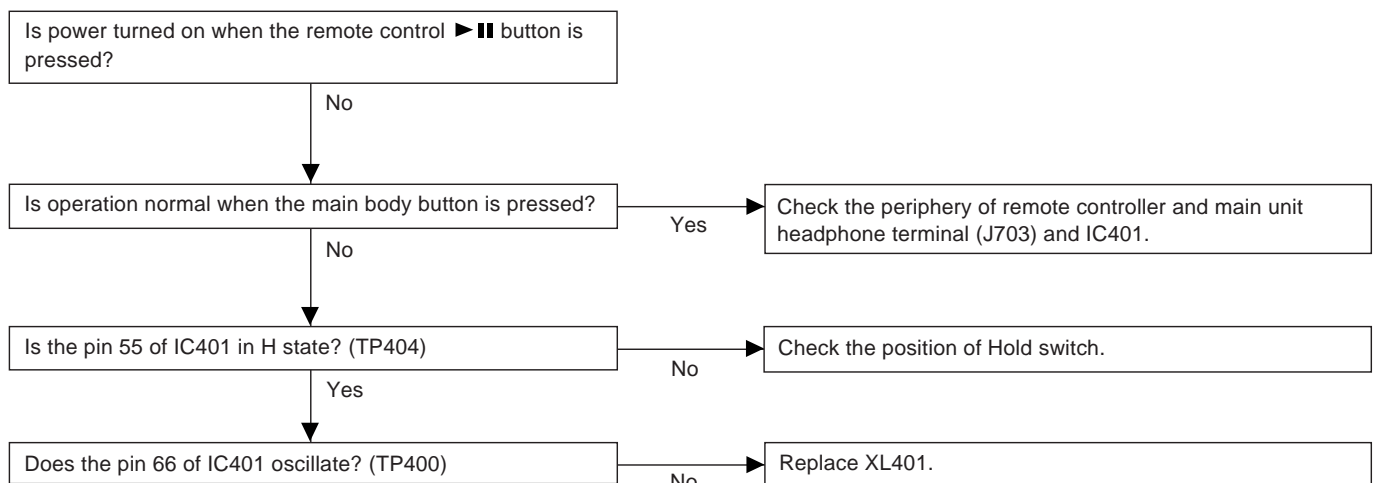
Turn the power off.

Gently clean the lens with a lens cleaning tissue and a small amount of isopropyl alcohol.

Do not touch the lens with the bare hand.

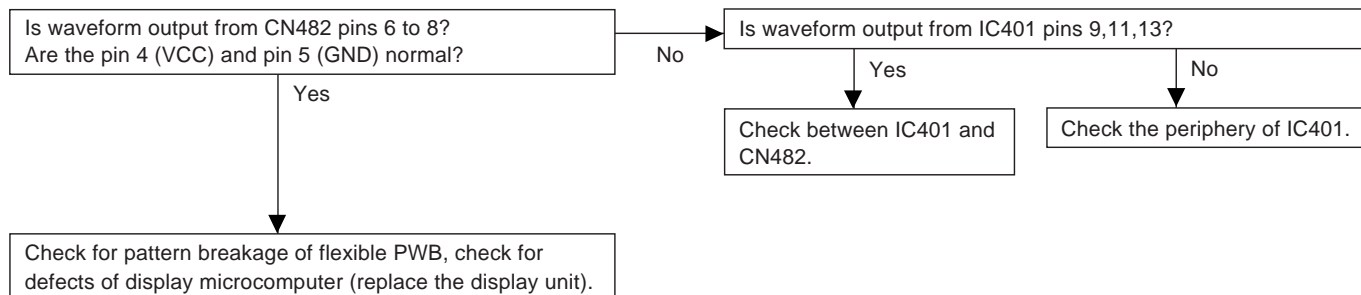


**• Power is not turned on when the ► / ►|| button is pressed.**



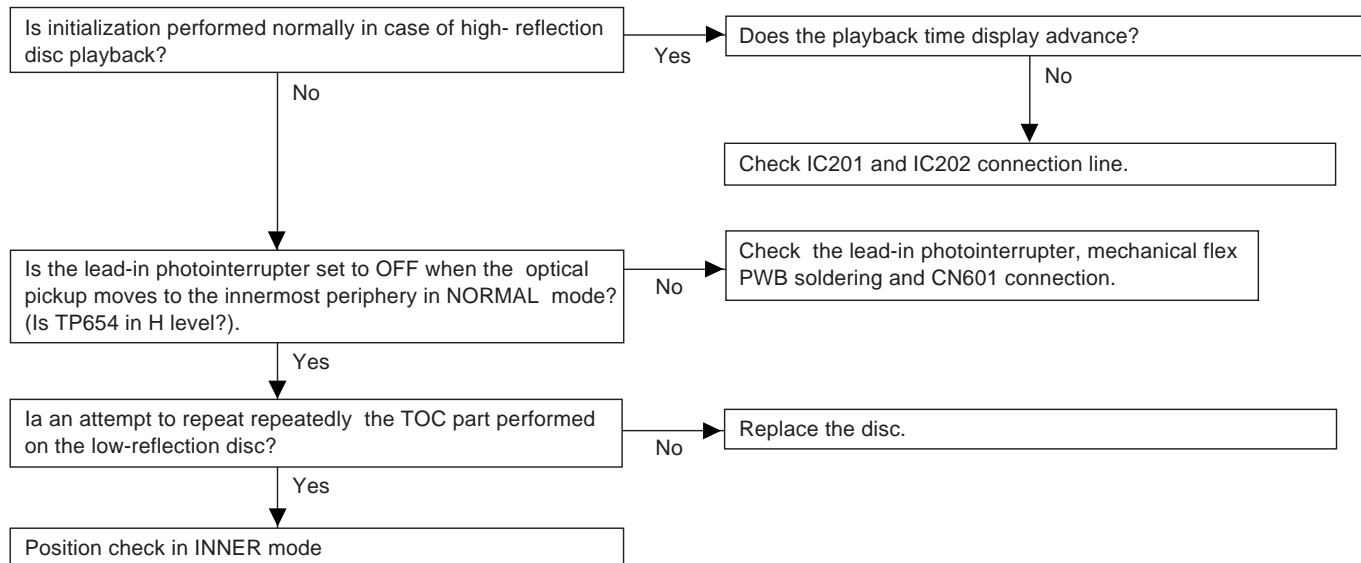
## MD-MT20/20C/20W

### • Abnormal display



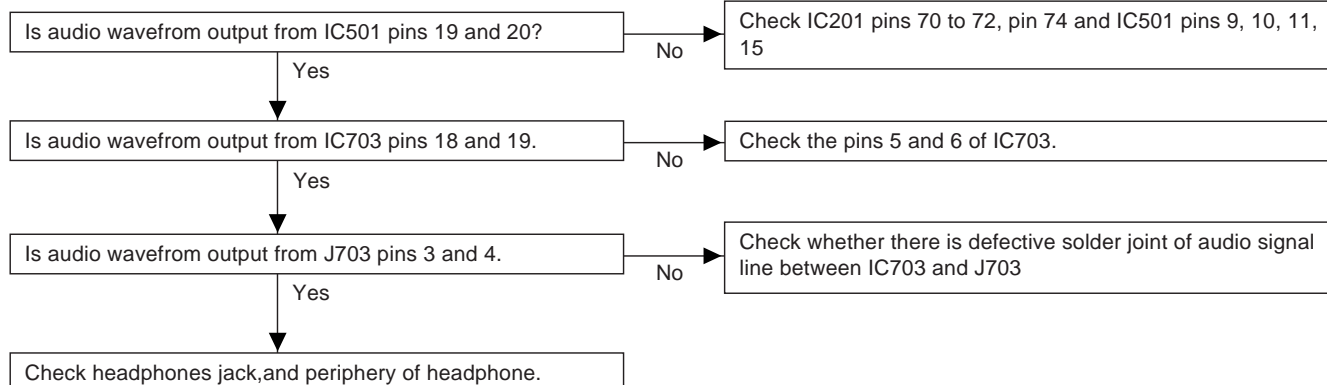
### • Playback state cannot be set

When it has been ascertained that the address up to cluster address is normal in the TEST mode.

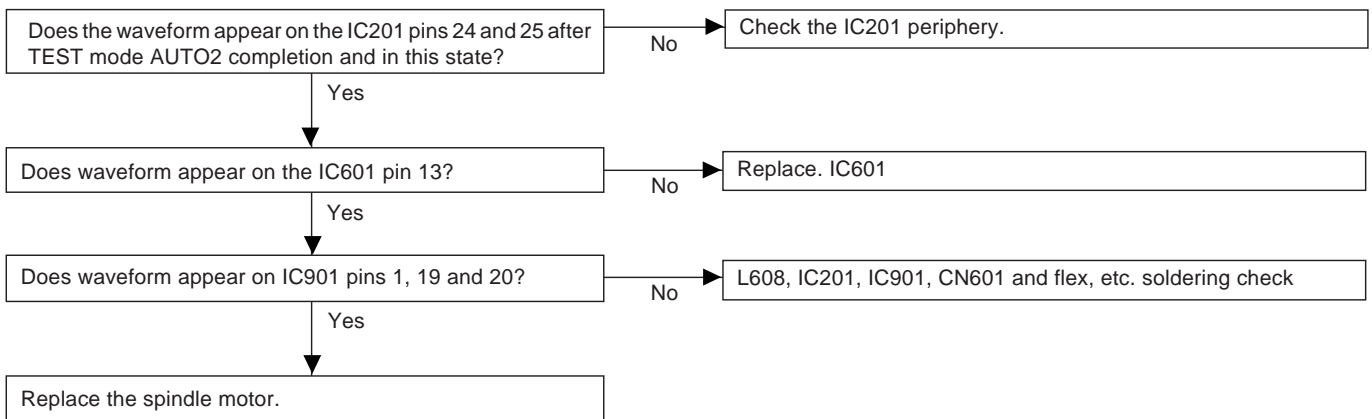


### • Audio playback circuit

Although the playback time display is acting., no sound is given during playback in the normal mode.

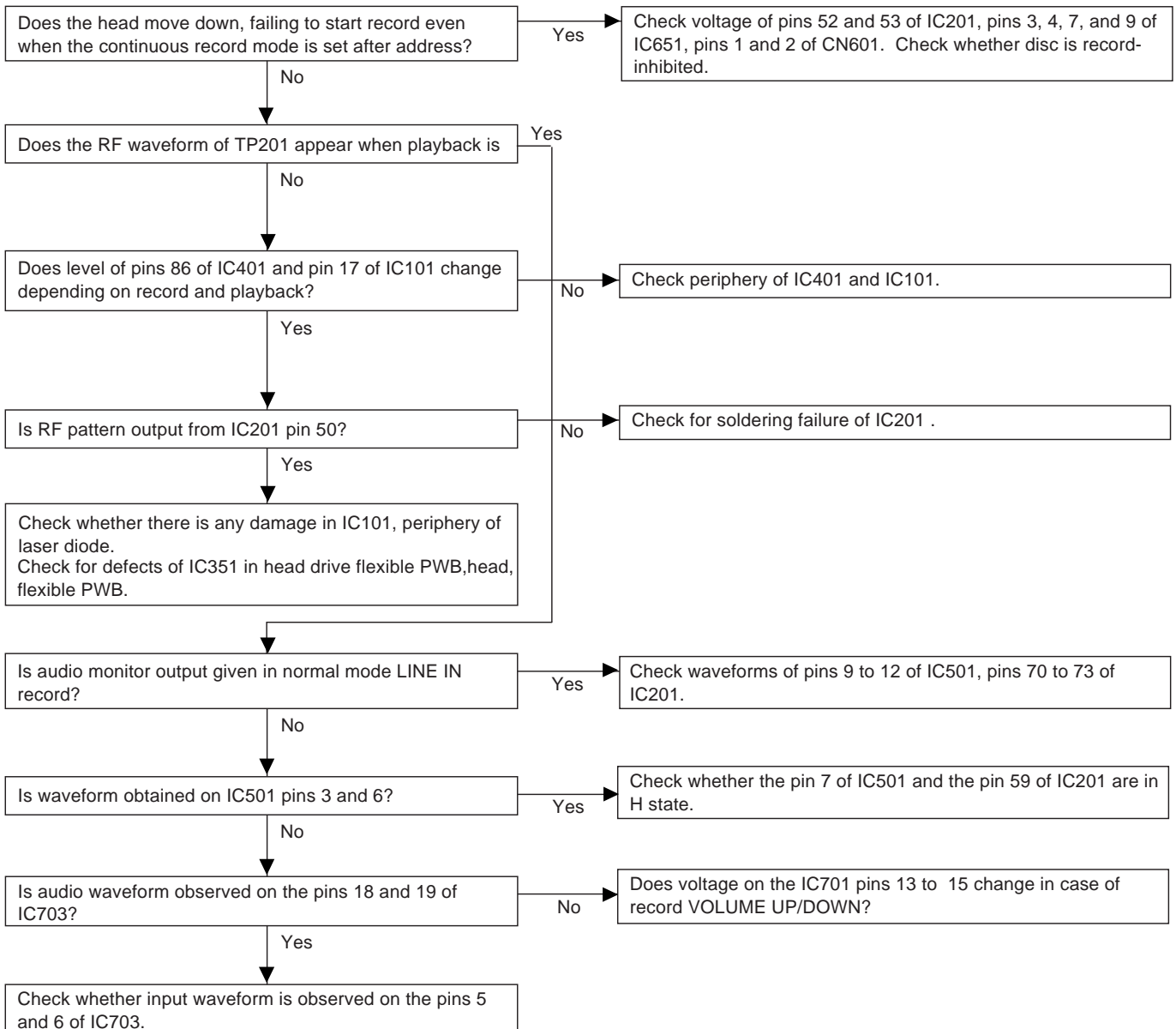


**• The spindle motor fails to run. Does the head move**



**• Recording/playback operation**

Insert a low reflection disc, and ascertain audio output by normal playback, and then set TEST REC mode.



## FUNCTION TABLE OF IC

## IC401 RH-iX0298AWZZ: System Microcomputer (IX0298AW) (1/3)

Pin No.	Port Name	Terminal Name	Input/Output	Function
1	P12/TCLKA	CIN	Input	Track cross signal/focus drive detection
2	TCLKB	SPIN	Input	Spindle motor FG pulse detection input
3	P14	CHGON	Output	Ni-MH battery charge ON output
4	P15	DISCPR	Input	Disc record inhibition switch input
5	TIOCA2	SPWDS	Input	Spindle motor FG pulse width detection
6	P17	PDCNT	Output	Inner detection PD current control output
7	Vss	VSS	—	Ground potential
8	TxD0	RMDAT	Output	Remote control indication data output
9	TxD1	DSPDAT	Output	Unit indication data output
10	P32	P32	Output	Spare [connected to _RPLAY (pin 75)]
11	P33	DSPSTB	Output	Main unit's display strobe output
12*	SCK0	SCK0	Output	Serial I/O clock output (not used)
13	SCK1	DSPSCK	Output	Unit indication data clock output
14	PE0	_EPCS	Output	EEPROM chip selection output
15	PE1	EEPD	Input/Output	EEPROM serial data input/output
16	PE2	EEPK	Output	EEPROM serial clock output
17	PE3	PLVON	Output	Battery voltage measurement ON output
18	Vss	VSS	—	Ground potential
19	PE4	PCNT1	Output	Vref supply control output of power IC
20	PE5	SYRS	Output	System LSI register selection output
21	PE6	_SYRD	Output	System LSI read enable output
22	PE7	_SYWR	Output	System LSI write enable output
23-30	PD0-PD7	SYD0-SYD7	Input/Output	System LSI parallel data bus
31	Vss	VSS	—	Ground potential
32	PC0	RCLAT	Output	Record audio IC data latch output
33	PC1	_MCPGI	Input	Microphone plug insertion detection input
34	PC2	_INPGI	Input	Line/digital plug insertion detection
35	PC3	INPGCK	Input	Line/digital plug type detection
36	PC4	RPCNT	Input/Output	Record circuit power control output
37*	PC5	TEST1	Input	Test mode setting input 1
38*	PC6	TEST0	Input	Test mode setting input 0
39	PC7	JPNP	Input	Kana conversion/Kana input existence/nonexistence discrimination
40	Vcc	VCC	—	Positive power supply
41*	PB0	PBO	Output	Spare 0
42	PB1	_LCDRST	Output	LCD driver reset output
43	PB2	PBLAT	Output	Audio IC data latch output
44	PB3	LDON	Output	P.U. laser ON/OFF control output
45	PB4	OPICGA	Output	P.U. detection sensitivity selection output
46	PB5	RFLAT	Output	RF amplifier IC data latch output
47	PB6	RACLK	Output	RF/Audio IC data clock output
48	PB7	RADAT	Output	RF/Audio IC serial data output
49	Vss	VSS	—	Ground potential
50	PA0	_ELON	Output	EL light control output
51	PA1	PLVGIN	Output	Battery voltage detection gain select output
52	PA2	_REC	Input	Unit REC button operation detection input
53	PA3	PBOPON	Output	Audio IC output stage control output
54	P20	_DCEXT	Input	DC-IN detection input
55	P21	_KHOLD	Input	Unit key hold switch input
56	TIOCC3	BUZOUT	Output	Beep sound pulse output
57	MD0	MD0	Input	Operation mode selection input 0

In this unit, the terminal with asterisk mark (\*) is (open) terminal which is not connected to the outside.

## IC401 RH-iX0298AWZZ: System Microcomputer (IX0298AW) (2/3)

Pin No.	Port Name	Terminal Name	Input/Output	Function
58	MD1	MD1	Input	Operation mode selection input 1
59	P23	INNSW	Input	Mechanism inner SW position detection input
60	WDTOV $\overline{F}$	WDTOV $\overline{F}$	Output	Watch dog timer (not used)
61	MD2	MD2	Input	Operation mode selection input 2
62	RES	_RESET	Input	Microcomputer hard reset input
63	NMI	_NMI	Input	Nonmaskable interruption (not used)
64	STBY $\overline{}$	_STBY	Input	Microcomputer standby input (not used)
65	Vcc	VCC	—	Positive power supply
66	XTAL	XTAL	—	Crystal connection terminal
67	EXTAL	EXTAL	—	Crystal connection terminal
68	Vss	VSS	—	Ground potential
69	PF7	_STOP	Input	Unit STOP button operation detection input
70	PF6	_PLAY	Input	Unit PLAY button operation detection input
71	PF5	EMPH0	Output	Audio emphasis control output 0
72*	PF4	PF4	Output	Spare
73	PF3	_DINT	Input	System LSI interruption
74	PF2	_ARQD	Input	Disk cap opens and closes detection/it is started and required
75	PF1	_RPLAY	Input	Remote control PLAY key operation detection
76	IRQ0	_ARQK	Input	It is started by the button input, requirement
77	AVcc	AVCC	—	A/D and D/A converter positive power supply
78	Vref	VREF	—	A/D and D/A converter reference voltage
79	AN0	PLVBAT	Input	Battery voltage detection input
80	AN1	PLVDCI	Input	DC jack voltage detection input
81	P42	TEMP	Output	Ambient temperature detection input
82	AN3	RKEY	Input	Remote control key operation detection input
83	AN4	HKEY1	Input	Unit key operation detection input 1
84	AN5	HKEY2	Input	Unit key operation detection input 2
85	AN6	CHGCNT	Output	Charging current control output
86	DA1	LDVAR	Output	P.U. laser power setting output
87	AVss	AVSS	—	A/D and D/A converter ground potential
88	Vss	VSS	—	Ground potential
89	P24	BATOFF	Output	Battery OFF output
90	TIOCB4	MCMON	Output	Internal operation status monitor
91	P26	NIHEXT	Input	Ni-MH battery detection input
92	P27	DCNT1M	Output	Mechanism driver enable output
93	PG0	SENSE	Input	System LSI servo sense input
94	PG1	_FOK	Input	Focus OK signal input
95	PG2	_XRST	Output	System LSI hard reset output
96	PG3	CKSTP	Output	Microcomputer standby operation monitor output
97	PG4	_EJSW	Input	Ejection lever operation detection input
98	Vcc	VDD	—	Positive power supply
99	P10	PCNT2	Output	Vcc supply control output of power IC
100	P11	HDON	Output	Recording head current control output

In this unit, the terminal with asterisk mark (\*) is (open) terminal which is not connected to the outside.



## MD-MT20/20C/20W

### IC401 RH-iX0298AWZZ: System Microcomputer (IX0298AW) (3/3)

#### System LSI expansion output port (6th generation: LR37811)

Pin No.	Port Name	Terminal Name	Input/Output	Function	Remarks
52	EXPORT0	LDCNT1	Output	Recording head raising-lowering control output 1	See the separate table *3.
53	EXPORT1	LDCNT2	Output	Recording head raising-lowering control output 2	See the separate table *3.
54	EXPORT2	—	Output	Not used.	(Open)
55	EXPORT3	EMPH1	Output	Audio emphasis control output 1	See the separate table *2.
56	EXPORT4	DCNT	Output	Mechanism driver enable output	'H': Driver operation ON
57	EXPORT5	OPTCNT	Output	Optical digital input circuit control	'H': Circuit operation ON
58	EXPORT6	DAPON	Output	D/A converter operation control output	'H': Operation ON
59	EXPORT7	ADPON	Output	A/D converter operation control output	'H': Operation ON

#### \*1: List of TEST port settings

TEST1	TEST0	Details
H	H	Normal mode
H	L	No adjustment mode
L	H	Test mode
L	L	(Settings prohibited)

#### \*2: List of EMPH port settings

EMPH1	EMPH0	Details
H	H	fs=32K: 'ON'
H	L	fs=48K: 'ON'
L	H	OFF
L	L	fs=44.1K: 'ON'

#### \*3: List of LDCNT port settings

LDCNT1	LDCNT0	Details
H	H	Brake
H	L	Drive UP
L	H	Drive DOWN
L	L	Output OFF

## CIRCUIT DESCRIPTION

### Charging control works as shown below.

Charging is performed in the following three modes.

Initial charging -> Main charging Supplementary charging -> Finish

The details are shown below.

The current value is measured by voltage on both ends of R250/R251.

### Initial charging

The charging current is approx. 250 mA. The initial charging time varies depending on the battery condition. The charging time may be more than five minutes, depending on the initial battery condition. If the battery voltage is below 2.0 V (or over 3.75 V) after two minutes, the charging mode is cancelled. When the battery voltage is over 2.0 V and less than 3.75 V after five minutes, the main charging mode is selected.

### Main charging

The charging current is approx. 375 mA. The main charging time varies depending on the battery condition.

### <Main charging stop mode>

When the full-charge check is performed, the output of pin 51 is pulled H and the voltage is measured at five minute intervals (eight separate voltage measurements should be made to get a mean voltage value for consideration). The voltage value is read 500 msec after the output of pin 51 (battery voltage detection gain select output) is pulled H.

The current reading is compared with the reading taken 30 minutes before and one of three judgements is given: Same, Higher or Lower.

The voltage drop is detected, and the charging is stopped.

When battery voltage is over 2.8 V, a full-charge check will be performed (when it is below 2.8 V, the full-charge check will not be conducted).

When the battery voltage is not over 2.8 V, the initial charging mode is not changed to the main charging mode.

It may be more than five minutes before the battery voltage exceeds 2.8 V.

(The initial charging time varies depending on the battery condition.)

### Supplementary charging

The supplementary charging mode (charging current: 250 A) will be engaged using the following specifications, depending on the main charging mode.

After the main charging is completed, the battery is charged for about two hours at a current of 250 mA, and then the charging mode is cancelled.

### Battery voltage measurement

When the battery is being used or while it is being charged, the output of pin 17 should be H (battery voltage measurement output). The output should be held L in the power-off mode and in the other modes. However, when it is necessary to measure the battery voltage, pull pin 17 (battery voltage measurement output) H temporarily, to make the measurement.

### Power supply change

When one of the power supplies is selected, the port settings are as follows:

Port name	When operating from the AC adaptor	When operating from the battery
Pin 3 Charge ON output	L	L
Pin 85 Charging current control output	Output port L	Output port H
Pin 89 Battery OFF output	H (1)	L (3)

The port settings in the power-off mode are as follows:

Port name	When operating from the AC adaptor	When operating from the battery	When charging
Pin 3 Charge ON output	L	L	H
Pin 85 Charging current control output	Output port L	Output port L	3-mode output
Pin 89 Battery OFF output	H (1)	L (3)	L

### Charging test mode

For details about the test mode, see the separate page.

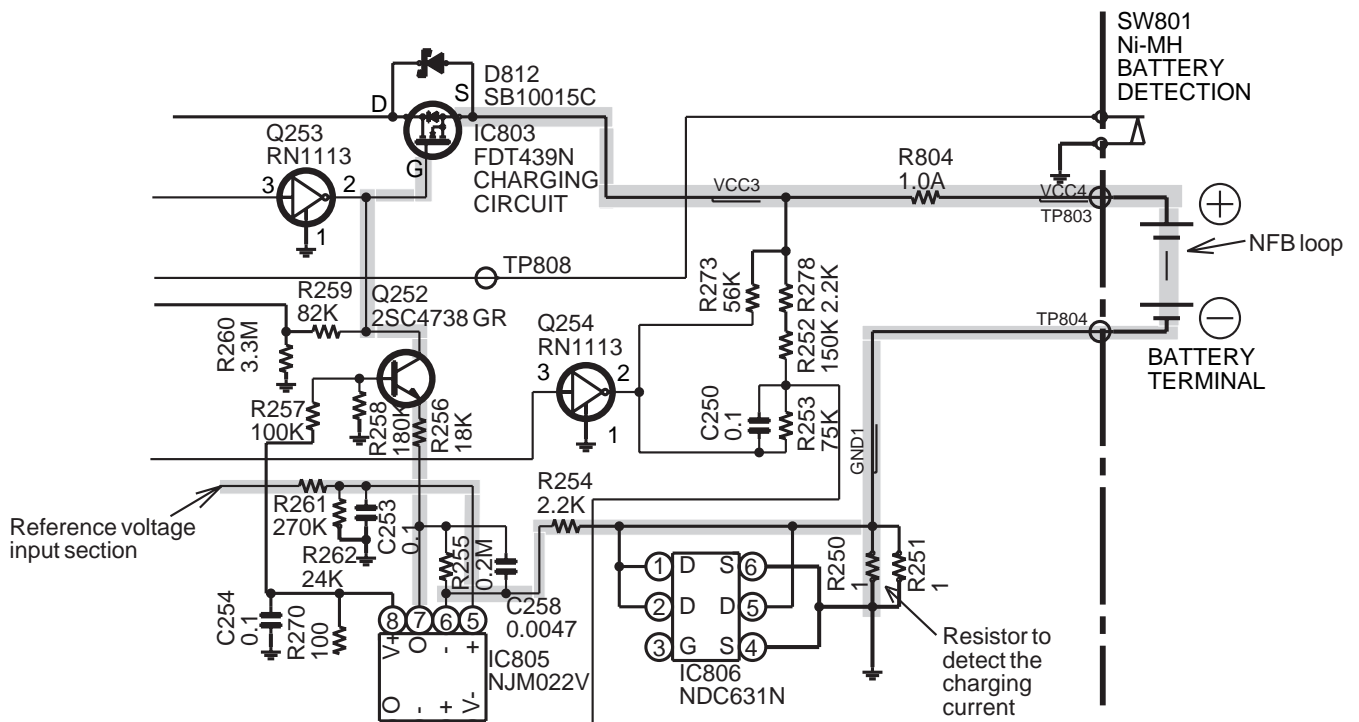
### Charging circuit description

The charging current value is determined by measuring the voltage across R250/R251. The charging current is controlled by IC805, Q252, IC803, the rechargeable battery, and R250/R251. The reference voltage for IC401 is output from pin 85 (DA port) and is input on pin 5 on IC805. Since the charging current is controlled by the NFB loop, the circuit is designed so that pin 5 on IC805 will have the same potential as the voltage across R250/R251. Since R250/R251 is 0.5 ohms, the desired charging current can be obtained by varying the potential of pin 5 on IC805.

### Battery voltage measurement

The battery voltage can be measured using either of the following two modes.

- 1) Pin 51 on IC401 Output L  
The output should always be L except during the following charging voltage measurement mode.
- 2) Pin 51 on IC401 Output H  
The output should be H while in the charging voltage measurement mode.  
Since the charging voltage is measured at intervals of five minutes while in the charging mode, the output should only be H about 500 msec every 5 minutes.



**MD-MT20/20C/20W**

— MEMO —

# SHARP PARTS GUIDE

**MODEL MD-MT20(S)**  
**MD-MT20C(S)**  
**MD-MT20W(BL)**  
**MD-MT20W(GL)**  
**MD-MT20W(S)**

## “HOW TO ORDER REPLACEMENT PARTS”

To have your order filled promptly and correctly, please furnish the following information.

- |                 |                |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. No.    |
| 3. PART NO.     | 4. DESCRIPTION |

★ MARK: SPARE PARTS-DELIVERY SECTION

### For U.S.A. only

Contact your nearest SHARP Parts Distributor to order.

For location of SHARP Parts Distributor,  
Please call Toll-Free;  
1-800-BE-SHARP

## Explanation of capacitors/resistors parts codes

### Capacitors

VCC ..... Ceramic type  
 VCK ..... Ceramic type  
 VCT ..... Semiconductor type  
 VC •• MF ..... Cylindrical type (without lead wire)  
 VC •• MN ..... Cylindrical type (without lead wire)  
 VC •• TV ..... Square type (without lead wire)  
 VC •• TQ ..... Square type (without lead wire)  
 VC •• CY ..... Square type (without lead wire)  
 VC •• CZ ..... Square type (without lead wire)  
 VC ..... J .. The 13th character represents capacity difference.  
 ("J" ±5%, "K" ±10%, "M" ±20%, "N" ±30%,  
 "C" ±0.25 pF, "D" ±0.5 pF, "Z" +80-20%.)


If there are no indications for the electrolytic capacitors, error is ±20%.

### Resistors

VRD ..... Carbon-film type  
 VRS ..... Carbon-film type  
 VRN ..... Metal-film type  
 VR •• MF ..... Cylindrical type (without lead wire)  
 VR •• MN ..... Cylindrical type (without lead wire)  
 VR •• TV ..... Square type (without lead wire)  
 VR •• TQ ..... Square type (without lead wire)  
 VR •• CY ..... Square type (without lead wire)  
 VR •• CZ ..... Square type (without lead wire)  
 VR ..... J .. The 13th character represents error.  
 ("J" ±5%, "F" ±1%, "D" ±0.5%.)

If there are no indications for other parts, the resistors are ±5% carbon-film type.

### NOTE:

Parts marked with “” are important for maintaining the safety of the set.  
Be sure to replace parts with specified ones for maintaining the safety and performance of the set.

# MD-MT20/20C/20W

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION
<b>INTEGRATED CIRCUITS</b>			
IC101	VHIIIR3R55/-1	J AQ	RF Signal,Processor,IR3R55
IC200	VHI62FP2002-1	J AE	2.0V Regulator,62FP2002
IC201	VHILR37811/-1	J BB	Encode/Decode/Servo Atrac, LR37811
IC202	RH-IX2567AFZZ	J BA	4M bit D-RAM,IX2567AF
IC351	VHI74ACT02T-1	J AE	Head Driver,74ACT02T
IC353	VHIFTD2005/-1	J AG	Head Driver,FTD2005
IC354	VHICPH5608/-1	J AH	Head Driver,CPH5608
IC401	RH-IX0298AWZZ	J AX	System Microcomputer, IX0298AW
IC402	VHIS29L294A-1	J AH	EEPROM,S29L294A
IC431	VHIS80820LN-1	J AD	Reset,S80820LN
IC501	VHIAK4519VF-1	J AQ	AD/DA Converter,AK4519VF
IC601	VHIMPC17A39-1	J AQ	4ch PWM Driver,MPC17A39
IC651	VHILB1930M/-1	J AH	Head Up/Down Driver,LB1930M
IC701	VHIIIR3R54N/-1	J AQ	Audio Amp.,IR3R54N
IC702	VHI62GR4522-1	J AG	4.5V Regulator,62GR4522
IC703	VHIIIR3R54N/-1	J AQ	Audio Amp.,IR3R54N
IC771	VHI62GR2522-1	J AG	2.5V Regulator,62GR2522
IC801	VHIIHN1C01FU-1	J AD	Over Voltage Reverse Connection Protection Circuit, HN1C01FU
IC802	VHIFDC634P/-1	J AG	Over Voltage Reverse Connection Protection Circuit,FDC634P
IC803	VSFDT439N/-1	J AL	Charging Circuit,FDT439N
IC805	VHINJM022V/-1	J AG	Charging Circuit,NJM022V
IC806	VHINDC631N/-1	J AG	Charging Circuit,NDC631N
IC807	VHIRN4904/-1	J AD	Charging Circuit,IRN4904
IC808	VHIIHN1C01FU-1	J AD	Charging Circuit,HN1C01FU
IC820	VHI62FP2502-1	J AE	2.5V Regulator,62FP2502
IC821	VHIIIR3M09N/-1	J AL	DC/DC Converter,IR3M09N
IC822	VHICPH3403/-1	J AE	2.7V Regulator,CPH3403
IC841	VHIXC62HS02-1	J AE	2.35V Regulator,XC62HS02
IC851	VHITC7S14FU-1	J AE	2.35V Regulator,TC7S14FU
IC871	VHIS8324A28-1	J AH	2.8V Up Converter,S8324A28
IC872	VHIS80813LN-1	J AE	2.8V Up Converter,S80813LN
IC901	VHIBA6966FV-1	J AM	Spindle Motor Driver,BA6966FV
Q873	VHINDS332P/-1	J AD	FETIC,NDS332P
<b>TRANSISTORS</b>			
Q101	VS2SA17457/-1	J AB	Silicon,PNP,2SA17457
Q251	VSRN1113/-1	J AC	Digital,NPN,RN1113
Q252	VS2SC4738GR-1	J AC	Silicon,NPN,2SC4738 GR
Q253~255	VSRN1113/-1	J AC	Digital,NPN,RN1113
Q461	VS2SC4738GR-1	J AC	Silicon,NPN,2SC4738 GR
Q711	VSRN1444A/-1	J AC	Digital,NPN,RN1444 A
Q721	VS2SC4213B/-1	J AC	Silicon,NPN,2SC4213 B
Q874	VSRN1113/-1	J AC	Digital,NPN,RN1113
Q901	VSRN1113/-1	J AC	Digital,NPN,RN1113
<b>DIODES</b>			
D351	VHDSBE803/-1	J AD	Silicon,SBE803
D431	VHD1SS361/-1	J AB	Silicon,1SS361
D461	VHDRB731U/-1	J AC	Silicon,RB731U
D492	VHE15AZ7R5Y-1	J AC	Zener,7.5V,15AZ7.5Y
D494	VHE15AZ7R5Y-1	J AC	Zener,7.5V,15AZ7.5Y
D800	VHD1SS360/-1	J AB	Silicon,1SS360
D801	VHDSB10015C-1	J AD	Silicon,SB10015C
D802	VHE015Z5R1Y-1	J AD	Zener,5.1V,015Z5.1Y
D803	VHD1SS382/-1	J AC	Silicon,1SS382
D812	VHDSB10015C-1	J AD	Silicon,SB10015C
D821	VHDEC30LA02-1	J AF	Silicon,EC30LA02
D822	VHD1SS389/-1	J AB	Silicon,1SS389
D831	VHD1SS372/-1	J AD	Silicon,1SS372
D861	VHDEP10LA03-1	J AD	Silicon,EP10LA03
D871	VHDEP10LA03-1	J AD	Silicon,EP10LA03
<b>COILS</b>			
L100	VPBNN100K0000	J AC	10 μH
L171	RCILC0356AFZZ	J AC	10 μH,Choke
L201~206	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L209	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L451	RCILC0352AFZZ	J AB	Tip Impeder,150mA
L452~454	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L456	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L500	RCILC0344AFZZ	J AC	47 μH,Choke
L600	RCILC0331AFZZ	J AC	2.2 μH,Choke
L601~604	RCILC0358AFZZ	J AC	4.7 μH,Choke
L608~610	RCILC0358AFZZ	J AC	4.7 μH,Choke

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION
L702~704	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L711~714	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
L719	VPBNNR47K0000	J AC	0.47 μH
L751,752	RCILC0354AFZZ	J AC	22 μH,Choke
L771	RCILC0359AFZZ	J AC	100 μH,Choke
L821	RCILC0004AWZZ	J AF	4.7 μH,Choke
L822	RCILC0005AWZZ	J AF	10 μH,Choke
L862	RCILC0359AFZZ	J AC	100 μH,Choke
L871	RCILC0344AFZZ	J AC	47 μH,Choke
L887,888	RCORF0017AWZZ	J AE	Tip Impeder
L921	RCILC0353AFZZ	J AB	Tip Solid Induction,100mA
<b>VIBRATORS</b>			
XL201	RCRSC0028AFZZ	J AH	Crystal,33.868 MHz
XL401	RCRM-0201AFZZ	J AD	Ceramic,4.19 MHz
<b>CAPACITORS</b>			
C100	VCSATA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C102,103	VCKYTV1AB105K	J AD	1 μF,10V
C104	VCKYCY1CB273K	J AA	0.027 μF,16V
C106	VCKYTV1CB224K	J AB	0.22 μF,16V
C107	VCKYCY1EB123K	J AA	0.012 μF,25V
C109	VCKYTV1AB105K	J AD	1 μF,10V
C110	VCKYTV1CB224K	J AB	0.22 μF,16V
C111	VCKYCY1HB332K	J AA	0.0033 μF,50V
C112	VCKYCY1CB333K	J AA	0.033 μF,16V
C121,122	VCCCCY1HH271J	J AA	270 pF (CH),50V
C123,124	VCCSCY1HL391J	J AA	390 pF,50V
C130	VCKYCY1CB104K	J AB	0.1 μF,16V
C161	VCKYTV1AB105K	J AD	1 μF,10V
C165	VCKYCY1CB333K	J AA	0.033 μF,16V
C171	VCSATE0JJ107M	J AE	100 μF,6.3V,Electrolytic,Tantalum
C200,201	VCKYTV1AB105K	J AD	1 μF,10V
C202	VCSATE0JJ476M	J AD	47 μF,6.3V,Electrolytic,Tantalum
C203	VCKYCY1CB104K	J AB	0.1 μF,16V
C204	VCKYTV1CB474K	J AC	0.47 μF,16V
C205	VCKYCY1CB104K	J AB	0.1 μF,16V
C207	VCKYCY1CB104K	J AB	0.1 μF,16V
C209	VCCCCY1HH220J	J AA	22 pF (CH),50V
C211,212	VCCCCY1HH5R0C	J AA	5 pF (CH),50V
C250	VCKYCY1CB104K	J AB	0.1 μF,16V
C253	VCKYTV1CB104K	J AA	0.1 μF,16V
C254~256	VCKYCY1CB104K	J AB	0.1 μF,16V
C258	VCKYCY1HB472K	J AA	0.0047 μF,50V
C351	VCCCCY1HH560J	J AA	56 pF (CH),50V
C353	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C354	VCKYCY1CB104K	J AB	0.1 μF,16V
C357	VCKYCY1CB104K	J AB	0.1 μF,16V
C361	VCKYTV1HB393K	J AB	0.039 μF,50V
C401	VCKYCY1CB104K	J AB	0.1 μF,16V
C431	VCKYTV1CB474K	J AC	0.47 μF,16V
C452	VCKYCY1HB102K	J AA	1000 pF,50V
C454	VCKYCY1HB222K	J AA	0.0022 μF,50V
C481,482	VCKYTV1CB105K	J AD	1 μF,16V
C491	VCKYTV1CB104K	J AA	0.1 μF,16V
C500	VCSATA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C501,502	VCKYCY1HB222K	J AA	0.0022 μF,50V
C503,504	VCSATA1AJ335M	J AB	3.3 μF,10V,Electrolytic,Tantalum
C505,506	VCKYCY1HB102K	J AA	1000 pF,50V
C507	VCSATA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C508	VCKYTV1AB105K	J AD	1 μF,10V
C509,510	VCKYTV1CF225Z	J AC	2.2 μF,16V
C511	VCKYTV1AB105K	J AD	1 μF,10V
C600	VCEAPS226AF0J	J AB	22 μF,6.3V,Electrolytic
C601~604	VCKYTV1AB105K	J AD	1 μF,10V
C605	VCKYCY1CB104K	J AB	0.1 μF,16V
C608	VCKYTV1CB105K	J AD	1 μF,16V
C609,610	VCKYTV1AB105K	J AD	1 μF,10V
C622	VCKYCY1CB104K	J AB	0.1 μF,16V
C651	VCKYTV1CF105Z	J AB	1 μF,16V
C701,702	VCSATA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C703	VCKYCY1EB103K	J AA	0.01 μF,25V
C711,712	VCCCCY1HH101J	J AA	100 pF (CH),50V
C713,714	VCKYTV1AB105K	J AD	1 μF,10V
C715	VCKYCY1CB104K	J AB	0.1 μF,16V
C719	VCSATA1AJ106M	J AE	10 μF,10V,Electrolytic,Tantalum
C720	VCKYCY1HB102K	J AA	1000 pF,50V
C721,722	VCSATA1AJ335M	J AB	3.3 μF,10V,Electrolytic,Tantalum
C723,724	VCKYCY1HB102K	J AA	1000 pF,50V
C725,726	VCSATA1AJ335M	J AB	3.3 μF,10V,Electrolytic,Tantalum
C731	VCKYCY1CF224Z	J AB	0.22 μF,16V

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION	NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION
C733,734	VCKYTV1CB104K	J AA	0.1 μF,16V	R268	VRS-CY1JB222J	J AA	2.2 kohms,1/16W
C735	VCKYCY1HB102K	J AA	1000 pF,50V	R269,270	VRS-CY1JB101J	J AA	100 ohm,1/16W
C751,752	VCKYTV1CB823K	J AB	0.082 μF,16V	R271	VRS-CY1JB102J	J AA	1 kohm,1/16W
C753,754	VCKYTV1CF105Z	J AB	1 μF,16V	R273	VRS-CY1JB563J	J AA	56 kohms,1/16W
C755	VCKYCY1EB103K	J AA	0.01 μF,25V	R274	VRS-CY1JB753D	J AA	75 kohms,1/16W
C756,757	VCKYTV1AB684K	J AC	0.68 μF,10V	R275	VRS-CY1JB563D	J AA	56 kohms,1/16W
C758	VCSATA1AJ335M	J AB	3.3 μF,10V,Electrolytic,Tantalum	R276	VRS-CY1JB332D	J AA	3.3 kohms,1/16W
C759,760	VCKYCY1CB273K	J AA	0.027 μF,16V	R277	VRS-CY1JB393J	J AA	39 kohms,1/16W
C761,762	VCKYTV1CF225Z	J AC	2.2 μF,16V	R278	VRS-CY1JB222J	J AA	2.2 kohms,1/16W
C765,766	VCKYTV1CB224K	J AB	0.22 μF,16V	R279	VRS-CY1JB101J	J AA	100 ohm,1/16W
C771	VCSATE0JJ476M	J AD	47 μF,6.3V,Electrolytic,Tantalum	R351	VRS-TV2AB5R6J	J AA	5.6 ohms,1/10W
C773	VCKYTV1CB224K	J AB	0.22 μF,16V	R361	VRS-TQ2BB150J	J AA	15 ohms,1/8W
C774	VCKYTV1CF105Z	J AB	1 μF,16V	R403	VRS-CY1JB102J	J AA	1 kohm,1/16W
C776	VCKYCY1HB102K	J AA	1000 pF,50V	R404	VRS-CY1JB104J	J AA	100 kohm,1/16W
C800	VCKYTV1AB105K	J AD	1 μF,10V	R405	VRS-CY1JB103J	J AA	10 kohm,1/16W
C801	VCKYCY1CB104K	J AB	0.1 μF,16V	R406	VRS-CY1JB104J	J AA	100 kohm,1/16W
C805	VCEAPS107AF0J	J AC	100 μF,6.3V,Electrolytic	R407	VRS-CY1JB103J	J AA	10 kohm,1/16W
C806	VCKYTV1AB335K	J AF	3.3 μF,10V	R408	VRS-CY1JB104J	J AA	100 kohm,1/16W
C810	VCKYTV1CB334K	J AC	0.33 μF,16V	R411	VRS-CY1JB104J	J AA	100 kohm,1/16W
C820	VCKYTV1AB105K	J AD	1 μF,10V	R412	VRS-CY1JB103J	J AA	10 kohm,1/16W
C821	VCEAPS227AF0G	J AC	220 μF,4V,Electrolytic	R413~415	VRS-CY1JB102J	J AA	1 kohm,1/16W
C822	VCCCCY1HH560J	J AA	56 pF (CH),50V	R422	VRS-CY1JB104J	J AA	100 kohm,1/16W
C823	VCCSCY1HL391J	J AA	390 pF,50V	R423	VRS-CY1JB223F	J AA	22 kohms,1/16W
C824	VCCSCY1HL561J	J AA	560 pF,50V	R424	VRS-CY1JB223J	J AA	22 kohms,1/16W
C825	VCCCCY1HH4R0C	J AA	4 pF (CH),50V	R425	VRS-CY1JB223J	J AA	22 kohms,1/16W
C826	VCKYTV1CB105K	J AD	1 μF,16V	R426	VRS-CY1JB223F	J AA	22 kohms,1/16W
C827	RC-SZ0001AWZZ	J AG	22 μF,6.3V,Electrolytic	R431	VRS-CY1JB334J	J AA	330 kohms,1/16W
C828	VCKYTV1AB105K	J AD	1 μF,10V	R451	VRS-CY1JB562J	J AA	5.6 kohms,1/16W
C829	VCKYCY1EB103K	J AA	0.01 μF,25V	R452	VRS-CY1JB822J	J AA	8.2 kohms,1/16W
C830	VCKYCY1HB102K	J AA	1000 pF,50V	R453	VRS-CY1JB183J	J AA	18 kohms,1/16W
C831,832	VCKYCY1CB104K	J AB	0.1 μF,16V	R455	VRS-CY1JB562J	J AA	5.6 kohms,1/16W
C834	VCKYCY1CB104K	J AB	0.1 μF,16V	R456	VRS-CY1JB822J	J AA	8.2 kohms,1/16W
C841	VCSATA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum	R457	VRS-CY1JB183J	J AA	18 kohms,1/16W
C851	VCCCCY1HH151J	J AA	150 pF (CH),50V	R458	VRS-CY1JB563J	J AA	56 kohms,1/16W
C852	VCKYTV1AB105K	J AD	1 μF,10V	R460	VRS-CY1JB683J	J AA	68 kohms,1/16W
C863	VCKYTV1CB105K	J AD	1 μF,16V	R461~465	VRS-CY1JB104J	J AA	100 kohm,1/16W
C865,866	VCKYTV1CB105K	J AD	1 μF,16V	R466	VRS-CY1JB564J	J AA	560 kohms,1/16W
C869	VCSATE0JJ476M	J AD	47 μF,6.3V,Electrolytic,Tantalum	R467	VRS-CY1JB183J	J AA	18 kohms,1/16W
C871	VCKYTV1CB474K	J AC	0.47 μF,16V	R492	VRS-CY1JB102J	J AA	1 kohm,1/16W
C874	RC-SZ1145AFZZ	J AD	15 μF,10V,Electrolytic	R500	VRS-CY1JB4R7J	J AA	4.7 ohms,1/16W
C875	VCKYTV1CB104K	J AA	0.1 μF,16V	R501,502	VRS-CY1JB471J	J AA	470 ohms,1/16W
C876,877	VCKYTV1AB105K	J AD	1 μF,10V	R600	VRS-CY1JB560J	J AA	56 ohms,1/16W
C902	VCKYCY1EB103K	J AA	0.01 μF,25V	R601	VRS-CY1JB563J	J AA	56 kohms,1/16W
C903	VCKYTV1AB335K	J AF	3.3 μF,10V	R701,702	VRS-CY1JB101J	J AA	100 ohm,1/16W
C905~907	VCKYCY1HB222K	J AA	0.0022 μF,50V	R703	VRS-CY1JB124J	J AA	120 kohms,1/16W
C908	VCKYTV1CB224K	J AB	0.22 μF,16V	R710	VRS-TV2AB560J	J AA	56 ohms,1/10W
C909,910	VCKYCY1CB333K	J AA	0.033 μF,16V	R711,712	VRS-CY1JB562J	J AA	5.6 kohms,1/16W
C911	VCKYCY1CB104K	J AB	0.1 μF,16V	R713,714	VRS-CY1JB103J	J AA	10 kohm,1/16W
				R715,716	VRS-CY1JB104J	J AA	100 kohm,1/16W
				R717	VRS-CY1JB102J	J AA	1 kohm,1/16W
				R719,720	VRS-CY1JB822J	J AA	8.2 kohms,1/16W
				R723,724	VRS-CY1JB682J	J AA	6.8 kohms,1/16W
				R725	VRS-CY1JB101J	J AA	100 ohm,1/16W
				R726	VRS-CY1JB393J	J AA	39 kohms,1/16W
				R727	VRS-CY1JB822J	J AA	8.2 kohms,1/16W
				R728	VRS-CY1JB102J	J AA	1 kohm,1/16W
				R729,730	VRS-CY1JB272J	J AA	2.7 kohms,1/16W
				R753	VRS-CY1JB124J	J AA	120 kohms,1/16W
				R754	VRS-CY1JB274J	J AA	270 kohms,1/16W
				R756,757	VRS-CY1JB273J	J AA	27 kohms,1/16W
				R761,762	VRS-CY1JB432J	J AA	4.3 kohms,1/16W
				R763,764	VRS-CY1JB680J	J AA	68 ohms,1/16W
				R765,766	VRS-CY1JB180J	J AA	18 ohms,1/16W [MD-MT20W]
				R765,766	VRS-CY1JB8R2J	J AA	8.2 ohms,1/16W [MD-MT20/20C]
				R767,768	VRS-CY1JB102J	J AA	1 kohm,1/16W
				R769,770	VRS-CY1JB153J	J AA	15 kohms,1/16W
				R800	VRS-CY1JB223J	J AA	22 kohms,1/16W
				R801	VRS-CY1JB222F	J AA	2.2 kohms,1/16W
				R802	VRS-CY1JB102J	J AA	1 kohm,1/16W
				R803	VRS-CY1JB104J	J AA	100 kohm,1/16W
				R804	VHHMSMDC100-1	J AH	Thermistor,Positive/Negative C, 1.0A
				R806	VRS-TV2AB102J	J AA	1 kohm,1/10W
				R807	VRS-CY1JB681F	J AA	680 ohms,1/16W
				R808	VRS-CY1JB562J	J AA	5.6 kohms,1/16W
				R809	VRS-CY1JB222J	J AA	2.2 kohms,1/16W
				R810,811	VRS-CY1JB184F	J AA	180 kohms,1/16W
				R815	VRS-CY1JB563F	J AA	56 kohms,1/16W
				R816	VRS-CY1JB243F	J AA	24 kohms,1/16W
				R821	VRS-CY1JB104J	J AA	100 kohm,1/16W
				R823	VRS-CY1JB104J	J AA	100 kohm,1/16W
				R824	VRS-CY1JB153J	J AA	15 kohms,1/16W

RESISTORS

	VRS-CY1JB000J	J AA	0 ohm,Jumper,0.8×1.55mm, Green
	VRS-TV2AB000J	J AA	0 ohm,Jumper,1.25×2mm,Green
R101~104	VRS-CY1JB223J	J AA	22 kohms,1/16W
R105	VRS-CY1JB394J	J AA	390 kohms,1/16W
R106	VRS-CY1JB563J	J AA	56 kohms,1/16W
R154	VRS-CY1JB122J	J AA	1.2 kohms,1/16W
R161	VRS-CY1JB122J	J AA	1.2 kohms,1/16W
R202	VRS-TV2AB330J	J AA	33 ohms,1/10W
R204	VRS-CY1JB102J	J AA	1 kohm,1/16W
R205	VRS-CY1JB334F	J AA	330 kohms,1/16W
R206	VRS-CY1JB274F	J AA	270 kohms,1/16W
R207	VRS-CY1JB681J	J AA	680 ohms,1/16W
R222	VRS-CY1JB105J	J AA	1 Mohm,1/16W
R250,251	VRS-TV2AB1R0F	J AB	1 ohm,1/10W
R252	VRS-CY1JB154D	J AA	150 kohms,1/16W
R253	VRS-CY1JB753D	J AA	75 kohms,1/16W
R254	VRS-CY1JB222J	J AA	2.2 kohms,1/16W
R255	VRS-CY1JB225J	J AA	0.2 Mohms,1/16W
R256	VRS-CY1JB183J	J AA	18 kohms,1/16W
R257	VRS-CY1JB104J	J AA	100 kohm,1/16W
R258	VRS-CY1JB184J	J AA	180 kohms,1/16W
R259	VRS-CY1JB823J	J AA	82 kohms,1/16W
R260	VRS-CY1JB335J	J AA	3.3 Mohms,1/16W
R261	VRS-CY1JB274F	J AA	270 kohms,1/16W
R262	VRS-CY1JB243F	J AA	24 kohms,1/16W
R263	VRS-CY1JB104J	J AA	100 kohm,1/16W
R264	VRS-CY1JB183D	J AA	18 kohms,1/16W
R265	VRS-CY1JB223D	J AA	22 kohms,1/16W
R266	VRS-CY1JB104D	J AA	100 kohm,1/16W
R267	VRS-CY1JB753D	J AA	75 kohms,1/16W



# MD-MT20/20C/20W

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION
R826	VRS-CY1JB103J	J AA	10 kohm,1/16W
R827	VRS-CY1JB304F	J AF	300 kohms,1/16W
R828	VRS-CY1JB224F	J AA	220 kohms,1/16W
R829	VRS-CY1JB333J	J AA	33 kohms,1/16W
R831	VRS-CY1JB104J	J AA	100 kohm,1/16W
R832	VRS-CY1JB106J	J AA	10 Mohm,1/16W
R833	VRS-CY1JB470J	J AA	47 ohms,1/16W
R851	VRS-CY1JB103J	J AA	10 kohm,1/16W
R852	VRS-CY1JB473J	J AA	47 kohms,1/16W
R853	VRS-CY1JB101J	J AA	100 ohm,1/16W
R871	VRS-CY1JB103J	J AA	10 kohm,1/16W
R878	VRS-CY1JB104J	J AA	100 kohm,1/16W
R901,902	VRS-CY1JB1R0J	J AA	1 ohm,1/16W
R903	VRS-CY1JB331J	J AA	330 ohms,1/16W
R904	VRS-CY1JB333J	J AA	33 kohms,1/16W
R905	VRS-CY1JB104J	J AA	100 kohm,1/16W
R906	VRS-CY1JB274J	J AA	270 kohms,1/16W
R907	VRS-CY1JB184J	J AA	180 kohms,1/16W
R908	VRS-CY1JB104J	J AA	100 kohm,1/16W
R909	VRS-CY1JB103J	J AA	10 kohm,1/16W
R920	VRS-CY1JB104J	J AA	100 kohm,1/16W
R921	VRS-CY1JB331J	J AA	330 ohms,1/16W
R922	VRS-CY1JB104J	J AA	100 kohm,1/16W

## OTHER CIRCUITRY PARTS

CN101	QCNCW801XAFZZ	J AH	Socket,22Pin
CN451	QCNCW804NAFZZ	J AE	Socket,13Pin
CN482	QCNCW804JAFZZ	J AE	Socket,9Pin
CN601	QCNCW716RAFZZ	J AF	Socket,16Pin
CN701,702	QCNCWWQ33AFZZ	J AE	Socket,33Pin
△ F871	QFS-L501AAFNO	J AG	Fuse,T0.5A L 63V
J701	VHLGP1FB95R-1	J AP	Jack,Optical/Line IN
J702	QJAKM0014AWZZ	J AF	Jack,Mic IN
J703	QJAKM0015AWZZ	J AL	Jack,Remote Control/Headphones
J801	QJAKC0007AWZZ	J AF	Jack,DC IN
M901	RMOTV0524AFZZ	J AS	Motor Ass'y [Spindle]
M902	RMOTV0511AFZZ	J AT	Motor Ass'y [Sled]
M903	RMOTV0512AFM1	J AR	Motor Ass'y [Head Up/Down]
PH901(8-3)	VHPGP1S93K/-1	J AF	Phote Interrupter,GP1S93K
SW401	QSW-M0172AFZZ	J AD	Switch,Push Type [Eject]
SW402	QSW-S0948AFZZ	J AC	Switch,Slide Type [Hold]
SW403	QSW-M0172AFZZ	J AD	Switch,Push Type [Disc Lid Open]
SW801	QSW-M0006AWZZ	J AD	Switch,Push Type [Ni-MH Battery Detection]
SW902(8-2)	QSW-M0170AFZZ	J AD	Switch,Push Type [Disc Protect]

## MECHANICAL PARTS

1	NGERH0597AFZZ	J AC	Wheel,Drive
2	NSFTD0334AFZZ	J AD	Screw,Drive
3	LHLDX3141AFM1	J AP	Cartridge Holder Ass'y
4	MSPRT1625AFFJ	J AD	Spring,Eject Lever
5	LANGF1610AFZZ	J AC	Bracket,Cancel
6	LCHSM0944AFM1	J AT	Main Chassis Ass'y
7	PCUSG0599AFZZ	J AB	Cushion,Mechanism
8	QPWBH0337AFM1	J AN	Mechanism Flexible PWB Ass'y
8- 1	—	—	Mechanism Flexible PWB (Not Replacement Item)
8- 2(SW902)	QSW-M0170AFZZ	J AD	Switch,Push Type [Disc Protect]
8- 3(PH901)	VHPGP1S93K/-1	J AF	Phote Interrupter,GP1S93K
9	MSPRP0925AFZZ	J	Spring,Drive Screw
10	PCOVPI339AFZZ	J AD	Cover,Mechanism
11	MARMM0170AFM1	J AK	Magnetic Field Block
12	NGERH0603AFZZ	J AE	Gear,Drive
△ 13	RCTRH8175AFZZ	J BM	Optical Pickup Unit [Except for U.S.A.]
△ 13	RCTRH8175AF10	J BM	Optical Pickup Unit [For U.S.A.]
14	MSPRP0922AFFJ	J AD	Spring,Drive Grip
15	MSPRP0923AFZZ	J	Spring,Thrust Plate
16	NSFTM0292AFFW	J AC	Shaft,Guide
17	MLEVF2641AFZZ	J	Lever,Eject
18	QPWBH0338AFZZ	J AH	Magnetic Head Flexible PWB
19	MLEVF2637AFM1	J AH	Lift Working Lever Ass'y
20	MLEVF2638AFFW	J AD	Lever,Block
21	MLEVF2639AFFW	J AD	Lever,Lift Joint
22	MLEVF2640AFZZ	J	Lever,Lift
23	MSPRD1362AFFJ	J AD	Spring,Lift Lever
24	RCILH0112AFZZ	J AM	Magnetic Head
501	LX-BZ0804AFF	J AA	Screw,ø1.4x2.2mm
502	LX-JZ0154AFZZ	J AA	Screw,ø1.4x2.8mm

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION
503	LX-BZ0823AFZZ	J AA	Screw,ø1.4x1.2mm
504	LX-WZ9290AFZZ	J AA	Washer,ø0.8xø2.4x0.2mm
505	LX-BZ0800AFZZ	J AA	Screw,ø1.4x2.5mm
506	XSPSN14P01500	J AA	Screw,ø1.7x2.5mm
507	LX-JZ0148AFZZ	J AA	Screw,ø1.7x3mm
508	XWSSD14-05000	J AA	Washer,ø1.4x0.5mm
509	LX-BZ0959AFZZ	J AB	Screw,ø1.4x1.8mm
510	LX-WZ9296AFZZ	J AA	Washer,ø1.5xø3.5x0.25mm
511	LX-BZ0974AFZZ	J AB	Screw,ø1.4x5.5mm
512	LX-BZ0991AFZZ	J AB	Screw,ø1.2x1.6mm
M901	RMOTV0524AFZZ	J AS	Motor Ass'y [Spindle]
M902	RMOTV0511AFZZ	J AT	Motor Ass'y [Sled]
M903	RMOTV0512AFM1	J AR	Motor Ass'y [Head Up/Down]

## CABINET PARTS

201	GFTAT3004AWM1	J AW	Top Cabinet Ass'y [MD-MT20-S/20C-S/20W-S]
201	GFTAT3004AWM2	J AW	Top Cabinet Ass'y [MD-MT20W-BL]
201	GFTAT3004AWM3	J AW	Top Cabinet Ass'y [MD-MT20W-GL]
201- 1	—	—	Top Cabinet (Not Replacement Item)
201- 2	—	—	Bracket,Top Cabinet (Not Replacement Item)
202	HDECQ0480AWM1	J AM	Decoration Plate Ass'y
202- 1	—	—	Plate,Decoration (Not Replacement Item)
202- 2	PSHEZ0033AWZZ	J AD	Sheet,Decoration Plate
203	TCAUS0044AWZZ	J AB	Label A,Class 3B [MD-MT20W Only]
204	PSHEZ0035AWZZ	J AB	Sheet A,Operation Button
205	PSHEZ0036AWZZ	J AB	Sheet B,Operation Button
206	PSHEZ0037AWZZ	J AC	Sheet C,Operation Button
207	JKNBZ0623AWSA	J AM	Button,Operation
208	LANGT0058AWFW	J AG	Bracket,Operation Button
209	MSPRP0026AWFW	J AB	Spring A,Cartridge
210	MSPRP0027AWFW	J AC	Spring B,Cartridge
211	MSPRP0028AWFW	J AB	Spring C,Cartridge
212	TCAUS0043AWZZ	J AC	Label B,Class 3B [MD-MT20W Only]
213	RUNTK0005AWZZ	J AV	Key Switch Flexible PWB Ass'y
214	RUNTZ0015AWZZ	J BD	LCD Ass'y
215	PSHEZ0046AWZZ	J AB	Sheet E,LCD
216	PSHEZ0044AWZZ	J AB	Sheet C,LCD
217	PCUSZ0016AWZZ	J AB	Cushion,Mechanism,Top
218	PSHEZ0045AWZZ	J AB	Sheet D,LCD
219	PCUSZ0017AWZZ	J AB	Cushion,Cartridge
220	GFTAU3008AWSA	J AS	Bottom Cabinet [MD-MT20-S]
220	GFTAU3009AWSA	J AS	Bottom Cabinet [MD-MT20C-S]
220	GFTAU3010AWSA	J AS	Bottom Cabinet [MD-MT20W-S]
220	GFTAU3011AWSA	J AS	Bottom Cabinet [MD-MT20W-BL]
220	GFTAU3012AWSA	J AS	Bottom Cabinet [MD-MT20W-GL]
221	JKNBZ0625AWSA	J AD	Button,Hold
222	GCOVA1241AWSA	J AC	Cover,DC IN Jack
223	PSHET0014AWZZ	J AE	Sheet,Bottom Cabinet
224	PSHEZ0043AWZZ	J AB	Insulate Fiber, Bottom Cabinet Sheet
225	LHLDZ3010AWM1	J AW	Main Frame Ass'y
226	PCUSZ0015AWZZ	J AB	Cushion,Mechanism,Front
227	PCUSZ0014AWZZ	J AB	Cushion,Mechanism,Right
228	PCUSG0534AFZZ	J AC	Rubber,Preventive Vibration
229	PCUSG0641AFSA	J AB	Insulator
230	PSHET0015AWZZ	J AB	Sheet B,Insulator
231	PSHET0016AWZZ	J AC	Sheet C,Insulator
232	PCOVV1009AW00	J AC	Cover,Battery Terminal,-
233	QTANB9018AWFQ	J AD	Terminal,Battery,-
234	PCOVV1008AW00	J AC	Cover,Battery Terminal,+
235	QTANB9017AWFQ	J AD	Terminal,Battery,+
236	PGIDM0027AW00	J AC	Guide,Battery
237	QTANB9016AWFQ	J AD	Terminal,Battery,+/-
238	LHLDZ1231AW00	J AC	Holder,Battery Terminal,+/-
239	MLEVP0094AW00	J AC	Lever,Battery Push
240	JKNBZ0624AWSA	J AF	Lever,Open
241	GCABA1185AWSA	J AF	Front Cabinet [Except for MD-MT20W-BL]
241	GCABA1185AWSB	J AF	Front Cabinet [MD-MT20W-BL]
242	GCABB1185AWSA	J AE	Rear Cabinet [Except for MD-MT20W-BL]
242	GCABB1185AWSB	J AE	Rear Cabinet [MD-MT20W-BL]

## MD-MT20/20C/20W

NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION	NO.	PARTS CODE	★ PRICE RANK	DESCRIPTION	
243	QCNWN1478AWZZ	J AG	Flat Cable,33Pin		TLABN0092AWZZ	J AB	Label,SER No. [MD-MT20C/20W for New Zealand]	
244	PSHEF0019AWZZ	J AB	Felt,Mechanism Flexible PWB		TLABN0092AW02	J AB	Label,SER No. [MD-MT20W Except for Asia/Middle and Near East/Africa/Australia/New Zealand/Hong Kong]	
245	GDORB0001AWSA	J AE	Door,Battery [MD-MT20-S/20C-S/20W-S]		TLABN0094AWZZ	J AB	Label,Taiwan SER.No. [MD-MT20W for Taiwan Only]	
245	GDORB0001AWSB	J AE	Door,Battery [MD-MT20W-BL]		TLABRF232AWZZ	J AB	Label,Bar Code [MD-MT20C]	
245	GDORB0001AWSC	J AE	Door,Battery [MD-MT20W-GL]		TLABR1054AWZZ	J AB	Label,Bar Code [MD-MT20W-S for Central South America/Brazil/Chile/Peru/Bolivia Only]	
246	PCUSZ0012AWZZ	J AB	Cushion,Vub		TLABR1055AWZZ	J AB	Label,Bar Code [MD-MT20W-BL for Central South America/Brazil/Chile/Peru/Bolivia Only]	
247	PSHEZ0047AWZZ	J	Insulate Fiber B		TLABR1056AWZZ	J AB	Label,Bar Code [MD-MT20W-GL for Central South America/Brazil/Chile/Peru/Bolivia Only]	
601	LX-BZ0045AWF3	J	Screw,ø1.4×2mm		TLABS0225AWZZ	J AB	Label,CPA [MD-MT20W for Asia/Middle and Near East/Africa Only]	
602	LX-BZ0805AFFN	J AB	Screw,ø1.7×2.5mm		TLABZ0589AWZZ	J AB	Label,Taiwan Impoter [MD-MT20W-S for Taiwan Only]	
603	LX-BZ0045AWFN	J	Screw,ø1.4×2mm		TLABZ0590AWZZ	J AB	Label,Taiwan Impoter [MD-MT20W-BL for Taiwan Only]	
<b>ACCESSORIES/PACKING PARTS (MD-MT20C/20W)</b>					TLABZ0591AWZZ	J AB	Label,Taiwan Impoter [MD-MT20W-GL for Taiwan Only]	
	QCNWG0382AFZZ	J AK	Connecting Cord,RCA Type		TLABZ0600AWSA	J AC	Label,Made in Malaysia [MD-MT20W for Australia/New Zealand/Brazil Only]	
	QCNWG0422AFZZ	J AQ	Optical Digital Cable		TLABZ0618AWZZ	J AB	Label,Made in Malaysia [MD-MT20W for Australia/New Zealand/Taiwan/Brazil Only]	
	RADPA3040AWZZ	J AX	AC Adaptor [MD-MT20C]		TLSTS0011AWZZ	J AB	Taiwan SS List [MD-MT20W for Taiwan Only]	
	RADPA5402AFZZ	J BF	AC Adapter [MD-MT20W Except for Taiwan/Australia/New Zealand/Hong Kong]		TSPC-0574AWZZ	J AC	Label,Taiwan Specifications [MD-MT20W-S for Taiwan Only]	
	RADPA5403AFZZ	J BF	AC Adaptor [MD-MT20W for Taiwan]		TSPC-0576AWZZ	J AC	Label,Taiwan Specification [MD-MT20W-BL for Taiwan Only]	
	RADPA6435AFZZ	J BG	AC Adaptor [MD-MT20W for Australia/New Zealand]		TSPC-0577AWZZ	J AC	Label,Taiwan Specifications [MD-MT20W-GL for Taiwan Only]	
	RADPA8493AFZZ	J BH	AC Adaptor [MD-MT20W for Hong Kong]		UBAGC0001AWZZ	J AK	Battery Carrying Case	
	RPHOH0003AWZZ	J AZ	Headphones [MD-MT20C Only]		UBAGC0002AWSA	J AK	Carrying Case	
	RPHOH0176AFZZ	J AR	Earphones [MD-MT20W Only]		UBATM0002AWSA	J BC	Battery,Rechargeable Nickel-Metal Hydride	
	RRMCW0001AWSA	J AZ	Remote Control		92LG-CARD1266E	J AB	Guarantee Card [MD-MT20W for Australia/New Zealand Only]	
	SPAKA0219AWZZ	J AC	Packing Add.,Unit [MD-MT20W]		92LPLUG155A	J AG	Adaptor,AC Plug [MD-MT20W for Middle South America/Brazil/Chile/Peru/Bolivia Only]	
	SPAKA0220AWZZ	J AC	Packing Add.,Unit [MD-MT20C]		<b>ACCESSORIES (MD-MT20)</b>			
	SPAKC0810AWZZ	J AG	Packing Case [MD-MT20W-S]		QCNWG0382AFZZ	J AK	Connecting Cord,RCA Type	
	SPAKC0811AWZZ	J AG	Packing Case [MD-MT20C]		QCNWG0422AFZZ	J AQ	Optical Digital Cable	
	SPAKC0825AWZZ	J AG	Packing Case [MD-MT20W-BL]		RADPA3040AWZZ	J AX	AC Adaptor [MD-MT20]	
	SPAKC0829AWZZ	J AG	Packing Case [MD-MT20W-GL]		RPHOH0003AWZZ	J AZ	Headphones [MD-MT20]	
	SPAKZ0485AWZZ	J AD	Pad,AC Adaptor [MD-MT20C]		RRMCW0001AWSA	J AZ	Remote Control	
	SPAKZ0486AWZZ	J AD	Pad,AC Adaptor [MD-MT20W Except for Australia/New Zealand]		TCAUH0050AWZZ	J AB	Caution,Headphones [MD-MT20 Only]	
	SPAKZ0487AWZZ	J AD	Pad,AC Adaptor [MD-MT20W for Australia/New Zealand]		TINSE0254AWZZ	J AE	Operation Manual [MD-MT20]	
	SPAKZ0490AWZZ	J AC	Pad,Operation Manual [MD-MT20W for Australia/New Zealand Only]		TINSZ0429AWZZ	J AB	Quick Guide [MD-MT20 Only]	
	SPAKZ0518AWZZ	J AB	Sheet,Protect		UBAGC0001AWZZ	J AK	Battery Carrying Case	
	SPAKZ0522AWZZ	J AC	Cushion,Protect		UBAGC0002AWSA	J AK	Carrying Case	
	TCAUA0040AWZZ	J AB	Card,Taiwan Caution [MD-MT20W for Taiwan Only]		UBATM0002AWSA	J BC	Battery,Rechargeable Nickel-Metal Hydride	
	TCAUH0050AWZZ	J AB	Caution,Headphones [MD-MT20C Only]		<b>P.W.B. ASSEMBLY (Not Replacement Item)</b>			
	TGANZ0022AW20	J AE	Card,Taiwan Guarantee [MD-MT20W-BL for Taiwan Only]		PWB-A1,2	92LPWB3107MDSS	J —	Main,Audio (Combined Ass'y)
	TGANZ0022AW21	J AE	Card,Taiwan Guarantee [MD-MT20W-GL for Taiwan Only]		<b>OTHER SERVICE PARTS</b>			
	TGANZ0022AW32	J	Card,Taiwan Guarantee [MD-MT20W-S for Taiwan Only]		UDSKM0001AFZZ	J AZ	Recording Mini Disc	
	TINSE0253AWZZ	J AE	Operation Manual [MD-MT20W for Australia/New Zealand]		88GMMD-110	J BV	High Reflection Disc MMD-110 (TEAC Test MD)	
	TINSK0093AWZZ	J AG	Operation Manual [MD-MT20C]		88GMMD-212	J BU	Low Reflection Disc MMD-212 (TEAC Test MD)	
	TINSZ0431AWZZ	J AG	Operation Manual [MD-MT20W Except for Australia/New Zealand]		88GMMD-213A	J	Low Reflection Disc MMD-213A (TEAC Test MD)	
	TLABE0304AWZZ	J AB	Label,Bar Code [MD-MT20W-S for Australia/New Zealand/Taiwan Only]					
	TLABE0305AWZZ	J AB	Label,Bar Code [MD-MT20W-GL for Australia/New Zealand/Taiwan Only]					
	TLABE0306AWZZ	J AB	Label,Bar Code [MD-MT20W-BL for Australia/New Zealand/Taiwan Only]					
	TLABG0002AWZZ	J AB	Label,Hong Kong [MD-MT20W for Hong Kong Only]					
	TLABH0055AWZZ	J AF	Sheet,E/C Comparison [MD-MT20W for Taiwan Only]					
	TLABJ0009AWSA	J AB	Label,SHARP Corporation Japan [MD-MT20W for Chile/Peru/Bolivia Only]					
	TLABJ0010AWZZ	J AB	Label,Japan [MD-MT20W for Chile/Peru/Bolivia Only]					
	TLABN0088AWZZ	J AB	Label,SER No. [Except for Taiwan of MD-MT20W]					

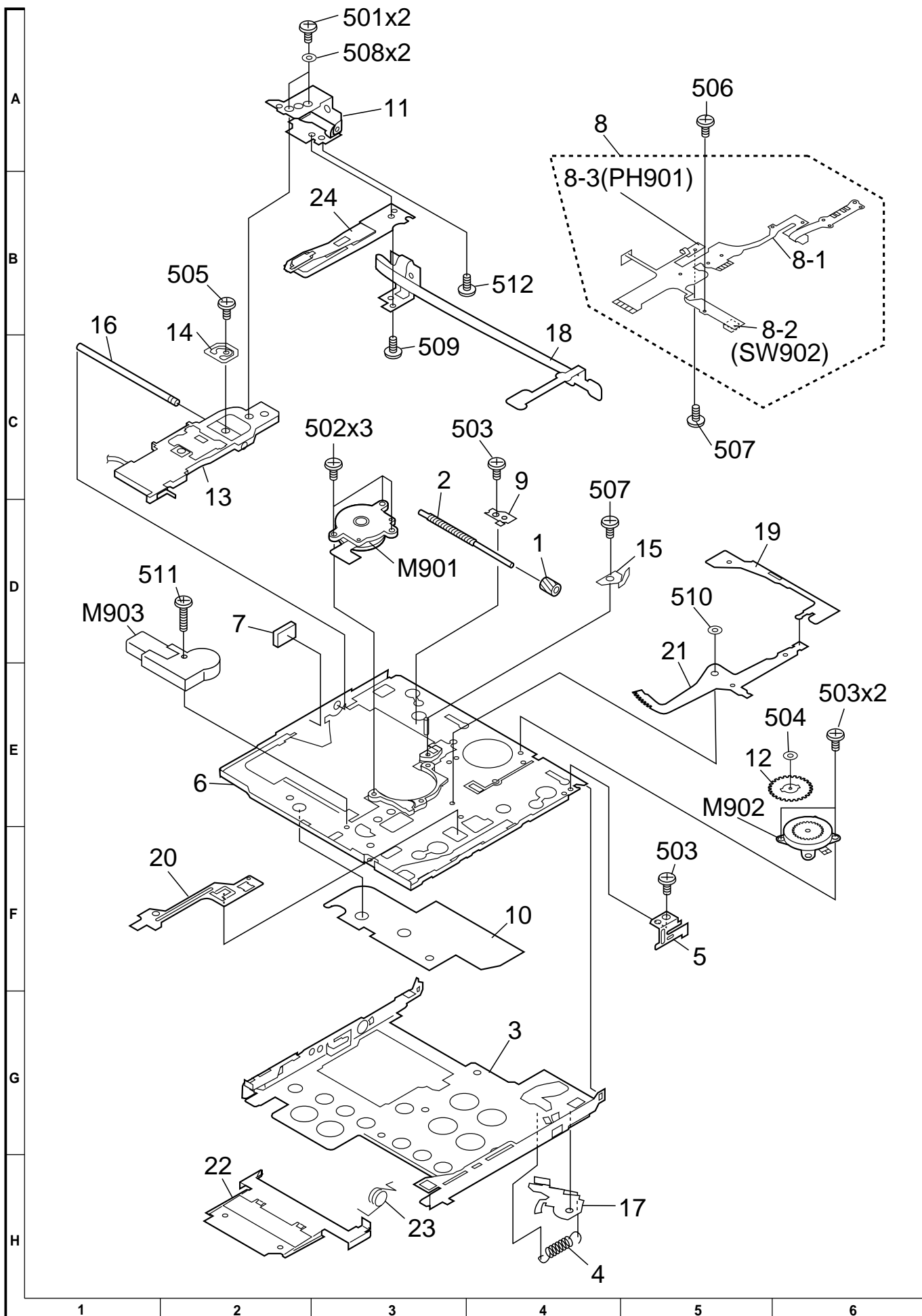


Figure 5 MD MECHANISM EXPLODED VIEW

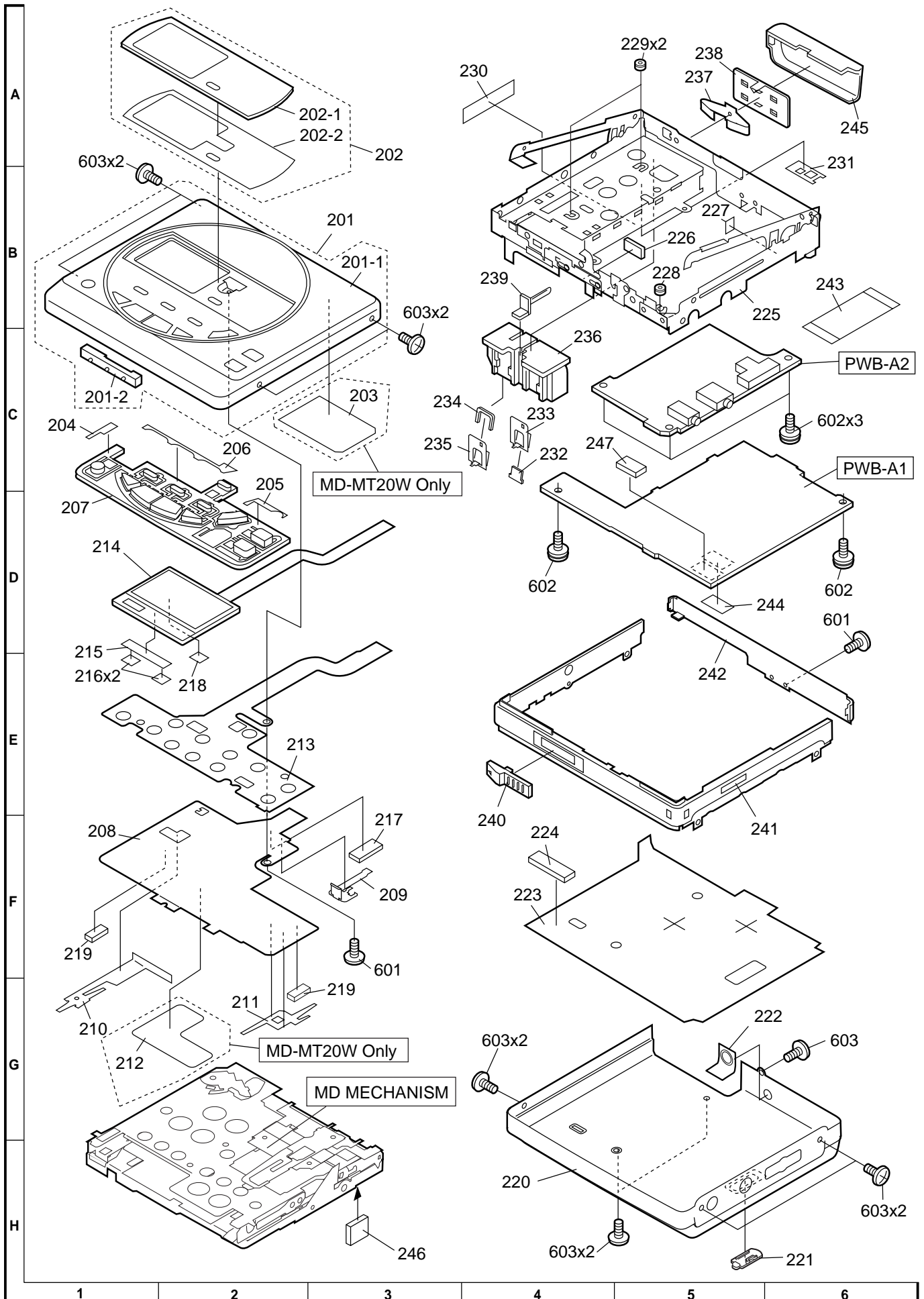
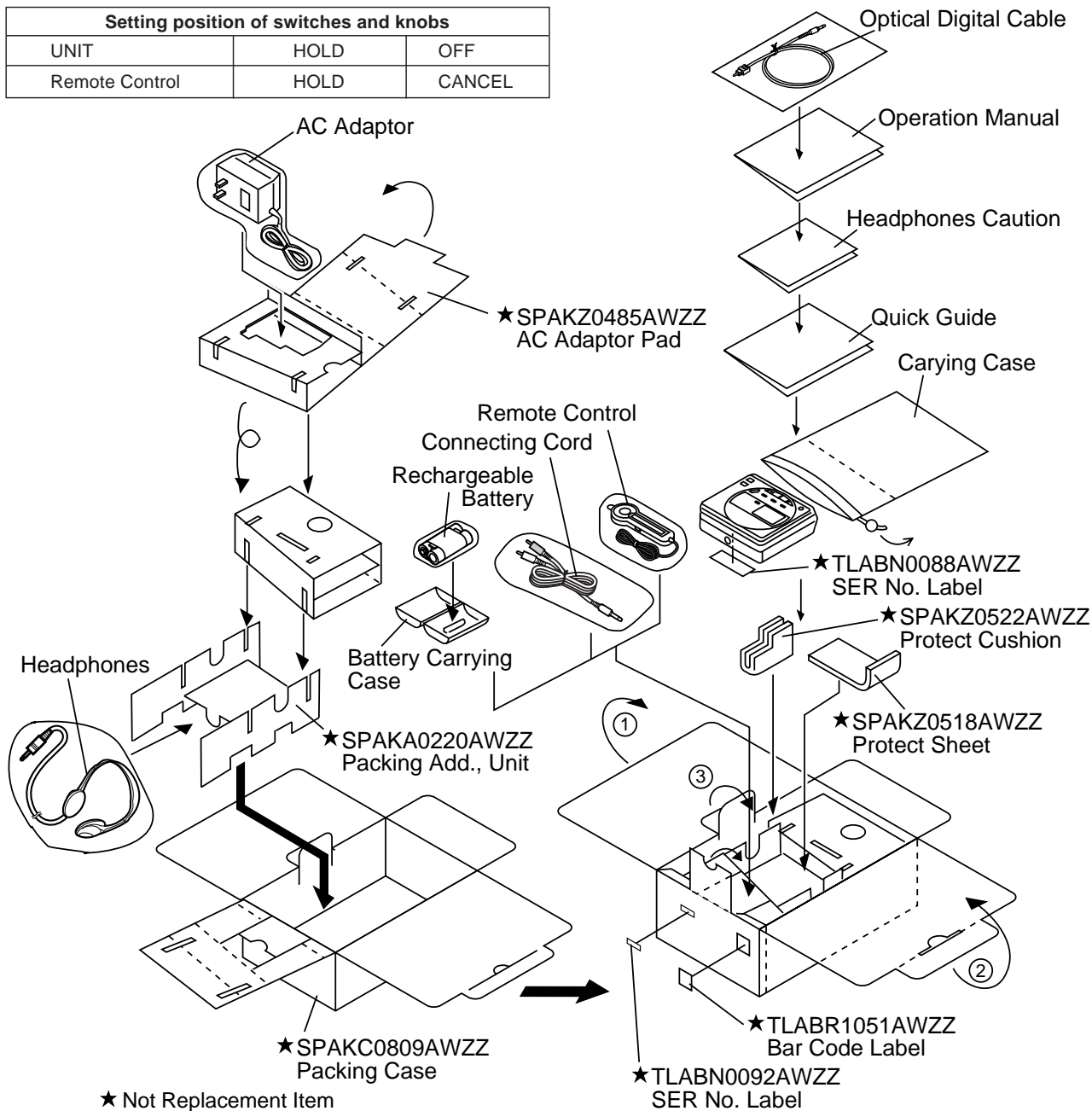


Figure 6 CABINET EXPLODED VIEW



PACKING OF THE SET (MD-MT20 ONLY)

Setting position of switches and knobs		
UNIT	HOLD	OFF
Remote Control	HOLD	CANCEL



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SHARP CORPORATION  
 Communication Systems Group  
 Quality & Reliability Control Center  
 Higashihiroshima, Hiroshima 739-0192, Japan  
 Printed in Japan

A9907-3034NS•HA•M

SA • SC • SL • SZ • EX • LAG